CRANFIELD UNIVERSITY

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AN INVESTIGATION INTO ILLEGAL DISCHARGE OF SEWAGE FROM BOATS IN THE BROADS

SCHOOL OF APPLIED SCIENCES

MSc THESIS

CRANFIELD UNIVERSITY

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Academic Year 2007-2008

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SEPTEMBER 2008

This thesis is submitted in partial fulfilment of the requirements for the Degree of Master of Science.

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ABSTRACT

In response to concerns expressed by the Environment Agency and Broads Authority, this project aimed to assess the risk of illegal sewage discharge from boats into the waterways of the Broads, East Anglia. The Broads are an internationally important wetland, consisting of marshes, fenland, rivers and shallow lakes. A popular area for boating, sewage discharge from boats could have deleterious impacts on the environment, health and public perception.

Water was tested for evidence of faecal pollution at a mooring site at Thorpe Island, River Yare, identified as at risk from illegal sewage disposal from boats. Continuous monitoring of ammonia, ammonium and dissolved oxygen up and downstream of the moorings took place at half hourly intervals over six weeks. Thermotolerant coliforms, ammonia, phosphorous and dissolved oxygen were manually sampled at Thorpe Island and nearby Whitlingham sewage treatment works. Definitive evidence of pollution from boats was not found, either sewage was not illegally discharged during the study period, or methods were inadequate to identify the occurrence of faecal pollution with certainty.

The distribution of sewage disposal facilities available for boats was also analysed. The navigable waterways of the Broads were categorised in terms of the risk of illegal sewage disposal due to distance from disposal facilities. The south eastern reaches of the River Bure and western reaches of the River Waveney were identified as being at most risk.

Recommendations are made to identify areas of the Broads at risk from pollution due to factors other than distance from sewage disposal facilities. Any further water quality studies should be carried out in these areas and improvements to the methods are suggested. Future management should include raising awareness of boaters about issues surrounding sewage disposal and the consideration of the provision of either mobile or static sewage disposal facilities in areas where current provision is deemed inadequate.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Dr Ian Holman for his help and guidance. Thanks to the Environment Agency for funding this project. I would also like to thank Dr Sean Tyrrel, Patricia Bellamy and Ian Truckell for their technical advice. Thanks also to Lisa Turner, Jennifer Johnson, Ruth Sanderson and Patience Davenport of the Environment Agency and to Steve Birtles and Oliver Ishmael of the Broads Authority for there assistance and provision of data. I would also like to thank Cranfield soil laboratory staff for all their time. I am very grateful to Paul Linstead a Broads Authority volunteer who cheerfully and skilfully crewed the boat ensuring that data gathering was always enjoyable. Finally many thanks to my friends and family for their encouragement.

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LIST OF ACRONYMS

BOD: Biochemical Oxygen Demand

CFU: Coliform Forming Units

DO: Dissolved Oxygen

GQA: General Quality Assessment

MPN: Most Probably Number

RC: Rushcutters

SAC: Special Area of Conservation

SPA: Special Protection Area

SSSI: Sites of Special Scientific Interest

STW: Sewage Treatment Works

TH: Townhouse

TON: Total oxidised nitrogen

WFD: Water Framework Directive

1 INTRODUCTION

1.1 THE BROADS

The Broads in East Anglia is a wetland area, of about 300km^2 consisting of rivers, shallow lakes, marshes and fenland (Green and Conti, 2004; Broads Authority, 2008a). Figure 1.1.1 shows the 3,173km^2 catchment that largely lies within Norfolk, with a small area in Suffolk (Green and Conti, 2004). The shallow lakes, known as broads, are believed to have formed as a result of flooding, in the 14th Century, of pits dug for peat (Moss, 1977; Green and Conti, 2004). Most of the broads are connected to the main river systems (figure 1.1.2) of the Rivers Waveney, Yare, Wensum and Bure (The Norfolk Society, 1998).

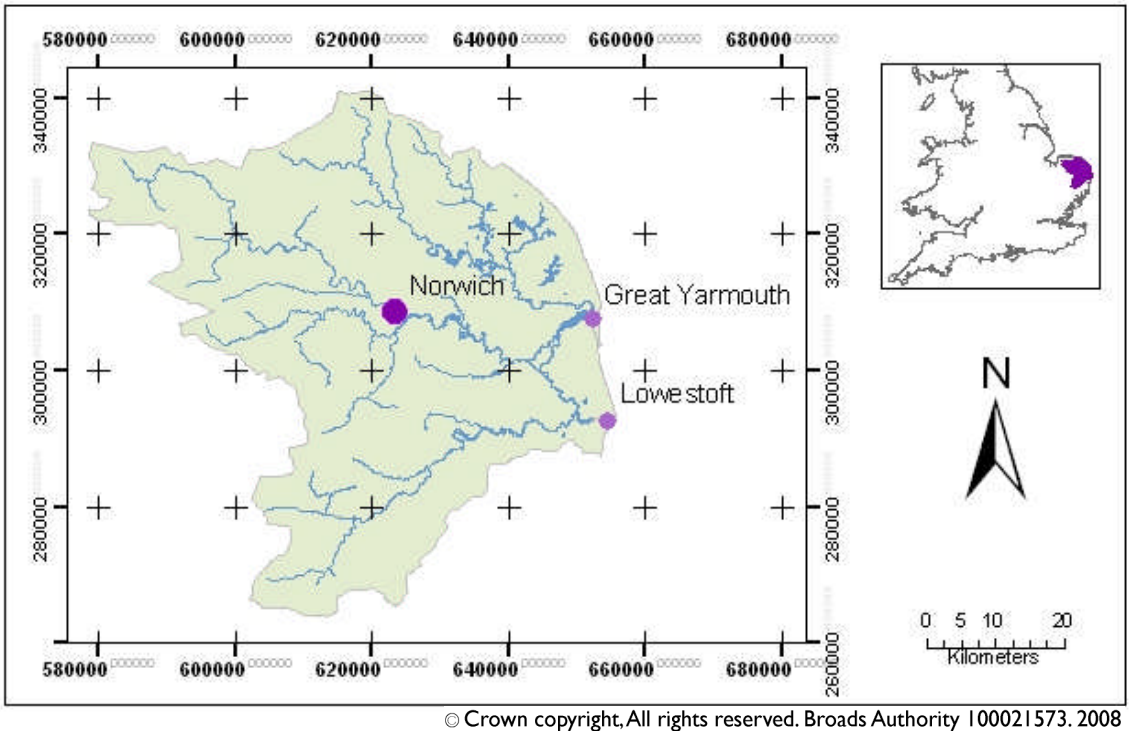

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Figure 1.1.1 Map of the Broads, Rivers and Catchment

1.1.1 Ecological importance of the Broads

The Broads is an internationally important wetland (Sterry, 1995; The Norfolk Society, 1998), providing habitat for rare species including the water soldier, fen

orchid and bittern (The Norfolk Society, 1998; Defra, 2007). An important habitat for birds, the area is listed under the Ramsar convention (Defra, 2007; JNCC, 2008a) and parts are designated as a Special Area of Conservation (SACs), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI) and National Nature reserves (Broads Authority, 2008b; JNCC, 2008b; JNCC, 2008c; JNCC, 2008d; JNCC, 2008e).

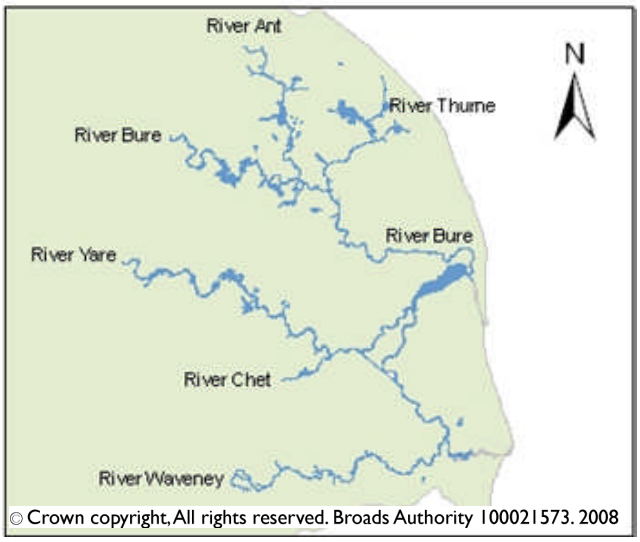

Figure 1.1.2. Public and navigable waterways of the Broads.

1.1.2 Water quality in the Broads

Until the middle of the 20th century the waterways were dominated by submerged plants with clear water. However a rise in nutrients within the water bodies caused a rapid and dramatic change in the waterways; aquatic macrophytes almost disappeared and the water became highly turbid and dominated by phytoplankton (Moss,1977; Garrad and Hey, 1987; George, 1992; Moss, 2001).

The increase in nutrients believed to be responsible for this change has been attributed to factors including sewage discharge, diffuse pollution from farmland and the use of phosphorous in detergents. Due to changes, such as nutrient stripping in sewage treatment works, water quality in the Broads has since improved (Green and Conti, 2004). However the Environment Agency's GQA

assessments (table 1.1.1), show variable water quality in the major rivers with often high nitrate and phosphate levels (Environment Agency, 2008a), suggesting that nutrients are still a major water quality problem.

Table 1.1.1 The poorest GQA water quality category for the major Broadland Rivers, adapted from Environment Agency (2008a) data.

Parameter	**River Bure**	**River Waveney**	**River Wensum**	**River Yare**
Biological quality	Very good (A)	Fair (D)	Very good (A)	Good (B)
Chemical quality	Fair (D)	Poor (E)	Fairly good (C)	Fair (D)
Phosphate level	Low (2)	High (4)	Moderate (3)	Very high (5)
Nitrate level	High (5)	High (5)	High (5)	High (5)

Water quality within the Broads must also be assessed in term of the EU Water Framework Directive (WFD). The directive, introduced in 2000, legally obliges EU member states to prevent deterioration and work towards achieving 'good status' in all surface and ground waters and associated terrestrial and wetland environments (Chave, 2001; Green and Conti, 2004; Masson, 2007). Good status is achieved in terms of chemical, ecological and physical quality with the specific requirements of good status depending upon the characteristics of an individual water body (Chave, 2001; Harrison, 2001).

The major river systems in the Broads are at risk of failing to meet the WFD (table 1.1.2). A number of Broads are also listed as at risk of failing to meet the WFD, including Hickling Broad due to diffuse pollution and Barton Broad, at risk from both diffuse and point source pollution (Environment Agency, 2008b)

As shown by the GQA and WFD assessments the waterways of the Broads are of variable quality and particularly affected by the continuing high levels of nutrients. This is likely to limit ecological quality and combined with possible

failure of the WFD provides a strong incentive to prevent deterioration and work towards improvement of water quality.

Table 1.1.2 The highest listed risk level (At risk, Probably at risk, Probably not at risk, Not at risk) of failing to achieve the WFD targets under a number of categories for the major rivers in the Broads. Adapted from Environment Agency (2008b) data.

Risk	**River Bure**	**River Waveney**	**River Wensum**	**River Yare**
Point source pollution	At risk	At risk	At risk	At risk
Diffuse source pollution	At risk	At risk	At risk	At risk
Water abstraction and flow regulation	Probably not at risk	Probably not at risk	Probably at risk	Probably at risk
Physical alteration	At risk	At risk	At risk	At risk
Alien species	Probably at risk	Probably at risk	Probably at risk	Probably at risk

The Broads environment is effected by a number of external influences which require management to ensure that the WFD is met. Among these is the influence of boats which have previously been inconclusively implicated as a cause of high turbidity, through bank erosion (Moss, 2001; Green and Conti, 2004) but which may also have other impacts on the environment.

1.2 BOATING ON THE BROADS

With over two million people visiting the Broads each year (Broads Authority, 2008a), tourism is important to the local economy generating an estimated £146.6 million in 1998 (Green and Conti, 2004). Boating is an important part of this, as there are about 200km of navigable water (figure 1.1.2) and between 12700 and 13200 licensed boats in the region (Green and Conti, 2004; Broads Authority, 2008c). There are also a number of permanent residents on the waterways, both on static structures known as house boats and typical boats known as residential boats.

1.2.1 Discharge from boats

Boats used on inland waterways normally have one of two types of toilet. Either a chemical toilet which should be emptied into the main sewage system because of the chemicals it contains, or a toilet which stores sewage in a holding tank and should be discharged at a pumpout station (The Green Blue, 2008a). Improper disposal of sewage from boats directly into the waterways may contribute to environmental degradation, deterioration of water quality, reduced aesthetic appeal and have negative health implications for recreational users. Prevention of such pollution would thus be included under the WFD. In addition to the requirements of the WFD, a number of other legislative measures specifically restrict sewage pollution from boats.

As a result of a 1960s bylaw, it is illegal for sewage to be discharged into the waterways of the Broads from a mechanically propelled boat (Environment Agency, 2007). However not all vessels using the waterways have to comply. A boat which “ordinarily voyages seaward past the port of Great Yarmouth” is exempt from the legislation (Environment Agency, 2007) and thus although asked not to discharge sewage into the waterways is not legally obliged obey.

The Boat Safety Scheme sets out standard requirements for boats with the aim of reducing risks such as fire and pollution (Broads Authority, 2008d). The Broads Authority introduced the standards in April 2007 and by April 2009 all hire boats will be required to meet the standards (Broads Authority, 2008d). One of the requirements of the scheme is that boat toilets and pumping systems must be designed and maintained to minimise the risk of pollution, and that a valve must be fitted into the overboard discharge line of toilets and holding tanks (BSS, 2005; Environment Agency, 2007), to ensure sewage is not discharged into the water.

Through a combination of the WFD, the 1960s bylaw and the Boat Safety Scheme sewage discharge from boats should thus be guarded against.

1.3 AIMS AND OBJECTIVES

Despite the legislation guarding against it, the Environment Agency and Broads Authority are aware of anecdotal evidence suggesting that sewage is being illegally discharged from boats on the Broads. There is also concern about the adequacy of sanitary facilities, particularly in light of the closure of a number of public toilets within the area, as the need for improved facilities including toilets and rubbish disposal was expressed by boat owners in a 2005 survey (Broads Authority, 2008e). These factors could have negative effects on public perception, health and the environment. Therefore this thesis aims to assess the risk of the illegal discharge of sewage from boats into the waterways of the Broads adversely impacting water quality.

This will be achieved through the following Objectives:

1. Review the literature surrounding evidence and impacts of pollution from boats on inland waterways.
2. Investigate water quality at a high risk boat mooring site and sewage treatment works on the River Yare using discrete manual sampling.
3. Investigate water quality at an identified high risk boat mooring on the River Yare using continuous automated sampling.
4. Map areas at risk of illegal sewage discharge from boats (due to lack of disposal facilities).
5. Make recommendations, based on findings, of action to be taken to reduce risk of pollution from boats.

2 LITERATURE REVIEW

This chapter will review the literature relevant to this study, covering firstly the potential environmental and health impacts of illegal sewage discharge in the Broads. The primary means used to identify faecal pollution will be outlined and literature about the relationship between boating and faecal pollution will be reviewed before finally looking specifically at boating and pollution on the Broads.

2.1 IMPACTS OF SEWAGE DISCHARGE

Discharge of untreated sewage is widely acknowledged to have deleterious impacts on health and the environment (Moss, 1977; Fewtrell *et al*. 1992; Chapman, 1996; Mallin *et al.* 1999; Sobsey *et al.* 2003; Green and Conti, 2004; Rechenburg *et al*. 2006; Garrido-Pérez *et al*. 2008; Kazi *et al*. 2008). As the waterways of the Broads are important for both tourism and conservation sewage discharge from boats could significantly affect the area.

2.1.1 Environment

The Broads is one of the most important wetland sites in the UK and lowland Europe (Sterry, 1995; The Norfolk Society, 1998). The area is recognised internationally (Defra, 2007; JNCC, 2008a) and under European legislation with about 24% of the Broads designated as SACs and SPAs (figure 2.1.1) (Green and Conti, 2004; JNCC, 2008b., JNCC, 2008c., JNCC, 2008d. and JNCC, 2008e). The Broads also has about 30 SSSIs (Defra, 2007; Broads Authority, 2008b) one third of which are National Nature Reserves (Green and Conti, 2004) (figure 2.1.2). Given the importance of the Broads as a wetland it is vital that it is protected, however as outlined below, the waterways have suffered severe degradation.

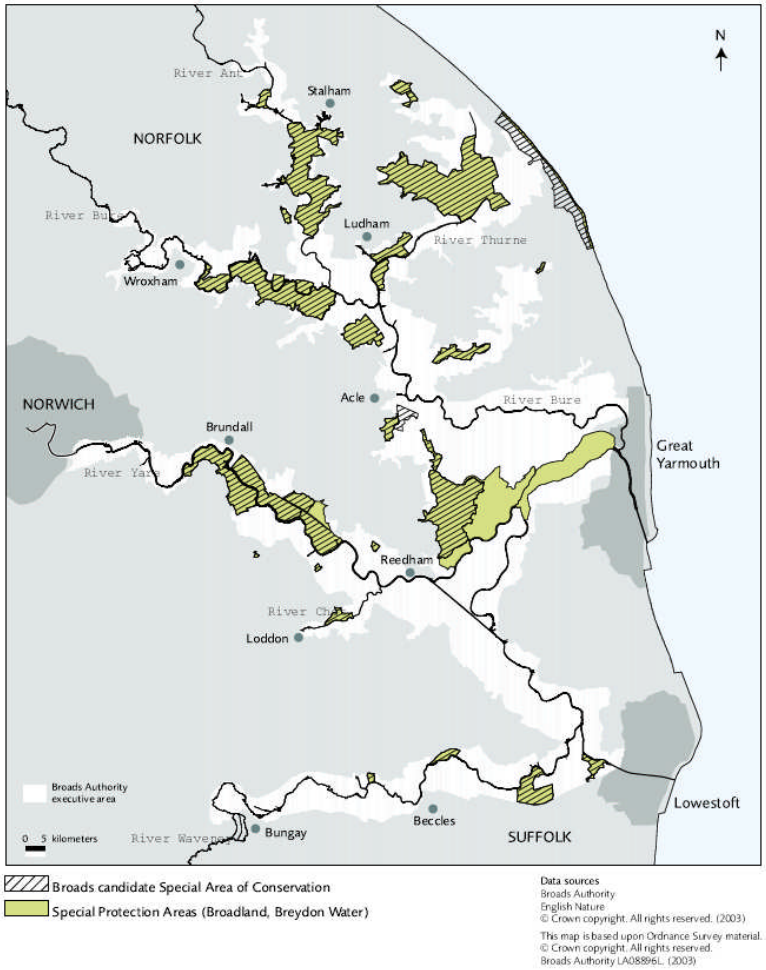

Figure 2.1.1 Location of SACs and SPAs from Green and Conti (2004).

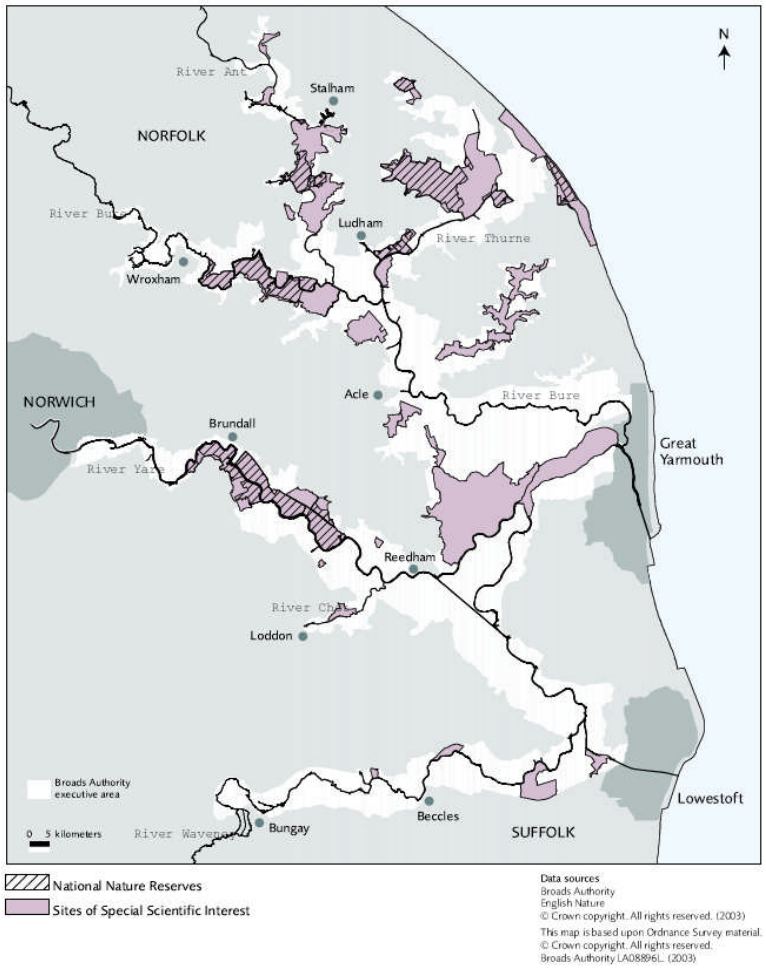

Figure 2.1.2 Location of National Nature Reserves and SSSIs from Green and Conti (2004).

Under pristine conditions the rivers and broads were nutrient poor environments with clear water. Phytoplankton was limited and aquatic vegetation present was that which would survive with limited nutrients, such as stoneworts (George, 1992; Moss, 2001). A gradual rise in nutrients entering the waterways appears to have occurred in the 19th century (Moss, 2001), leading to increased growth and colonization by plants which require higher nutrient levels, such as the water soldier (*Stratiotes aloides*) and yellow water lily (*Nuphar lutea)* (George, 1992), and increased presence of filamentous algae (Moss, 2001).

At the beginning of the 20th century the waterways were clear and dominated by submerged macrophytes (Garrad and Hey, 1987). However there was a rapid decline in quality in the middle of the century. During the 1950s or 60s the waterways became highly turbid and dominated by phytoplankton, and macrophyte abundance declined dramatically (Moss, 1977; Garrad and Hey, 1987; George, 1992; Moss, 2001). As a result ecological diversity was greatly reduced, bird and fish populations decreased, bank erosion became more common, the rate of sedimentation increased and the aesthetic appeal of the waterways declined (George, 1992; Moss, 2001).

This change in ecological condition has been attributed to sewage discharge, farm runoff, sediment disturbance and plant damage by boats and the use of detergents containing phosphorous (Moss, 2001; Green and Conti, 2004), although there is general agreement that increased nutrients entering the waterways are primarily responsible. High nutrient levels are believed to have encouraged phytoplankton growth. This increased turbidity so reducing light penetration, as a result the ability of submerged macrophytes to photosynthesise was limited which resulted in their loss (Garrad and Hey, 1987; Moss, 1977)

Sewage contains high levels of nutrients, so disposal directly from boats into the Broads could contribute to the suppressed water quality of the waterways.

2.1.2 Health

The Broads are used for a number of recreational activities which may involve some body contact with water, such as canoeing, fishing and sailing (Norfolk Broads.com, 2008). Bodily exposure to sewage contaminated water can have significant health impacts. In 2001 and 2002 the United States Centre for Disease Control (USCDC) estimated that contact with contaminated water had resulted in 2,500 people with illness, 61 hospital admissions and 8 deaths (Standish-Lee and Loboschefsky, 2006). Recreational contact with polluted water is most commonly associated with gastrointestinal disease (Zmirou, 2003) however respiratory illness, ear, eye, throat and skin infections have also been reported (Philipp, 1991; Zmirou, 2003).

A number of studies have reported an increased incidence of gastrointestinal illness among swimmers exposed to water showing evidence of contamination by sewage effluent (Philipp, 1991; Medema *et al*. 1997; Zmirou, 2003; Wade *et al*. 2008). Wade *et al* (2008) studied illness among bathers in waters of the Great Lakes, USA which receive treated sewage effluent. The study found that swimmers had a greater likelihood of developing disease than those who had not had body contact with the water.

Disease incidence has been correlated with concentrations of faecal indicators. The results of analysis of 18 studies by Zmirou (2003) confirmed the results of a previous study by Prüss (1998) that gastrointestinal disease could be causally linked with water quality in the form of faecal indicator organisms.

Participants in water related recreation other than swimming may also be at risk from illness; however evidence for this is not conclusive. In 1979 the World Health Organisation (WHO) acknowledged that uses of recreational water such as wading and boating may result in ill health (Philipp, 1991). Fewtrell *et al* (1992) found evidence that canoeing in contaminated water resulted in

increased risk of gastrointestinal illness. Comparing a site with non contaminated water with one receiving effluent from sewage treatment works and showing significantly higher levels of faecal coliforms, the study found increased occurrence of illness among canoeists at the site with greater microbiological contamination (Fewtrell *et al*. 1992). However studies in Bristol City Docks found little risk from body contact associated with activities such as canoeing and sailing (Philipp, 1991).

It is therefore possible that recreational users of waterways in the Broads could be exposed to pathogens and ill health as a result of faecal contamination from illegal sewage disposal from boats.

2.2 IDENTIFYING FAECAL CONTAMINATION

2.2.1 Indicator organisms

It is difficult to test for specific faecal pathogens because of the wide range that exist, their intermittent presence and the often impractical and expensive methods required (Hutton, 1983; Bartram and Ballance, 1996; Gleeson and Gray, 1997). In addition if the focus of the study is to assess faecal contamination rather than health risk, testing pathogens is unnecessary. It is therefore common practice to use indicator organisms to assess the occurrence of faecal pollution, as suggested by the World Health Organisation, European Union and United States Environmental Protection Agency (Gleeson and Gray, 1997). Faecal indicators are useful to assess both whether sewage contamination has occurred and if there is a subsequent health risk.

Ideal faecal indicator organisms should be common, but only present, in the human intestine; should not cause disease; and should reflect the survival of pathogenic organisms. In addition methods to identify them should be simple and inexpensive (Gleeson and Gray, 1997). There are three main groups of organisms which meet many of these criteria; Coliforms; Faecal streptococci

and Clostridia (Hutton, 1983; Gleeson and Gray, 1997). Of these, coliforms have been favoured as an indicator because of the ease of identification (Hutton, 1983; Park *et al.* 2006).

2.2.1.1 Coliform bacteria

Coliform bacteria (known as total coliforms) consist of a number genera of the family *Enterobacteriaceae*. They are identified by the ability to ferment lactose at 35 to 37°C to produce acid and gas (Hutton, 1983; Chapman, 1996; Gleeson and Gray, 1997). Abundant in faeces, they are also present in unpolluted soil and vegetation (Hutton, 1983; Bartram and Ballance, 1996; Gleeson and Gray, 1997; Alley, 2007), so positive test results for total coliforms do not necessarily confirm faecal contamination. Further there is a risk of non-faecal bacteria also growing during analysis for total coliforms, resulting in inaccurate results (Gleeson and Gray, 1997; Park *et al*. 2006).

Testing at higher temperatures to identify a subgroup of coliforms known as faecal or thermotolerant coliforms can resolve these problems. Thermotolerant coliforms include species of *Escherichia, Enterobacter, Citrobactera* and *Klebsiella* which can ferment lactose at 44 - 44.5°C (Hutton, 1983; Bartram and Ballance, 1996; Gleeson and Gray, 1997). Incubation at this temperature involved in methods to identify this group inhibits growth of other bacteria, a problem associated with the use of total coliforms (Gleeson and Gray, 1997; Park *et al*. 2006).

Escherichia coli is the only thermotolerant coliform found solely in faeces (Hutton, 1983; Gleeson and Gray, 1997). As other species may originate from non faecal sources, tests for thermotolerant coliform bacteria are not definitive. *E. coli* is however generally agreed to be the predominant species found in temperate regions when testing for thermotolerant coliforms and may make up 95% of thermotolerant coliforms (Hutton, 1983; Bartram and Ballance, 1996.,

Gleeson and Gray, 1997). A study by Park *et al* (2006) comparing the use of total coliforms and faecal coliforms to monitor faecal pollution in temperate waters found that *E.coli* made up on 5.1% of the colonies of total coliforms, but 89% of colonies of faecal coliforms.

The highly variable survival of coliform bacteria within water can be problematic (Chapman, 1996) because concentrations may not reflect the actual extent of contamination. *E.coli* may survive for less than 24 hours within the water column (Gleeson and Gray, 1997), however bacteria may survive for much longer periods within sediment. Coliform survival in the aquatic environment is affected by numerous factors. Increased turbidity and nutrient availability may increase survival time (Gleeson and Gray, 1997; Garrido-Pérez *et al.* 2008), whilst studies have found that predation, increased temperature, salinity and UV light reduce survival time (Mallin *et al.* 1999; Kay *et al*. 2007). In addition coliforms have been found to multiply in warm or nutrient rich water (Bartram and Ballance, 1996; Gleeson and Gray, 1997; Park *et al*. 2006).

A further limitation with the use of thermotolerant coliforms is that they are also present in faeces of animals other than humans (Hutton, 1983; Gleeson and Gray, 1997; Shah *et al* 2007; Tyagi *et al* 2007). The ability to differentiate between sources of faecal pollution is thus limited.

The value of total coliforms as faecal indicators is limited because of the risk of erroneous result suggesting faecal contamination when none has occurred and the variable survival of coliform bacteria. However thermotolerant coliforms meet most of the criteria for ideal indicator organisms and provide a good indication of faecal contamination.

2.2.1.2 Faecal streptococci

Faecal streptococci belong to the *Enterococcus* and *Streptococcus* genera (Ashbolt *et al*. 2001. and Gleeson and Gray, 1997). They are present in the faeces of warm blooded animals (including humans) so can be used as an indicator of faecal pollution (Csuros and Csuros, 1999; Ashbolt *et al*. 2001). *Enterococci* are the preferred indicator because they are predominantly faecal in origin (Payment *et al*. 2003). Faecal streptococci are, however, a very diverse group and some species (including *Enterococcus sp*) can be found in the unpolluted environment (Gleeson and Gray, 1997; Ashbolt *et al*. 2001).

Faecal streptococci have a number of advantages over coliforms in that they are more resistant to stress, including drying, so are more persistent in the environment. Further, they very rarely multiply in the aquatic environment (Bartram and Ballance, 1996; Gleeson and Gray, 1997; Csuros and Csuros, 1999; Ashbolt *et al*. 2001; Payment *et al*. 2003). Identification of Faecal streptococci, is however a more lengthy process than that for coliform bacteria (Hutton, 1983; Gleeson and Gray, 1997) and as they are less abundant in human faeces than coliform bacteria, the tests are less sensitive (Gleeson and Gray, 1997).

2.2.1.3 Sulphite reducing clostridia

Sulphite reducing clostridia are anaerobic spore forming bacteria (Chapman, 1996; Ashbolt *et al* 2001; Mason, 2002; Payment *et al* 2003; Garrido-Pérez *et al*. 2008). They occur naturally within the environment, but only *Clostridium perfringens* is exclusively found in the faeces of animals and humans (Gleeson and Gray, 1997; Ashbolt *et al* 2001; Payment *et al.* 2003).

The spores of *C.perfringens* are more resistant to environmental stress and can survive for longer than coliform bacteria and faecal streptococci (Chapman, 1996; Gleeson and Gray, 1997; Garrido-Pérez *et al*. 2008). As such they can be

useful to assess pollution over a longer time scale than possible with coliform bacteria (Garrido-Pérez *et al*. 2008). This long survival time can however lead to false positive results as they can be detected at a spatial and temporal distance from a pollution event (Payment *et al*. 2003).

Another disadvantage of using *C. perfringens* is that it is much less abundant in faeces than coliform bacteria and is only present in 13 – 35 % of human faeces (Ashbolt *et al* 2001; Payment *et al*. 2003.), so may not be as sensitive a test. Further as anaerobic conditions are required in the analysis (Payment *et al*. 2003) the identification of *C.perfringens* is a more complex process than that for coliform bacteria (Hutton, 1983.).

2.2.2 Methods of identification

Two techniques are commonly used to identify thermotolerant coliforms. The Most Probable Number (MPN) method, provides a statistical estimate of the number of bacteria present by progressively diluting samples until they do not show the presence of bacteria (Hutton, 1983; Bartram and Ballance, 1996., Gleeson and Gray, 1997; Csuros and Csuros, 1999). The membrane filtration method involves the filtration of a known volume of water so that bacteria remain on the filter membrane, this is then incubated in a growth medium and the numbers of bacteria colonies are counted (Gleeson and Gray, 1997; Csuros and Csuros, 1999).

The MPN method has some advantages over membrane filtration; it is useful for turbid water which would block the filter used in membrane filtration; can be used for bacteria that will only grow in solution and may enable damaged bacteria to recover (Hutton, 1983; Bartram and Ballance, 1996; Gleeson and Gray, 1997; Csuros and Csuros, 1999). MPN is, however, only a statistical estimate where as membrane filtration provides a more precise result from direct counts of colony forming units (CFU) of bacteria. Membrane filtration

allows analysis of larger samples which are therefore more representative (Bartram and Ballance, 1996; Gleeson and Gray, 1997; Csuros and Csuros, 1999). In addition membrane filtration takes less time to obtain results and requires less material (Hutton, 1983; Bartram and Ballance, 1996; Csuros and Csuros, 1999).

2.3 BOATING AND FAECAL POLLUTION

A number of studies have suggested that sewage discharge from boats can have a significant impact on water quality and is of concern to the public (Warnken and Byrnes, 2003). Potter (2004) states that over a weekend the faecal coliforms in discharges of untreated sewage from a single boat are equal to that in the treated sewage of 10,000 people, suggesting that discharge from boats may be more damaging than that from other sources because the organic content is highly concentrated. The significance of effluent discharge from boats is however often overlooked as attention is focused on more obvious sources (Sobsey *et al*. 2003).

2.3.1 Boats as sources of pollution

A number of studies which encompass different forms of boating and sites have investigated the impact of boats as sources of faecal pollution.

Following 60 deaths in 2004 resulting from poor water quality in Manchar Lake, Pakistan, Kazi *et al* (2008) used statistical analysis to identify pollution sources. Analysis of 36 parameters at a number of sites across the lake found that the highest Biochemical Oxygen Demand (BOD), which indicates organic pollution, was in the area dominated by a number of live-on boats. The study concluded that in addition to industrial and agricultural effluent, sewage pollution from boats had a significant negative impact on the water quality of the lake.

Guillon-Cottard *et al* (1998) analysed the impact of houseboats in Saint-Gervais Harbour, the gulf of Fos (near Marseilles, France). Analysis of faecal indicators found that concentrations increased during periods of high boat occupancy. They concluded that pollution was caused by sewage discharge from boats fitted with toilets that empty directly into the water.

Sobsey *et al* (2003) assessed the impact of different forms of boating (recreational and working) in two marinas in North Carolina, USA. They found that despite the differences, concentrations of faecal indicators in both marinas increased with boat occupancy. As concentrations of faecal organisms were higher at sites close to the boats they could be identified as the source of the contamination.

Faust (1982) investigated the impact of recreational boats on concentrations of faecal coliforms in the Rhode River, a sub estuary of Chesapeake Bay, USA. Concentrations of faecal coliforms were positively correlated with the number of boats in the estuary and actual concentrations followed the same pattern as was to be expected if boating was responsible, so it was concluded that the increased concentrations of faecal coliforms were a result of the presence of boats.

2.3.2 Significance of boats as sources of pollution

Conclusions as to the significance of pollution from boats vary because it depends largely on the specific features of a site. Where boating is seasonal and occurs for short periods in comparison to other pollutant sources, as in the study by Faust (1982), the impact from boats is likely to have a comparatively small impact. However if boating is continuous and in high density it is likely to have a significant impact, as in the study by Guillon-Cottard *et al* (1998) which estimated 80 people per hectare living on boats

2.3.3 Boating, facilities & sewage pollution

Studies have linked the incidence of faecal pollution from boats to the availability of facilities such as pump out stations. Guillon-Cottard *et al* (1998) concluded that the problem of faecal pollution from boats is exacerbated by inadequate sanitary facilities, the provision of adequate facilities is therefore important in reducing such pollution (Brown, 2001).

Rather than sampling water quality in relation to the availability of sanitary facilities Baasel-Tillis and Tucker-Carver (1998) analysed the attitude of members of a US national boaters' association to sewage and waste. It was found that disposal of waste overboard was less likely when adequate facilities were available. People were more likely to dispose of organic waste, such as sewage, overboard than non-biodegradable waste, as the former was perceived as less environmentally damaging. Baasel-Tillis and Tucker-Carver (1998) concluded that to improve waste disposal practice both awareness and access to facilities had to increase.

To summarise little attention appears to have been paid to the impact of boats on faecal contamination. The value of the few studies reported may be further limited by sampling in sites subject to numerous other sources of pollution (Warnken and Byrnes, 2003). Despite these difficulties available evidence suggests that boats can be an important source of faecal pollution, particularly where access to sanitary facilities are limited.

2.4 IMPACT OF BOATING ON THE BROADS

The water quality and conservation problems in the Broads are commonly attributed to increased pollutants, particularly nutrients, and high turbidity (Green and Conti, 2004; Broads Authority, 2008f). Boating is often listed along side sewage effluent and agricultural runoff as one of the causes of such pollution (Green and Conti, 2004; Broads Authority, 2008f), however there does

not appear to be evidence in the literature linking sewage discharge from boats with increased nutrient levels and deterioration of water quality in the Broads.

Moss (2001) and George (1992) argue that in comparison to the other nutrient sources in the catchment discharge from boats is minimal. Moss (2001) compared the relative population sizes of permanent residence in the catchment with those on boats revealing that boating would account for less than 1% of the sewage discharge in the catchment. Further since the introduction of a bylaw which restricts sewage discharge from boats directly into water the problem has reduced (George, 1992). However discharge of 'grey water' used for washing is still legal (George,1992) and because it contains nutrients (The Green Blue, 2008a) it could play some part in increasing nutrient levels in the Broads.

Boating on the Broads has been implicated as a cause of increased turbidity, and subsequent loss of macrophytes, through disturbance of sediment and river bank erosion (Moss, 1977; Garrad and Hey, 1987). However evidence of this is inconclusive. Moss (1977; 2001) found only a weak non causal correlation between boat activity and turbidity in the Broads and concluded that algal growth and natural processes such as freshwater discharge and tidal disturbance are a more likely cause of turbidity. Garrad and Hey (1987) disputed Moss' (1977) conclusions finding, by studying individual boats and monitoring daily variation, that increased turbidity could be correlated with boat traffic. If the action of motorboats in the Broads causes the re-suspension of sediment, this will increase turbidity and may release phosphorous when anoxic sediment comes into contact with water (George, 1992). In addition it may lengthen the survival time of faecal coliforms (Faust, 1982).

A number of studies have demonstrated the faecal indicator organisms, including coliforms, can be stored within sediment (Faust, 1982; Mallin *et al* .1999; Muirhead *et al*. 2004; Wilkinson *et al.* 2006; Garrido-Pérez *et al.* 2008;

Kay, 2008). Garrido-Pérez *et al* (2008) suggests that survival of bacteria within sediment is greater than in open water because sediment provides an environment with higher levels of nutrients and protection from UV radiation (which can kill coliforms) and predation.

A number of processes have been shown to increase indicator organism concentration by disturbing sediment which both reintroduces coliforms into the water column and increases turbidity lengthening coliform survival time (Faust, 1982). Muirhead *et al*. (2004) found that sediment disturbance from artificial flood events caused *E.coli* to re-enter the water column. Kay (2008a) also found that high flow events caused an increase in concentrations of indicator organisms suggesting that this was a result of sediment dispersal, increased surface runoff resulting in increased numbers entering the watercourse and greater survival because of higher turbidity and deeper water. Wilkinson *et al.* (2006) differentiated mechanisms which disturbed sediment and increased indicator concentrations. The study found that waves created by high flow, rapid flow changes and erosion of river bed and banks by turbulence created by continuous high flow could cause episodes of high loads of indicator organisms (Wilkinson *et al.* 2006).

Faecal coliform concentrations have also been found to vary with the tide, increasing at low tide (Faust, 1982; Mallin *et al*. 1999). Mallin *et al* (1999) suggest that this is a result of lower salinity at low tide in addition to disturbance of sediment reintroducing faecal coliforms into the water. In studies by both Faust (1982) and Mallin *et al* (1999) the activity of boats in tidal areas has been further implicated in the increased concentrations of faecal coliforms. Mallin *et al* (1999) found that abundance of coliforms increased more at low tide during the summer and suggested that this was a result of the additive effect of tidal disturbance and increased boating activity disturbing sediment.

The passage of boats may therefore result in higher turbidity in waterways of the Broads and increase concentrations of faecal coliforms and phosphorous.

2.5 SUMMARY

Boating on the Broads previously appears to have been implicated in only bank erosion and increased turbidity. However a number of studies elsewhere provide evidence of sewage discharge from boats which can have negative environmental and health impacts. The next Chapter outlines how faecal indicator organisms and other methods were used to investigate sewage discharge from boats on the Broads.

3 METHODOLOGY

This section outlines the methods used for continuous and manual water quality monitoring and the GIS analysis of the distribution of sewage disposal facilities.

3.1 MANUAL SAMPLING

3.1.1 Sample sites

Thorpe Island was suggested by the Environment Agency and Broads Authority as a site where faecal pollution from boats is suspected and thus selected for manual sampling. On the River Yare to the south east of Norwich, there are legal moorings on the northern side and occasional illegal moorings on the southern side of the island.

The second site investigated was the nearby downstream Whitlingham sewage treatment works, selected because it allows a comparison between possible pollution from the treatment works and boats, and thus relative significance of pollution from boats.

3.1.2 Sample collection

Samples were collected on four occasions determined by boat and staff availability (table 3.1.1) just after low tide. Pollutant concentrations may be higher at low tide due to sediment disturbance, however consistently sampling at low tide removed a variable allowing easier comparison. Sampling at low tide was chosen over high tide because the north of Thorpe Island is not accessible at high water. Sampling after low tide meant there was a risk that water quality at Thorpe Island may have been influenced by the discharge from Whitlingham sewage treatment works, however it was carried out after low tide to ensure that the direction of flow did not change during sampling.

Thorpe Island site had 4 sampling points (figure 3.1.1). Site 1 and 4 were chosen to provide an indication of change in water quality up and downstream of the island. Sites 2 and 3 were chosen to allow analysis of the effect of the moored boats on water quality independent of upstream emergency overflows (figure 3.1.2), which could impact water quality during high rainfall events.

Table 3.1.1 Sampling dates at Thorpe Island and Whitlingham Sewage Treatment works and approximate time of low tide at Norwich (Norfolk-Broads.org. 2008).

Date	Day	Time of low tide (BST)
23/06/08	Monday	1048
07/07/08	Monday	1108
21/07/08	Monday	0957
04/08/08	Monday	1006

Samples were taken up and downstream of Whitlingham sewage treatment, (figure 3.1.1) to allow assessment of the impact of the sewage treatment works on water quality.

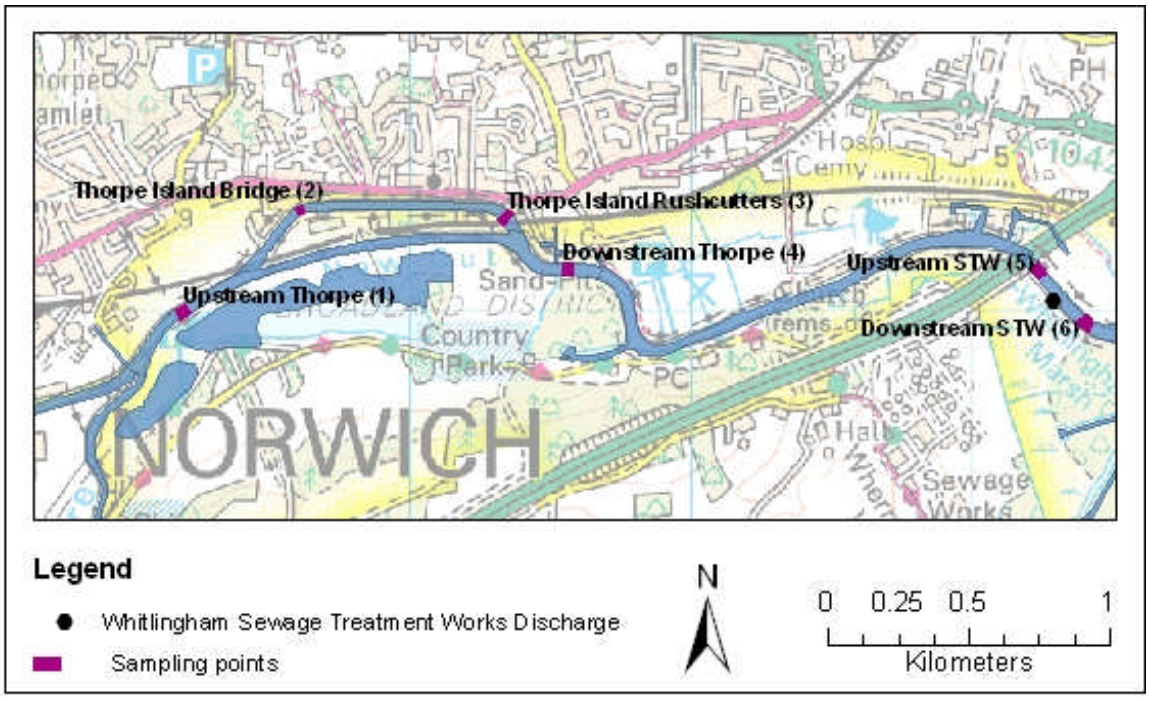

Figure 3.1.1 Location of manual sampling points

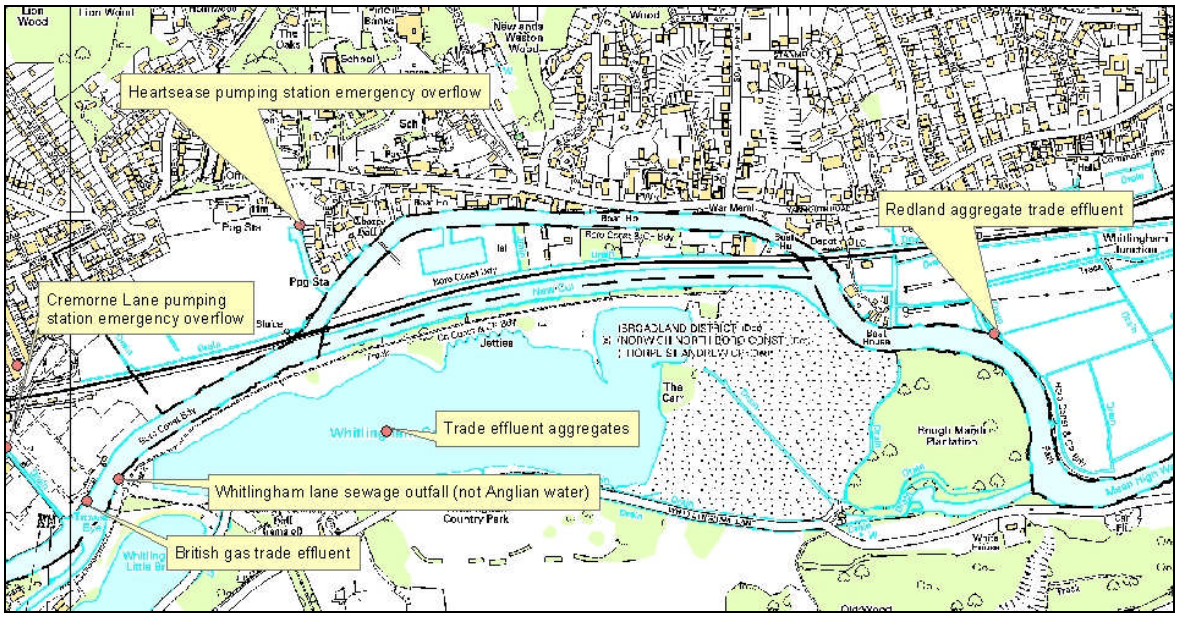

Figure 3.1.2 Discharges at Thorpe Island with Environment Agency consent adapted from Turner (pers. com. 2008a)

Samples were collected from a boat at a depth of 30cm below the surface to avoid water affected by solar radiation which may damage or destroy coliform bacteria (Hutton, 1983; Garrido-Pérez. *et al.* 2008). Sterile glass bottles, positioned into the stream flow (Hutton, 1983; Csuros and Csuros, 1999) were used to collect the samples. They were then stored in a cool box and analysed within 24 hours of collection (Hutton, 1983; Csuros and Csuros, 1999)

Five samples were taken at each site to allow for statistical analysis. It was not possible to take samples at sufficient distance from possible pollutant sources to ensure complete mixing. Therefore the five samples at each site were taken along a transect across the river to reduce possible bias. Samples were not taken in unrepresentative areas, such as areas of stagnant water.

River discharge could not be measured due to the tidal nature of the river and lack of equipment (principally boat availability).

3.1.3 Sample analysis

3.1.3.1 Laboratory analysis

Collected samples were analysed in the laboratory for thermotolerant coliforms using membrane filtration, following the method set out in the Oxfam Delagua Users Manual (2004), and ammonia N, total nitrogen and orthophosphate, using a Burkard SFA 2000 auto-analyser (see Appendix A for the Standard Operating Procedures). These parameters were selected for analysis because they provide an indication of organic and faecal pollution (Bartram and Ballance, 1996).

Sampling of thermotolerant coliforms provided an indication of faecal pollution. Total coliforms were not suitable because species within this group can also exist in other sources, such as non polluted soils (Hutton, 1983; Bartram and Ballance, 1996; Gleeson and Gray, 1997; Alley, 2007). Although not all thermotolerant coliforms are faecal in origin, faecal *E.coli* predominates. This level of resolution is deemed adequate for this study as higher levels of thermotolerant coliforms tidally downstream of a suspected source would indicate it was the likely cause of contamination. The risk remains, however that thermotolerant coliforms present could be due to other animal sources (Hutton, 1983; Tyagi *et al*. 2007). Coliforms were chosen over other organisms such as faecal streptococci and *Clostridium* sp. because of ease of analyses. Membrane filtration was chosen over the Most Probable Number method because water sampled was not highly turbid and the method provides a greater level of accuracy. Section 2.2 discussed faecal indicators further.

Ammonia occurs naturally within water (Chapman, 1996; Alley, 2007) however it is present in faeces, so high levels can signify organic pollution (Chapman, 1996)

It is estimated that 90 % of phosphorous in East Anglian rivers results from sewage effluent (Mason, 2001) both in faeces and detergents (Chapman, 1996; Tebbutt, 1998) so measurement of orthophosphate provides an indication of organic pollution.

3.1.3.2 In situ analysis

Temperature, pH and dissolved oxygen (DO) were measured in situ at a depth of 30cm at each sampling point using an HI-769828 Multi-parameter meter produced by Hanna Instruments. DO was measured because it can indicate the level or organic material in the water. Low DO may occur when microorganisms decompose organic matter, depleting oxygen in the process (Chapman, 1996; Tebbutt, 1998; Csuros and Csuros, 1999)

Temperature was measured because it influences numerous other processes and thus concentrations of other parameters, for example biological activity tends to increase with increased temperature resulting in reduced dissolved oxygen (Chapman, 1996; Alley, 2007). Measurement of pH was also carried out because it affects other processes within the river (Chapman, 1996)

3.2 CONTINUOUS SAMPLING

YSI Sondes, model 6920, were also installed and used at Thorpe Island to continuously record temperature, pH, specific conductivity, ammonia (NH3 N), ammonium (NH4+ N) and dissolved oxygen at half hourly intervals between 15:00 16/05/2008 and 14:30 15/06/2008. They were placed up and downstream of the boat moorings (figure 3.2.1) at the maximum possible distance from the moorings, to allow maximum mixing of the water, but in a position where emergency overflows would not discharge between them (figure 3.1.2). The precise location was limited by site access and risk of vandalism. The sondes are serviced annually and during this study period were calibrated every two weeks (Sanderson pers. com. 2008).

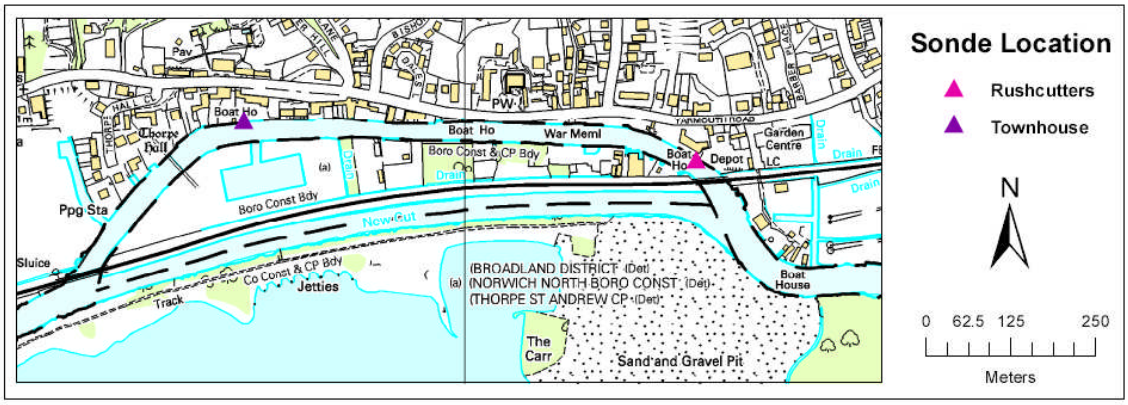

Figure 3.2.1 Location of YSI Sondes used to record temperature, pH, specific conductivity, ammonia, ammonium and dissolved oxygen between 15:00 16/05/2008 and 14:30 15/06/2008.

3.3 DISCHARGE DATA

As already discussed discharge data could not be collected during sampling, however estimated flow data for Thorpe Island, between 01/05/2008 and 31/07/2008, was obtained from the Environment Agency (Davenport pers com 2008a). Appendix B outlines the method used to compile the data set.

3.4 STATISTICAL ANALYSIS

Statistical analysis was carried out using the software package STATISTICA version 8 (StatSoft, Inc. 2008).

3.4.1 Data from manual sampling

The data was analysed using the one way analysis of variance (ANOVA) test. A P plot of the residuals was carried out to identify whether results were normal when differences due to location were taken into account. This was used to identify outliers which were removed. The data points removed are highlighted in Appendix C. The data set was then normally distributed and ANOVA tests were carried out to identify whether there was a significant difference between the means of each parameter at the 5 sites.

3.4.2 Data from continuous sampling

The data from the probes at Townhouse and Rushcutters were combined, removing any measures from both sets if they were not present in the other (for example because the battery had failed). Tidal direction for the River Yare at Norwich was provided by www.Norfolk-Broads.org. (2008), any reading within 5 minutes of the tide change was not allotted a tidal direction.

The data from the probe at Townhouse contained a number of anomalous values because the probes were not initially fully submerged when water levels were low. These were identified manually as very unlikely values in ammonia, ammonium and DO which corresponded with rapid and unusual changes in other variables (temperature, pH and specific conductivity). Where an anomalous reading was identified the data measured at this time was removed from the data set for both sondes. If there was uncertainty as to whether values should be removed they were left in the data set to prevent bias. The erroneous values are highlighted in Appendix D. This data was then tested for normality. It was not possible to transform the data so that it was normal, so further statistical analysis was not carried out. The anomalous data values were included on the line plots produced.

3.5 CALCULATION OF IMPACT OF DILUTION

Estimates of the volume of a single sewage discharge from boats, required to result in an instantaneous observable change in water quality were calculated using the equation:

$$f = \frac{F\,(C - T)}{T - c}$$

f = Volume discharged from boats, assumed to occur in one second (l/s)

c = Concentration of effluent from boats (mg/l or CFU/100ml)

F = Upstream flow (l/s)

C = Upstream concentration (mg/l or CFU/100ml)

T = Downstream concentration (mg/l or CFU/100ml)

The discharge data used was a total for Thorpe Island between 01/05/2008 and 31/07/2008, this was halved to account for the split in the channel at Thorpe Island (F). Minimum, mean and maximum mean daily flows were (l/s) then calculated. The discharge data for Thorpe Island was calculated rather than directly measured, and does not take into account tidal variation so only provides an estimate of flow.

Approximate concentrations of the water quality parameters in sewage (c) were obtained from literature (Kiefer. 2003; Metcalf and Eddy, 2003). It was assumed that any increase in downstream concentrations associated with pollution (T) would be noticed if it was greater than the largest 95% confidence interval for the parameters from the manual sampling. A concentration for ammoniacal nitrogen was chosen manually as one which could be differentiated from ‘noise’ in the graphs from the continuous sampling, because 95% confidence intervals could not be calculated. Upstream concentration (C) was assumed to be zero, because the change in concentration, rather than actual concentration was of interest.

It was assumed that complete mixing of discharge from boats with the River Yare would occur and that any change in downstream stream concentration of pollutants would be instantaneous.

3.6 GIS

A number of maps were produced using Arc GIS version 9.20 (ESRI, 2006) to categorise the river in terms of the availability of sewage disposal systems for

holding tanks and chemical toilets. A list of pumpout stations and emptying points for chemical toilets were compiled from a number of sources (Environment Agency, 2007; Birtles pers. com. 2008; NSBA, 2008). The approximate locations were identified by finding coordinates for the postcodes using www.Streetmap.co.uk (2008).

A shape file with the navigable waterways of the Broads segmented into 1206m intervals, to represent 15 minute intervals when travelling at 3 mph, was manually adapted to classify the river at various time intervals from the disposal facilities. Time intervals were chosen on the basis of results from a survey conducted by British Waterways (2006). The speed of 3 mph used to segment the river was used because it is the slowest speed limit on the Broads (Broads Authority, 2008g) and thus presents a conservative scenario in terms of time to reach a disposal facility.

4 RESULTS

This chapter outlines the results obtained from the two sondes at Thorpe Island, the four manual sampling trips and the GIS analysis of the distribution of sewage disposal facilities available for boats.

4.1 AUTOMATED CONTINUOUS SAMPLING

This section outlines the results obtained from the two sondes, called Townhouse (TH) and Rushcutters (RC), which were placed at Thorpe Island to measure DO, ammonium (N), ammonia (N), temperature, specific conductivity and pH. The sondes were in place for approximately six weeks and were removed every two weeks for calibration and maintenance, so data falls into three periods (table 4.1.1).

Table 4.1.1 Periods during which water quality was measured at Thorpe Island by in situ sondes.

Period	Date and time of first measurement	Date and time of last measurement
1	06/05/2008 1500	21/05/2008 1500
2	21/05/2008 1630	03/06/2008 1100
3	04/06/2008 1400	15/06/2008 1430

The Environment Agency uses the General Quality Assessment (GQA) to monitor the quality of rivers in terms of aesthetics, biology, chemistry and nutrients (Environment Agency, 2008a). Ammoniacal nitrogen and DO are included in the GQA assessment of chemical quality, the classification requirements for which are displayed in table 4.1.2. Assessing the data collected from the two probes at Thorpe Island against the GQA classes provides a means to quantify the significance of the peaks.

Table 4.1.2. GQA classification for Dissolved Oxygen and Total Ammonia. Adapted from Environment Agency (2008a)

GQA Grade		Dissolved Oxygen % Saturation (10 percentile)	Total Ammonia mg/l (90 percentile)
A	Very Good	80	0.25
B	Good	70	0.6
C	Fairly Good	60	1.3
D	Fair	50	2.5
E	Poor	20	9.0
F	Bad	<20	-

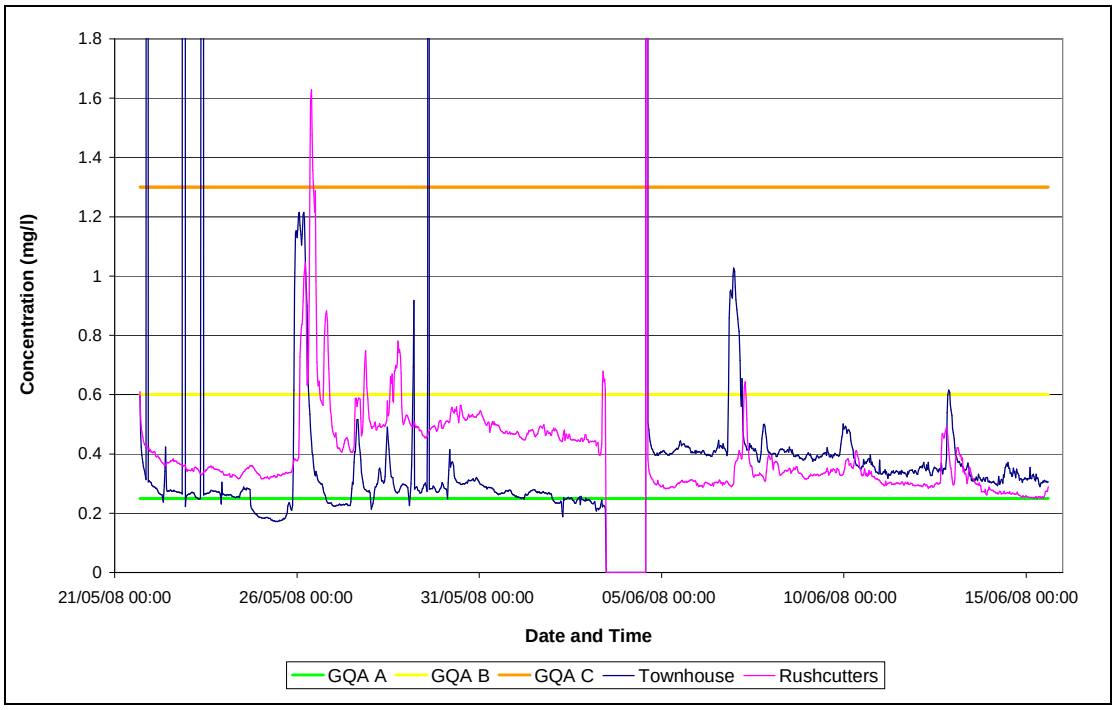

Figure 4.1.1 Total Ammonia (mg/l), from summing levels of ammonia N and ammonium N, measured at half hourly intervals at Rushcutters and Townhouse between 16:30 21/05/08 and 14:30 15/06/08

The GQA methodology uses Total ammonia, which includes ammonia and ammonium. So values of ammonia and ammonium collected at the sondes during period 2 and 3 were summed to be compared with GQA categories (figure 4.1.1). Over most of this time concentration of total ammonia corresponds with GQA level B with peaks to level C The maximum concentration occurred at RC, corresponding to level D.

Over the monitoring period the lowest GQA classification for DO was level E, the highest was level A. During period 1 DO was generally within class A, falling briefly to class B (figure 4.1.4). During period 2 DO levels were within class B falling to class D, but generally remaining about level C (figure 4.1.6); during period 3 the level of DO generally remained above level C (figure 4.1.9).

4.1.1 Periods 1 to 3

Peaks in ammonia, ammonium, DO, temperature and pH occur at TH throughout the monitoring period. As discussed earlier these are due to the sonde becoming exposed at low water. Similarly, peaks occur at both probes at either end of the two week monitoring periods. These are believed to be due to removal of the probe from the water for maintenance and calibration.

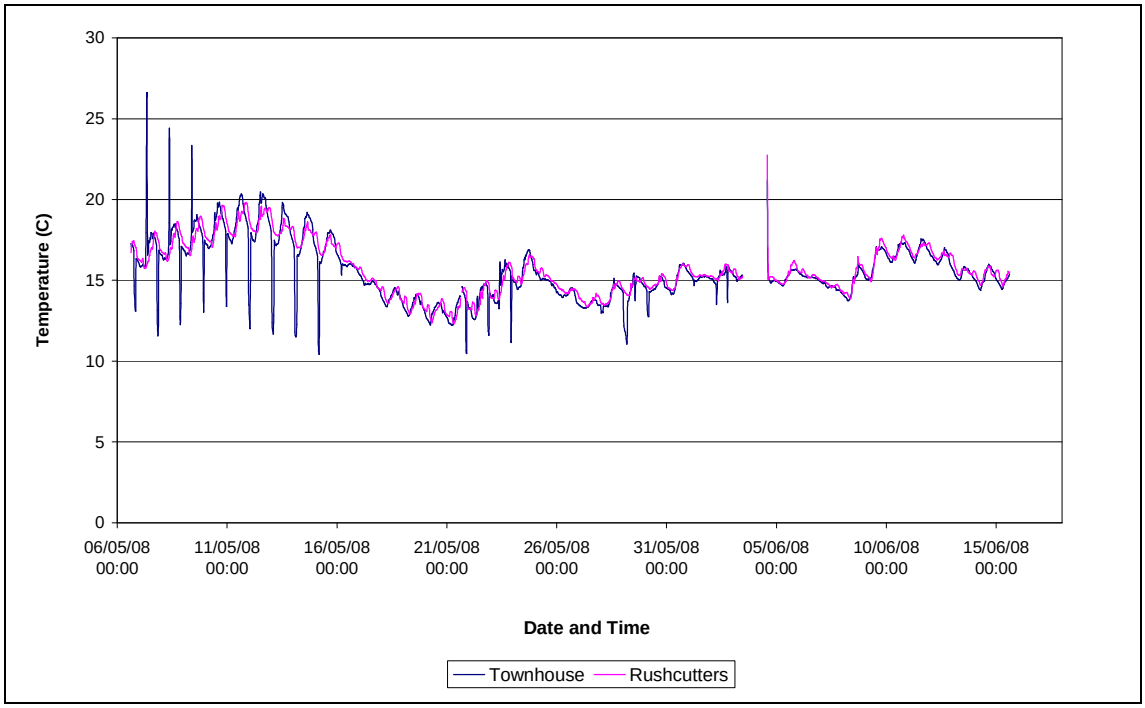

Figure 4.1.2 Temperature (˚C) measured at half hourly intervals at Rushcutters and Townhouse between 1500 06/05/2008 and 1430 15/06/2008

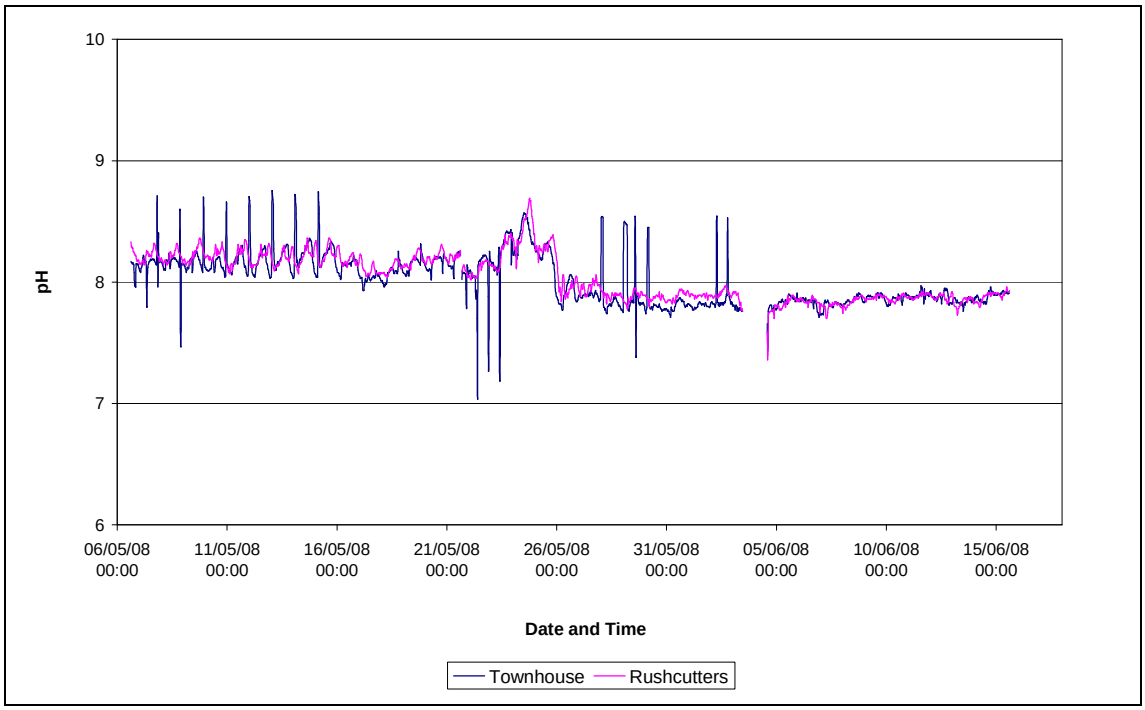

Figure 4.1.3 pH measured at half hourly intervals at Rushcutters and Townhouse between 1500 06/05/2008 and 1430 15/06/2008

Throughout the monitoring period the sondes exhibited similar values for both pH and temperature (figure 4.1.2 and 4.1.3). The noticeable peaks in both pH and temperature occurred around the 24/05/2008 corresponding to peaks in ammonia and DO.

DO varied noticeably during the monitoring period (figures 4.1.4, 4.1.6 and 4.1.9). Levels decreased during period 2, so that % saturation during period 3 was lower than in period 1. The highest peak in DO occurred during period 2 (around the 24/05/2008). Levels of DO at TH and RC followed a similar pattern throughout the monitoring period, with levels at TH generally slightly lower than at RC.

Ammonia was not measured during period 1. Concentration of ammonia during period 2 (figure 4.1.7) was higher at RC than TH, however this was reversed period 3 (figure 4.1.10).

During periods 1 and 2 there was a greater concentration of ammonium at RC than TH, however during period 3 this was reversed (figures 4.1.5, 4.1.8 and 4.1.11). Concentration was generally greater during the final two periods than the first.

4.1.2 Period 1

During this period the percentage saturation of DO at TH was generally lower than at RC, this is particularly noticeable at the lower values (figure 4.1.4).

DO at both TH and RC exhibited regular daily variation, the lowest levels occurred during the night and early morning and higher values during the afternoon. Both probes displayed the same daily cycle but were slightly offset; the lowest value at RC usually occurring approximately 4 hours after TH. Neither probe had peaks in DO which appeared to be independent of the other. Between 16/05/08 and 18/05/08 there was a drop in DO (figure 4.1.4) at both probes. There appears to be a concurrent slight increase in ammonium concentration at RC (figure 4.1.5).

Concentration of ammonium at RC was generally higher than at TH, except when TH values were extreme due to sampling error. The probe displaying with the highest ammonium concentration was not dependent on tidal direction.

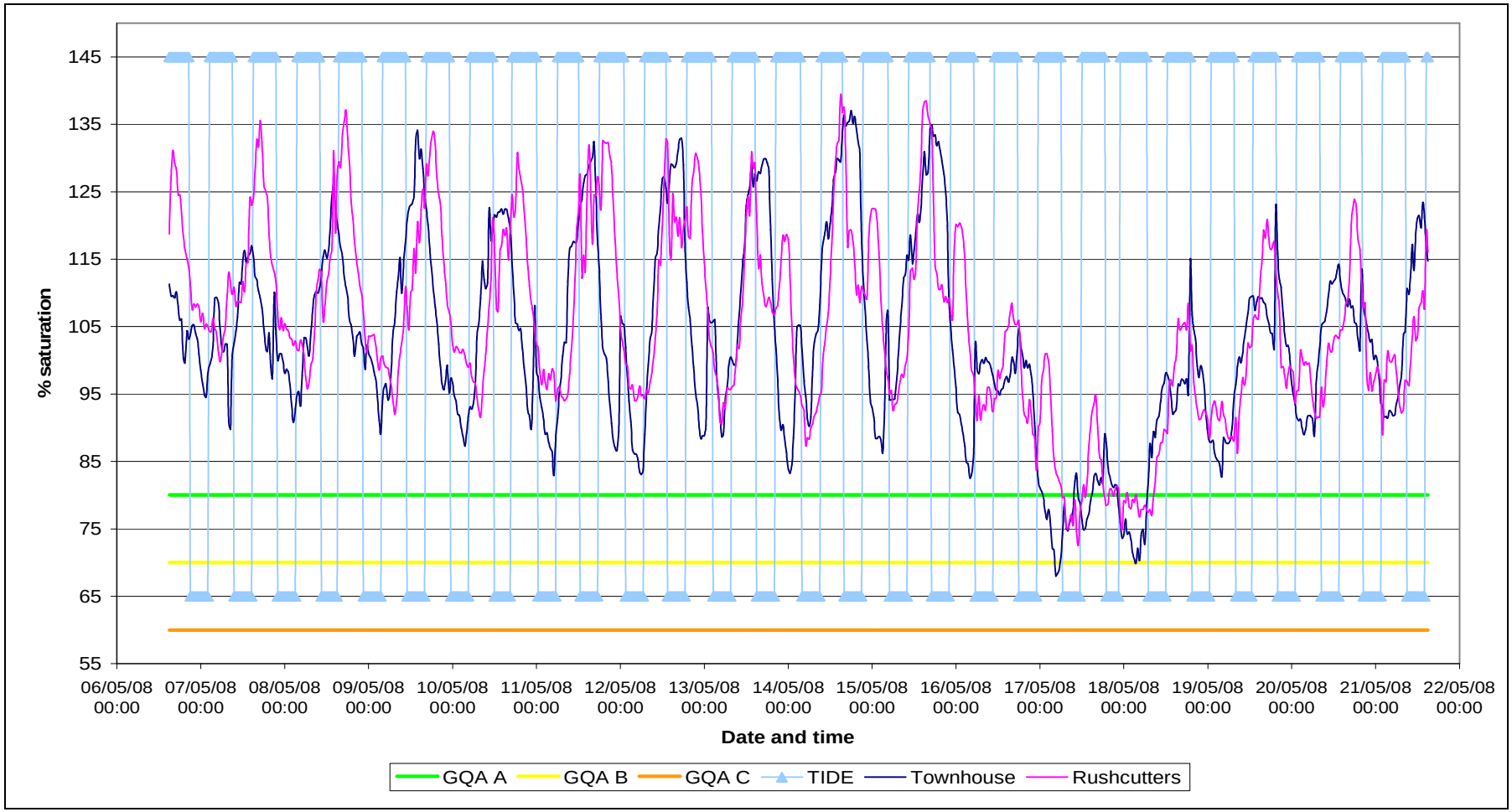

Figure 4.1.4 Tidal direction, GQA boundaries and dissolved oxygen (% saturation) measured by continuous sondes for period 1. Tidal values at 145 indicate an ebb tide (water moving from TH to RC), values of 65 indicates a flood tide (water flowing from RC to TH)

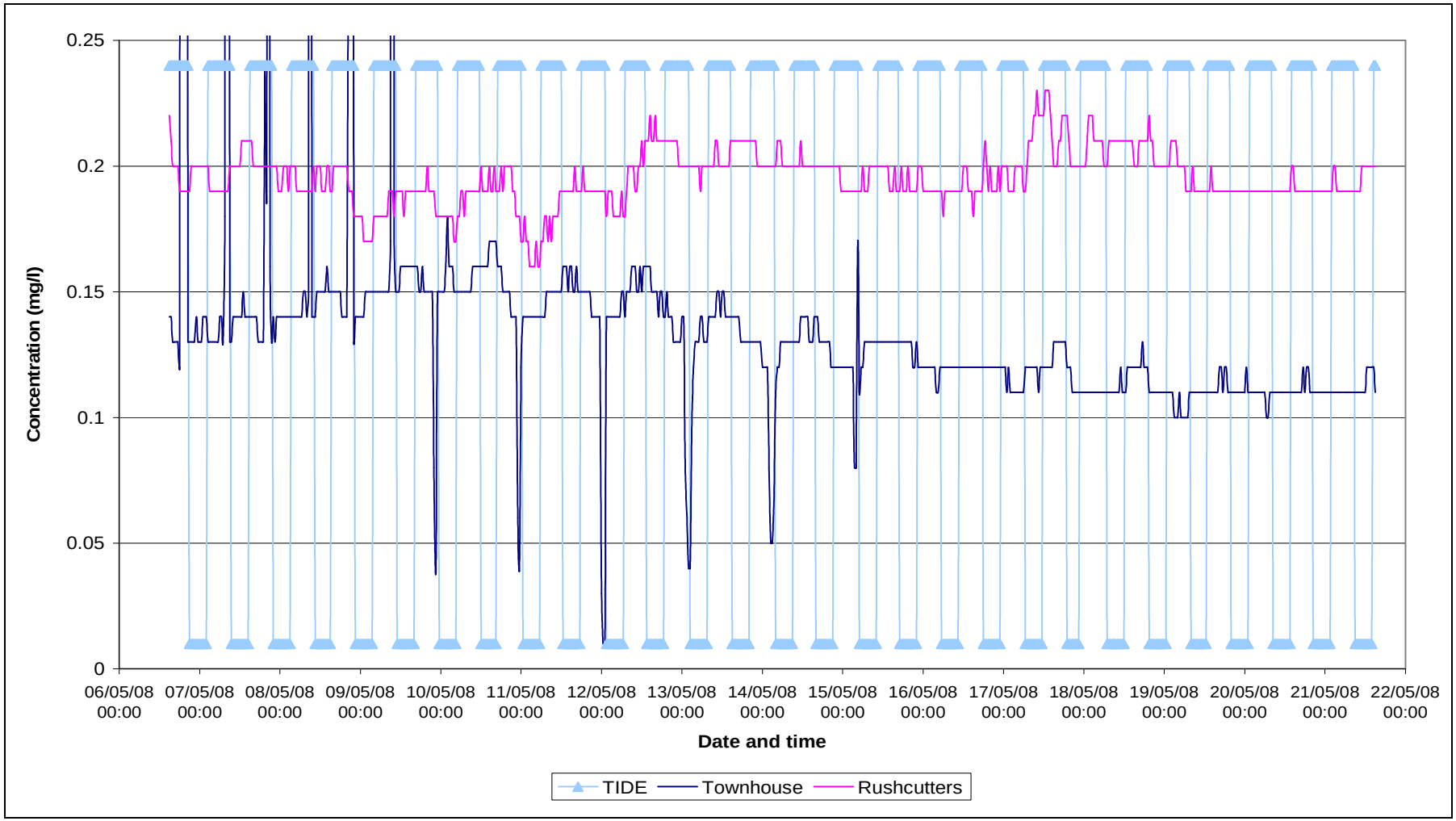

Figure 4.1.5 Tidal direction and concentration of Ammonium N (mg/l) measured by continuous sondes for period 1. Tidal values at 0.24 indicate an ebb tide (water moving from TH to RC), value of 0.01 indicates a flood tide (water flowing from RC to TH).

4.1.3 Period 2

During period 2 levels of DO at RC and TH were very similar, although TH consistently displayed lower troughs (figure 4.1.6). DO levels at both probes followed a daily cycle until 26/05/08, when it became less pronounced as DO levels declined. Levels at RC generally peaked about 3 hours after those at TH.

The concentrations of ammonia and ammonium were generally higher at RC than TH. There were 4 noticeable peaks in concentration of ammonia at both TH and RC (labelled 1, 2, 4 and 5 in figure 4.1.7), that correspond with 3 peaks in ammonium concentration (peaks 2, 4 and 5 in figure 4.1.8).

The first peak in ammonia was the largest during the period (figure 4.1.7). It occurred simultaneously with an increase in DO levels and lasted for a number of tides. As ammonia concentrations reached maximum the DO saturation declined rapidly from the maximum to the minimum value during this period. At points 2 and 5 concentrations of ammonia and ammonium increased rapidly and were sustained over a number of tides. Peaks 1, 2 and 5 began during ebb tides and reached the maximum concentration at TH before RC.

Both ammonia and ammonium increased at peak 4. However this peak began during a flood tide without a delay between TH and RC. The pollutant source may thus have been downstream of both probes. If this is the case the second peak of this series, at RC, is likely be a result of the pollutant moving back downstream during the following ebb tide.

At point 3 the concentration of ammonium and ammonia increases noticeably at RC with no corresponding change at TH. This occurs during an ebb tide.

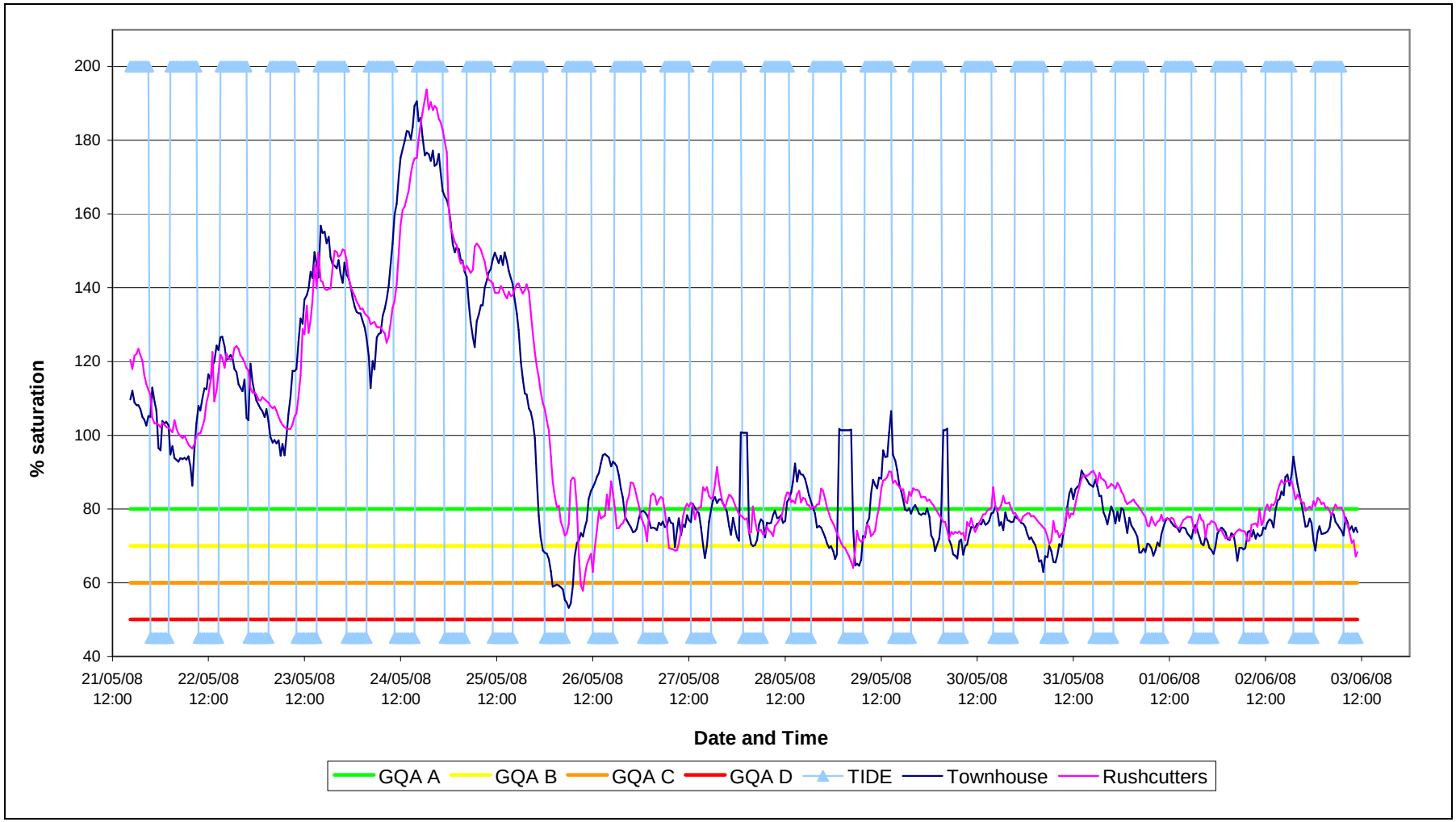

Figure 4.1.6 Tidal direction, GQA levels and dissolved oxygen (% saturation) measured by the sondes for period 2. Tidal values at 200 indicate an ebb tide (water moving from TH to RC), values of 45 indicate a flood tide (water flowing from RC to TH).

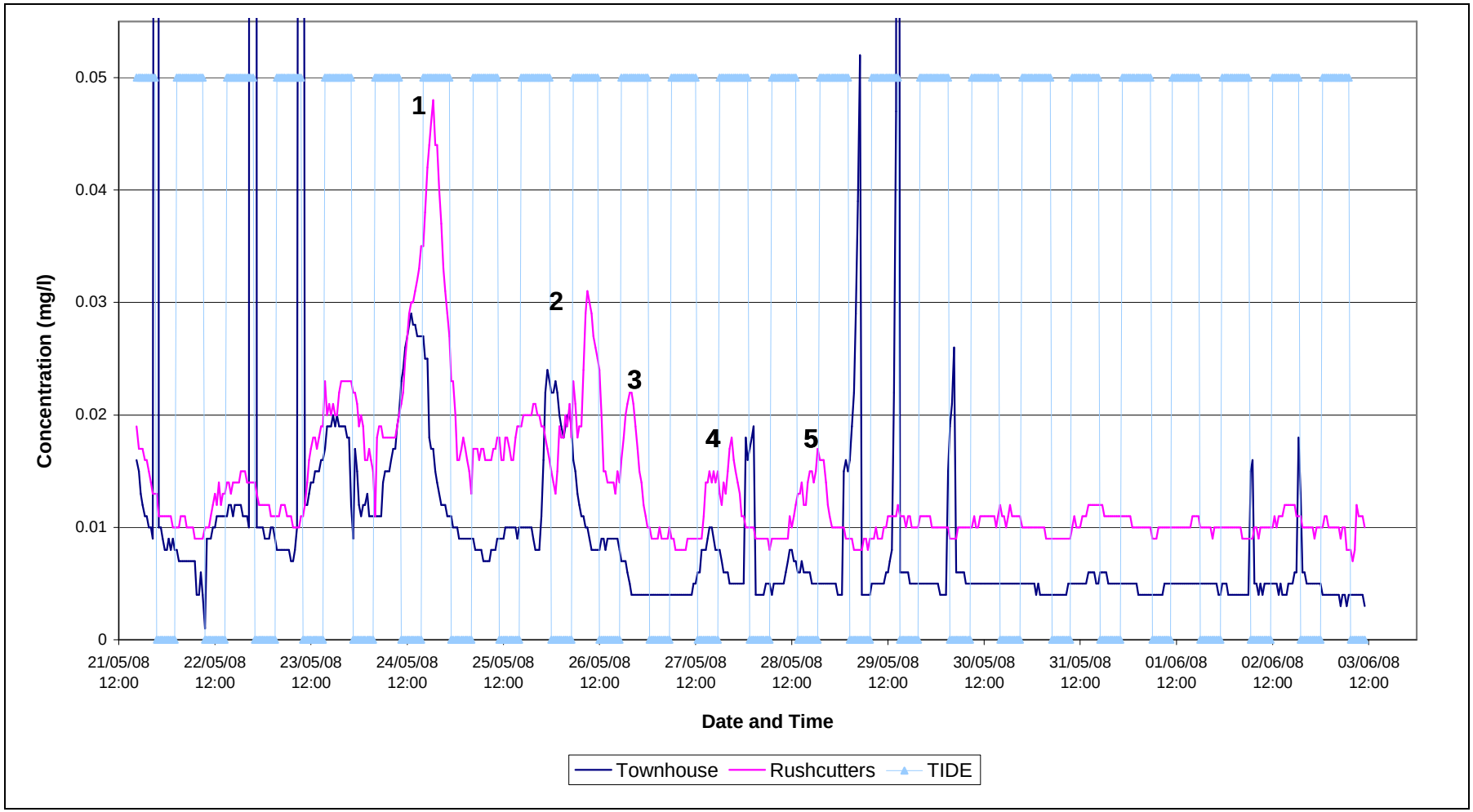

Figure 4.1.7 Tidal direction and concentration of Ammonia N (mg/l) measured by the sondes for period 2. Tidal values at 0.05 indicate an ebb tide (water moving from TH to RC), value of 0 indicates a flood tide (water flowing from RC to TH)

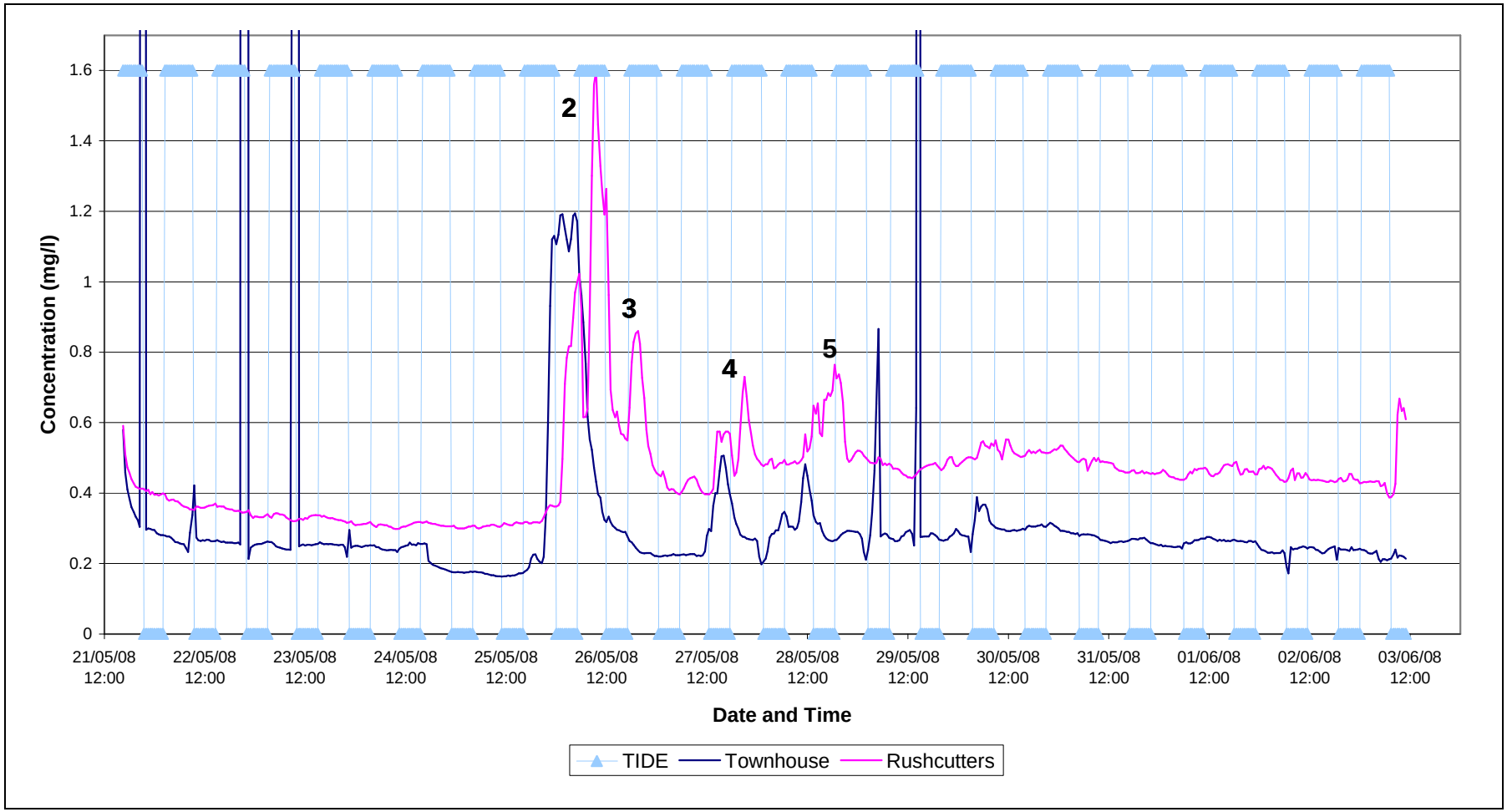

Figure 4.1.8 Tidal direction and concentration of Ammonium N (mg/l) measured by the sondes for period 2. Tidal values at 1.6 indicate an ebb tide (water moving from TH to RC), value of 0 indicates a flood tide (water flowing from RC to TH).

4.1.4 Period 3

During period 3 DO levels were generally higher at RC than TH (figure 4.1.9). DO at both sondes followed a similar pattern, although not to the same extent as during previous periods. There was no consistent pattern as to which sonde peaked first. The daily variation was not as pronounced as during earlier weeks, however both peaked during late afternoon or early evening and troughs tended to occur during the early morning.

Unlike previous weeks, during period 3 concentrations of ammonia (figure 4.1.10) and ammonium (figure 4.1.11) at TH were greater than those at RC.

Figure 4.1.11 shows four noticeable peaks in ammonium concentration which occurred at both RC and TH. Peaks 6 and 7 were the largest and corresponded to noticeable increases in ammonia concentration and temporary decreases in DO saturation. Peaks 8 and 9 are not apparent in ammonia and DO, it is possible that the smaller changes in concentration shown at these peaks could be masked by variation within the graphs.

Both peak 6 and 9 occurred over a number of tides, starting during an ebb tide with concentrations of ammonium at TH peaking before RC. At peak 8 concentration of ammonium also increased at both sites starting during an ebb tide, although it was not as sustained as peaks 6 and 9 (figure 4.1.11).

At peak 7 concentrations of ammonia and ammonium increased and DO decreased. This change is clearest in ammonia (figure 4.1.10). This began during a flood tide, and RC peaked before TH. Ammonium concentrations at both probes decreased during the following ebb tide. However approximately 3 hours after ammonia had peaked at TH, concentrations at RC temporarily increased again, possibly because it was receiving polluted water previously measured at TH.

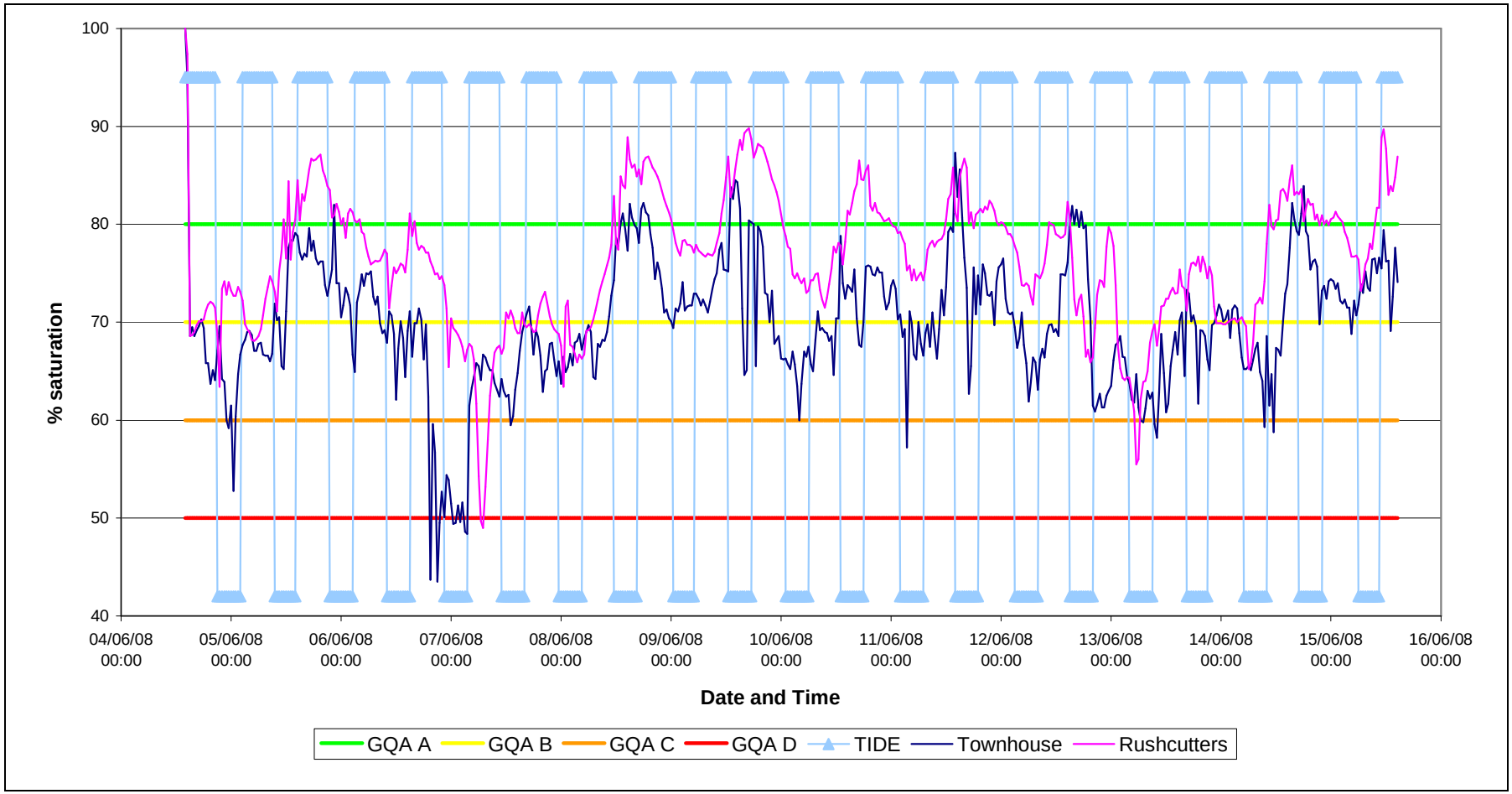

Figure 4.1.9 Tide direction, GQA boundaries and dissolved oxygen (% saturation) measured by the sondes for period 3. Tidal values at 95 indicate an ebb tide (water moving from TH to RC), values of 42 indicate a flood tide (water flowing from RC to TH)

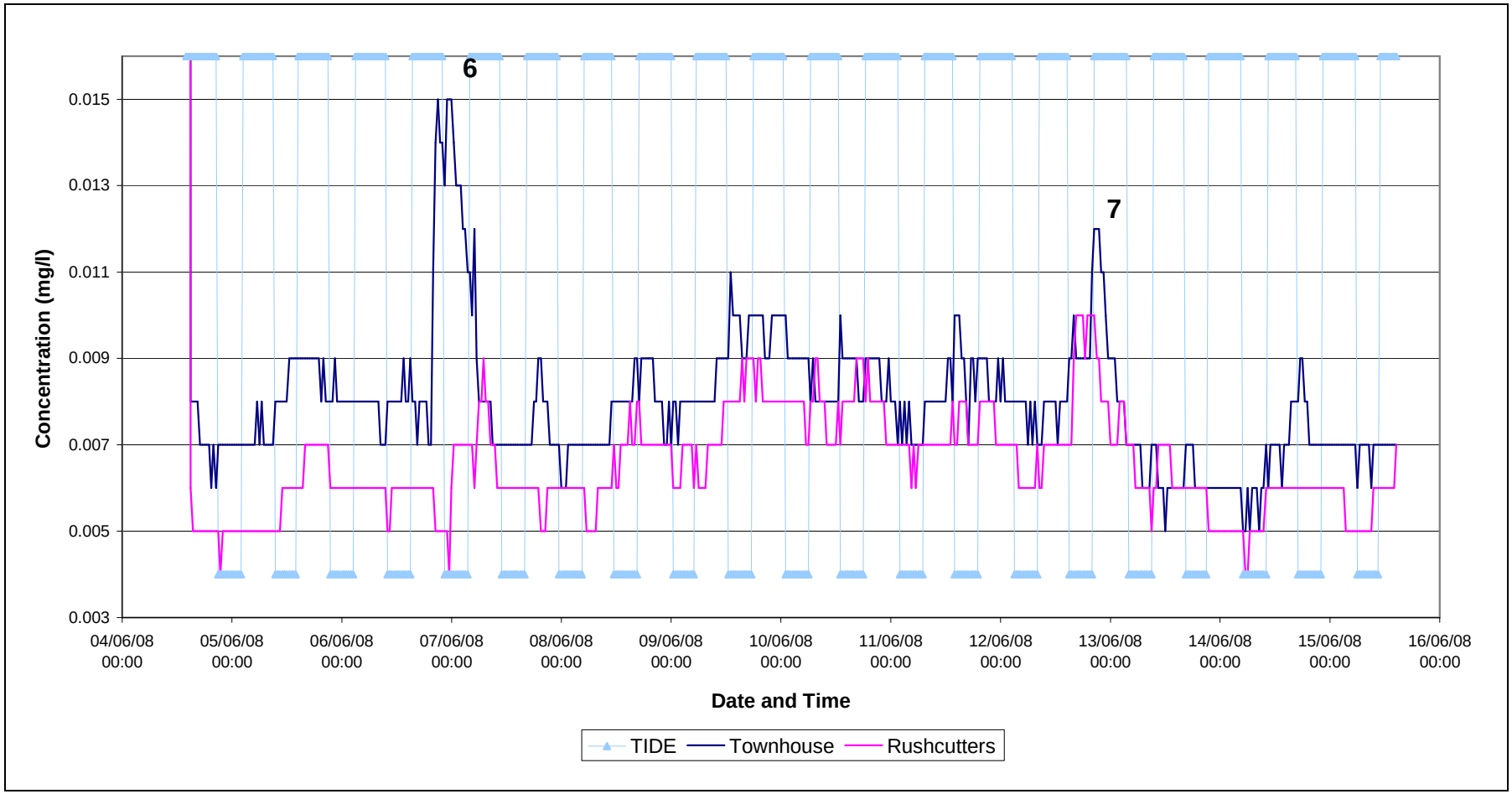

Figure 4.1.10 Tidal direction and concentration of Ammonia N (mg/l) measured by the sondes for period 3. Tidal values at 0.016 indicate an ebb tide (water moving from TH to RC), values of 0.04 indicates a flood tide (water flowing from RC to TH)

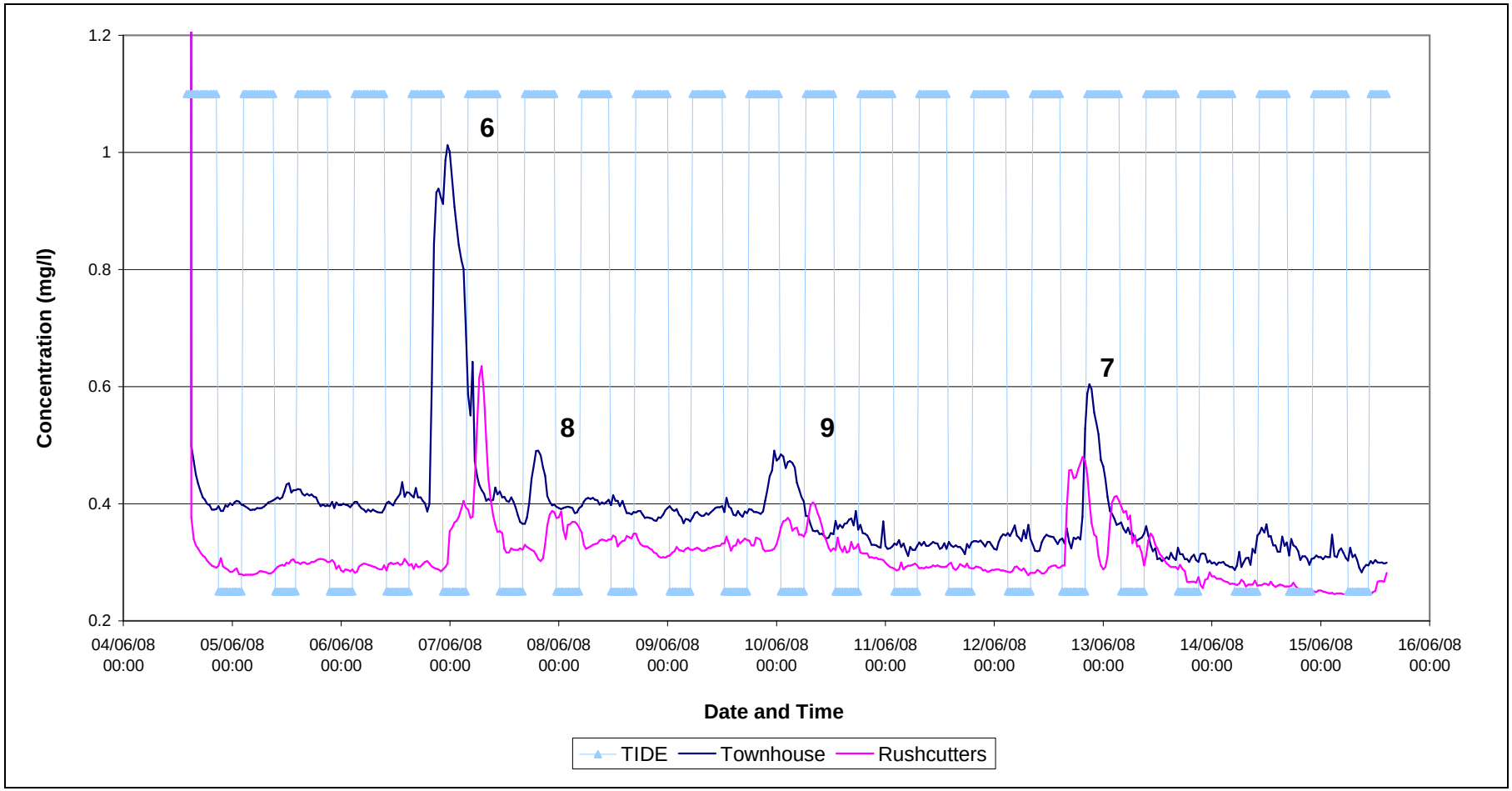

Figure 4.1.11 Tide direction and concentration of Ammonium N (mg/l) measured by the sondes for period 3. Tidal values at 1.1 indicate an ebb tide (water moving from TH to RC), value of 0.25 indicates a flood tide (water flowing from RC to TH)

4.1.5 Discharge and continuous sampling

This section outlines the results obtained by the two sondes at Thorpe Island in relation to flow at Thorpe Island.

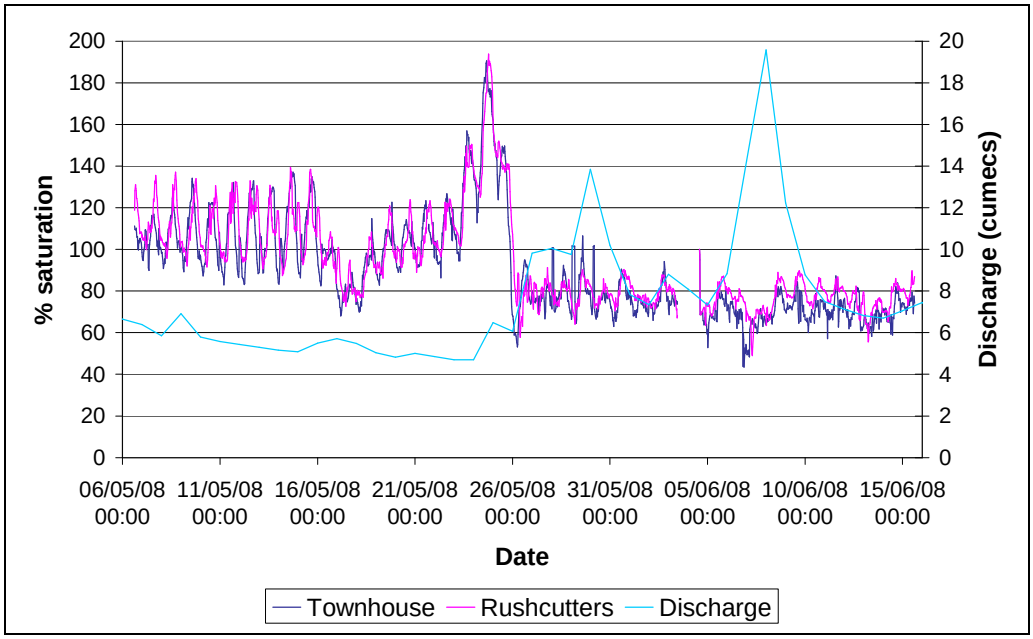

Figure 4.1.12. Dissolved oxygen (%saturation) and mean daily discharge (cumecs) at Thorpe Island.

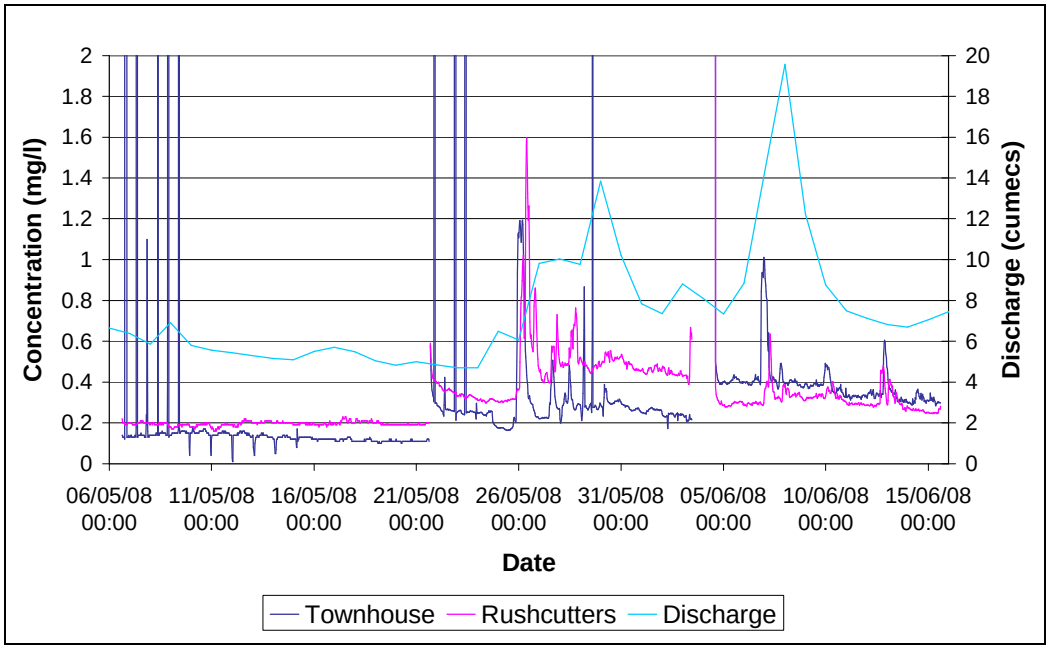

Figure 4.1.13. Ammonium concentration (mg/l) and mean daily discharge (cumecs) at Thorpe Island

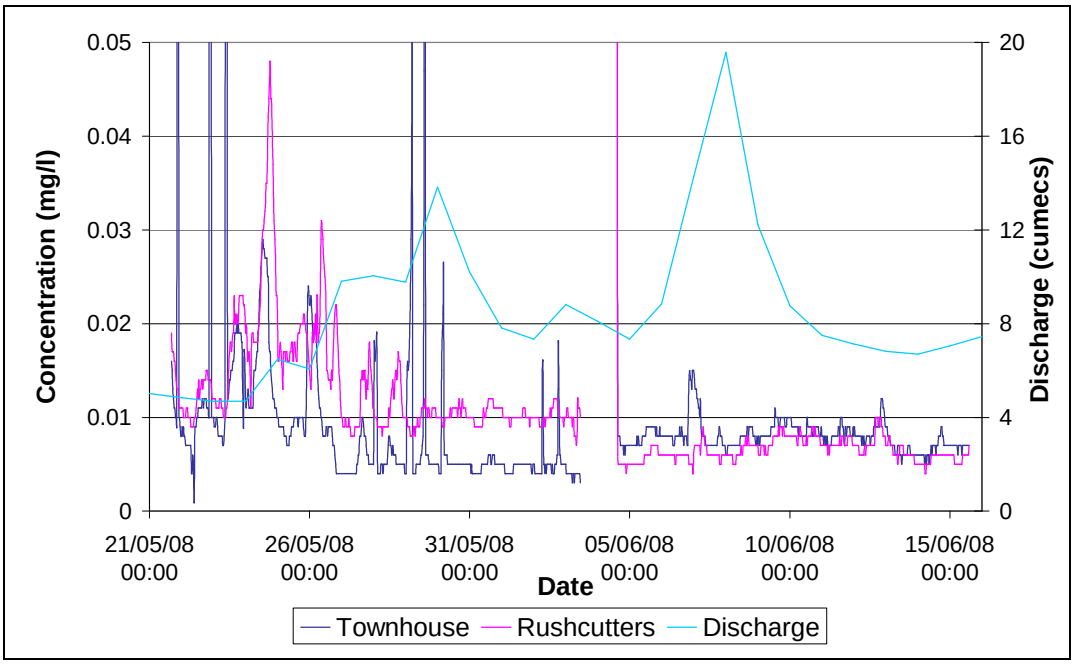

Figure 4.1.14. Ammonia concentration (mg/l) and mean daily discharge (cumecs) at Thorpe Island

Figures 4.1.12 to 4.1.14 show the water quality parameters in relation to the discharge estimated at Thorpe Island. There is a lot of variation between and within the graphs however some patterns are apparent.

Three decreases in DO occurred shortly after discharge began to increase (approximately 17/05/08, 26/05/08 and 06/06/08). However DO did not decrease as a result of every increase in discharge and the magnitude of change in discharge was not reflected by the magnitude change in DO.

Ammonium peaks also tended to occur during periods of high discharge, with the highest peak of a series occurring first after an increase in discharge.

Ammonia concentration appeared to increase at the beginning of an increase in discharge, however changes in relation to discharge are not as apparent as for ammonium and DO.

4.2 DISCRETE MANUAL SAMPLING

The results from four manual sampling trips on the River Yare during summer 2008 are outlined in this section. Note that data was not collected at Thorpe Bridge on 21/07/08 due to unusually high water.

4.2.1 Dissolved Oxygen

DO was not measured on 04/08/08 because of problems with equipment. The remaining sampling dates exhibit little variation between DO levels on different dates (figure 4.2.1). On the first and second sampling date levels at site 2 are statistically significantly higher than other sites.

Other trends can be seen. On all dates DO decreases slightly after the STW. On the third sampling date levels increase significantly between sites 4 and 1. DO also increases slightly between these sites on the first sampling date, although they do not change on the second.

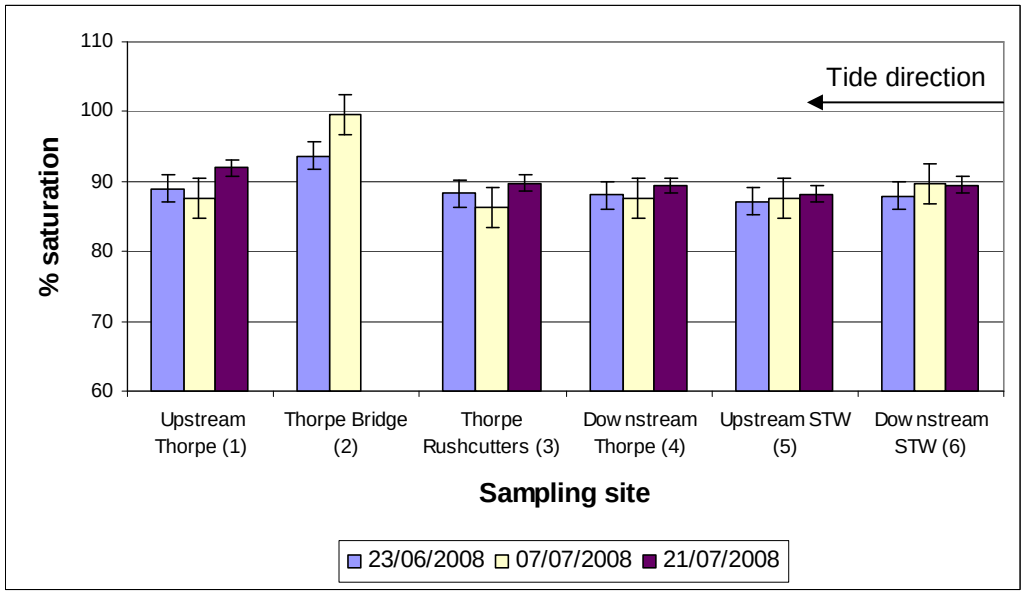

Figure 4.2.1 Mean dissolved oxygen (% saturation) measured on 23/06/08, 07/07/08 and 21/07/08. Vertical lines reflect 95% confidence intervals. Data was not collected from Thorpe Bridge (2) on 21/07/08.

4.2.2 Thermotolerant coliforms

There is no consistent pattern between the number of CFUs measured on different dates (figure 4.2.2). Not all differences between sites are significant, however trends can be seen. There is no significant difference between measures taken either side of the STW on any date. On the first and third sampling dates the CFU count increases upstream of the STW, however on the second and fourth dates the count decreases.

CFU numbers significantly increase upstream of Thorpe Island (between site 4 and 1) on the first sampling date, they also increase on the fourth. However on the second there is little difference and on the third they are significantly lower.

On none of the sampling dates were the differences between site 2 and 3 significant. CFU numbers were higher at Thorpe Bridge than Rushcutters on the second and fourth sampling dates but lower on the first.

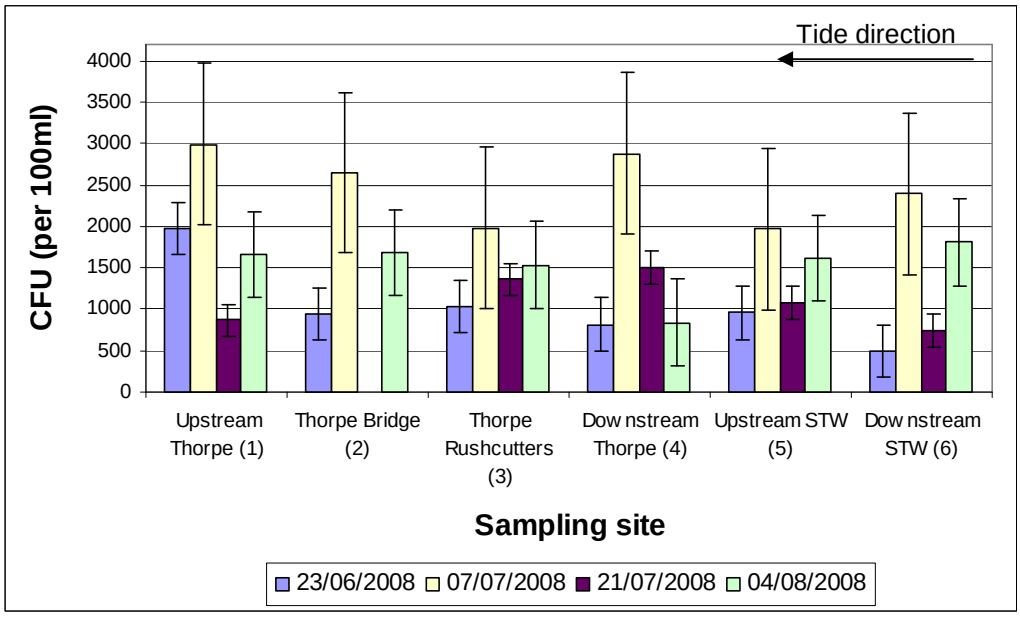

Figure 4.2.2 Mean Coliform Forming Units (CFU) per 100ml measured on 23/06/08, 07/07/08, 21/07/08, 04/08/08. Vertical lines reflect 95% confidence intervals. Data was not collected from Thorpe Bridge (2) on 21/07/08.

4.2.3 Ammonia

There are no significant differences between ammonia concentration at the sampling sites on any of the sampling dates (figure 4.2.3). This is partly due to the variability within samples. Samples taken on 21/07/2008 are particularly variable. Although there are no statistically significant differences the data can still be interpreted.

Concentrations of ammonia increase upstream of the STW on all but the final sampling date. On all four dates concentrations of ammonia are higher upstream than downstream of Thorpe Island, the extent to which they differ varies between dates.

On the first and second sampling dates there is very little difference in ammonia concentration between sampling site 2 and 3. However ammonia concentration on the fourth sampling date is greater at site 2 than 3.

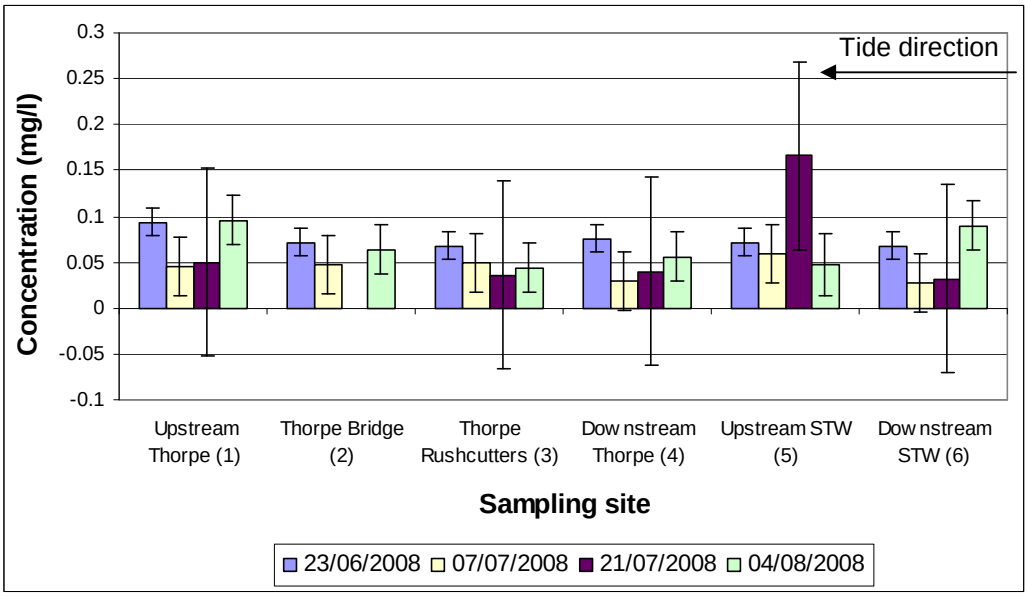

Figure 4.2.3 Mean ammonia concentration (mg/l) measured on 23/06/08, 07/07/08, 21/07/08 and 04/08/08. Vertical lines reflect 95% confidence intervals. Data was not collected from Thorpe Bridge (2) on 21/07/08.

4.2.4 Total Oxidised Nitrogen (TON)

TON concentrations varied depending on the date (figure 4.2.4); samples taken on 23/06/08 had the highest concentration.

On all four dates concentrations were greater at site 5 than site 6; significantly so on the second and fourth sampling dates. On all dates concentration of TON was highest at the sites surrounding the STW; significantly so on 23/06/08.

On the latter three sampling dates concentration of TON was higher upstream of Thorpe Island, than downstream. The difference was only statistically significant on the second sampling date. On the first sampling date there was no noticeable difference in concentration.

There was little difference in concentration between sites 2 and 3. On the fourth sampling date concentration at site 2 was slightly lower than at site 3.

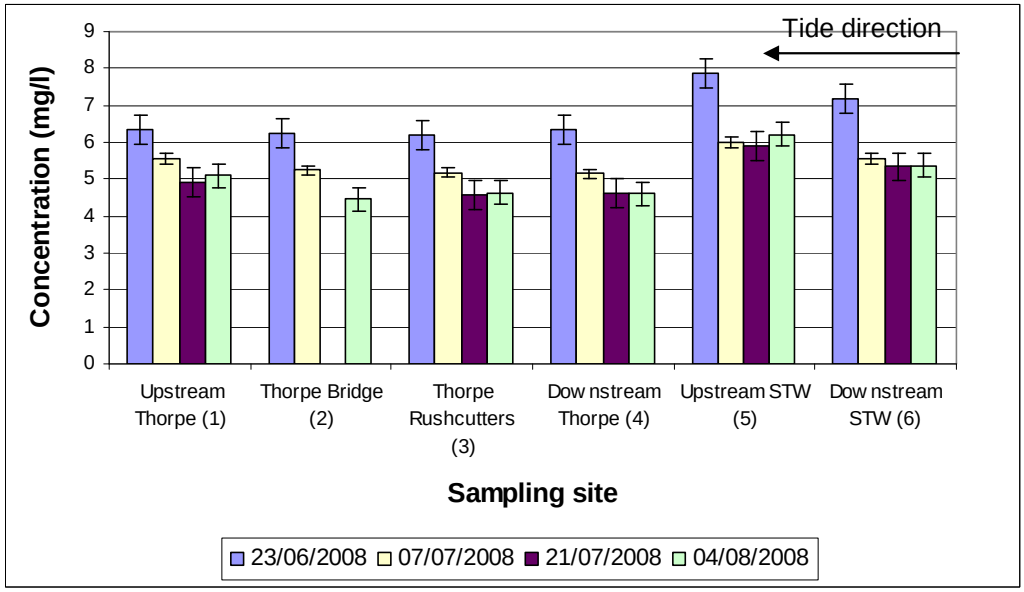

Figure 4.2.4 Mean TON concentration (mg/l) measured on 23/06/08, 07/07/08, 21/07/08 and 04/08/08. Vertical lines reflect 95% confidence intervals. Data was not collected from Thorpe Bridge (2) on 21/07/08.

4.2.5 Phosphate

Phosphate concentration varied depending on the sampling date, with lowest concentrations generally on the first sampling date and highest on the last (figure 4.2.5).

The changes in concentration up and downstream of the STW are small on all sampling dates. There is no consistent pattern as to which of the two sites had the greater concentration.

On the first and second sampling dates concentration was lower upstream than downstream of Thorpe Island. This is reversed on the third and fourth sampling dates.

Concentration at Thorpe Bridge was always lower than at Rushcutters. The difference is statistically significant on the second and fourth sampling

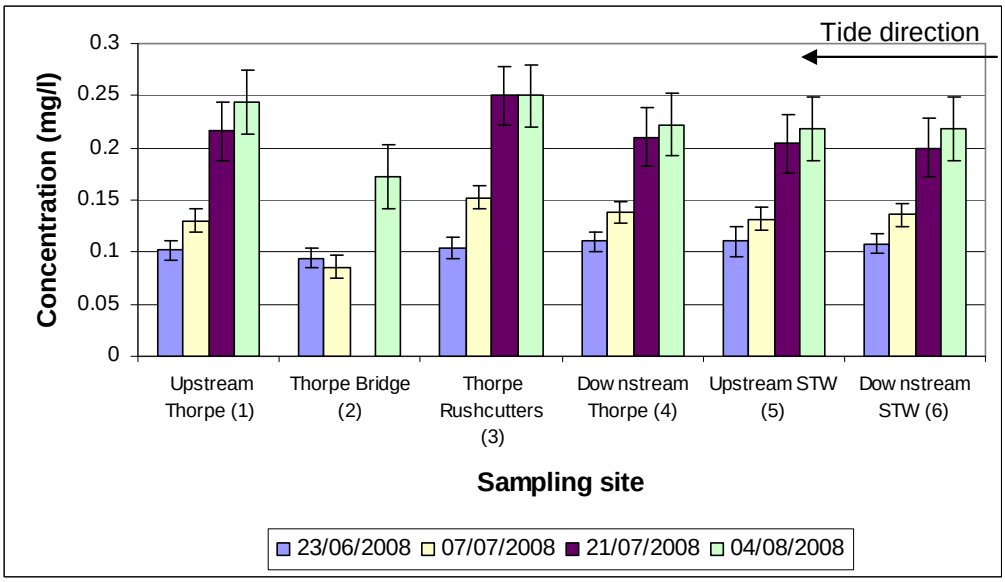

Figure 4.2.5 Mean phosphate concentration (mg/l) measured on 23/06/08, 07/07/08, 21/07/08 and 04/08/08. Vertical lines reflect 95% confidence intervals. Data was not collected from Thorpe Bridge (2) on 21/07/08.

4.2.6 Temperature and pH

There are few consistent patterns in pH and temperature. pH is significantly greater at site 2 than site 3 on the first sampling date, but there is no difference on the other dates (figure 4.2.6). There is a slight increase in temperature between site 3 and 2, however this is only significant on the second sampling date (figure 4.2.7).

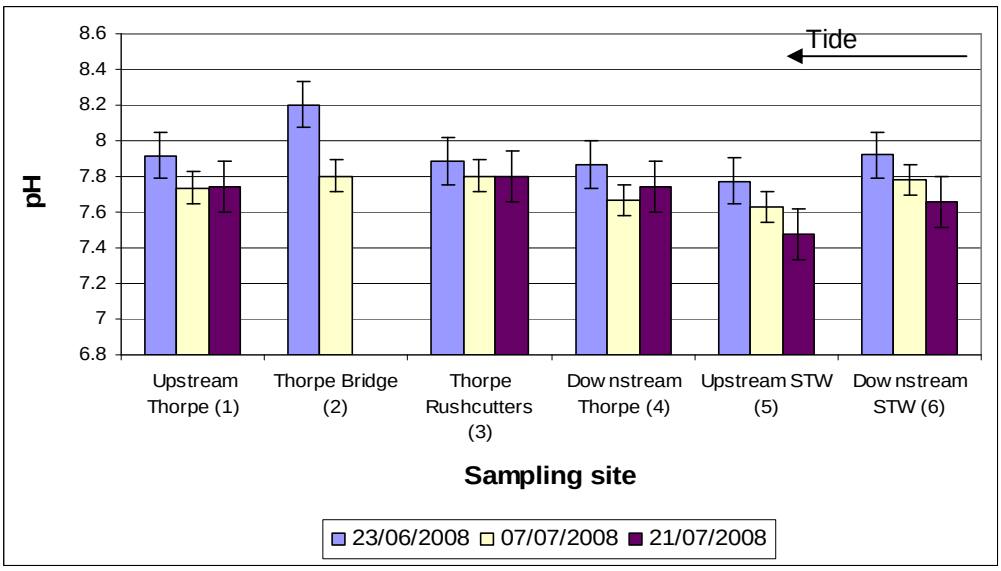

Figure 4.2.6 Mean pH measured on 23/06/08, 07/07/08 and 21/07/08. Vertical lines reflect 95% confidence intervals. Data was not collected from Thorpe Bridge on 21/07/08.

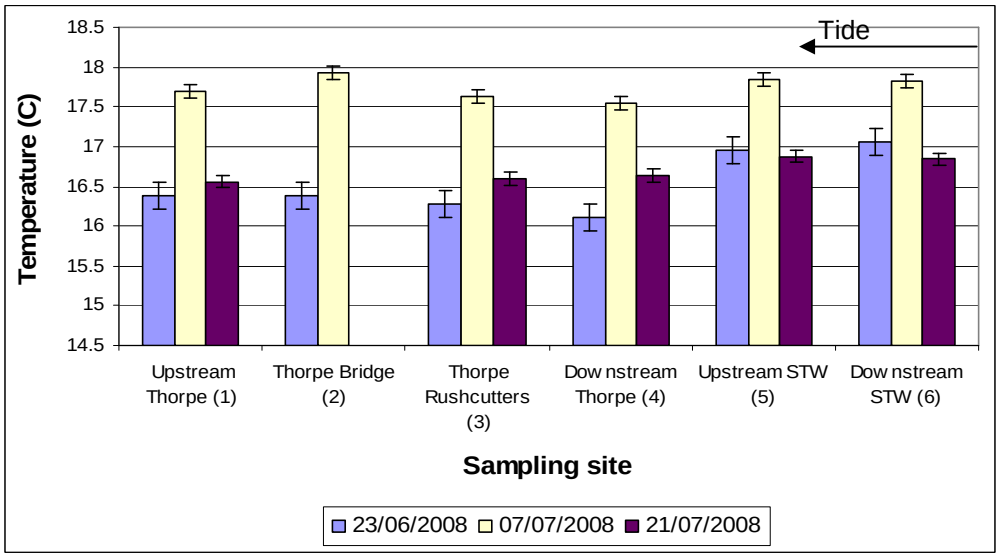

Figure 4.2.7 Mean temperature (˚C) measured on 23/06/08, 07/07/08 and 21/07/08. Vertical lines reflect 95% confidence intervals. Data was not collected from Thorpe Bridge on 21/07/08.

4.3 IMPACT OF DILUTION

The estimates, in table 4.3.1, show that under high flow conditions larger volumes of effluent would have to be discharged from boats for any increase in downstream concentration of pollutants to be observed.

Table 4.3.1. Volume of effluent discharged from boats in a single incident required to observe a downstream change in pollutant concentration under minimum, mean and maximum mean daily flow of the River Yare at the north of Thorpe Island.

Pollutant (unit)	Concentration in sewage	Observable change in concentration	Required volume of discharge from boats at different river flows [f] (litres)		
			Min (1561.5 l/s)	Mean (3035.2 l/s)	Max (9789.6 l/s)
Ammonia Nitrogen[a] (mg/l)	64	0.10	2.44	4.75	15.32
Ammonia Nitrogen[b] (mg/l)	138	0.10	1.13	2.20	7.10
Ammonia [c] (mg/l)	12	0.21	27.81	54.06	174.37
Ammonia [d] (mg/l)	45	0.21	7.32	14.23	45.90
Thermotolerant coliforms [c] (CFU/100ml)	100000	1945	30.97	60.21	194.18
Thermotolerant coliforms [d] (CFU/100ml)	100000000	1945	0.03	0.06	0.19
Inorganic P [c e] (mg/l)	3	0.06	31.87	61.94	199.79
Inorganic P [d e] (mg/l)	10	0.06	9.43	18.32	59.09

[a] Concentration in household waste water (Kiefer, 2003). [b] Concentration in blackwater (Kiefer, 2003). [c] Level in weak domestic waste water (Metcalf and Eddy, 2003). [d] Level in strong domestic waste water (Metcalf and Eddy, 2003) [e] Dissolved inorganic P is the equivalent of orthophosphate (Welch and Jacoby, 2004). [f] Values are an estimate and do not warrant listing to 2 d.p., however such precision is required to ensure that small volumes are not listed as zero.

4.4 GIS ANALYSIS

This section includes maps of the sewage disposal facilities available to boats in the Broads and categorises the river in terms of distance from these facilities when travelling at 3 mph, the lowest speed limit on the Broads (Broads Authority, 2008g).

4.4.1 Pump out station availability

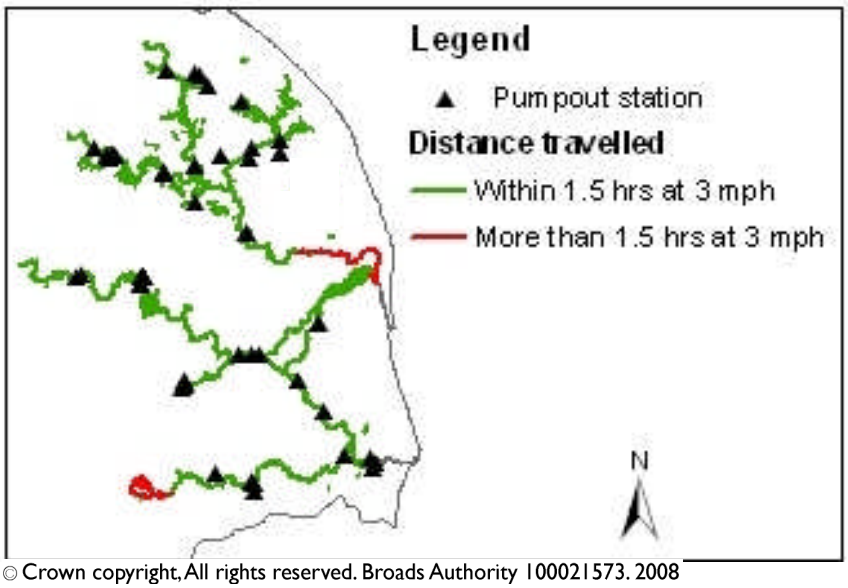

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Figure 4.3.1 Navigable waterways of the Broads categorised by ability to reach the nearest pumpout station within 1.5 hours when travelling at 3mph.

British Waterways (2006) suggests that when a pumpout is not available at their home mooring boaters require one within 1.5 hours travel. On this basis, figure 4.3.1 illustrates that the western reaches of the River Waveney and the eastern reaches of the River Bure above Braydon water are not within 1.5 hours of a pumpout station when travelling at 3 mph.

The report also found that the most demanding 25% of boat owners require pump out stations at 5 hour intervals when travelling. On the Broads network these demands are met even if boats are limited to a maximum speed of 3 mph (figure 4.3.2).

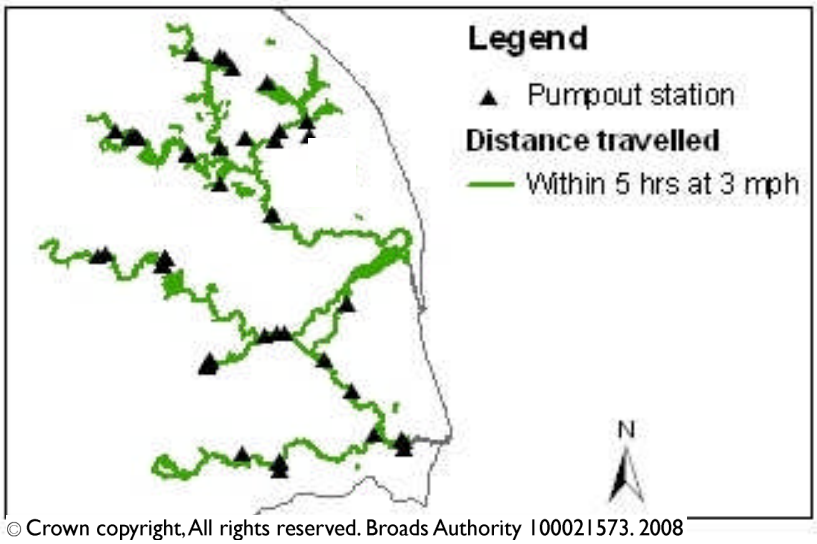

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Figure 4.3.2 Navigable waterways of the Broads categorised by ability to reach the nearest pumpout station within 5 hours when travelling at 3 mph

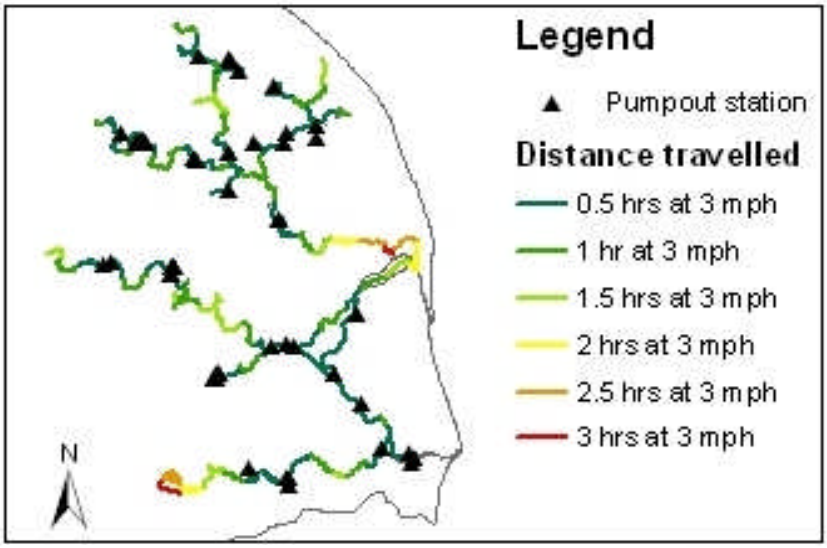

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Figure 4.3.3 Distance to closest pumpout station expressed as half hour intervals travelling at 3 mph on the navigable waterways of the Broads

Figure 4.3.3 presents a 'worst case' scenario, assuming that boats are limited to 3 mph and require pump out stations at greater frequency than suggested by British Waterways (2006). This highlights the areas of lesser provision, particularly the western reaches of the River Waveney and the eastern reaches of the River Bure.

4.4.2 Chemical toilet disposal

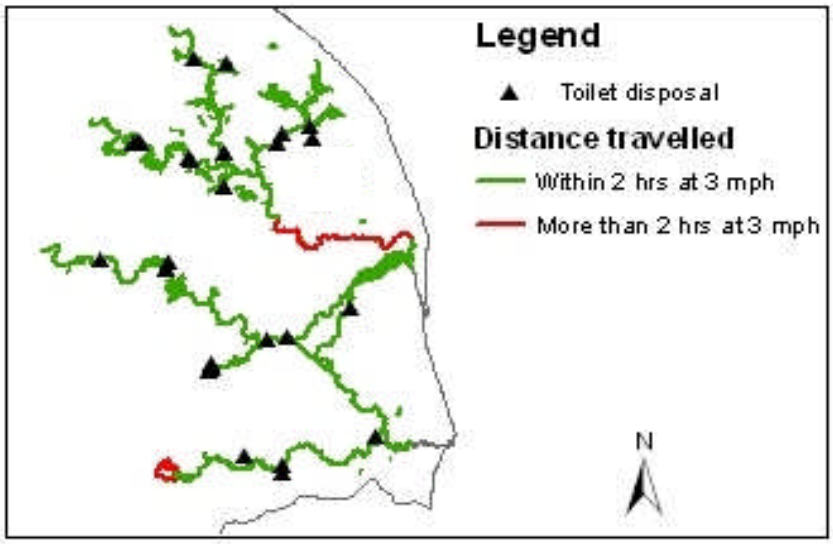

Figure 4.3.4 Waterways of the Broads categorised by ability to reach the nearest chemical toilet disposal facility within 2 hours when travelling at 3 mph

British waterways (2006) research suggests that the boaters without chemical toilet disposal facilities at their home mooring have, on average, to travel 2 hours to reach one. Whilst much of the Broads network is within 2 hours of a chemical toilet disposal point, the western reaches of the River Waveney and a considerable length of the eastern River Bure are not (figure 4.3.4).

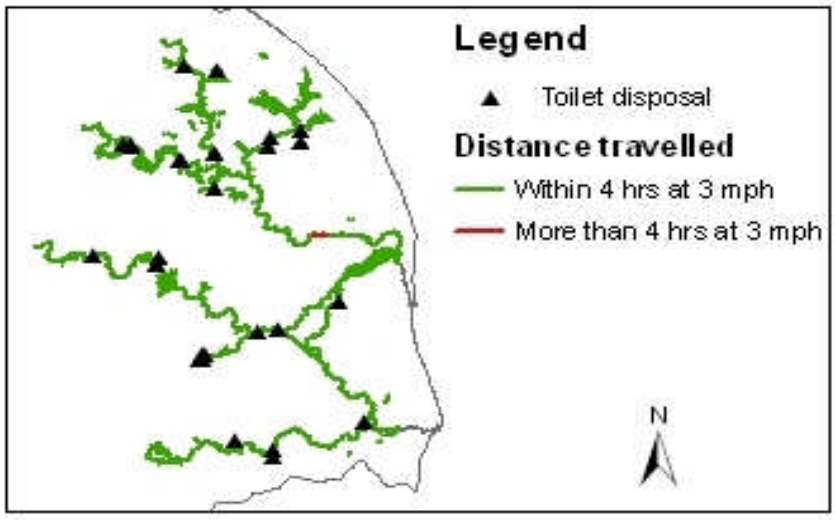

Figure 4.3.5 Waterways of the Broads categorised by ability to reach the nearest chemical toilet disposal facility within 4 hours when travelling at 3 mph

Only a short reach of the River Bure is not within 4 hours of a toilet disposal point (figure 4.3.5) as required when travelling, by the most demanding 25% of people interviewed by British Waterways (2006).

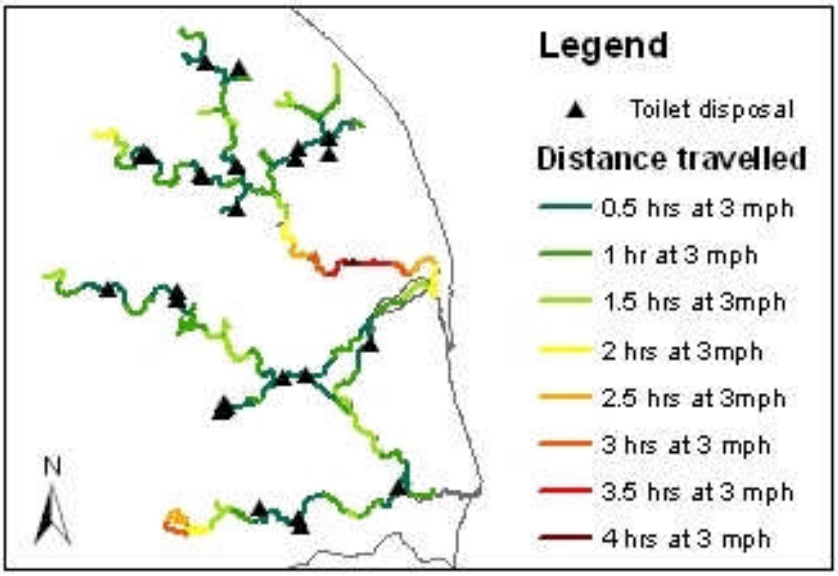

Figure 4.3.6 Distance to closest chemical toilet disposal facility expressed as half hour intervals when travelling at 3 mph

Showing distances covered at half hour intervals whilst travelling at 3 mph, figure 4.3.6 assumes a greater requirement for facilities than outlined by British waterways (2006). The areas less well served for chemical toilet disposal facilities are primarily a small reach of the north of the River Bure, a long reach of the southern Bure and western reaches of the River Waveney.

Comparison of figures 4.3.3 with 4.3.6, shows that the network is generally better served for pumpout stations than chemical toilet disposal facilities.

5 ANALYSIS AND DISCUSSION

This section discusses the implications of the results in relation to the objectives defined in chapter 1 and previous research outlined in chapter 2. Before discussing the results the parameters used in the manual and continuous sampling methods are reviewed.

The parameters tested were chosen to indicate whether sewage pollution had occurred between sampling points. Although they also occur in other sources ammonia, ammonium, nitrogen and phosphate are all present in sewage and therefore raised concentrations indicate organic pollution (Chapman, 1996; Tebbutt, 1998; Harrison, 2001). Similarly although some thermotolerant coliforms have non faecal sources because *Eschericia coli* is both the predominant species in faeces and only occurs in faeces, raised levels indicate faecal pollution (Hutton, 1983; Bartram and Ballance, 1996; Gleeson and Gray, 1997)

As oxygen is consumed when microorganism decompose organic matter (Csuros and Csuros, 1999; Mason, 2002) lower DO indicates increased organic matter (Chapman, 1996; Tebbutt, 1998) and thus possible sewage pollution.

Therefore higher levels of ammonia, ammonium, TON, orthophosphate and thermotolerant coliforms and lower DO tidally downstream of a suspected pollution source would indicate possible sewage pollution.

5.1 CONTINUOUS MONITORING

This section discusses the data collected from Thorpe Island, a high risk boat mooring site on the River Yare, using automated monitoring.

Ammonia, ammonium and DO measured at half hourly intervals by sondes at Townhouse (TH) and Rushcutters (RC) showed variation indicative of contamination of the river with organic matter. As shown in table 5.1.1 differences between readings at the two sondes indicate the pollution source.

Table 5.1.1 Differences between readings at the two sondes at TH and RC which indicate the location of pollution

Pollution source in relation to sondes	Tide during which change of sonde reading occurs	Sonde(s) registering change	Sonde at which change first shown
Upstream	Ebb	RC & TH	TH
Downstream	Flood	RC & TH	RC
Between	Ebb	RC	RC
Between	Flood	TH	TH

Figures 4.1.6 to 4.1.11 show six peaks (1, 2, 5, 6, 8 and 9) that appear to be a result of upstream pollution. In all cases changes in concentration begin to occur during an ebb tide and are shown at TH before RC. Peaks 4 and 7 have features that suggest a downstream pollution source; changes in concentration begin during a flood tide and occur at RC first.

These peaks do not occur in all the determinants. DO, for example, does not decrease during peaks 4, 5, 8, 9. These are the smaller peaks in ammonia or ammonium, so it is possible that the extent of re-oxygenation, due to factors such as movement of water is sufficient to replace oxygen consumed by microorganism decomposing the organic matter (Csuros and Csuros, 1999; Harrison, 2001). The flow in the River Yare may also be great enough to transport organic matter from the sample site before DO is reduced by the activities of microorganisms (Csuros and Csuros, 1999).

Minor changes in oxygen saturation may also be masked by the daily cycling of oxygen concentration. DO was generally highest during the afternoon and lowest during the night due to the presence of submerged plants which produce oxygen by photosynthesis during the day and consume it through respiration during the night (Brönmark and Hansson, 2005).

The decreases in DO and increases in ammonia and ammonium discussed above tend to occur during high mean discharge at Thorpe Island (figures 4.1.12 to 4.1.14). The increases also tend to occur at the beginning of a peak in discharge. These changes in water quality parameters are therefore likely to be a result of organic pollution due to diffuse runoff or emergency overflows.

At peak 3 (figures 4.1.7 and 4.1.8) ammonia and ammonium concentrations peak at RC during an ebb tide with no change in concentrations at TH. It is thus possible that the pollution source is between the two sondes and could be sewage disposal from boats moored at Thorpe Island. This peak is not however totally isolated from that preceding it (peak 2), and occurs during high flow at Thorpe Island, so it is possible that peak 3 is a continuation of the upstream pollution exhibited by peak 2.

The data does not therefore provide conclusive evidence of pollution due to the boats moored at Thorpe Island, although it may have occurred on 26/05/08. It is possible that even if sewage was illegally discharged during this period the changes in water quality parameters were too small to be noticed within the variation caused by other pollution sources. Such interference from other sources is a common problem in boat pollution studies (Warnken and Byrnes, 2003). In addition, under such high flow conditions, the volume of any sewage discharged from boats could be too low to cause an observable change in water quality (table 4.3.1).

5.2 MANUAL SAMPLING

This section discusses data collected by discrete manual sampling (section 4.2) at Whitlingham STW and a mooring at Thorpe Island on the River Yare.

5.2.1 Evidence of pollution at Thorpe Island

Comparison of determinants up and downstream of Thorpe Island mooring (site 2 and 3) provides an indication of sewage pollution from the moored boats. As sampling was undertaken during flood tide, if boats were discharging sewage at Thorpe Island greater levels of TON, orthophosphate, ammonia, thermotolerant coliforms and lower levels of DO would be expected upstream of the boats (sites 1 and 2) than downstream (sites 3 and 4).

Concentrations of ammonia on 23/06/08 and 04/08/08 and of thermotolerant coliforms on 07/07/08 and 04/08/08 indicate possible faecal pollution from boats moored at Thorpe Island. However neither parameter is statistically significantly greater at site 2 than 3. So it is possible that the increase in the determinants is due to chance.

Thermotolerant coliforms also increased between sites 4 and 1 on the 23/06/08 and 04/08/08, however a statistically significant increase only occurs on the earlier date. There is no statistically significant change in thermotolerant coliforms between sites 2 and 3 on these dates. This increase is possibly due to pollution entering the river to the south of Thorpe Island; Sewage discharge from boats is a potential cause of such pollution, however other sources are also possible.

Increases in ammonia or thermotolerant coliforms could also be due to pollution from sources other than sewage discharge from boats. Ammonia could increase due to the breakdown of other organic matter (Abel, 1996; Bartram and

Ballance, 1996) and as outlined in section 2.2 thermotolerant coliforms have sources other than human faeces. Such sources could include faeces from the wildfowl along this stretch of river.

Alternatively, sewage may have been discharged from boats some time before sampling. Thermotolerant coliforms may have declined because of there limited survival time (section 2.2) and ammonia concentrations could reduce through nitrification as ammonia is converted to nitrite and nitrate (Abel, 1996; Bartram and Ballance, 1996; Welch and Jacoby, 2004).

Therefore although ammonia and thermotolerant coliforms indicate possible organic pollution they do not show definitive proof of illegal sewage discharge from boats.

DO was significantly higher at site 2 than site 3 on the dates it was sampled. Phosphate was lower at site 2 than site 3, significantly so on 07/07/08 and 04/08/08. Both determinants thus indicate reduced organic pollution tidally downstream of the moorings at Thorpe Island (site 2), however factors other than levels of organic pollution may have impacted these parameters.

Any decrease in DO as a result of organic pollution may have been prevented by the movement of water increasing oxygen diffusion into the water (Csuros and Csuros, 1999).

Levels of DO could have been affected by the presence of aquatic plants. Oxygen is released during the day through photosynthesis by submerged plants; this can result in significantly raised DO, sometimes above 100% (Brönmark and Hansson, 2005). Data on the extent of vegetation was not fathered during this study, however it is possible that greater biomass of aquatic

plants at site 2 could have masked the effects of organic pollution and be responsible for higher DO levels at this site than the other sampling sites.

As plants readily consume orthophosphate (Chapman, 1996) greater numbers of aquatic plants could also be responsible for reduced levels of orthophosphate at site 2.

Although some indicators suggested possible increased faecal pollution tidally downstream of the moorings at Thorpe Island, the manual sampling did not provide definitive evidence of sewage pollution from the boats.

5.2.2 Evidence of pollution from sewage treatment works

Any change in water quality as a result of the effluent discharged at Whitlingham STW could be identified by comparison of the parameters sampled up and downstream of the STW (sites 5 and 6).

Organic pollution was indicated by changes in DO and TON on all sampling dates and ammonia and thermotolerant coliforms on some dates. However the only significant differences between the sites (confirming that difference between the means were not due to chance) were tidally downstream increases in TON on the 07/04/08 and 04/08/08.

Orthophosphate concentrations did not indicate an increase in pollution, showing no real difference between the sampling points either side of the STW despite the concentrations in sewage from excreta and detergents (George, 1992; Gray, 2004). This may be because Whitlingham STW employs phosphate stripping (Turner pers. coms., 2008b) which significantly reduces the phosphate entering the river.

Reductions downstream of the STW in ammonia on 04/08/08 and thermotolerant coliforms on 07/07/08 and 04/08/08 suggest reduced organic pollution.

Despite the large volumes of effluent which Whitlingham STW can discharge ((up to 198,750 m^3/day (Turner pers. coms., 2008b)) the manual sampling did not consistently indicate organic pollution. The maximum volume the treatment works can discharge is 2.3 m^3/s, compared to approximate river flows of 3.1 m^3/s minimum flow, 6.1 m^3/s mean flow and 19.6 m^3/s maximum flow conditions (these values are approximate as they are taken from calculated data for Thorpe Island, upstream of the treatment works) (Davenport pers com 2008a). The extent to which the effluent will be diluted by the river will therefore vary considerably depending upon the river flow and whether the maximum allowable volume of effluent is discharged from the STW. If less than the maximum volume is discharged dilution of the effluent may be great enough to ensure that changes in water quality are too small to be detected by methods used in this study. In addition effluent from the STW may be of such a quality that it does not increase levels of contaminants, such as phosphate, in the river. Further study including analysis of effluent would be required to substantiate these arguments.

5.3 IMPACT OF DILUTION

It is possible that any sewage pollution discharged from boats at Thorpe Island is not apparent due to the extent of dilution by the flow of the River Yare.

Table 4.3.1 indicates that relatively large volumes of sewage would have to be discharged from boats before downstream concentrations of pollutants exhibited an observable change. However it is notable that if sewage was ‘strong’ ammonia nitrogen and thermotolerant coliforms could be noticed at much lower discharge volumes than the other parameters. As flow in the River

Yare increases larger volumes of sewage discharge from boats would be required to observe differences. Difficulty in observing pollution under high flows would be further increased because high flows also appear to cause peaks in pollutants due to diffuse pollution or emergency point source overflows.

The large volumes required before a change in pollutant concentration is apparent suggest that, in addition to the risk of missing pollution due to infrequent sampling (discussed in section 5.5.1), sewage pollution from boats at Thorpe Island may have been missed as a result of dilution, especially under high flows.

This also has implications for the value of further water quality sampling throughout the Broads. Pollution as a result of boats is unlikely to be noticed in areas with high flow and small volumes of effluent discharge. Water quality assessment is likely to be of much greater value where flow in the waterways is low and a lot of boats are suspected of discharging sewage, so the volume of discharge from boats is high.

As discharge of sewage in areas of lower flow will result in higher downstream concentrations of pollutants, illegal sewage discharge in low flow areas may be more significant, having greater implications for the environment and health than exhibited at Thorpe Island.

Due to the assumptions (section 3.5) the values in table 4.3.1 are only an estimate of the volumes required to observe a downstream increase in pollutants. Variables such as the strength of sewage, flow in the River Yare and whether complete mixing occurs would greatly impact the extent to which pollution could be observed.

5.4 SIGNIFICANCE OF POLLUTION

The significance of any pollution due to sewage disposal from boats can be interpreted by comparison of collected data with known standards. Data was compared with GQA grade boundaries to assess environmental impact and with European legislation to assess possible health affects.

Peaks in DO and total ammonia exhibited in the data from the continuous monitoring and believed to result from pollution sources other than sewage disposal from boats, cause changes in the GQA level and thus a quantifiable decrease in environmental water quality. Other than one possible occurrence, sewage disposal from boats is not noticeable within the data.

TON and orthophosphate data gathered by manual sampling can also be compared with GQA levels. The data suggests that phosphate concentrations are moderate to very high, whilst TON is very low to low (Environment Agency, 2008c). The GQA grades do not worsen as a result of the boats moored at Thorpe.

Data from the automated continuous and manual discrete sampling therefore suggests that any pollution from boats has no discernable impact on environmental water quality in comparison to other sources.

Levels of thermotolerant coliforms can be linked to disease risk (Zmirou, 2003) and are used by EU Bathing Water Directives to indicate whether recreational use of water is a health risk. Although the Broads is not designated as a bathing water, comparison with the directives can indicate health risk According to the EU Bathing Water Directive (EEC/76/160) designated waters must not exceed 2000 faecal CFUs per 100ml (Harrison, 2001; Kay *et al.* 2007). The revised Bathing Water Directive (2006/7/EC) came into force in the UK in March 2008

(Environment Agency, 2008d) and will require designated inland waters to have no more than 900 thermotolerant CFUs per 100ml (EUROPA, 2008).

Other than samples taken on 07/07/08 numbers of CFUs complied with the earlier directive, but the majority of samples did not comply with the more stringent revised directive. Faecal contamination could thus be a health risk to recreational users of the Broads, but as levels of thermotolerant coliforms do not significantly increase due to boats moored at Thorpe Island, boats do not appear to increase health risk.

Any changes in water quality due to pollution from boats do not appear have significant environmental or health implications, the impact of other pollution sources is likely to be much greater. As discussed in section 2.3.2 the significance of pollution from boats depends largely on individual site characteristics; pollution from boats elsewhere on the Broads may have a more significant impact.

5.5 LIMITATIONS OF WATER QUALITY STUDY

The data collected shows no definitive evidence of boats illegally discharging sewage at Thorpe Island, despite the perceived risk. Therefore either sewage was not discharged from boats during the study period or pollution was not detected due to limitations in the methods applied. This section outlines such limitations.

5.5.1 Infrequent sampling

Any illegal discharge of sewage will occur erratically and at unknown times. Therefore the infrequent sampling undertaken in the manual study is likely to have missed pollution events. *E.coli*, for example, may survive for less than 24 hours within the water column (Gleeson and Gray, 1997), so infrequent

sampling of coliforms is unlikely to provide evidence of temporally distant pollution.

With specific reference to sampling for faecal indicator organisms other species can be used to detect temporally distant pollution (outlined in section 2.2), however this can present problems by suggesting recent pollution long after or at a distance from the original occurrence (Payment *et al*. 2003).

If a suitable indicator species could be identified at the study site applying the method used by Guillon-Cottard *et al* (1998) of measuring faecal indicators within the flesh of a species which bioaccumulate pollutants could ensure that intermittent pollution was not missed.

5.5.2 Impact of dilution

As discussed further in section 5.3 small volumes of sewage discharge from boats may have been diluted, on entering the River Yare, to such an extent that a downstream change in concentration of pollutants indicative of sewage contamination may not have been observed. Pollution events may thus have been missed by the water quality sampling because of the effects of dilution.

5.5.3 Sediment disturbance

Sediment disturbance can lengthen coliform survival time and limit validity or results (Faust, 1982). Tidal variation and boating activity could have disturbed sediment at the sample site, distorting the data and resulting in faecal pollution only being indicated at Thorpe Island and the STW on two dates.

Such disturbance of the river bed may also bring anoxic sediment into the aerobic environment causing phosphorous to be released into the water (George, 1992). This release from sediment is thought to be significant in the

Broads contributing up to 278mgP/m2/d (Harrison, 2001). Sediment disturbance is thus a possible explanation (in addition to those already outlined) for the apparent reduction and lack of variation in phosphorous at Thorpe Island and the STW respectively.

As manual sampling occurred close to low tide, when sediment disturbance was likely to be greatest (Mallin *et al*. 1999,) the reintroduction of pollutants from sediment could have masked differences within the water column due to sewage pollution.

5.5.4 Other pollution sources

The River Yare is subject to point source pollution and diffuse pollution from the large arable catchment (George, 1992). This is a common problem in studies of boat pollution (Warnken and Byrnes, 2003). Pollution from such sources may mask small pollution events from boats (Faust, 1982). Further, although thermotolerant coliforms indicate faecal pollution, they do not differentiate between animal sources, so pollution due to human sewage can not be distinguished.

Other studies have successfully isolated boats as the cause of contamination by sampling during periods with little rainfall and thus avoiding external sources of pollution such as diffuse pollution from runoff (Faust, 1982; Guillon-Cottard *et al.* 1998). Guillon-Cottard *et al* (1998) was also able to sample in waters not subject to waste water discharges. During this study it was not possible to limit sampling to times without rainfall because of limited access to facilities, principally boats, which had to be prearranged.

Avoiding external sources of pollution is not always possible. In such cases differentiating between animal and human sources may be achieved through comparing the ratio of thermotolerant coliforms and faecal streptococcus

because the relative numbers of each vary between animal and human faeces (Gleeson and Gray, 1997; Liu and Liptak, 2000). However the ratio of thermotolerant coliforms to faecal streptococci can vary due to a numerous other factors, such as an animals diet, so is not always reliable (Gleeson and Gray, 1997).

Chemical markers, such as caffeine, detergents and faecal sterols, have been suggested as an alternative means of identifying the origin of faecal pollution (Gleeson and Gray, 1999; Tyagi *et al*. 2007; Shah *et al.* 2007). As the composition of faecal sterols, such as coprostanol and cholesterol, in mammalian faeces varies between species they have been suggested as a means to differentiate pollution sources (Gleeson and Gray, 1997; Tyagi *et al*. 2007; Shah *et al*. 2007).

Shah *et al* (2007) found that using faecal sterols to differentiate sources of pollution is problematic because average values for different animals could not be identified and whilst assessing the relative percentages of sterols in the faeces of different species could be useful, no one sterol could be used to identify human contamination. Tyagi *et al* (2007) however, found it possible to accurately identify sources of faecal pollution from domestic animals by analysing a combination of faecal sterols and bile acids.

Chemical markers could thus potentially be used to differentiate human sewage pollution from boats and non human sources of pollution. However due to complicated methods required for analysis chemical markers are not yet suitable for routine use (Gleeson and Gray, 1997) and thus unsuitable for this study.

5.6 GIS ANALYSIS

This section discusses the results and limitations of the GIS analysis which mapped areas at risk from illegal sewage discharge from boats.

As noted by a number of authors, sewage discharge from boats is inversely related to the proximity and adequacy of disposal facilities (Baasel-Tillis and Tucker-Carver, 1998; Guillon-Cottard *et al* 1998; Brown, 2001). There are areas of the Broads where the requirements of boaters, suggested by British Waterways (2006), in terms of distance to disposal facilities, are not met (section 4.3). Of note are the southern reaches of the River Bure and the western reaches of the River Waveney which are likely to be at greatest risk of pollution from illegal sewage discharge from boats.

The Broads have less disposal facilities for chemical toilets than holding tanks (figures 4.3.3 and 4.3.6) and boaters may have to travel further to use a chemical toilet disposal point than a pump out. The waterways may thus be at greater risk of sewage disposal from boats with chemical toilets than those with holding tanks. Illegal disposal from chemical toilets could have additional detrimental effects on the environment because they can contain chemicals such as formaldehyde and chlorine (Potter, 2004; The Green Blue, 2008a). However as the number of boats with each disposal system is unknown the relative provision requirements can not be assessed.

5.6.1 Study limitations

There were a number of limitations to the GIS analysis which limit the accuracy of the results. Classification of the waterways was carried out by eye so when disposal points did not fall on boundaries between segments human judgement was used to define the location of boundaries. Classification was therefore not exact, but the level of accuracy was deemed sufficient for this study.

Movement restrictions due to factors such as heavy traffic or tide preventing access under low structures were not included in the analysis. The maps produced may therefore underestimate the time required to reach disposal facilities. However the use of the lowest speed restriction on the Broads, of 3 mph when boats are often allowed to travel at double this speed (Broads Authority, 2008g) provided some recompense for this.

There are a number of static structures on the Broads which do not have access to mains sewerage and are unable to travel to sewage disposal facilities, these include the wooden bungalows at Potter Heigham, River Thurne (Birtles pers. coms., 2008b).The GIS analysis, however, assumed that all boats were able to travel to disposal sites, so the maps do not illustrate the risk from boats incapable of travelling to disposal facilities.

The awareness and attitudes of boaters towards waste disposal is important in increasing use of disposal facilities (Baasel-Tillis and Tucker-Carver, 1998; Brown, 2001). It was assumed during the analysis that boaters know the location of facilities and will use them if they are within a certain distance. No account was taken of factors other than distance which could influence use of disposal facilities. These could include cost, for example it is possible that the £8 to £10 charge per use (Environment Agency, 2007) may act as a disincentive.

In addition the relationship between the distribution of facilities and boats was not analysed. Demand for facilities will be greater where there is a high density of boats and facilities may be inadequate for the numbers requiring them. This may cause delays, inconveniencing boat users (Brown, 2001) and possibly discourage the use of facilities.

It is thus possible that areas which are at risk from faecal pollution through the inadequacy of sanitary facilities caused by factors other than distance, remain unidentified. Despite these limitations the GIS analysis provides an indication of the distribution of facilities and thus the areas at risk from faecal pollution from boats due to distance from disposal points.

6 CONCLUSIONS

This project aimed to assess the risk of boats on the Broads illegally discharging sewage. A mooring site at Thorpe Island on the River Yare was chosen for investigation because it was identified as being at high risk of pollution due to illegal sewage discharge from boats. Continuous water quality monitoring of ammonia, ammonium and dissolved oxygen and the manual sampling of thermotolerant coliforms, nitrogen, phosphate and dissolved oxygen at the mooring site and around Whitlingham sewage treatment works found no conclusive evidence of pollution due to boats. There are two possible scenarios; either the boats did not illegally discharge sewage or that any pollution went unnoticed due to dilution and limitations of the study.

Analysis of the distribution of sewage disposal facilities showed that Thorpe Island was within the required distance of disposal facilities expressed by boaters in a British Waterways (2006) survey, suggesting that there would be little incentive, in terms of distance from disposal points, to illegally discharge sewage at Thorpe Island. The analysis did however highlight areas which may be at risk of illegal sewage disposal due to distance from sewage disposal facilities.

Comparison of the data with GQA levels and European Directives showed that any pollution due to boats at Thorpe Island discharging sewage does not have a significant impact on environmental water quality or health. Sources other than sewage discharge from boats have a much greater effect on water quality. However this may not be the case for the rest of the Broads, particularly in areas highlighted as at greater risk by the GIS analysis or with lower flow. Sewage disposal into the waterways is also unsightly and illegal, so despite the apparent lack of health and environmental implications, continued management to minimise the risk is suggested.

7 RECOMMENDATIONS

This section outlines recommendations for further study which address the limitations and develop the findings of this thesis, and actions to be taken to reduce the risk of pollution from boats.

7.1 RECOMMENDATIONS FOR FURTHER STUDY

7.1.1 GIS analysis

The GIS analysis should be developed to better identify areas at risk of illegal sewage disposal from boats. The method used to categorise the river should be automated, thus removing errors due to human judgement. Factors affecting navigation including speed limits and restrictions due to tide should be included in the analysis. Adequacy in terms of demand should be included through comparison of the number and distribution of boats in relation to facilities. Other factors effecting use of facilities should be included, these should be identified through a survey of boater's attitudes towards sewage disposal.

7.1.2 Improvement of water quality studies

Any further water quality studies should be conducted in areas identified by the GIS analysis (outlined above) and limitations discussed in section 5.5 should be addressed through a number of measures.

Sampling should occur at hourly intervals between high and low tide and should be avoided during or after rainfall. This avoids interference from pollution from other sources, such as run off (Mallin *et al*. 1999) and mitigates against unknown discharge time and variables such as coliform survival.

If such frequent sampling is not possible, unless restricted by access, sampling should be undertaken midway through ebb tide to increase confidence of flow direction and reduce variation due to pollutant from sediment.

Biochemical Oxygen Demand (BOD) would be useful for future studies, providing an indication of the organic matter within the water by measuring the decline in oxygen concentrations over 5 days due to decomposition by microorganisms (Csuros and Csuros, 1999; Alley, 2007). This was not included in the present study due to practical difficulties.

Prior to further water quality studies consideration should be given to whether pollution will be great enough to be identified. If dilution of any pollution is likely to be so great that methods are incapable of the precision required to distinguish changes, water quality studies may be futile.

7.2 ACTION TO REDUCE POLLUTION FROM BOATS

Although conclusive evidence of pollution from boats at Thorpe Island was not found, pollution may have been missed or be occurring elsewhere. Therefore actions to reduce the risk of pollution from boats should be considered.

Awareness of issues surrounding sewage disposal is important in reducing overboard sewage discharge (Cottrell and Graefe, 1997; Baasel-Tillis and Tucker-Carver, 1998; Brown, 2001). Information about sewage disposal is already available to boaters (Environment Agency, 2007; The Green Blue, 2008a; The Green Blue, 2008b). To gain maximum benefit from current facilities continuing emphasis should be placed upon raising awareness about the impacts of inappropriate sewage disposal on health and the environment, the availability of disposal facilities (Brown, 2001) and the laws prohibiting sewage disposal in the waterways of the Broads.

Additional sewage disposal facilities may be necessary in areas identified as at high risk of illegal sewage disposal. A mobile pumpout boat should also be considered. By removing the inconvenience, and possible inability, of boaters to travel to sewage disposal facilities it could reduce illegal sewage discharge. Such a facility could be either summoned by a telephone or radio call, or patrol an area and respond to markers indicating the need for a pumpout service (Brown, 2001). A similar scheme already operates at Potter Heigham (Birtles pers. coms., 2008) where the high density of structures is the likely reason that it is viable. Costs of a mobile service may be prohibitive elsewhere and further investigation, including analysis of the Potter Heigham scheme is recommended.

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Appendix A.

Standard Operating Procedures

A1 Standard Operating Procedure for ammonium-N

A2 Standard Operating Procedure for phosphate - P

A3 Standard Operating Procedure for TON

A1

NR-SAS / SOP 31 / Version 1

Determination of suspended solids and ammonium-N in water using the Burkard SFA-2000 auto-analyser

1. Source

- Method supplied by Burkard Scientific.
- 'Automated Phenate Method', p 4-81, Standard Methods for the Examination of Water and Wastewater, 19th Edition, 1995.

2. Scope

- This SOP describes a method for the determination of suspended solids and ammonium-nitrogen in water.
- This SOP is applicable to water samples.

3. Principle

- Ammonium-N in the sample reacts with phenol and hypochlorite to form indiphenol blue. The blue colour is measured at 650nm.

4. Laboratory sample

- Use water samples, which have been equilibrated to the laboratory temperature for one hour.

5. Reagents and [*Colour coding*]

- Brij-35 wash solution (RPU 79)
- D.I.C. solution (RPU 88) [*purple*]
- Citrate buffer (RPU 89) [two tubes: *white* & *red*]
- Ammonium-N stock standard (RPU 90)
- Sodium salicylate (RPU 94) [*blue*]
- Ammonium-N working standards - LOW (RPU 99)
- Ammonium-N working standards - HIGH (RPU 100)
- Dionised water [*orange*]

6. Expression of results

- Suspended solids is calculated and recorded to one decimal place.
- The result for suspended solids is reported to one decimal place.
- Ammonium-nitrogen is calculated and recorded to one decimal place.
- The result for ammonium-nitrogen is reported to one decimal place.

7. Determination of suspended solids

1. Place a 0.45µm membrane filter paper in an oven set at 105°C ±2°C for approximately one hour. Allow the filter to cool in a desiccator and weigh. Call this mass $\mathbf{W_1}$.
2. Shake the water sample vigorously and immediately draw up 25ml of sample using a syringe and filter through the weighed 0.45µm filter, retaining the filtrate. This filtrate is used to determine ammonium-N.
3. Wash the syringe through the filter with three 25ml aliquots of demineralised water, discarding the washings.
4. Place the filter paper in an oven set at 105°C ±2°C for approximately one hour. Allow the filter to cool in a desiccator and weigh. Call this mass $\mathbf{W_2}$.

Author: Date:

mg/l of suspended material = $(W_2 - W_1) \times 40000$

where

- W_1 is the mass, in grams, of the filter paper;
- W_2 is the mass, in grams, of the filter paper plus suspended material.

8. Preparation of auto-analyser

1. Connect to auto-analyser to the mains, and switch on the pumps, colorimeter, autosampler and chemistry modules required for Group 1.
2. Check all drain tubes are running to waste.
3. Place the sample wash tube and all water tubes in demineralised water. Place reagent tubes in Brij-35 wash solution (RPU 79).
4. Tension tubing, latch platens, and apply pressure to the pump tubes by moving the levers on the platens to on.
5. Turn on the pumps in continuous mode and run for about 30 minutes, checking that there are no leaks in the system. After the 30 minutes have elapsed ensure that the temperature of the ammonium-N channel is 50°C ±0.5°C.
6. Turn on the computer, double click on the Microstream icon. When Microstream has loaded select Group 1 (lower left of screen)

- Select
- File
- Load form
- Select form required
- Open

7. Then

- Select:
- File
- New file
- Data file
- Save

8. Enter the number of samples in the box (the total number of cups will be calculated)

- Select
- OK (the cup table will be generated).

9. Then

- Select:
- View
- ADC readings (the ADC window will be displayed)
- For ammonium-N set the baseline to between 200 and 500 using the baseline zero screw inside the colorimeter.

10. Check cup table
    - Select:
    - Edit
    - Sample cups
    - Highlight file number and channel
    - Select;
    - Check value for standards and drifts are correct (sample identifiers may be entered at this stage or later).
11. Close cup editor
    - Select:
    - End
    - Yes
    - Quit.
12. If readings are high and baseline noisy suspect a bubble in the flow cell. This can be cleared by pinching the outlet tube from flow cell for 2-3 seconds and then releasing. If necessary, this can be repeated several times.

9. Measurement of ammonium-N

1. All reagents must be at room temperature. Place the reagent tubes for the analysis in their respective reagent containers and run for 15 – 30 minutes until a stable baseline is obtained, adjusted to between 200 and 500 (as above).
2. Load 2ml cups containing the standards [*red cups*], drifts [*green cups*], washes [blue *cups*] and samples [*colourless cups*] (all at room temperature) into the sample tray in the order displayed in the cup table. Check that the carousel is in the "home" position, and reset if necessary. If the autosampler needs resetting, press *7## on the front panel.
3. To start the run:

- Select:
- Go
- Yes

4. To enter sample identities: (this can be done at any time, before, during or after the run).

- Select:
- Edit
- Sample cups
- Highlight the file required
- Select
- Enter sample identities into the table
- End
- Yes
- Quit

5. To print a calibration graph: (this can be done at any time after the results for the standards have been displayed in the table)
- Select:
- Graph
- Calibration graph
- Highlight the required file and channel
- Select: Print

10. Sample result over calibration

- The auto-analyser has been calibrated to measure ammonium-nitrogen in a sample up to a concentration of 25 mg N/litre. If the concentration in the sample exceeds this upper limit, then the sample must be diluted using volumetric glassware (dilution factor D). The calculated result will then be multiplied by the dilution factor to give mg N/litre in the sample.

11. Shutting down the auto-analyser on completion of determinations

1. Place all reagent tubes in Brij-35 wash solution (RPU 79) and wash through the system for 30 minutes.
2. When the wash is completed, switch off the pumps, release the pressure, unlatch the platens and release the tension on the pump tubes.
3. Turn off the autosamplers, pumps, chemistry units and colorimeters at the mains.
4. To format and print the results, first turn on the printer.
- Select:
- Edit
- Format results
- Highlight the required file
- Select
- Check the box beside the results required (e.g. standards, unknowns, user types)
- O.K.
5. To print the full data, first turn on the printer.
- Select:
- Calculate
- Print
- Highlight required file
- Select
6. Close all open files, exit from Microstream, close down the computer, and turn off at the mains.

A2

NR-SAS / SOP 33 / Version 1

Determination of suspended solids and phosphate-P in water using the Burkard SFA-2000 auto-analyser

1. Source

- Method supplied by Burkard Scientific.
- 'Automated Ascorbic Acid Reduction Method', p 4-114, Standard Methods for the Examination of Water and Wastewater, 19th Edition, 1995.

2. Scope

- This SOP describes a method for the determination of suspended solids and phosphate-P in water.
- This SOP is applicable to water samples.

3. Principle

- The measurement of phosphate is based on the reaction of phosphate with molybdate to form phosphomolybdate which is then reduced to 'Molybdenum Blue' by ascorbic acid. The blue colour is measured at 660nm.

4. Laboratory sample

- Use water samples, which have been equilibrated to the laboratory temperature for one hour.

5. Reagents and [*Colour coding*]

- 10g/l sodium dodecyl sulphate wash solution (RPU 86)
- Phosphate-P stock standard (RPU 95)
- 2% v/v sulphuric acid solution (RPU 96) [two tubes: *yellow* & *red*]
- Ammonium molybdate solution (RPU 97) [*green*]
- Ascorbic acid solution (RPU 98) [*blue*]
- Phosphate-P working standards - LOW (RPU 103)
- Phosphate-P working standards - HIGH (RPU 104)
- Deionised water [*orange*]

6. Expression of results

- Suspended solids is calculated and recorded to one decimal place.
- The result for suspended solids is reported to one decimal place.
- Phosphate-P is calculated and recorded to one decimal place.
- The result for phosphate-P is reported to one decimal place.

7. Determination of suspended solids

1. Place a 0.45µm membrane filter paper in an oven set at 105°C ±2°C for approximately one hour. Allow the filter to cool in a desiccator and weigh. Call this mass $\mathbf{W_1}$.
2. Shake the water sample vigorously and immediately draw up 25ml of sample using a syringe and filter through the weighed 0.45µm filter, retaining the filtrate. This filtrate is used to determine phosphate-P.
3. Wash the syringe through the filter with three 25ml aliquots of demineralised water, discarding the washings.

Author: Date:

4. Place the filter paper in an oven set at 105°C ±2°C for approximately one hour. Allow the filter to cool in a desiccator and weigh. Call this mass $\mathbf{W_2}$.

mg/l of suspended material = $(\mathbf{W_2} - \mathbf{W_1}) \times 40000$

where

- $\mathbf{W_1}$ is the mass, in grams, of the filter paper;
- $\mathbf{W_2}$ is the mass, in grams, of the filter paper plus suspended material.

8. Preparation of auto-analyser

1. Connect to auto-analyser to the mains, and switch on the pumps, colorimeter, autosampler and chemistry modules required for Group 1.
2. Check all drain tubes are running to waste.
3. Place the sample wash tube and all water tubes in demineralised water. Place reagent tubes in sodium dodecyl sulphate wash solution (RPU 86).
4. Tension tubing, latch platens, and apply pressure to the pump tubes by moving the levers on the platens to on.
5. Turn on the pumps in continuous mode and run for about 30 minutes, checking that there are no leaks in the system. After the 30 minutes have elapsed ensure that the temperature of the phosphate-P channel is 90°C ±0.5°C.
6. Turn on the computer, double click on the Microstream icon. When Microstream has loaded select Group 1 (lower left of screen)

- Select
- File
- Load form
- Select form required
- Open

7. Then

- Select:
- File
- New file
- Data file
- Save

8. Enter the number of samples in the box (the total number of cups will be calculated)

- Select
- OK (the cup table will be generated).

9. Then

- Select:
- View
- ADC readings (the ADC window will be displayed)
- For phosphate-P set the baseline to between 200 and 500 using the baseline zero screw inside the colorimeter.

10. Check cup table
    - Select:
    - Edit
    - Sample cups
    - Highlight file number and channel
    - Select;
    - Check value for standards and drifts are correct (sample identifiers may be entered at this stage or later).
11. Close cup editor
    - Select:
    - End
    - Yes
    - Quit.
12. If readings are high and baseline noisy suspect a bubble in the flow cell. This can be cleared by pinching the outlet tube from flow cell for 2-3 seconds and then releasing. If necessary, this can be repeated several times.

9. Measurement of phosphate-P

1. All reagents must be at room temperature. Place the reagent tubes for the analysis in their respective reagent containers and run for 15 – 30 minutes until a stable baseline is obtained, adjusted to between 200 and 500 (as above).
2. Load 2ml cups containing the standards [*red cups*], drifts [*green cups*], washes [blue *cups*] and samples [*colourless cups*] (all at room temperature) into the sample tray in the order displayed in the cup table. Check that the carousel is in the "home" position, and reset if necessary. If the autosampler needs resetting, press *7## on the front panel.
3. To start the run:

- Select:
- Go
- Yes

4. To enter sample identities: (this can be done at any time, before, during or after the run).

- Select:
- Edit
- Sample cups
- Highlight the file required
- Select
- Enter sample identities into the table
- End
- Yes
- Quit

5. To print a calibration graph: (this can be done at any time after the results for the standards have been displayed in the table)

- Select:

- Graph
- Calibration graph
- Highlight the required file and channel
- Select: Print

10. Sample result over calibration

- The auto-analyser has been calibrated to measure phophate-P in a sample up to a concentration of 25 mg P/litre. If the concentration in the sample exceeds this upper limit, then the sample must be diluted using volumetric glassware (dilution factor D). The calculated result will then be multiplied by the dilution factor to give mg N/litre in the sample.

11. Shutting down the auto-analyser on completion of determinations

1. Place all reagent tubes in sodium dodecyl sulphate wash solution (RPU 86) and wash through the system for 30 minutes.
2. When the wash is completed, switch off the pumps, release the pressure, unlatch the platens and release the tension on the pump tubes.
3. Turn off the autosamplers, pumps, chemistry units and colorimeters at the mains.
4. To format and print the results, first turn on the printer.

- Select:
- Edit
- Format results
- Highlight the required file
- Select
- Check the box beside the results required (e.g. standards, unknowns, user types)
- O.K.

5. To print the full data, first turn on the printer.

- Select:
- Calculate
- Print
- Highlight required file
- Select

6. Close all open files, exit from Microstream, close down the computer, and turn off at the mains.

A3

NR-SAS / SOP 32 / Version 1

Determination of suspended solids and total oxides of nitrogen (TON) in water using the Burkard SFA-2000 auto-analyser

1. Source

- Method supplied by Burkard Scientific.
- 'Automated Hydrazine Reduction Method', p 4-90, Standard Methods for the Examination of Water and Wastewater, 19th Edition, 1995.

2. Scope

- This SOP describes a method for the determination of suspended solids and total oxides of nitrogen (TON) in water.
- This SOP is applicable to water samples.

3. Principle

- Nitrate-N in the sample is reduced to nitrite by copper-hydrazine solution. The resultant nitrite and any nitrite in the original sample reacts with sulpanilamide and N-1-naphthylethylenediamine to form a red azo dye that is measured at 520nm.

4. Laboratory sample

- Use water samples, which have been equilibrated to the laboratory temperature for one hour.

5. Reagents and [*Colour coding*]

- Nitrogen stock standard (RPU 64)
- 0.4 mol/l sodium hydroxide solution (RPU 71) [*green*]
- 0.2 mol/l sodium hydroxide solution (RPU 72) [*purple*]
- Copper sulphate stock solution (RPU 73)
- Hydrazine copper reagent (RPU 74) [*yellow*]
- Suphanilamide solution (RPU 75) [*white*]
- Brij-35 wash solution (RPU 79)
- TON working standards - LOW (RPU 101)
- TON working standards - HIGH (RPU 102)
- Deionised water [*orange*]

6. Expression of results

- Suspended solids is calculated and recorded to one decimal place.
- The result for suspended solids is reported to one decimal place.
- TON is calculated and recorded to one decimal place.
- The result for TON is reported to one decimal place.

7. Determination of suspended solids

1. Place a 0.45µm membrane filter paper in an oven set at 105°C ±2°C for approximately one hour. Allow the filter to cool in a desiccator and weigh. Call this mass $\mathbf{W_1}$.
2. Shake the water sample vigorously and immediately draw up 25ml of sample using a syringe and filter through the weighed 0.45µm filter, retaining the filtrate. This filtrate is used to determine TON.

Author: Date:

3. Wash the syringe through the filter with three 25ml aliquots of demineralised water, discarding the washings.
4. Place the filter paper in an oven set at 105°C ±2°C for approximately one hour. Allow the filter to cool in a desiccator and weigh. Call this mass $\mathbf{W_2}$.

mg/l of suspended material = $(\mathbf{W_2} - \mathbf{W_1}) \times 40000$

where

- $\mathbf{W_1}$ is the mass, in grams, of the filter paper;
- $\mathbf{W_2}$ is the mass, in grams, of the filter paper plus suspended material.

8. Preparation of auto-analyser

1. Connect to auto-analyser to the mains, and switch on the pumps, colorimeter, autosampler and chemistry modules required for Group 1.
2. Check all drain tubes are running to waste.
3. Place the sample wash tube and all water tubes in demineralised water. Place reagent tubes in Brij-35 wash solution (RPU 79).
4. Tension tubing, latch platens, and apply pressure to the pump tubes by moving the levers on the platens to on.
5. Turn on the pumps in continuous mode and run for about 30 minutes, checking that there are no leaks in the system. After the 30 minutes have elapsed ensure that the temperature of the TON channel is 37°C ±0.5°C.
6. Turn on the computer, double click on the Microstream icon. When Microstream has loaded select Group 1 (lower left of screen)

- Select
- File
- Load form
- Select form required
- Open

7. Then

- Select:
- File
- New file
- Data file
- Save

8. Enter the number of samples in the box (the total number of cups will be calculated)

- Select
- OK (the cup table will be generated).

9. Then

- Select:
- View
- ADC readings (the ADC window will be displayed)
- For nitrate-N and nitrite-N set the baseline to between 200 and 500 using the baseline zero screw inside the colorimeter.

10. Check cup table
    - Select:
    - Edit
    - Sample cups
    - Highlight file number and channel
    - Select;
    - Check value for standards and drifts are correct (sample identifiers may be entered at this stage or later).
11. Close cup editor
    - Select:
    - End
    - Yes
    - Quit.
12. If readings are high and baseline noisy suspect a bubble in the flow cell. This can be cleared by pinching the outlet tube from flow cell for 2-3 seconds and then releasing. If necessary, this can be repeated several times.

9. Measurement of TON

1. All reagents must be at room temperature. Place the reagent tubes for the analysis in their respective reagent containers and run for 15 – 30 minutes until a stable baseline is obtained, adjusted to between 200 and 500 (as above).
2. Load 2ml cups containing the standards [*red cups*], drifts [*green cups*], washes [blue *cups*] and samples [*colourless cups*] (all at room temperature) into the sample tray in the order displayed in the cup table. Check that the carousel is in the "home" position, and reset if necessary. If the autosampler needs resetting, press *7## on the front panel.
3. To start the run:

- Select:
- Go
- Yes

4. To enter sample identities: (this can be done at any time, before, during or after the run).

- Select:
- Edit
- Sample cups
- Highlight the file required
- Select
- Enter sample identities into the table
- End
- Yes
- Quit

5. To print a calibration graph: (this can be done at any time after the results for the standards have been displayed in the table)
- Select:
- Graph
- Calibration graph
- Highlight the required file and channel
- Select: Print

10. Sample result over calibration

- The auto-analyser has been calibrated to measure TON in a sample up to a concentration of 25 mg N/litre. If the concentration in the sample exceeds this upper limit, then the sample must be diluted using volumetric glassware (dilution factor D). The calculated result will then be multiplied by the dilution factor to give mg N/litre in the sample.

11. Shutting down the auto-analyser on completion of determinations

1. Place all reagent tubes in Brij-35 wash solution (RPU 79) and wash through the system for 30 minutes.
2. When the wash is completed, switch off the pumps, release the pressure, unlatch the platens and release the tension on the pump tubes.
3. Turn off the autosamplers, pumps, chemistry units and colorimeters at the mains.
4. To format and print the results, first turn on the printer.
- Select:
- Edit
- Format results
- Highlight the required file
- Select
- Check the box beside the results required (e.g. standards, unknowns, user types)
- O.K.
5. To print the full data, first turn on the printer.
- Select:
- Calculate
- Print
- Highlight required file
- Select
6. Close all open files, exit from Microstream, close down the computer, and turn off at the mains.

Appendix B

Calculation of flow at Thorpe Island

Methodology outlined below received by personal communication from Davenport (2008b)

Initial investigation on the WISKI database into good available flow data for the period 6th May to 28th July 2008, from gauging stations upstream of Thorpe Island at grid reference TG 26004 08363 provided:

- Costessey Mill on the Wensum - station number 34004 at grid reference TG 1770 1280
- Costessey Park on the Tud – station number 034005 grid reference TG 1700 1130
- Colney on the upper Yare – station number 034001 grid reference TG 182 082
- Shotesham on the Tas – station number 034002 grid reference TM 2260 9940

The daily mean, maximum and 15 minute data for each were exported and entered in spreadsheets.

The whole catchment overview was looked into on the Lows Flows Enterprise application used at the Environment Agency. The main rivers and tributaries are shown divided by catchment lines, crossing the rivers and tributaries at the gauging stations (figure B1). Any area can be looked into in detail to 1:3,000 scale.

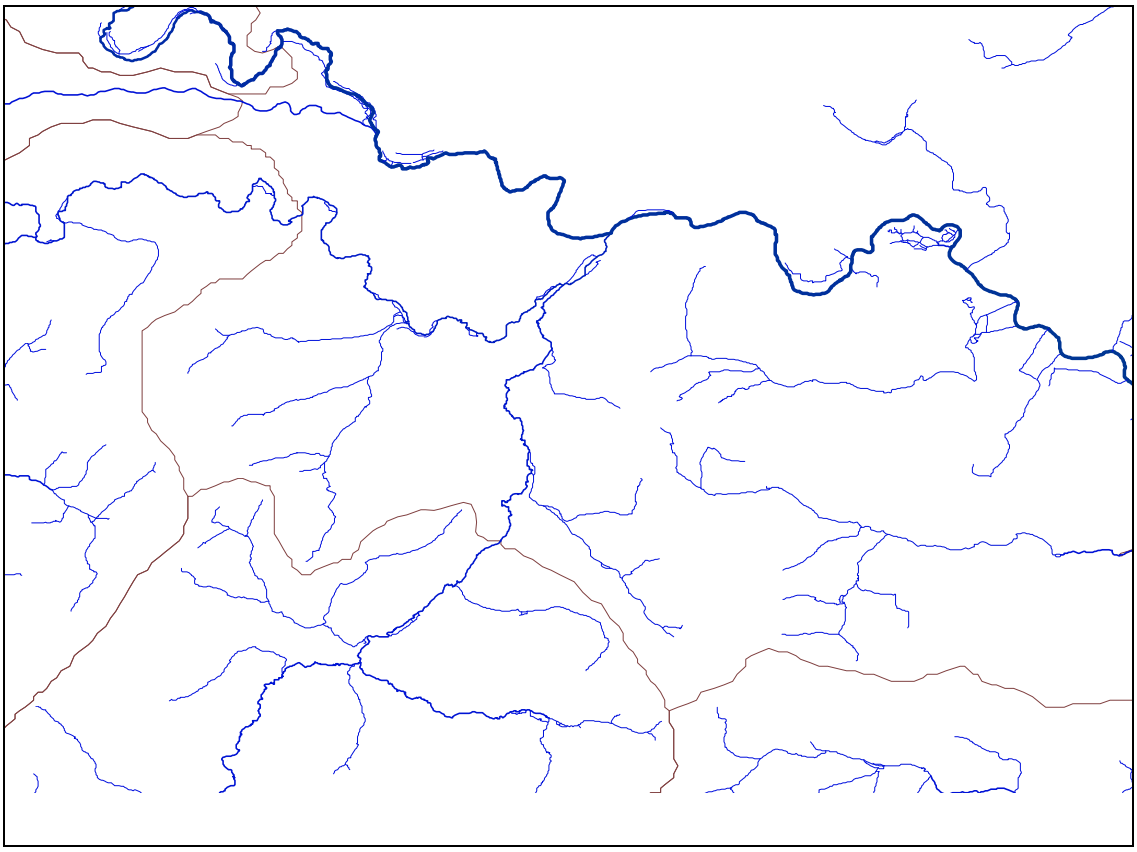

Figure B1. Catchment overview for Thorpe Island

Low Flows provides basic flow statistical output such as Annual Mean Flow, a flow derivation curve and output flow percentiles for most grid references. These are derived from actual area gauging station flow data and from gauging stations with comparable catchment characteristics. It can show both catchment and sub-catchment areas. Low Flows derives catchment areas by a digital 'climb method' requiring some difference in height within 750m of a selected grid point.

If there is 'no climb' the area is analogue and can be erroneous, encompassing groundwater catchments. For this reason each area required for this flow derivation was checked on FEH (the Flood Estimation Handbook) which provides precise area data.

From looking at the catchment and available gauging stations it was decided to use Low Flows at each of the following grid references for their catchment area, checked on FEH, and in the case of the tributaries on the mid-Yare the Annual Mean Flow also from Low Flows Enterprise.

The flows were factored as follows:

Wensum:

Wensum at Costessey Mill – area 560.8 km² at TM 1770 1280

Made up to pre-Tud confluence – area 571.3 km² at TG 199 107

Multiply all flow records by = 1.0872

Giving Wensum flows at pre-Tud confluence

Tud at Costessey Park – area 72.06 km²

Made up to pre-Wensum confluence – area 75.26 km² at TG 196107

Multiply all flows by = 1.04441

Gives Tud flows up to Wensum confluence

Total of both Wensum and Tud areas = 646.56 km² at TG 196 107

Post-confluence area = 647.96 km² at TG 198 103

Multiply all flows by = 1.00216

Gives Wensum flows after Tud confluence

Increase Wensum from post-confluence area = 647.96 km² at TG 198 103

to pre-Yare confluence area = 677.69 km² at TG 24998 07788

Multiply flows by = 1.04588

Gives Wensum flows to pre-Yare confluence

Yare

Yare at Colney – area 228.78 km² at TG 182 082 with Annual mean flow – 1.326 m³/s

Yare tributaries – area 29.8 km² at TG 205053 with Annual mean flow – 0.169 m³/s

Yare to post-tributaries – area 271.06 km²

Multiply all flows by = 1.18481

Gives Colney flow made up to tributary inflow

Tributary inflow AMF = 0.169 m³/s

Yare AMF = 1.326 m³/s

= 0.12745 x Yare flows to TG 205053

Add to Yare flows to TG 205053

Gives Yare flows plus tributary inflows

Yare – area 271.06 km²

made up to pre-Tas confluence – area 279.1 km² at TG 239064

multiply all flows by = 1.02966

Gives Yare flows to pre-Tas confluence

Tas at Shotesham – area 153.97 km² at TM 226 994

Made up to pre-Yare confluence – area 189.9 km² to TG 239 063

Multiply all flows by = 1.23336

Gives Tas flows up to Yare confluence

Colney to pre-Tas confluence – area 279.1 km² at TG 239064

Tas to pre-Yare confluence – area 189.9 km² at TG 239063

Combined areas = 469 km²

Yare post-Tas confluence area – 472.89 km² at TG 240064

Multiply Yare flows by = 1.00829

Gives Yare flows post-Tas confluence

Yare area pre-Wensum confluence – 479.61 km² at TG 25010 07747

Multiply Yare flows by = 1.01421

Gives Yare flows pre-Wensum confluence

Wensum & Yare

Wensum at pre-Yare confluence – area 677.69 km² at TG 250077

Yare at pre-Wensum confluence – area 479.61 at TG 25010 07747

Combined area = 1157.3 km²

Yare to post-Wensum Yare confluence – 1158.58 km² at TG 263 082

Multiply flows by 1.0011

Gives Yare flows post-confluence

Thorpe Island area = 1175.1 km²

Multiply flows by 1.01426

Gives Yare flows to Thorpe Island.

It should also be noted that the Yare is tidal at this point.

Appendix C

Discrete manual sampling data

Please see attached CD

Appendix D

Continuous automated sampling data

Please see attached CD

Appendix C

Discrete manual sampling data

To allow analysis of the data which was collected manually on 23/06/08, 07/07/08, 21/07/08 and 04/08/08 outliers were removed to ensure that remaining data was normally distributed. The raw data is shown here with the removed outliers highlighted in blue cells.

Table C1. Discrete manual sampling data

Date	Location	Dissolved oxygen (% saturation)	pH	Temperature (°C)	CFU per 100ml	Ammonia (mg N/l)	TON (mg N/l)	Phosphate (mg P/l)
23/06/2008	Upstream Thorpe	91.2	7.8	16.2	1400	0.09	6.29	0.08
		90.2	7.86	16.9	2190	0.08	6.29	0.11
		87.5	7.85	16.2	1880	0.09	6.28	0.11
		90	7.98	16.3	1970	0.07	6.51	0.1
		85.9	8.1	16.3	2410	0.14	6.4	0.11
	Thorpe Bridge	91.6	8.05	16.4	640	0.08	6.03	0.1
		92.4	8.49	16.4	920	0.07	6.17	0.1
		92.2	8.41	16.45	880	0.08	6.59	0.09
		99	8.04	16.14	1580	0.06	6.19	0.09
		93.1	8.03	16.51	720	0.07	6.23	0.09
	Thorpe Rushcutters	88.9	7.9	16.4	1210	0.07	5.97	0.09
		84.9	7.6	16.4	900	0.07	6.41	0.11
		92.3	8.02	16.1	1110	0.07	6.27	0.11
		88.3	7.96	16.2	1430	0.07	6.15	0.1

		87.3	7.96	16.3	550	0.06	6.13	0.11
	Downstream Thorpe	86.3	7.93	16.03	840	0.07	6.21	0.11
		87.7	7.9	16.04	540	0.06	6.25	0.12
		86.2	7.88	16.2	630	0.07	6.37	0.1
		89.6	7.67	16.08	1280	0.07	6.41	0.1
		90.3	7.96	16.17	790	0.11	6.44	0.12
	Upstream STW	88.6	7.79	16.76	1200	0.05	8.61	0.1
		85.9	7.76	16.78	1610	0.06	9.12	0.09
		86.6	7.79	17.17	780	0.1	7.44	0.11
		88.1	7.63	17.18	490	0.08	6.83	0.09
		86.4	7.91	16.89	710	0.07	7.38	0.11
	Downstream STW	87.8	7.98	17.4	540	0.06	7.22	0.11
		86.5	7.83	16.9	630	0.08	7.59	0.13
		87.3	7.98	16.93	600	0.07	7.17	0.1
		89	7.91	17.06	140	0.07	7.22	0.1
		88.9	7.9	17.02	530	0.06	6.7	0.1
07/07/2008	Upstream Thorpe	91.05	7.72	17.7	3400	0.13	5.4	0.13
		90.05	7.74	17.79	3800	0.04	5.4	0.14
		85.93	7.79	17.79	2850	0.03	5.6	0.13
		85.54	7.7	17.48	2410	0.03	5.6	0.13
		85.43	7.74	17.75	2530	0	5.6	0.12
	Thorpe Bridge	88.9	7.82	17.9	1030	0.03	5.2	0.09
		100.4	7.79	17.9	2180	0.05	5.2	0.08
		98.9	7.71	17.74	2340	0.04	5.2	0.08
		106.4	7.97	18.04	4120	0.08	5.3	0.09
		103.4	7.73	18.03	3600	0.04	5.3	0.09
	Thorpe Rushcutters	87.1	7.85	17.6	3400	0.05	5.2	0.15
		86.4	7.84	17.6	1460	0.05	5.2	0.15
		86.3	7.84	17.64	1550	0.06	5.2	0.16
		85.9	7.82	17.68	1770	0.05	5.2	0.15
		85.7	7.67	17.62	1730	0.04	5.1	0.15
	Down	87.1	7.6	17.5	3400	0.02	5.2	0.11

	stream Thorpe	87.5	7.6	17.5	1830	0.03	5.1	0.14
		88.8	7.8	17.5	2770	0.04	5.2	0.15
		88.8	7.64	17.64	1730	0.03	5.1	0.14
		86.2	7.69	17.6	4700	0.03	5.1	0.15
	Upstream STW	87.89	7.81	17.89	3250	0.17	6.6	0.14
		89.7	7.6	17.8	2260	0.05	6.5	0.11
		87.5	7.5	17.85	1730	0.01	5.8	0.13
		86.3	7.5	17.84	1890	0.04	6	0.14
		86.2	7.73	17.8	710	0.03	5.7	0.14
	Downstream STW	88.4	7.9	17.84	4300	0.03	5.6	0.11
		91.82	7.7	17.8	1490	0.01	5.5	0.13
		88.6	7.7	17.8	1680	0.04	5.6	0.15
		89.2	7.9	17.7	3320	0.02	5.6	0.15
		90.09	7.7	18	1190	0.04	5.5	0.14
21/07/2008	Upstream Thorpe	92.2	7.5	16.8	860	0.01	4.6	0.14
		90.1	7.8	16.5	1010	0.06	4.8	0.22
		91.3	7.8	16.5	900	0.03	4.8	0.25
		93.3	7.8	16.5	830	0.06	4.9	0.24
		92.9	7.8	16.5	740	0.09	5.5	0.23
	Thorpe Bridge							
	Thorpe Rushcutters	90.1	7.8	16.6	1050	0.02	4.6	0.25
		89.9	7.8	16.6	1410	0.02	4.6	0.26
		89.6	7.8	16.6	1480	0.04	4.6	0.25
		89.6	7.8	16.6	1800	0.05	4.5	0.25
		89.8	7.8	16.6	1060	0.05	4.6	0.24
	Down stream Thorpe	90.1	7.6	16.7	1450	0.02	4.5	0.15
		89.2	7.8	16.6	1360	0.02	4.6	0.22
		89.3	7.7	16.7	1400	0.07	4.7	0.22

		89.8	7.8	16.6	1600	0.06	4.7	0.23
		88.9	7.8	16.6	1700	0.03	4.6	0.23
	Upstream STW	90.3	7.2	16.8	990	0.6	5.1	0.2
		87.1	7.6	16.8	900	0.05	5.4	0.23
		88.3	7.6	16.8	800	0.07	5.4	0.22
		87.5	7.5	17	1430	0.03	6.7	0.19
		87.8	7.5	17	1240	0.08	6.9	0.18
	Downstream STW	92.1	7.6	16.8	690	0.03	5.2	0.15
		90.3	7.3	16.8	750	0.03	5.4	0.2
		87.01	7.6	16.9	1030	0.03	5.3	0.21
		89.86	7.9	16.9	690	0.03	5.3	0.23
		88.2	7.9	16.8	560	0.04	5.5	0.21
04/08/2008	Upstream Thorpe				1390	0.11	5.1	0.24
					1810	0.1	4.9	0.25
					2380	0.11	5.3	0.24
					1350	0.06	5.1	0.23
					1360	0.1	5.1	0.26
	Thorpe Bridge				1130	0.05	4.4	0.09
					1700	0.06	4.3	0.17
					1630	0.04	4.5	0.18
					2000	0.1	4.6	0.21
					1970	0.07	4.5	0.21
	Thorpe Rushcutters				1860	0.03	4.5	0.25
					1360	0.04	4.6	0.25
					1350	0.04	4.7	0.25
					1430	0.04	4.7	0.25
					1670	0.07	4.7	0.25
	Down stream Thorpe				610	0.03	4.5	0.14
					860	0.1	4.5	0.23
					560	0.1	4.9	0.24
					890	0.03	4.6	0.24
					1270	0.02	4.6	0.26

	Upstream STW				1930	0.03	5.3	0.23
					860	0.05	5.4	0.23
					1730	0.08	6.8	0.22
					1870	0.03	6.9	0.2
					1710	0.03	6.7	0.21
	Downstream STW				3610	0.05	5.5	0.15
					1890	0.06	5.4	0.23
					1010	0.13	5.3	0.24
					690	0.1	5.3	0.23
					1850	0.11	5.4	0.24

Appendix D

Continuous automated sampling data

Data collected with YSI Sondes, model 6920 at half hourly intervals between 06/05/08 15:00 and 15/06/08 14:30 is shown here. Values highlighted in blue are erroneous results caused by removal of the sondes for calibration and recharging or because the sonde was not submerged during low water.

Table D1. Data collected during period 1 from sondes at TH and RC with erroneous values highlighted.

Date & Time	Townhouse					Rushcutters					TIDE
d/m/y hh:mm	Temp C	SpCond mS/cm	pH	AmmoniumN mg/L	DO % saturation	Temp C	SpCond mS/cm	pH	AmmoniumN mg/L	DO % saturation	
06/05/08 15:00	17.28	0.784	8.17	0.14	111.28	16.7	0.772	8.33	0.22	118.75	EBB
06/05/08 15:30	17.09	0.785	8.16	0.14	109.5	16.99	0.771	8.29	0.21	128.1	EBB
06/05/08 16:00	17.13	0.785	8.16	0.13	109.61	17.27	0.768	8.29	0.2	131.11	EBB
06/05/08 16:30	17.2	0.783	8.15	0.13	109.25	17.4	0.765	8.28	0.2	129.17	EBB
06/05/08 17:00	17.13	0.782	8.16	0.13	110.11	17.3	0.764	8.28	0.2	128.37	EBB
06/05/08 17:30	17.03	0.781	8.15	0.13	107.96	17.42	0.763	8.25	0.2	124.49	EBB
06/05/08 18:00	16.85	0.41	8.14	0.12	105.92	17.44	0.762	8.25	0.19	124.52	EBB
06/05/08 18:30	14.64	0.002	8.08	999999	106.11	17.35	0.761	8.24	0.19	121.87	EBB
06/05/08 19:00	13.86	0.001	7.97	999999	100.36	17.21	0.761	8.23	0.19	118.43	EBB
06/05/08 19:30	13.3	0.001	8	999999	99.64	17.12	0.758	8.22	0.19	116.43	EBB
06/05/08 20:00	13.1	0.001	7.96	999999	104.26	17.05	0.756	8.22	0.19	115.05	EBB
06/05/08 20:30	16.34	0.786	8.15	0.13	103.14	17.01	0.753	8.21	0.19	113.79	EBB
06/05/08 21:00	16.32	0.786	8.15	0.13	103.82	16.86	0.753	8.19	0.19	111.15	
06/05/08 21:30	16.3	0.786	8.15	0.13	105.14	16.5	0.755	8.17	0.2	107.57	FLOOD
06/05/08 22:00	16.23	0.786	8.15	0.13	105.27	16.36	0.755	8.18	0.2	108.33	FLOOD

06/05/08 22:30	16.21	0.786	8.14	0.13	103.96	16.34	0.755	8.17	0.2	107.88	FLOOD
06/05/08 23:00	16.14	0.786	8.14	0.14	103.19	16.33	0.755	8.18	0.2	108.35	FLOOD
06/05/08 23:30	16.1	0.787	8.12	0.13	100.9	16.28	0.755	8.18	0.2	107.91	FLOOD
07/05/08 00:00	15.99	0.787	8.11	0.13	98.48	16.24	0.758	8.15	0.2	105.74	FLOOD
07/05/08 00:30	15.9	0.788	8.09	0.13	96.5	16.25	0.759	8.16	0.2	106.95	FLOOD
07/05/08 01:00	15.86	0.788	8.09	0.14	94.93	16.23	0.759	8.15	0.2	104.71	FLOOD
07/05/08 01:30	15.81	0.787	8.08	0.14	94.55	16.2	0.759	8.15	0.2	105.34	FLOOD
07/05/08 02:00	15.87	0.79	8.11	0.14	98.03	16.17	0.761	8.15	0.2	105.03	FLOOD
07/05/08 02:30	15.88	0.791	8.12	0.13	99.28	16.12	0.762	8.15	0.2	104.29	EBB
07/05/08 03:00	15.88	0.791	8.13	0.13	100.1	16.12	0.761	8.16	0.19	104.28	EBB
07/05/08 03:30	15.91	0.789	8.15	0.13	102.25	16.35	0.76	8.18	0.19	106.27	EBB
07/05/08 04:00	15.99	0.793	8.2	0.13	109.17	16.35	0.76	8.17	0.19	104.8	EBB
07/05/08 04:30	15.97	0.796	8.22	0.13	109.34	16.19	0.76	8.17	0.19	104.09	EBB
07/05/08 05:00	15.93	0.795	8.21	0.13	108.49	15.88	0.761	8.15	0.19	101.13	EBB
07/05/08 05:30	15.86	0.792	8.18	0.13	104.6	15.76	0.762	8.14	0.19	99.81	EBB
07/05/08 06:00	15.83	0.794	8.16	0.14	101.71	15.73	0.765	8.15	0.19	101.26	EBB
07/05/08 06:30	15.86	0.795	8.17	0.14	101.26	15.74	0.766	8.17	0.19	103.66	EBB
07/05/08 07:00	15.92	0.795	8.17	0.13	102.39	15.74	0.766	8.18	0.19	104.94	EBB
07/05/08 07:30	17.94	0.001	8.17	0.18	102.39	15.8	0.769	8.22	0.19	109.44	EBB
07/05/08 08:00	24.26	0	7.91	100436	91.06	15.89	0.771	8.26	0.19	113.01	EBB
07/05/08 08:30	26.36	0	7.8	1483360	89.87	15.96	0.768	8.25	0.19	111.47	EBB
07/05/08 09:00	16.55	0.794	8.1	0.13	100.75	16.06	0.766	8.24	0.2	109.76	EBB
07/05/08 09:30	16.66	0.789	8.12	0.13	102.51	16.18	0.764	8.25	0.2	110.85	
07/05/08 10:00	16.8	0.788	8.15	0.14	104.34	16.15	0.765	8.22	0.2	108.05	FLOOD
07/05/08 10:30	17.43	0.786	8.16	0.14	106.41	16.26	0.762	8.21	0.2	108.72	FLOOD
07/05/08 11:00	17.31	0.783	8.17	0.14	111.56	16.5	0.76	8.23	0.2	108.66	FLOOD
07/05/08 11:30	17.43	0.782	8.17	0.14	111.3	16.54	0.762	8.21	0.2	108.57	FLOOD
07/05/08 12:00	17.63	0.779	8.18	0.14	114.68	16.76	0.761	8.22	0.2	111.64	FLOOD
07/05/08 12:30	17.56	0.778	8.19	0.14	116.29	16.76	0.762	8.21	0.21	110.22	FLOOD
07/05/08 13:00	17.94	0.779	8.18	0.15	114.5	16.93	0.763	8.22	0.21	114.42	FLOOD
07/05/08 13:30	17.88	0.779	8.18	0.14	115.4	17.02	0.76	8.21	0.21	114.52	FLOOD
07/05/08 14:00	17.89	0.778	8.19	0.14	115.85	16.96	0.757	8.25	0.21	124.12	FLOOD
07/05/08 14:30	17.58	0.779	8.19	0.14	116.98	16.92	0.758	8.25	0.21	122.99	FLOOD

07/05/08 15:00	17.69	0.779	8.19	0.14	115.47	17.06	0.757	8.26	0.21	124.07	EBB
07/05/08 15:30	17.64	0.779	8.18	0.14	112.54	17.44	0.757	8.28	0.21	127.82	EBB
07/05/08 16:00	17.91	0.778	8.19	0.14	111.93	17.73	0.757	8.32	0.2	132.74	EBB
07/05/08 16:30	17.63	0.78	8.18	0.14	110.33	17.71	0.755	8.32	0.2	131.66	EBB
07/05/08 17:00	17.65	0.778	8.17	0.14	109.29	18.03	0.749	8.31	0.2	135.55	EBB
07/05/08 17:30	17.55	0.781	8.16	0.13	107.78	17.94	0.746	8.3	0.2	132.29	EBB
07/05/08 18:00	17.43	0.783	8.15	0.13	104.66	17.96	0.742	8.27	0.2	126.06	EBB
07/05/08 18:30	17.27	0.785	8.14	0.13	101.99	17.94	0.737	8.26	0.2	125.07	EBB
07/05/08 19:00	17.13	0.418	8.14	0.13	101.3	17.91	0.734	8.25	0.2	124.22	EBB
07/05/08 19:30	13.13	0.003	8.71	0.24	104.04	17.74	0.731	8.23	0.2	118.84	EBB
07/05/08 20:00	12.03	0.002	8.27	0.19	98.98	17.6	0.73	8.21	0.2	115.27	EBB
07/05/08 20:30	11.56	0.002	7.96	1.1	97.44	17.53	0.742	8.21	0.2	114.04	EBB
07/05/08 21:00	12.17	0.001	8.4	0.16	109.96	17.46	0.744	8.21	0.2	113.09	EBB
07/05/08 21:30	16.85	0.784	8.19	0.13	104	17.36	0.745	8.2	0.2	111.75	EBB
07/05/08 22:00	16.69	0.784	8.16	0.14	100	17.14	0.745	8.17	0.2	106.95	FLOOD
07/05/08 22:30	16.66	0.784	8.17	0.13	100.95	16.94	0.741	8.17	0.2	104.53	FLOOD
07/05/08 23:00	16.62	0.784	8.18	0.14	100.94	16.9	0.74	8.19	0.2	106.29	FLOOD
07/05/08 23:30	16.58	0.783	8.17	0.14	99.76	16.84	0.741	8.18	0.19	104.42	FLOOD
08/05/08 00:00	16.58	0.784	8.16	0.14	98.09	16.83	0.741	8.2	0.19	105.43	FLOOD
08/05/08 00:30	16.56	0.784	8.16	0.14	98.68	16.79	0.742	8.19	0.19	104.65	FLOOD
08/05/08 01:00	16.55	0.784	8.16	0.14	98.25	16.73	0.744	8.18	0.2	104.39	FLOOD
08/05/08 01:30	16.43	0.784	8.14	0.14	96.46	16.72	0.745	8.17	0.2	103.38	FLOOD
08/05/08 02:00	16.33	0.784	8.13	0.14	93.25	16.7	0.747	8.16	0.2	103.11	FLOOD
08/05/08 02:30	16.26	0.783	8.11	0.14	90.8	16.66	0.749	8.14	0.19	102.16	FLOOD
08/05/08 03:00	16.29	0.784	8.1	0.14	92.78	16.64	0.749	8.16	0.2	102.85	
08/05/08 03:30	16.37	0.785	8.11	0.14	94.89	16.62	0.748	8.17	0.2	101.61	EBB
08/05/08 04:00	16.37	0.785	8.11	0.14	95.35	16.61	0.748	8.18	0.2	101.45	EBB
08/05/08 04:30	16.3	0.786	8.1	0.14	93.23	16.72	0.752	8.18	0.2	103	EBB
08/05/08 05:00	16.33	0.79	8.14	0.14	97.76	16.66	0.751	8.17	0.19	102.25	EBB
08/05/08 05:30	16.38	0.795	8.18	0.14	103.34	16.48	0.752	8.17	0.19	100.73	EBB
08/05/08 06:00	16.36	0.796	8.18	0.14	103.3	16.26	0.751	8.16	0.19	97.55	EBB
08/05/08 06:30	16.37	0.794	8.16	0.14	101.97	16.2	0.752	8.14	0.19	95.8	EBB
08/05/08 07:00	16.44	0.792	8.15	0.15	100.68	16.18	0.754	8.15	0.19	96.82	EBB

08/05/08 07:30	16.61	0.793	8.18	0.15	104.31	16.24	0.754	8.16	0.19	99.39	EBB
08/05/08 08:00	16.85	0.613	8.18	0.14	107.76	16.27	0.754	8.16	0.19	100.35	EBB
08/05/08 08:30	18.54	0.002	8.24	0.15	109.7	16.38	0.756	8.18	0.19	104.05	EBB
08/05/08 09:00	24.41	0.001	8.23	3436800	110.18	16.55	0.761	8.23	0.19	110	EBB
08/05/08 09:30	17.21	0.785	8.11	0.14	110	16.72	0.76	8.24	0.19	111.94	EBB
08/05/08 10:00	17.26	0.783	8.13	0.14	110.79	16.97	0.757	8.25	0.2	113.47	EBB
08/05/08 10:30	17.42	0.782	8.17	0.14	112.64	17.03	0.757	8.24	0.19	112.97	FLOOD
08/05/08 11:00	17.94	0.782	8.18	0.15	115.31	16.9	0.753	8.21	0.2	105.89	FLOOD
08/05/08 11:30	18.18	0.783	8.19	0.15	116.34	16.95	0.751	8.2	0.2	107.73	FLOOD
08/05/08 12:00	18.1	0.78	8.19	0.15	115.16	16.99	0.75	8.22	0.2	111.7	FLOOD
08/05/08 12:30	18.28	0.78	8.19	0.15	116.23	17.36	0.751	8.21	0.19	112.8	FLOOD
08/05/08 13:00	18.31	0.779	8.2	0.15	119.82	17.58	0.75	8.21	0.19	115.3	FLOOD
08/05/08 13:30	18.31	0.775	8.2	0.15	124.39	17.83	0.75	8.21	0.19	116.55	FLOOD
08/05/08 14:00	18.47	0.773	8.2	0.16	126.02	17.89	0.747	8.23	0.2	131.1	FLOOD
08/05/08 14:30	18.39	0.774	8.19	0.15	122.79	17.9	0.751	8.22	0.2	118.88	FLOOD
08/05/08 15:00	18.46	0.773	8.2	0.15	120.5	17.66	0.745	8.26	0.19	127.4	FLOOD
08/05/08 15:30	18.24	0.774	8.19	0.15	118.73	17.85	0.745	8.26	0.19	129.42	EBB
08/05/08 16:00	18.48	0.774	8.19	0.15	116.75	18.07	0.75	8.28	0.2	128.61	EBB
08/05/08 16:30	18.17	0.774	8.18	0.15	115.32	18.37	0.751	8.31	0.2	133.56	EBB
08/05/08 17:00	18.17	0.774	8.17	0.15	112.27	18.52	0.751	8.32	0.2	135.52	EBB
08/05/08 17:30	18.08	0.776	8.17	0.15	110.79	18.62	0.747	8.32	0.2	137.04	EBB
08/05/08 18:00	18.01	0.776	8.17	0.15	109.35	18.62	0.744	8.3	0.2	132.84	EBB
08/05/08 18:30	17.87	0.776	8.16	0.14	106.05	18.57	0.752	8.28	0.2	129.39	EBB
08/05/08 19:00	17.72	0.776	8.15	0.14	105.26	18.5	0.754	8.25	0.2	123.7	EBB
08/05/08 19:30	17.6	0.774	8.13	0.14	103.33	18.34	0.757	8.24	0.2	120.99	EBB
08/05/08 20:00	17.46	0.466	8.12	0.14	100.59	18.21	0.76	8.24	0.2	117.58	EBB
08/05/08 20:30	12.77	0.003	8.59	0.41	103.42	18.06	0.77	8.23	0.19	114.78	EBB
08/05/08 21:00	12.25	0.001	7.62	501.77	103.83	17.94	0.77	8.22	0.19	112.98	EBB
08/05/08 21:30	13.57	0.001	7.47	999999	104.19	17.84	0.774	8.21	0.19	111.01	EBB
08/05/08 22:00	17.08	0.411	8.15	0.13	102.4	17.77	0.773	8.21	0.18	109.71	EBB
08/05/08 22:30	17.07	0.784	8.15	0.14	101.76	17.69	0.773	8.19	0.18	107.11	
08/05/08 23:00	16.95	0.785	8.14	0.14	98.65	17.49	0.776	8.16	0.18	103.09	FLOOD
08/05/08 23:30	16.99	0.783	8.15	0.14	102.18	17.34	0.776	8.15	0.18	101.16	FLOOD

09/05/08 00:00	16.95	0.784	8.15	0.14	101.03	17.29	0.776	8.18	0.18	103.55	FLOOD
09/05/08 00:30	16.88	0.783	8.15	0.14	100.43	17.27	0.777	8.18	0.18	103.55	FLOOD
09/05/08 01:00	16.82	0.784	8.14	0.14	99.58	17.23	0.776	8.18	0.17	103.67	FLOOD
09/05/08 01:30	16.82	0.784	8.13	0.15	98.29	17.19	0.778	8.19	0.17	103.81	FLOOD
09/05/08 02:00	16.76	0.784	8.13	0.15	97.26	17.14	0.778	8.17	0.17	102.3	FLOOD
09/05/08 02:30	16.66	0.784	8.11	0.15	94.65	17.11	0.779	8.15	0.17	100.06	FLOOD
09/05/08 03:00	16.57	0.784	8.1	0.15	91.08	17.06	0.78	8.14	0.17	98.57	FLOOD
09/05/08 03:30	16.51	0.784	8.08	0.15	89.17	17.05	0.781	8.14	0.17	100.26	FLOOD
09/05/08 04:00	16.63	0.786	8.1	0.15	94.42	17.01	0.78	8.16	0.18	100.61	EBB
09/05/08 04:30	16.69	0.786	8.12	0.15	96.02	17.02	0.778	8.16	0.18	99.42	EBB
09/05/08 05:00	16.66	0.787	8.12	0.15	96.46	17	0.777	8.17	0.18	98.95	EBB
09/05/08 05:30	16.64	0.787	8.11	0.15	94.1	17.03	0.775	8.17	0.18	98.81	EBB
09/05/08 06:00	16.63	0.787	8.11	0.15	95.04	16.97	0.776	8.17	0.18	97.43	EBB
09/05/08 06:30	16.71	0.789	8.14	0.15	99.23	16.76	0.776	8.17	0.18	96.09	EBB
09/05/08 07:00	16.8	0.793	8.17	0.15	104.32	16.59	0.773	8.15	0.18	93.74	EBB
09/05/08 07:30	16.87	0.795	8.18	0.15	105.8	16.53	0.773	8.14	0.18	91.98	EBB
09/05/08 08:00	17.08	0.795	8.19	0.15	110.14	16.53	0.775	8.15	0.18	93.87	EBB
09/05/08 08:30	17.35	0.794	8.19	0.15	112.22	16.68	0.776	8.18	0.19	98.31	EBB
09/05/08 09:00	18.32	0.009	8.2	0.17	115.22	16.84	0.776	8.19	0.19	100.83	EBB
09/05/08 09:30	23.34	0.001	8.19	1189248	109.92	16.95	0.774	8.2	0.19	102.61	EBB
09/05/08 10:00	17.97	0.001	8.08	0.18	114.81	17.3	0.778	8.21	0.18	105.4	EBB
09/05/08 10:30	18.04	0.79	8.12	0.15	117.56	17.64	0.773	8.25	0.19	110.89	EBB
09/05/08 11:00	18.09	0.787	8.19	0.15	120.73	17.74	0.773	8.22	0.19	107.74	FLOOD
09/05/08 11:30	18.2	0.788	8.2	0.15	122.49	17.47	0.773	8.19	0.19	104.52	FLOOD
09/05/08 12:00	18.67	0.786	8.21	0.16	122.98	17.35	0.769	8.24	0.19	109.95	FLOOD
09/05/08 12:30	18.74	0.785	8.21	0.16	123.28	17.56	0.77	8.25	0.19	110.62	FLOOD
09/05/08 13:00	18.68	0.784	8.22	0.16	124.44	17.54	0.77	8.26	0.18	116.56	FLOOD
09/05/08 13:30	18.65	0.781	8.25	0.16	132.43	17.95	0.772	8.24	0.19	113.01	FLOOD
09/05/08 14:00	18.68	0.78	8.25	0.16	134.1	18.08	0.772	8.26	0.19	120.48	FLOOD
09/05/08 14:30	18.75	0.781	8.24	0.16	129.94	18.2	0.773	8.26	0.19	117.45	FLOOD
09/05/08 15:00	19.06	0.781	8.25	0.16	131.27	18.14	0.772	8.29	0.19	122.29	FLOOD
09/05/08 15:30	18.89	0.784	8.23	0.16	128.46	18.18	0.772	8.28	0.19	125.38	FLOOD
09/05/08 16:00	18.8	0.784	8.21	0.16	124.6	18.02	0.772	8.29	0.19	122.61	FLOOD

09/05/08 16:30	18.65	0.784	8.21	0.16	122.42	18.19	0.769	8.31	0.19	129	EBB
09/05/08 17:00	18.5	0.784	8.19	0.16	120.1	18.43	0.769	8.32	0.19	127.38	EBB
09/05/08 17:30	18.4	0.785	8.18	0.15	116.48	18.82	0.768	8.35	0.19	130.58	EBB
09/05/08 18:00	18.32	0.786	8.18	0.15	113.62	18.79	0.767	8.36	0.19	132.81	EBB
09/05/08 18:30	18.25	0.786	8.16	0.16	110.4	18.92	0.769	8.36	0.19	133.98	EBB
09/05/08 19:00	18.18	0.786	8.14	0.15	107.88	18.97	0.769	8.35	0.19	132.06	EBB
09/05/08 19:30	18.08	0.787	8.14	0.15	105.71	18.94	0.769	8.33	0.19	127.15	EBB
09/05/08 20:00	17.98	0.788	8.12	0.15	102.37	18.86	0.769	8.31	0.2	124.62	EBB
09/05/08 20:30	17.88	0.789	8.1	0.15	99.2	18.78	0.769	8.3	0.19	123.31	EBB
09/05/08 21:00	17.74	0.789	8.09	0.15	96.52	18.62	0.768	8.29	0.19	118.46	EBB
09/05/08 21:30	17.63	0.425	8.08	0.15	95.62	18.42	0.768	8.26	0.19	114.55	EBB
09/05/08 22:00	14.19	0.004	8.7	0.08	96.87	18.26	0.769	8.25	0.19	111.88	EBB
09/05/08 22:30	13.11	0.004	8.69	0.04	99.27	18.13	0.77	8.23	0.18	108.46	EBB
09/05/08 23:00	17.34	0.78	8.14	0.15	95.16	18.04	0.772	8.23	0.18	107.12	EBB
09/05/08 23:30	17.49	0.786	8.14	0.15	97.33	17.93	0.772	8.22	0.18	105.6	FLOOD
10/05/08 00:00	17.38	0.788	8.12	0.15	96.56	17.75	0.77	8.2	0.18	102.25	FLOOD
10/05/08 00:30	17.28	0.785	8.12	0.15	94.74	17.68	0.769	8.2	0.18	101.25	FLOOD
10/05/08 01:00	17.25	0.783	8.11	0.15	93.89	17.66	0.769	8.21	0.18	102.01	FLOOD
10/05/08 01:30	17.24	0.781	8.1	0.16	91.99	17.61	0.77	8.21	0.18	101.75	FLOOD
10/05/08 02:00	17.19	0.781	8.1	0.18	91.81	17.57	0.77	8.21	0.18	101.16	FLOOD
10/05/08 02:30	17.17	0.782	8.1	0.16	89.93	17.55	0.769	8.22	0.18	101.12	FLOOD
10/05/08 03:00	17.05	0.782	8.09	0.16	88.77	17.51	0.77	8.22	0.18	101.64	FLOOD
10/05/08 03:30	16.98	0.779	8.09	0.16	87.27	17.51	0.771	8.21	0.18	100.58	FLOOD
10/05/08 04:00	16.96	0.781	8.09	0.15	89.25	17.46	0.773	8.19	0.17	99.43	FLOOD
10/05/08 04:30	17.02	0.788	8.1	0.15	91.7	17.42	0.772	8.18	0.17	98.95	FLOOD
10/05/08 05:00	17.06	0.784	8.1	0.15	93.08	17.38	0.771	8.21	0.18	99.55	EBB
10/05/08 05:30	17.08	0.785	8.11	0.15	92.77	17.38	0.77	8.2	0.18	97.5	EBB
10/05/08 06:00	17.12	0.785	8.11	0.15	93.72	17.42	0.77	8.19	0.19	96.8	EBB
10/05/08 06:30	17.18	0.785	8.11	0.15	96.28	17.4	0.773	8.18	0.19	96.61	EBB
10/05/08 07:00	17.33	0.791	8.16	0.15	103.4	17.25	0.773	8.18	0.18	94.52	EBB
10/05/08 07:30	17.46	0.796	8.18	0.15	105.38	17.09	0.772	8.17	0.19	92.67	EBB
10/05/08 08:00	17.59	0.796	8.19	0.15	109.21	17.04	0.769	8.17	0.19	91.62	EBB
10/05/08 08:30	17.78	0.795	8.2	0.15	114.65	17.16	0.769	8.19	0.19	95	EBB

10/05/08 09:00	17.87	0.793	8.17	0.15	111.99	17.33	0.769	8.21	0.19	98.46	EBB
10/05/08 09:30	17.95	0.789	8.13	0.16	110.62	17.5	0.769	8.21	0.19	100.92	EBB
10/05/08 10:00	18.3	0.799	8.08	0.16	111.49	17.83	0.768	8.23	0.19	104.8	EBB
10/05/08 10:30	19.17	0.786	8.09	0.16	122.51	18.08	0.77	8.24	0.19	108.15	EBB
10/05/08 11:00	18.7	0.789	8.12	0.16	117.79	18.07	0.772	8.28	0.19	112.25	EBB
10/05/08 11:30	18.72	0.788	8.17	0.16	119.27	18.58	0.772	8.31	0.19	121.04	EBB
10/05/08 12:00	18.92	0.787	8.19	0.16	121.53	18.46	0.772	8.27	0.2	117.85	FLOOD
10/05/08 12:30	19.05	0.788	8.19	0.16	121.24	18.19	0.769	8.22	0.19	107.62	FLOOD
10/05/08 13:00	19.2	0.787	8.19	0.16	121.95	18.11	0.769	8.22	0.19	107.25	FLOOD
10/05/08 13:30	19.78	0.785	8.2	0.16	122.03	18.23	0.767	8.27	0.19	115.8	FLOOD
10/05/08 14:00	19.53	0.788	8.2	0.16	122.41	18.38	0.767	8.26	0.19	117.02	FLOOD
10/05/08 14:30	19.7	0.79	8.21	0.17	121.67	18.93	0.77	8.23	0.2	119.37	FLOOD
10/05/08 15:00	19.69	0.789	8.21	0.17	122.41	18.74	0.768	8.25	0.19	118.53	FLOOD
10/05/08 15:30	19.83	0.789	8.21	0.17	122.35	18.99	0.769	8.24	0.19	119.55	FLOOD
10/05/08 16:00	19.61	0.788	8.2	0.17	121.08	18.77	0.781	8.23	0.2	114.85	FLOOD
10/05/08 16:30	19.54	0.786	8.17	0.17	119.6	18.79	0.771	8.25	0.19	119.42	FLOOD
10/05/08 17:00	19.36	0.784	8.15	0.16	114.46	18.81	0.77	8.27	0.19	124.56	EBB
10/05/08 17:30	19.1	0.785	8.13	0.16	109.89	18.97	0.767	8.27	0.19	121.24	EBB
10/05/08 18:00	19.26	0.784	8.12	0.16	105.59	19.25	0.77	8.29	0.2	122.54	EBB
10/05/08 18:30	18.95	0.787	8.12	0.15	105.38	19.62	0.77	8.33	0.19	130.59	EBB
10/05/08 19:00	18.83	0.786	8.11	0.15	104.43	19.55	0.77	8.29	0.2	128.41	EBB
10/05/08 19:30	18.78	0.786	8.12	0.15	104.7	19.55	0.77	8.27	0.2	126.94	EBB
10/05/08 20:00	18.69	0.786	8.1	0.15	101.67	19.61	0.768	8.27	0.2	125.45	EBB
10/05/08 20:30	18.57	0.787	8.09	0.15	98.96	19.58	0.768	8.25	0.2	122.39	EBB
10/05/08 21:00	18.45	0.788	8.08	0.14	95.98	19.54	0.767	8.22	0.2	118.06	EBB
10/05/08 21:30	18.31	0.789	8.04	0.14	92.47	19.34	0.767	8.18	0.19	113.93	EBB
10/05/08 22:00	18.2	0.787	8.06	0.14	91.74	19.14	0.766	8.17	0.19	111.03	EBB
10/05/08 22:30	18.02	0.408	8.05	0.14	89.85	18.92	0.765	8.16	0.18	108.52	EBB
10/05/08 23:00	13.4	0.004	8.66	0.06	96.09	18.78	0.766	8.14	0.18	107.08	EBB
10/05/08 23:30	13.39	0.004	8.65	0.04	108.11	18.63	0.767	8.13	0.18	104.54	EBB
11/05/08 00:00	17.81	0.184	8.14	0.12	98.4	18.52	0.768	8.12	0.17	102.4	EBB
11/05/08 00:30	17.9	0.781	8.14	0.14	97.48	18.41	0.768	8.13	0.17	101.74	FLOOD
11/05/08 01:00	17.88	0.78	8.12	0.14	94.5	18.29	0.768	8.11	0.18	98.23	FLOOD

11/05/08 01:30	17.74	0.779	8.12	0.14	92.95	18.1	0.764	8.08	0.17	96.37	FLOOD
11/05/08 02:00	17.66	0.776	8.11	0.14	91.18	18.02	0.76	8.11	0.17	98.65	FLOOD
11/05/08 02:30	17.57	0.775	8.09	0.14	89.03	18	0.76	8.09	0.16	96.74	FLOOD
11/05/08 03:00	17.54	0.774	8.09	0.14	89.25	17.96	0.76	8.07	0.16	95.68	FLOOD
11/05/08 03:30	17.49	0.775	8.08	0.14	87.81	17.92	0.762	8.13	0.16	97.97	FLOOD
11/05/08 04:00	17.44	0.774	8.08	0.14	86.95	17.86	0.763	8.14	0.16	97.08	FLOOD
11/05/08 04:30	17.38	0.775	8.08	0.14	86.32	17.86	0.764	8.15	0.17	98.74	FLOOD
11/05/08 05:00	17.26	0.775	8.06	0.14	82.94	17.83	0.765	8.15	0.16	98.16	FLOOD
11/05/08 05:30	17.32	0.776	8.07	0.14	88.32	17.79	0.763	8.1	0.16	94.03	
11/05/08 06:00	17.47	0.78	8.12	0.14	91.38	17.78	0.763	8.1	0.17	95.7	EBB
11/05/08 06:30	17.58	0.782	8.13	0.14	95.06	17.73	0.763	8.15	0.17	96.08	EBB
11/05/08 07:00	17.73	0.782	8.15	0.14	97.31	17.81	0.765	8.15	0.18	94.88	EBB
11/05/08 07:30	17.87	0.782	8.16	0.15	100.68	17.87	0.769	8.15	0.18	94.45	EBB
11/05/08 08:00	18.05	0.782	8.17	0.15	102.65	17.75	0.77	8.15	0.17	94	EBB
11/05/08 08:30	18.19	0.783	8.17	0.15	102.63	17.69	0.769	8.15	0.18	94.25	EBB
11/05/08 09:00	18.3	0.791	8.19	0.15	111.69	17.7	0.766	8.15	0.17	95.02	EBB
11/05/08 09:30	18.53	0.791	8.2	0.15	116.54	18.03	0.764	8.18	0.18	98.03	EBB
11/05/08 10:00	18.58	0.796	8.21	0.15	116.86	18.21	0.765	8.19	0.18	101.4	EBB
11/05/08 10:30	19.08	0.793	8.21	0.15	117.59	18.42	0.765	8.22	0.18	106.06	EBB
11/05/08 11:00	19.36	0.789	8.16	0.15	117.47	18.6	0.765	8.24	0.18	112	EBB
11/05/08 11:30	19.48	0.788	8.15	0.15	117.63	18.83	0.764	8.28	0.19	119.39	EBB
11/05/08 12:00	19.34	0.786	8.18	0.15	120.61	18.93	0.764	8.31	0.19	122.19	EBB
11/05/08 12:30	19.6	0.786	8.24	0.16	122.85	19.24	0.763	8.28	0.19	127.36	
11/05/08 13:00	19.64	0.786	8.25	0.16	123.89	18.81	0.763	8.23	0.19	112.48	FLOOD
11/05/08 13:30	19.95	0.788	8.26	0.16	126.28	18.73	0.769	8.24	0.19	115.57	FLOOD
11/05/08 14:00	20.11	0.785	8.27	0.15	127.38	18.65	0.77	8.23	0.19	113.26	FLOOD
11/05/08 14:30	20.25	0.786	8.28	0.16	127.6	18.74	0.766	8.27	0.19	124.85	FLOOD
11/05/08 15:00	20.22	0.787	8.28	0.16	128.82	18.99	0.766	8.3	0.19	131.93	FLOOD
11/05/08 15:30	20.36	0.786	8.29	0.15	129.52	19.19	0.77	8.24	0.19	125.4	FLOOD
11/05/08 16:00	20.25	0.785	8.29	0.15	130.1	19.27	0.772	8.23	0.2	117.23	FLOOD
11/05/08 16:30	20.28	0.785	8.3	0.16	132.25	19.23	0.769	8.24	0.19	124.54	FLOOD
11/05/08 17:00	20	0.786	8.25	0.15	124.74	19.2	0.769	8.27	0.19	124.42	FLOOD
11/05/08 17:30	19.75	0.786	8.21	0.15	117.55	19.13	0.769	8.25	0.19	127.23	FLOOD

11/05/08 18:00	19.52	0.787	8.18	0.15	113.11	19.31	0.769	8.26	0.19	125.58	EBB
11/05/08 18:30	19.33	0.787	8.15	0.15	106.21	19.31	0.769	8.26	0.2	122.5	EBB
11/05/08 19:00	19.16	0.788	8.12	0.15	101.87	19.72	0.765	8.35	0.19	132.56	EBB
11/05/08 19:30	19.06	0.787	8.13	0.15	100.83	19.78	0.766	8.35	0.19	132.27	EBB
11/05/08 20:00	18.95	0.788	8.13	0.15	100.23	19.73	0.766	8.34	0.19	132.2	EBB
11/05/08 20:30	18.84	0.788	8.11	0.15	96.8	19.79	0.767	8.34	0.19	132.24	EBB
11/05/08 21:00	18.7	0.789	8.08	0.14	93.36	19.82	0.766	8.33	0.19	130.26	EBB
11/05/08 21:30	18.62	0.79	8.06	0.14	90.61	19.76	0.767	8.31	0.19	128.71	EBB
11/05/08 22:00	18.5	0.79	8.05	0.14	87.97	19.7	0.767	8.28	0.19	122.89	EBB
11/05/08 22:30	18.35	0.79	8.05	0.14	87.06	19.48	0.767	8.25	0.19	118.01	EBB
11/05/08 23:00	18.22	0.787	8.06	0.14	86.59	19.24	0.767	8.23	0.19	113.26	EBB
11/05/08 23:30	13.51	0.005	8.34	0.14	89.44	19	0.768	8.21	0.19	109.43	EBB
12/05/08 00:00	13.45	0.004	8.7	0.03	106.48	18.79	0.769	8.19	0.19	104.79	EBB
12/05/08 00:30	12.35	0.004	8.67	0.01	105.45	18.64	0.77	8.17	0.19	102.9	EBB
12/05/08 01:00	12.02	0.003	8.62	0.01	105.32	18.52	0.77	8.15	0.19	101.57	EBB
12/05/08 01:30	15.39	0.003	8.23	0.14	101.91	18.41	0.768	8.13	0.18	99.48	FLOOD
12/05/08 02:00	17.92	0.782	8.15	0.14	97.71	18.3	0.769	8.12	0.19	99.23	FLOOD
12/05/08 02:30	17.82	0.781	8.13	0.14	93.93	18.2	0.755	8.12	0.19	96.09	FLOOD
12/05/08 03:00	17.68	0.78	8.11	0.14	90.92	18.19	0.767	8.13	0.19	95.77	FLOOD
12/05/08 03:30	17.6	0.779	8.08	0.14	86.74	18.2	0.766	8.14	0.18	96.3	FLOOD
12/05/08 04:00	17.49	0.779	8.07	0.14	86.12	18.13	0.767	8.13	0.18	94.04	FLOOD
12/05/08 04:30	17.5	0.778	8.06	0.14	86.09	18.05	0.764	8.12	0.18	94.06	FLOOD
12/05/08 05:00	17.47	0.778	8.05	0.14	85.3	18.08	0.764	8.14	0.18	94.63	FLOOD
12/05/08 05:30	17.41	0.778	8.06	0.14	83.47	18.07	0.764	8.14	0.18	96.17	FLOOD
12/05/08 06:00	17.38	0.778	8.05	0.15	83.06	18.04	0.766	8.14	0.19	94.73	FLOOD
12/05/08 06:30	17.39	0.778	8.04	0.15	83.7	18.02	0.766	8.14	0.18	94.89	
12/05/08 07:00	17.62	0.781	8.08	0.14	88.98	18	0.766	8.14	0.18	94.31	EBB
12/05/08 07:30	17.84	0.785	8.11	0.15	95.06	17.97	0.766	8.14	0.19	95.57	EBB
12/05/08 08:00	18.09	0.786	8.14	0.15	99.36	17.96	0.764	8.14	0.2	95.21	EBB
12/05/08 08:30	18.32	0.787	8.15	0.15	103.23	17.98	0.765	8.14	0.2	96.79	EBB
12/05/08 09:00	18.47	0.786	8.14	0.16	104.6	17.99	0.776	8.15	0.2	98.28	EBB
12/05/08 09:30	18.53	0.787	8.15	0.16	110.28	18.06	0.772	8.16	0.2	100.41	EBB
12/05/08 10:00	18.67	0.792	8.18	0.16	115.02	18.18	0.771	8.17	0.19	103.33	EBB

12/05/08 10:30	18.81	0.795	8.18	0.15	115.92	18.52	0.768	8.19	0.19	107.16	EBB
12/05/08 11:00	19.69	0.792	8.21	0.15	119.73	18.83	0.763	8.23	0.2	114.9	EBB
12/05/08 11:30	19.87	0.793	8.21	0.16	122.69	18.77	0.764	8.23	0.2	114.11	EBB
12/05/08 12:00	20.24	0.792	8.22	0.15	126.83	19.11	0.766	8.24	0.21	119.72	EBB
12/05/08 12:30	20.46	0.791	8.22	0.16	127.2	18.78	0.761	8.26	0.2	125.71	EBB
12/05/08 13:00	19.78	0.795	8.23	0.16	125.5	19.53	0.76	8.31	0.21	132.84	EBB
12/05/08 13:30	19.81	0.793	8.23	0.16	123.3	19.58	0.761	8.28	0.21	132.15	
12/05/08 14:00	20.02	0.791	8.24	0.16	126.59	18.99	0.771	8.22	0.21	117.54	FLOOD
12/05/08 14:30	20.2	0.791	8.26	0.16	129.06	18.95	0.774	8.2	0.22	114.97	FLOOD
12/05/08 15:00	20.35	0.791	8.27	0.15	128.9	19.07	0.773	8.23	0.21	124.61	FLOOD
12/05/08 15:30	20.3	0.791	8.27	0.15	128.58	19.11	0.772	8.22	0.21	120.57	FLOOD
12/05/08 16:00	20.22	0.791	8.27	0.15	129.13	19.08	0.77	8.22	0.22	121.22	FLOOD
12/05/08 16:30	20.12	0.79	8.28	0.15	131.07	19.38	0.78	8.22	0.21	118.4	FLOOD
12/05/08 17:00	20.1	0.789	8.3	0.14	132.78	19.45	0.773	8.23	0.21	121.14	FLOOD
12/05/08 17:30	20.11	0.79	8.29	0.15	132.91	19.45	0.777	8.22	0.21	116.71	FLOOD
12/05/08 18:00	20.02	0.789	8.27	0.15	128.99	19.39	0.777	8.22	0.21	119.81	FLOOD
12/05/08 18:30	19.61	0.793	8.19	0.14	116.71	19.35	0.776	8.24	0.21	120.67	FLOOD
12/05/08 19:00	19.5	0.794	8.16	0.14	111.53	19.31	0.776	8.24	0.21	122.72	EBB
12/05/08 19:30	19.42	0.794	8.15	0.15	107.81	19.2	0.776	8.22	0.21	118.35	EBB
12/05/08 20:00	19.15	0.795	8.14	0.14	105.83	19.22	0.775	8.23	0.21	118.12	EBB
12/05/08 20:30	18.96	0.796	8.11	0.14	102.05	19.33	0.769	8.29	0.21	126.26	EBB
12/05/08 21:00	18.84	0.796	8.1	0.14	99	19.36	0.768	8.3	0.21	127.89	EBB
12/05/08 21:30	18.7	0.797	8.08	0.13	95.28	19.46	0.768	8.32	0.21	130.63	EBB
12/05/08 22:00	18.6	0.798	8.06	0.13	93.49	19.49	0.768	8.31	0.21	129.97	EBB
12/05/08 22:30	18.49	0.798	8.04	0.13	90.22	19.49	0.769	8.3	0.21	128.37	EBB
12/05/08 23:00	18.37	0.799	8.03	0.13	88.38	19.44	0.771	8.28	0.2	124.86	EBB
12/05/08 23:30	18.21	0.8	8.04	0.13	88.78	19.28	0.773	8.24	0.2	119.04	EBB
13/05/08 00:00	18.06	0.799	8.04	0.14	88.82	19.12	0.774	8.21	0.2	114.49	EBB
13/05/08 00:30	17.12	0.005	8.08	0.14	90.34	18.91	0.774	8.19	0.2	110.7	EBB
13/05/08 01:00	12.39	0.004	8.75	0.08	107.68	18.7	0.775	8.17	0.2	107.32	EBB
13/05/08 01:30	11.97	0.004	8.72	0.06	105.83	18.52	0.776	8.14	0.2	103.14	EBB
13/05/08 02:00	11.85	0.003	8.68	0.04	105.56	18.36	0.777	8.14	0.2	101.97	EBB
13/05/08 02:30	11.69	0.003	8.64	0.04	105.78	18.2	0.763	8.12	0.2	101.05	

13/05/08 03:00	12.8	0.003	8.27	0.1	106	18	0.542	8.11	0.2	98.44	FLOOD
13/05/08 03:30	17.47	0.792	8.17	0.12	98.18	17.96	0.784	8.09	0.2	97.51	FLOOD
13/05/08 04:00	17.36	0.792	8.14	0.13	94.77	17.91	0.771	8.1	0.2	95.58	FLOOD
13/05/08 04:30	17.19	0.792	8.12	0.13	91.97	17.84	0.771	8.11	0.2	90.87	FLOOD
13/05/08 05:00	17.2	0.792	8.1	0.13	88.63	17.83	0.766	8.12	0.2	90.56	FLOOD
13/05/08 05:30	17.14	0.791	8.1	0.14	88.99	17.79	0.766	8.12	0.19	93.69	FLOOD
13/05/08 06:00	17.21	0.792	8.13	0.14	94.03	17.77	0.767	8.13	0.2	92.78	FLOOD
13/05/08 06:30	17.25	0.792	8.14	0.13	96.03	17.77	0.774	8.14	0.2	95.87	FLOOD
13/05/08 07:00	17.22	0.791	8.16	0.13	99.24	17.76	0.766	8.14	0.2	95.72	FLOOD
13/05/08 07:30	17.26	0.792	8.17	0.13	100.47	17.76	0.766	8.13	0.2	95.69	FLOOD
13/05/08 08:00	17.31	0.79	8.16	0.14	100.01	17.79	0.764	8.14	0.2	96.09	EBB
13/05/08 08:30	17.49	0.784	8.14	0.14	99.28	17.8	0.766	8.14	0.2	96.45	EBB
13/05/08 09:00	17.75	0.783	8.15	0.14	99.57	17.83	0.763	8.16	0.2	99.18	EBB
13/05/08 09:30	17.93	0.783	8.17	0.14	102.83	17.91	0.759	8.17	0.2	102.22	EBB
13/05/08 10:00	18.08	0.783	8.18	0.14	106.85	17.89	0.765	8.17	0.21	101.79	EBB
13/05/08 10:30	18.35	0.783	8.19	0.15	110.31	17.92	0.77	8.17	0.21	106.16	EBB
13/05/08 11:00	18.46	0.783	8.2	0.15	114.73	17.9	0.771	8.18	0.2	109.29	EBB
13/05/08 11:30	18.6	0.787	8.2	0.14	116.92	17.99	0.766	8.21	0.2	115.2	EBB
13/05/08 12:00	19.48	0.782	8.24	0.15	122.92	18.15	0.754	8.25	0.2	121.2	EBB
13/05/08 12:30	19.82	0.782	8.25	0.15	124.58	18.06	0.769	8.28	0.2	124.3	EBB
13/05/08 13:00	19.64	0.782	8.25	0.14	125.63	18.39	0.765	8.26	0.2	121.62	EBB
13/05/08 13:30	19.71	0.783	8.27	0.14	128.98	18.82	0.759	8.29	0.2	130.73	EBB
13/05/08 14:00	19.34	0.786	8.25	0.14	125.72	18.72	0.758	8.29	0.2	128.4	EBB
13/05/08 14:30	19.25	0.785	8.27	0.14	127.67	18.81	0.756	8.3	0.21	129.27	EBB
13/05/08 15:00	19.14	0.784	8.28	0.14	126.6	18.55	0.765	8.25	0.21	121.18	FLOOD
13/05/08 15:30	19.1	0.783	8.29	0.14	127.95	18.37	0.767	8.21	0.21	113.73	FLOOD
13/05/08 16:00	19.08	0.783	8.29	0.14	127.72	18.33	0.771	8.2	0.21	115.62	FLOOD
13/05/08 16:30	19.04	0.784	8.3	0.14	128.98	18.35	0.781	8.19	0.21	111.34	FLOOD
13/05/08 17:00	19	0.783	8.31	0.14	129.82	18.36	0.776	8.2	0.21	109.7	FLOOD
13/05/08 17:30	18.96	0.784	8.31	0.13	129.9	18.34	0.775	8.19	0.21	108	FLOOD
13/05/08 18:00	18.96	0.784	8.31	0.13	129.32	18.31	0.773	8.19	0.21	108.45	FLOOD
13/05/08 18:30	18.91	0.785	8.3	0.13	128.01	18.29	0.775	8.19	0.21	109.35	FLOOD
13/05/08 19:00	18.8	0.785	8.26	0.13	119.37	18.26	0.782	8.17	0.21	108.49	FLOOD

13/05/08 19:30	18.61	0.789	8.2	0.13	111.96	18.22	0.772	8.17	0.21	107.15	FLOOD
13/05/08 20:00	18.44	0.79	8.16	0.13	105.3	18.17	0.779	8.18	0.21	106.78	
13/05/08 20:30	18.19	0.791	8.14	0.13	101.72	18.17	0.773	8.2	0.21	107.68	EBB
13/05/08 21:00	17.98	0.792	8.11	0.13	96.93	18.18	0.772	8.2	0.21	108.25	EBB
13/05/08 21:30	17.84	0.792	8.08	0.13	91.45	18.16	0.768	8.23	0.21	111.22	EBB
13/05/08 22:00	17.76	0.792	8.08	0.13	89.63	18.17	0.763	8.26	0.21	114.89	EBB
13/05/08 22:30	17.66	0.792	8.07	0.13	90.44	18.25	0.762	8.29	0.2	118.46	EBB
13/05/08 23:00	17.57	0.793	8.06	0.13	88.48	18.29	0.768	8.28	0.2	117.65	EBB
13/05/08 23:30	17.48	0.795	8.05	0.13	86.35	18.32	0.765	8.29	0.2	118.67	EBB
14/05/08 00:00	17.37	0.794	8.03	0.12	83.83	18.34	0.761	8.29	0.2	117.92	EBB
14/05/08 00:30	17.25	0.795	8.03	0.12	83.27	18.25	0.768	8.25	0.2	112.63	EBB
14/05/08 01:00	17.12	0.795	8.04	0.12	84.46	18.07	0.767	8.2	0.2	105.22	EBB
14/05/08 01:30	17	0.423	8.07	0.12	88.52	17.79	0.771	8.17	0.2	100.5	EBB
14/05/08 02:00	11.79	0.004	8.72	0.08	95.78	17.56	0.775	8.15	0.2	97.06	EBB
14/05/08 02:30	11.61	0.004	8.71	0.05	104.88	17.41	0.779	8.14	0.2	95.92	EBB
14/05/08 03:00	11.5	0.003	8.64	0.05	105.24	17.33	0.775	8.14	0.2	95.47	EBB
14/05/08 03:30	11.53	0.003	8.56	0.07	105.11	17.17	0.784	8.13	0.2	94.75	EBB
14/05/08 04:00	12.26	0.003	8.16	0.11	101.53	17.09	0.425	8.12	0.2	93.24	FLOOD
14/05/08 04:30	16.47	0.785	8.18	0.12	96.91	17	0.791	8.1	0.21	92.52	FLOOD
14/05/08 05:00	16.58	0.786	8.16	0.12	94.66	17.03	0.771	8.1	0.21	87.37	FLOOD
14/05/08 05:30	16.56	0.786	8.13	0.13	91.29	17.02	0.782	8.08	0.21	88.48	FLOOD
14/05/08 06:00	16.49	0.786	8.12	0.13	90.21	17.04	0.77	8.07	0.2	88.31	FLOOD
14/05/08 06:30	16.59	0.786	8.12	0.13	91.57	17.04	0.772	8.13	0.2	89.98	FLOOD
14/05/08 07:00	16.64	0.785	8.18	0.13	99.01	17.02	0.772	8.14	0.2	90.55	FLOOD
14/05/08 07:30	16.73	0.786	8.19	0.13	102.67	17.01	0.764	8.15	0.2	91.75	FLOOD
14/05/08 08:00	16.82	0.788	8.18	0.13	103.83	17.02	0.766	8.15	0.2	92.25	FLOOD
14/05/08 08:30	16.97	0.79	8.19	0.13	104.49	17.04	0.764	8.16	0.2	93.39	FLOOD
14/05/08 09:00	17.13	0.789	8.2	0.13	107.82	17.13	0.765	8.16	0.2	94.76	
14/05/08 09:30	17.23	0.785	8.24	0.13	114.77	17.19	0.783	8.17	0.2	95.54	EBB
14/05/08 10:00	17.35	0.781	8.24	0.13	117.52	17.39	0.776	8.19	0.2	100.79	EBB
14/05/08 10:30	17.63	0.78	8.24	0.13	118.86	17.47	0.769	8.21	0.2	102.64	EBB
14/05/08 11:00	17.94	0.779	8.24	0.13	120.55	17.48	0.765	8.21	0.2	105.21	EBB
14/05/08 11:30	18.23	0.778	8.24	0.14	118.01	17.56	0.768	8.21	0.21	107	EBB

14/05/08 12:00	18.26	0.779	8.23	0.14	120.29	17.75	0.769	8.23	0.2	112.08	EBB
14/05/08 12:30	18.34	0.779	8.24	0.14	122.39	17.83	0.771	8.25	0.2	117.23	EBB
14/05/08 13:00	18.83	0.778	8.27	0.14	126.72	18.19	0.769	8.3	0.2	124.06	EBB
14/05/08 13:30	18.85	0.779	8.27	0.14	127.93	18.07	0.767	8.3	0.2	129.66	EBB
14/05/08 14:00	18.96	0.78	8.29	0.13	129.91	18.09	0.775	8.3	0.2	132.09	EBB
14/05/08 14:30	18.91	0.782	8.28	0.13	129.7	18.39	0.766	8.26	0.2	132.81	EBB
14/05/08 15:00	19.03	0.783	8.28	0.13	129.43	18.27	0.761	8.32	0.2	139.36	EBB
14/05/08 15:30	19.21	0.781	8.32	0.14	133.76	18.47	0.764	8.36	0.2	136.75	EBB
14/05/08 16:00	19.06	0.78	8.34	0.14	136.33	18.59	0.761	8.36	0.2	137.46	
14/05/08 16:30	19.05	0.78	8.33	0.14	134.81	18.24	0.767	8.32	0.2	130.34	FLOOD
14/05/08 17:00	19.02	0.779	8.33	0.13	135.24	18.11	0.774	8.24	0.2	116.95	FLOOD
14/05/08 17:30	18.91	0.78	8.34	0.13	135.5	18.1	0.774	8.24	0.2	119.22	FLOOD
14/05/08 18:00	18.89	0.779	8.36	0.13	137.03	18.12	0.773	8.24	0.2	119.3	FLOOD
14/05/08 18:30	18.85	0.779	8.35	0.13	135.08	18.1	0.774	8.24	0.2	117.54	FLOOD
14/05/08 19:00	18.79	0.779	8.35	0.13	136.19	18.07	0.774	8.24	0.2	114.7	FLOOD
14/05/08 19:30	18.68	0.779	8.34	0.13	134.27	17.98	0.774	8.22	0.2	109.76	FLOOD
14/05/08 20:00	18.61	0.781	8.33	0.13	132.42	17.93	0.774	8.22	0.2	111.14	FLOOD
14/05/08 20:30	18.56	0.782	8.3	0.12	130.62	17.91	0.774	8.21	0.2	108.53	FLOOD
14/05/08 21:00	18.39	0.784	8.23	0.12	118.04	17.86	0.774	8.22	0.2	110.89	
14/05/08 21:30	18.15	0.787	8.16	0.12	112.16	17.79	0.774	8.22	0.2	110.34	EBB
14/05/08 22:00	17.69	0.788	8.16	0.12	107.67	17.78	0.774	8.22	0.2	109.71	EBB
14/05/08 22:30	17.43	0.789	8.13	0.12	102.98	17.76	0.773	8.21	0.2	109.1	EBB
14/05/08 23:00	17.31	0.79	8.11	0.12	99.04	17.83	0.769	8.27	0.2	117.59	EBB
14/05/08 23:30	17.19	0.791	8.07	0.12	93.91	17.89	0.765	8.3	0.19	121.35	EBB
15/05/08 00:00	17.12	0.791	8.07	0.12	93	17.91	0.762	8.32	0.19	122.48	EBB
15/05/08 00:30	17.04	0.791	8.06	0.12	91.48	17.94	0.762	8.33	0.19	122.48	EBB
15/05/08 01:00	16.96	0.792	8.05	0.12	88.42	17.97	0.762	8.34	0.19	122.4	EBB
15/05/08 01:30	16.82	0.792	8.04	0.12	88.41	17.97	0.764	8.32	0.19	120.27	EBB
15/05/08 02:00	16.69	0.792	8.05	0.12	88.7	17.88	0.766	8.28	0.19	115.9	EBB
15/05/08 02:30	16.58	0.793	8.05	0.12	88.26	17.61	0.77	8.23	0.19	109.03	EBB
15/05/08 03:00	16.31	0.006	8.04	0.12	86.29	17.42	0.77	8.2	0.19	104.7	EBB
15/05/08 03:30	11.18	0.004	8.74	0.08	91.5	17.12	0.771	8.18	0.19	101.65	EBB
15/05/08 04:00	10.63	0.003	8.68	0.08	104.72	16.96	0.771	8.16	0.19	98.7	EBB

15/05/08 04:30	10.44	0.003	8.56	0.17	107.23	16.85	0.772	8.15	0.19	97.28	EBB
15/05/08 05:00	16	0.772	8.13	0.11	94.13	16.66	0.774	8.14	0.19	95.05	FLOOD
15/05/08 05:30	16.15	0.784	8.12	0.12	94.16	16.68	0.774	8.13	0.19	95.5	FLOOD
15/05/08 06:00	16.04	0.784	8.12	0.12	94.2	16.61	0.775	8.12	0.2	92.57	FLOOD
15/05/08 06:30	16.05	0.783	8.12	0.13	94.3	16.58	0.773	8.14	0.19	93.42	FLOOD
15/05/08 07:00	16.15	0.782	8.13	0.13	97.19	16.55	0.773	8.14	0.19	93.69	FLOOD
15/05/08 07:30	16.3	0.784	8.16	0.13	100.85	16.54	0.773	8.16	0.19	95.15	FLOOD
15/05/08 08:00	16.41	0.784	8.18	0.13	104.9	16.56	0.773	8.17	0.2	96.88	FLOOD
15/05/08 08:30	16.51	0.784	8.2	0.13	108.09	16.59	0.774	8.18	0.2	97.92	FLOOD
15/05/08 09:00	16.67	0.784	8.21	0.13	112.09	16.62	0.773	8.18	0.2	97.51	FLOOD
15/05/08 09:30	16.78	0.783	8.22	0.13	112.7	16.68	0.774	8.17	0.2	99.21	FLOOD
15/05/08 10:00	16.77	0.781	8.23	0.13	115.59	16.71	0.774	8.17	0.2	100.34	
15/05/08 10:30	16.78	0.778	8.22	0.13	114.91	16.91	0.776	8.19	0.2	104.45	EBB
15/05/08 11:00	16.95	0.776	8.24	0.13	118.58	17.12	0.773	8.22	0.2	113.16	EBB
15/05/08 11:30	17.08	0.777	8.22	0.13	114.37	17.14	0.772	8.23	0.2	113.66	EBB
15/05/08 12:00	17.24	0.776	8.23	0.13	116.39	17.13	0.771	8.23	0.2	112	EBB
15/05/08 12:30	17.41	0.776	8.24	0.13	118.96	17.18	0.771	8.24	0.2	113.65	EBB
15/05/08 13:00	17.59	0.776	8.25	0.13	121.74	17.39	0.771	8.27	0.2	122.28	EBB
15/05/08 13:30	17.67	0.777	8.24	0.13	120.44	17.52	0.77	8.29	0.2	125.04	EBB
15/05/08 14:00	17.94	0.776	8.26	0.13	122.76	17.44	0.768	8.31	0.19	129.5	EBB
15/05/08 14:30	17.96	0.775	8.27	0.13	127.46	17.65	0.77	8.34	0.19	136.95	EBB
15/05/08 15:00	17.91	0.776	8.28	0.13	130.96	17.61	0.77	8.36	0.19	138.26	EBB
15/05/08 15:30	17.94	0.778	8.27	0.13	127.51	17.64	0.766	8.36	0.2	138.41	EBB
15/05/08 16:00	17.95	0.778	8.27	0.13	127.93	17.77	0.763	8.36	0.19	136.21	EBB
15/05/08 16:30	18.09	0.775	8.32	0.13	133.77	17.8	0.763	8.35	0.19	135.18	EBB
15/05/08 17:00	18.09	0.775	8.33	0.13	134.93	17.79	0.762	8.34	0.19	134.15	
15/05/08 17:30	18	0.775	8.33	0.13	133.26	17.53	0.768	8.29	0.2	125.62	FLOOD
15/05/08 18:00	17.96	0.776	8.33	0.13	133.43	17.29	0.775	8.24	0.19	113.99	FLOOD
15/05/08 18:30	17.91	0.776	8.32	0.13	131.87	17.25	0.775	8.23	0.19	112.95	FLOOD
15/05/08 19:00	17.88	0.776	8.32	0.13	132.42	17.22	0.775	8.22	0.19	110.59	FLOOD
15/05/08 19:30	17.85	0.776	8.31	0.13	131.11	17.2	0.775	8.23	0.2	110.52	FLOOD
15/05/08 20:00	17.8	0.778	8.3	0.13	129.64	17.17	0.776	8.23	0.19	111.15	FLOOD
15/05/08 20:30	17.7	0.776	8.3	0.13	127.62	17.13	0.776	8.22	0.19	108.72	FLOOD

15/05/08 21:00	17.63	0.777	8.28	0.12	125.15	17.09	0.776	8.21	0.19	109.43	FLOOD
15/05/08 21:30	17.57	0.779	8.25	0.12	119.95	17.1	0.779	8.2	0.19	108.57	FLOOD
15/05/08 22:00	17.29	0.786	8.17	0.13	108.55	17.06	0.777	8.2	0.19	109.16	FLOOD
15/05/08 22:30	17.03	0.787	8.15	0.12	104.99	17.01	0.776	8.21	0.2	107.26	EBB
15/05/08 23:00	16.78	0.79	8.12	0.12	101.52	16.98	0.775	8.21	0.2	106.03	EBB
15/05/08 23:30	16.7	0.79	8.12	0.12	99.03	17.14	0.767	8.27	0.2	116.16	EBB
16/05/08 00:00	16.63	0.791	8.1	0.12	95.93	17.23	0.764	8.29	0.19	120.11	EBB
16/05/08 00:30	16.57	0.79	8.08	0.12	92.39	17.25	0.763	8.29	0.19	119.82	EBB
16/05/08 01:00	16.52	0.792	8.08	0.12	91.96	17.28	0.762	8.3	0.19	120.36	EBB
16/05/08 01:30	16.46	0.792	8.08	0.12	90.5	17.29	0.762	8.3	0.19	119.79	EBB
16/05/08 02:00	16.39	0.792	8.07	0.12	89.13	17.3	0.763	8.3	0.19	118.38	EBB
16/05/08 02:30	16.33	0.793	8.05	0.12	87.25	17.26	0.764	8.27	0.19	115.08	EBB
16/05/08 03:00	16.24	0.795	8.05	0.12	84.88	17.12	0.77	8.23	0.19	109.14	EBB
16/05/08 03:30	16.17	0.795	8.05	0.12	84.58	16.9	0.772	8.2	0.19	104.59	EBB
16/05/08 04:00	16.08	0.795	8.02	0.11	82.56	16.71	0.773	8.18	0.19	101.36	EBB
16/05/08 04:30	15.97	0.422	8.03	0.11	83.14	16.56	0.773	8.16	0.19	98.53	EBB
16/05/08 05:00	15.32	0.004	8.09	0.12	86.22	16.49	0.773	8.16	0.19	97.68	EBB
16/05/08 05:30	15.94	0.78	8.16	0.12	102.41	16.47	0.773	8.15	0.19	94.57	
16/05/08 06:00	16	0.789	8.15	0.12	98.84	16.34	0.774	8.13	0.18	91.04	FLOOD
16/05/08 06:30	15.99	0.791	8.13	0.12	97.99	16.32	0.773	8.13	0.19	94.76	FLOOD
16/05/08 07:00	15.92	0.791	8.14	0.12	99.54	16.24	0.775	8.13	0.19	91.17	FLOOD
16/05/08 07:30	15.92	0.791	8.15	0.12	100.07	16.21	0.775	8.14	0.19	92.83	FLOOD
16/05/08 08:00	15.92	0.791	8.14	0.12	99.54	16.2	0.776	8.16	0.19	93.39	FLOOD
16/05/08 08:30	15.97	0.791	8.14	0.12	100.38	16.19	0.776	8.15	0.19	92.64	FLOOD
16/05/08 09:00	15.96	0.79	8.14	0.12	99.85	16.16	0.778	8.17	0.19	95.91	FLOOD
16/05/08 09:30	15.92	0.79	8.14	0.12	99.62	16.16	0.778	8.17	0.19	95.93	FLOOD
16/05/08 10:00	15.9	0.79	8.13	0.12	98.79	16.15	0.777	8.16	0.19	94.29	FLOOD
16/05/08 10:30	15.87	0.791	8.14	0.12	97.76	16.16	0.779	8.14	0.19	92.34	FLOOD
16/05/08 11:00	15.84	0.792	8.15	0.12	96.52	16.13	0.784	8.12	0.19	94.29	EBB
16/05/08 11:30	15.9	0.789	8.15	0.12	95.51	16.14	0.783	8.12	0.19	94.42	EBB
16/05/08 12:00	15.94	0.787	8.15	0.12	95.46	16.16	0.777	8.17	0.2	98.43	EBB
16/05/08 12:30	15.96	0.786	8.15	0.12	94.88	16.17	0.775	8.18	0.2	97.31	EBB
16/05/08 13:00	15.99	0.784	8.15	0.12	95.65	16.18	0.773	8.18	0.2	98.34	EBB

16/05/08 13:30	16.02	0.785	8.15	0.12	95.9	16.19	0.773	8.18	0.19	99.43	EBB
16/05/08 14:00	16.01	0.785	8.15	0.12	97.18	16.16	0.773	8.21	0.19	104.15	EBB
16/05/08 14:30	16	0.785	8.16	0.12	97.57	16.14	0.772	8.21	0.19	104.49	EBB
16/05/08 15:00	16	0.785	8.15	0.12	96.76	16.13	0.771	8.21	0.18	105.08	EBB
16/05/08 15:30	15.99	0.785	8.13	0.12	97.76	16.09	0.772	8.22	0.19	107.07	EBB
16/05/08 16:00	15.98	0.784	8.17	0.12	100.42	16.04	0.773	8.23	0.19	108.43	EBB
16/05/08 16:30	15.94	0.784	8.17	0.12	99.75	16.01	0.771	8.23	0.19	105.98	EBB
16/05/08 17:00	15.86	0.778	8.17	0.12	98.08	16.03	0.77	8.24	0.19	105.31	EBB
16/05/08 17:30	15.92	0.78	8.18	0.12	101.23	16.03	0.768	8.24	0.19	105.38	EBB
16/05/08 18:00	15.93	0.782	8.22	0.12	104.63	16.02	0.769	8.24	0.2	105.86	FLOOD
16/05/08 18:30	15.84	0.782	8.2	0.12	102.04	15.91	0.76	8.2	0.21	100.13	FLOOD
16/05/08 19:00	15.84	0.781	8.19	0.12	100.81	15.86	0.767	8.17	0.2	94.85	FLOOD
16/05/08 19:30	15.78	0.783	8.19	0.12	98.86	15.84	0.776	8.17	0.19	92.07	FLOOD
16/05/08 20:00	15.8	0.781	8.18	0.12	99.98	15.84	0.777	8.15	0.2	91.52	FLOOD
16/05/08 20:30	15.79	0.783	8.18	0.12	98.91	15.83	0.777	8.14	0.19	90.76	FLOOD
16/05/08 21:00	15.78	0.783	8.18	0.12	99.42	15.8	0.778	8.18	0.19	94.13	FLOOD
16/05/08 21:30	15.73	0.784	8.18	0.12	97.89	15.78	0.779	8.15	0.19	92.24	FLOOD
16/05/08 22:00	15.65	0.783	8.16	0.12	95.39	15.75	0.78	8.14	0.19	89.1	FLOOD
16/05/08 22:30	15.59	0.782	8.12	0.12	90.68	15.72	0.781	8.13	0.2	88.6	FLOOD
16/05/08 23:00	15.52	0.781	8.1	0.12	85.43	15.71	0.781	8.13	0.19	83.66	FLOOD
16/05/08 23:30	15.46	0.781	8.07	0.12	82.19	15.69	0.776	8.15	0.2	89.85	EBB
17/05/08 00:00	15.41	0.783	8.06	0.12	81.06	15.68	0.773	8.16	0.2	90.81	EBB
17/05/08 00:30	15.35	0.785	8.05	0.12	80.53	15.76	0.77	8.2	0.2	96.79	EBB
17/05/08 01:00	15.33	0.786	8.05	0.11	79.67	15.81	0.77	8.22	0.2	98.54	EBB
17/05/08 01:30	15.31	0.787	8.03	0.12	77.61	15.8	0.765	8.23	0.19	100.88	EBB
17/05/08 02:00	15.27	0.787	8.03	0.11	76.4	15.77	0.765	8.22	0.19	100.99	EBB
17/05/08 02:30	15.23	0.788	8.03	0.11	77.85	15.74	0.767	8.22	0.19	99.85	EBB
17/05/08 03:00	15.13	0.792	8.04	0.11	76.19	15.62	0.769	8.19	0.19	95.98	EBB
17/05/08 03:30	15.07	0.793	8.01	0.11	72.09	15.5	0.769	8.15	0.2	89.58	EBB
17/05/08 04:00	15.01	0.794	7.98	0.11	71.92	15.4	0.769	8.12	0.2	85.44	EBB
17/05/08 04:30	14.97	0.793	7.93	0.11	68.01	15.35	0.768	8.11	0.2	83.56	EBB
17/05/08 05:00	14.91	0.794	7.93	0.11	68.37	15.31	0.775	8.1	0.2	82.83	EBB
17/05/08 05:30	14.77	0.784	7.93	0.11	68.88	15.27	0.769	8.1	0.2	82.12	EBB

17/05/08 06:00	14.68	0.782	7.98	0.11	70.82	15.22	0.77	8.09	0.19	81.4	EBB
17/05/08 06:30	14.76	0.782	8	0.12	74.19	15.19	0.786	8.09	0.19	79.64	FLOOD
17/05/08 07:00	14.8	0.786	8.03	0.12	78.73	15.14	0.771	8.08	0.2	79.65	FLOOD
17/05/08 07:30	14.73	0.783	8.01	0.12	75.15	15.05	0.762	8.05	0.21	75.31	FLOOD
17/05/08 08:00	14.75	0.782	8	0.12	74.68	15.01	0.77	8.05	0.21	74.98	FLOOD
17/05/08 08:30	14.75	0.782	8.01	0.12	75.97	14.98	0.772	8.05	0.21	76.31	FLOOD
17/05/08 09:00	14.75	0.783	8.01	0.12	76.72	14.99	0.773	8.06	0.22	77.1	FLOOD
17/05/08 09:30	14.77	0.783	8.02	0.12	77.93	14.94	0.774	8.06	0.22	75.5	FLOOD
17/05/08 10:00	14.81	0.785	8.06	0.12	82.07	14.96	0.774	8.07	0.23	79.26	FLOOD
17/05/08 10:30	14.77	0.784	8.07	0.11	83.22	14.96	0.774	8.07	0.22	74.64	FLOOD
17/05/08 11:00	14.73	0.783	8.04	0.12	79.52	14.97	0.778	8.06	0.22	72.57	FLOOD
17/05/08 11:30	14.77	0.783	8.03	0.12	78.88	14.95	0.774	8.05	0.22	77.5	
17/05/08 12:00	14.74	0.784	8.02	0.12	76.23	14.96	0.772	8.06	0.22	79.27	EBB
17/05/08 12:30	14.75	0.782	8.01	0.12	74.85	14.99	0.773	8.08	0.23	81.53	EBB
17/05/08 13:00	14.81	0.782	8.02	0.12	75.13	14.98	0.77	8.08	0.23	79.67	EBB
17/05/08 13:30	14.86	0.783	8.02	0.12	76.57	15.03	0.773	8.1	0.23	82.17	EBB
17/05/08 14:00	14.91	0.782	8.03	0.12	77.19	15.11	0.77	8.13	0.22	87.23	EBB
17/05/08 14:30	14.94	0.783	8.04	0.12	79.19	15.12	0.783	8.15	0.21	90.14	EBB
17/05/08 15:00	14.97	0.782	8.04	0.13	80.27	15.12	0.768	8.16	0.2	92.5	EBB
17/05/08 15:30	14.93	0.786	8.05	0.13	82.63	15.08	0.767	8.17	0.2	93.48	EBB
17/05/08 16:00	14.92	0.786	8.05	0.13	83.2	15.08	0.767	8.17	0.2	94.81	EBB
17/05/08 16:30	14.89	0.787	8.04	0.13	82.14	15.02	0.777	8.13	0.21	89.98	EBB
17/05/08 17:00	14.84	0.785	8.03	0.13	81.51	14.99	0.766	8.11	0.21	85.77	EBB
17/05/08 17:30	14.77	0.784	8.05	0.13	82.62	14.98	0.761	8.1	0.22	85.14	EBB
17/05/08 18:00	14.75	0.784	8.04	0.13	81.73	14.96	0.773	8.08	0.22	81.9	EBB
17/05/08 18:30	14.73	0.784	8.09	0.13	88.93	14.98	0.762	8.08	0.22	79.69	EBB
17/05/08 19:00	14.69	0.785	8.09	0.12	87.81	14.84	0.747	8.06	0.22	78.46	FLOOD
17/05/08 19:30	14.62	0.785	8.07	0.12	84.08	14.7	0.769	8.07	0.21	78.76	FLOOD
17/05/08 20:00	14.58	0.785	8.07	0.12	82.84	14.57	0.775	8.07	0.2	80.87	FLOOD
17/05/08 20:30	14.55	0.785	8.05	0.11	81.75	14.53	0.776	8.07	0.2	80.89	FLOOD
17/05/08 21:00	14.5	0.784	8.05	0.11	81.15	14.51	0.776	8.07	0.2	79.81	FLOOD
17/05/08 21:30	14.46	0.781	8.06	0.11	81.53	14.48	0.776	8.07	0.2	80.8	FLOOD
17/05/08 22:00	14.42	0.782	8.05	0.11	81.37	14.47	0.776	8.08	0.2	81.38	FLOOD

17/05/08 22:30	14.37	0.782	8.04	0.11	78.28	14.46	0.776	8.08	0.2	80.92	FLOOD
17/05/08 23:00	14.31	0.782	8.03	0.11	76.03	14.45	0.776	8.06	0.2	77.01	EBB
17/05/08 23:30	14.22	0.782	8.02	0.11	73.61	14.43	0.777	8.07	0.2	74.91	EBB
18/05/08 00:00	14.08	0.785	8.01	0.11	74.04	14.37	0.774	8.08	0.2	79.18	EBB
18/05/08 00:30	13.99	0.789	8.01	0.11	76.45	14.36	0.774	8.07	0.2	78.89	EBB
18/05/08 01:00	13.94	0.79	8.01	0.11	74.24	14.51	0.766	8.08	0.21	80.36	EBB
18/05/08 01:30	13.88	0.79	8.01	0.11	74.54	14.61	0.767	8.07	0.22	78.27	EBB
18/05/08 02:00	13.81	0.788	7.99	0.11	73.43	14.61	0.764	8.07	0.22	78.04	EBB
18/05/08 02:30	13.74	0.785	7.99	0.11	71.48	14.56	0.766	8.07	0.22	79.33	EBB
18/05/08 03:00	13.68	0.783	7.97	0.11	70.47	14.49	0.776	8.08	0.21	78.96	EBB
18/05/08 03:30	13.65	0.784	7.96	0.11	69.93	14.31	0.775	8.08	0.21	80.04	EBB
18/05/08 04:00	13.57	0.79	7.98	0.11	72.11	14.14	0.766	8.06	0.21	78.34	EBB
18/05/08 04:30	13.52	0.794	7.97	0.11	70.32	13.96	0.769	8.06	0.21	76.77	EBB
18/05/08 05:00	13.44	0.795	7.99	0.11	73.98	13.86	0.769	8.05	0.21	77.84	EBB
18/05/08 05:30	13.37	0.793	7.99	0.11	74.93	13.79	0.772	8.06	0.21	77.87	EBB
18/05/08 06:00	13.37	0.792	7.98	0.11	72.78	13.71	0.775	8.06	0.2	78.49	EBB
18/05/08 06:30	13.35	0.789	8.01	0.11	78.38	13.64	0.776	8.06	0.2	77.77	EBB
18/05/08 07:00	13.4	0.785	8.05	0.11	82.11	13.63	0.773	8.04	0.2	77.5	
18/05/08 07:30	13.57	0.785	8.08	0.11	87.61	13.58	0.774	8.05	0.21	77.83	FLOOD
18/05/08 08:00	13.58	0.785	8.07	0.11	85.61	13.58	0.767	8.05	0.21	77.03	FLOOD
18/05/08 08:30	13.77	0.783	8.08	0.11	89.4	13.57	0.764	8.07	0.21	79.77	FLOOD
18/05/08 09:00	13.8	0.784	8.08	0.11	88.57	13.63	0.771	8.09	0.21	82.03	FLOOD
18/05/08 09:30	13.84	0.783	8.09	0.11	91.19	13.76	0.764	8.1	0.21	85.58	FLOOD
18/05/08 10:00	13.86	0.784	8.09	0.11	91.68	13.83	0.764	8.11	0.21	86.01	FLOOD
18/05/08 10:30	13.91	0.784	8.1	0.11	93.96	13.82	0.767	8.11	0.21	87.73	FLOOD
18/05/08 11:00	14.05	0.784	8.12	0.12	95.99	13.83	0.768	8.1	0.21	87.84	FLOOD
18/05/08 11:30	14.08	0.783	8.11	0.11	96.58	13.89	0.769	8.11	0.21	89.72	FLOOD
18/05/08 12:00	14.11	0.782	8.12	0.11	98.11	13.97	0.77	8.1	0.21	89.53	FLOOD
18/05/08 12:30	14.16	0.78	8.12	0.11	97.78	13.97	0.77	8.1	0.21	89.16	EBB
18/05/08 13:00	14.27	0.779	8.11	0.12	96.91	14.18	0.769	8.13	0.21	96.82	EBB
18/05/08 13:30	14.4	0.779	8.1	0.12	94.89	14.14	0.767	8.14	0.21	97.13	EBB
18/05/08 14:00	14.42	0.78	8.07	0.12	92.02	14.25	0.771	8.15	0.21	96.29	EBB
18/05/08 14:30	14.45	0.78	8.07	0.12	92.35	14.31	0.772	8.16	0.21	99.49	EBB

18/05/08 15:00	14.55	0.779	8.07	0.12	92.8	14.31	0.773	8.17	0.2	100.55	EBB
18/05/08 15:30	14.53	0.779	8.09	0.12	96.47	14.39	0.773	8.19	0.2	106.06	EBB
18/05/08 16:00	14.49	0.78	8.09	0.12	96.21	14.39	0.773	8.19	0.2	104.53	EBB
18/05/08 16:30	14.45	0.784	8.09	0.12	97.18	14.45	0.77	8.19	0.21	104.82	EBB
18/05/08 17:00	14.39	0.786	8.09	0.12	97.01	14.45	0.769	8.19	0.21	105.4	EBB
18/05/08 17:30	14.24	0.786	8.07	0.13	96.54	14.51	0.766	8.18	0.21	105.54	EBB
18/05/08 18:00	14.11	0.787	8.07	0.12	97.2	14.52	0.766	8.18	0.21	104.58	EBB
18/05/08 18:30	14.1	0.788	8.09	0.12	94.97	14.6	0.764	8.19	0.21	108.41	EBB
18/05/08 19:00	14.3	0.782	8.25	0.12	114.76	14.58	0.765	8.17	0.21	101.4	EBB
18/05/08 19:30	14.25	0.784	8.19	0.11	106.78	14.54	0.764	8.17	0.22	102.25	FLOOD
18/05/08 20:00	14.15	0.785	8.18	0.11	104.59	14.33	0.768	8.14	0.21	96.81	FLOOD
18/05/08 20:30	14.07	0.785	8.18	0.11	103.13	13.92	0.774	8.13	0.21	94.68	FLOOD
18/05/08 21:00	13.95	0.786	8.15	0.11	99.17	13.84	0.774	8.13	0.2	92.82	FLOOD
18/05/08 21:30	13.87	0.787	8.13	0.11	97.46	13.84	0.775	8.11	0.2	91.24	FLOOD
18/05/08 22:00	13.84	0.788	8.14	0.11	99.17	13.78	0.775	8.12	0.2	91.34	FLOOD
18/05/08 22:30	13.8	0.787	8.13	0.11	98.38	13.73	0.774	8.12	0.2	92.07	FLOOD
18/05/08 23:00	13.72	0.788	8.13	0.11	96.28	13.7	0.774	8.13	0.2	92.66	FLOOD
18/05/08 23:30	13.59	0.789	8.1	0.11	91.75	13.69	0.774	8.12	0.2	92.09	FLOOD
19/05/08 00:00	13.47	0.791	8.08	0.11	89.15	13.68	0.775	8.12	0.2	91.04	FLOOD
19/05/08 00:30	13.35	0.79	8.08	0.11	87.93	13.64	0.747	8.12	0.2	88.41	
19/05/08 01:00	13.29	0.791	8.07	0.11	87.82	13.58	0.752	8.12	0.2	91.41	EBB
19/05/08 01:30	13.25	0.791	8.07	0.11	88.09	13.68	0.748	8.14	0.2	93.37	EBB
19/05/08 02:00	13.21	0.791	8.07	0.11	86.24	14.02	0.744	8.15	0.21	93.96	EBB
19/05/08 02:30	13.15	0.792	8.06	0.11	85.4	14	0.745	8.14	0.21	92.67	EBB
19/05/08 03:00	13.11	0.792	8.05	0.1	85.08	13.97	0.745	8.13	0.21	91.28	EBB
19/05/08 03:30	13.06	0.792	8.06	0.1	84.46	13.94	0.745	8.13	0.21	91.09	EBB
19/05/08 04:00	13	0.793	8.05	0.1	82.76	13.8	0.746	8.15	0.2	93.88	EBB
19/05/08 04:30	12.96	0.795	8.09	0.11	88.52	13.54	0.748	8.14	0.2	91.96	EBB
19/05/08 05:00	12.89	0.796	8.07	0.1	87.95	13.3	0.748	8.13	0.2	91.15	EBB
19/05/08 05:30	12.81	0.796	8.08	0.1	87.66	13.18	0.751	8.12	0.2	89.15	EBB
19/05/08 06:00	12.77	0.796	8.09	0.1	87.69	13.11	0.756	8.12	0.2	88.4	EBB
19/05/08 06:30	12.83	0.797	8.05	0.1	88.2	13.05	0.755	8.11	0.19	88.56	EBB
19/05/08 07:00	12.82	0.798	8.08	0.1	89.93	12.99	0.754	8.11	0.19	88.67	EBB

19/05/08 07:30	12.93	0.795	8.13	0.11	94.33	12.91	0.755	8.12	0.19	88.06	EBB
19/05/08 08:00	13.03	0.794	8.15	0.11	96.42	12.94	0.755	8.13	0.19	91.47	FLOOD
19/05/08 08:30	13.18	0.794	8.16	0.11	99.1	12.95	0.753	8.1	0.2	86.2	FLOOD
19/05/08 09:00	13.25	0.793	8.17	0.11	100.5	13.03	0.755	8.15	0.19	92.33	FLOOD
19/05/08 09:30	13.31	0.794	8.16	0.11	99.65	13.15	0.757	8.16	0.19	94.68	FLOOD
19/05/08 10:00	13.38	0.793	8.17	0.11	101.1	13.27	0.756	8.18	0.19	97.39	FLOOD
19/05/08 10:30	13.52	0.793	8.18	0.11	103.3	13.32	0.757	8.18	0.19	96.3	FLOOD
19/05/08 11:00	13.64	0.793	8.19	0.11	105.04	13.28	0.757	8.19	0.19	97.88	FLOOD
19/05/08 11:30	13.63	0.792	8.19	0.11	106.93	13.39	0.76	8.21	0.19	102.51	FLOOD
19/05/08 12:00	13.85	0.791	8.2	0.11	109.19	13.5	0.76	8.2	0.19	101.85	FLOOD
19/05/08 12:30	13.93	0.792	8.2	0.11	109.46	13.7	0.758	8.22	0.19	102.28	FLOOD
19/05/08 13:00	13.84	0.792	8.2	0.11	109.51	13.55	0.757	8.18	0.19	105.95	EBB
19/05/08 13:30	13.86	0.793	8.18	0.11	107.41	13.55	0.757	8.18	0.19	106.71	EBB
19/05/08 14:00	14.06	0.795	8.19	0.11	108.73	13.75	0.753	8.21	0.2	106.2	EBB
19/05/08 14:30	14.13	0.793	8.2	0.11	109.44	13.85	0.752	8.22	0.19	106.1	EBB
19/05/08 15:00	14.08	0.794	8.19	0.11	109.15	14.04	0.751	8.24	0.19	111.91	EBB
19/05/08 15:30	14.11	0.797	8.19	0.11	109.23	14.14	0.75	8.25	0.19	114.35	EBB
19/05/08 16:00	14.12	0.797	8.18	0.11	108.62	14.15	0.747	8.27	0.19	119.25	EBB
19/05/08 16:30	14.13	0.797	8.18	0.12	108.29	14.07	0.75	8.27	0.19	118.18	EBB
19/05/08 17:00	14	0.798	8.17	0.12	106.37	14.19	0.75	8.28	0.19	120.91	EBB
19/05/08 17:30	13.93	0.798	8.16	0.11	105.37	14.16	0.751	8.28	0.19	117.63	EBB
19/05/08 18:00	13.81	0.798	8.16	0.12	104.07	14.16	0.75	8.28	0.19	116.46	EBB
19/05/08 18:30	13.69	0.798	8.16	0.12	103.9	14.18	0.751	8.27	0.19	116.82	EBB
19/05/08 19:00	13.5	0.797	8.14	0.11	101.79	14.19	0.751	8.26	0.19	117.54	EBB
19/05/08 19:30	13.7	0.789	8.31	0.11	122.7	14.15	0.753	8.26	0.19	112.87	EBB
19/05/08 20:00	13.69	0.791	8.26	0.11	115.82	14.07	0.753	8.24	0.19	110.03	
19/05/08 20:30	13.62	0.794	8.24	0.11	112.06	14.01	0.751	8.22	0.19	108.04	FLOOD
19/05/08 21:00	13.55	0.794	8.23	0.11	110.83	13.52	0.754	8.18	0.19	98.94	FLOOD
19/05/08 21:30	13.42	0.795	8.21	0.11	107.05	13.36	0.756	8.18	0.19	99.06	FLOOD
19/05/08 22:00	13.31	0.796	8.19	0.11	103.82	13.32	0.757	8.17	0.19	97.76	FLOOD
19/05/08 22:30	13.24	0.797	8.16	0.11	102.12	13.3	0.757	8.17	0.19	95.86	FLOOD
19/05/08 23:00	13.17	0.797	8.17	0.11	102.17	13.25	0.759	8.18	0.19	98.04	FLOOD
19/05/08 23:30	13.12	0.798	8.16	0.11	100.35	13.22	0.759	8.17	0.19	99.22	FLOOD

20/05/08 00:00	12.99	0.8	8.14	0.11	96.56	13.19	0.76	8.16	0.19	98.59	FLOOD
20/05/08 00:30	12.92	0.8	8.13	0.12	95.08	13.19	0.762	8.15	0.19	98.18	FLOOD
20/05/08 01:00	12.79	0.8	8.12	0.11	93.51	13.17	0.762	8.14	0.19	93.71	FLOOD
20/05/08 01:30	12.68	0.799	8.11	0.11	91.58	13.09	0.761	8.15	0.19	95.41	EBB
20/05/08 02:00	12.62	0.798	8.1	0.11	91.05	13.07	0.757	8.17	0.19	95.67	EBB
20/05/08 02:30	12.59	0.798	8.1	0.11	91.23	13.37	0.753	8.21	0.19	101.44	EBB
20/05/08 03:00	12.56	0.797	8.1	0.11	89.95	13.48	0.752	8.21	0.19	100.41	EBB
20/05/08 03:30	12.52	0.797	8.09	0.11	88.96	13.45	0.752	8.2	0.19	99.29	EBB
20/05/08 04:00	12.46	0.797	8.09	0.11	89.69	13.47	0.751	8.2	0.19	99.79	EBB
20/05/08 04:30	12.41	0.798	8.1	0.11	91.59	13.41	0.754	8.21	0.19	99.4	EBB
20/05/08 05:00	12.36	0.799	8.11	0.11	91.8	13.17	0.755	8.21	0.19	99.56	EBB
20/05/08 05:30	12.3	0.8	8.1	0.11	91.72	12.84	0.756	8.19	0.19	97.08	EBB
20/05/08 06:00	12.23	0.801	8.1	0.11	91.27	12.66	0.755	8.17	0.19	94.24	EBB
20/05/08 06:30	12.36	0.801	8.06	0.1	88.87	12.58	0.756	8.16	0.19	92.38	EBB
20/05/08 07:00	12.59	0.489	8.02	0.1	96.46	12.5	0.757	8.15	0.19	91.42	EBB
20/05/08 07:30	12.86	0.8	8.12	0.11	99.19	12.44	0.757	8.15	0.19	91.6	EBB
20/05/08 08:00	12.97	0.802	8.14	0.11	101.67	12.38	0.756	8.15	0.19	91.55	EBB
20/05/08 08:30	12.93	0.799	8.17	0.11	105.01	12.6	0.757	8.18	0.19	96.01	FLOOD
20/05/08 09:00	13.05	0.799	8.18	0.11	105.52	12.61	0.757	8.16	0.19	93.11	FLOOD
20/05/08 09:30	13.1	0.799	8.18	0.11	105.81	12.72	0.755	8.18	0.19	94.88	FLOOD
20/05/08 10:00	13.19	0.799	8.19	0.11	107.15	12.85	0.757	8.2	0.19	99.22	FLOOD
20/05/08 10:30	13.33	0.799	8.19	0.11	109.56	12.97	0.758	8.22	0.19	102.48	FLOOD
20/05/08 11:00	13.32	0.798	8.2	0.11	111.75	13.01	0.757	8.21	0.19	101.41	FLOOD
20/05/08 11:30	13.34	0.798	8.19	0.11	111.33	13.08	0.767	8.2	0.19	101.26	FLOOD
20/05/08 12:00	13.37	0.797	8.21	0.11	111.73	13.14	0.763	8.19	0.19	103	FLOOD
20/05/08 12:30	13.44	0.798	8.21	0.11	112.06	13.17	0.762	8.2	0.19	103.66	FLOOD
20/05/08 13:00	13.49	0.798	8.21	0.11	113.24	13.18	0.762	8.19	0.19	103.53	FLOOD
20/05/08 13:30	13.6	0.798	8.21	0.11	114.2	13.22	0.764	8.19	0.19	103.27	
20/05/08 14:00	13.61	0.798	8.2	0.11	111.73	13.31	0.761	8.2	0.2	104.45	EBB
20/05/08 14:30	13.63	0.797	8.2	0.11	110.23	13.33	0.76	8.21	0.2	104.54	EBB
20/05/08 15:00	13.6	0.797	8.2	0.11	109.56	13.34	0.758	8.23	0.19	105.96	EBB
20/05/08 15:30	13.57	0.796	8.2	0.11	108.83	13.41	0.755	8.24	0.19	108.4	EBB
20/05/08 16:00	13.54	0.796	8.2	0.11	107.97	13.4	0.753	8.25	0.19	109.05	EBB

20/05/08 16:30	13.55	0.796	8.21	0.11	109.1	13.45	0.754	8.26	0.19	111.65	EBB
20/05/08 17:00	13.58	0.797	8.2	0.11	107.8	13.5	0.753	8.28	0.19	119.63	EBB
20/05/08 17:30	13.54	0.797	8.2	0.12	108	13.68	0.753	8.3	0.19	122.49	EBB
20/05/08 18:00	13.4	0.797	8.19	0.11	105.64	13.83	0.753	8.31	0.19	123.87	EBB
20/05/08 18:30	13.3	0.797	8.17	0.12	105.4	13.86	0.753	8.31	0.19	122.76	EBB
20/05/08 19:00	13.17	0.793	8.17	0.12	103.26	13.84	0.753	8.29	0.19	118.01	EBB
20/05/08 19:30	12.98	0.419	8.07	0.11	101.53	13.8	0.751	8.28	0.19	116.35	EBB
20/05/08 20:00	13.09	0.791	8.21	0.11	113.41	13.68	0.752	8.27	0.19	111.54	EBB
20/05/08 20:30	13.11	0.794	8.23	0.11	108.38	13.64	0.752	8.26	0.19	107.73	
20/05/08 21:00	13.03	0.794	8.22	0.11	106.53	13.57	0.753	8.25	0.19	108.46	FLOOD
20/05/08 21:30	12.99	0.795	8.21	0.11	105.19	13.21	0.758	8.21	0.19	97.93	FLOOD
20/05/08 22:00	12.88	0.796	8.2	0.11	103.93	13.1	0.759	8.2	0.19	95.53	FLOOD
20/05/08 22:30	12.85	0.796	8.2	0.11	102.77	12.99	0.762	8.2	0.19	98.18	FLOOD
20/05/08 23:00	12.8	0.798	8.2	0.11	103.04	12.94	0.76	8.2	0.19	95.45	FLOOD
20/05/08 23:30	12.77	0.798	8.18	0.11	100.21	12.91	0.762	8.19	0.19	96.76	FLOOD
21/05/08 00:00	12.7	0.803	8.18	0.11	100.72	12.86	0.763	8.18	0.19	97.91	FLOOD
21/05/08 00:30	12.67	0.802	8.17	0.11	99.74	12.84	0.764	8.18	0.19	99.06	FLOOD
21/05/08 01:00	12.59	0.802	8.16	0.11	97.39	12.81	0.764	8.17	0.19	98.02	FLOOD
21/05/08 01:30	12.5	0.801	8.14	0.11	93.7	12.82	0.765	8.16	0.19	96.62	FLOOD
21/05/08 02:00	12.37	0.802	8.13	0.11	93.22	12.81	0.764	8.15	0.19	88.95	EBB
21/05/08 02:30	12.35	0.8	8.13	0.11	91.59	12.78	0.763	8.17	0.2	97.04	EBB
21/05/08 03:00	12.32	0.802	8.13	0.11	91.71	12.75	0.762	8.19	0.2	96.83	EBB
21/05/08 03:30	12.33	0.802	8.13	0.11	91.43	13.03	0.754	8.23	0.19	101.34	EBB
21/05/08 04:00	12.3	0.801	8.13	0.11	92.54	13.07	0.755	8.22	0.19	99.97	EBB
21/05/08 04:30	12.28	0.8	8.13	0.11	92.25	13.07	0.753	8.22	0.19	99.77	EBB
21/05/08 05:00	12.24	0.8	8.11	0.11	91.76	13.06	0.752	8.22	0.19	100.34	EBB
21/05/08 05:30	12.21	0.799	8.11	0.11	91.93	12.98	0.753	8.22	0.19	100.77	EBB
21/05/08 06:00	12.23	0.799	8.12	0.11	93.63	12.65	0.755	8.21	0.19	97.98	EBB
21/05/08 06:30	12.23	0.801	8.13	0.11	94.66	12.44	0.758	8.19	0.19	95.22	EBB
21/05/08 07:00	12.3	0.802	8.11	0.11	96.45	12.38	0.761	8.17	0.19	93.01	EBB
21/05/08 07:30	12.65	0.434	8.03	0.11	98.03	12.33	0.758	8.18	0.19	92.17	EBB
21/05/08 08:00	12.55	0.801	8.17	0.11	103.85	12.31	0.757	8.18	0.19	92.86	EBB
21/05/08 08:30	12.68	0.801	8.18	0.11	104.26	12.42	0.757	8.22	0.19	97.01	EBB

21/05/08 09:00	12.83	0.799	8.21	0.11	110.57	12.46	0.757	8.2	0.19	96.83	FLOOD
21/05/08 09:30	13.03	0.798	8.21	0.11	109.76	12.54	0.756	8.19	0.19	96.3	FLOOD
21/05/08 10:00	13.33	0.799	8.22	0.11	112.32	12.59	0.759	8.2	0.19	99.43	FLOOD
21/05/08 10:30	13.41	0.799	8.23	0.11	117.2	12.73	0.761	8.23	0.19	103.5	FLOOD
21/05/08 11:00	13.5	0.799	8.22	0.11	113.35	12.85	0.762	8.24	0.2	106.5	FLOOD
21/05/08 11:30	13.63	0.799	8.24	0.11	118.62	12.96	0.762	8.22	0.2	102.94	FLOOD
21/05/08 12:00	13.59	0.798	8.24	0.11	121.04	13.36	0.766	8.2	0.2	103.48	FLOOD
21/05/08 12:30	13.77	0.797	8.25	0.12	121.44	13.22	0.764	8.22	0.2	107.78	FLOOD
21/05/08 13:00	13.83	0.802	8.24	0.12	119.65	13.39	0.763	8.23	0.2	108.53	FLOOD
21/05/08 13:30	13.88	0.798	8.25	0.12	123.38	13.4	0.765	8.22	0.2	110.29	FLOOD
21/05/08 14:00	14.01	0.798	8.24	0.12	121.18	13.33	0.764	8.21	0.2	107.81	
21/05/08 14:30	14.03	0.798	8.23	0.12	117.05	13.41	0.762	8.26	0.2	119.09	EBB
21/05/08 15:00	13.97	0.798	8.22	0.11	114.74	13.87	0.764	8.24	0.2	116.03	EBB

Table D2. Data collected during period 2 from sondes at TH and RC with erroneous values highlighted.

Date & Time	**Townhouse**						**Rushcutters**						TIDE
d/m/y hh:mm:ss	Temp	SpCond	pH	Ammonium-N	Ammonia-N	DO	Temp	SpCond	pH	Ammonium N	Ammonia N	DO	
	C	uS/cm		mg/L	mg/L	% sat	C	uS/cm		mg/L	mg/L	% sat	
21/05/08 16:30	14.57	814	8.02	0.58	0.016	109.7	14.27	783	8.08	0.591	0.019	120.5	EBB
21/05/08 17:00	14.6	817	8.09	0.458	0.015	112.1	14.36	781	8.1	0.509	0.017	117.9	EBB
21/05/08 17:30	14.27	819	8.07	0.41	0.013	108.9	14.33	780	8.12	0.473	0.017	121.5	EBB
21/05/08 18:00	14.26	817	8.08	0.383	0.012	108.2	14.47	781	8.13	0.457	0.017	122.1	EBB
21/05/08 18:30	14.2	816	8.08	0.36	0.011	108.1	14.54	781	8.14	0.44	0.016	123.4	EBB
21/05/08 19:00	14.12	816	8.08	0.346	0.011	107.1	14.56	781	8.13	0.427	0.016	121.7	EBB
21/05/08 19:30	14.07	816	8.07	0.333	0.01	104.9	14.54	781	8.12	0.418	0.015	120.2	EBB
21/05/08 20:00	13.92	815	8.07	0.323	0.01	104.2	14.44	783	8.1	0.415	0.014	116.3	EBB
21/05/08 20:30	13.68	443	8.05	0.304	0.009	102.6	14.37	782	8.09	0.412	0.013	113.9	EBB
21/05/08 21:00	10.64	3	7.9	11.29	0.178	105.2	14.33	782	8.09	0.413	0.013	112.3	EBB
21/05/08 21:30	10.48	2	7.79	216.6	2.623	105	14.28	782	8.08	0.411	0.013	110.9	FLOOD

21/05/08 22:00	13.66	815	8.14	0.296	0.01	112.9	13.56	790	8.05	0.406	0.011	104.7	FLOOD
21/05/08 22:30	13.61	817	8.12	0.3	0.01	109.1	13.35	792	8.04	0.409	0.011	103.2	FLOOD
21/05/08 23:00	13.5	817	8.09	0.298	0.009	106.7	13.28	792	8.05	0.397	0.011	103.3	FLOOD
21/05/08 23:30	13.41	819	8.06	0.296	0.008	96.5	13.25	792	8.04	0.403	0.011	102.8	FLOOD
22/05/08 00:00	13.3	820	8.07	0.295	0.008	95.9	13.23	792	8.05	0.395	0.011	102.1	FLOOD
22/05/08 00:30	13.31	820	8.09	0.286	0.009	103.9	13.23	793	8.05	0.396	0.011	103.3	FLOOD
22/05/08 01:00	13.26	820	8.09	0.283	0.008	103.1	13.2	793	8.05	0.393	0.011	102.8	FLOOD
22/05/08 01:30	13.28	819	8.1	0.281	0.009	103.7	13.23	795	8.03	0.396	0.01	102.3	FLOOD
22/05/08 02:00	13.22	819	8.09	0.281	0.008	102.7	13.24	796	8.02	0.399	0.01	101.9	FLOOD
22/05/08 02:30	13.11	821	8.07	0.279	0.008	94.8	13.2	796	8.02	0.396	0.01	101.5	EBB
22/05/08 03:00	12.9	823	8.05	0.277	0.007	97	13.16	794	8.03	0.383	0.01	100.8	EBB
22/05/08 03:30	12.78	824	8.03	0.277	0.007	93.8	13.39	787	8.08	0.378	0.011	104.1	EBB
22/05/08 04:00	12.68	824	8.04	0.273	0.007	93.3	13.65	787	8.06	0.381	0.011	101.8	EBB
22/05/08 04:30	12.64	824	8.04	0.267	0.007	92.8	13.61	787	8.05	0.382	0.011	100.4	EBB
22/05/08 05:00	12.62	822	8.05	0.261	0.007	93.8	13.58	787	8.05	0.377	0.01	99.8	EBB
22/05/08 05:30	12.59	821	8.05	0.26	0.007	93.5	13.59	786	8.05	0.376	0.01	99.2	EBB
22/05/08 06:00	12.57	821	8.05	0.257	0.007	93.9	13.49	787	8.05	0.371	0.01	99.9	EBB
22/05/08 06:30	12.56	820	8.05	0.256	0.007	93.4	13.19	788	8.04	0.366	0.01	98.7	EBB
22/05/08 07:00	12.59	819	8.05	0.255	0.007	94.3	12.96	789	8.03	0.362	0.009	97.5	EBB
22/05/08 07:30	12.67	819	7.89	0.244	0.004	91.4	12.84	788	8.03	0.36	0.009	96.8	EBB
22/05/08 08:00	12.79	443	7.86	0.233	0.004	86.3	12.83	788	8.03	0.358	0.009	96.4	EBB
22/05/08 08:30	12.89	1	7.93	0.287	0.006	96.1	12.84	788	8.04	0.354	0.009	97.6	EBB
22/05/08 09:00	13.83	0	7.7	0.338	0.004	103.3	12.92	786	8.05	0.354	0.009	99.8	EBB
22/05/08 09:30	14	0	7.04	0.422	0.001	107.9	13.07	786	8.06	0.352	0.01	100.4	FLOOD
22/05/08 10:00	13.27	822	8.13	0.274	0.009	106.7	13.12	789	8.06	0.362	0.01	100.5	FLOOD
22/05/08 10:30	13.34	822	8.15	0.266	0.009	110.4	13.18	790	8.07	0.361	0.01	102.5	FLOOD
22/05/08 11:00	13.47	821	8.17	0.264	0.009	112.7	13.19	791	8.09	0.358	0.011	104.3	FLOOD
22/05/08 11:30	13.95	820	8.17	0.266	0.01	112.5	13.41	791	8.14	0.358	0.012	108.9	FLOOD
22/05/08 12:00	13.92	829	8.18	0.265	0.01	116.6	13.55	789	8.15	0.359	0.013	110.9	FLOOD
22/05/08 12:30	14.43	820	8.17	0.268	0.011	114.9	13.51	795	8.14	0.362	0.012	115	FLOOD
22/05/08 13:00	14.35	821	8.18	0.267	0.011	118.7	14.26	787	8.16	0.364	0.014	122.6	FLOOD
22/05/08 13:30	14.56	821	8.19	0.263	0.011	120	13.96	794	8.1	0.365	0.012	109.2	FLOOD
22/05/08 14:00	14.45	820	8.2	0.263	0.011	124.3	14.12	793	8.12	0.366	0.013	112.3	FLOOD

22/05/08 14:30	14.61	818	8.2	0.264	0.011	123.1	14.2	792	8.13	0.37	0.013	116.7	
22/05/08 15:00	14.62	816	8.2	0.266	0.011	126.6	13.87	786	8.17	0.361	0.014	121.8	EBB
22/05/08 15:30	14.45	814	8.22	0.263	0.012	126.7	14.44	788	8.15	0.363	0.014	120.9	EBB
22/05/08 16:00	14.68	813	8.22	0.261	0.012	124.1	14.37	787	8.15	0.362	0.013	118.3	EBB
22/05/08 16:30	14.76	815	8.21	0.262	0.011	120.4	14.72	783	8.16	0.362	0.014	122.1	EBB
22/05/08 17:00	14.72	815	8.22	0.259	0.012	120.8	14.74	784	8.17	0.357	0.014	121	EBB
22/05/08 17:30	14.7	815	8.22	0.259	0.012	121.7	14.76	783	8.17	0.355	0.014	120.5	EBB
22/05/08 18:00	14.76	814	8.22	0.259	0.012	120.8	14.71	783	8.17	0.354	0.014	120.9	EBB
22/05/08 18:30	14.85	814	8.22	0.259	0.012	118	14.87	783	8.18	0.353	0.015	123.7	EBB
22/05/08 19:00	14.75	813	8.21	0.258	0.011	117.1	14.94	786	8.18	0.35	0.015	124.2	EBB
22/05/08 19:30	14.69	813	8.2	0.258	0.011	113.8	14.98	786	8.18	0.349	0.015	123.4	EBB
22/05/08 20:00	14.64	813	8.19	0.259	0.011	112.9	14.94	786	8.17	0.35	0.014	121.7	EBB
22/05/08 20:30	14.47	439	8.18	0.254	0.01	111.9	14.91	784	8.17	0.348	0.014	121	EBB
22/05/08 21:00	11.84	1	7.88	1319	21.54	115.1	14.88	783	8.17	0.344	0.014	119.8	EBB
22/05/08 21:30	11.83	1	7.27	721.4	2.928	104.7	14.85	782	8.17	0.345	0.014	118.2	EBB
22/05/08 22:00	11.63	1	7.41	635	3.471	104.1	14.8	782	8.17	0.347	0.014	117.6	FLOOD
22/05/08 22:30	14.22	443	8.25	0.213	0.01	119.4	14.41	787	8.14	0.351	0.013	112.8	FLOOD
22/05/08 23:00	14.15	814	8.21	0.245	0.01	114.4	14.06	787	8.14	0.338	0.012	111.6	FLOOD
22/05/08 23:30	14.18	815	8.18	0.25	0.01	111.5	13.95	786	8.14	0.329	0.012	111.6	FLOOD
23/05/08 00:00	14.04	817	8.17	0.253	0.01	109.4	13.93	787	8.14	0.334	0.012	111	FLOOD
23/05/08 00:30	14.02	817	8.16	0.255	0.009	108.2	13.92	787	8.14	0.333	0.012	109.5	FLOOD
23/05/08 01:00	13.96	818	8.15	0.256	0.009	107.2	13.9	788	8.13	0.332	0.012	109.4	FLOOD
23/05/08 01:30	13.97	818	8.15	0.256	0.009	106.5	13.88	789	8.14	0.332	0.012	110.3	FLOOD
23/05/08 02:00	14.06	817	8.16	0.258	0.01	104.9	13.88	789	8.13	0.332	0.011	109.8	FLOOD
23/05/08 02:30	14.11	817	8.16	0.26	0.01	107.1	13.9	790	8.13	0.336	0.011	109.3	FLOOD
23/05/08 03:00	14.03	818	8.14	0.262	0.009	103.6	13.92	790	8.12	0.34	0.011	108.8	
23/05/08 03:30	13.75	822	8.1	0.261	0.008	99.6	13.88	790	8.11	0.333	0.011	107.9	EBB
23/05/08 04:00	13.66	822	8.09	0.261	0.008	98	13.91	788	8.13	0.33	0.011	107.3	EBB
23/05/08 04:30	13.6	820	8.1	0.256	0.008	98.7	14.37	785	8.13	0.341	0.012	107.8	EBB
23/05/08 05:00	13.59	819	8.11	0.249	0.008	97.8	14.39	785	8.12	0.343	0.012	106.6	EBB
23/05/08 05:30	13.58	818	8.11	0.246	0.008	98.6	14.36	786	8.11	0.342	0.012	104.9	EBB
23/05/08 06:00	13.58	817	8.1	0.245	0.008	94.4	14.35	786	8.1	0.339	0.011	103.7	EBB
23/05/08 06:30	13.56	816	8.12	0.243	0.008	97.7	14.35	785	8.09	0.339	0.011	102.8	EBB

23/05/08 07:00	13.57	815	8.06	0.241	0.007	94.5	14.26	785	8.09	0.337	0.011	102.2	EBB
23/05/08 07:30	13.63	795	8.08	0.24	0.007	100.2	14.05	785	8.09	0.331	0.01	101.8	EBB
23/05/08 08:00	13.69	793	8.13	0.24	0.008	105.7	13.87	786	8.08	0.327	0.01	101.7	EBB
23/05/08 08:30	13.74	472	8.21	0.239	0.01	110.4	13.81	785	8.08	0.323	0.01	101.7	EBB
23/05/08 09:00	13.26	2	8.28	3.162	0.148	117.5	13.81	783	8.1	0.32	0.01	103	EBB
23/05/08 09:30	14.6	0	7.27	332.1	1.668	117.4	13.88	782	8.11	0.32	0.011	105.1	EBB
23/05/08 10:00	16.13	0	7.19	29.88	0.14	118	14.08	782	8.12	0.322	0.011	105.9	FLOOD
23/05/08 10:30	14.92	819	8.23	0.249	0.012	125.3	14.2	786	8.15	0.327	0.012	110.5	FLOOD
23/05/08 11:00	14.71	817	8.25	0.252	0.012	131.7	14.26	786	8.2	0.327	0.014	116.2	FLOOD
23/05/08 11:30	15.43	818	8.26	0.254	0.013	130.2	14.47	785	8.28	0.324	0.016	128.8	FLOOD
23/05/08 12:00	15.37	818	8.28	0.251	0.014	136.8	14.64	783	8.29	0.329	0.017	127.4	FLOOD
23/05/08 12:30	15.66	816	8.29	0.253	0.014	138	14.71	781	8.3	0.327	0.018	135.1	FLOOD
23/05/08 13:00	15.6	814	8.3	0.253	0.015	139.8	14.96	786	8.3	0.333	0.018	127.8	FLOOD
23/05/08 13:30	15.51	780	8.31	0.252	0.015	144.4	15.06	785	8.27	0.336	0.017	131.3	FLOOD
23/05/08 14:00	15.57	784	8.32	0.253	0.015	142.6	15.28	783	8.28	0.337	0.018	136.5	FLOOD
23/05/08 14:30	15.65	794	8.35	0.255	0.016	149.7	15.19	782	8.3	0.338	0.019	146.2	FLOOD
23/05/08 15:00	15.82	795	8.33	0.256	0.016	146.3	15.05	782	8.3	0.337	0.019	139.9	FLOOD
23/05/08 15:30	16.27	808	8.34	0.26	0.017	142.7	15.19	777	8.39	0.337	0.023	149.5	EBB
23/05/08 16:00	15.87	805	8.39	0.257	0.019	156.8	15.42	777	8.33	0.333	0.02	141.9	EBB
23/05/08 16:30	15.86	801	8.41	0.255	0.019	154.8	15.64	775	8.33	0.335	0.021	141.6	EBB
23/05/08 17:00	15.83	801	8.41	0.256	0.019	155.2	15.7	772	8.32	0.332	0.02	139.7	EBB
23/05/08 17:30	16.05	801	8.42	0.255	0.02	152.1	15.89	769	8.33	0.329	0.021	139.4	EBB
23/05/08 18:00	15.78	800	8.41	0.256	0.019	153.8	15.89	767	8.32	0.328	0.02	139.7	EBB
23/05/08 18:30	15.93	801	8.41	0.255	0.02	148.3	15.87	764	8.31	0.329	0.02	139.8	EBB
23/05/08 19:00	15.87	800	8.4	0.253	0.019	146.3	15.99	767	8.35	0.326	0.022	145.4	EBB
23/05/08 19:30	15.78	800	8.41	0.253	0.019	146	16.11	764	8.38	0.325	0.023	150	EBB
23/05/08 20:00	15.73	801	8.4	0.252	0.019	145.3	16.1	761	8.37	0.323	0.023	149.7	EBB
23/05/08 20:30	15.67	801	8.41	0.253	0.019	147.5	16.08	764	8.37	0.323	0.023	148.4	EBB
23/05/08 21:00	15.61	802	8.4	0.253	0.018	143.7	16.08	760	8.38	0.321	0.023	148.9	EBB
23/05/08 21:30	15.5	447	8.4	0.246	0.018	141.3	16.01	762	8.39	0.319	0.023	150.4	EBB
23/05/08 22:00	11.22	2	8.43	0.219	0.012	146.8	15.92	759	8.4	0.316	0.023	150.1	EBB
23/05/08 22:30	11.96	1	8.14	0.295	0.009	143.6	15.87	763	8.37	0.317	0.022	147.5	FLOOD
23/05/08 23:00	15.27	805	8.4	0.245	0.017	142.6	15.77	763	8.36	0.32	0.022	143	FLOOD

23/05/08 23:30	15.24	805	8.34	0.249	0.015	140.3	15.26	762	8.37	0.312	0.021	140.2	FLOOD
24/05/08 00:00	15.16	805	8.24	0.25	0.012	137.4	15.12	762	8.34	0.309	0.019	139.1	FLOOD
24/05/08 00:30	15.02	805	8.22	0.25	0.011	134.8	15.08	761	8.36	0.31	0.02	137.7	FLOOD
24/05/08 01:00	14.94	805	8.23	0.249	0.012	133.4	15.07	761	8.34	0.31	0.019	136.3	FLOOD
24/05/08 01:30	14.87	805	8.25	0.247	0.012	133.1	15.04	764	8.27	0.311	0.016	135.2	FLOOD
24/05/08 02:00	14.98	805	8.26	0.249	0.013	133	14.98	764	8.28	0.312	0.016	134.2	FLOOD
24/05/08 02:30	14.94	804	8.22	0.251	0.011	131	14.97	764	8.29	0.313	0.017	134.3	FLOOD
24/05/08 03:00	14.88	806	8.22	0.25	0.011	129.3	14.95	764	8.27	0.315	0.016	133.1	FLOOD
24/05/08 03:30	14.78	807	8.22	0.252	0.011	126.5	14.93	770	8.24	0.318	0.015	132.5	
24/05/08 04:00	14.66	807	8.21	0.251	0.011	121.5	14.88	770	8.11	0.311	0.011	131.9	EBB
24/05/08 04:30	14.57	808	8.19	0.252	0.011	112.8	14.86	770	8.32	0.307	0.018	130.1	EBB
24/05/08 05:00	14.46	807	8.23	0.247	0.011	120.1	14.95	764	8.35	0.303	0.019	130.5	EBB
24/05/08 05:30	14.43	806	8.22	0.246	0.011	117.8	15.23	771	8.33	0.31	0.019	130.7	EBB
24/05/08 06:00	14.49	801	8.34	0.242	0.014	126.5	15.24	770	8.32	0.311	0.018	129.4	EBB
24/05/08 06:30	14.55	799	8.36	0.24	0.015	127.4	15.24	772	8.31	0.31	0.018	129.3	EBB
24/05/08 07:00	14.57	799	8.36	0.239	0.015	127.8	15.22	770	8.33	0.309	0.018	129.3	EBB
24/05/08 07:30	14.59	799	8.38	0.237	0.015	132.4	15.16	769	8.32	0.309	0.018	128.3	EBB
24/05/08 08:00	14.59	797	8.4	0.238	0.016	134.3	15.11	768	8.33	0.305	0.018	127.6	EBB
24/05/08 08:30	14.61	796	8.42	0.239	0.017	136.8	14.92	765	8.33	0.304	0.018	125.1	EBB
24/05/08 09:00	14.66	798	8.43	0.238	0.017	140.4	14.79	771	8.33	0.3	0.018	126.7	EBB
24/05/08 09:30	14.81	796	8.48	0.238	0.019	146.7	14.78	771	8.36	0.298	0.019	130.7	EBB
24/05/08 10:00	14.96	446	8.5	0.233	0.02	152	14.81	768	8.4	0.298	0.02	134.6	EBB
24/05/08 10:30	15.33	797	8.52	0.242	0.023	159.9	14.93	773	8.4	0.299	0.021	136.4	
24/05/08 11:00	15.78	795	8.53	0.247	0.024	162.8	15.17	774	8.42	0.303	0.022	141	FLOOD
24/05/08 11:30	15.78	792	8.55	0.248	0.026	170.1	15.29	773	8.46	0.305	0.025	149.3	FLOOD
24/05/08 12:00	15.93	790	8.56	0.25	0.027	175.2	15.34	770	8.5	0.305	0.027	157	FLOOD
24/05/08 12:30	16.26	791	8.57	0.252	0.028	177.6	15.52	773	8.52	0.308	0.029	161.1	FLOOD
24/05/08 13:00	16.41	790	8.56	0.259	0.029	179.8	15.58	770	8.52	0.31	0.03	162.1	FLOOD
24/05/08 13:30	16.28	788	8.56	0.253	0.028	182.5	15.76	770	8.51	0.312	0.03	164.3	FLOOD
24/05/08 14:00	16.54	787	8.56	0.254	0.028	182.4	15.94	772	8.52	0.316	0.031	166.2	FLOOD
24/05/08 14:30	16.5	778	8.54	0.252	0.027	180.3	15.96	770	8.53	0.317	0.032	171	FLOOD
24/05/08 15:00	16.63	781	8.53	0.258	0.027	183.6	16.04	770	8.54	0.318	0.033	173.6	FLOOD
24/05/08 15:30	16.68	781	8.52	0.256	0.027	189.3	16.04	774	8.56	0.318	0.035	175	FLOOD

24/05/08 16:00	16.79	778	8.53	0.256	0.027	190.6	16	772	8.57	0.316	0.035	175.3	EBB
24/05/08 16:30	16.8	777	8.48	0.257	0.025	185.2	15.97	766	8.6	0.317	0.038	180.3	EBB
24/05/08 17:00	16.89	775	8.49	0.255	0.025	186.1	16.4	763	8.63	0.319	0.042	184.5	EBB
24/05/08 17:30	16.87	767	8.44	0.208	0.018	180.9	16.44	759	8.65	0.316	0.044	187.5	EBB
24/05/08 18:00	16.89	755	8.43	0.201	0.017	175.9	16.53	754	8.68	0.314	0.046	191.1	EBB
24/05/08 18:30	16.82	754	8.43	0.196	0.017	176.6	16.59	753	8.69	0.313	0.048	193.8	EBB
24/05/08 19:00	16.69	767	8.38	0.194	0.015	176.2	16.42	746	8.66	0.313	0.044	188.4	EBB
24/05/08 19:30	16.51	766	8.37	0.192	0.014	174.4	16.42	738	8.67	0.31	0.044	190.4	EBB
24/05/08 20:00	16.42	767	8.35	0.189	0.013	177.2	16.43	743	8.63	0.309	0.04	188.2	EBB
24/05/08 20:30	16.34	769	8.32	0.186	0.012	173.1	16.48	740	8.59	0.307	0.037	189.3	EBB
24/05/08 21:00	16.25	771	8.31	0.185	0.012	173.5	16.49	741	8.54	0.307	0.033	188.6	EBB
24/05/08 21:30	16.14	778	8.33	0.183	0.012	176.3	16.45	750	8.52	0.306	0.031	185.8	EBB
24/05/08 22:00	15.98	777	8.32	0.18	0.011	171.5	16.42	744	8.49	0.306	0.029	184.9	EBB
24/05/08 22:30	15.79	778	8.31	0.178	0.011	166.3	16.4	740	8.46	0.306	0.027	182.9	EBB
24/05/08 23:00	15.62	779	8.32	0.176	0.011	164.8	16.32	736	8.39	0.306	0.023	179.6	
24/05/08 23:30	15.59	779	8.3	0.175	0.01	163.8	16.32	740	8.4	0.307	0.023	176.8	FLOOD
25/05/08 00:00	15.63	778	8.28	0.175	0.01	162.1	15.98	744	8.35	0.302	0.02	162	FLOOD
25/05/08 00:30	15.59	779	8.28	0.176	0.01	157.7	15.79	746	8.26	0.3	0.016	156.2	FLOOD
25/05/08 01:00	15.49	779	8.25	0.175	0.009	151.9	15.7	745	8.27	0.3	0.016	154.4	FLOOD
25/05/08 01:30	15.4	780	8.25	0.175	0.009	149.6	15.66	746	8.28	0.3	0.017	152.3	FLOOD
25/05/08 02:00	15.35	780	8.26	0.174	0.009	151	15.64	746	8.3	0.3	0.018	151.6	FLOOD
25/05/08 02:30	15.46	778	8.25	0.175	0.009	150.5	15.57	752	8.28	0.302	0.017	148.3	FLOOD
25/05/08 03:00	15.48	778	8.25	0.175	0.009	147.6	15.56	754	8.25	0.305	0.016	146.6	FLOOD
25/05/08 03:30	15.46	778	8.24	0.177	0.009	147.4	15.53	755	8.24	0.305	0.015	147	FLOOD
25/05/08 04:00	15.41	778	8.23	0.176	0.009	144.4	15.52	755	8.16	0.307	0.013	144.7	FLOOD
25/05/08 04:30	15.31	779	8.23	0.177	0.009	143	15.49	754	8.28	0.307	0.017	145.9	EBB
25/05/08 05:00	15.21	781	8.22	0.176	0.008	135.8	15.44	753	8.3	0.301	0.017	145	EBB
25/05/08 05:30	15.15	782	8.2	0.175	0.008	130.9	15.46	751	8.28	0.3	0.017	144	EBB
25/05/08 06:00	15.08	783	8.19	0.175	0.008	126.6	15.55	747	8.26	0.301	0.016	144.9	EBB
25/05/08 06:30	15	783	8.2	0.174	0.008	123.9	15.73	743	8.27	0.305	0.017	151.2	EBB
25/05/08 07:00	15	778	8.18	0.17	0.007	130.9	15.72	745	8.27	0.306	0.017	152	EBB
25/05/08 07:30	15.05	775	8.18	0.17	0.007	132.8	15.75	744	8.26	0.307	0.016	151.3	EBB
25/05/08 08:00	15.08	774	8.2	0.168	0.007	135.3	15.72	746	8.25	0.307	0.016	150.3	EBB

25/05/08 08:30	15.09	773	8.19	0.167	0.007	135.3	15.7	745	8.24	0.31	0.016	148.7	EBB
25/05/08 09:00	15.12	771	8.23	0.167	0.008	140.1	15.62	750	8.25	0.31	0.016	147	EBB
25/05/08 09:30	15.1	770	8.25	0.165	0.008	142.1	15.44	751	8.29	0.308	0.017	143.8	EBB
25/05/08 10:00	15.08	769	8.27	0.164	0.008	144.1	15.29	750	8.3	0.305	0.017	142.2	EBB
25/05/08 10:30	15.05	769	8.29	0.164	0.009	145	15.22	748	8.32	0.304	0.018	141.8	EBB
25/05/08 11:00	15.08	768	8.31	0.163	0.009	147.7	15.22	744	8.32	0.307	0.018	141.2	
25/05/08 11:30	15.08	767	8.31	0.164	0.009	149.5	15.27	742	8.26	0.315	0.016	138.7	FLOOD
25/05/08 12:00	15.04	766	8.31	0.164	0.009	148.2	15.32	746	8.27	0.313	0.016	138.6	FLOOD
25/05/08 12:30	15.01	767	8.32	0.166	0.01	146.7	15.34	750	8.3	0.31	0.018	138.6	FLOOD
25/05/08 13:00	15.03	766	8.32	0.165	0.01	148.7	15.31	749	8.31	0.309	0.018	140.4	FLOOD
25/05/08 13:30	15	766	8.32	0.166	0.01	146.2	15.29	749	8.28	0.309	0.017	139.6	FLOOD
25/05/08 14:00	15.03	765	8.33	0.166	0.01	149.6	15.28	748	8.25	0.314	0.016	138.2	FLOOD
25/05/08 14:30	15	764	8.32	0.168	0.01	147.1	15.28	748	8.26	0.317	0.016	137.1	FLOOD
25/05/08 15:00	15	765	8.31	0.172	0.01	144.6	15.26	747	8.3	0.315	0.018	138.9	FLOOD
25/05/08 15:30	14.98	767	8.3	0.172	0.009	142.6	15.2	746	8.34	0.314	0.019	137.8	FLOOD
25/05/08 16:00	14.95	766	8.3	0.173	0.01	141	15.17	743	8.34	0.314	0.019	137.9	FLOOD
25/05/08 16:30	14.95	765	8.29	0.177	0.01	136.7	15.17	743	8.34	0.318	0.019	139.7	EBB
25/05/08 17:00	14.94	762	8.29	0.182	0.01	133	15.1	742	8.35	0.318	0.02	140.9	EBB
25/05/08 17:30	14.96	740	8.27	0.19	0.01	128.6	15	739	8.36	0.314	0.02	141.1	EBB
25/05/08 18:00	14.77	645	8.24	0.215	0.01	119.7	14.94	719	8.37	0.314	0.02	139.6	EBB
25/05/08 18:30	14.7	621	8.23	0.225	0.01	115.4	14.94	714	8.36	0.317	0.02	138.4	EBB
25/05/08 19:00	14.67	621	8.21	0.226	0.01	111.4	14.95	716	8.37	0.317	0.02	139.4	EBB
25/05/08 19:30	14.76	659	8.19	0.213	0.009	111	14.96	723	8.38	0.317	0.021	140.9	EBB
25/05/08 20:00	14.74	687	8.15	0.206	0.008	107.2	14.95	724	8.39	0.316	0.021	138.8	EBB
25/05/08 20:30	14.68	701	8.16	0.201	0.008	106.3	14.92	718	8.36	0.321	0.02	133.4	EBB
25/05/08 21:00	14.58	693	8.14	0.219	0.008	103.7	14.89	705	8.34	0.332	0.02	127.6	EBB
25/05/08 21:30	14.54	690	8.1	0.339	0.011	99.2	14.85	686	8.31	0.346	0.019	122.5	EBB
25/05/08 22:00	14.53	703	8.01	0.599	0.016	88.7	14.82	671	8.28	0.359	0.019	118.8	EBB
25/05/08 22:30	14.52	718	7.94	0.931	0.022	78.1	14.8	668	8.26	0.366	0.018	115.6	EBB
25/05/08 23:00	14.42	709	7.91	1.12	0.024	72.5	14.81	676	8.24	0.364	0.017	112	EBB
25/05/08 23:30	14.32	696	7.88	1.13	0.023	68.7	14.76	681	8.21	0.362	0.016	108.6	EBB
26/05/08 00:00	14.24	691	7.88	1.107	0.022	68.1	14.74	683	8.18	0.362	0.015	107.2	FLOOD
26/05/08 00:30	14.28	692	7.87	1.134	0.022	67.9	14.7	680	8.16	0.365	0.014	104	FLOOD

26/05/08 01:00	14.29	701	7.86	1.189	0.023	66.4	14.66	679	8.12	0.375	0.013	101.3	FLOOD
26/05/08 01:30	14.19	703	7.85	1.192	0.022	63.1	14.58	678	8.04	0.497	0.015	94.3	FLOOD
26/05/08 02:00	14.16	698	7.83	1.151	0.02	58.9	14.55	679	8	0.71	0.019	87.4	FLOOD
26/05/08 02:30	14.11	693	7.82	1.12	0.019	59.2	14.51	680	7.92	0.784	0.018	83.5	FLOOD
26/05/08 03:00	14.1	692	7.82	1.086	0.018	59.5	14.49	681	7.92	0.817	0.018	80.5	FLOOD
26/05/08 03:30	14.1	695	7.82	1.121	0.019	59.2	14.47	682	7.96	0.818	0.02	80.8	FLOOD
26/05/08 04:00	14.09	704	7.82	1.187	0.02	58.8	14.47	688	7.89	0.897	0.019	76.6	FLOOD
26/05/08 04:30	14.09	708	7.82	1.194	0.02	58.2	14.46	691	7.9	0.969	0.021	74.9	FLOOD
26/05/08 05:00	14.05	706	7.81	1.172	0.019	55.3	14.45	691	7.84	0.998	0.018	72.8	
26/05/08 05:30	13.97	686	7.78	1.021	0.016	54.7	14.39	692	7.92	1.022	0.023	73.3	EBB
26/05/08 06:00	13.94	683	7.77	0.961	0.015	53.2	14.35	693	7.94	0.919	0.021	75.9	EBB
26/05/08 06:30	13.93	682	7.77	0.885	0.013	54.4	14.43	703	8.05	0.615	0.018	87.6	EBB
26/05/08 07:00	13.93	690	7.8	0.767	0.012	59.2	14.38	705	8.06	0.616	0.019	88.6	EBB
26/05/08 07:30	14.02	706	7.86	0.617	0.011	67.2	14.35	703	8.06	0.639	0.019	88.1	EBB
26/05/08 08:00	14.06	714	7.89	0.553	0.011	70.8	14.3	700	8.01	0.915	0.024	80	EBB
26/05/08 08:30	14.07	717	7.89	0.523	0.01	71.4	14.26	697	7.93	1.301	0.029	67.7	EBB
26/05/08 09:00	14.09	725	7.9	0.473	0.01	73.5	14.22	695	7.88	1.56	0.031	59.2	EBB
26/05/08 09:30	14.05	732	7.91	0.432	0.009	72.5	14.17	685	7.86	1.598	0.03	57.8	EBB
26/05/08 10:00	14.03	738	7.92	0.397	0.008	75.2	14.19	677	7.88	1.446	0.029	62.1	EBB
26/05/08 10:30	14.04	737	7.93	0.387	0.008	76.9	14.23	676	7.9	1.329	0.027	64.9	EBB
26/05/08 11:00	14.08	733	7.97	0.347	0.008	82.7	14.2	683	7.9	1.254	0.026	66.2	EBB
26/05/08 11:30	14.08	730	7.98	0.324	0.008	84.9	14.19	686	7.91	1.191	0.025	67.8	EBB
26/05/08 12:00	14.1	732	7.99	0.318	0.008	85.8	14.2	679	7.87	1.264	0.024	62.9	FLOOD
26/05/08 12:30	14.15	736	8	0.333	0.009	87.1	14.22	694	7.9	0.962	0.02	69.5	FLOOD
26/05/08 13:00	14.19	732	8.02	0.318	0.009	88.7	14.18	697	7.91	0.694	0.015	74.3	FLOOD
26/05/08 13:30	14.26	730	8.02	0.307	0.008	89.8	14.35	697	7.94	0.636	0.015	79.6	FLOOD
26/05/08 14:00	14.37	731	8.05	0.301	0.009	92.2	14.27	697	7.94	0.615	0.014	77.4	FLOOD
26/05/08 14:30	14.45	731	8.06	0.296	0.009	94.5	14.34	696	7.94	0.631	0.014	77.8	FLOOD
26/05/08 15:00	14.49	731	8.06	0.294	0.009	94.9	14.36	701	7.95	0.591	0.014	78.2	FLOOD
26/05/08 15:30	14.51	731	8.06	0.291	0.009	94.4	14.46	698	7.98	0.569	0.014	83.9	FLOOD
26/05/08 16:00	14.53	730	8.05	0.289	0.009	94	14.37	700	7.95	0.565	0.013	79.8	FLOOD
26/05/08 16:30	14.54	729	8.05	0.29	0.009	91.6	14.51	693	8.01	0.555	0.015	87.5	FLOOD
26/05/08 17:00	14.51	722	8.03	0.277	0.008	92.8	14.38	692	7.99	0.549	0.014	84.3	

26/05/08 17:30	14.5	715	8.03	0.264	0.007	92.4	14.41	688	7.97	0.643	0.016	80.6	EBB
26/05/08 18:00	14.47	714	8.02	0.26	0.007	91.5	14.46	688	7.95	0.771	0.018	74.7	EBB
26/05/08 18:30	14.43	713	7.99	0.253	0.007	89.1	14.48	686	7.96	0.829	0.02	74.8	EBB
26/05/08 19:00	14.35	711	7.95	0.245	0.006	85.4	14.46	688	7.97	0.853	0.021	75.7	EBB
26/05/08 19:30	14.2	706	7.91	0.237	0.005	83.2	14.46	694	7.98	0.86	0.022	76.1	EBB
26/05/08 20:00	14.08	705	7.87	0.232	0.004	78	14.46	697	8	0.823	0.022	77.5	EBB
26/05/08 20:30	13.95	707	7.85	0.23	0.004	76.9	14.39	701	8.04	0.727	0.021	82	EBB
26/05/08 21:00	13.83	713	7.85	0.229	0.004	75.9	14.4	705	8.04	0.67	0.019	83.6	EBB
26/05/08 21:30	13.71	720	7.84	0.23	0.004	75.1	14.35	697	8.05	0.58	0.017	87.2	EBB
26/05/08 22:00	13.6	727	7.84	0.23	0.004	73.7	14.3	699	8.04	0.533	0.015	87	EBB
26/05/08 22:30	13.57	728	7.84	0.23	0.004	73.9	14.29	695	8.01	0.512	0.014	85.5	EBB
26/05/08 23:00	13.56	721	7.85	0.225	0.004	74.6	14.2	695	7.99	0.48	0.012	83.4	EBB
26/05/08 23:30	13.53	714	7.87	0.222	0.004	77.6	14.11	682	7.96	0.466	0.011	80.6	EBB
27/05/08 00:00	13.5	739	7.89	0.221	0.004	79.2	13.99	689	7.93	0.457	0.01	77.8	EBB
27/05/08 00:30	13.46	737	7.89	0.22	0.004	79.5	13.89	694	7.92	0.452	0.01	76.4	
27/05/08 01:00	13.42	745	7.89	0.22	0.004	79.1	13.85	676	7.91	0.448	0.009	74.9	FLOOD
27/05/08 01:30	13.44	728	7.88	0.221	0.004	78.3	13.9	680	7.88	0.462	0.009	71.3	FLOOD
27/05/08 02:00	13.4	710	7.88	0.223	0.004	77.1	13.86	690	7.89	0.441	0.009	77.8	FLOOD
27/05/08 02:30	13.36	709	7.87	0.222	0.004	74.8	13.81	702	7.94	0.416	0.009	83.6	FLOOD
27/05/08 03:00	13.36	708	7.87	0.223	0.004	74.9	13.75	696	7.98	0.408	0.01	84.2	FLOOD
27/05/08 03:30	13.34	706	7.87	0.224	0.004	74.7	13.71	701	7.96	0.411	0.009	83.5	FLOOD
27/05/08 04:00	13.33	706	7.87	0.227	0.004	74.3	13.7	695	7.94	0.41	0.009	81.2	FLOOD
27/05/08 04:30	13.29	706	7.89	0.224	0.004	76.3	13.7	698	7.95	0.403	0.009	82.5	FLOOD
27/05/08 05:00	13.28	708	7.89	0.224	0.004	75.6	13.65	697	7.98	0.399	0.009	83.2	FLOOD
27/05/08 05:30	13.3	709	7.89	0.224	0.004	76.6	13.63	698	7.99	0.396	0.01	82.9	FLOOD
27/05/08 06:00	13.28	709	7.89	0.225	0.004	75.1	13.64	693	7.96	0.405	0.009	79.3	EBB
27/05/08 06:30	13.28	711	7.9	0.226	0.004	75.4	13.67	691	7.93	0.414	0.009	75.1	EBB
27/05/08 07:00	13.29	706	7.9	0.224	0.004	77.6	13.58	689	7.88	0.427	0.008	69.4	EBB
27/05/08 07:30	13.29	695	7.9	0.225	0.004	76.3	13.5	692	7.88	0.438	0.008	69.2	EBB
27/05/08 08:00	13.28	685	7.89	0.227	0.004	76	13.44	691	7.88	0.442	0.008	69.1	EBB
27/05/08 08:30	13.31	686	7.88	0.227	0.004	69.6	13.38	682	7.88	0.445	0.008	68.7	EBB
27/05/08 09:00	13.32	705	7.89	0.227	0.004	74.2	13.36	684	7.89	0.447	0.008	68.8	EBB
27/05/08 09:30	13.32	713	7.9	0.222	0.004	77.5	13.36	685	7.9	0.438	0.008	70.6	EBB

27/05/08 10:00	13.33	718	7.9	0.223	0.004	73	13.37	683	7.92	0.422	0.009	74.1	EBB
27/05/08 10:30	13.36	712	7.88	0.222	0.004	75.8	13.42	682	7.95	0.409	0.009	77.8	EBB
27/05/08 11:00	13.39	708	7.89	0.223	0.004	75.1	13.48	678	7.97	0.401	0.009	80.3	EBB
27/05/08 11:30	13.44	692	7.91	0.234	0.005	78.3	13.52	673	7.98	0.397	0.009	81.4	EBB
27/05/08 12:00	13.48	686	7.9	0.278	0.005	77	13.51	669	7.97	0.397	0.009	80.6	EBB
27/05/08 12:30	13.53	687	7.89	0.298	0.006	76.4	13.54	665	7.98	0.396	0.009	81.8	
27/05/08 13:00	13.63	680	7.93	0.292	0.006	81.4	13.58	665	7.97	0.401	0.009	81.1	FLOOD
27/05/08 13:30	13.65	695	7.92	0.364	0.008	80.3	13.55	655	7.92	0.412	0.009	77.1	FLOOD
27/05/08 14:00	13.69	699	7.91	0.4	0.008	79.5	13.59	674	7.95	0.502	0.011	79.5	FLOOD
27/05/08 14:30	13.74	700	7.91	0.399	0.008	78.8	13.6	690	7.98	0.574	0.014	80.4	FLOOD
27/05/08 15:00	13.74	703	7.89	0.463	0.009	74.9	13.62	689	7.98	0.574	0.014	80.6	FLOOD
27/05/08 15:30	13.74	709	7.89	0.505	0.01	70.2	13.93	680	8.03	0.546	0.015	85.9	FLOOD
27/05/08 16:00	13.91	707	7.87	0.506	0.01	66.7	13.79	684	8	0.567	0.014	85	FLOOD
27/05/08 16:30	13.75	715	7.88	0.472	0.009	70.1	13.83	694	8.01	0.574	0.015	85.9	FLOOD
27/05/08 17:00	13.82	716	7.89	0.425	0.008	76.6	13.79	695	7.97	0.574	0.014	83.5	FLOOD
27/05/08 17:30	13.82	776	7.91	0.397	0.008	79.8	13.79	690	8.01	0.569	0.015	82.8	FLOOD
27/05/08 18:00	13.8	769	7.92	0.371	0.008	82.2	13.96	681	8	0.507	0.013	83.2	EBB
27/05/08 18:30	13.77	779	7.93	0.331	0.007	83.2	13.98	675	8.02	0.449	0.012	86.7	EBB
27/05/08 19:00	13.75	784	7.9	0.312	0.006	81.6	14.19	679	8.06	0.458	0.014	91.3	EBB
27/05/08 19:30	13.72	820	7.91	0.299	0.006	82.5	14.04	682	8.02	0.497	0.013	87.2	EBB
27/05/08 20:00	13.58	744	7.9	0.282	0.006	82.7	14.03	682	8	0.583	0.015	84	EBB
27/05/08 20:30	13.51	746	7.89	0.276	0.005	81.5	14.05	688	7.98	0.685	0.017	81.4	EBB
27/05/08 21:00	13.46	749	7.88	0.275	0.005	80.5	14.06	694	7.97	0.73	0.018	80.1	EBB
27/05/08 21:30	13.45	751	7.87	0.271	0.005	79.3	14.04	703	7.98	0.674	0.016	82.1	EBB
27/05/08 22:00	13.46	750	7.85	0.269	0.005	75.3	13.98	710	7.98	0.607	0.015	83.8	EBB
27/05/08 22:30	13.47	741	7.84	0.268	0.005	73	13.95	710	7.98	0.571	0.014	83.5	EBB
27/05/08 23:00	13.47	730	7.86	0.267	0.005	77.6	13.88	715	7.97	0.536	0.013	82.6	EBB
27/05/08 23:30	13.46	724	7.85	0.271	0.005	74.8	13.74	724	7.95	0.51	0.011	81	EBB
28/05/08 00:00	13.44	389	7.86	0.264	0.005	72.4	13.65	725	7.94	0.497	0.011	79.8	EBB
28/05/08 00:30	12.97	4	8.53	0.219	0.018	71.4	13.59	716	7.93	0.49	0.01	78.6	EBB
28/05/08 01:00	13.07	4	8.54	0.198	0.016	100.8	13.55	717	7.93	0.481	0.01	78.2	EBB
28/05/08 01:30	13.05	3	8.54	0.206	0.017	100.7	13.54	722	7.92	0.476	0.01	77.7	
28/05/08 02:00	13.08	3	8.54	0.214	0.018	100.7	13.54	720	7.92	0.482	0.01	77.1	FLOOD

28/05/08 02:30	13	3	8.53	0.235	0.019	100.7	13.57	728	7.92	0.482	0.01	77.5	FLOOD
28/05/08 03:00	13.4	384	7.82	0.274	0.004	73.7	13.53	715	7.88	0.494	0.009	73.4	FLOOD
28/05/08 03:30	13.41	699	7.79	0.284	0.004	70.5	13.49	709	7.87	0.498	0.009	73.8	FLOOD
28/05/08 04:00	13.4	695	7.79	0.285	0.004	69.9	13.44	699	7.91	0.471	0.009	80.7	FLOOD
28/05/08 04:30	13.4	684	7.77	0.294	0.004	70.2	13.48	704	7.9	0.473	0.009	77	FLOOD
28/05/08 05:00	13.42	683	7.78	0.294	0.004	71.6	13.52	725	7.89	0.481	0.009	74.1	FLOOD
28/05/08 05:30	13.39	556	7.77	0.314	0.005	75.9	13.54	727	7.9	0.485	0.009	74.2	FLOOD
28/05/08 06:00	13.37	494	7.75	0.341	0.005	77.2	13.54	728	7.9	0.485	0.009	74.3	FLOOD
28/05/08 06:30	13.4	489	7.74	0.347	0.005	76.6	13.54	713	7.82	0.494	0.008	73.1	FLOOD
28/05/08 07:00	13.41	586	7.74	0.334	0.004	72.3	13.52	704	7.9	0.481	0.009	73.3	EBB
28/05/08 07:30	13.38	690	7.8	0.304	0.005	76.3	13.57	714	7.9	0.481	0.009	75.2	EBB
28/05/08 08:00	13.35	710	7.8	0.305	0.005	76.1	13.61	713	7.89	0.484	0.009	74.1	EBB
28/05/08 08:30	13.38	711	7.8	0.304	0.005	76.2	13.64	685	7.89	0.487	0.009	73.7	EBB
28/05/08 09:00	13.5	710	7.81	0.296	0.005	78.4	13.65	676	7.87	0.49	0.009	72.6	EBB
28/05/08 09:30	13.57	714	7.82	0.301	0.005	79.6	13.73	665	7.87	0.483	0.009	75.4	EBB
28/05/08 10:00	13.66	710	7.81	0.319	0.005	77.5	13.76	644	7.85	0.486	0.009	76.1	EBB
28/05/08 10:30	13.82	704	7.82	0.375	0.006	77.7	13.81	624	7.84	0.493	0.009	77	EBB
28/05/08 11:00	14.24	697	7.81	0.442	0.007	78.3	13.87	632	7.85	0.502	0.009	77.6	EBB
28/05/08 11:30	14.04	705	7.8	0.482	0.008	76.2	13.94	657	7.86	0.567	0.011	79.6	EBB
28/05/08 12:00	14.43	704	7.81	0.449	0.008	76.8	14.2	675	7.89	0.518	0.01	83	EBB
28/05/08 12:30	14.4	709	7.83	0.41	0.007	81.9	14.39	693	7.91	0.528	0.011	84.4	EBB
28/05/08 13:00	14.53	709	7.83	0.378	0.007	82.7	14.46	696	7.91	0.561	0.012	84.4	EBB
28/05/08 13:30	14.47	710	7.84	0.337	0.006	84.5	14.49	696	7.89	0.648	0.013	81.9	
28/05/08 14:00	14.7	708	7.86	0.318	0.006	87.4	14.64	663	7.89	0.625	0.013	82.2	FLOOD
28/05/08 14:30	15.12	707	7.89	0.312	0.007	92.3	14.77	667	7.88	0.655	0.014	81.6	FLOOD
28/05/08 15:00	14.71	709	7.86	0.315	0.006	87.4	14.49	694	7.89	0.57	0.012	84	FLOOD
28/05/08 15:30	14.77	709	7.88	0.293	0.006	90.4	14.53	701	7.91	0.562	0.012	84.9	FLOOD
28/05/08 16:00	14.72	709	7.87	0.279	0.006	89.4	14.66	700	7.89	0.665	0.014	81.8	FLOOD
28/05/08 16:30	14.77	710	7.87	0.272	0.006	89.2	14.73	683	7.91	0.665	0.015	83	FLOOD
28/05/08 17:00	14.74	712	7.86	0.267	0.005	88.1	14.8	682	7.9	0.684	0.015	82.8	FLOOD
28/05/08 17:30	14.71	713	7.85	0.265	0.005	85.9	14.73	683	7.89	0.676	0.014	81.2	FLOOD
28/05/08 18:00	14.69	713	7.84	0.263	0.005	83.7	14.74	681	7.89	0.691	0.015	81	FLOOD
28/05/08 18:30	14.65	712	7.83	0.266	0.005	82	14.92	683	7.9	0.764	0.017	80	FLOOD

28/05/08 19:00	14.64	710	7.83	0.267	0.005	80.2	14.94	687	7.89	0.726	0.016	80.7	EBB
28/05/08 19:30	14.6	708	7.81	0.274	0.005	78.8	14.93	686	7.89	0.737	0.016	80.4	EBB
28/05/08 20:00	14.57	706	7.8	0.281	0.005	75	14.97	687	7.9	0.713	0.016	81.2	EBB
28/05/08 20:30	14.53	699	7.81	0.286	0.005	75.4	14.95	688	7.89	0.658	0.014	81.3	EBB
28/05/08 21:00	14.5	693	7.8	0.289	0.005	74.9	14.88	688	7.91	0.546	0.012	85.5	EBB
28/05/08 21:30	14.48	686	7.79	0.293	0.005	73.8	14.79	688	7.91	0.498	0.011	85	EBB
28/05/08 22:00	14.47	683	7.78	0.293	0.005	72.2	14.7	686	7.9	0.489	0.01	82.6	EBB
28/05/08 22:30	14.44	680	7.77	0.292	0.005	70.6	14.63	684	7.88	0.494	0.01	80.3	EBB
28/05/08 23:00	14.42	680	7.77	0.291	0.005	69.4	14.57	691	7.88	0.505	0.01	78.7	EBB
28/05/08 23:30	14.35	679	7.77	0.29	0.004	69.9	14.51	681	7.87	0.515	0.01	77.1	EBB
29/05/08 00:00	14.3	677	7.76	0.29	0.004	68.5	14.47	682	7.86	0.521	0.01	76	EBB
29/05/08 00:30	14.23	669	7.75	0.284	0.004	66.4	14.43	669	7.85	0.52	0.01	74.8	EBB
29/05/08 01:00	12.9	6	8.37	0.271	0.015	67.7	14.4	662	7.85	0.515	0.01	73.4	EBB
29/05/08 01:30	12.19	5	8.49	0.233	0.016	101.7	14.37	669	7.84	0.506	0.009	72.1	EBB
29/05/08 02:00	11.96	5	8.5	0.211	0.015	101.3	14.32	672	7.83	0.5	0.009	70.8	EBB
29/05/08 02:30	11.85	4	8.49	0.239	0.016	101.4	14.26	679	7.83	0.493	0.009	69.8	
29/05/08 03:00	11.78	4	8.49	0.281	0.019	101.4	14.21	665	7.83	0.487	0.009	69.4	FLOOD
29/05/08 03:30	11.6	4	8.48	0.344	0.022	101.4	14.19	662	7.82	0.485	0.008	68.2	FLOOD
29/05/08 04:00	11.38	4	8.48	0.464	0.029	101.4	14.18	679	7.82	0.484	0.008	67.2	FLOOD
29/05/08 04:30	11.03	4	8.47	0.654	0.039	101.5	14.13	681	7.8	0.486	0.008	65.7	FLOOD
29/05/08 05:00	11.22	4	8.47	0.866	0.052	74.8	14.08	680	7.78	0.501	0.008	64	FLOOD
29/05/08 05:30	13.68	377	7.8	0.277	0.004	64.7	14.06	688	7.8	0.497	0.008	69	FLOOD
29/05/08 06:00	13.71	706	7.77	0.282	0.004	65.1	14.07	724	7.86	0.48	0.009	74	FLOOD
29/05/08 06:30	13.75	707	7.77	0.285	0.004	64.6	14.07	693	7.84	0.484	0.009	71.7	FLOOD
29/05/08 07:00	13.88	709	7.76	0.283	0.004	66.3	14.08	705	7.83	0.48	0.008	71.1	FLOOD
29/05/08 07:30	14.12	717	7.8	0.273	0.004	72.6	14.06	711	7.84	0.483	0.009	71.6	FLOOD
29/05/08 08:00	14.22	725	7.81	0.271	0.005	72.3	14.06	724	7.84	0.48	0.009	72.8	EBB
29/05/08 08:30	14.28	730	7.83	0.269	0.005	76.2	14.14	718	7.87	0.469	0.009	75.9	EBB
29/05/08 09:00	14.41	731	7.85	0.263	0.005	77.5	14.78	693	7.88	0.47	0.01	75.1	EBB
29/05/08 09:30	14.53	731	7.85	0.264	0.005	84.1	14.55	679	7.86	0.469	0.009	72.6	EBB
29/05/08 10:00	14.55	728	7.84	0.266	0.005	87.9	14.69	692	7.86	0.466	0.009	73.2	EBB
29/05/08 10:30	14.62	724	7.83	0.277	0.005	86.5	14.64	697	7.87	0.458	0.009	74.2	EBB
29/05/08 11:00	14.75	723	7.85	0.279	0.005	85.6	14.71	689	7.9	0.452	0.01	78.1	EBB

29/05/08 11:30	15.21	723	7.85	0.289	0.006	88.6	14.82	699	7.91	0.45	0.01	80.2	EBB
29/05/08 12:00	15.42	719	7.83	0.292	0.006	88.2	15.03	704	7.94	0.444	0.011	85.6	EBB
29/05/08 12:30	15.43	648	7.91	0.295	0.007	95.9	15.12	707	7.95	0.445	0.011	87.7	EBB
29/05/08 13:00	15.02	6	7.99	0.284	0.008	94.1	15.05	703	7.94	0.442	0.011	88	EBB
29/05/08 13:30	13.74	5	8.54	0.251	0.022	94.2	15.06	702	7.95	0.447	0.011	88.7	EBB
29/05/08 14:00	14.59	2	8.44	0.642	0.047	100.7	15.09	707	7.95	0.453	0.011	90.2	EBB
29/05/08 14:30	14.85	1	7.39	37.41	0.252	106.5	15.16	715	7.95	0.462	0.012	90.1	EBB
29/05/08 15:00	15.26	710	7.9	0.275	0.006	94.7	15.16	722	7.92	0.467	0.011	87.1	FLOOD
29/05/08 15:30	15.23	715	7.9	0.276	0.006	93.1	14.99	727	7.91	0.471	0.011	87.6	FLOOD
29/05/08 16:00	15.21	722	7.88	0.277	0.006	90.6	14.96	739	7.91	0.474	0.011	86.7	FLOOD
29/05/08 16:30	15.19	726	7.89	0.277	0.006	86.7	14.98	732	7.89	0.478	0.01	86	FLOOD
29/05/08 17:00	15.2	728	7.86	0.277	0.006	84.8	14.96	736	7.9	0.48	0.011	85.3	FLOOD
29/05/08 17:30	15.19	733	7.83	0.286	0.005	82.3	14.96	733	7.91	0.481	0.011	85.3	FLOOD
29/05/08 18:00	15.17	738	7.82	0.285	0.005	79.8	14.94	724	7.88	0.482	0.01	82.1	FLOOD
29/05/08 18:30	15.15	737	7.83	0.281	0.005	79.5	14.91	734	7.87	0.486	0.01	81.5	FLOOD
29/05/08 19:00	15.04	746	7.81	0.276	0.005	80.1	14.89	734	7.89	0.479	0.01	84.6	FLOOD
29/05/08 19:30	14.97	749	7.82	0.268	0.005	78.7	14.9	733	7.89	0.472	0.01	83.6	FLOOD
29/05/08 20:00	14.93	750	7.83	0.266	0.005	80.3	14.97	718	7.92	0.465	0.011	85.6	EBB
29/05/08 20:30	14.89	751	7.82	0.265	0.005	81.1	15.05	707	7.92	0.471	0.011	85.2	EBB
29/05/08 21:00	14.84	752	7.82	0.267	0.005	80	15.1	700	7.91	0.48	0.011	85.2	EBB
29/05/08 21:30	14.79	749	7.82	0.268	0.005	78.7	15.13	696	7.91	0.495	0.011	84.8	EBB
29/05/08 22:00	14.76	736	7.83	0.276	0.005	78.4	15.15	688	7.89	0.501	0.011	83.1	EBB
29/05/08 22:30	14.74	728	7.83	0.28	0.005	78.8	15.14	692	7.89	0.502	0.011	83.3	EBB
29/05/08 23:00	14.7	704	7.82	0.286	0.005	78.6	14.99	707	7.89	0.484	0.01	83.2	EBB
29/05/08 23:30	14.6	648	7.81	0.298	0.005	80.1	14.9	697	7.89	0.476	0.01	82.2	EBB
30/05/08 00:00	14.62	659	7.8	0.292	0.005	77.9	14.82	712	7.89	0.477	0.01	82.5	EBB
30/05/08 00:30	14.63	685	7.77	0.284	0.005	72.8	14.78	706	7.89	0.483	0.01	81.8	EBB
30/05/08 01:00	14.56	697	7.75	0.28	0.004	71.7	14.73	708	7.89	0.489	0.01	81.1	EBB
30/05/08 01:30	14.54	704	7.74	0.279	0.004	68.6	14.7	698	7.88	0.494	0.01	80.2	EBB
30/05/08 02:00	14.42	713	7.78	0.277	0.004	70.3	14.66	680	7.88	0.499	0.01	79.3	EBB
30/05/08 02:30	14.29	7	7.79	0.277	0.004	71.9	14.62	667	7.87	0.501	0.01	78.3	EBB
30/05/08 03:00	12.93	6	8.44	0.233	0.015	76.8	14.6	663	7.86	0.501	0.01	77.6	EBB
30/05/08 03:30	12.86	5	8.45	0.283	0.019	101.4	14.58	656	7.85	0.499	0.009	76.5	

30/05/08 04:00	12.74	5	8.45	0.323	0.021	101.4	14.57	666	7.85	0.496	0.009	76.5	FLOOD
30/05/08 04:30	12.77	5	8.45	0.389	0.026	101.8	14.55	670	7.83	0.5	0.009	74.2	FLOOD
30/05/08 05:00	14.29	666	7.81	0.349	0.006	71.7	14.49	658	7.8	0.521	0.009	71.9	FLOOD
30/05/08 05:30	14.27	675	7.8	0.362	0.006	70.1	14.46	696	7.86	0.543	0.01	73.8	FLOOD
30/05/08 06:00	14.27	674	7.78	0.367	0.006	67.7	14.46	692	7.86	0.547	0.01	73.2	FLOOD
30/05/08 06:30	14.27	675	7.78	0.367	0.006	67.3	14.49	692	7.85	0.535	0.01	73.8	FLOOD
30/05/08 07:00	14.3	679	7.78	0.353	0.006	66.5	14.5	713	7.84	0.532	0.01	73.5	FLOOD
30/05/08 07:30	14.34	694	7.79	0.322	0.005	71.3	14.52	697	7.85	0.528	0.01	73.9	FLOOD
30/05/08 08:00	14.36	705	7.8	0.313	0.005	71.7	14.52	695	7.85	0.541	0.01	73.2	FLOOD
30/05/08 08:30	14.38	711	7.77	0.307	0.005	67.6	14.55	705	7.85	0.534	0.01	73.5	FLOOD
30/05/08 09:00	14.39	719	7.79	0.302	0.005	70	14.6	696	7.85	0.549	0.01	71.5	EBB
30/05/08 09:30	14.39	720	7.8	0.3	0.005	70.3	14.66	684	7.88	0.523	0.011	76.4	EBB
30/05/08 10:00	14.44	722	7.82	0.298	0.005	73	14.67	690	7.87	0.516	0.01	75.4	EBB
30/05/08 10:30	14.46	726	7.81	0.297	0.005	75.1	14.71	705	7.88	0.496	0.01	77.5	EBB
30/05/08 11:00	14.47	724	7.81	0.297	0.005	75	14.69	706	7.87	0.527	0.011	75.3	EBB
30/05/08 11:30	14.46	722	7.81	0.293	0.005	74.9	14.69	691	7.87	0.553	0.011	73.8	EBB
30/05/08 12:00	14.5	716	7.81	0.292	0.005	76	14.75	709	7.88	0.552	0.011	74.9	EBB
30/05/08 12:30	14.59	706	7.81	0.292	0.005	76.1	14.74	705	7.89	0.535	0.011	76.3	EBB
30/05/08 13:00	14.63	698	7.8	0.294	0.005	75.8	14.73	713	7.89	0.52	0.011	77.4	EBB
30/05/08 13:30	14.67	691	7.8	0.295	0.005	77.1	14.73	702	7.89	0.513	0.011	78.5	EBB
30/05/08 14:00	14.7	686	7.79	0.293	0.005	75.7	14.72	713	7.88	0.509	0.011	78.6	EBB
30/05/08 14:30	14.75	681	7.8	0.294	0.005	76	14.77	717	7.88	0.506	0.011	79.6	EBB
30/05/08 15:00	14.84	680	7.79	0.296	0.005	76.7	14.83	696	7.88	0.503	0.01	79.9	EBB
30/05/08 15:30	14.91	673	7.8	0.299	0.005	78.8	14.92	690	7.88	0.504	0.011	80.3	EBB
30/05/08 16:00	15.01	671	7.82	0.296	0.005	79	15.28	691	7.92	0.506	0.012	85.9	FLOOD
30/05/08 16:30	15.17	666	7.8	0.304	0.005	80.7	15.12	692	7.88	0.516	0.011	81	FLOOD
30/05/08 17:00	15.02	661	7.79	0.307	0.005	79.9	15.15	686	7.86	0.522	0.011	79.3	FLOOD
30/05/08 17:30	15.19	661	7.78	0.305	0.005	75.5	14.92	661	7.85	0.514	0.01	80.2	FLOOD
30/05/08 18:00	15.25	662	7.78	0.305	0.005	76.4	15.13	681	7.86	0.517	0.011	81	FLOOD
30/05/08 18:30	15.2	664	7.77	0.305	0.005	74.3	15.42	689	7.9	0.514	0.012	83.6	FLOOD
30/05/08 19:00	15.15	666	7.76	0.307	0.005	79.1	15.3	696	7.88	0.519	0.011	81.5	FLOOD
30/05/08 19:30	15.07	670	7.77	0.308	0.005	77	15.36	688	7.88	0.523	0.011	81.5	FLOOD
30/05/08 20:00	14.99	671	7.77	0.311	0.005	76.8	15.38	686	7.89	0.516	0.011	81.7	FLOOD

30/05/08 20:30	14.97	672	7.77	0.305	0.005	76.4	15.33	673	7.87	0.515	0.011	80.2	FLOOD
30/05/08 21:00	14.94	673	7.77	0.304	0.005	76.6	15.25	666	7.86	0.514	0.011	78.8	
30/05/08 21:30	14.77	670	7.78	0.31	0.005	78	15.24	662	7.86	0.514	0.01	78.9	EBB
30/05/08 22:00	14.61	668	7.78	0.316	0.005	77.5	15.22	656	7.85	0.515	0.01	78	EBB
30/05/08 22:30	14.57	664	7.77	0.313	0.005	77	15.15	656	7.84	0.52	0.01	76.8	EBB
30/05/08 23:00	14.56	664	7.78	0.307	0.005	76.2	15.1	657	7.83	0.524	0.01	76.8	EBB
30/05/08 23:30	14.54	666	7.78	0.304	0.005	76	14.95	653	7.83	0.523	0.01	78	EBB
31/05/08 00:00	14.52	667	7.78	0.3	0.005	75.2	14.85	655	7.83	0.527	0.01	78.4	EBB
31/05/08 00:30	14.5	670	7.77	0.293	0.005	73.2	14.71	655	7.84	0.535	0.01	78.8	EBB
31/05/08 01:00	14.48	672	7.76	0.293	0.004	71.8	14.61	653	7.84	0.534	0.01	78.8	EBB
31/05/08 01:30	14.47	675	7.77	0.292	0.005	72.3	14.55	652	7.85	0.525	0.01	78	EBB
31/05/08 02:00	14.45	678	7.76	0.29	0.004	71	14.52	654	7.85	0.517	0.01	78.1	EBB
31/05/08 02:30	14.43	680	7.76	0.29	0.004	70.2	14.51	655	7.85	0.511	0.01	77.6	EBB
31/05/08 03:00	14.4	682	7.74	0.286	0.004	68.4	14.5	659	7.85	0.505	0.01	76.9	EBB
31/05/08 03:30	14.37	684	7.73	0.286	0.004	65.7	14.48	668	7.85	0.499	0.009	76.2	EBB
31/05/08 04:00	14.33	688	7.73	0.284	0.004	66.1	14.46	671	7.85	0.493	0.009	75.6	EBB
31/05/08 04:30	14.24	687	7.71	0.286	0.004	62.9	14.44	679	7.85	0.489	0.009	74.9	EBB
31/05/08 05:00	14.12	378	7.79	0.278	0.004	67.2	14.42	695	7.84	0.488	0.009	74.4	FLOOD
31/05/08 05:30	14.12	618	7.77	0.282	0.004	66.9	14.41	685	7.83	0.495	0.009	72.5	FLOOD
31/05/08 06:00	14.21	702	7.77	0.283	0.004	70	14.37	689	7.82	0.498	0.009	70.5	FLOOD
31/05/08 06:30	14.18	704	7.76	0.282	0.004	68.6	14.36	680	7.83	0.494	0.009	71.4	FLOOD
31/05/08 07:00	14.14	705	7.76	0.283	0.004	65.6	14.39	711	7.87	0.464	0.009	76.7	FLOOD
31/05/08 07:30	14.15	706	7.76	0.282	0.004	65.5	14.41	691	7.85	0.48	0.009	73.8	FLOOD
31/05/08 08:00	14.19	708	7.76	0.281	0.004	67.3	14.49	695	7.85	0.491	0.009	74	FLOOD
31/05/08 08:30	14.3	710	7.77	0.28	0.004	70.5	14.47	690	7.83	0.5	0.009	72.3	FLOOD
31/05/08 09:00	14.4	713	7.8	0.277	0.005	69.8	14.51	699	7.83	0.491	0.009	73.2	FLOOD
31/05/08 09:30	14.49	716	7.8	0.274	0.005	73.1	14.54	705	7.83	0.499	0.009	73.2	FLOOD
31/05/08 10:00	14.68	720	7.82	0.267	0.005	75.7	14.78	701	7.87	0.488	0.01	76.4	EBB
31/05/08 10:30	14.74	722	7.83	0.266	0.005	80.6	15.05	705	7.89	0.49	0.011	80.1	EBB
31/05/08 11:00	15.01	726	7.84	0.265	0.005	84.3	15	693	7.87	0.488	0.01	77.6	EBB
31/05/08 11:30	15.3	732	7.85	0.263	0.005	85.5	15.17	700	7.88	0.488	0.01	78.7	EBB
31/05/08 12:00	15.33	736	7.84	0.261	0.005	82.7	15.03	698	7.88	0.487	0.01	78.5	EBB
31/05/08 12:30	15.39	737	7.85	0.258	0.005	85.3	15.2	704	7.89	0.486	0.011	81.2	EBB

31/05/08 13:00	15.48	737	7.85	0.261	0.005	86	15.35	701	7.91	0.483	0.011	83.9	EBB
31/05/08 13:30	15.62	735	7.86	0.26	0.005	86.4	15.51	707	7.92	0.473	0.011	85.9	EBB
31/05/08 14:00	15.85	733	7.87	0.26	0.006	90.4	15.65	712	7.93	0.468	0.012	88.2	EBB
31/05/08 14:30	15.98	728	7.87	0.262	0.006	89.5	15.74	715	7.94	0.464	0.012	89	EBB
31/05/08 15:00	15.95	727	7.87	0.263	0.006	88.6	15.77	721	7.93	0.463	0.012	89	EBB
31/05/08 15:30	15.92	723	7.86	0.261	0.006	87.8	15.79	718	7.93	0.461	0.012	89	EBB
31/05/08 16:00	15.91	724	7.85	0.262	0.005	86.8	15.87	723	7.94	0.458	0.012	89.5	EBB
31/05/08 16:30	15.92	724	7.84	0.264	0.005	86.4	15.91	731	7.94	0.458	0.012	90	EBB
31/05/08 17:00	15.95	727	7.85	0.266	0.006	86	15.98	718	7.93	0.459	0.012	90.3	FLOOD
31/05/08 17:30	15.99	724	7.85	0.27	0.006	88	16	733	7.92	0.464	0.012	89.1	FLOOD
31/05/08 18:00	16.05	723	7.84	0.27	0.006	86.1	16	724	7.91	0.465	0.011	87	FLOOD
31/05/08 18:30	16.04	725	7.84	0.269	0.006	83.5	15.94	704	7.93	0.457	0.011	89.8	FLOOD
31/05/08 19:00	16.01	725	7.84	0.268	0.005	83.6	15.9	707	7.9	0.457	0.011	88.3	FLOOD
31/05/08 19:30	15.93	724	7.81	0.272	0.005	79.1	15.91	723	7.9	0.458	0.011	87.9	FLOOD
31/05/08 20:00	15.9	723	7.8	0.272	0.005	77.9	15.91	708	7.91	0.463	0.011	87.4	FLOOD
31/05/08 20:30	15.86	723	7.79	0.273	0.005	75.8	15.88	710	7.9	0.456	0.011	85.7	FLOOD
31/05/08 21:00	15.76	722	7.8	0.268	0.005	78.5	15.85	715	7.89	0.459	0.011	86.1	FLOOD
31/05/08 21:30	15.72	721	7.81	0.262	0.005	80.7	15.83	720	7.91	0.457	0.011	86.8	FLOOD
31/05/08 22:00	15.66	724	7.81	0.258	0.005	79.3	15.87	715	7.92	0.455	0.011	86.4	FLOOD
31/05/08 22:30	15.6	724	7.8	0.258	0.005	76.1	15.91	713	7.92	0.457	0.011	85.5	EBB
31/05/08 23:00	15.55	724	7.82	0.256	0.005	79.3	15.95	716	7.93	0.454	0.011	87.1	EBB
31/05/08 23:30	15.53	724	7.82	0.253	0.005	76.8	15.97	715	7.92	0.456	0.011	86.4	EBB
01/06/08 00:00	15.5	724	7.82	0.251	0.005	80.2	15.96	711	7.91	0.457	0.011	84.8	EBB
01/06/08 00:30	15.46	724	7.82	0.253	0.005	79.7	15.95	706	7.9	0.459	0.011	83.8	EBB
01/06/08 01:00	15.42	725	7.81	0.249	0.005	76.4	15.83	703	7.88	0.466	0.01	82.1	EBB
01/06/08 01:30	15.39	725	7.81	0.25	0.005	73.5	15.71	709	7.88	0.462	0.01	81.3	EBB
01/06/08 02:00	15.36	725	7.81	0.249	0.005	77.6	15.64	710	7.89	0.454	0.01	81.8	EBB
01/06/08 02:30	15.32	725	7.8	0.249	0.004	75.5	15.55	704	7.9	0.448	0.01	82.1	EBB
01/06/08 03:00	15.28	727	7.8	0.248	0.004	74.6	15.5	721	7.9	0.446	0.01	82.6	EBB
01/06/08 03:30	15.23	728	7.8	0.246	0.004	73.7	15.45	715	7.9	0.445	0.01	81.8	EBB
01/06/08 04:00	15.2	728	7.79	0.247	0.004	72.4	15.4	702	7.9	0.441	0.01	81.1	EBB
01/06/08 04:30	15.14	709	7.77	0.248	0.004	68.1	15.36	706	7.89	0.44	0.01	80.4	EBB
01/06/08 05:00	15.05	727	7.77	0.248	0.004	68.2	15.33	712	7.89	0.438	0.01	79.6	EBB

01/06/08 05:30	14.98	400	7.77	0.243	0.004	69.3	15.29	703	7.89	0.438	0.01	78.5	EBB
01/06/08 06:00	14.66	4	7.78	0.257	0.004	68.3	15.25	707	7.89	0.438	0.009	77.8	FLOOD
01/06/08 06:30	14.99	736	7.79	0.26	0.004	70.6	15.23	698	7.86	0.442	0.009	75.5	FLOOD
01/06/08 07:00	14.95	739	7.79	0.257	0.004	70.4	15.21	707	7.87	0.453	0.009	75.4	FLOOD
01/06/08 07:30	14.96	739	7.78	0.257	0.004	69.2	15.21	723	7.89	0.46	0.01	77.8	FLOOD
01/06/08 08:00	14.93	739	7.78	0.259	0.004	67.3	15.22	713	7.88	0.456	0.01	76.5	FLOOD
01/06/08 08:30	14.93	741	7.79	0.266	0.004	68.8	15.22	719	7.87	0.468	0.01	75.5	FLOOD
01/06/08 09:00	14.95	743	7.79	0.266	0.005	70.9	15.22	714	7.87	0.465	0.01	76.6	FLOOD
01/06/08 09:30	15	743	7.79	0.267	0.005	69.9	15.2	724	7.88	0.469	0.01	76.9	FLOOD
01/06/08 10:00	15.01	744	7.8	0.271	0.005	73.1	15.23	736	7.89	0.47	0.01	78.4	FLOOD
01/06/08 10:30	15.03	745	7.82	0.271	0.005	74.8	15.24	736	7.88	0.47	0.01	76.8	FLOOD
01/06/08 11:00	15.08	746	7.82	0.271	0.005	76.8	15.26	727	7.89	0.472	0.01	77.3	EBB
01/06/08 11:30	15.13	747	7.83	0.275	0.005	77.5	15.27	722	7.89	0.467	0.01	77.4	EBB
01/06/08 12:00	15.16	748	7.84	0.275	0.005	77.2	15.31	715	7.89	0.455	0.01	77	EBB
01/06/08 12:30	15.2	749	7.83	0.274	0.005	76.3	15.32	713	7.89	0.449	0.01	77.6	EBB
01/06/08 13:00	15.22	750	7.83	0.27	0.005	75.5	15.31	722	7.89	0.448	0.01	77.3	EBB
01/06/08 13:30	15.2	753	7.82	0.268	0.005	75.2	15.3	724	7.89	0.454	0.01	75.7	EBB
01/06/08 14:00	15.18	755	7.82	0.264	0.005	74.8	15.28	740	7.88	0.455	0.01	74.9	EBB
01/06/08 14:30	15.2	756	7.81	0.268	0.005	73.8	15.25	726	7.88	0.459	0.01	74.7	EBB
01/06/08 15:00	15.2	757	7.82	0.265	0.005	75	15.27	728	7.89	0.468	0.01	76	EBB
01/06/08 15:30	15.23	757	7.82	0.267	0.005	74.9	15.3	726	7.89	0.479	0.01	77	EBB
01/06/08 16:00	15.22	757	7.82	0.263	0.005	74.7	15.33	727	7.9	0.481	0.011	77.4	EBB
01/06/08 16:30	15.24	755	7.82	0.265	0.005	73.3	15.34	728	7.9	0.482	0.011	77.9	EBB
01/06/08 17:00	15.22	755	7.81	0.263	0.005	72.8	15.35	728	7.9	0.479	0.011	77.8	EBB
01/06/08 17:30	15.2	755	7.8	0.266	0.005	71.9	15.36	738	7.9	0.476	0.011	77.8	EBB
01/06/08 18:00	15.25	756	7.82	0.268	0.005	74.4	15.34	738	7.88	0.485	0.01	75.3	
01/06/08 18:30	15.29	756	7.83	0.265	0.005	75.6	15.32	735	7.87	0.489	0.01	73.5	FLOOD
01/06/08 19:00	15.27	758	7.82	0.263	0.005	74.3	15.29	742	7.89	0.467	0.01	76.2	FLOOD
01/06/08 19:30	15.23	757	7.81	0.264	0.005	72.2	15.28	745	7.91	0.452	0.01	78.5	FLOOD
01/06/08 20:00	15.2	758	7.8	0.263	0.005	70.6	15.27	748	7.89	0.455	0.01	77.1	FLOOD
01/06/08 20:30	15.21	759	7.8	0.261	0.005	70.1	15.26	743	7.88	0.467	0.01	76.6	FLOOD
01/06/08 21:00	15.21	759	7.8	0.26	0.005	72.5	15.24	736	7.85	0.468	0.009	72.3	FLOOD
01/06/08 21:30	15.2	760	7.8	0.264	0.005	71.2	15.23	744	7.88	0.46	0.01	75.8	FLOOD

01/06/08 22:00	15.17	760	7.8	0.264	0.005	69.4	15.23	748	7.89	0.46	0.01	75.9	FLOOD
01/06/08 22:30	15.15	760	7.79	0.261	0.004	68.9	15.22	754	7.89	0.462	0.01	76.7	FLOOD
01/06/08 23:00	15.11	761	7.79	0.263	0.004	67.8	15.22	743	7.89	0.453	0.01	76.5	FLOOD
01/06/08 23:30	15.1	763	7.8	0.256	0.005	69.7	15.23	742	7.89	0.453	0.01	76.1	EBB
02/06/08 00:00	15.11	766	7.82	0.246	0.005	73.3	15.28	744	7.88	0.468	0.01	74.3	EBB
02/06/08 00:30	15.1	769	7.83	0.239	0.005	74.3	15.26	739	7.89	0.47	0.01	74.4	EBB
02/06/08 01:00	15.09	770	7.83	0.237	0.004	75	15.25	736	7.89	0.477	0.01	74.2	EBB
02/06/08 01:30	15.09	767	7.84	0.235	0.004	74.5	15.25	732	7.89	0.468	0.01	73.2	EBB
02/06/08 02:00	15.07	766	7.83	0.231	0.004	73.7	15.24	729	7.88	0.474	0.01	72.1	EBB
02/06/08 02:30	15.04	767	7.82	0.231	0.004	71.8	15.23	743	7.87	0.472	0.01	72.3	EBB
02/06/08 03:00	14.99	771	7.82	0.232	0.004	71.6	15.2	741	7.87	0.469	0.01	72	EBB
02/06/08 03:30	14.91	776	7.82	0.229	0.004	73.4	15.16	750	7.87	0.46	0.01	72.5	EBB
02/06/08 04:00	14.88	781	7.82	0.23	0.004	72.9	15.13	742	7.88	0.451	0.01	72.6	EBB
02/06/08 04:30	14.85	781	7.81	0.23	0.004	69.8	15.11	757	7.88	0.444	0.009	73.6	EBB
02/06/08 05:00	14.82	780	7.79	0.23	0.004	65.9	15.09	742	7.89	0.438	0.009	74	EBB
02/06/08 05:30	14.79	774	7.81	0.237	0.004	69.4	15.08	751	7.89	0.436	0.009	74.5	EBB
02/06/08 06:00	14.75	445	7.83	0.23	0.004	69.5	15.07	750	7.89	0.432	0.009	74.1	EBB
02/06/08 06:30	13.5	6	8.5	0.191	0.015	69	15.07	741	7.89	0.433	0.009	74	
02/06/08 07:00	14.28	6	8.54	0.172	0.016	69.4	15.07	758	7.88	0.442	0.009	73.7	FLOOD
02/06/08 07:30	14.99	774	7.84	0.247	0.005	73.7	15.07	757	7.87	0.464	0.01	71.3	FLOOD
02/06/08 08:00	15.12	776	7.83	0.24	0.005	74	15.02	765	7.87	0.47	0.01	71.5	FLOOD
02/06/08 08:30	15.16	776	7.81	0.242	0.004	72.5	14.97	753	7.9	0.437	0.009	75.7	FLOOD
02/06/08 09:00	15.25	775	7.83	0.242	0.005	74.3	15.03	767	7.89	0.456	0.01	75.9	FLOOD
02/06/08 09:30	15.25	774	7.8	0.245	0.004	72	15.18	769	7.88	0.456	0.01	76.1	FLOOD
02/06/08 10:00	15.26	774	7.81	0.246	0.005	73.3	15.19	765	7.9	0.443	0.01	75.2	FLOOD
02/06/08 10:30	15.62	775	7.83	0.249	0.005	72.6	15.37	761	7.92	0.444	0.01	79.9	FLOOD
02/06/08 11:00	15.36	774	7.81	0.246	0.005	73	15.37	766	7.89	0.457	0.01	75.6	FLOOD
02/06/08 11:30	15.53	775	7.82	0.243	0.005	75	15.3	761	7.9	0.45	0.01	76.8	FLOOD
02/06/08 12:00	15.51	774	7.83	0.246	0.005	74.6	15.33	754	7.92	0.439	0.01	80.2	EBB
02/06/08 12:30	15.31	773	7.82	0.247	0.005	76.3	15.57	751	7.93	0.436	0.011	81.2	EBB
02/06/08 13:00	15.3	771	7.83	0.245	0.005	77.2	15.39	755	7.92	0.438	0.01	79.4	EBB
02/06/08 13:30	15.35	770	7.81	0.239	0.004	76.8	15.56	749	7.94	0.436	0.011	81.2	EBB
02/06/08 14:00	15.37	769	7.83	0.238	0.005	74.9	15.59	763	7.94	0.438	0.011	81	EBB

02/06/08 14:30	15.36	768	7.82	0.233	0.004	79.8	15.6	766	7.94	0.436	0.011	82.1	EBB
02/06/08 15:00	15.35	767	7.83	0.229	0.004	82.3	15.76	752	7.96	0.435	0.012	85	EBB
02/06/08 15:30	15.41	768	7.84	0.23	0.004	82.7	15.89	751	7.96	0.434	0.012	86.5	EBB
02/06/08 16:00	15.5	771	7.83	0.236	0.005	84.8	15.99	756	7.97	0.432	0.012	87.8	EBB
02/06/08 16:30	15.55	774	7.85	0.241	0.005	83.7	15.92	765	7.96	0.432	0.012	87	EBB
02/06/08 17:00	15.83	772	7.88	0.244	0.005	88.7	15.99	755	7.96	0.435	0.012	87.3	EBB
02/06/08 17:30	15.79	770	7.9	0.246	0.006	89.3	15.98	751	7.95	0.434	0.012	87.6	EBB
02/06/08 18:00	15.49	7	7.89	0.249	0.006	86.3	15.96	746	7.95	0.431	0.011	87.4	EBB
02/06/08 18:30	13.62	6	8.52	0.211	0.018	89.3	15.97	742	7.95	0.433	0.011	87.5	EBB
02/06/08 19:00	15.45	4	8.25	0.244	0.013	94.2	15.95	750	7.93	0.44	0.011	85.5	
02/06/08 19:30	15.9	768	7.94	0.24	0.006	90.3	15.79	754	7.91	0.443	0.01	82.6	FLOOD
02/06/08 20:00	15.79	773	7.9	0.24	0.006	86.7	15.61	756	7.91	0.433	0.01	83.8	FLOOD
02/06/08 20:30	15.73	775	7.88	0.24	0.005	84.1	15.57	755	7.91	0.434	0.01	83	FLOOD
02/06/08 21:00	15.65	776	7.86	0.238	0.005	81.5	15.55	741	7.89	0.439	0.01	81.9	FLOOD
02/06/08 21:30	15.59	775	7.85	0.236	0.005	78	15.56	752	7.89	0.455	0.01	81.7	FLOOD
02/06/08 22:00	15.59	774	7.82	0.246	0.005	75.2	15.51	751	7.88	0.454	0.01	79.5	FLOOD
02/06/08 22:30	15.57	775	7.82	0.238	0.005	75.4	15.48	750	7.87	0.441	0.009	80.1	FLOOD
02/06/08 23:00	15.54	775	7.84	0.239	0.005	77.4	15.47	740	7.88	0.438	0.01	80.6	FLOOD
02/06/08 23:30	15.51	774	7.83	0.24	0.005	76.2	15.47	743	7.89	0.438	0.01	80	FLOOD
03/06/08 00:00	15.47	774	7.81	0.242	0.005	71.4	15.45	746	7.91	0.428	0.01	82.1	FLOOD
03/06/08 00:30	15.39	773	7.8	0.239	0.004	68.7	15.47	745	7.9	0.429	0.01	80.8	EBB
03/06/08 01:00	15.32	773	7.81	0.238	0.004	73.7	15.62	750	7.92	0.432	0.011	83	EBB
03/06/08 01:30	15.27	774	7.81	0.235	0.004	75.3	15.71	748	7.92	0.431	0.011	82.5	EBB
03/06/08 02:00	15.24	775	7.8	0.23	0.004	73.2	15.71	748	7.91	0.432	0.01	81.3	EBB
03/06/08 02:30	15.23	780	7.79	0.228	0.004	73.3	15.71	749	7.92	0.433	0.01	81.8	EBB
03/06/08 03:00	15.21	777	7.77	0.228	0.004	73.6	15.68	749	7.92	0.432	0.01	80.2	EBB
03/06/08 03:30	15.18	765	7.81	0.232	0.004	73.9	15.62	757	7.92	0.432	0.01	80.5	EBB
03/06/08 04:00	15.18	771	7.81	0.236	0.004	74.9	15.47	749	7.9	0.434	0.01	79.4	EBB
03/06/08 04:30	14.98	650	7.8	0.212	0.004	78.7	15.38	733	7.89	0.433	0.01	78.3	EBB
03/06/08 05:00	14.93	571	7.76	0.205	0.003	78.5	15.28	700	7.9	0.419	0.009	80.1	EBB
03/06/08 05:30	15.04	628	7.79	0.212	0.004	76.5	15.25	737	7.9	0.422	0.01	81.2	EBB
03/06/08 06:00	15.06	666	7.78	0.212	0.004	75.7	15.21	738	7.91	0.429	0.01	80.2	EBB
03/06/08 06:30	15.05	667	7.76	0.209	0.003	74.8	15.09	647	7.88	0.399	0.008	80.4	EBB

03/06/08 07:00	15.05	669	7.78	0.212	0.004	74.1	15.06	595	7.86	0.388	0.008	80.4	EBB
03/06/08 07:30	15.07	668	7.77	0.214	0.004	72.8	15.08	591	7.84	0.389	0.008	79.2	
03/06/08 08:00	15.13	667	7.79	0.226	0.004	77.7	15.06	592	7.81	0.397	0.007	76.6	FLOOD
03/06/08 08:30	15.22	671	7.77	0.24	0.004	76.3	15.12	604	7.81	0.426	0.008	75.6	FLOOD
03/06/08 09:00	15.2	672	7.77	0.217	0.004	74.3	15.11	659	7.83	0.622	0.012	73.6	FLOOD
03/06/08 09:30	15.25	670	7.77	0.223	0.004	75.3	15.12	667	7.77	0.668	0.011	70.8	FLOOD
03/06/08 10:00	15.29	664	7.76	0.221	0.004	73.8	15.16	659	7.78	0.633	0.011	71.5	FLOOD
03/06/08 10:30	15.3	663	7.76	0.219	0.004	75	15.14	660	7.78	0.641	0.011	67.1	FLOOD
03/06/08 11:00	15.32	663	7.76	0.214	0.003	73.7	15.23	652	7.76	0.609	0.01	68.3	FLOOD

Table D3. Data collected during period 3 from sondes at TH and RC with erroneous values highlighted

Date and Time	**Townhouse**						**Rushcutters**						**TIDE**
d/m/y hh:mm	Temp	SpCond	pH	Ammonium N	Ammonia N	DO	Temp	SpCond	pH	Ammonium N	Ammonia N	DO	
	C	uS/cm		mg/L	mg/L	% sat	C	uS/cm		mg/L	mg/L	% sat	
04/06/08 14:00	21.16	10	7.66	382.1	7.551	100	22.74	10	7.59	11.07	0.213	100	EBB
04/06/08 14:30	16.43	7	7.43	27.25	0.227	95	17.63	7	7.36	14.75	0.113	97.4	EBB
04/06/08 15:00	15.07	709	7.76	0.499	0.008	68.6	15.08	682	7.72	0.377	0.006	68.6	EBB
04/06/08 15:30	15.05	711	7.78	0.473	0.008	69.5	15.05	685	7.74	0.34	0.005	68.7	EBB
04/06/08 16:00	15.02	713	7.79	0.45	0.008	68.6	15.11	689	7.75	0.329	0.005	69	EBB
04/06/08 16:30	14.98	718	7.8	0.435	0.008	69.2	15.18	691	7.75	0.324	0.005	69.7	EBB
04/06/08 17:00	14.91	723	7.81	0.421	0.007	69.6	15.21	694	7.76	0.316	0.005	70.1	EBB
04/06/08 17:30	14.85	729	7.81	0.411	0.007	70.3	15.21	697	7.76	0.312	0.005	70.1	EBB
04/06/08 18:00	14.83	732	7.81	0.407	0.007	69.4	15.21	700	7.76	0.309	0.005	70.3	EBB
04/06/08 18:30	14.88	731	7.81	0.4	0.007	65.8	15.21	703	7.76	0.303	0.005	71.2	EBB
04/06/08 19:00	14.91	727	7.78	0.397	0.007	65.8	15.21	706	7.76	0.298	0.005	71.8	EBB
04/06/08 19:30	14.93	724	7.76	0.39	0.006	63.7	15.22	708	7.77	0.294	0.005	72.1	EBB
04/06/08 20:00	14.96	725	7.78	0.39	0.007	65.1	15.2	710	7.77	0.293	0.005	71.9	EBB
04/06/08 20:30	14.97	727	7.78	0.391	0.006	64.1	15.17	712	7.77	0.291	0.005	71.5	EBB
04/06/08 21:00	14.98	728	7.79	0.396	0.007	67.1	15.15	711	7.74	0.294	0.005	68.7	FLOOD

04/06/08 21:30	15	729	7.81	0.388	0.007	69.6	15.08	703	7.7	0.307	0.004	63.4	FLOOD
04/06/08 22:00	14.99	728	7.8	0.388	0.007	64.2	15.03	747	7.8	0.293	0.005	73.4	FLOOD
04/06/08 22:30	14.96	728	7.78	0.397	0.007	63.9	15.01	755	7.81	0.29	0.005	74.2	FLOOD
04/06/08 23:00	14.95	729	7.78	0.395	0.007	60	15	756	7.81	0.288	0.005	72.8	FLOOD
04/06/08 23:30	14.94	731	7.77	0.401	0.007	59.2	15	758	7.81	0.284	0.005	74.1	FLOOD
05/06/08 00:00	14.93	732	7.78	0.398	0.007	61.5	14.99	757	7.8	0.284	0.005	73.2	FLOOD
05/06/08 00:30	14.93	734	7.78	0.402	0.007	52.8	14.96	756	7.8	0.287	0.005	72.7	FLOOD
05/06/08 01:00	14.93	742	7.8	0.405	0.007	60.4	14.93	756	7.8	0.29	0.005	72.7	FLOOD
05/06/08 01:30	14.92	754	7.81	0.404	0.007	64.7	14.91	756	7.81	0.28	0.005	73.6	FLOOD
05/06/08 02:00	14.89	762	7.82	0.399	0.007	66.7	14.89	757	7.81	0.28	0.005	73.1	
05/06/08 02:30	14.85	764	7.83	0.397	0.007	67.7	14.91	747	7.8	0.278	0.005	72.2	EBB
05/06/08 03:00	14.83	766	7.84	0.395	0.007	68.2	14.95	735	7.78	0.279	0.005	69.8	EBB
05/06/08 03:30	14.81	768	7.84	0.392	0.007	69	14.89	724	7.77	0.279	0.005	69.3	EBB
05/06/08 04:00	14.79	767	7.84	0.389	0.007	69.1	14.83	737	7.78	0.279	0.005	69	EBB
05/06/08 04:30	14.78	769	7.84	0.39	0.007	68.7	14.81	736	7.77	0.279	0.005	68.2	EBB
05/06/08 05:00	14.74	768	7.83	0.39	0.007	67.1	14.79	740	7.77	0.28	0.005	68.1	EBB
05/06/08 05:30	14.72	774	7.85	0.393	0.008	67.1	14.78	745	7.78	0.281	0.005	68.3	EBB
05/06/08 06:00	14.69	783	7.85	0.392	0.007	67.8	14.76	762	7.78	0.285	0.005	68.6	EBB
05/06/08 06:30	14.67	784	7.86	0.393	0.008	67.9	14.74	776	7.79	0.285	0.005	69.3	EBB
05/06/08 07:00	14.65	781	7.84	0.395	0.007	66.7	14.74	766	7.8	0.284	0.005	70.7	EBB
05/06/08 07:30	14.68	776	7.84	0.399	0.007	66.6	14.75	775	7.81	0.283	0.005	72.4	EBB
05/06/08 08:00	14.72	774	7.83	0.402	0.007	66.6	14.77	770	7.82	0.281	0.005	73.6	EBB
05/06/08 08:30	14.79	773	7.83	0.404	0.007	66	14.82	769	7.83	0.281	0.005	74.7	EBB
05/06/08 09:00	14.87	772	7.82	0.406	0.007	66.8	14.85	776	7.82	0.284	0.005	74.2	EBB
05/06/08 09:30	15.04	772	7.85	0.408	0.008	71.9	14.91	766	7.81	0.288	0.005	73.1	FLOOD
05/06/08 10:00	15.04	773	7.85	0.411	0.008	70.2	14.92	777	7.79	0.292	0.005	71.1	FLOOD
05/06/08 10:30	15.06	772	7.85	0.408	0.008	70.5	14.92	786	7.82	0.294	0.005	75.2	FLOOD
05/06/08 11:00	15.16	772	7.84	0.411	0.008	65.5	14.98	787	7.84	0.296	0.006	77.2	FLOOD
05/06/08 11:30	15.19	772	7.83	0.421	0.008	65.2	15.21	787	7.86	0.294	0.006	80.5	FLOOD
05/06/08 12:00	15.24	772	7.82	0.433	0.008	71.1	15.2	790	7.83	0.299	0.006	76.5	FLOOD
05/06/08 12:30	15.29	771	7.88	0.435	0.009	77.6	15.23	789	7.89	0.298	0.006	84.4	FLOOD
05/06/08 13:00	15.33	771	7.88	0.419	0.009	78.4	15.52	790	7.83	0.304	0.006	76.4	FLOOD
05/06/08 13:30	15.35	772	7.9	0.423	0.009	78.3	15.56	788	7.84	0.305	0.006	79.2	FLOOD

05/06/08 14:00	15.37	773	7.89	0.423	0.009	79.1	15.32	789	7.86	0.3	0.006	80.5	FLOOD
05/06/08 14:30	15.43	776	7.89	0.425	0.009	78.8	15.45	793	7.86	0.3	0.006	84.5	EBB
05/06/08 15:00	15.49	778	7.89	0.424	0.009	77.1	15.43	785	7.85	0.297	0.006	80.4	EBB
05/06/08 15:30	15.57	779	7.88	0.417	0.009	76.4	15.88	783	7.86	0.3	0.006	83.1	EBB
05/06/08 16:00	15.62	780	7.88	0.414	0.009	77	15.95	784	7.87	0.3	0.007	82.4	EBB
05/06/08 16:30	15.64	780	7.88	0.417	0.009	76.7	15.92	784	7.88	0.297	0.007	83.9	EBB
05/06/08 17:00	15.62	780	7.88	0.414	0.009	79.6	15.96	781	7.89	0.298	0.007	85.6	EBB
05/06/08 17:30	15.61	780	7.87	0.416	0.009	77.3	16.08	788	7.89	0.301	0.007	86.7	EBB
05/06/08 18:00	15.62	781	7.87	0.412	0.009	78.3	16.1	774	7.89	0.301	0.007	86.5	EBB
05/06/08 18:30	15.65	783	7.86	0.411	0.009	76.5	16.14	781	7.89	0.303	0.007	86.6	EBB
05/06/08 19:00	15.64	787	7.86	0.402	0.009	75.9	16.21	787	7.88	0.305	0.007	86.9	EBB
05/06/08 19:30	15.62	790	7.87	0.396	0.008	76.2	16.21	776	7.88	0.306	0.007	87.1	EBB
05/06/08 20:00	15.66	791	7.87	0.399	0.009	76.2	16.13	785	7.87	0.305	0.007	85.5	EBB
05/06/08 20:30	15.67	789	7.84	0.396	0.008	73.8	16.06	789	7.87	0.304	0.007	84.9	EBB
05/06/08 21:00	15.67	788	7.85	0.397	0.008	72.7	16	785	7.86	0.301	0.007	83.9	EBB
05/06/08 21:30	15.65	787	7.85	0.396	0.008	74.1	15.93	789	7.86	0.301	0.006	83.5	
05/06/08 22:00	15.61	787	7.86	0.403	0.008	75.4	15.92	789	7.84	0.304	0.006	80.7	FLOOD
05/06/08 22:30	15.7	781	7.91	0.393	0.009	82	15.76	788	7.84	0.3	0.006	80.9	FLOOD
05/06/08 23:00	15.6	783	7.86	0.402	0.008	74	15.61	778	7.86	0.289	0.006	82.1	FLOOD
05/06/08 23:30	15.54	785	7.86	0.398	0.008	74	15.57	785	7.85	0.294	0.006	81.3	FLOOD
06/06/08 00:00	15.51	784	7.86	0.398	0.008	70.5	15.55	778	7.85	0.286	0.006	80	FLOOD
06/06/08 00:30	15.47	782	7.84	0.4	0.008	71.7	15.55	785	7.86	0.284	0.006	80.6	FLOOD
06/06/08 01:00	15.46	782	7.86	0.399	0.008	73.5	15.53	791	7.84	0.288	0.006	78.6	FLOOD
06/06/08 01:30	15.4	781	7.85	0.397	0.008	72.8	15.49	778	7.86	0.287	0.006	81.1	FLOOD
06/06/08 02:00	15.39	780	7.85	0.394	0.008	71.7	15.5	787	7.87	0.285	0.006	81.6	FLOOD
06/06/08 02:30	15.4	780	7.84	0.399	0.008	66.7	15.48	779	7.86	0.288	0.006	81.2	FLOOD
06/06/08 03:00	15.38	779	7.85	0.403	0.008	64.9	15.46	777	7.87	0.282	0.006	80.4	EBB
06/06/08 03:30	15.34	780	7.85	0.403	0.008	72	15.48	788	7.85	0.284	0.006	80.2	EBB
06/06/08 04:00	15.29	777	7.86	0.397	0.008	73.3	15.66	776	7.86	0.293	0.006	80.5	EBB
06/06/08 04:30	15.27	776	7.87	0.392	0.008	74.9	15.7	787	7.85	0.296	0.006	79.2	EBB
06/06/08 05:00	15.26	773	7.87	0.39	0.008	73.7	15.69	790	7.85	0.298	0.006	79	EBB
06/06/08 05:30	15.25	774	7.87	0.386	0.008	75	15.65	795	7.84	0.297	0.006	77.6	EBB
06/06/08 06:00	15.24	776	7.86	0.39	0.008	74.9	15.6	793	7.84	0.296	0.006	76.7	EBB

06/06/08 06:30	15.23	776	7.86	0.387	0.008	75.2	15.56	791	7.83	0.294	0.006	75.9	EBB
06/06/08 07:00	15.22	776	7.85	0.39	0.008	72.6	15.48	775	7.83	0.293	0.006	76.1	EBB
06/06/08 07:30	15.22	776	7.85	0.388	0.008	71.8	15.41	781	7.83	0.292	0.006	76.3	EBB
06/06/08 08:00	15.23	781	7.87	0.386	0.008	72.6	15.37	780	7.83	0.29	0.006	76.2	EBB
06/06/08 08:30	15.21	781	7.84	0.385	0.007	69.9	15.32	780	7.83	0.288	0.006	76.3	EBB
06/06/08 09:00	15.19	781	7.83	0.385	0.007	68.9	15.3	785	7.84	0.288	0.006	76.8	EBB
06/06/08 09:30	15.17	777	7.83	0.391	0.007	69.2	15.28	783	7.84	0.295	0.006	77.4	EBB
06/06/08 10:00	15.15	773	7.84	0.401	0.008	67.9	15.29	774	7.83	0.286	0.005	77	
06/06/08 10:30	15.19	772	7.85	0.404	0.008	71.1	15.19	760	7.79	0.297	0.005	71.4	FLOOD
06/06/08 11:00	15.18	775	7.85	0.4	0.008	70.7	15.16	785	7.82	0.299	0.006	73.7	FLOOD
06/06/08 11:30	15.19	775	7.84	0.397	0.008	68.8	15.15	791	7.84	0.297	0.006	75.6	FLOOD
06/06/08 12:00	15.18	772	7.85	0.406	0.008	62.1	15.16	794	7.84	0.298	0.006	75	FLOOD
06/06/08 12:30	15.15	769	7.84	0.411	0.008	67.3	15.18	792	7.84	0.299	0.006	75.4	FLOOD
06/06/08 13:00	15.18	765	7.85	0.417	0.008	70.1	15.16	786	7.85	0.296	0.006	76	FLOOD
06/06/08 13:30	15.17	764	7.84	0.437	0.009	68.4	15.17	787	7.85	0.297	0.006	75.8	FLOOD
06/06/08 14:00	15.19	764	7.83	0.412	0.008	64.4	15.18	791	7.84	0.306	0.006	75.1	FLOOD
06/06/08 14:30	15.2	768	7.84	0.42	0.008	69.1	15.27	791	7.87	0.301	0.006	77.4	FLOOD
06/06/08 15:00	15.18	774	7.86	0.419	0.009	71.1	15.32	776	7.89	0.295	0.006	81.1	FLOOD
06/06/08 15:30	15.19	774	7.85	0.414	0.008	66.5	15.31	780	7.86	0.297	0.006	78.8	EBB
06/06/08 16:00	15.17	762	7.85	0.411	0.008	69.9	15.36	772	7.88	0.289	0.006	80.3	EBB
06/06/08 16:30	15.16	752	7.78	0.427	0.007	69.9	15.33	769	7.86	0.297	0.006	78.1	EBB
06/06/08 17:00	15.16	752	7.83	0.411	0.008	71.4	15.31	779	7.86	0.292	0.006	77.4	EBB
06/06/08 17:30	15.16	763	7.84	0.411	0.008	70.3	15.31	779	7.86	0.293	0.006	77.8	EBB
06/06/08 18:00	15.16	763	7.85	0.405	0.008	66.2	15.31	764	7.86	0.297	0.006	77.6	EBB
06/06/08 18:30	15.12	771	7.85	0.401	0.008	69.8	15.28	771	7.86	0.301	0.006	77.1	EBB
06/06/08 19:00	15.1	755	7.84	0.387	0.007	62.4	15.25	759	7.85	0.302	0.006	77.1	EBB
06/06/08 19:30	15.1	735	7.82	0.4	0.007	43.7	15.22	742	7.85	0.298	0.006	76.2	EBB
06/06/08 20:00	15.14	706	7.8	0.607	0.011	59.6	15.19	724	7.84	0.293	0.006	75.6	EBB
06/06/08 20:30	15.14	723	7.76	0.844	0.014	56.7	15.17	714	7.83	0.291	0.005	74.9	EBB
06/06/08 21:00	15.08	716	7.75	0.932	0.015	43.5	15.15	719	7.83	0.289	0.005	75	EBB
06/06/08 21:30	15.04	720	7.75	0.938	0.014	49.5	15.14	718	7.83	0.288	0.005	74.4	EBB
06/06/08 22:00	15.01	721	7.73	0.923	0.014	52.7	15.09	733	7.83	0.285	0.005	74.7	EBB
06/06/08 22:30	14.98	721	7.71	0.912	0.013	50.1	15.06	734	7.83	0.288	0.005	73.8	

06/06/08 23:00	14.96	714	7.75	0.987	0.015	54.4	15.06	725	7.8	0.292	0.005	71.4	FLOOD
06/06/08 23:30	14.95	713	7.74	1.012	0.015	53.9	15.02	712	7.74	0.298	0.004	65.4	FLOOD
07/06/08 00:00	14.93	715	7.73	1.001	0.015	51.5	14.99	751	7.81	0.353	0.006	70.4	FLOOD
07/06/08 00:30	14.91	716	7.74	0.949	0.014	49.4	15	748	7.82	0.36	0.007	69.4	FLOOD
07/06/08 01:00	14.89	717	7.73	0.907	0.013	49.5	14.99	751	7.82	0.368	0.007	69.1	FLOOD
07/06/08 01:30	14.85	722	7.74	0.874	0.013	51.3	14.97	745	7.81	0.371	0.007	68.7	FLOOD
07/06/08 02:00	14.85	724	7.74	0.842	0.013	49.6	14.96	752	7.8	0.378	0.007	68.2	FLOOD
07/06/08 02:30	14.81	722	7.74	0.816	0.012	51.6	14.93	754	7.8	0.392	0.007	67.5	FLOOD
07/06/08 03:00	14.79	723	7.73	0.801	0.012	48.6	14.93	760	7.8	0.405	0.007	66	FLOOD
07/06/08 03:30	14.85	727	7.76	0.705	0.011	48.4	14.92	749	7.8	0.394	0.007	67.2	FLOOD
07/06/08 04:00	14.84	736	7.83	0.586	0.011	61.5	14.93	757	7.81	0.39	0.007	67.8	EBB
07/06/08 04:30	14.83	739	7.83	0.551	0.01	63.3	14.94	772	7.8	0.376	0.007	67.5	EBB
07/06/08 05:00	14.82	740	7.85	0.642	0.012	64.4	14.92	752	7.8	0.378	0.006	66.2	EBB
07/06/08 05:30	14.74	736	7.84	0.473	0.009	65.8	14.9	762	7.77	0.439	0.007	61.7	EBB
07/06/08 06:00	14.67	742	7.83	0.447	0.008	65.5	14.86	761	7.73	0.537	0.008	54.3	EBB
07/06/08 06:30	14.62	748	7.83	0.432	0.008	64.1	14.85	752	7.7	0.616	0.008	49.7	EBB
07/06/08 07:00	14.61	752	7.84	0.423	0.008	66.7	14.83	734	7.7	0.635	0.009	49	EBB
07/06/08 07:30	14.56	759	7.84	0.417	0.008	66.4	14.8	740	7.72	0.583	0.008	53.2	EBB
07/06/08 08:00	14.53	762	7.85	0.405	0.008	65.6	14.79	745	7.75	0.509	0.008	58	EBB
07/06/08 08:30	14.54	760	7.84	0.408	0.008	65.1	14.76	742	7.78	0.443	0.007	62.5	EBB
07/06/08 09:00	14.56	744	7.83	0.405	0.007	65.1	14.74	748	7.8	0.406	0.007	64.9	EBB
07/06/08 09:30	14.58	734	7.82	0.407	0.007	63.8	14.71	746	7.81	0.38	0.007	66.9	EBB
07/06/08 10:00	14.6	729	7.81	0.428	0.007	63.1	14.66	761	7.81	0.364	0.006	67.4	EBB
07/06/08 10:30	14.6	723	7.8	0.416	0.007	62.4	14.63	751	7.82	0.352	0.006	67.6	EBB
07/06/08 11:00	14.61	721	7.81	0.421	0.007	64.2	14.63	743	7.81	0.353	0.006	66.8	FLOOD
07/06/08 11:30	14.64	724	7.81	0.411	0.007	63	14.59	739	7.8	0.35	0.006	67.4	FLOOD
07/06/08 12:00	14.64	724	7.81	0.412	0.007	62.4	14.53	750	7.81	0.323	0.006	71	FLOOD
07/06/08 12:30	14.64	717	7.8	0.405	0.007	62.6	14.55	750	7.81	0.317	0.006	70.4	FLOOD
07/06/08 13:00	14.64	715	7.79	0.403	0.007	59.5	14.6	741	7.83	0.317	0.006	71.2	FLOOD
07/06/08 13:30	14.63	716	7.79	0.411	0.007	60.4	14.63	751	7.83	0.324	0.006	70.5	FLOOD
07/06/08 14:00	14.63	720	7.79	0.404	0.007	63.1	14.62	751	7.81	0.322	0.006	69.4	FLOOD
07/06/08 14:30	14.6	728	7.81	0.394	0.007	64.8	14.59	753	7.81	0.321	0.006	68.9	FLOOD
07/06/08 15:00	14.58	731	7.82	0.38	0.007	67.1	14.62	741	7.82	0.321	0.006	68.9	FLOOD

07/06/08 15:30	14.58	735	7.83	0.369	0.007	69	14.66	745	7.83	0.324	0.006	71	FLOOD
07/06/08 16:00	14.6	737	7.84	0.366	0.007	69.9	14.66	744	7.82	0.322	0.006	69.8	
07/06/08 16:30	14.57	727	7.84	0.366	0.007	70.8	14.69	765	7.83	0.33	0.006	69.5	EBB
07/06/08 17:00	14.48	705	7.84	0.377	0.007	71.6	14.72	763	7.84	0.326	0.006	69.8	EBB
07/06/08 17:30	14.38	716	7.83	0.401	0.007	69.4	14.72	756	7.83	0.324	0.006	69.5	EBB
07/06/08 18:00	14.4	703	7.82	0.443	0.008	66.7	14.74	738	7.82	0.321	0.006	69	EBB
07/06/08 18:30	14.41	703	7.82	0.467	0.008	69.2	14.74	736	7.81	0.319	0.006	69.1	EBB
07/06/08 19:00	14.39	716	7.83	0.49	0.009	68.5	14.7	739	7.82	0.313	0.006	70.7	EBB
07/06/08 19:30	14.39	723	7.82	0.491	0.009	66.6	14.67	740	7.82	0.306	0.005	71.9	EBB
07/06/08 20:00	14.4	725	7.82	0.483	0.008	62.9	14.63	739	7.82	0.302	0.005	72.6	EBB
07/06/08 20:30	14.4	727	7.82	0.462	0.008	65	14.56	739	7.82	0.307	0.005	73.1	EBB
07/06/08 21:00	14.39	721	7.81	0.448	0.008	65.2	14.48	739	7.81	0.331	0.006	72	EBB
07/06/08 21:30	14.35	725	7.82	0.413	0.007	67.8	14.42	720	7.8	0.363	0.006	70.6	EBB
07/06/08 22:00	14.3	726	7.82	0.404	0.007	67.9	14.37	725	7.79	0.381	0.006	69.8	EBB
07/06/08 22:30	14.26	726	7.82	0.397	0.007	66.2	14.34	722	7.79	0.388	0.006	69.3	EBB
07/06/08 23:00	14.24	726	7.81	0.399	0.007	64.5	14.34	728	7.79	0.386	0.006	69	EBB
07/06/08 23:30	14.19	719	7.81	0.395	0.007	66	14.33	726	7.79	0.376	0.006	68.8	FLOOD
08/06/08 00:00	14.16	720	7.8	0.393	0.006	63.7	14.33	730	7.78	0.377	0.006	67.6	FLOOD
08/06/08 00:30	14.15	720	7.8	0.391	0.006	66.5	14.31	727	7.74	0.387	0.006	63.4	FLOOD
08/06/08 01:00	14.12	722	7.81	0.393	0.006	64.9	14.16	721	7.81	0.356	0.006	71.6	FLOOD
08/06/08 01:30	14.07	713	7.82	0.394	0.007	65.4	14.13	725	7.81	0.34	0.006	72.2	FLOOD
08/06/08 02:00	14.03	710	7.82	0.395	0.007	66.8	14.22	724	7.8	0.364	0.006	67.7	FLOOD
08/06/08 02:30	14	715	7.82	0.394	0.007	65.6	14.23	726	7.79	0.365	0.006	67.5	FLOOD
08/06/08 03:00	13.97	720	7.82	0.393	0.007	67.9	14.23	729	7.79	0.369	0.006	66.8	FLOOD
08/06/08 03:30	13.95	719	7.83	0.384	0.007	68.1	14.21	727	7.77	0.369	0.006	65.9	FLOOD
08/06/08 04:00	13.94	718	7.84	0.385	0.007	68.8	14.22	730	7.79	0.366	0.006	66.7	FLOOD
08/06/08 04:30	13.91	720	7.83	0.392	0.007	67.2	14.23	732	7.79	0.36	0.006	66.3	
08/06/08 05:00	13.85	719	7.84	0.396	0.007	68.3	14.25	744	7.79	0.351	0.006	66.7	EBB
08/06/08 05:30	13.75	722	7.85	0.404	0.007	69	14.2	731	7.81	0.33	0.005	69.1	EBB
08/06/08 06:00	13.73	719	7.85	0.408	0.007	69.7	14.12	731	7.81	0.323	0.005	69.2	EBB
08/06/08 06:30	13.74	719	7.85	0.41	0.007	69	14.05	733	7.81	0.325	0.005	69.5	EBB
08/06/08 07:00	13.75	719	7.85	0.408	0.007	64.4	13.99	731	7.81	0.327	0.005	70.3	EBB
08/06/08 07:30	13.8	718	7.84	0.41	0.007	64.2	13.95	729	7.81	0.33	0.005	71.2	EBB

08/06/08 08:00	13.86	717	7.84	0.407	0.007	67.8	13.9	729	7.82	0.331	0.006	72.3	EBB
08/06/08 08:30	13.92	717	7.83	0.406	0.007	67.5	13.86	727	7.83	0.332	0.006	73.3	EBB
08/06/08 09:00	14.01	718	7.84	0.399	0.007	68.2	13.87	728	7.83	0.337	0.006	74.2	EBB
08/06/08 09:30	14.08	718	7.83	0.402	0.007	68.1	13.93	725	7.84	0.339	0.006	74.9	EBB
08/06/08 10:00	14.24	718	7.83	0.4	0.007	69	14.15	738	7.84	0.338	0.006	75.8	EBB
08/06/08 10:30	14.5	719	7.83	0.403	0.007	70.6	14.38	726	7.84	0.336	0.006	76.6	EBB
08/06/08 11:00	14.76	719	7.84	0.407	0.008	72.7	14.68	725	7.84	0.339	0.006	77.9	EBB
08/06/08 11:30	14.98	722	7.84	0.398	0.008	74.3	14.95	723	7.86	0.339	0.007	82.9	
08/06/08 12:00	15.18	722	7.85	0.415	0.008	78.6	15.05	721	7.83	0.346	0.006	78	FLOOD
08/06/08 12:30	15.21	719	7.86	0.405	0.008	77.8	14.89	730	7.84	0.343	0.006	77.4	FLOOD
08/06/08 13:00	15.1	722	7.88	0.405	0.008	80.1	14.81	733	7.87	0.327	0.007	84.9	FLOOD
08/06/08 13:30	15.08	724	7.88	0.396	0.008	81.1	15.17	731	7.87	0.333	0.007	84	FLOOD
08/06/08 14:00	15.15	724	7.86	0.405	0.008	79.5	15.3	734	7.85	0.336	0.007	83.7	FLOOD
08/06/08 14:30	15.2	711	7.87	0.394	0.008	77.3	15.47	737	7.88	0.337	0.007	88.9	FLOOD
08/06/08 15:00	15.22	713	7.88	0.384	0.008	82.1	15.74	735	7.87	0.345	0.008	86.6	FLOOD
08/06/08 15:30	15.24	713	7.89	0.384	0.008	80.7	15.78	728	7.86	0.343	0.007	85.8	FLOOD
08/06/08 16:00	15.33	721	7.9	0.382	0.009	79.9	15.72	729	7.87	0.341	0.007	86.1	FLOOD
08/06/08 16:30	15.34	723	7.89	0.386	0.009	79.6	15.93	736	7.86	0.349	0.008	84.9	FLOOD
08/06/08 17:00	15.48	713	7.88	0.385	0.008	78.1	16.47	737	7.86	0.349	0.008	85.6	EBB
08/06/08 17:30	15.93	733	7.91	0.388	0.009	81.6	16.07	734	7.86	0.338	0.007	84.1	EBB
08/06/08 18:00	15.93	723	7.91	0.388	0.009	82.2	16.05	732	7.87	0.331	0.007	86.4	EBB
08/06/08 18:30	15.82	720	7.9	0.381	0.009	81.2	15.97	734	7.87	0.328	0.007	86.8	EBB
08/06/08 19:00	15.8	737	7.9	0.376	0.009	80.9	15.97	736	7.88	0.327	0.007	86.9	EBB
08/06/08 19:30	15.78	737	7.9	0.377	0.009	79	15.95	736	7.88	0.327	0.007	86.4	EBB
08/06/08 20:00	15.75	737	7.89	0.376	0.009	77.6	15.95	740	7.89	0.324	0.007	85.8	EBB
08/06/08 20:30	15.71	737	7.88	0.375	0.008	74.4	15.96	740	7.89	0.322	0.007	85.4	EBB
08/06/08 21:00	15.68	736	7.87	0.372	0.008	76.1	15.97	742	7.89	0.317	0.007	84.9	EBB
08/06/08 21:30	15.63	735	7.86	0.371	0.008	75.2	15.94	739	7.89	0.315	0.007	84.3	EBB
08/06/08 22:00	15.58	736	7.84	0.377	0.008	73.4	15.88	740	7.88	0.31	0.007	83.4	EBB
08/06/08 22:30	15.53	736	7.84	0.376	0.007	71	15.77	740	7.88	0.308	0.007	82.6	EBB
08/06/08 23:00	15.47	736	7.83	0.382	0.007	71.3	15.66	742	7.87	0.309	0.007	81.9	EBB
08/06/08 23:30	15.4	736	7.84	0.389	0.008	70.4	15.58	741	7.87	0.308	0.007	81.2	EBB
09/06/08 00:00	15.32	736	7.83	0.393	0.007	70.1	15.51	740	7.87	0.311	0.007	80.5	EBB

09/06/08 00:30	15.25	735	7.84	0.396	0.008	69.4	15.45	740	7.86	0.312	0.006	79.4	FLOOD
09/06/08 01:00	15.17	733	7.85	0.39	0.008	71.4	15.39	741	7.85	0.317	0.006	78.1	FLOOD
09/06/08 01:30	15.11	731	7.84	0.388	0.007	71.1	15.37	742	7.85	0.319	0.006	77.3	FLOOD
09/06/08 02:00	15.09	734	7.86	0.391	0.008	71.9	15.33	742	7.84	0.326	0.006	76.8	FLOOD
09/06/08 02:30	15.05	732	7.88	0.381	0.008	74.1	15.31	740	7.86	0.321	0.007	78.3	FLOOD
09/06/08 03:00	15.04	737	7.88	0.377	0.008	71.2	15.29	741	7.86	0.32	0.007	78.4	FLOOD
09/06/08 03:30	15.05	736	7.88	0.367	0.008	71.6	15.26	738	7.86	0.319	0.007	77.9	FLOOD
09/06/08 04:00	15.07	738	7.89	0.374	0.008	71.7	15.22	752	7.86	0.323	0.007	77.9	FLOOD
09/06/08 04:30	15.01	746	7.88	0.373	0.008	71.7	15.22	748	7.86	0.325	0.007	77.7	FLOOD
09/06/08 05:00	15.07	750	7.89	0.37	0.008	72.9	15.17	741	7.86	0.322	0.006	77.1	
09/06/08 05:30	15.06	751	7.88	0.377	0.008	72.9	15.15	751	7.86	0.321	0.007	77.9	EBB
09/06/08 06:00	15.05	754	7.88	0.384	0.008	72.4	15.12	742	7.86	0.323	0.006	77.3	EBB
09/06/08 06:30	15.09	753	7.89	0.386	0.008	71.7	15.03	736	7.86	0.325	0.006	77.1	EBB
09/06/08 07:00	15.13	751	7.88	0.382	0.008	72.3	14.93	743	7.86	0.323	0.006	76.9	EBB
09/06/08 07:30	15.18	762	7.88	0.379	0.008	71.7	14.93	740	7.86	0.32	0.006	76.7	EBB
09/06/08 08:00	15.29	760	7.87	0.38	0.008	71	15.01	736	7.87	0.32	0.007	77	EBB
09/06/08 08:30	15.45	750	7.87	0.384	0.008	72.1	15.14	739	7.87	0.321	0.007	76.9	EBB
09/06/08 09:00	15.64	753	7.88	0.381	0.008	73.4	15.3	755	7.87	0.325	0.007	76.8	EBB
09/06/08 09:30	15.73	763	7.87	0.385	0.008	74.4	15.48	768	7.86	0.324	0.007	77.2	EBB
09/06/08 10:00	15.88	748	7.87	0.389	0.009	75	15.7	762	7.86	0.326	0.007	78.1	EBB
09/06/08 10:30	15.97	737	7.87	0.393	0.009	77.4	15.92	763	7.87	0.327	0.007	79.1	EBB
09/06/08 11:00	16.13	724	7.88	0.394	0.009	78.1	16.12	753	7.87	0.328	0.007	81.1	EBB
09/06/08 11:30	16.36	743	7.88	0.394	0.009	75.4	16.43	759	7.88	0.328	0.008	82.5	EBB
09/06/08 12:00	16.58	741	7.88	0.396	0.009	75.3	16.61	751	7.88	0.332	0.008	84.8	EBB
09/06/08 12:30	16.72	741	7.88	0.386	0.009	75.2	16.78	749	7.9	0.332	0.008	86.9	FLOOD
09/06/08 13:00	17.08	742	7.9	0.41	0.011	83.8	17.03	754	7.85	0.344	0.008	82.8	FLOOD
09/06/08 13:30	16.93	735	7.9	0.395	0.01	82.6	16.69	759	7.87	0.332	0.008	83.8	FLOOD
09/06/08 14:00	16.9	743	7.91	0.392	0.01	84.5	16.59	754	7.89	0.32	0.008	85.6	FLOOD
09/06/08 14:30	16.9	741	7.91	0.381	0.01	84.3	16.86	748	7.89	0.328	0.008	87.1	FLOOD
09/06/08 15:00	16.88	754	7.91	0.38	0.01	81.6	16.84	769	7.9	0.329	0.008	88.6	FLOOD
09/06/08 15:30	16.88	746	7.87	0.388	0.009	71.4	17.07	759	7.89	0.339	0.009	87.6	FLOOD
09/06/08 16:00	16.87	746	7.87	0.382	0.009	64.6	17.02	760	7.89	0.333	0.008	89.3	FLOOD
09/06/08 16:30	16.91	752	7.87	0.378	0.009	65.1	17.27	775	7.9	0.336	0.009	89.6	FLOOD

09/06/08 17:00	16.91	764	7.9	0.387	0.01	80.4	17.56	746	7.89	0.341	0.009	89.8	FLOOD
09/06/08 17:30	16.93	764	7.91	0.384	0.01	80.2	17.46	754	7.89	0.338	0.009	88.7	
09/06/08 18:00	16.92	775	7.9	0.391	0.01	80	17.56	755	7.89	0.337	0.009	86.8	EBB
09/06/08 18:30	17.05	772	7.91	0.39	0.01	65.5	17.53	776	7.88	0.329	0.008	87.4	EBB
09/06/08 19:00	17.08	776	7.9	0.386	0.01	79.8	17.59	759	7.89	0.329	0.009	88.2	EBB
09/06/08 19:30	17.03	768	7.9	0.386	0.01	79.3	17.53	759	7.87	0.342	0.009	88	EBB
09/06/08 20:00	16.98	772	7.89	0.385	0.01	77.7	17.42	754	7.88	0.341	0.008	87.8	EBB
09/06/08 20:30	16.96	770	7.88	0.383	0.009	73	17.39	757	7.88	0.338	0.008	87.2	EBB
09/06/08 21:00	16.93	769	7.88	0.387	0.009	72.8	17.3	765	7.89	0.323	0.008	86.4	EBB
09/06/08 21:30	16.9	777	7.87	0.405	0.009	70	17.22	766	7.89	0.319	0.008	85.6	EBB
09/06/08 22:00	16.86	765	7.86	0.423	0.01	73.2	17.17	774	7.88	0.32	0.008	84.6	EBB
09/06/08 22:30	16.81	766	7.85	0.447	0.01	67.8	17.13	769	7.88	0.32	0.008	84	EBB
09/06/08 23:00	16.76	765	7.84	0.457	0.01	68.2	17.07	763	7.88	0.321	0.008	83.3	EBB
09/06/08 23:30	16.7	772	7.83	0.491	0.01	68.6	17.01	768	7.88	0.323	0.008	82.4	EBB
10/06/08 00:00	16.64	762	7.82	0.474	0.01	66.3	16.93	768	7.87	0.331	0.008	81	EBB
10/06/08 00:30	16.57	761	7.81	0.477	0.01	66.2	16.84	765	7.87	0.344	0.008	79.6	EBB
10/06/08 01:00	16.49	763	7.8	0.484	0.01	66.3	16.76	768	7.86	0.36	0.008	78.8	
10/06/08 01:30	16.44	764	7.81	0.481	0.009	65.7	16.69	768	7.86	0.37	0.008	77.7	FLOOD
10/06/08 02:00	16.36	774	7.8	0.461	0.009	65.2	16.66	764	7.86	0.372	0.008	77.5	FLOOD
10/06/08 02:30	16.35	769	7.82	0.471	0.009	67	16.61	761	7.83	0.376	0.008	74.9	FLOOD
10/06/08 03:00	16.3	767	7.81	0.473	0.009	65.7	16.54	767	7.84	0.371	0.008	74.5	FLOOD
10/06/08 03:30	16.23	769	7.81	0.47	0.009	63.5	16.5	777	7.85	0.354	0.008	75	FLOOD
10/06/08 04:00	16.18	758	7.81	0.462	0.009	60	16.47	785	7.84	0.358	0.008	74.4	FLOOD
10/06/08 04:30	16.12	774	7.82	0.436	0.009	63.7	16.46	777	7.84	0.359	0.008	74	FLOOD
10/06/08 05:00	16.11	777	7.84	0.425	0.009	67	16.42	789	7.85	0.347	0.008	74.5	FLOOD
10/06/08 05:30	16.13	771	7.84	0.412	0.009	66.5	16.39	778	7.83	0.347	0.007	73	FLOOD
10/06/08 06:00	16.12	754	7.85	0.404	0.009	67.5	16.36	769	7.85	0.344	0.007	73.2	FLOOD
10/06/08 06:30	16.13	759	7.86	0.379	0.008	65.7	16.39	767	7.85	0.352	0.008	74.3	EBB
10/06/08 07:00	16.26	779	7.87	0.379	0.009	65	16.45	773	7.84	0.374	0.008	74.3	EBB
10/06/08 07:30	16.37	783	7.88	0.365	0.008	68.2	16.49	770	7.84	0.397	0.009	74.9	EBB
10/06/08 08:00	16.47	786	7.87	0.354	0.008	71.1	16.45	776	7.84	0.402	0.009	75	EBB
10/06/08 08:30	16.48	791	7.87	0.353	0.008	69.2	16.38	767	7.83	0.399	0.008	73.3	EBB
10/06/08 09:00	16.45	781	7.87	0.354	0.008	69.4	16.3	769	7.83	0.385	0.008	72.3	EBB

10/06/08 09:30	16.43	776	7.87	0.348	0.008	69	16.26	769	7.82	0.376	0.008	71.5	EBB
10/06/08 10:00	16.43	796	7.87	0.349	0.008	68.9	16.26	766	7.83	0.362	0.007	72.5	EBB
10/06/08 10:30	16.46	793	7.87	0.345	0.008	68.1	16.31	763	7.84	0.346	0.007	73.9	EBB
10/06/08 11:00	16.52	783	7.86	0.341	0.008	68.6	16.4	768	7.85	0.336	0.007	75.5	EBB
10/06/08 11:30	16.63	791	7.86	0.342	0.008	64.6	16.53	778	7.87	0.325	0.007	77.7	EBB
10/06/08 12:00	16.76	772	7.87	0.35	0.008	70.4	16.59	781	7.87	0.319	0.007	77.1	EBB
10/06/08 12:30	16.88	765	7.85	0.348	0.008	70.4	16.79	775	7.88	0.324	0.008	78.1	EBB
10/06/08 13:00	17.2	772	7.9	0.371	0.01	78.8	16.77	793	7.87	0.321	0.007	77.8	
10/06/08 13:30	17.1	771	7.88	0.357	0.009	74	16.89	789	7.85	0.342	0.008	75.9	FLOOD
10/06/08 14:00	17.06	789	7.89	0.364	0.009	72.4	16.93	787	7.86	0.326	0.008	78.2	FLOOD
10/06/08 14:30	17.27	788	7.88	0.359	0.009	73.8	17.05	780	7.87	0.318	0.008	81.4	FLOOD
10/06/08 15:00	17.18	772	7.87	0.366	0.009	73.5	17.05	783	7.88	0.327	0.008	81	FLOOD
10/06/08 15:30	17.26	775	7.87	0.367	0.009	73.1	17.17	777	7.87	0.317	0.008	82.2	FLOOD
10/06/08 16:00	17.29	783	7.88	0.373	0.009	75.4	17.36	781	7.89	0.319	0.008	83.4	FLOOD
10/06/08 16:30	17.36	772	7.84	0.375	0.009	70.4	17.44	771	7.89	0.335	0.009	84.1	FLOOD
10/06/08 17:00	17.26	781	7.83	0.363	0.008	67.7	17.67	770	7.9	0.323	0.009	86.5	FLOOD
10/06/08 17:30	17.26	776	7.81	0.388	0.008	67.5	17.71	776	7.9	0.325	0.009	84.6	FLOOD
10/06/08 18:00	17.23	769	7.85	0.356	0.008	70	17.64	773	7.89	0.331	0.009	84.5	FLOOD
10/06/08 18:30	17.22	779	7.88	0.364	0.009	75.7	17.67	779	7.9	0.317	0.008	85.5	EBB
10/06/08 19:00	17.28	779	7.88	0.35	0.009	75.8	17.8	777	7.91	0.315	0.009	86	EBB
10/06/08 19:30	17.28	797	7.88	0.349	0.009	75.7	17.56	788	7.89	0.315	0.008	81.9	EBB
10/06/08 20:00	17.32	796	7.88	0.346	0.009	74.9	17.62	780	7.88	0.315	0.008	81.4	EBB
10/06/08 20:30	17.3	798	7.89	0.339	0.009	74.8	17.51	781	7.89	0.308	0.008	82.2	EBB
10/06/08 21:00	17.21	787	7.91	0.33	0.009	75.6	17.44	779	7.88	0.309	0.008	81.2	EBB
10/06/08 21:30	17.1	806	7.91	0.33	0.009	75.1	17.4	785	7.88	0.307	0.008	81.1	EBB
10/06/08 22:00	17.05	803	7.9	0.329	0.008	75.1	17.39	779	7.88	0.308	0.008	80.7	EBB
10/06/08 22:30	17	793	7.89	0.326	0.008	72.6	17.37	772	7.87	0.305	0.008	80.3	EBB
10/06/08 23:00	16.94	784	7.89	0.325	0.008	71.3	17.32	771	7.87	0.305	0.007	80.4	EBB
10/06/08 23:30	16.92	770	7.89	0.37	0.009	72	17.26	772	7.87	0.304	0.007	80.6	EBB
11/06/08 00:00	16.9	760	7.89	0.328	0.008	73.7	17.2	770	7.87	0.299	0.007	80.1	EBB
11/06/08 00:30	16.88	760	7.89	0.323	0.008	74.3	17.15	774	7.87	0.296	0.007	79.8	EBB
11/06/08 01:00	16.8	759	7.88	0.324	0.008	73.4	17.1	778	7.87	0.292	0.007	79.7	EBB
11/06/08 01:30	16.73	759	7.86	0.327	0.007	70.3	17.04	778	7.87	0.291	0.007	79.1	EBB

11/06/08 02:00	16.64	758	7.87	0.332	0.008	70.8	16.93	777	7.88	0.289	0.007	79.2	
11/06/08 02:30	16.56	759	7.86	0.33	0.007	68.5	16.85	791	7.88	0.286	0.007	78.5	FLOOD
11/06/08 03:00	16.49	756	7.86	0.338	0.008	69.3	16.77	788	7.87	0.288	0.007	78	FLOOD
11/06/08 03:30	16.41	762	7.86	0.326	0.007	57.2	16.71	786	7.86	0.3	0.007	75.3	FLOOD
11/06/08 04:00	16.38	756	7.88	0.332	0.008	71.1	16.66	784	7.87	0.288	0.007	75.8	FLOOD
11/06/08 04:30	16.29	758	7.87	0.321	0.007	69.9	16.58	782	7.85	0.292	0.006	74.3	FLOOD
11/06/08 05:00	16.27	764	7.86	0.311	0.007	66.7	16.48	775	7.86	0.294	0.007	75.4	FLOOD
11/06/08 05:30	16.24	764	7.87	0.326	0.007	66.2	16.45	774	7.85	0.294	0.006	74.3	FLOOD
11/06/08 06:00	16.18	759	7.88	0.321	0.007	70	16.42	775	7.86	0.296	0.007	74.7	FLOOD
11/06/08 06:30	16.08	778	7.87	0.321	0.007	67.8	16.39	774	7.86	0.298	0.007	75.1	FLOOD
11/06/08 07:00	16.06	774	7.87	0.328	0.007	66.6	16.4	769	7.86	0.295	0.007	74.3	FLOOD
11/06/08 07:30	16.12	764	7.88	0.334	0.008	68.9	16.42	778	7.87	0.29	0.007	75.4	EBB
11/06/08 08:00	16.21	766	7.88	0.329	0.008	69.8	16.59	780	7.88	0.291	0.007	77.4	EBB
11/06/08 08:30	16.29	767	7.88	0.335	0.008	67.5	16.6	799	7.88	0.29	0.007	78	EBB
11/06/08 09:00	16.47	774	7.89	0.328	0.008	71	16.65	784	7.88	0.292	0.007	78.3	EBB
11/06/08 09:30	16.55	768	7.89	0.328	0.008	68.6	16.61	767	7.87	0.291	0.007	77.7	EBB
11/06/08 10:00	16.63	768	7.88	0.331	0.008	66.3	16.67	784	7.88	0.292	0.007	78.2	EBB
11/06/08 10:30	16.78	770	7.88	0.335	0.008	69.3	16.73	774	7.87	0.295	0.007	78.4	EBB
11/06/08 11:00	16.89	762	7.87	0.333	0.008	73.3	16.78	760	7.87	0.293	0.007	78.5	EBB
11/06/08 11:30	16.99	765	7.88	0.332	0.008	70.7	16.83	761	7.88	0.295	0.007	79	EBB
11/06/08 12:00	17.06	781	7.9	0.323	0.008	73.6	16.93	773	7.89	0.293	0.007	80.5	EBB
11/06/08 12:30	17.2	784	7.92	0.325	0.009	79.2	17	770	7.9	0.292	0.007	82.6	EBB
11/06/08 13:00	17.19	794	7.91	0.333	0.009	79.7	17.03	771	7.9	0.292	0.007	83.1	EBB
11/06/08 13:30	17.24	795	7.89	0.323	0.008	79.2	17.17	777	7.91	0.293	0.008	85.8	EBB
11/06/08 14:00	17.55	776	7.97	0.335	0.01	87.3	17.16	778	7.89	0.297	0.007	81.2	
11/06/08 14:30	17.52	771	7.94	0.329	0.01	82.8	17.2	777	7.88	0.299	0.007	80.3	FLOOD
11/06/08 15:00	17.44	706	7.96	0.326	0.01	85.6	17.1	778	7.91	0.29	0.008	84.8	FLOOD
11/06/08 15:30	17.47	773	7.92	0.329	0.009	80.7	17.13	776	7.91	0.287	0.008	85.9	FLOOD
11/06/08 16:00	17.54	780	7.9	0.326	0.009	76.6	17.25	777	7.92	0.291	0.008	86.7	FLOOD
11/06/08 16:30	17.49	782	7.89	0.326	0.008	73.5	17.31	774	7.92	0.297	0.008	85.8	FLOOD
11/06/08 17:00	17.47	779	7.82	0.322	0.007	62.7	17.26	769	7.89	0.294	0.007	80.1	FLOOD
11/06/08 17:30	17.4	779	7.94	0.314	0.009	65.5	17.2	770	7.89	0.292	0.007	81.2	FLOOD
11/06/08 18:00	17.34	777	7.91	0.331	0.009	75.6	17.17	792	7.89	0.298	0.007	79.6	FLOOD

11/06/08 18:30	17.28	782	7.86	0.325	0.008	70.8	17.15	789	7.9	0.291	0.007	81	FLOOD
11/06/08 19:00	17.2	777	7.89	0.334	0.009	74.8	17.14	789	7.9	0.29	0.007	81.2	FLOOD
11/06/08 19:30	17.12	777	7.9	0.336	0.009	71.8	17.17	786	7.9	0.29	0.008	81.6	EBB
11/06/08 20:00	17.03	776	7.91	0.336	0.009	75.9	17.16	785	7.9	0.293	0.008	81.2	EBB
11/06/08 20:30	16.94	778	7.9	0.335	0.009	75	17.22	767	7.91	0.292	0.008	81.8	EBB
11/06/08 21:00	16.9	775	7.9	0.337	0.009	72.8	17.23	769	7.9	0.291	0.008	81.5	EBB
11/06/08 21:30	16.88	778	7.89	0.332	0.008	72.7	17.26	770	7.91	0.286	0.008	82.4	EBB
11/06/08 22:00	16.84	776	7.89	0.327	0.008	73.1	17.29	780	7.91	0.287	0.008	82.1	EBB
11/06/08 22:30	16.8	776	7.88	0.335	0.008	69.7	17.31	767	7.91	0.284	0.008	81.4	EBB
11/06/08 23:00	16.74	780	7.9	0.335	0.008	74.2	17.3	770	7.9	0.285	0.007	80.3	EBB
11/06/08 23:30	16.66	788	7.92	0.329	0.009	75.6	17.23	778	7.89	0.287	0.007	79.9	EBB
12/06/08 00:00	16.58	793	7.91	0.323	0.008	75.9	17.11	776	7.89	0.287	0.007	80.2	EBB
12/06/08 00:30	16.54	794	7.93	0.322	0.009	76.5	17.01	777	7.89	0.288	0.007	80.1	EBB
12/06/08 01:00	16.49	791	7.9	0.335	0.008	72.4	16.91	776	7.89	0.288	0.007	79.7	EBB
12/06/08 01:30	16.5	782	7.88	0.343	0.008	71	16.84	789	7.88	0.286	0.007	79	EBB
12/06/08 02:00	16.49	780	7.88	0.348	0.008	70.8	16.77	776	7.88	0.286	0.007	79	EBB
12/06/08 02:30	16.44	782	7.88	0.346	0.008	71	16.72	792	7.88	0.285	0.007	78.6	EBB
12/06/08 03:00	16.38	790	7.87	0.35	0.008	69.5	16.65	776	7.88	0.284	0.007	77.8	
12/06/08 03:30	16.33	791	7.87	0.345	0.008	67.4	16.6	785	7.88	0.283	0.007	77.1	FLOOD
12/06/08 04:00	16.24	757	7.86	0.353	0.008	68.4	16.55	786	7.87	0.285	0.006	75.7	FLOOD
12/06/08 04:30	16.26	767	7.88	0.363	0.008	71	16.46	779	7.85	0.292	0.006	73.8	FLOOD
12/06/08 05:00	16.22	762	7.87	0.346	0.008	67.7	16.4	781	7.85	0.293	0.006	73.7	FLOOD
12/06/08 05:30	16.19	762	7.87	0.342	0.008	65.8	16.39	775	7.86	0.289	0.006	74	FLOOD
12/06/08 06:00	16.18	759	7.86	0.336	0.007	61.9	16.4	783	7.86	0.286	0.006	73.7	FLOOD
12/06/08 06:30	16.13	756	7.86	0.355	0.008	63.9	16.37	798	7.85	0.29	0.006	72.6	FLOOD
12/06/08 07:00	16.04	756	7.84	0.341	0.007	66.4	16.31	795	7.86	0.284	0.006	71.8	FLOOD
12/06/08 07:30	16.04	758	7.85	0.364	0.008	65.9	16.24	787	7.88	0.278	0.006	74.9	FLOOD
12/06/08 08:00	15.96	759	7.85	0.34	0.007	63.1	16.29	786	7.88	0.282	0.007	74.7	FLOOD
12/06/08 08:30	15.98	764	7.88	0.33	0.007	66.2	16.3	781	7.88	0.282	0.006	74.5	EBB
12/06/08 09:00	15.98	765	7.88	0.32	0.007	67.3	16.31	781	7.88	0.282	0.006	75.1	EBB
12/06/08 09:30	16.09	762	7.9	0.319	0.008	66.4	16.36	779	7.88	0.287	0.007	76	EBB
12/06/08 10:00	16.12	761	7.9	0.32	0.008	68.8	16.37	790	7.9	0.285	0.007	77.9	EBB
12/06/08 10:30	16.18	751	7.88	0.334	0.008	69.7	16.41	797	7.91	0.281	0.007	80.2	EBB

12/06/08 11:00	16.23	744	7.88	0.342	0.008	69.8	16.45	779	7.91	0.281	0.007	80	EBB
12/06/08 11:30	16.24	745	7.87	0.347	0.008	69	16.45	772	7.9	0.285	0.007	79.9	EBB
12/06/08 12:00	16.29	736	7.86	0.345	0.008	69.3	16.52	770	7.89	0.291	0.007	79	EBB
12/06/08 12:30	16.39	741	7.82	0.344	0.007	68.6	16.66	778	7.89	0.293	0.007	78.8	EBB
12/06/08 13:00	16.47	748	7.88	0.343	0.008	74.9	16.68	782	7.89	0.294	0.007	78.6	EBB
12/06/08 13:30	16.54	760	7.88	0.337	0.008	74.9	16.65	782	7.89	0.295	0.007	78.7	EBB
12/06/08 14:00	16.61	760	7.89	0.331	0.008	74.8	16.63	787	7.89	0.291	0.007	79	EBB
12/06/08 14:30	16.7	758	7.89	0.338	0.008	76.1	16.81	795	7.91	0.291	0.007	82.3	EBB
12/06/08 15:00	16.86	752	7.93	0.341	0.009	79.7	16.83	794	7.9	0.294	0.007	80.7	
12/06/08 15:30	17.02	745	7.95	0.332	0.009	81.9	16.62	756	7.87	0.295	0.007	76.6	FLOOD
12/06/08 16:00	16.87	751	7.93	0.358	0.01	80	16.52	769	7.85	0.392	0.009	72.3	FLOOD
12/06/08 16:30	16.85	751	7.93	0.335	0.009	81.5	16.55	760	7.86	0.457	0.01	70.7	FLOOD
12/06/08 17:00	16.88	741	7.95	0.324	0.009	79.7	16.54	763	7.85	0.458	0.01	72.3	FLOOD
12/06/08 17:30	16.85	757	7.93	0.342	0.009	81.3	16.6	765	7.86	0.444	0.01	72.8	FLOOD
12/06/08 18:00	16.73	744	7.94	0.34	0.009	79.6	16.56	778	7.84	0.445	0.01	70.6	FLOOD
12/06/08 18:30	16.73	746	7.94	0.343	0.009	79.9	16.47	771	7.82	0.459	0.009	66.5	FLOOD
12/06/08 19:00	16.69	748	7.92	0.339	0.009	74.4	16.49	773	7.84	0.469	0.01	67.2	FLOOD
12/06/08 19:30	16.6	745	7.89	0.378	0.009	70.4	16.45	780	7.83	0.48	0.01	65.9	FLOOD
12/06/08 20:00	16.43	742	7.82	0.528	0.011	61.5	16.44	773	7.83	0.473	0.01	66.4	FLOOD
12/06/08 20:30	16.31	745	7.81	0.588	0.012	60.9	16.45	770	7.85	0.45	0.01	69.4	EBB
12/06/08 21:00	16.19	755	7.82	0.604	0.012	61.6	16.54	780	7.87	0.405	0.009	72.8	EBB
12/06/08 21:30	16.04	754	7.83	0.596	0.012	62.7	16.63	772	7.88	0.367	0.009	74.3	EBB
12/06/08 22:00	15.96	754	7.83	0.555	0.011	61.3	16.68	779	7.88	0.347	0.008	74.2	EBB
12/06/08 22:30	15.89	752	7.83	0.538	0.011	61.3	16.63	775	7.88	0.344	0.008	73.6	EBB
12/06/08 23:00	15.83	748	7.82	0.519	0.01	62.5	16.57	772	7.91	0.311	0.008	77.7	EBB
12/06/08 23:30	15.77	747	7.82	0.475	0.009	63	16.56	778	7.92	0.294	0.008	79.7	EBB
13/06/08 00:00	15.74	750	7.82	0.464	0.009	63.5	16.55	765	7.92	0.288	0.007	79.1	EBB
13/06/08 00:30	15.67	752	7.84	0.442	0.009	66.1	16.53	773	7.9	0.292	0.007	77.8	EBB
13/06/08 01:00	15.6	755	7.86	0.412	0.009	67.7	16.46	763	7.87	0.31	0.007	73.8	EBB
13/06/08 01:30	15.58	776	7.87	0.388	0.008	67.9	16.23	766	7.83	0.367	0.007	67.7	EBB
13/06/08 02:00	15.5	784	7.87	0.383	0.008	68.6	16.07	756	7.81	0.402	0.008	65.3	EBB
13/06/08 02:30	15.43	780	7.87	0.374	0.008	66.5	15.94	756	7.8	0.412	0.008	64.3	EBB
13/06/08 03:00	15.34	775	7.87	0.364	0.008	66.4	15.86	756	7.8	0.413	0.008	64.1	EBB

13/06/08 03:30	15.26	758	7.86	0.366	0.007	64.4	15.77	751	7.8	0.405	0.007	64.4	EBB
13/06/08 04:00	15.24	751	7.85	0.368	0.007	63.8	15.71	756	7.8	0.396	0.007	64.3	FLOOD
13/06/08 04:30	15.22	757	7.83	0.357	0.007	62.1	15.66	756	7.79	0.385	0.007	62.8	FLOOD
13/06/08 05:00	15.13	749	7.83	0.351	0.007	61.8	15.58	749	7.78	0.388	0.007	60.9	FLOOD
13/06/08 05:30	15.12	756	7.85	0.359	0.007	64.7	15.39	715	7.73	0.373	0.006	55.5	FLOOD
13/06/08 06:00	15.07	752	7.83	0.348	0.007	61.3	15.37	741	7.74	0.38	0.006	56	FLOOD
13/06/08 06:30	15.07	749	7.83	0.35	0.007	60	15.35	768	7.78	0.333	0.006	62.1	FLOOD
13/06/08 07:00	15.05	756	7.83	0.34	0.006	59.8	15.33	764	7.78	0.346	0.006	63.9	FLOOD
13/06/08 07:30	14.99	755	7.83	0.337	0.006	61.2	15.31	760	7.8	0.327	0.006	64	FLOOD
13/06/08 08:00	15.01	753	7.82	0.34	0.006	63	15.29	761	7.8	0.328	0.006	65	FLOOD
13/06/08 08:30	15.05	744	7.83	0.342	0.006	62.2	15.3	764	7.82	0.316	0.006	67.9	FLOOD
13/06/08 09:00	15.08	741	7.83	0.349	0.007	62.8	15.35	755	7.81	0.295	0.005	69.1	FLOOD
13/06/08 09:30	15.14	740	7.82	0.362	0.007	59.6	15.44	761	7.83	0.312	0.006	69.8	EBB
13/06/08 10:00	15.22	741	7.84	0.346	0.007	58.2	15.56	758	7.82	0.337	0.006	67.6	EBB
13/06/08 10:30	15.41	744	7.81	0.329	0.006	62.8	15.69	758	7.83	0.349	0.007	69.3	EBB
13/06/08 11:00	15.61	745	7.84	0.319	0.006	68.8	15.71	753	7.84	0.344	0.007	71.6	EBB
13/06/08 11:30	15.68	749	7.8	0.324	0.006	64.8	15.67	761	7.85	0.33	0.007	71.7	EBB
13/06/08 12:00	15.7	747	7.76	0.305	0.005	60.8	15.65	758	7.86	0.324	0.007	72.4	EBB
13/06/08 12:30	15.81	750	7.79	0.307	0.006	61.7	15.62	761	7.86	0.314	0.007	72.4	EBB
13/06/08 13:00	15.84	749	7.82	0.302	0.006	65.5	15.62	762	7.87	0.31	0.007	73.1	EBB
13/06/08 13:30	15.84	751	7.83	0.305	0.006	67.2	15.62	768	7.87	0.304	0.006	73.5	EBB
13/06/08 14:00	15.78	767	7.81	0.309	0.006	69	15.62	767	7.87	0.298	0.006	72.9	EBB
13/06/08 14:30	15.75	752	7.83	0.305	0.006	66.7	15.63	756	7.86	0.295	0.006	73	EBB
13/06/08 15:00	15.72	758	7.84	0.316	0.006	70.2	15.72	761	7.87	0.292	0.006	75.4	EBB
13/06/08 15:30	15.68	767	7.84	0.308	0.006	71	15.74	758	7.85	0.292	0.006	73.7	EBB
13/06/08 16:00	15.64	773	7.84	0.304	0.006	64.5	15.74	756	7.85	0.292	0.006	73.4	EBB
13/06/08 16:30	15.7	772	7.87	0.325	0.007	73.3	15.65	756	7.83	0.288	0.006	71.2	FLOOD
13/06/08 17:00	15.72	765	7.87	0.314	0.007	72.9	15.57	777	7.86	0.296	0.006	74.9	FLOOD
13/06/08 17:30	15.65	772	7.87	0.314	0.007	70.1	15.49	776	7.87	0.289	0.006	76	FLOOD
13/06/08 18:00	15.61	768	7.88	0.305	0.007	70.7	15.46	784	7.87	0.285	0.006	76.1	FLOOD
13/06/08 18:30	15.59	772	7.87	0.306	0.006	69.6	15.45	784	7.86	0.267	0.006	75.8	FLOOD
13/06/08 19:00	15.49	776	7.85	0.301	0.006	61.7	15.44	785	7.87	0.266	0.006	76.7	FLOOD
13/06/08 19:30	15.42	777	7.85	0.309	0.006	69.2	15.39	782	7.86	0.267	0.006	75.2	FLOOD

13/06/08 20:00	15.39	763	7.86	0.313	0.006	69.1	15.37	783	7.88	0.267	0.006	76.7	FLOOD
13/06/08 20:30	15.42	763	7.85	0.304	0.006	68.6	15.37	781	7.87	0.265	0.006	75.9	FLOOD
13/06/08 21:00	15.35	775	7.83	0.301	0.006	66.2	15.35	792	7.87	0.275	0.006	74.5	FLOOD
13/06/08 21:30	15.35	776	7.84	0.314	0.006	65.1	15.31	797	7.87	0.261	0.005	75.7	EBB
13/06/08 22:00	15.27	778	7.86	0.315	0.006	69.7	15.34	787	7.87	0.256	0.005	74.8	EBB
13/06/08 22:30	15.19	772	7.83	0.314	0.006	69.9	15.49	780	7.85	0.27	0.005	71.6	EBB
13/06/08 23:00	15.15	787	7.85	0.3	0.006	70.7	15.56	759	7.84	0.272	0.005	69.9	EBB
13/06/08 23:30	15.11	780	7.84	0.303	0.006	71.8	15.58	754	7.82	0.283	0.005	69.9	EBB
14/06/08 00:00	15.08	781	7.87	0.298	0.006	71.3	15.56	759	7.83	0.276	0.005	69.9	EBB
14/06/08 00:30	15.05	782	7.85	0.3	0.006	70.1	15.53	753	7.83	0.276	0.005	69.8	EBB
14/06/08 01:00	15.02	789	7.87	0.296	0.006	70.3	15.51	754	7.83	0.272	0.005	69.8	EBB
14/06/08 01:30	14.98	791	7.88	0.3	0.006	71.2	15.47	757	7.83	0.272	0.005	70	EBB
14/06/08 02:00	14.95	796	7.87	0.299	0.006	68.4	15.35	765	7.84	0.272	0.005	70.2	EBB
14/06/08 02:30	14.89	786	7.88	0.301	0.006	71.3	15.27	768	7.83	0.269	0.005	70.3	EBB
14/06/08 03:00	14.82	790	7.89	0.296	0.006	71.7	15.17	775	7.84	0.267	0.005	70.4	EBB
14/06/08 03:30	14.73	791	7.89	0.294	0.006	71.4	15.12	780	7.83	0.266	0.005	70	EBB
14/06/08 04:00	14.67	794	7.88	0.292	0.006	68.9	15.03	784	7.83	0.263	0.005	70.3	EBB
14/06/08 04:30	14.59	791	7.87	0.292	0.006	66.4	14.98	784	7.82	0.264	0.005	70.5	EBB
14/06/08 05:00	14.53	783	7.85	0.287	0.005	65.2	14.96	779	7.82	0.263	0.005	70	FLOOD
14/06/08 05:30	14.46	772	7.85	0.294	0.005	65.2	14.92	780	7.79	0.261	0.004	69.6	FLOOD
14/06/08 06:00	14.42	780	7.84	0.318	0.006	65.5	14.81	791	7.79	0.264	0.004	65.2	FLOOD
14/06/08 06:30	14.43	789	7.84	0.292	0.005	65.1	14.72	790	7.8	0.27	0.005	65.9	FLOOD
14/06/08 07:00	14.37	786	7.86	0.3	0.006	66.1	14.69	791	7.81	0.267	0.005	67.8	FLOOD
14/06/08 07:30	14.53	787	7.84	0.307	0.006	67.3	14.75	802	7.84	0.259	0.005	71.8	FLOOD
14/06/08 08:00	14.6	778	7.84	0.308	0.006	67.9	14.74	806	7.85	0.262	0.005	72	FLOOD
14/06/08 08:30	14.72	777	7.83	0.296	0.005	64.9	14.87	794	7.84	0.262	0.005	72.5	FLOOD
14/06/08 09:00	14.82	787	7.84	0.323	0.006	64	14.9	789	7.85	0.262	0.005	71.9	FLOOD
14/06/08 09:30	14.88	789	7.83	0.316	0.006	59.3	14.95	807	7.87	0.269	0.005	74.2	FLOOD
14/06/08 10:00	14.89	788	7.84	0.346	0.007	68.6	15.12	811	7.88	0.26	0.006	78	
14/06/08 10:30	14.97	778	7.82	0.35	0.006	61.5	15.36	803	7.89	0.261	0.006	82	EBB
14/06/08 11:00	14.95	772	7.83	0.359	0.007	64.7	15.41	805	7.88	0.261	0.006	79.8	EBB
14/06/08 11:30	15.07	789	7.84	0.351	0.007	58.8	15.55	799	7.88	0.264	0.006	79.5	EBB
14/06/08 12:00	15.35	770	7.84	0.365	0.007	67.4	15.65	804	7.89	0.263	0.006	80.4	EBB

14/06/08 12:30	15.44	777	7.82	0.344	0.007	67.2	15.61	784	7.89	0.261	0.006	80.5	EBB
14/06/08 13:00	15.52	778	7.82	0.345	0.007	66.6	15.62	785	7.89	0.267	0.006	83.4	EBB
14/06/08 13:30	15.55	780	7.83	0.329	0.006	70.1	15.62	801	7.89	0.261	0.006	83.6	EBB
14/06/08 14:00	15.78	786	7.86	0.329	0.007	72.9	15.65	787	7.9	0.258	0.006	83.2	EBB
14/06/08 14:30	15.78	786	7.87	0.318	0.007	73.9	15.69	804	7.9	0.26	0.006	82.4	EBB
14/06/08 15:00	15.86	792	7.9	0.318	0.007	77.6	15.87	803	7.91	0.262	0.006	84.5	EBB
14/06/08 15:30	15.94	796	7.92	0.344	0.008	82.2	15.88	806	7.91	0.261	0.006	86	EBB
14/06/08 16:00	15.99	796	7.93	0.328	0.008	80.5	15.79	795	7.9	0.259	0.006	83	EBB
14/06/08 16:30	15.9	800	7.9	0.334	0.008	79.3	15.78	792	7.91	0.259	0.006	83.3	EBB
14/06/08 17:00	15.8	797	7.92	0.312	0.008	78.9	15.82	791	7.91	0.259	0.006	83.1	
14/06/08 17:30	15.83	788	7.94	0.34	0.009	81.1	15.82	789	7.91	0.26	0.006	83.6	FLOOD
14/06/08 18:00	15.87	809	7.96	0.329	0.009	83.9	15.67	799	7.88	0.265	0.006	80.3	FLOOD
14/06/08 18:30	15.78	812	7.93	0.326	0.008	79.3	15.39	807	7.91	0.259	0.006	81.6	FLOOD
14/06/08 19:00	15.68	802	7.93	0.319	0.008	78.8	15.36	801	7.89	0.255	0.006	82.6	FLOOD
14/06/08 19:30	15.66	800	7.91	0.304	0.007	75.4	15.34	801	7.91	0.254	0.006	82	FLOOD
14/06/08 20:00	15.59	805	7.91	0.31	0.007	76.2	15.32	822	7.91	0.253	0.006	82.1	FLOOD
14/06/08 20:30	15.55	795	7.92	0.31	0.007	76.4	15.3	823	7.9	0.25	0.006	80.5	FLOOD
14/06/08 21:00	15.52	794	7.91	0.306	0.007	75.7	15.23	823	7.91	0.249	0.006	81	FLOOD
14/06/08 21:30	15.49	800	7.89	0.296	0.007	69.8	15.22	805	7.91	0.247	0.006	79.9	FLOOD
14/06/08 22:00	15.38	798	7.9	0.306	0.007	73.2	15.21	804	7.91	0.253	0.006	80.9	FLOOD
14/06/08 22:30	15.34	807	7.89	0.307	0.007	73.7	15.23	800	7.91	0.25	0.006	80	EBB
14/06/08 23:00	15.23	799	7.91	0.312	0.007	72.4	15.35	809	7.91	0.249	0.006	80.4	EBB
14/06/08 23:30	15.12	803	7.91	0.309	0.007	74.2	15.5	790	7.9	0.252	0.006	79.9	EBB
15/06/08 00:00	15.07	798	7.89	0.309	0.007	74.4	15.58	791	7.9	0.252	0.006	80.5	EBB
15/06/08 00:30	15.03	802	7.9	0.305	0.007	74.2	15.61	793	7.9	0.25	0.006	80.7	EBB
15/06/08 01:00	14.98	791	7.89	0.31	0.007	73.4	15.6	788	7.91	0.249	0.006	81.3	EBB
15/06/08 01:30	14.93	797	7.9	0.309	0.007	74	15.61	790	7.91	0.248	0.006	80.8	EBB
15/06/08 02:00	14.9	798	7.9	0.309	0.007	72.2	15.62	792	7.91	0.247	0.006	80.5	EBB
15/06/08 02:30	14.86	797	7.9	0.347	0.007	71.9	15.58	787	7.91	0.248	0.006	80.2	EBB
15/06/08 03:00	14.81	791	7.9	0.311	0.007	72.3	15.47	801	7.9	0.246	0.006	79.2	EBB
15/06/08 03:30	14.75	791	7.9	0.309	0.007	71.5	15.25	796	7.89	0.247	0.005	78.6	EBB
15/06/08 04:00	14.7	812	7.89	0.32	0.007	71.5	15.09	804	7.89	0.247	0.005	77.7	EBB
15/06/08 04:30	14.65	797	7.9	0.324	0.007	68.8	15.06	802	7.88	0.247	0.005	76.7	EBB

15/06/08 05:00	14.59	767	7.91	0.317	0.007	72.2	14.98	809	7.88	0.246	0.005	76.7	EBB
15/06/08 05:30	14.53	762	7.9	0.307	0.007	70.7	14.92	798	7.87	0.246	0.005	76.8	EBB
15/06/08 06:00	14.48	758	7.9	0.303	0.006	71.8	14.88	803	7.88	0.25	0.005	76.4	FLOOD
15/06/08 06:30	14.42	781	7.92	0.325	0.007	73.9	14.77	804	7.85	0.251	0.005	73.2	FLOOD
15/06/08 07:00	14.47	787	7.92	0.309	0.007	73	14.71	801	7.88	0.245	0.005	74.1	FLOOD
15/06/08 07:30	14.54	781	7.93	0.313	0.007	75.2	14.61	801	7.89	0.249	0.005	75.9	FLOOD
15/06/08 08:00	14.69	772	7.93	0.304	0.007	73.5	14.64	801	7.9	0.251	0.005	76.5	FLOOD
15/06/08 08:30	14.74	771	7.92	0.291	0.007	73.2	14.83	817	7.9	0.25	0.005	78	FLOOD
15/06/08 09:00	14.82	762	7.91	0.283	0.006	76.4	14.92	812	7.89	0.251	0.005	77.5	FLOOD
15/06/08 09:30	14.94	755	7.92	0.291	0.007	76.5	15.04	822	7.92	0.248	0.006	79.9	FLOOD
15/06/08 10:00	14.91	774	7.91	0.296	0.007	75	15.07	818	7.92	0.245	0.006	81.7	FLOOD
15/06/08 10:30	14.94	779	7.92	0.295	0.007	76.6	15.06	818	7.92	0.25	0.006	81.7	FLOOD
15/06/08 11:00	15.03	786	7.91	0.302	0.007	75.5	15.17	801	7.93	0.245	0.006	88.9	EBB
15/06/08 11:30	15.09	803	7.91	0.298	0.007	79.4	15.36	802	7.96	0.249	0.006	89.7	EBB
15/06/08 12:00	15.09	793	7.93	0.304	0.007	76.2	15.32	807	7.94	0.251	0.006	87.7	EBB
15/06/08 12:30	15.11	793	7.91	0.3	0.007	76.3	15.38	818	7.92	0.267	0.006	83	EBB
15/06/08 13:00	15.18	790	7.9	0.299	0.007	69.1	15.56	818	7.92	0.268	0.006	83.9	EBB
15/06/08 13:30	15.23	792	7.91	0.3	0.007	72.6	15.48	812	7.92	0.268	0.006	83.4	EBB
15/06/08 14:00	15.27	792	7.91	0.298	0.007	77.6	15.42	810	7.92	0.267	0.006	84.8	EBB
15/06/08 14:30	15.36	790	7.91	0.299	0.007	74.1	15.52	811	7.93	0.282	0.007	86.9	EBB