Report on River Water Quality in Tipperary

2013

Contents

1. Overview

This report provides an assessment of river water quality in County Tipperary in 2013. It should be read in conjunction with the other data and assessments provided under the South East River Basin district report.

The report is presented in the following sections:
(i) Section two of the report provides a general assessment of the state of rivers in the county, with graphs showing trends in annual average o-phosphate and nitrate concentrations in the County since 2001.
(ii) The third section identifies the river sites which require further investigation and the suspected causes of pollution. They were selected on the basis of having a Q value less than 4 (i.e. moderate or worse status), poor chemistry, or there were other significant pollution issues.
(iii) The fourth section provides a summary assessment of water quality for each river, having regard to the relevant Q values and WFD criteria for the 4 key physico-chemical parameters BOD, ammonia, o-phosphate and Nitrate.
(iv) Sections five and six include long term graphs for both ortho-phosphate and nitrate in Waterford Rivers. These are based on three year rolling means.
(v) Finally there are a set of maps which provide an indication of river water quality based on the four key physico-chemical parameters. These maps compare the annual average for each parameter at each river station against the relevant EQS.

2. General Assessment & Trends

Water quality in County Tipperary is good when compared to the national picture. In terms of ecological status, 66% of river stations in the county are at least good status compared with 65% nationally.

The general physico-chemical data suggests that there was a slight improvement in water quality in 2013 compared to 2012. As indicated in the table below, there was a decrease in the percentage of river stations which exceeded the Good status EQS for o-phosphate, nitrate and BOD levels however the percentage of rivers which exceeded the EQS for ammonia increased for 2013 compared to 2012.

Parameter	2013 (%)	2012 (%)
Ammonia	18.1	11.8
o-Phosphate	15.4	22.5
Nitrate	52.6	60.4
BOD	6.3	17.2

Table 1. % of River Stations that exceeded the EQS for Good status for each parameter in 2013 compared to 2012.

The drop in the percentage of rivers which exceeded the Good status for ortho-phosphate was coupled with the fact that the annual ortho-phosphate concentration in Tipperary rivers in 2013 also fell to its lowest value since 2001. The average ortho-phosphate level reached Good status in 2012 and remained so for 2013. The challenge is now to reduce levels to High status.

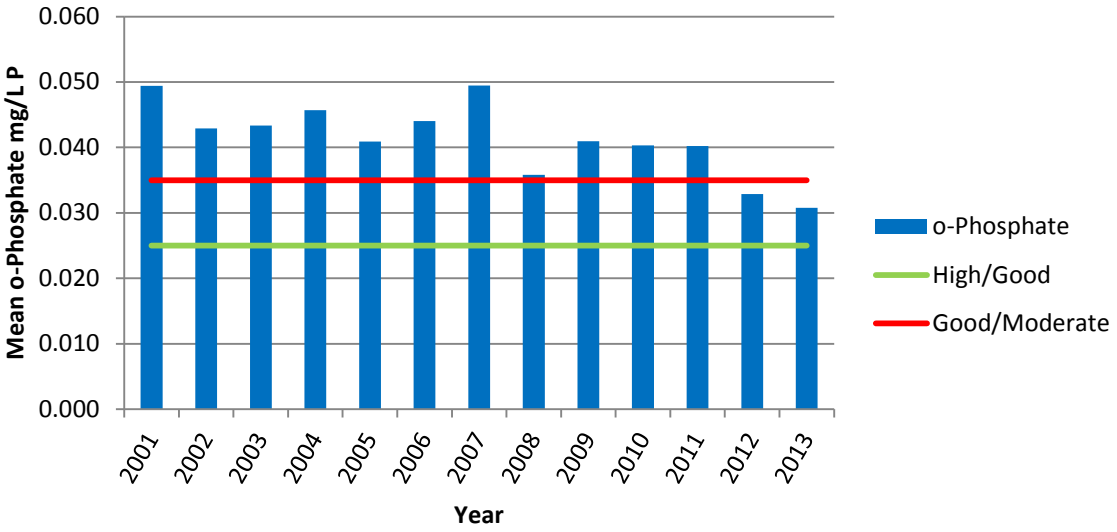

Fig 1. Annual average ortho-phosphate levels in Tipperary rivers 2001 – 2013.

Similar to the ortho-phosphate the drop in the percentage of rivers which exceeded the Good status for nitrate was coupled with a decrease in the annual average nitrate concentration in Tipperary rivers in 2013. The average nitrate values are at their lowest value since 2001. Nitrates are a still a significant problem in the Tipperary rivers. The average nitrate concentration has consistently exceeded the surrogate EQS for Good Status over the past 14 years.

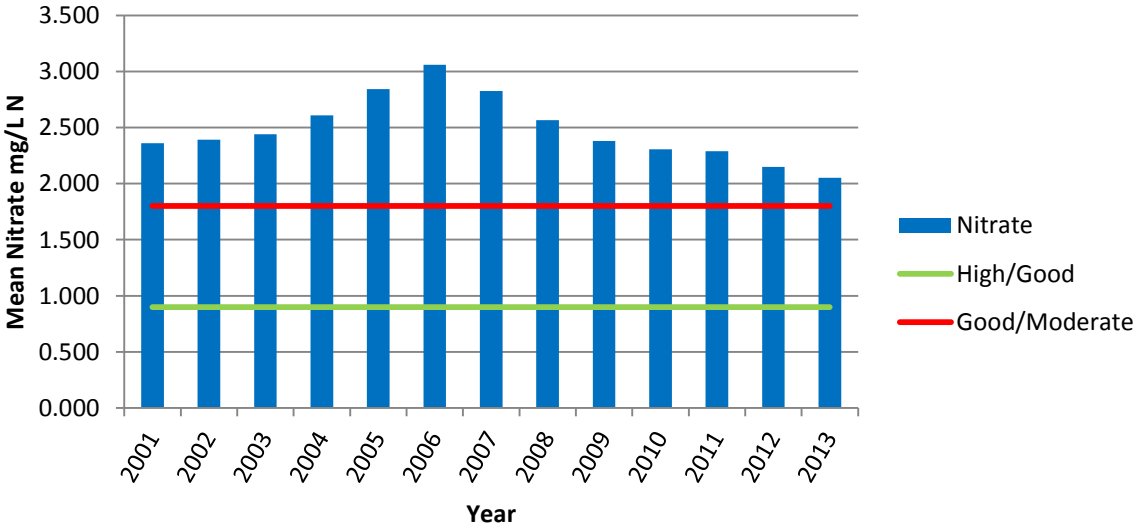

Fig 2. Annual average nitrate levels in Tipperary rivers 2001 – 2013.

With the advent of the Water Framework Directive compliance rules for certain river chemistry determinands were applied to the data collected. Assessment is based on the four most significant contributing parameters to water quality, namely BOD, ammonium, o-phosphate and TON. Sites are identified as passing or failing based on an assessment of the mean and 95%ile of these parameters. Sites fail chemistry where two or more parameters fail the criteria set. While few sites fail two parameters, a significant number of sites fail a single parameter (in the majority of cases this is due to TON). Where a site fails one parameter, it is described as being of concern. The data for the Tipperary rivers since the start of the WFD monitoring (2007) is shown in Table 2. The percentage of sites which fall into each category is trended over 3 year rolling cycles (Figure 3).

Chemical monitoring since 2007 indicated an improving trend in all Tipperary rivers. This trend stabilised in 2013. No sites have failed chemistry in any cycle since 2007 and the number of passing sites has increased from one hundred and eight in 2007-2009 to one hundred and thirty-eight for 2011-2013.

While chemical monitoring indicates an improving trend, it is important to also remain focussed on maintaining the status of those sites that are already at good or higher status.

Year	No. of Stations	Pass	Of Concern	Fail
2007-2009	167	108	59	0
2008-2010	172	129	43	0
2009-2011	176	145	31	0
2010-2012	176	144	32	0
2011-2013	169	138	31	0

Table 2. Number of river stations by WFD compliance status

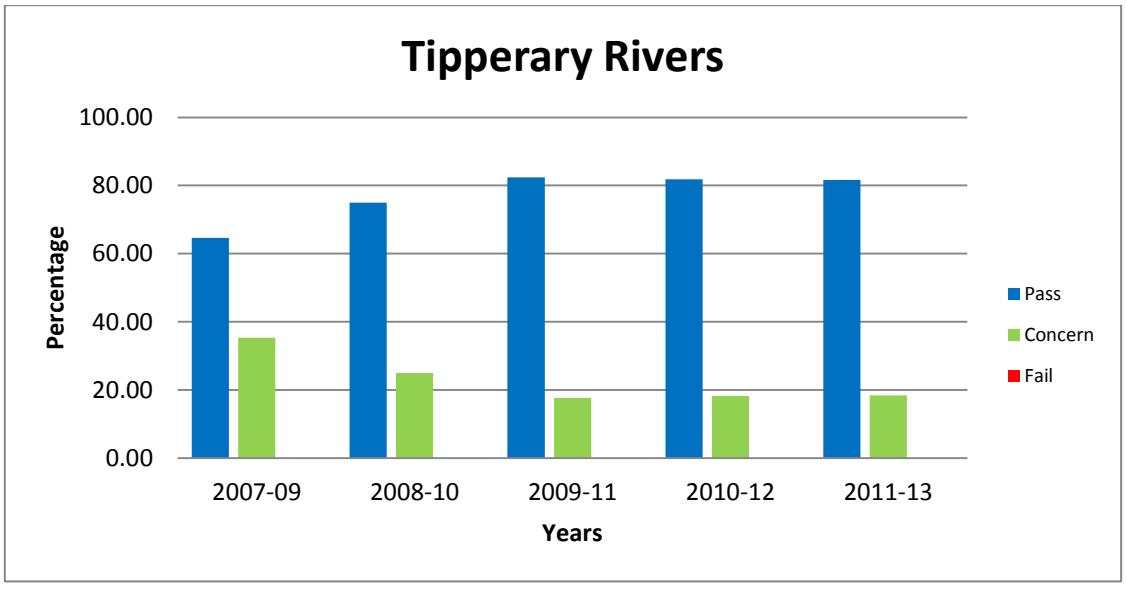

Fig 3. % of river stations by WFD compliance status

Table 3. River stations with the highest average ammonia concentration in 2013 (in decreasing order).

River Name	River Code / Station Number
Clareen (Nenagh)	25C11-0300
Rossestown	16R01-0040
Drish	16D02-0070
Anner	16A02-0500
Drish	16D02-0100

Table 4. River stations with the highest average o-phosphate concentration in 2013 (in decreasing order).

River Name	River Code / Station Number
Anner	16A02-0500
Clareen (Nenagh)	25C11-0300
Borrisoleigh Stream	16B06-0600
Silvermines Village Stream	25S10-0100
Anner	16A02-0100

Table 5. River stations with the highest average nitrate concentration in 2013 (in decreasing order).

River Name	River Code / Station Number
Clareen (Nenagh)	25C11-0300
Owenbeg	16O01-0200
Moyle	16M01-0200
Moyle	16M01-0100
Black Stream(Cashel)	16B05-0100

Table 6. River stations with the highest average BOD concentration in 2013 (in decreasing order).

River Name	River Code / Station Number
Clareen (Nenagh)	25C11-0300
Anner	16A02-0500
Rossestown	16R01-0040
Moyle	16M01-0100
Breagagh	16B03-0200

3. WFD River Sites for further investigation

There are over 900 river sites of less than good status across the country – that is they have a biological Q value of 3-4 or less. There are forty river stations in County Tipperary (that are also monitored for chemical determinands) that have a Q value of 3-4 or less. These have been identified as sites for further investigation. Table 8 lists all these sites along with the suspected causes and any relevant additional comments.

Tipperary is a predominantly rural county with several significant urban conurbations such as Tipperary Town, Clonmel and Nenagh. Agriculture is one of the main activities in the county. Diffuse pollution from agriculture as well as small point sources such as small urban wastewater treatment plants (UWWT), domestic wastewater treatment systems (DWWTS) and farmyards are significant contributory pressures. The predominant pollution sources in the more urbanised areas are discharges from wastewater treatment plants, storm water overflows and industrial discharges. It must be borne in mind that multiple pressures may impact on any given site. Further work is required also in order to better distinguish between the impacts of DWWTS and diffuse agricultural sources. The pathways by which pollutants reach water are similar for those emanating from DWWTS and from agricultural sources, whether farmyard or field. If sources of pollution affecting rivers can be reduced or eliminated, this will have a positive knock-on effect on lakes, estuaries and ground-waters in the region.

The EPA is responsible for the licensing or certification of all discharges to the aquatic environment from sewerage systems owned, managed and operated by Irish Water. The licensing and certification authorisation process was introduced on a phased basis commencing on 14th December 2007 in accordance with the requirements of the Waste Water Discharge (Authorisation) Regulations, 2007 (SI No. 684 of 2007). Up to the end of 2013 sixteen licences were issued in County Tipperary and are shown in Table 7 below. Three licences were issued in 2013, for Thurles, Mullinahone and Limerick Junction.

Table 7. Wastewater discharge licences issued in Tipperary up to end of 2013.

Agglomeration	Licence No.	Authority	Date Issued
Roscrea	D0025-01	Irish Water	6/1/08
Thurles	D0026-01	Irish Water	13/9/13
Nenagh	D0027-01	Irish Water	25/9/08
Clonmel	D0035-01	Irish Water	8/2/11
Carrick on Suir	D0148-01	Irish Water	20/12/12
Cahir	D0167-01	Irish Water	24/12/12
Cashel	D0171-01	Irish Water	1/11/12
Borrisokane	D0326-01	Irish Water	26/1/12
Cappawhite	D0440-01	Irish Water	13/7/13

Agglomeration	Licence No.	Authority	Date Issued
Killenaule	D0443-01	Irish Water	16/10/13
Kilsheelin	D0452-01	Irish Water	16/10/13
Clogheen	D0453-01	Irish Water	10/10/11
Ballyclerihan	D0455-01	Irish Water	10/6/10
Mullinahone	D0456-01	Irish Water	11/12/13
Limerick Junction	D0457-01	Irish Water	11/12/13
Cloughjordan	D0475-01	Irish Water	21/3/11

Both diffuse and point source pollution are key pressures in Co. Tipperary. Many of the point sources are due directly to wastewater discharges. A number of the plants do not have secondary treatment and upgrade works are scheduled or in progress. Tipperary Co.Co. carried out improvement works at at a number of plants in 2012 and 2013. Inlet screens were installed at Templetouhy, Portroe, Borrisokane, Cloughjordan, Holycross, Toomevara, Two-Mile-Borris and Littleton. Ferric dosing was installed at Holycross WWTP. It is hoped that the licencing of WWTP plants will show improvements over the coming years.

The focus on domestic waste water treatment systems (DWWTS) has continued to increase in recent years. In 2013, a National Inspection Plan for DWWTS was published in response to the European Court of Justice finding that Ireland had not met the legal obligation required by the 1975 Waste Framework Directive to regulate the waste water generated in our unsewered areas. Nationwide inspections commenced in 2013, starting with areas at greatest risk of damage to human health or the environment. In the period 01/07/2013 to 31/12/2013, seventeen inspections were carried out in Co. Tipperary. Nine of these inspections (52.9%) were deemed to be non-compliant.

It is apparent that diffuse agricultural pollution is a key pressure in Co. Tipperary. Animal access to rivers as well as spreading of wastes are issues that need to be addressed. Food Harvest 2020 has the potential to put further pressure on water quality with the proposed increase in output likely to be challenging in Co. Tipperary. Eleven farm inspections and one quarry inspection were carried out by Tipperary County Council in the Ollatrim river catchment on a planned basis over a period of months in 2013.

Table 8:. Sites for further investigation in County Tipperary

River	Code	Location	Q Value	Year	Key Pressures	Comments
ANNER	16A02-0100	Drangan Br.	Q3	2011	Urban (Sewage) Agriculture and mixed rural influences	
ANNER	16A02-0340	Ballincullin Br	Q3-4	2011	Agriculture and mixed rural influences	
ANNER	16A02-0600	Drummon Br	Q3-4	2011	Agriculture	Extensive tillage u/s of location
ARA	16A03-0100	Bohereenbuee Br	Q3	2011	Agriculture and mixed rural influences	
ARA	16A03-0300	1 km d/s Tipperary near Railway Br	Q3	2011	Urban Industrial	Tipperary Town Creamery
BALLYFINBOY	25B02-0300	Modreeny Br (North)	Q3-4	2011	Urban Agriculture	Cloghjordan WWTP
BALLYFINBOY	25B02-0600	Br nr Ballyfinboy Castle	Q3-4	2011	Urban Agriculture	Borrisokane WWTP
BALLYFINBOY	25B02-0800	Br just u/s Lough Derg	Q3-4	2011	Agriculture	
BLACK STR. (CASHEL)	16B05-0100	0.5 km u/s Suir Confluence	Q3	2011	Urban	d/s of Cashel
BORRISOLEIGH STREAM	16B06-0600	Br 0.5km SW Borrisoleigh	Q3	2012	Agriculture and mixed rural influences	d/s Borrisoleigh

River	Code	Location	Q Value	Year	Key Pressures	Comments
CAPPAWHITE STR.	25C10-0200	Gortandrum Br	Q3-4	2012	Urban Agriculture and mixed rural influences	Capawhite WWTP Intensive land use u/s Excessive siltation and abundant algae
CARRIGAHORIG STR.	25C16-0500	Br at Carrigahorig	Q3-4	2011	Agriculture and mixed rural influences	Improved pasture u/s Eutrophic conditions
CLAREEN	25C11-0300	u/s confluence with Nenagh River	--	--	Industrial Agricultrual	Arabawn Co-op Diffuse agricultural pressures
DEAD	25D01-0100	Pope's Br	Q3-4	2012	Agriculture	Improved pasture and tillage u/s. Enriched conditions, excessive siltation
DRISH	16D02-0070	Castletown Br	Q3/0	2011	Industrial (mining)	Lisheen mine – Toxic influences noted during last biological survey
DRISH	16D02-0100	Boolabeha Br	Q3	2011	Industrial (mining)	Lisheen mine
DRISH	16D02-0200	Br near Athlummon	Q3-4	2011	Industrial (mining)	Lisheen mine
FARNEYBRIDGE	16F02-0500	Ballynahow Br	Q3-4	2011	Agriculture	
FIDAGHTA	16F01-0100	Br near Aughnagawer Crossroads	Q3	2011	Agriculture	
FIDAGHTA	16F01-0300	Kilnacask Br	Q3-4	2011	Agriculture	
FISHMOYNE	16F03-0300	Monroe Br	Q3	2011	Hydromorphological	Arterial drainage
GOLDEN GROVE STREAM	25G06-0200	Br just u/s Little Brosna R.	Q3-4	2011	Urban Aquaculture	d/s of fish farm and Roscrea WWTP

River	Code	Location	Q Value	Year	Key Pressures	Comments
KILFADDA CASTLE STREAM	25K07-0600	Br SE Carrigahorig	Q3-4*	2011	Agriculture	
KILMASTULLA	25K04-0800	Cranna Br	Q3-4	2012	Industrial (mining) Agriculture	Silvermines Intensive land use
KILLENAULE STREAM	16K05-0100	Br 1km d/s Killenaule	Q3	2011	Urban Agricultural	d/s Killenaule village
LINGAUN	16L01-0600	The Three Bridges	Q3-4	2011	Urban Agriculture and mixed rural influences	Carrick on Suir
MOYLE	16M01-0050	Br NW Mocklerstown	Q3	2011	Hydromorphological Agricultural	Many stations dry in summer
MOYLE	16M01-0400	Br u/s Anner River Confluence	Q3	2011	Hydromorphological Agricultural	Many stations dry in summer
NENAGH	25N01-0800	Annaghbeg Br	Q3-4	2012	Agriculture	
OLATRIM	25O01-0600	Br u/s Nenagh River complex	Q3-4	2012	Agriculture	
OUTERAGH STR.	16O01-0200	Br u/s Suir River	Q3-4	2012	Agriculture	
ROSSESTOWN	16R01-0040	Br N Barnalisheen	Q3*	2011	Industrial (mining)	Lisheen mine
ROSSESTOWN	16R01-0150	Br W of Ballyerk	Q3	2011	Industrial (mining)	Lisheen mine
ROSSESTOWN	16R01-0300	Br u/s Suir R Confluence	Q3-4	2011	Industrial (mining)	Lisheen mine
SILVERMINES VILLAGE	25S10-0100	Kilmore Br	Q3-4	2012	Urban Agriculture	d/s Silvermines village

River	Code	Location	Q Value	Year	Key Pressures	Comments
SUIR	16S02-0200	Knocknageragh Br	Q3-4	2011	Agriculture	
SUIR	16S02-0300	Penane Br	Q3-4	2011	Urban (sewage)	Templemore WWTP
SUIR	16S02-0600	Thurles Br	Q3	2011	Urban	Thurles town
SUIR	16S02-0900	Cabragh Br	Q3-4	2011	Urban(sewage)	Thurles WWTP
SUIR	16S02-1100	Holycross Br	Q3-4	2011	Urban (sewage) Agriculture and mixed rural influences	Holycross village
SUIR	16S02-2000	Ardfinnan Br	Q3-4	2011	Urban	Ardfinnan WWTP
SUIR	16S02-2700	Kilsheelan Br	Q3-4	2011	Urban	Kilsheelin village
SUIR	16S02-2850	1.5km u/s Carrick on Suir	Q3-4	2011	Agricultural	Diffuse agricultural pressures
YOUGHAL	25Y02-0050	Br N of Curragh	Q3-4	2012	Agriculture and mixed rural influences	Algal growth and excessive siltation in river

4. 2013 Summary of River Water Quality in Tipperary

These assessments are based on physico-chemical measurements made during 2013, and the most recent Q values and assessments of the river biologists.

River	Remarks	Change from 2012
Coalbrook Stream **15C20-0040 Q4 (2013)**	Rising in the Slieveardagh Hills, this tributary of the Kings River flows past the village of Coalbrook in South Tipperary. BOD was high in July (rainfall after dry period). Ecological quality remains good status following biological monitoring in 2013.	No change from 2012.
Kings **15K02-0100** **15K02-0200 Q4 (2013)**	This river flows through Co. Tipperary and Co. Kilkenny, before it joins the Nore d/s of Bennettsbridge. It flows through Callan and Kells in Co. Kilkenny. Elevated ammonia and BOD in July (rainfall after dry period). Ecological quality remains good status following biological monitoring in 2013.	No change from 2012.
Munster **15M03-0500** **15M03-0600 Q4 (2013)**	There are two branches to this river – the east branch (formerly known as the Tullaroan Stream) and the main branch. The final station is below the confluence of the two branches. Low flows can be observed in the upper reaches at times. Pysico-chemical quality is satisfactory. Ecological quality remains at good status following biological monitoring in 2013.	No change from 2012.
Nore **15N01-0080 Q4 (2013)** **15N01-0100** **15N01-0200** **15N01-0300 Q4 (2013)**	This river is 141 km in length and has a catchment area of 2530 km^2. It flows through Tipperary, Laois and Kilkenny, before joining the R. Barrow at New Ross. These rivers then join the R. Suir and flow into Waterford Harbour. It flows through mainly agricultural land, but also some peatland. Ammonia levels were elevated at stations 0800 through to 0300 in April following heavy rain and elevated again in November. Ammonia levels at Station 0300 d/s Monaincha Bog are elevated throughout the year also high colour is observed at this station. Biological monitoring in 2013 indicated good ecological status over most of the river.	No significant change from 2012.

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Kings **15K02-0100** **15K02-0200 Q4 (2013)**	This river flows through Co. Tipperary and Co. Kilkenny, before it joins the Nore d/s of Bennettsbridge. It flows through Callan and Kells in Co. Kilkenny. Elevated ammonia and BOD in July (rainfall after dry period). Ecological quality remains good status following biological monitoring in 2013.	No change from 2012.
Munster **15M03-0500** **15M03-0600 Q4 (2013)**	There are two branches to this river – the east branch (formerly known as the Tullaroan Stream) and the main branch. The final station is below the confluence of the two branches. Low flows can be observed in the upper reaches at times. Pysico-chemical quality is satisfactory. Ecological quality remains at good status following biological monitoring in 2013.	No change from 2012.
Nore **15N01-0080 Q4 (2013)** **15N01-0100** **15N01-0200** **15N01-0300 Q4 (2013)**	This river is 141 km in length and has a catchment area of 2530 km^2. It flows through counties Tipperary, Laois and Kilkenny, before joining the River Barrow at New Ross. These rivers then join the Suir and flow into Waterford Harbour. The Nore is a Designated Salmonid River under the Freshwater Fish Directive (78/659/EEC). It flows through mainly agricultural land, but also some peatland. Ammonia levels were elevated at stations 0800 through to 0300 in April following heavy rain and elevated again in November. Ammonia levels at Station 0300 d/s Monaincha Bog are elevated throughout the year also high colour is observed at this station. Biological monitoring in 2013 indicated good ecological status over most of the river.	No significant change from 2012.

River	Remarks	Change from 2012
Aherlow **16A01-0100** **16A01-0200 Q4 (2011)** **16A01-0300 Q4 (2011)** **16A01-0500 Q4(2011)** **16A01-0600** **16A01-0700 Q4 (2011)** **16A01-0800 Q4-5 (2011)** **16A01-0900 Q4-5 (2011)**	The Aherlow is a Designated Salmonid River under the Freshwater Fish Directive (78/659/EEC). It flows through Co. Limerick and South Tipperary. Physico-chemical monitoring was satisfactory. Monitoring in 2011 indicated good to high ecological conditions.	No change from 2012.
Anner **16A02-0100 Q3 (2011)** **16A02-0200** **16A02-0300** **16A02-0500** **16A02-0600 Q3-4 (2011)** **16A02-0800 Q4 (2011)** **16A02-0900 Q4 (2011)** **16A02-1100 Q4 (2011)**	There are two branches in the upper Anner – the first three stations are on the western branch (Drangan), the next is on the eastern branch (Mullinahone) the remaining stations are on the main channel after the confluence. Ammonia, BOD and o-phosphate were elevated at all stations at times during the year particularly in February and July. Stations 0100 and 0200 were dry in September and low flows were noted at the other stations . Biological monitoring indicated good quality in the lower reaches in 2011.	No significant change from 2012.
Ara **16A03-0100 Q3 (2011)** **16A03-0300 Q3 (2011)** **16A03-0400** **16A03-0600 Q4 (2011)**	The Ara flows through Tipperary town and is a tributary of the Aherlow. Elevated ammonia at times throughout the year. Ortho-phosphate is elevated at all stations. Ecological monitoring indicated moderate conditions u/s and d/s of Tipperary Town.	No significant change from 2012.
Arglo **16A04-0100 Q4 (2011)** **16A04-0200 Q4 (2011)**	Overall quality is good.	No change from 2012.
Black (Twomileborris) **16B01-0100 Q4 (2011)**	This river is quite coloured, otherwise overall quality is good.	No change from 2012.
Bregagh (Tipperary) **16B03-0200** **16B02-0400**	River coloured at station 0200 near Littleton Bog. Ammonia and BOD were high at both stations in October 2013 possibly due to heavy rain, otherwise satisfactory physico-chemical results.	No significant change from 2012.

River	Remarks	Change from 2012
Burncourt **16B04-0200** **16B04-0310 Q4 at station 0300 (2011)**	This river rises in the Galtee mountains and is a tributary of the Tar. Pysico-chemical quality is satisfactory. Ecology was high to good on this stream in 2011.	No change from 2012.
Black Stream (Cashel) **16B05-0100 Q3 (2011)**	This small stream receives sewage discharge at Cashel. BOD was high and DO levels low in September after heavy rain. Overall DO levels rose slightly in 2013. Nitrates remain elevated.	Slight improvement in DO levels.
Clashawley **16C01-0100** **16C01-0200** **16C01-0300** **16C01-0400 Q4 (2011)** **16C01-0500 Q4 (2011)** **16C01-0600 Q4 (2011)**	There are two branches to the Clashawley, which join to form the main channel for the final two stations. Colour, ammonia, BOD and o-phosphate were elevated at stations 0100, 0200 and 0300 in January following heavy rain . Nitrates remain elevated at station 0100 d/s of Killenaule. Ecology is good over the length of the river.	No significant change from 2012.
Clodiagh (Tipperary) **16C02-0080 Q4-5 (2011)** **16C02-0200 Q4 (2011)** **16C02-0500**	Physico-chemical monitoring is satisfactory, and ecological monitoring indicates high or good ecological quality.	No change from 2012.
College Stream **16C10-0100**	This stream is an abstraction point for the Galtee Regional water supply. Physico-chemical monitoring is satisfactory	No change from 2012.
Drish **16D02-0068** **16D02-0070 Q3/0 (2011)** **16D02-0100 Q3 (2011)** **16D02-0200 Q3-4 (2011)** **16D02-0400 Q4 (2011)**	This river is adjacent to the Lisheen lead and zinc mine, which discharges u/s of station 0070 (NE of Castletown). Colour is high at times throughout the river especially at station 0068 d/s of Derryfada Bog.. Ammonia levels remain high d/s of the mine discharge and further downstream at station 0100 (Boolbeha Bridge). The quality improves at station 0200 (Athlummon) however there are intermittent elevated ammonia levels. Nitrate levels remain slightly elevated at all stations.	No significant change since 2012.

River	Remarks	Change from 2012
Duag **16D03-0100 Q4 (2011)** **16D03-0400 Q4 (2011)** **16D03-1100 Q4 (2011)** **16D03-1400**	The final station on this river (1400) is a tributary of the Duag (Mountanglesby Spring) and is used as a raw water supply. Colour was elevated at times at stations 0100, 0400 and 1100. Algal/weed growth was noted at stations 0400 (d/s Ballyporeen) and 1100 (d/s Clogheen) in April.	No significant change from 2012.
Fidaghta **16F01-0100 Q3 (2011)** **16F01-0300 Q3-4 (2011)**	Nitrates remain slightly elevated, otherwise physico-chemical quality is satisfactory. Ecological quality is poor to moderate.	No change from 2012.
Farneybridge **16F02-0500 Q3-4 (2011)**	Nitrates are slightly elevated, otherwise physico-chemical monitoring was satisfactory. Biological monitoring indicates moderate ecological conditions.	No significant change from 2012.
Fishmoyne **16F03-0100** **16F03-0200 Q4 (2011)** **16F03-0300 Q3 (2011)**	Elevated BOD measured at stations 0100 and 0300 in September.	No significant change from 2012.
Glenbrook **16G04-0100** **16G04-0200**	This tributary of the Suir flows through Carrick-on-Suir. Nitrates remain slightly elevated, otherwise physico-chemical quality is satisfactory.	No significant change from 2012.
Lingaun **16L01-0050 Q4-5 (2011)** **16L01-0200 Q4 (2011)** **16L01-0300 Q4-5 (2011)** **16L01-0400 Q4 (2011)** **16L01-0550** **16L01-0600 Q3-4 (2011)**	This river rises in Slievenamon and flows along the Kilkenny/Tipperary border. The water supply for Carrick-on-Suir is abstracted near station 0550. Physico-chemical monitoring was satisfactory during 2013 although nitrates are elevated in the river from station 0200 (Lingaun Br).	No change from 2012.
Moyle **16M01-0100** **16M01-0200** **16M01-0300** **16M01-0400 Q3 (2011)**	There is a history of serious pollution in this river d/s National Proteins (station 0100) – ammonia was elevated at this stations in January and March. The upper stations can have very low or no flow in dry weather with station 0200 (Ballinvoher Br) dry in August. Nitrates are elevated throughout the river. Poor ecological quality at Station 0400 in 2011.	No significant change from 2012.

River	Remarks	Change from 2012
Multeen **16M02-0050** **16M02-0300 Q4 (2011)** **16M02-0500 Q4 (2011)** **16M02-0520** **16M02-0600 Q4-5 (2011)** **16M02-0900 Q4-5 (2011)** **16M02-1000 Q4-5 (2011)** **16M02-1100 Q4-5 (2011)**	There are two raw water abstraction points on the Multeen for Dundrum water supply. The river is also an important habitat for the freshwater pearl mussel and crayfish. River can be coloured at times, otherwise physico-chemical monitoring was generally satisfactory. Ammonia was slightly elevated at stations 0600 (SE of Inchinsquillib) and 0900 (Morpeth Br) in September and BOD and o-phosphate were elevated at station 1100 (Ballygriffin Br) in October and November. Ecological quality was good to high in 2011.	No significant change from 2012.
Outeragh Stream **16O01-0100** **16O01-0200 Q3-4 (2012)**	Nitrates remain slightly elevated, otherwise physico-chemical quality is satisfactory. Ecological quality is moderate.	No change from 2012.
Rossestown **16R01-0040 Q3* (2011)** **16R01-0150 Q3 (2011)** **16R01-0300 Q3-4 (2011)**	This river flows near the Lisheen mine and Derryfada Bog - the first station is d/s of the mine discharge. Overall quality remains poor, particularly at stations 0040 (d/s mine) and 0150 (W of mine) where ammonia was high. Colour is high at times throughout the river. Biological monitoring in 2011 indicated only poor to moderate quality also.	No change from 2012.
Rockwell Stream **16R02-0200**	Nitrates are elevated otherwise satisfactory quality. Algal/weed growth was noted in May.	No change from 2012.
Suir **16S02-0100 Q4 (2011)** **16S02-0200 Q3-4 (2011)** **16S02-0300 Q3-4 (2011)** **16S02-0400** **16S02-0500 Q4 (2011)** **16S02-0600 Q3 (2011)** **16S02-0800** **16S02-0900 Q3-4 (2011)** **16S02-1100 Q3-4 (2011)** **16S02-1200 Q4 (2011)** **16S02-1300 Q4 (2011)** **16S02-1400 Q4 (2011)** **16S02-1500 Q4 (2011**	This river is 184 km long and has a catchment area of 3613 km^2. The Suir rises in North Tipperary and flows through Tipperary, along the Tipperary/ Waterford and the Kilkenny/Waterford borders before discharging in to Waterford Harbour. Ammonia was high at station 0400 (Loughmore Br) in June. Ammonia was slightly elevated from stations 0800 to 1200 and from stations 1700 to 2300 in February 2013. Chemistry remains good at station 0300 (d/s Templemore STW), and this is reflected in improved ecology.	DO's rose again periodically at stations 2700 and 2800 in 2013 otherwise no significant change from 2012.

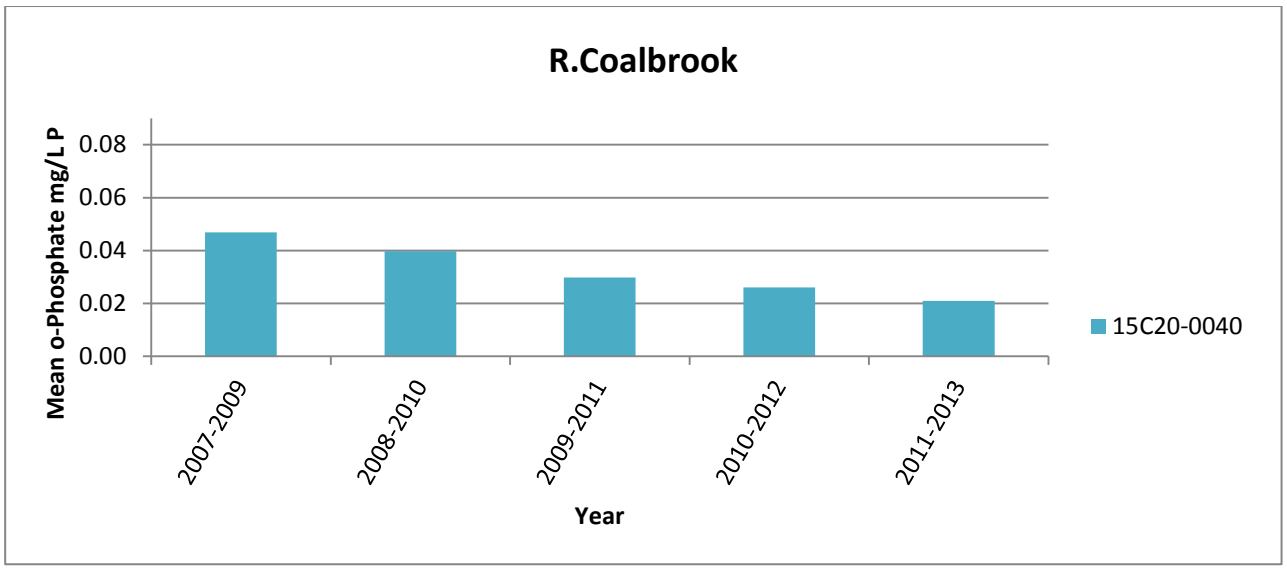
River	Remarks	Change from 2012
Suir, continued. **16S02-1600 Q4 (2011)** **16S02-1700 Q4 (2011)** **16S02-1900** **16S02-2000 Q3-4 (2011)** **16S02-2200 Q4 (2011)** **16S02-2300 Q4 (2011)** **16S02-2400 Q4 (2011)** **16S02-2600** **16S02-2700 Q4 (2011)**	High DOs were once again observed at Kilsheelin Bridge (station 2700) and at Coolnamuck Weir (station 2800) in 2013. Overall biological monitoring also indicates an improving situation with mainly moderate to good ecological conditions, however quality deteriorated from Q4 to Q3-4 at station 2000 (Ardfinnan Bridge) in 2011.	
Tar **16T01-0030 Q4-5 (2011)** **16T01-0300 Q4-5 (2011)** **16T01-0600 Q4 (2011)**	Satisfactory physico-chemical results. Good to high ecological conditions.	No change from 2012.
Thonoge **16T02-0080 Q4 (2011)** **16T02-0200 Q4 (2011)**	Satisfactory physico-chemical results. Ecological quality is good.	No change from 2012.
Annagh **25A02-0200 Q4 (2012)** **25A02-0300 Q4-5 (2012)**	This river is a tributary of the Newport. Colour was high at both stations in November 2013. Good to high ecological conditions throughout this river.	No change from 2012.
Ballintotty **25B01-0100 Q4 (2012)** **25B01-0300 Q4 (2012)**	Ecology of this river has improved from moderate to good since 2008. Chemistry remains good.	No change from 2012.
Ballyfinboy **25B02-0300 Q3-4 (2011)** **25B02-0600 Q3-4 (2011)** **25B02-0800 Q3-4 (2011)**	This river flows through Cloughjordan and Borrisokane. Physico-chemical monitoring is satisfactory, however biological monitoring in 2011 only indicated moderate ecological quality.	No change from 2012.
Bunow (Mooneen) **25B25-0100** **25B25-0400 Q4 (2011)**	This river flows through Roscrea and is a tributary of the Little Brosna. Elevated ammonia at station 0400 (Bunnow Br) in April and June. Ecological quality shows good status following biological monitoring in 2011.	No significant change from 2012.
Cahernahallia **25C01-0060**	This river rises in Co. Tipperary and flows into Co. Limerick. This report deals with the Co. Tipperary stretch only. Chemistry shows satisfactory quality.	No change from 2012.

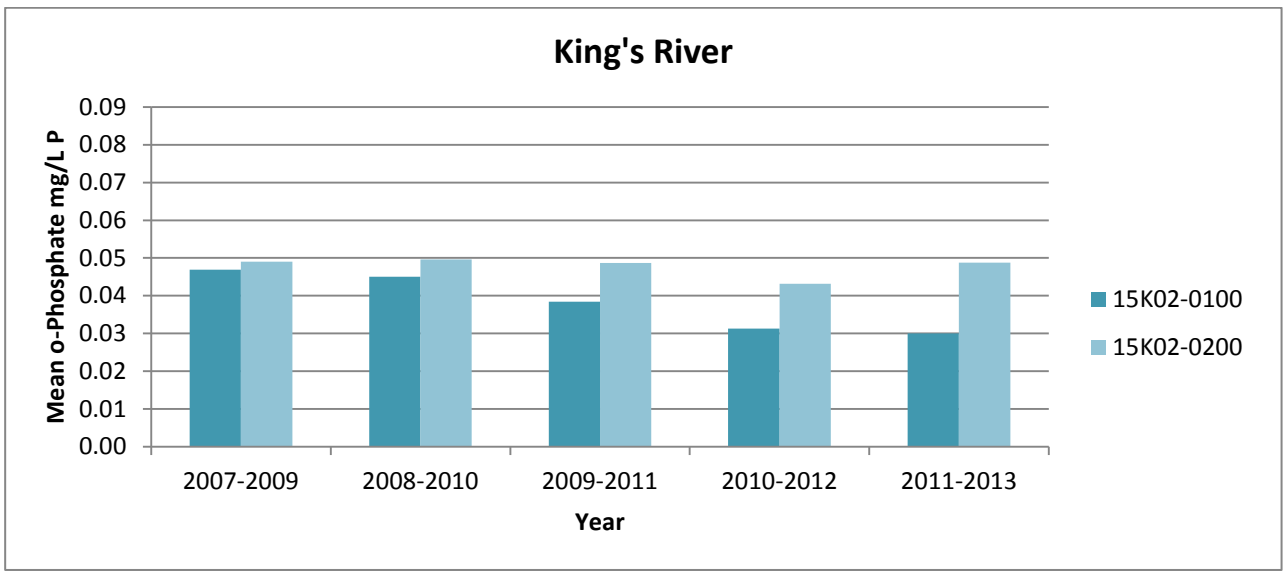
River	Remarks	Change from 2012
Cappawhite Stream 25C10-0200 Q3-4 (2012)	BOD, ammonia and o-phosphate were elevated at times during 2013 due to the effects of sewage from Cappawhite. Ecological conditions improved from poor to moderate in 2012.	Conditions continue to improve.
Clareen (Nenagh) 25C11-0300	This river flows through Nenagh town and receives effluent from Arrabawn Co-op and local sewage discharges along with diffuse agricultural pollution. Ammonia, BOD and ortho-phosphate and TON concentrations were high during 2013 and the quality of this river remains poor. DO levels also remain low.	No change from 2012 - the poor quality observed in this river over many years continues.
Carrigahorig Stream 25C16-0500 Q3-4 (2011)	This stream flows through Carrigahorig village and into the north end of Lough Derg. Satisfactory physico-chemical quality in 2013, however the biological monitoring in 2011 indicated only moderate ecological conditions.	No change from 2012.
Dead 25D01-0100 Q3-4 (2012)	This river rises in Co. Tipperary and flows into Co. Limerick. This report deals with the Co. Tipperary stretch only. The Donohill landfill is within its catchment. Colour, ammonia, ortho-Phosphate and BOD were elevated at times during the year. The river has been subject to intermittent pollution over the years – probably from agriculture and the landfill at Donohill.	No change from 2012.
Golden Grove Stream 25G06-0200 Q3-4 (2011)	This river is a tributary of the Little Brosna. Quality in this river is moderate – ammonia was again elevated in 2013, probably due to the fish farm u/s of the sampling station.	No significant change from 2012.
Grange (25G10)	Physico-chemical monitoring shows satisfactory conditions.	No change from 2012.

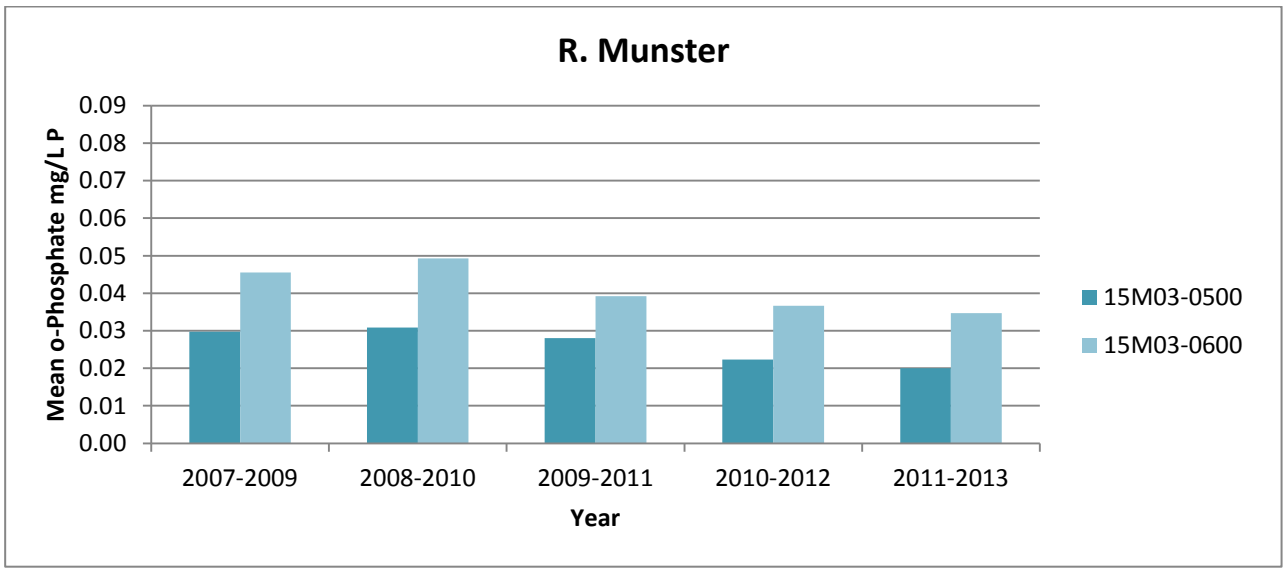
River	Remarks	Change from 2012
Kilmastulla **25K04-0100** **25K04-0200** **25K04-0300** **25K04-0400 Q3/0 (2005)** **25K04-0500 Q4 (2012)** **25K04-0600 Q3-4 (2012)** **25K04-0800 Q3-4 (2012)** **25K04-1000 Q4 (2012)**	This river drains an old mining area at Silvermines in Co.Tipperary. Station 0400 (Garryard Stream) drains the mine and flows into the Yellow river, which in turn flows into the Kilmastulla. Lead and zinc mining ceased operations in 1982, however metals from the old mine and tailings pond continue to leach into the upper reaches of this river system. Physico-chemical monitoring shows satisfactory quality. Biological monitoring in 2012 indicated good ecological conditions u/s of the mine discharge and at Cool Bridge (station 1000).	No change from 2012.
Kilfadda Castle Stream **25K07-0600 Q3-4*(2011)**	This stream was added to the sampling programme in 2010 and is a tributary of the Carrigahorig Stream. Slightly elevated BOD in August.	No significant change from 2012.
Little Brosna **25L02-0100 Q4 (2011)** **25L02-0200** **25L02-0400 Q3-4 (2011)** **25L02-0600 Q4 (2011)** **25L02-0700 Q4 (2011)** **25L02-1000 Q4 (2011)**	The first 4 stations on this river are in Co. Offaly, but are impacted at station 0400 by discharges from Roscrea. The lower portion flows along the Offaly/Tipperary border. Ammonia is elevated at times at station 0700 (Riverstown Br). Ecology is good except d/s Roscrea WWTP (station 0300). Abundant algal/weed growth noted in April at stations 0700 and 100 (New Br).	No significant change from 2012.
Lorrha Stream **25L05-0200 Q4 (2011)**	This stream was added to the sampling programme in 2010 and flows into Lough Derg. This stream can be coloured at times. Physico-chemical monitoring is satisfactory with the exception of an elevated BOD in February.	No significant change from 2012.
Nenagh **25N01-0200 Q4-5 (2012)** **25N01-0300 Q4-5 (2012)** **25N01-0500 Q4 (2012)** **25N01-0640** **25N01-0660** **25N01-0800 Q3-4 (2012)**	This river flows through Nenagh town and into Lough Derg at Dromineer. Physico-chemical monitoring was generally satisfactory during 2013 although there was elevated colour at all stations in November and slightly elevated ammonia and BOD at stations 0640,0660 and elevated BOD at station 0800 also in November. This was most likely due to rainfall.	No significant change from 2012.

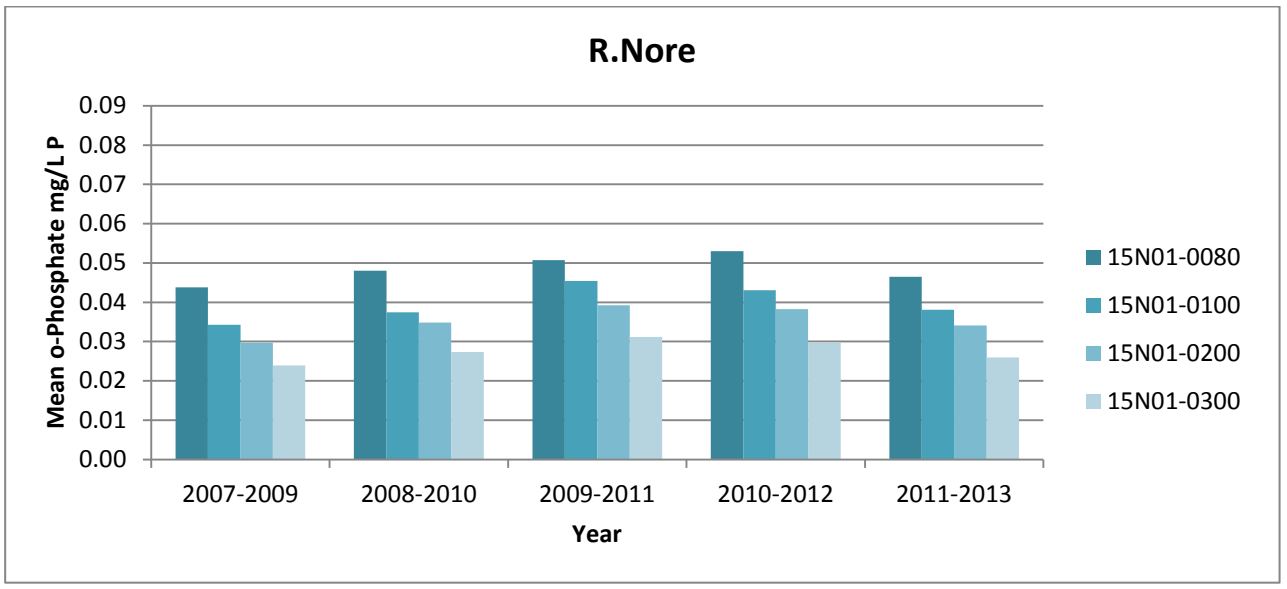
River	Remarks	Change from 2012
Newport **25N02-0100 Q4-5 (2012)** **25N02-0200 Q4-5 (2012)** **25N02-0300 Q4-5 (2012)**	Station 0200 is the abstraction point for Newport water supply. River can be coloured at times, times otherwise physico-chemical quality is satisfactory. Improvement to high ecological conditions in 2012.	No change from 2012.
Newtown **25N03-0200 Q4 (2011)**	This river flows into Lough Derg at Youghal Bay. Ecological conditions are good. Physico-chemical monitoring shows satisfactory quality although BOD was high in May 2013.	No significant change from 2012.
Ollatrim **25O01-0150 Q4-5 (2012)** **25O01-0400 Q4 (2012)**	Ecological conditions improved at Rathurles Bridge (station 0400) in 2012, however excessive siltation and some algal growth remain. Physico-chemical monitoring is satisfactory.	No significant change from 2012.
Pallas **25P01-0500 Q4 (2011)**	Colour, ammonia and BOD were elevated in April.	No change from 2012.
Shannon (L. Derg) **25S01-2200** **25S01-2210** **25S01-2220** **25S01-2230** **25S01-2240** **25S01-2250** **25S01-2260** **25S01-2270** **25S01-2280** **25S01-2290** **25S01-2230**	This report refers to the eastern shore of Lough Derg in Co. Tipperary only. Isolated outbreaks of cyanobacteria (blue-green algae) were reported in the past, however, these have not been reported in more recent years. Colour was high at times otherwise physico-chemical monitoring was satisfactory at all stations during 2013.	No change from 2012.
Small **25S05-0200 Q4 (2012)**	Colour is naturally high, otherwise physico-chemical monitoring was satisfactory.	No change from 2012.
Silvermines Village Str. **25S10-0100 Q3-4 (2012)**	Physico-chemical monitoring was satisfactory. The 2012 biological assessment indicated only moderate quality.	No change from 2012.
Youghal **25Y02-0200 Q4-5 (2012)**	This river runs through Youghal on Lough Derg and receives effluent from Portroe STW (u/s station 0200). Satisfactory physico-chemical results during 2013. Ecology improved to high quality in 2012.	No change from 2012.

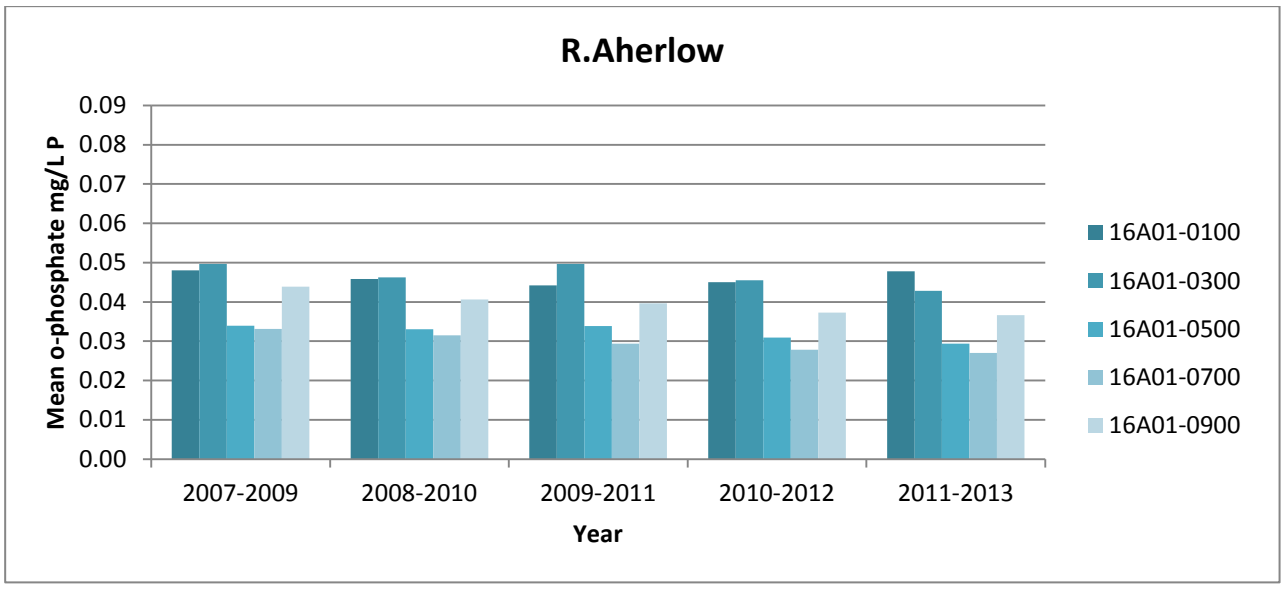
5. Long Term Trend Graphs – o-Phosphate

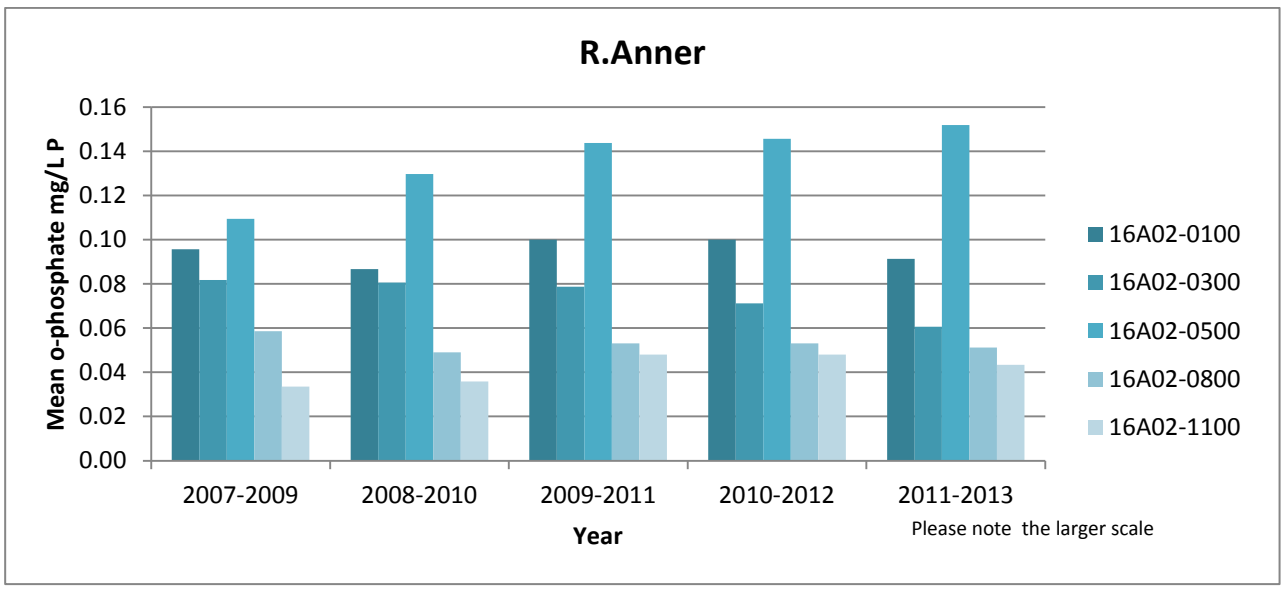


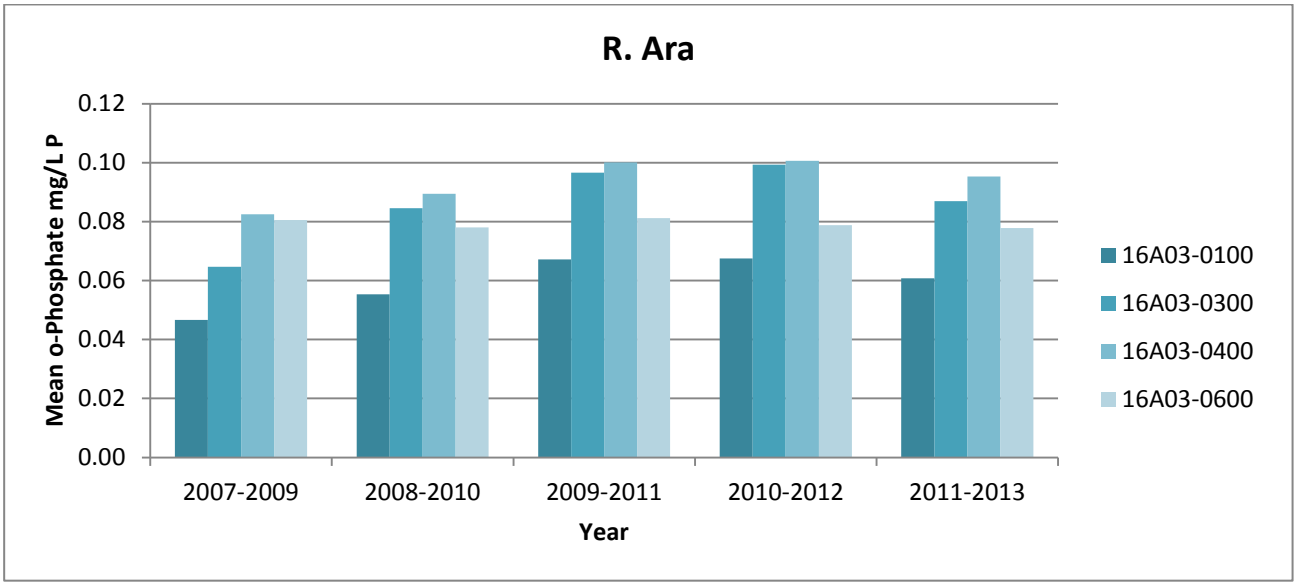





R.Nore
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
15N01-0080
15N01-0100
15N01-0200
15N01-0300


R.Aherlow
Mean o-phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16A01-0100
16A01-0300
16A01-0500
16A01-0700
16A01-0900


R.Anner
Mean o-phosphate mg/L P
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
Please note the larger scale
16A02-0100
16A02-0300
16A02-0500
16A02-0800
16A02-1100


R. Ara
Mean o-Phosphate mg/L P
0.12
0.10
0.08
0.06
0.04
0.02
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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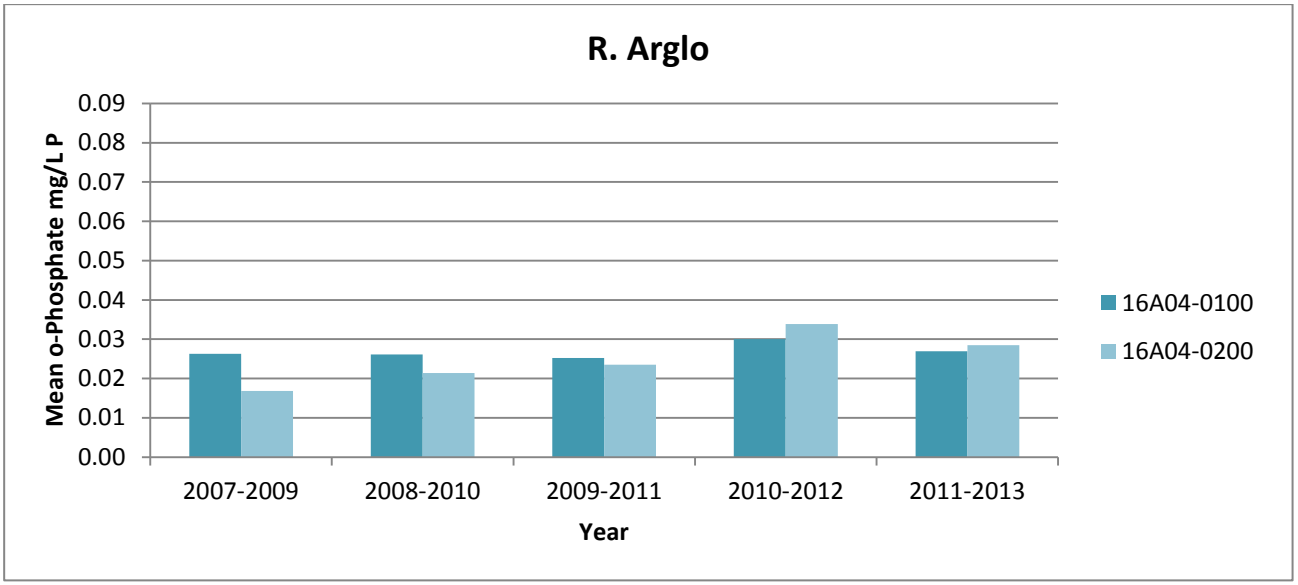
16A03-0300
16A03-0400
16A03-0600


R. Arglo
Mean o-Phosphate mg/L P
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0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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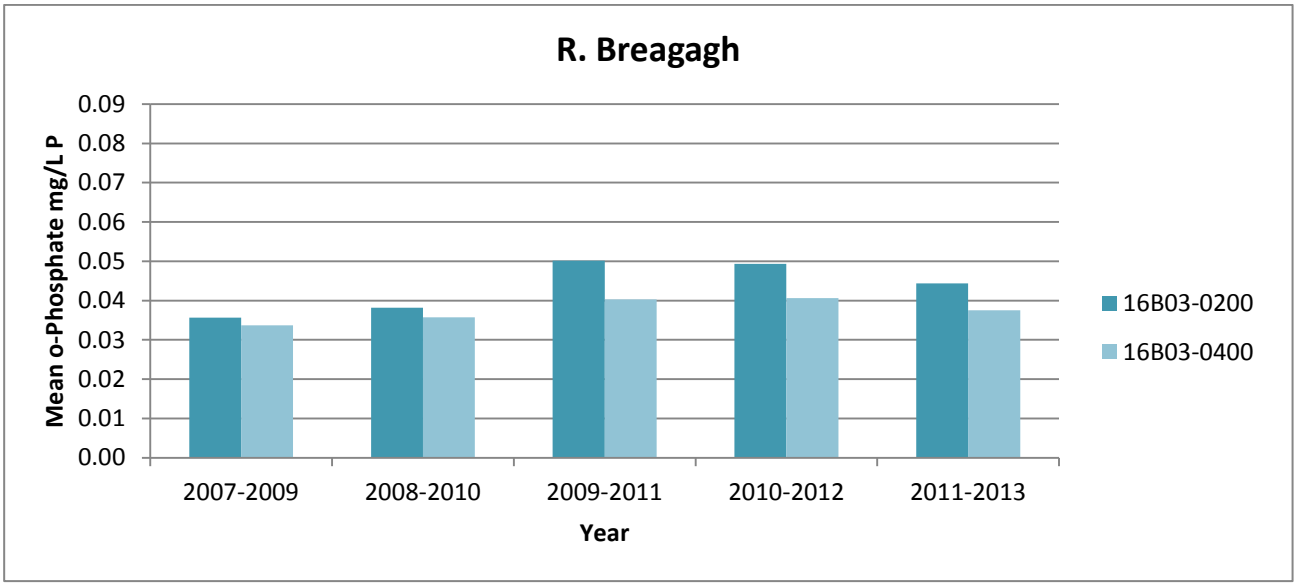
16A04-0200


R. Breagagh
Mean o-Phosphate mg/L P
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0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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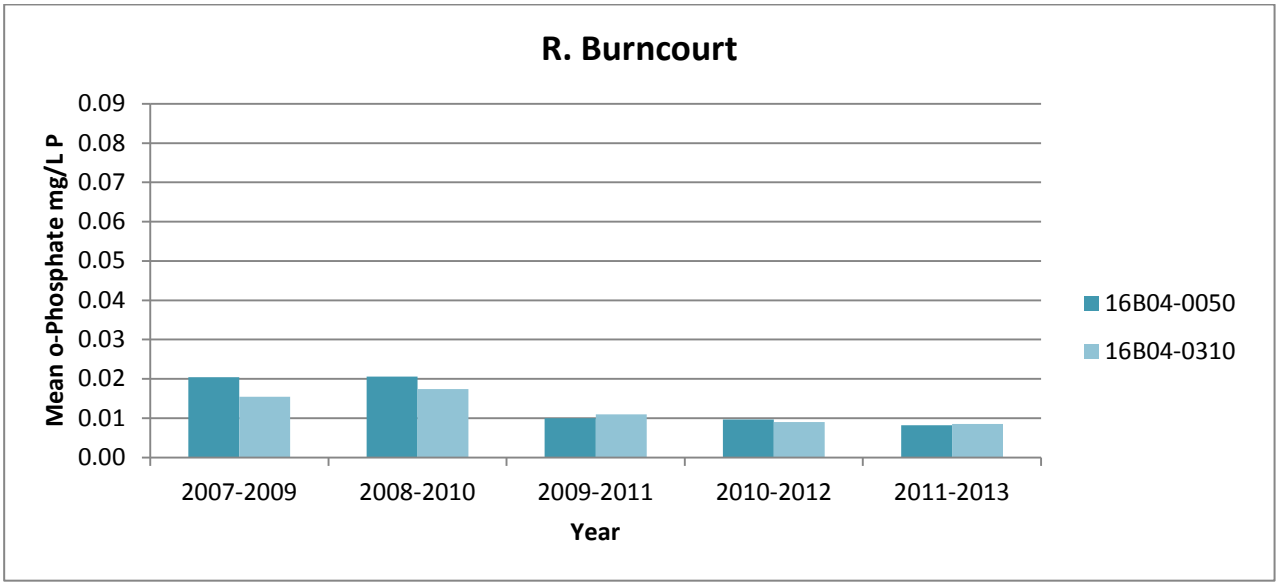
R. Burncourt
Mean o-Phosphate mg/L P
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0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
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2011-2013
Year
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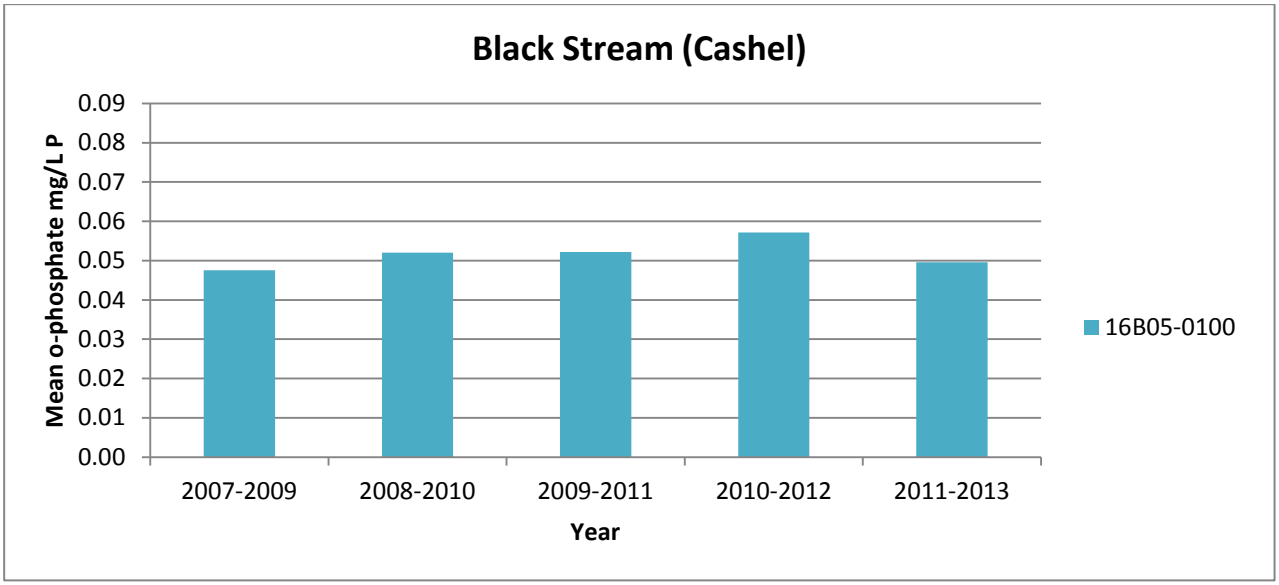
Black Stream (Cashel)
Mean o-phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
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Year
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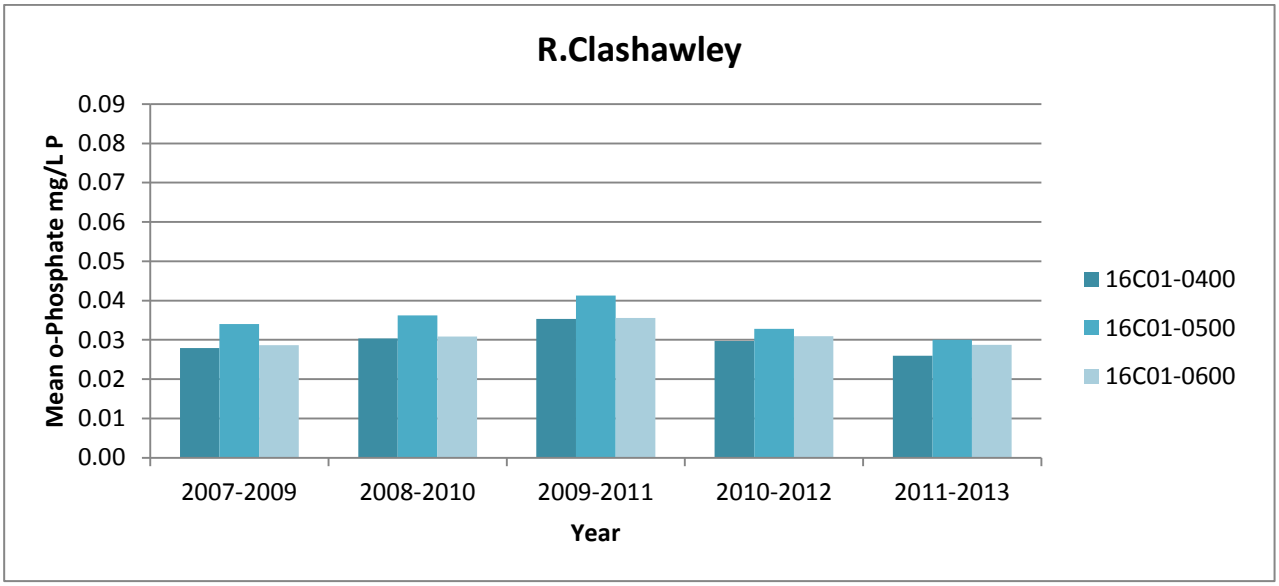
R.Clashawley
Mean o-Phosphate mg/L P
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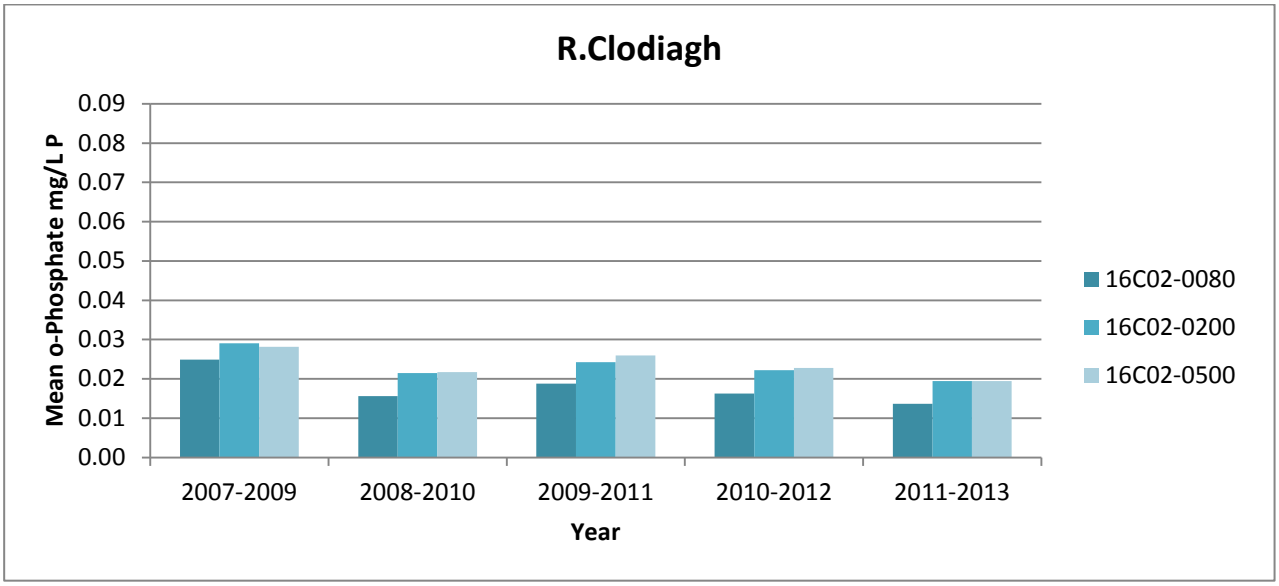
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16C01-0400
16C01-0500
16C01-0600


R.Clodiagh
Mean o-Phosphate mg/L P
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0.08
0.07
0.06
0.05
0.04
0.03
0.02
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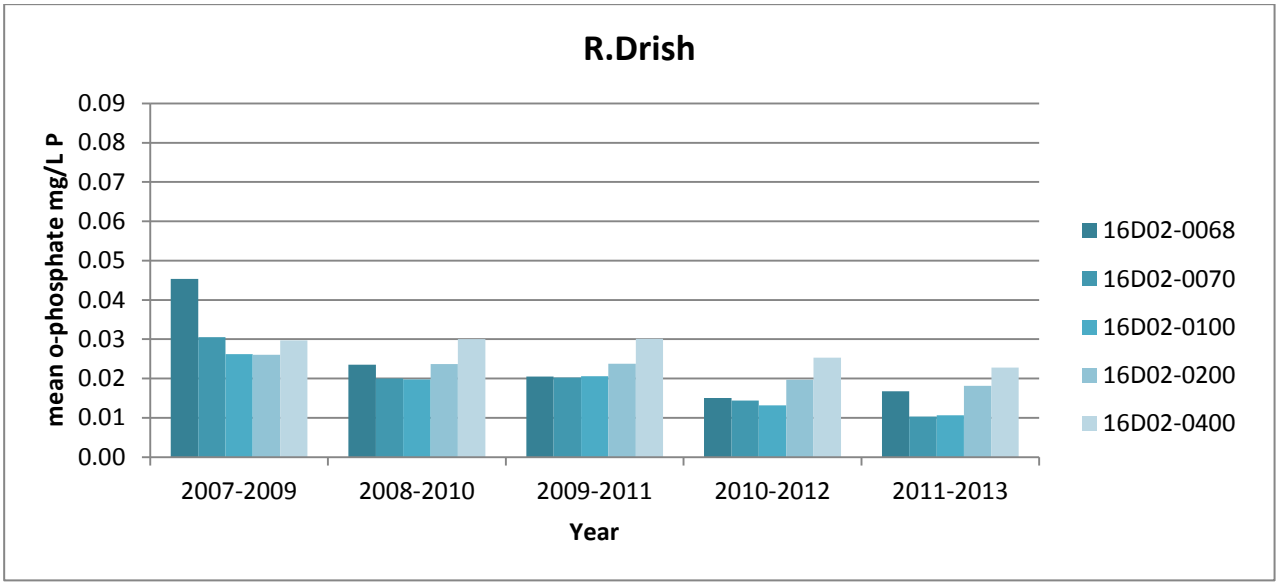
R.Drish
mean o-phosphate mg/L P
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0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
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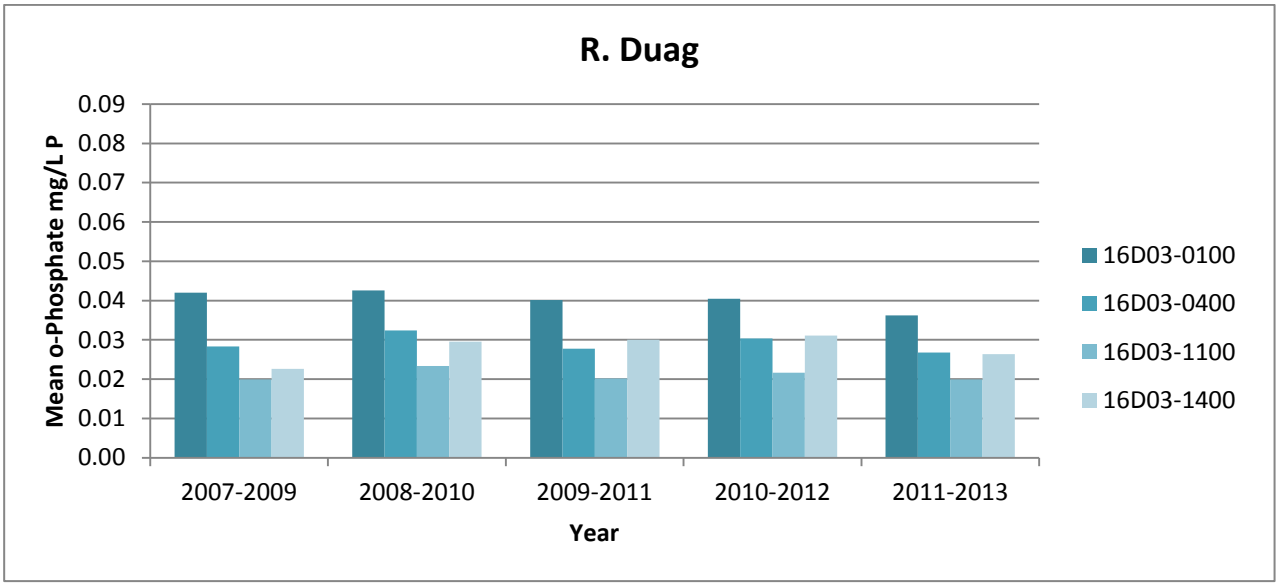
R. Duag
Mean o-Phosphate mg/L P
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0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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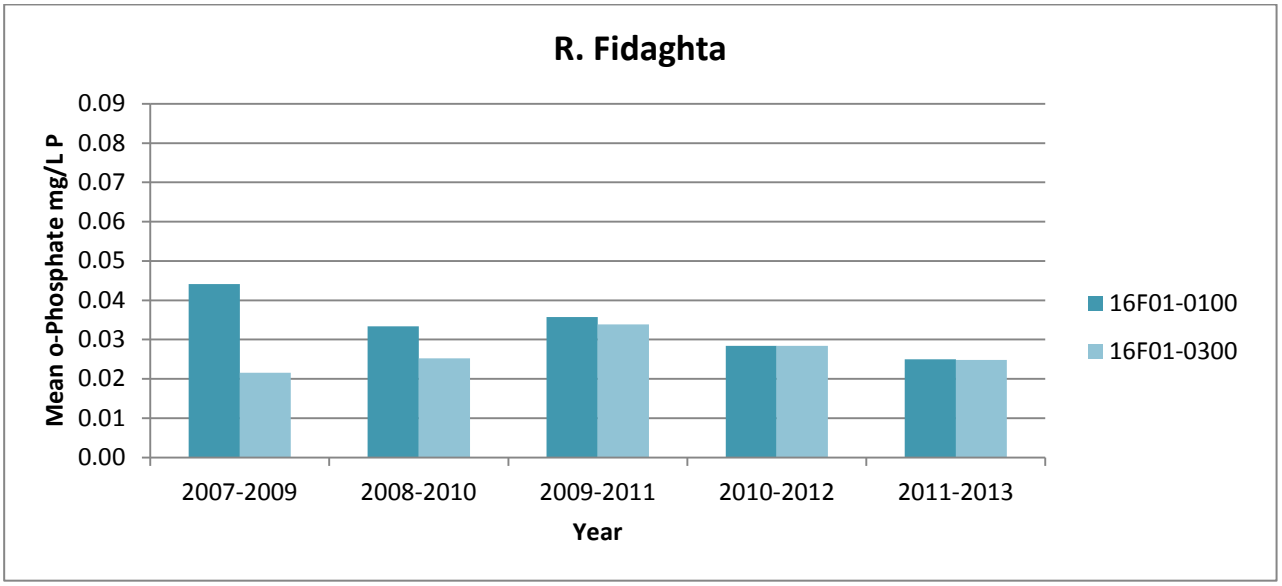
16D03-1400


R. Fidaghta
Mean o-Phosphate mg/L P
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0.08
0.07
0.06
0.05
0.04
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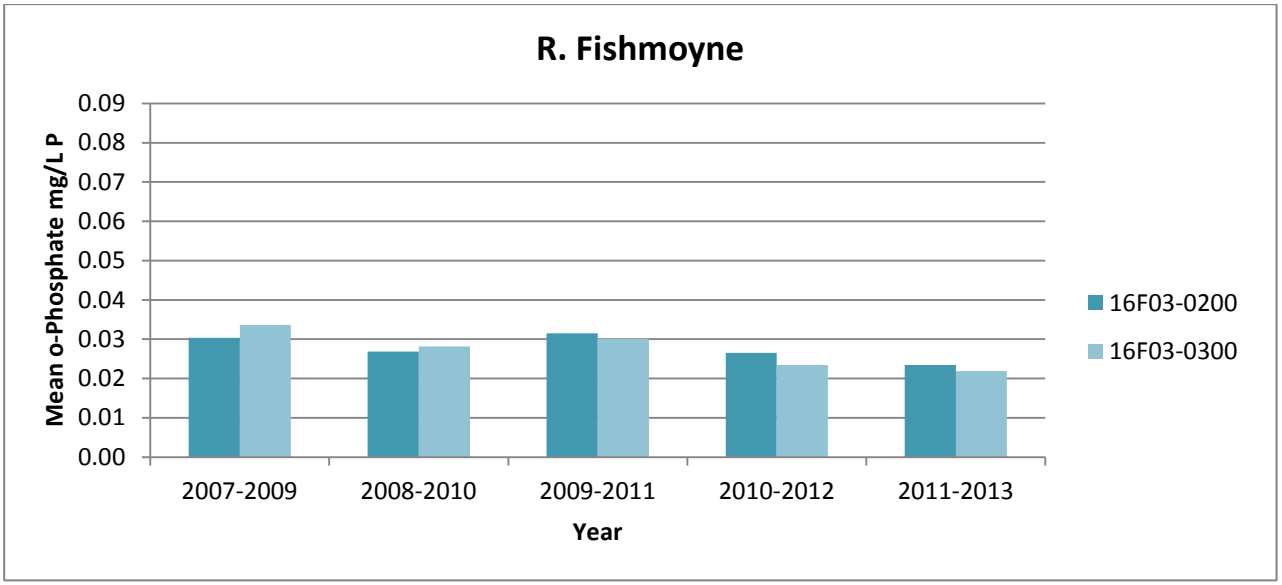
R. Fishmoyne
Mean o-Phosphate mg/L P
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0.07
0.06
0.05
0.04
0.03
0.02
0.01
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2008-2010
2009-2011
2010-2012
2011-2013
Year
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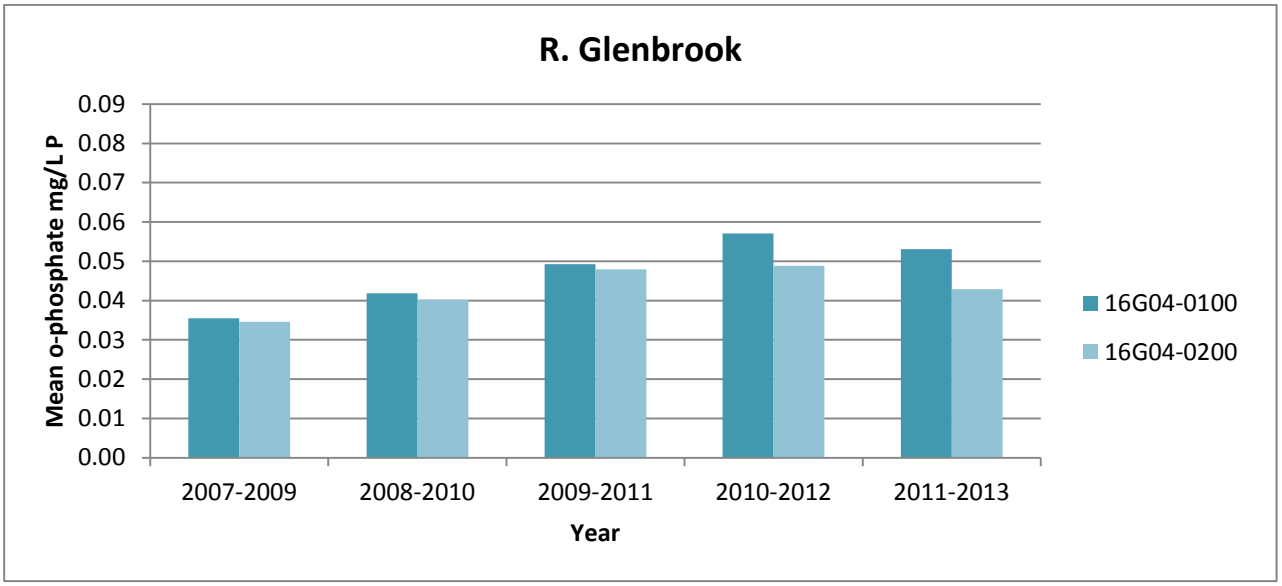
16F03-0300


R. Glenbrook
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0.05
0.04
0.03
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2010-2012
2011-2013
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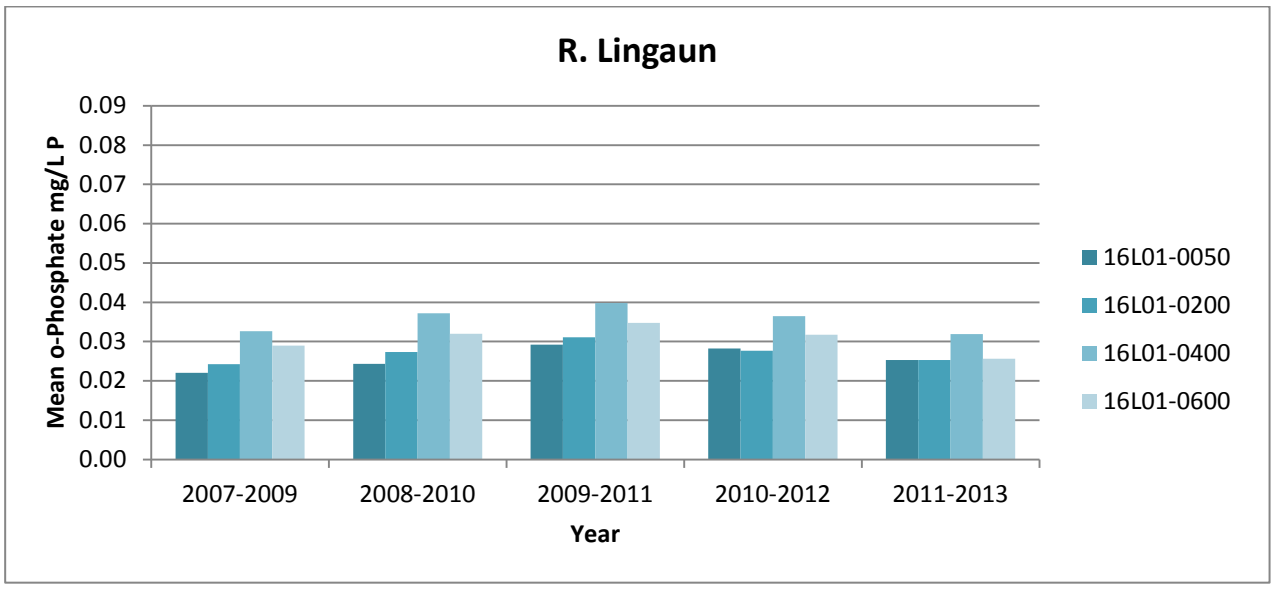
16G04-0200


R. Lingaun
Mean o-Phosphate mg/L P
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0.08
0.07
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0.05
0.04
0.03
0.02
0.01
0.00
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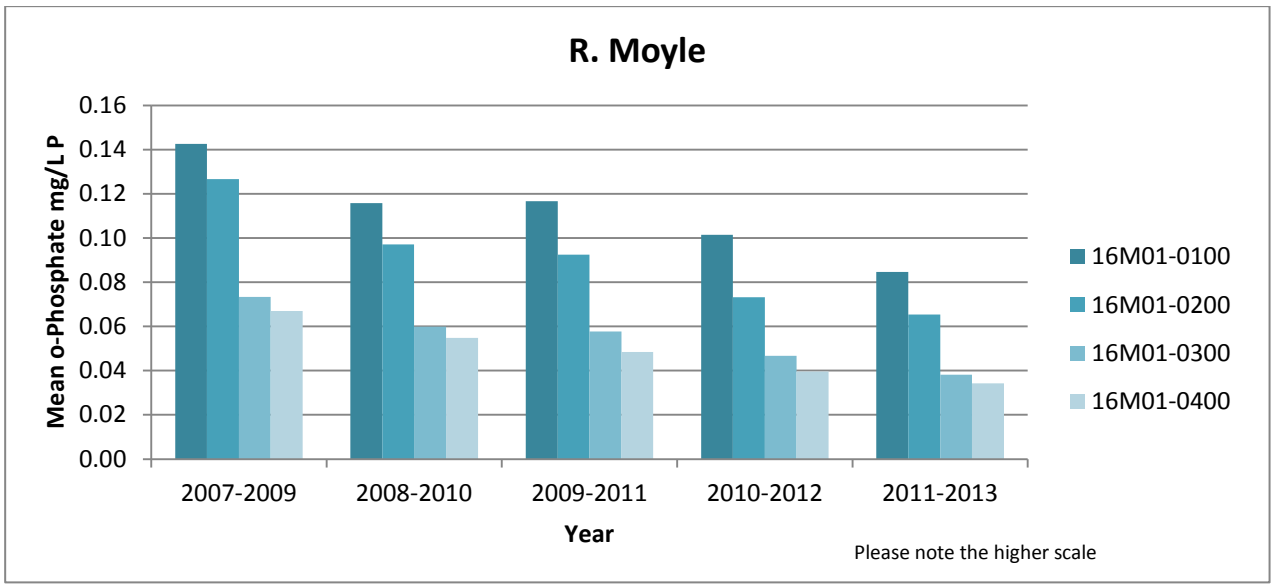
R. Moyle
Mean o-Phosphate mg/L P
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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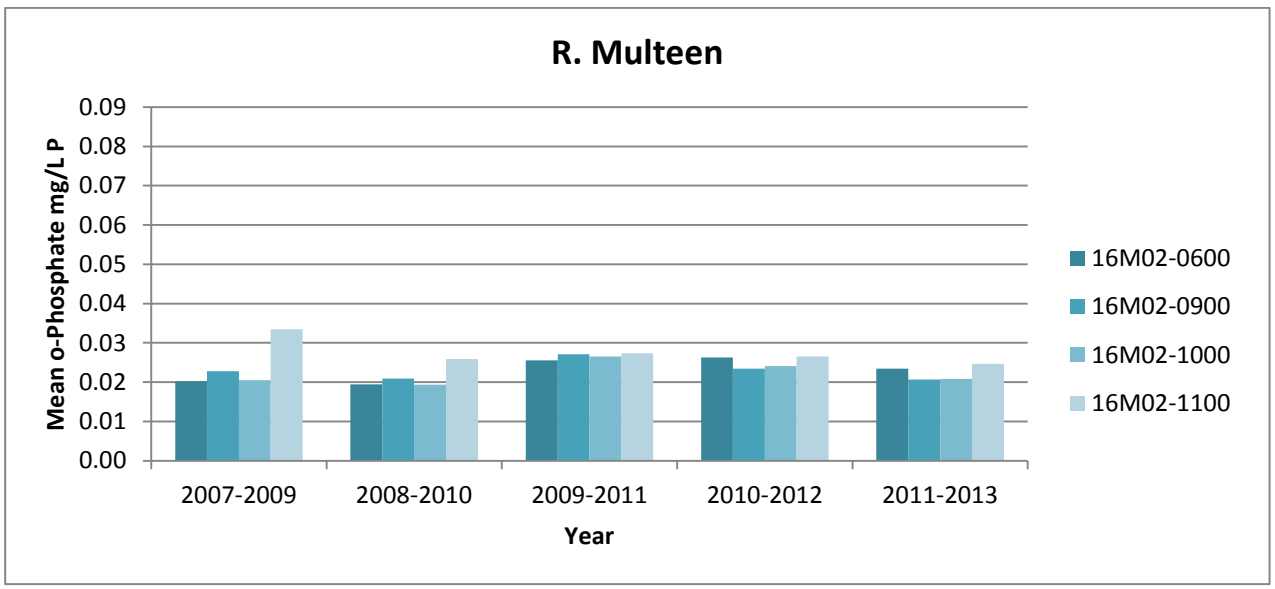
16M01-0300
16M01-0400
Please note the higher scale


R. Multeen
Mean o-Phosphate mg/L P
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0.07
0.06
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0.04
0.03
0.02
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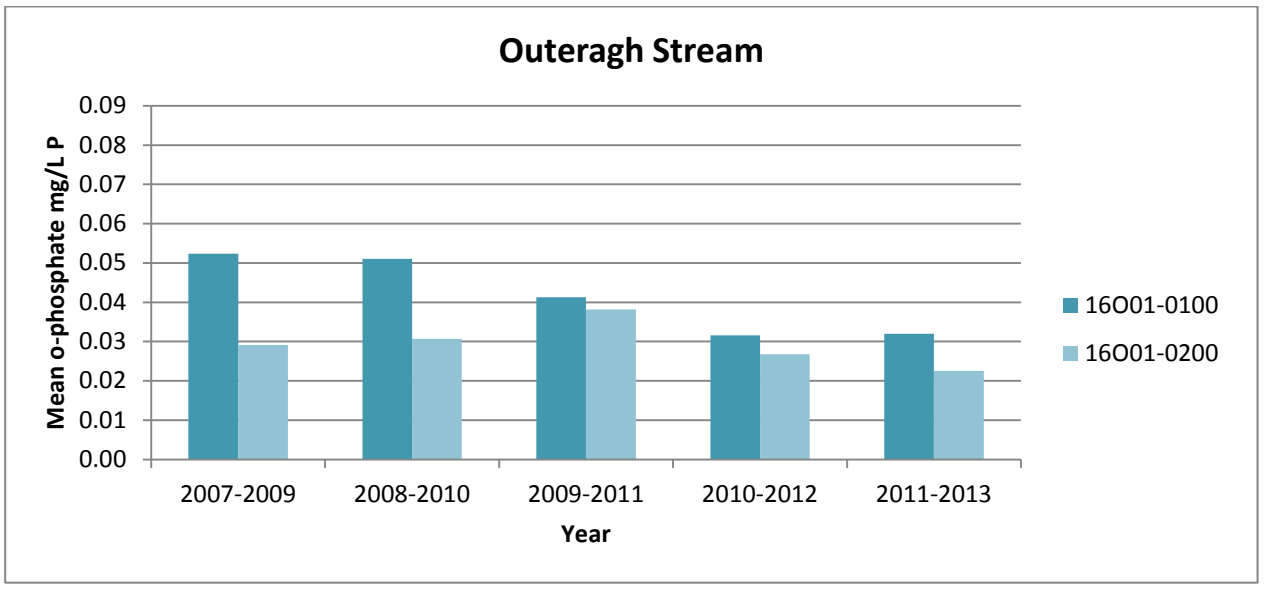
Outeragh Stream
Mean o-phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
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0.00
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2008-2010
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2011-2013
Year
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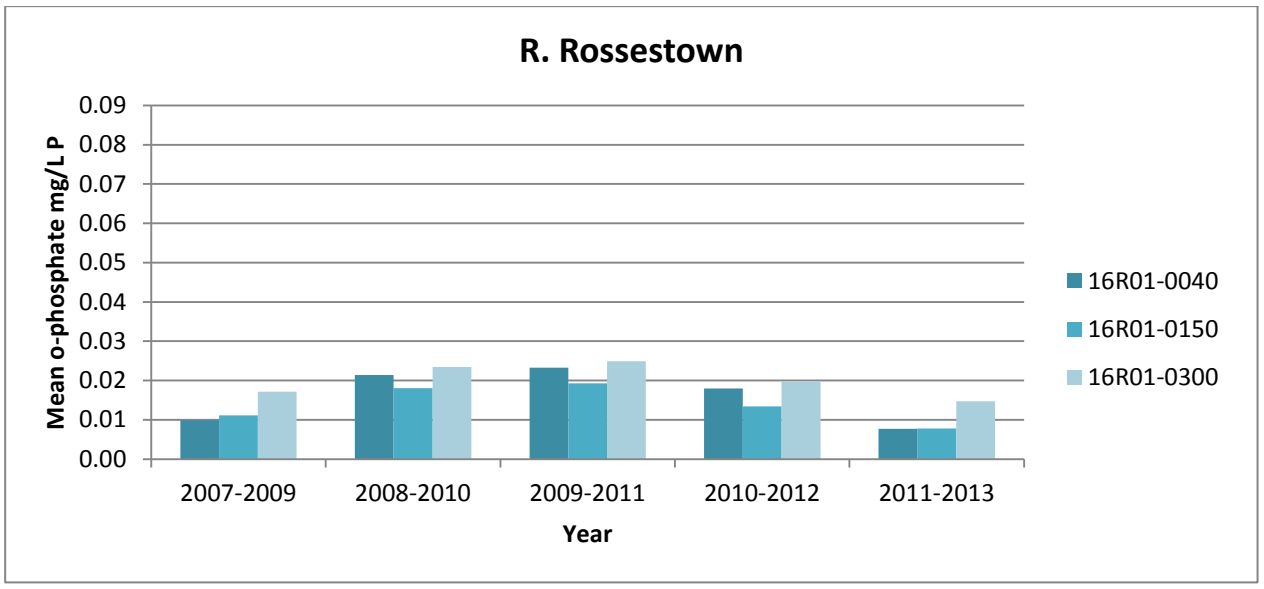
R. Rossestown
Mean o-phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16R01-0040
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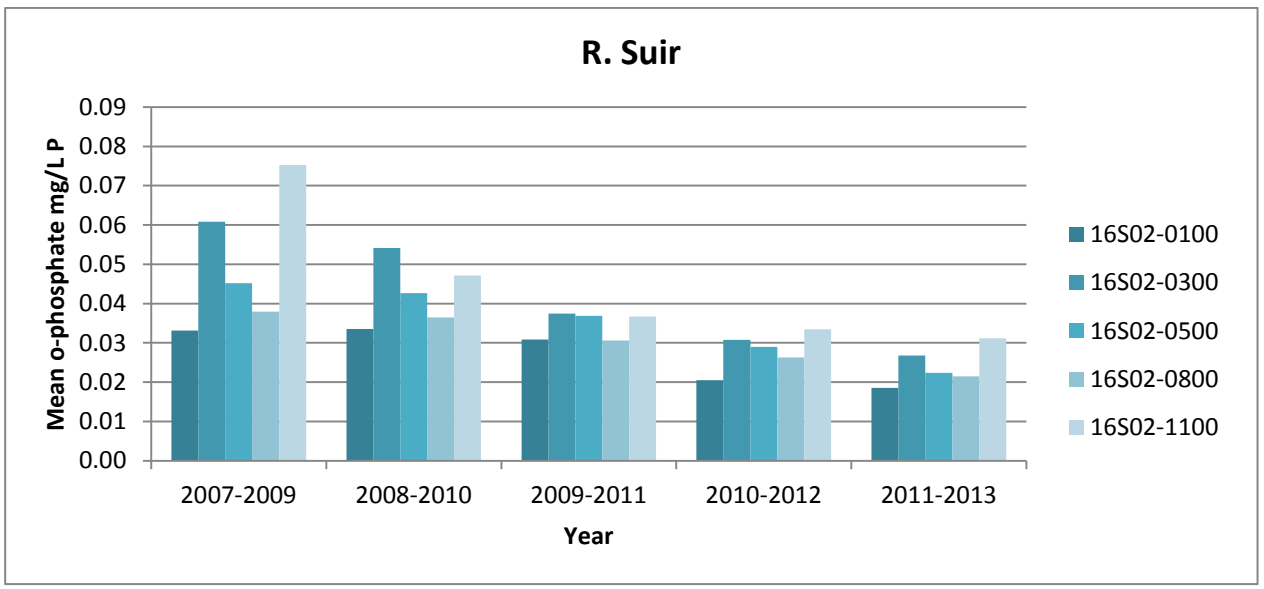
16R01-0300


R. Suir
Mean o-phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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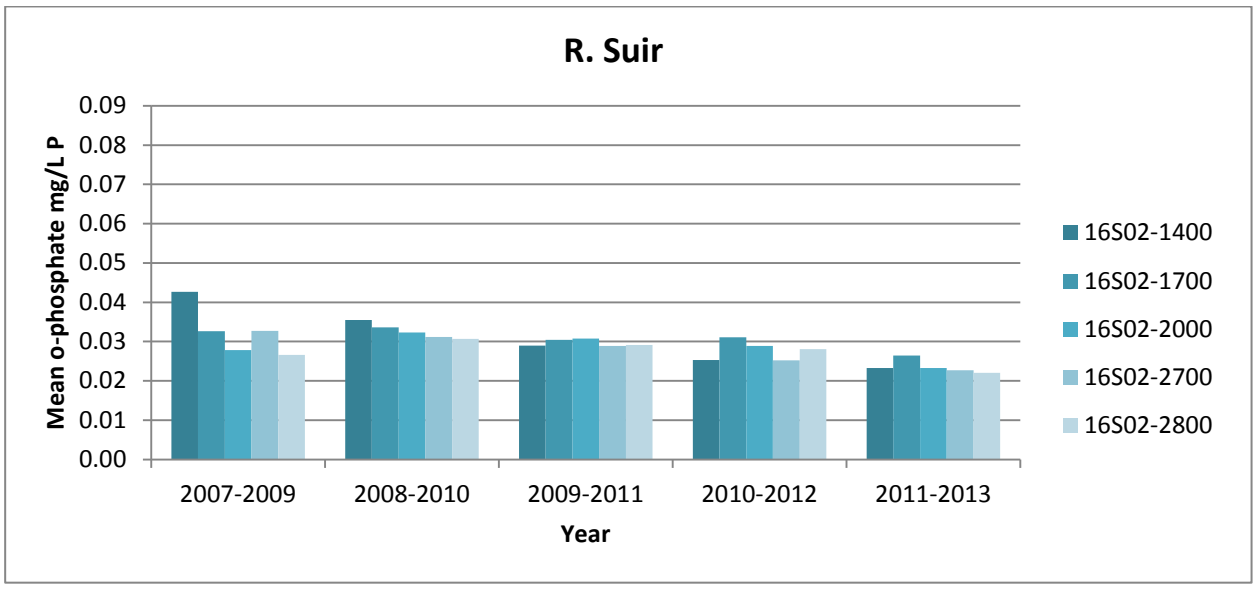
16S02-0500
16S02-0800
16S02-1100


R. Suir
Mean o-phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
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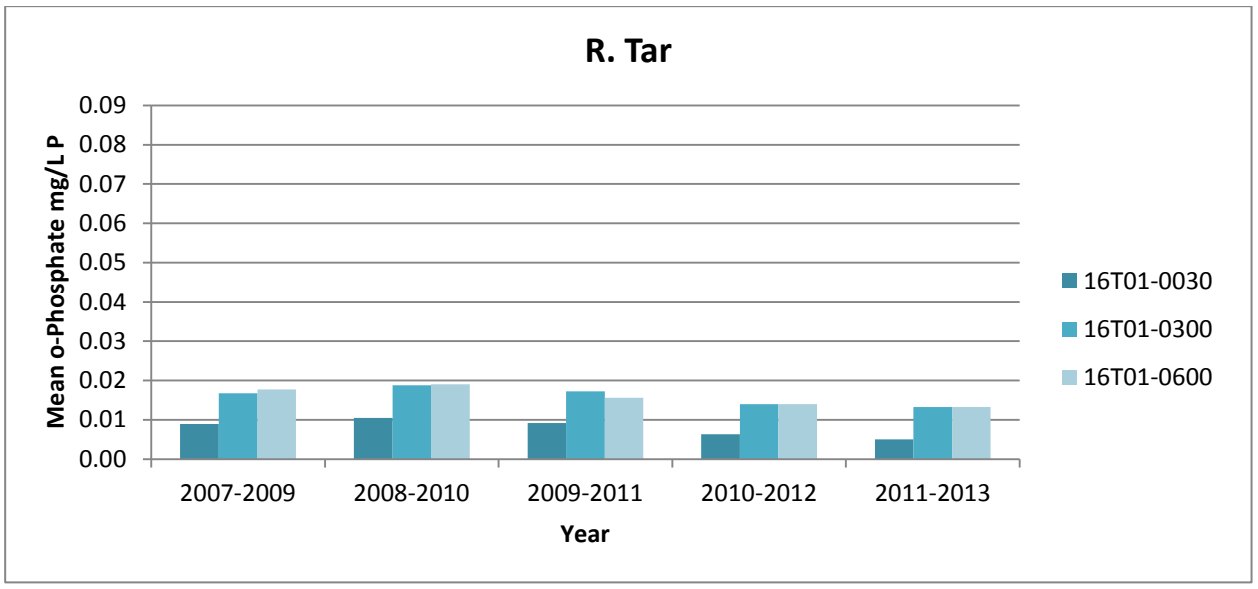
R. Tar
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
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2007-2009
2008-2010
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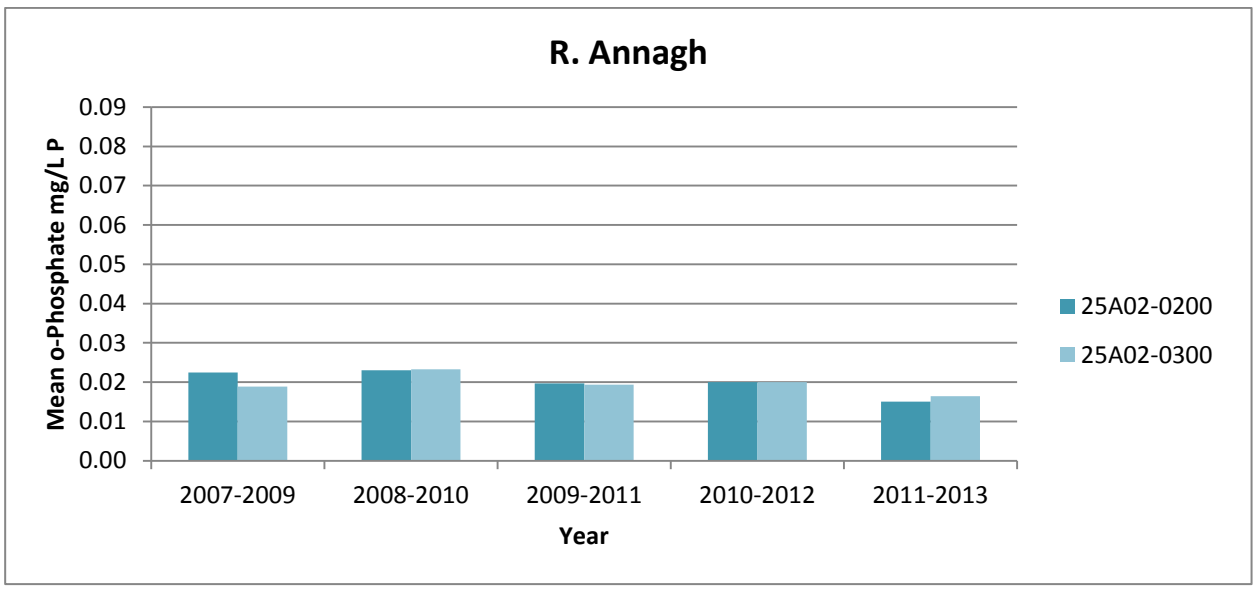
16T01-0600


R. Annagh
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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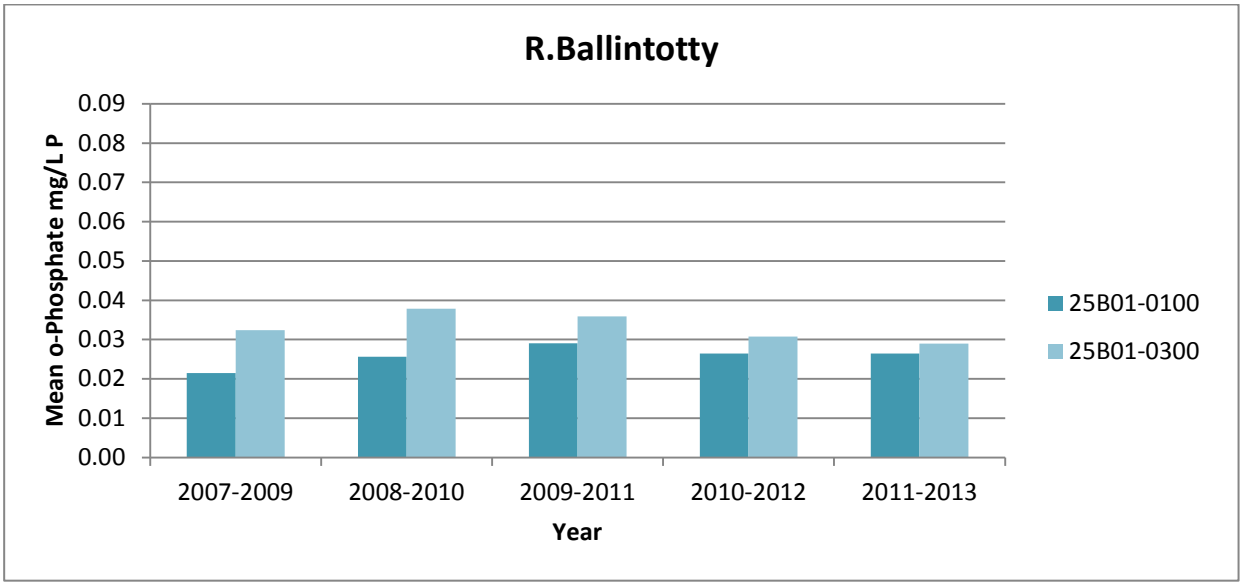
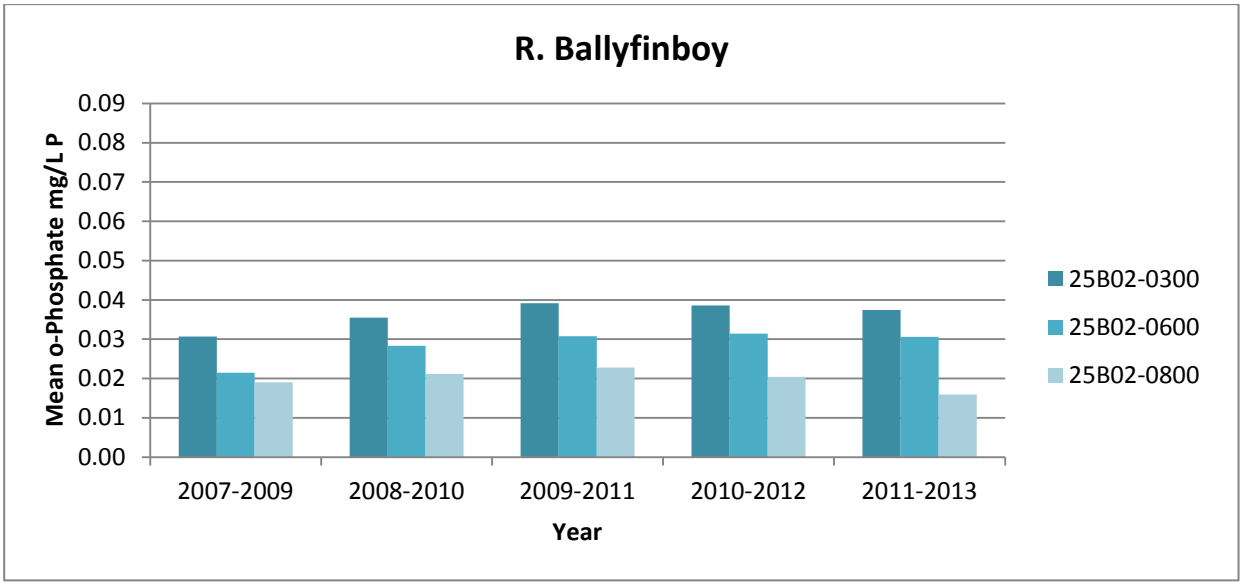
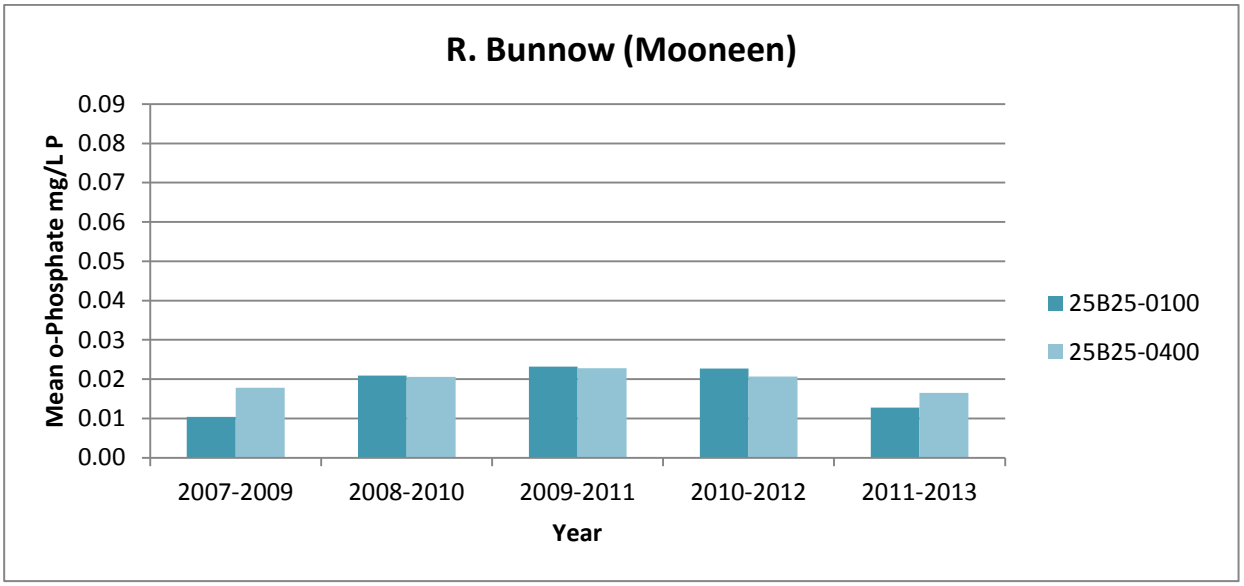
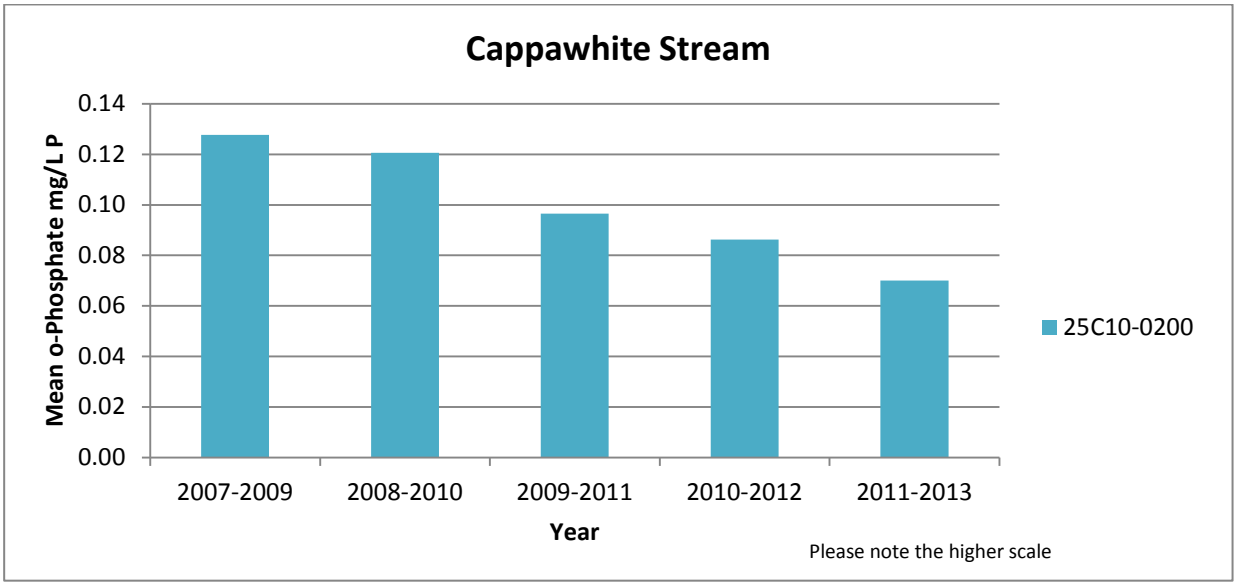
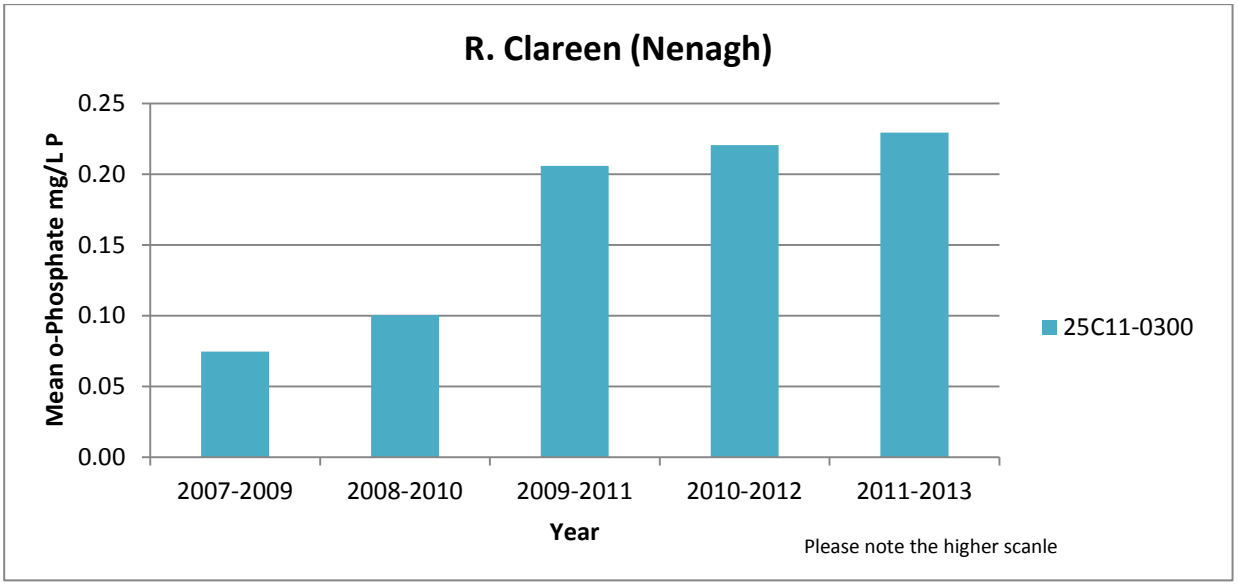
25A02-0300

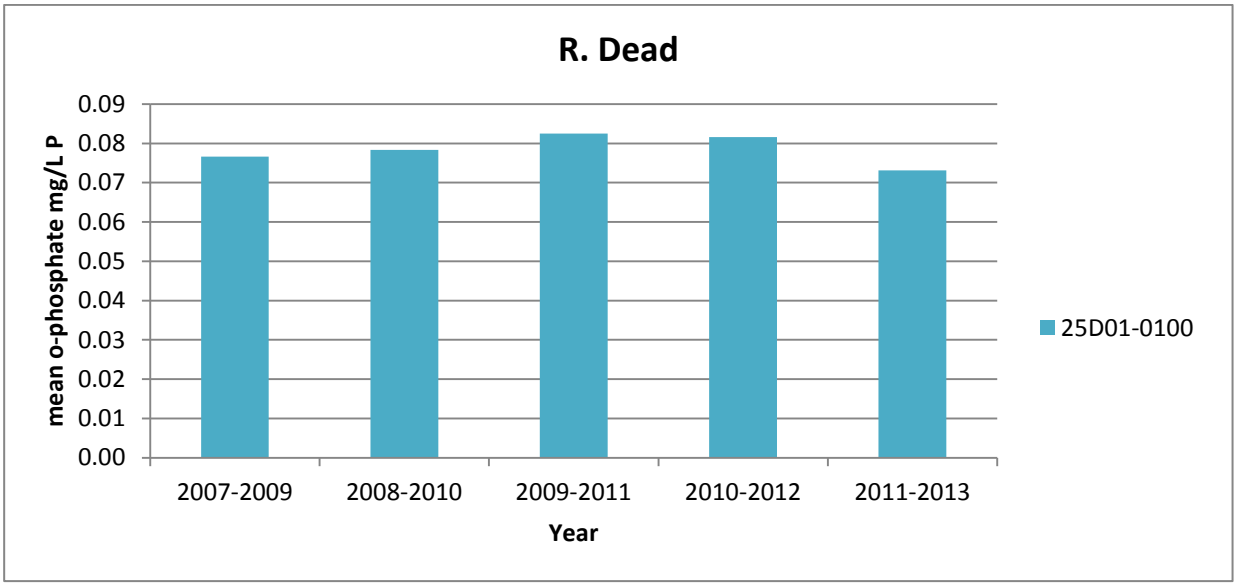

R.Ballintotty
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25B01-0100
25B01-0300

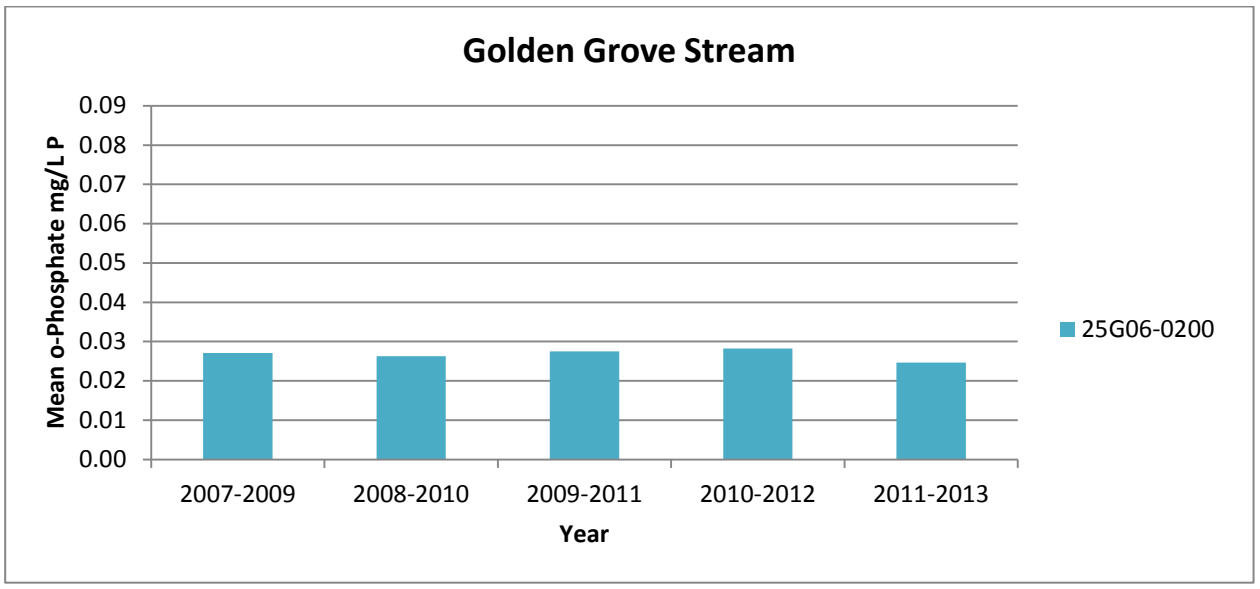

R. Ballyfinboy
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25B02-0300
25B02-0600
25B02-0800

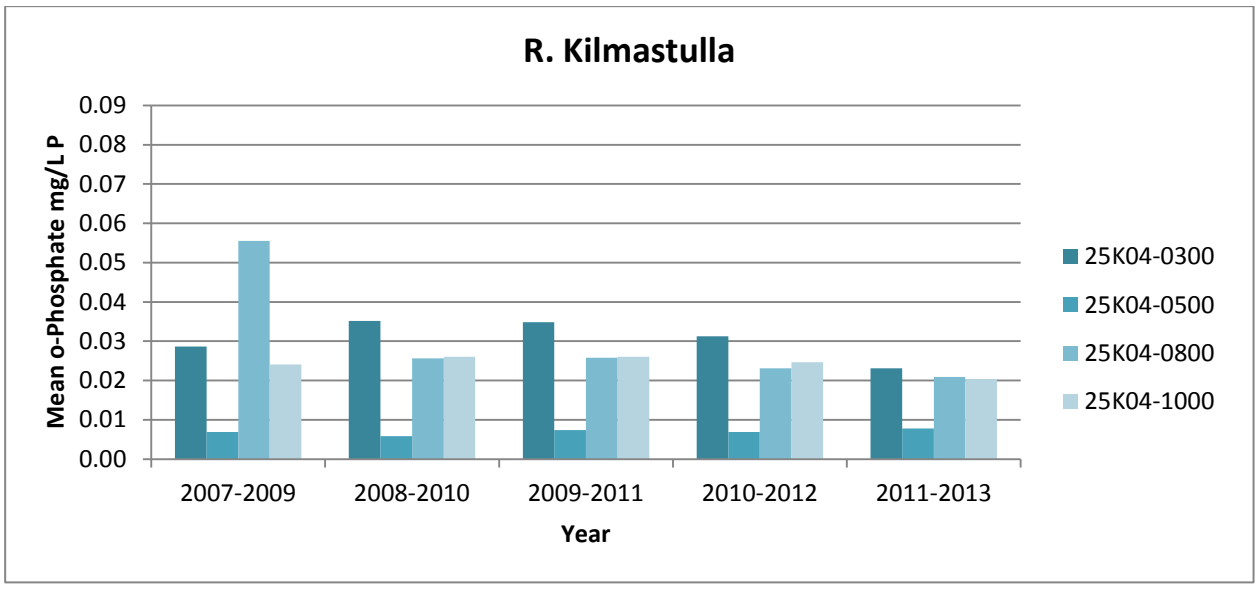

R. Bunnow (Mooneen)
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25B25-0100
25B25-0400


Cappawhite Stream
Mean o-Phosphate mg/L P
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25C10-0200
Please note the higher scale


R. Clareen (Nenagh)
Mean o-Phosphate mg/L P
0.25
0.20
0.15
0.10
0.05
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25C11-0300
Please note the higher scanle


R. Dead
mean o-phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25D01-0100


Golden Grove Stream
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25G06-0200


R. Kilmastulla
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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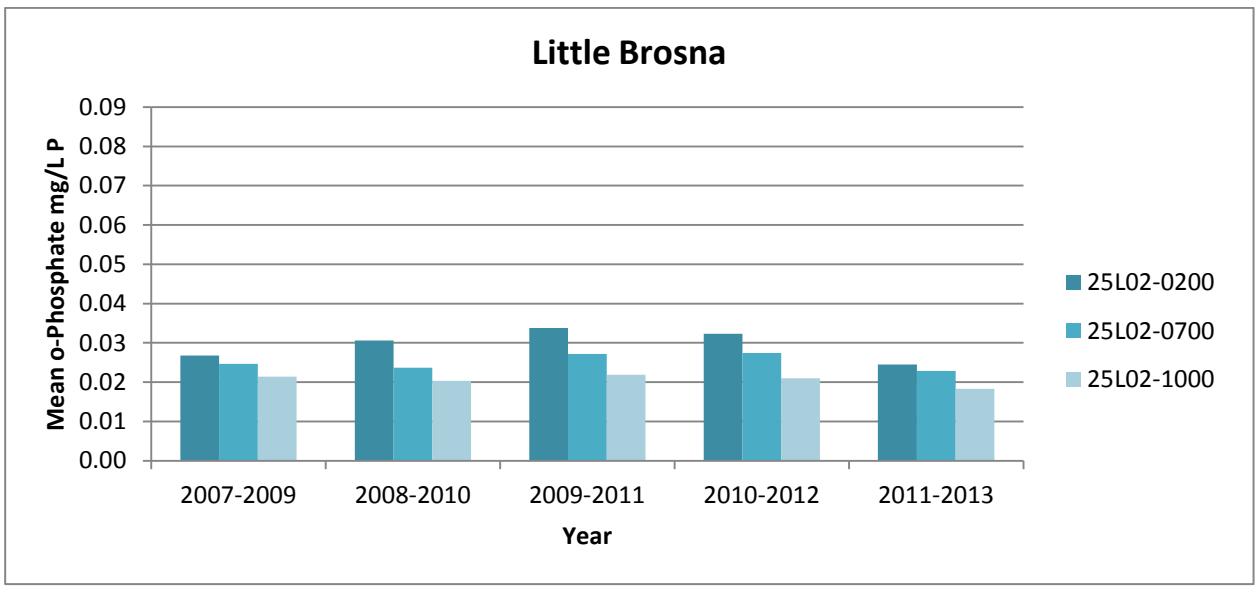
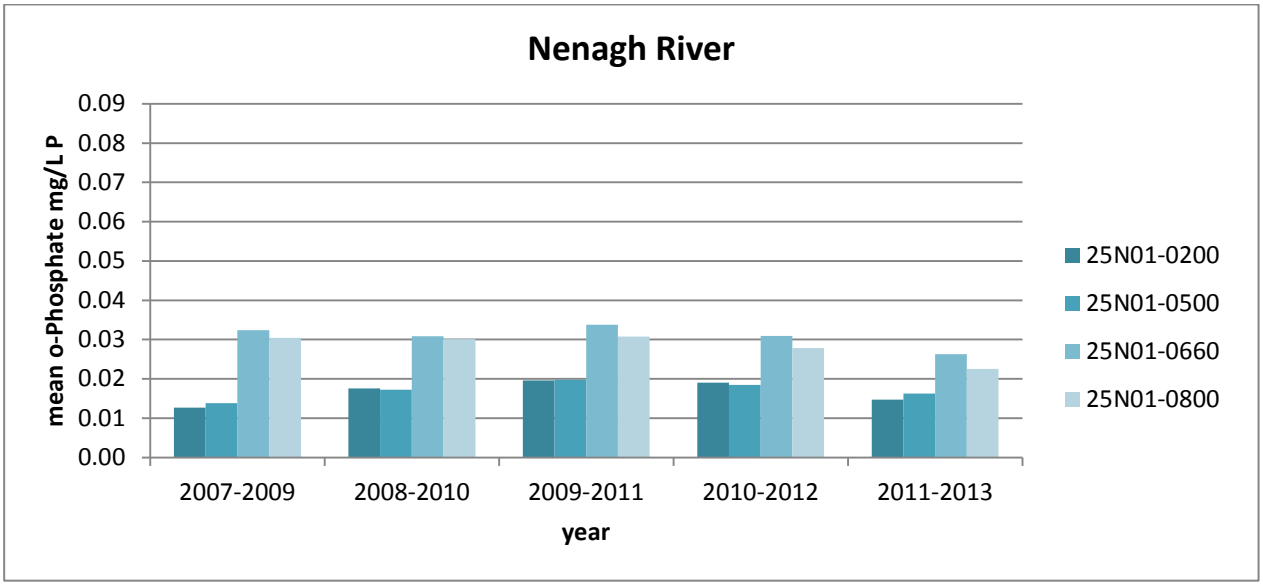
25K04-0500
25K04-0800
25K04-1000


Little Brosna
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25L02-0200
25L02-0700
25L02-1000


Nenagh River
mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
year
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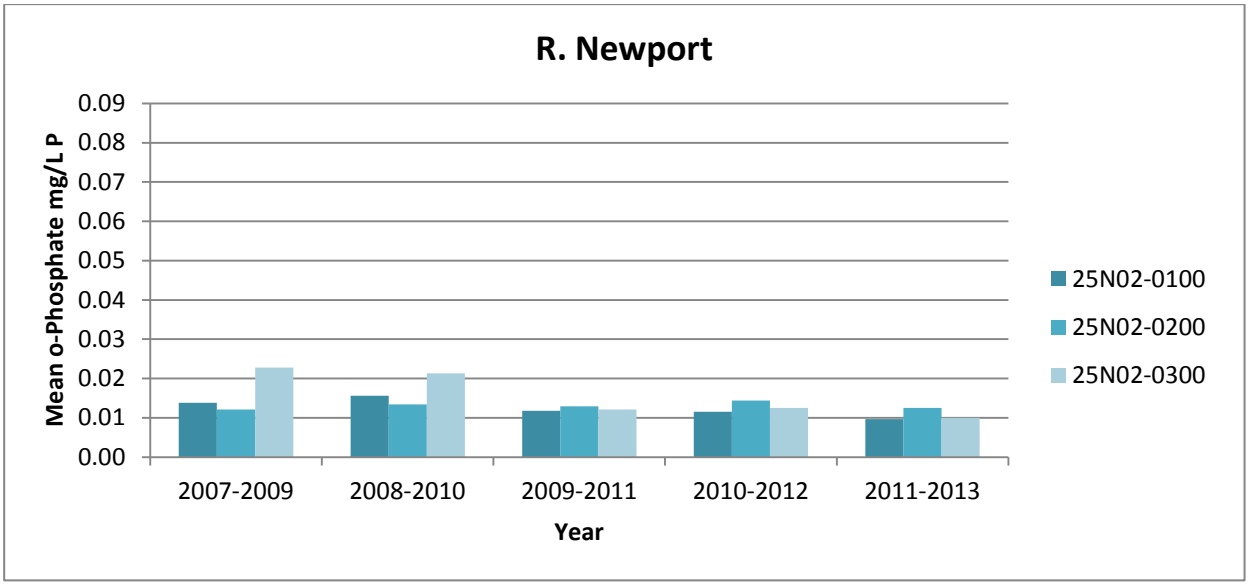
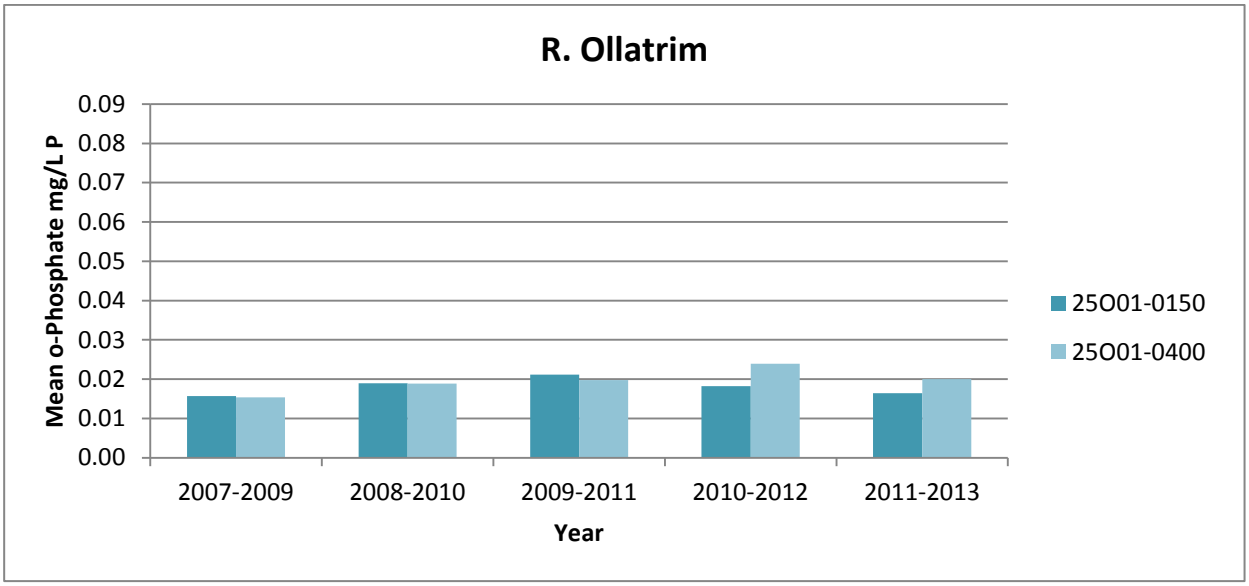
25N01-0800


R. Newport
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25N02-0100
25N02-0200
25N02-0300


R. Ollatrim
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
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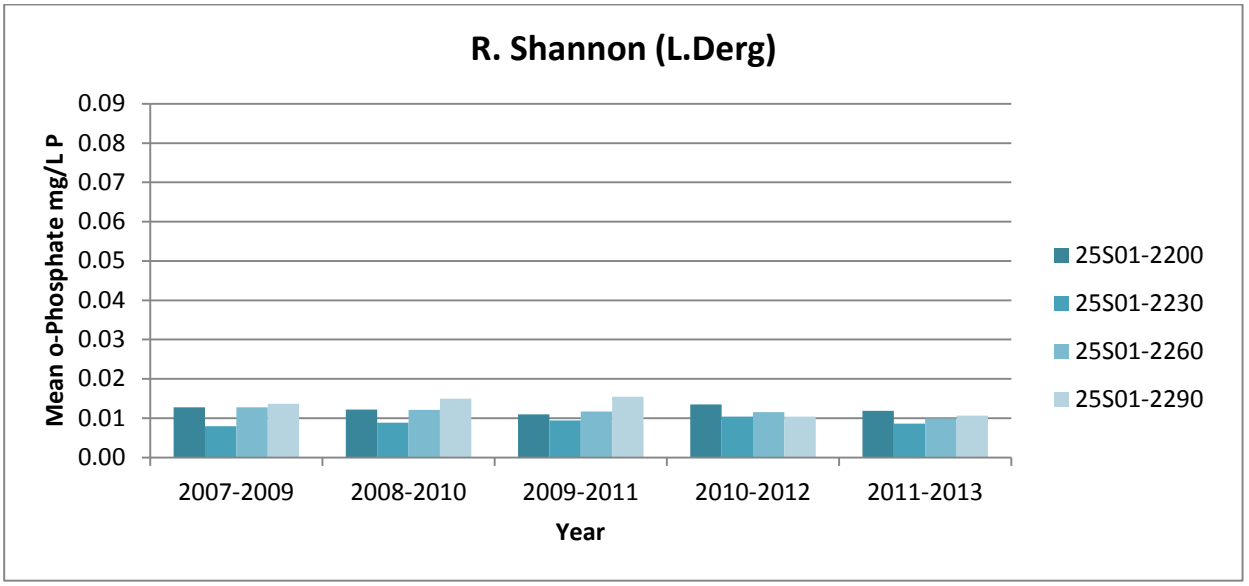
2011-2013
Year
25O01-0150
25O01-0400


R. Shannon (L.Derg)
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
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Year
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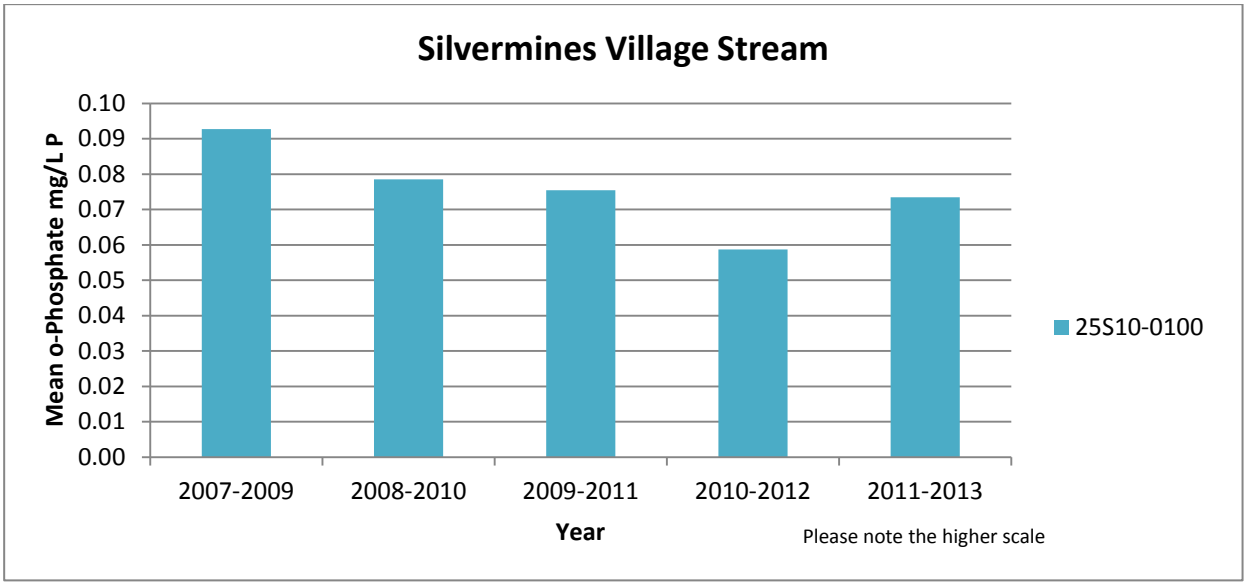
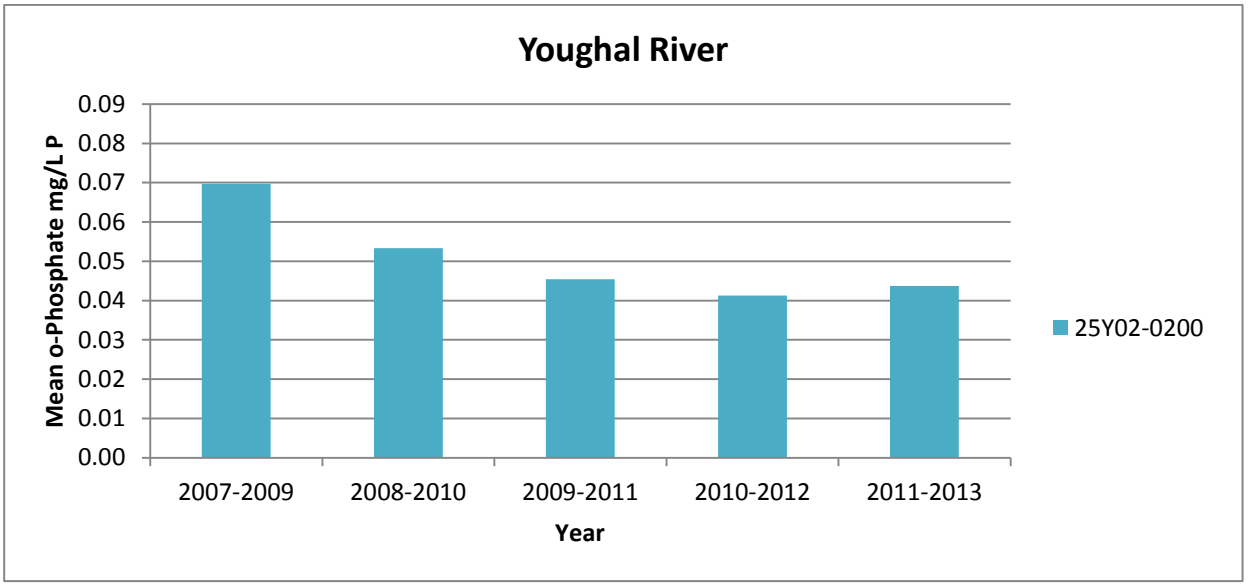
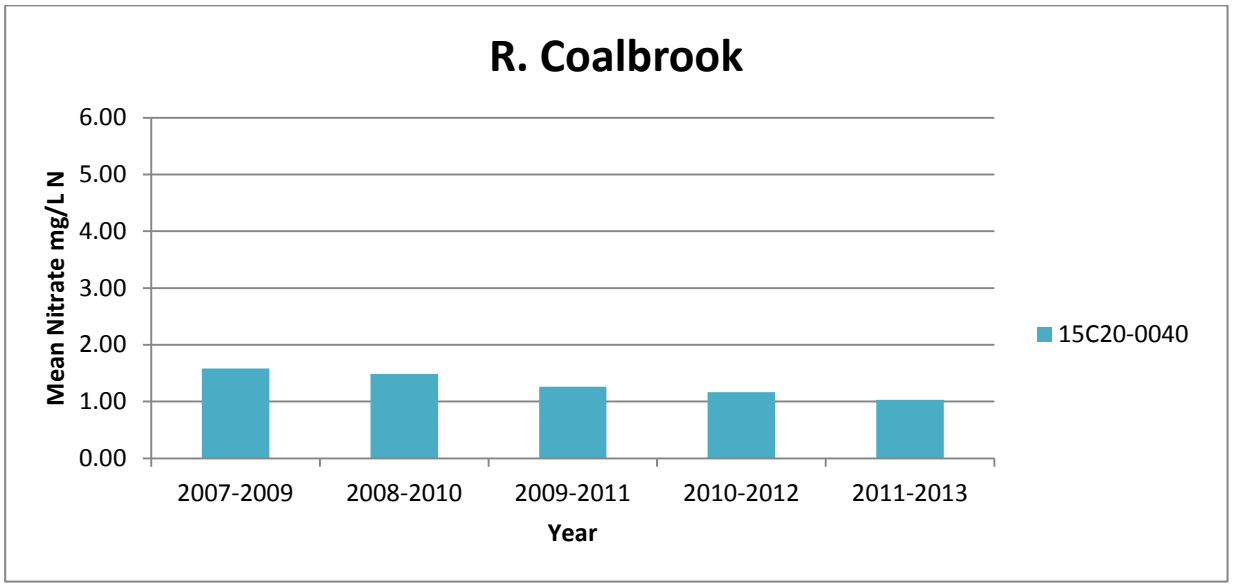
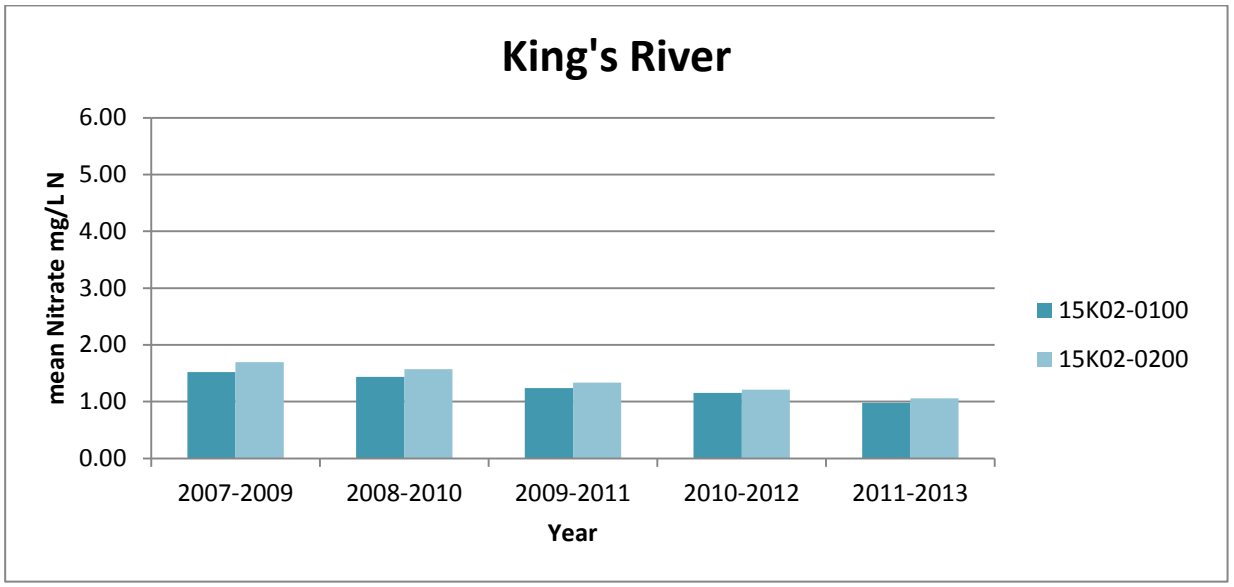
25S01-2230
25S01-2260
25S01-2290

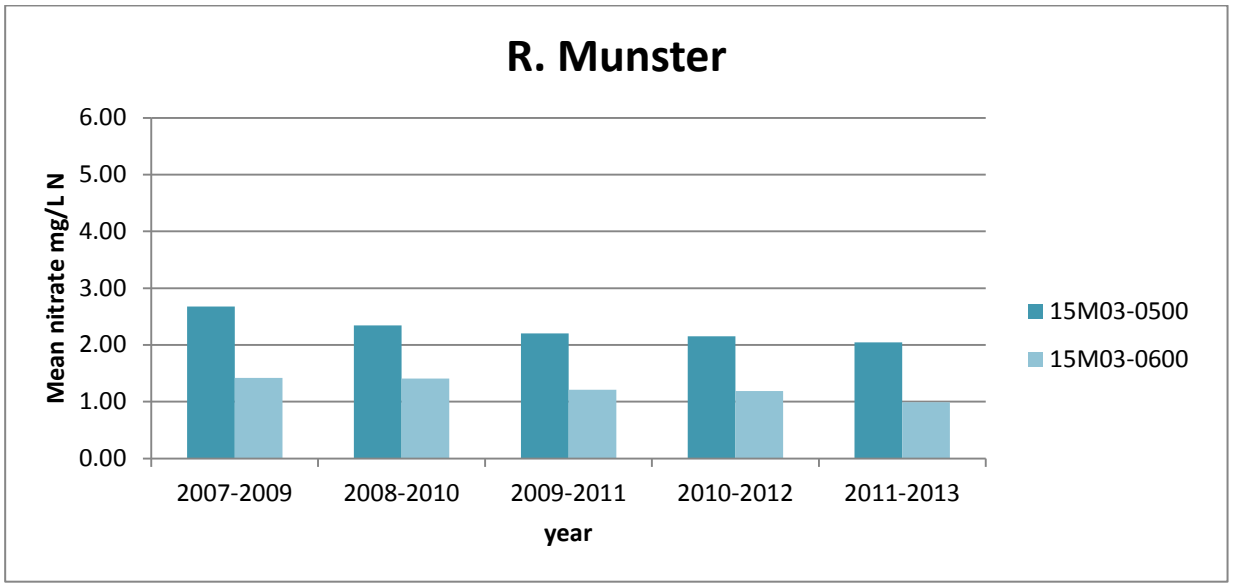

Silvermines Village Stream
Mean o-Phosphate mg/L P
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25S10-0100
Please note the higher scale

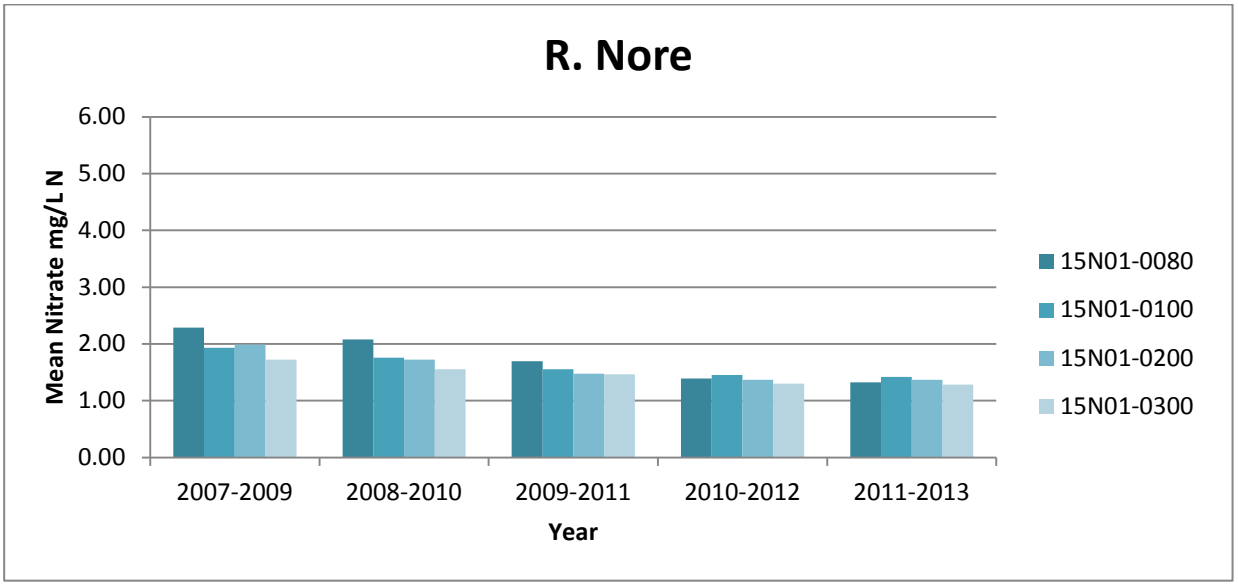

Youghal River
Mean o-Phosphate mg/L P
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25Y02-0200

6. Long Term Trend Graphs – Nitrate








R. Nore
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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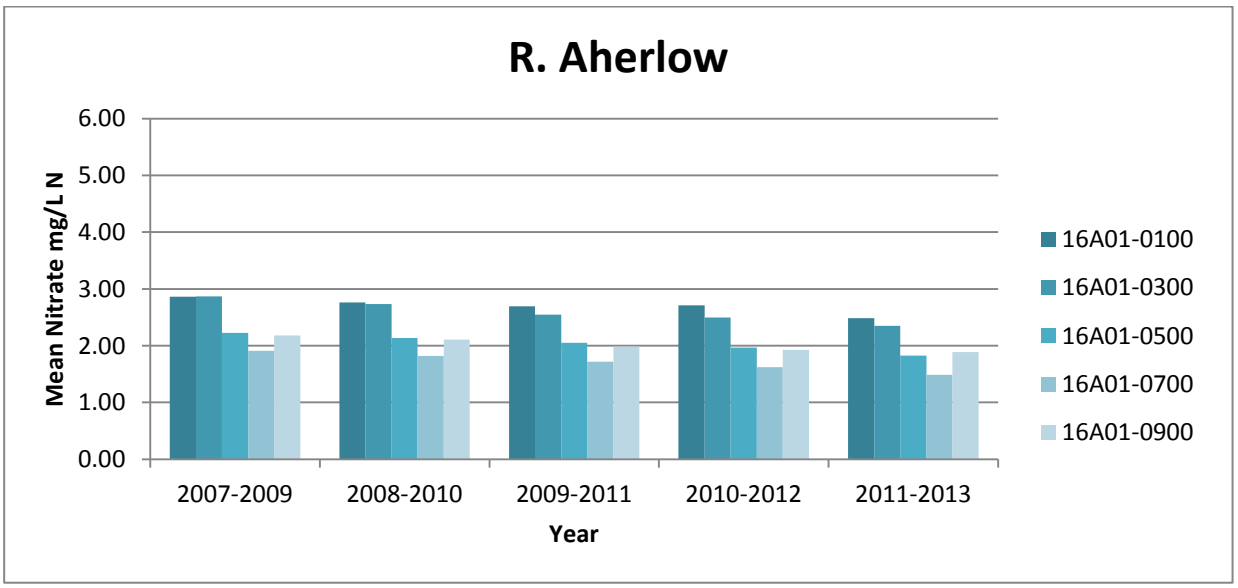
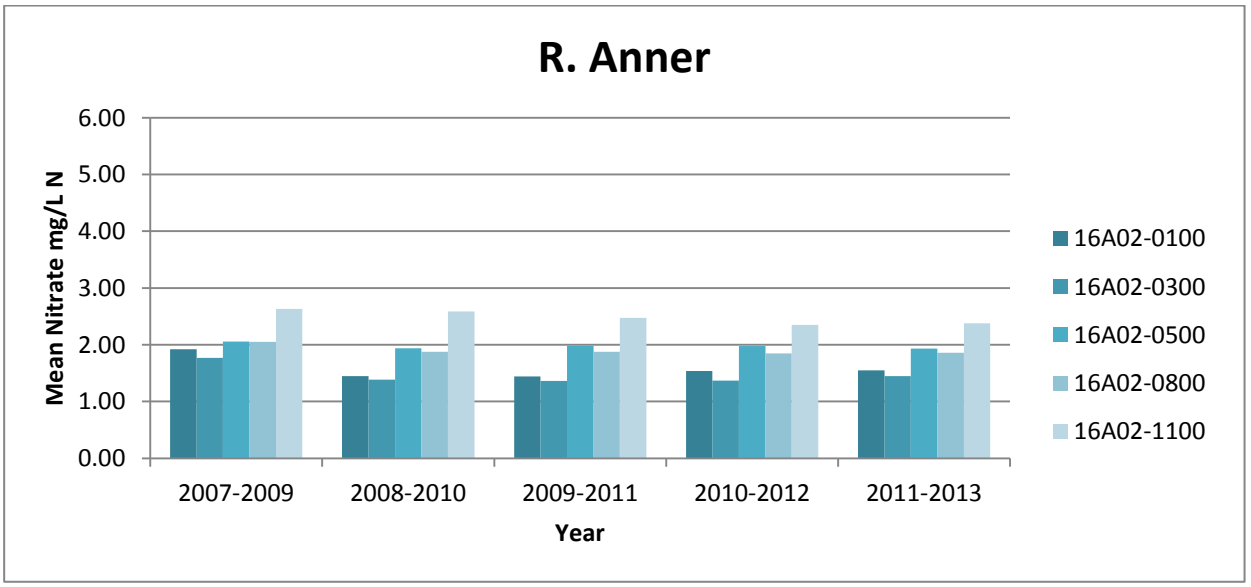
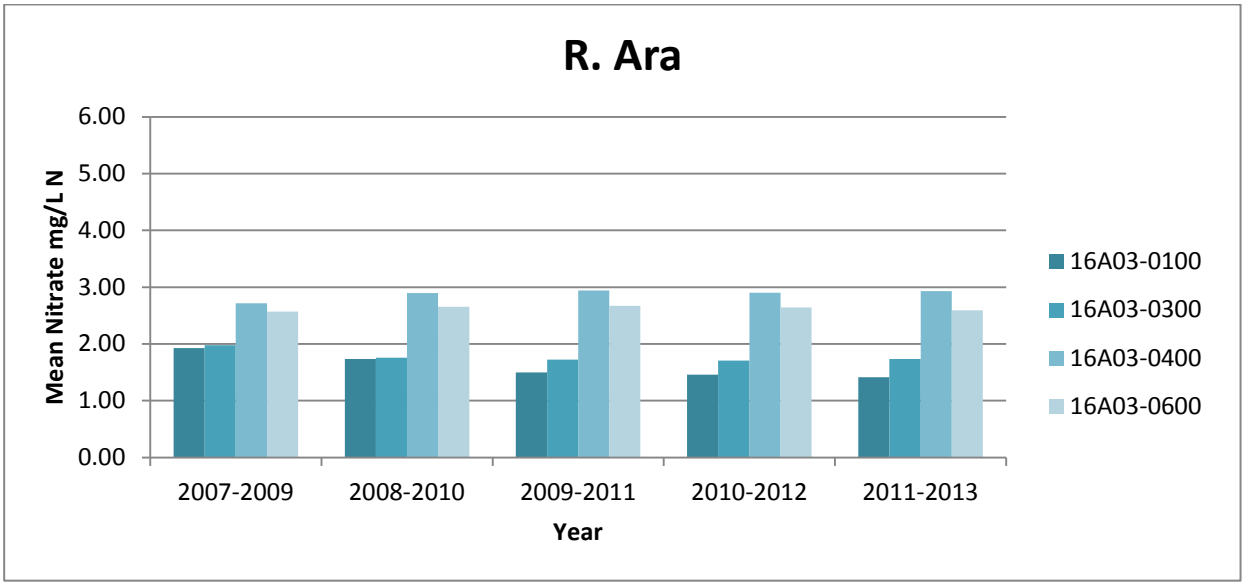
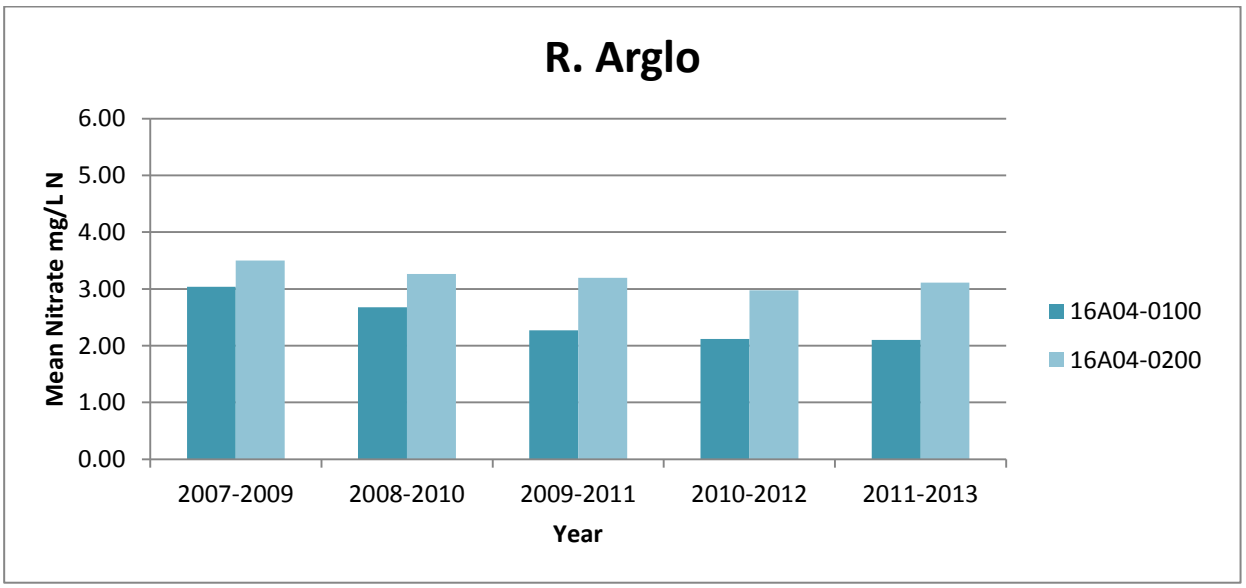
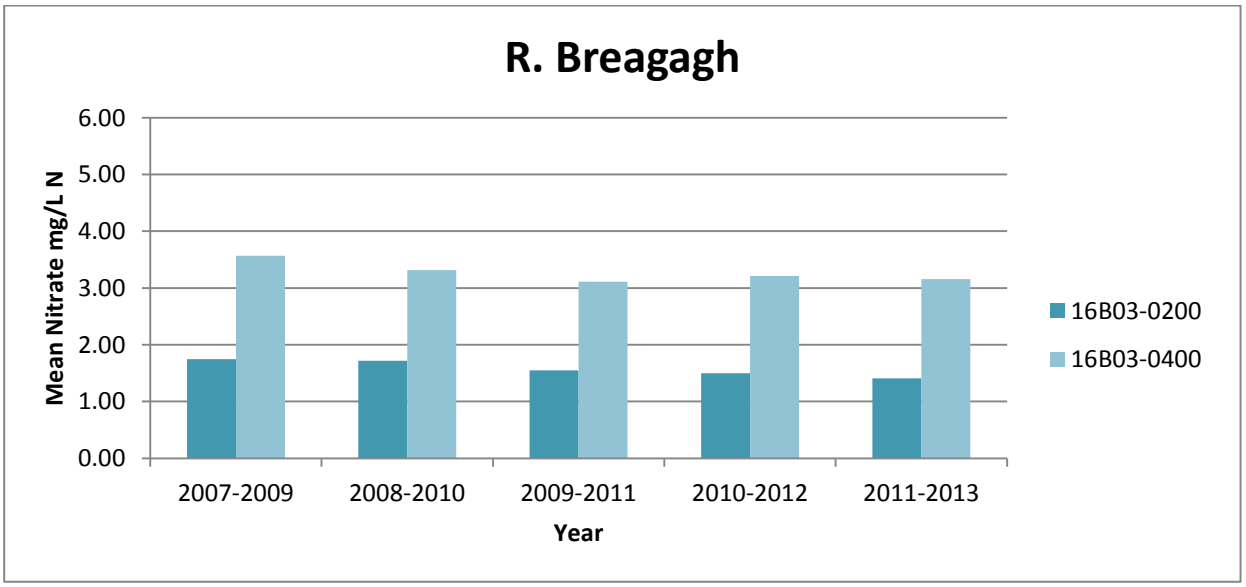
15N01-0100
15N01-0200
15N01-0300

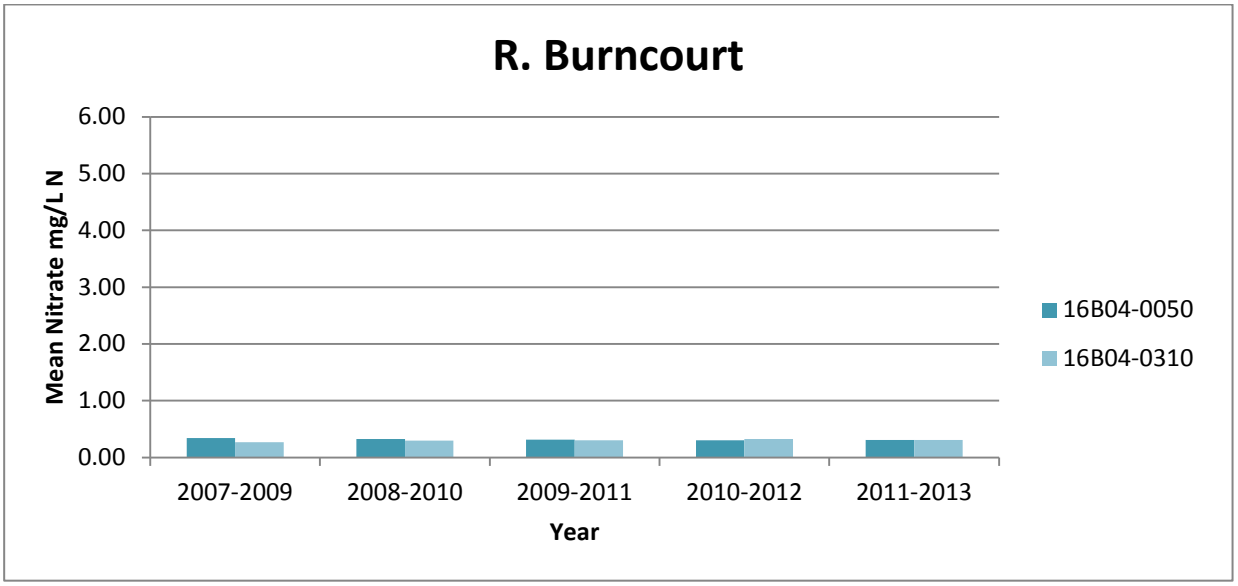

R. Aherlow
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16A01-0100
16A01-0300
16A01-0500
16A01-0700
16A01-0900


R. Anner
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16A02-0100
16A02-0300
16A02-0500
16A02-0800
16A02-1100


R. Ara
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16A03-0100
16A03-0300
16A03-0400
16A03-0600


R. Arglo
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16A04-0100
16A04-0200


R. Breagagh
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16B03-0200
16B03-0400


R. Burncourt
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
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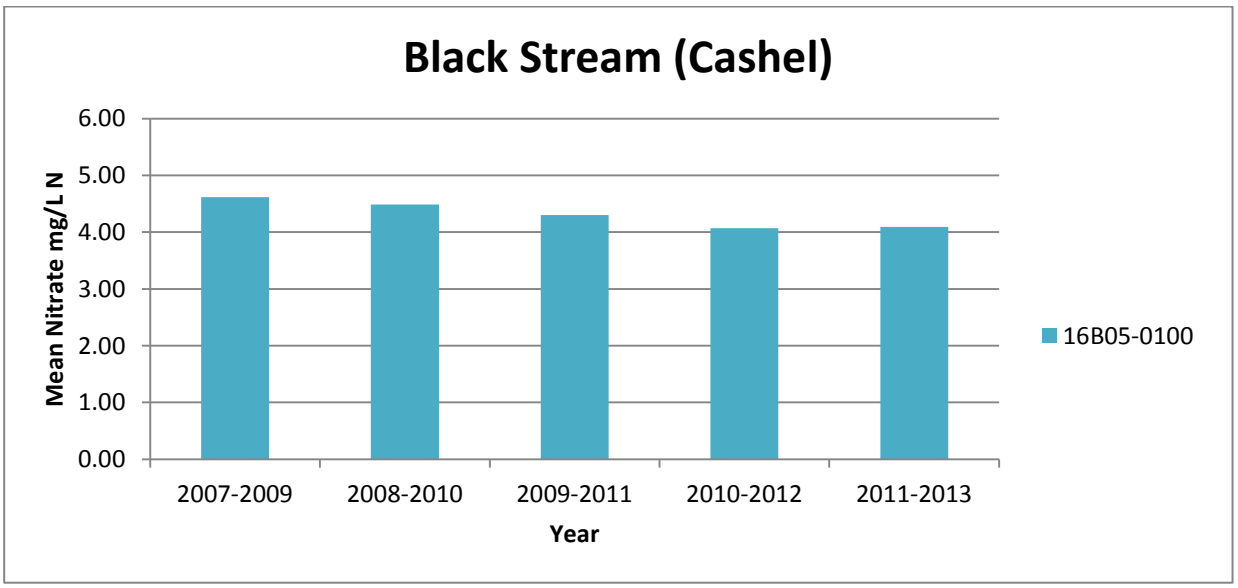
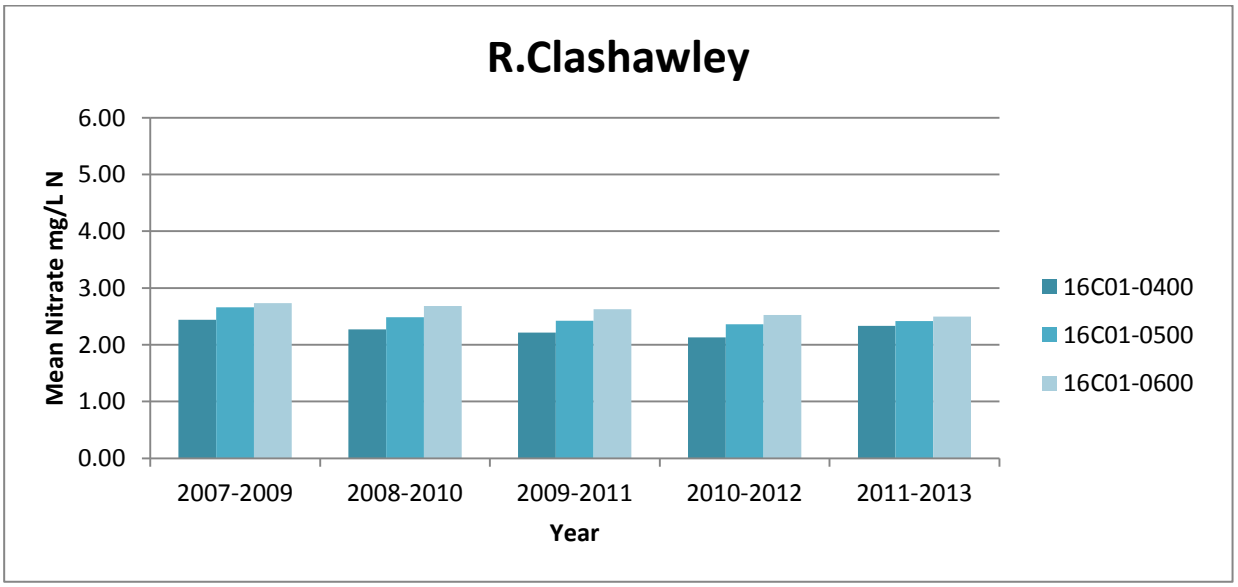
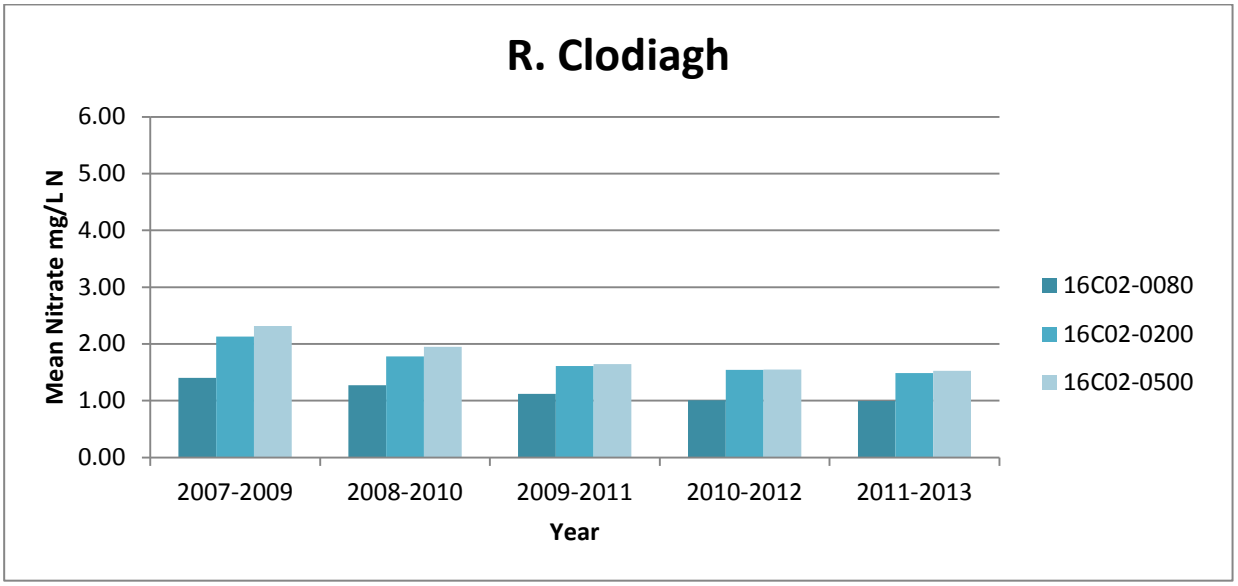
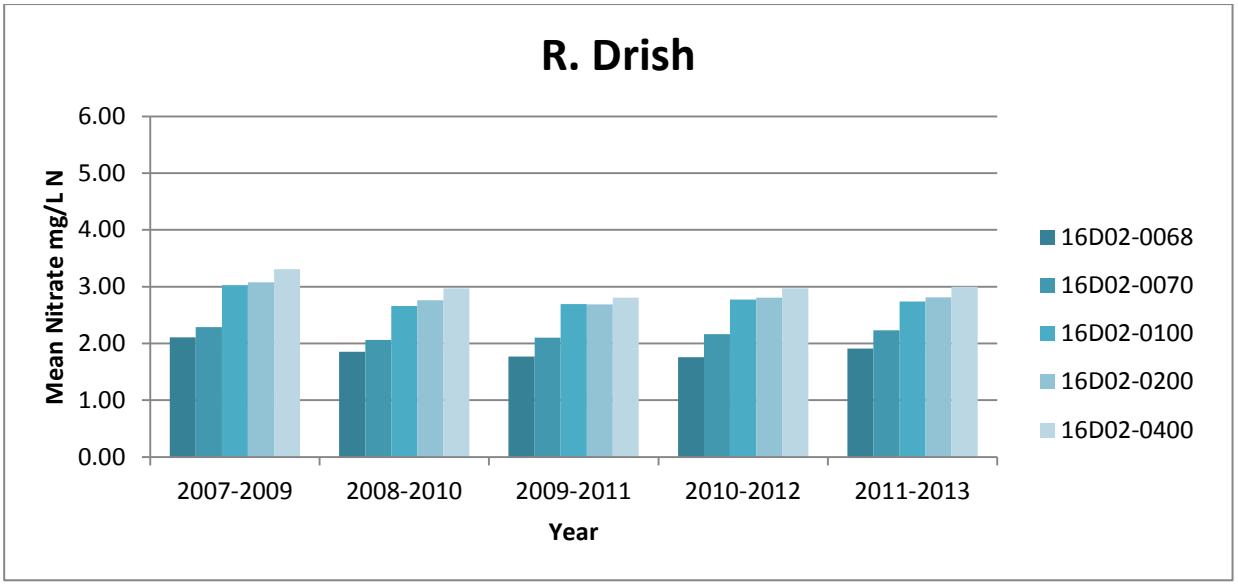
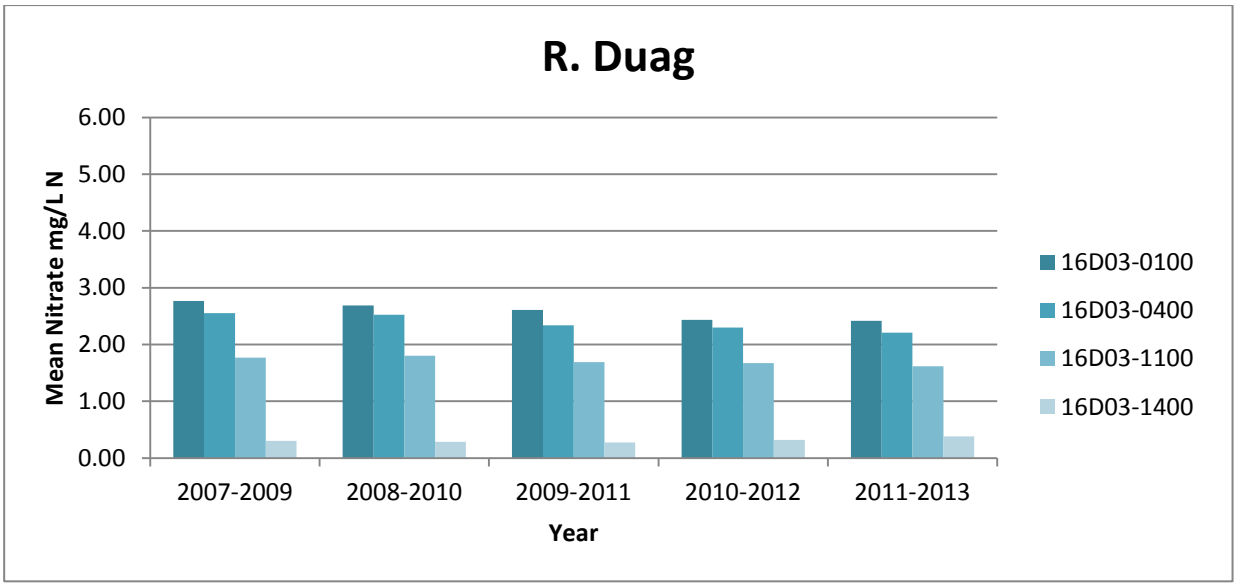
2011-2013
Year
16B04-0050
16B04-0310


Black Stream (Cashel)
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16B05-0100


R.Clashawley
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16C01-0400
16C01-0500
16C01-0600


R. Clodiagh
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16C02-0080
16C02-0200
16C02-0500


R. Drish
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16D02-0068
16D02-0070
16D02-0100
16D02-0200
16D02-0400


R. Duag
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
16D03-0100
16D03-0400
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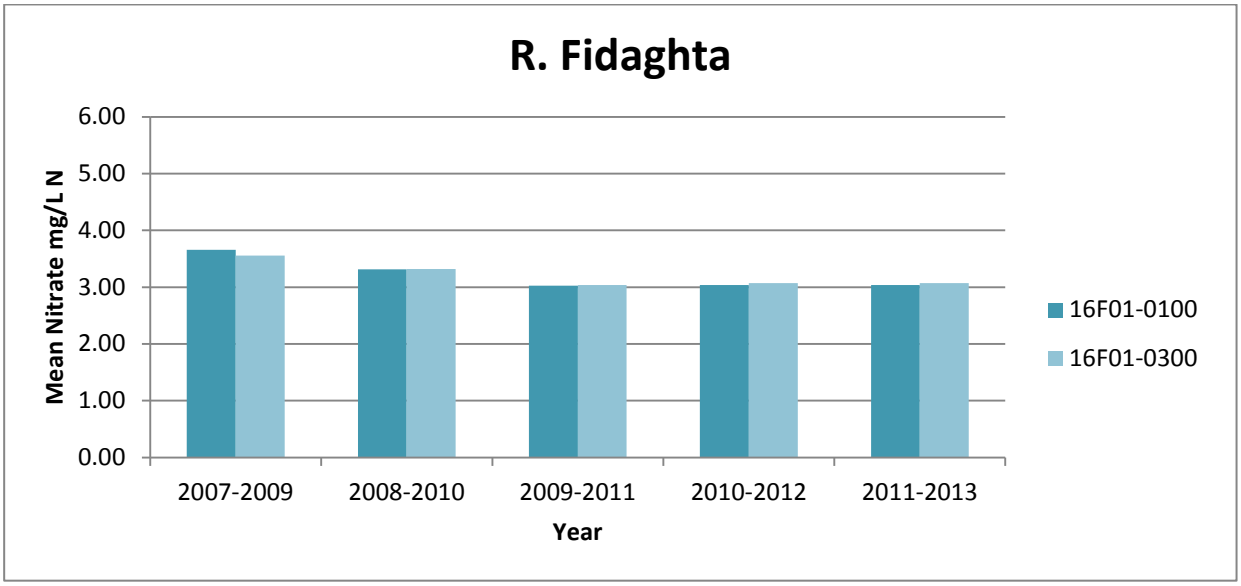
R. Fidaghta
Mean Nitrate mg/L N
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5.00
4.00
3.00
2.00
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2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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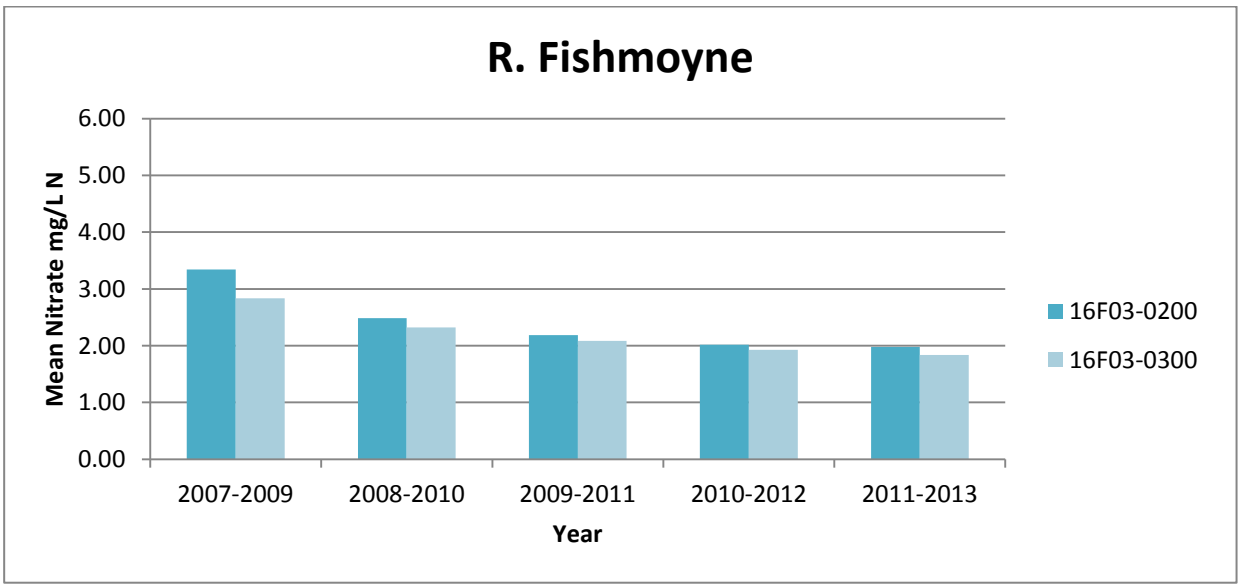
R. Fishmoyne
Mean Nitrate mg/L N
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2008-2010
2009-2011
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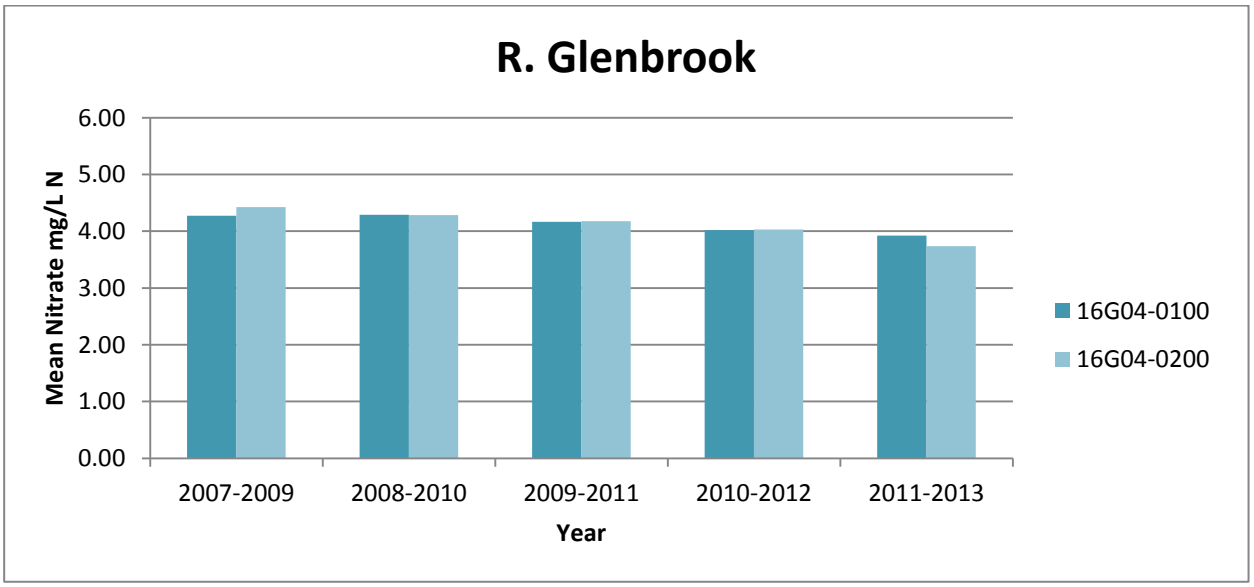
R. Glenbrook
Mean Nitrate mg/L N
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2007-2009
2008-2010
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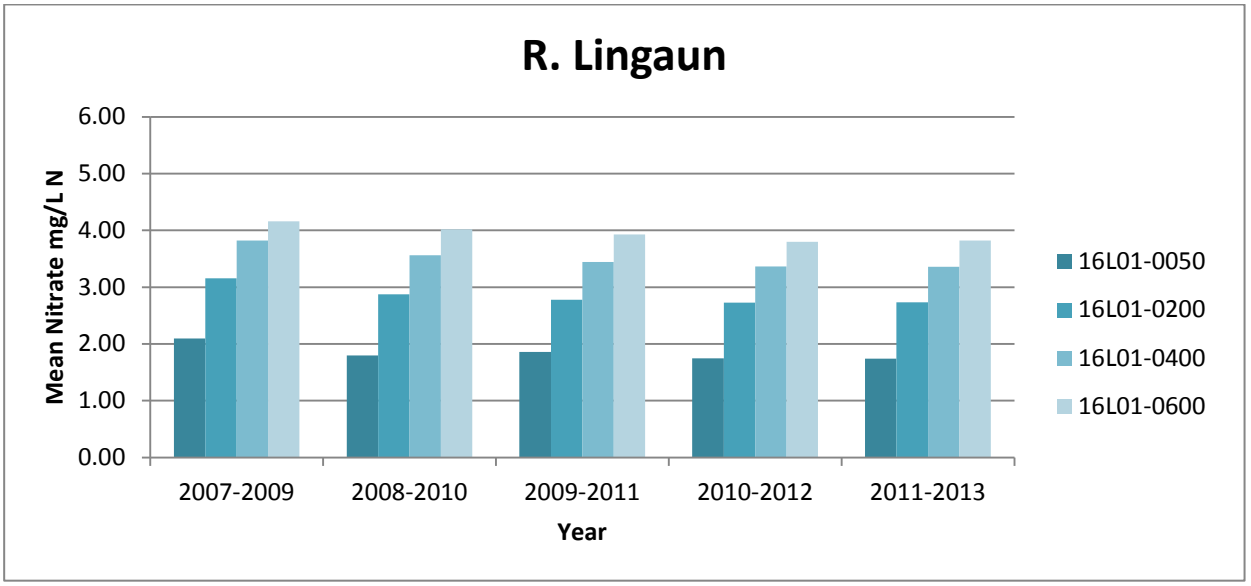
R. Lingaun
Mean Nitrate mg/L N
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3.00
2.00
1.00
0.00
2007-2009
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Year
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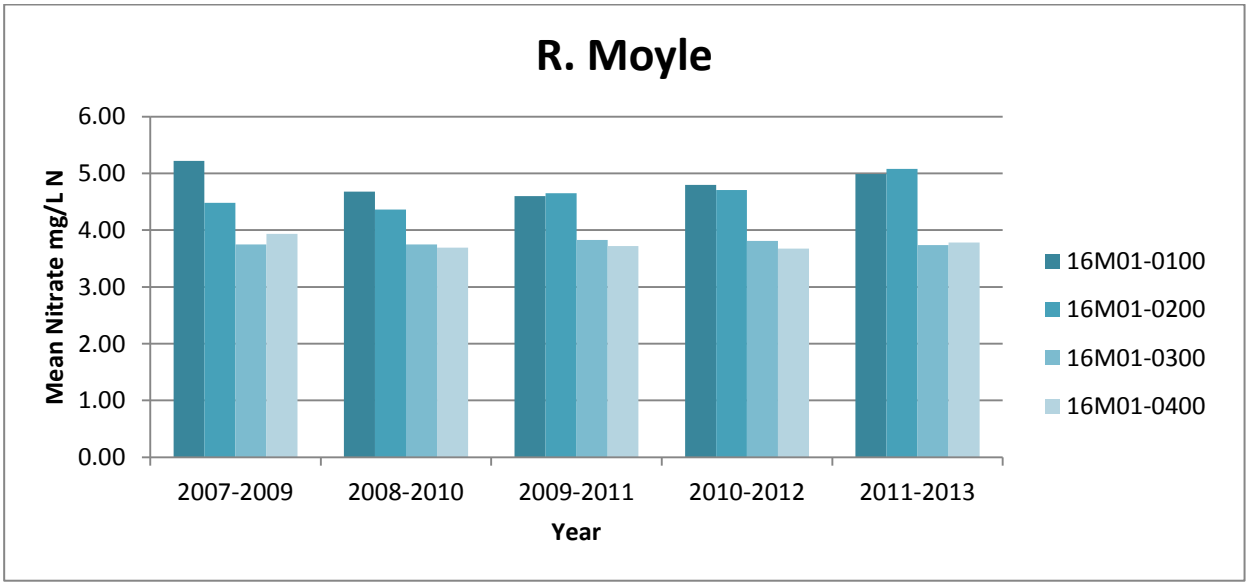
R. Moyle
Mean Nitrate mg/L N
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3.00
2.00
1.00
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Year
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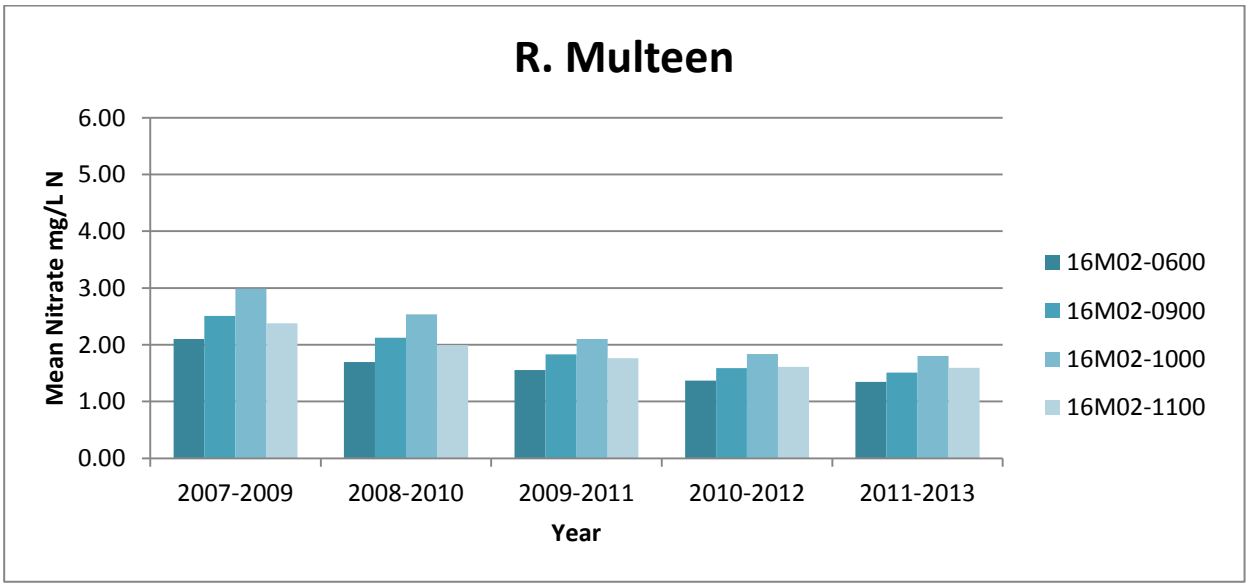
R. Multeen
Mean Nitrate mg/L N
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2.00
1.00
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2007-2009
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Year
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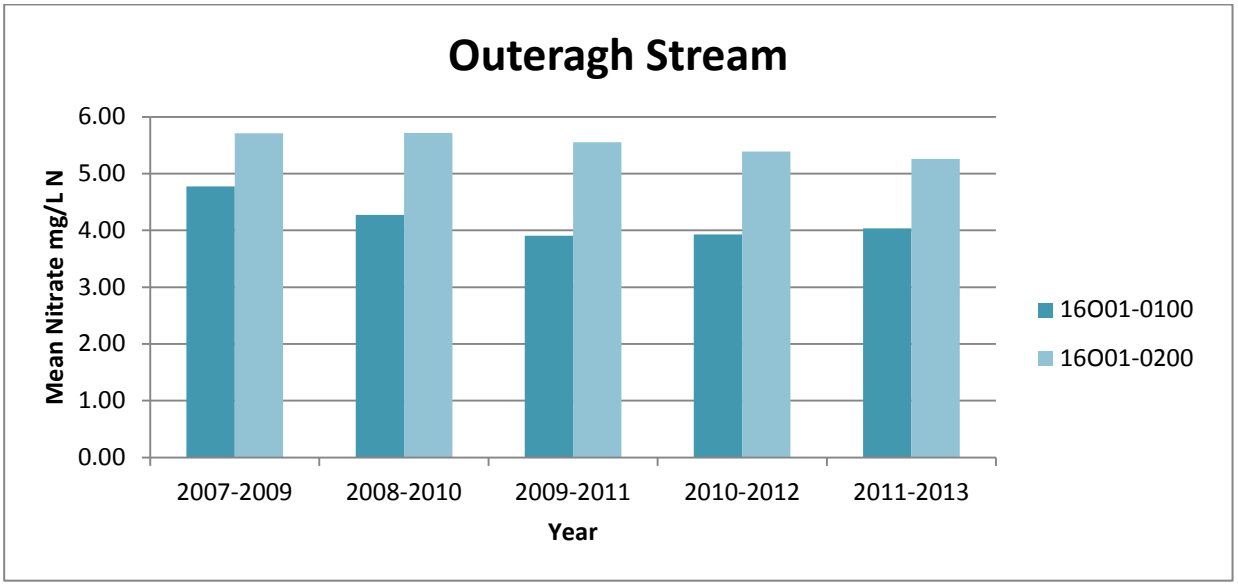
16M02-1100


Outeragh Stream
Mean Nitrate mg/L N
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2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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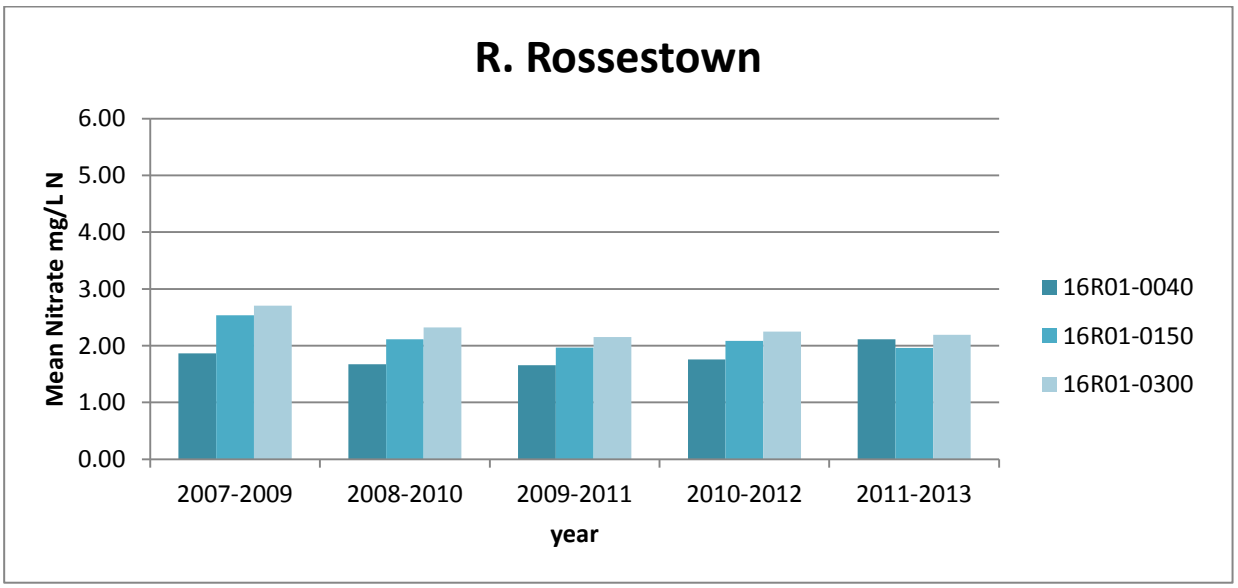
16O01-0200


R. Rossestown
Mean Nitrate mg/L N
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2008-2010
2009-2011
2010-2012
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year
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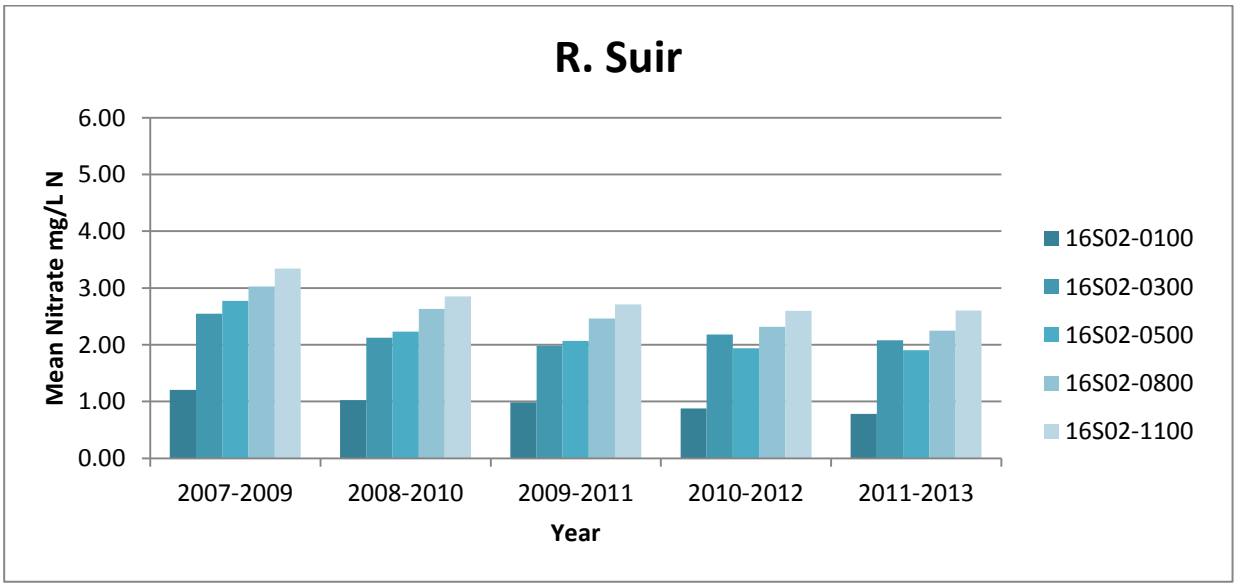
R. Suir
Mean Nitrate mg/L N
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3.00
2.00
1.00
0.00
2007-2009
2008-2010
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2011-2013
Year
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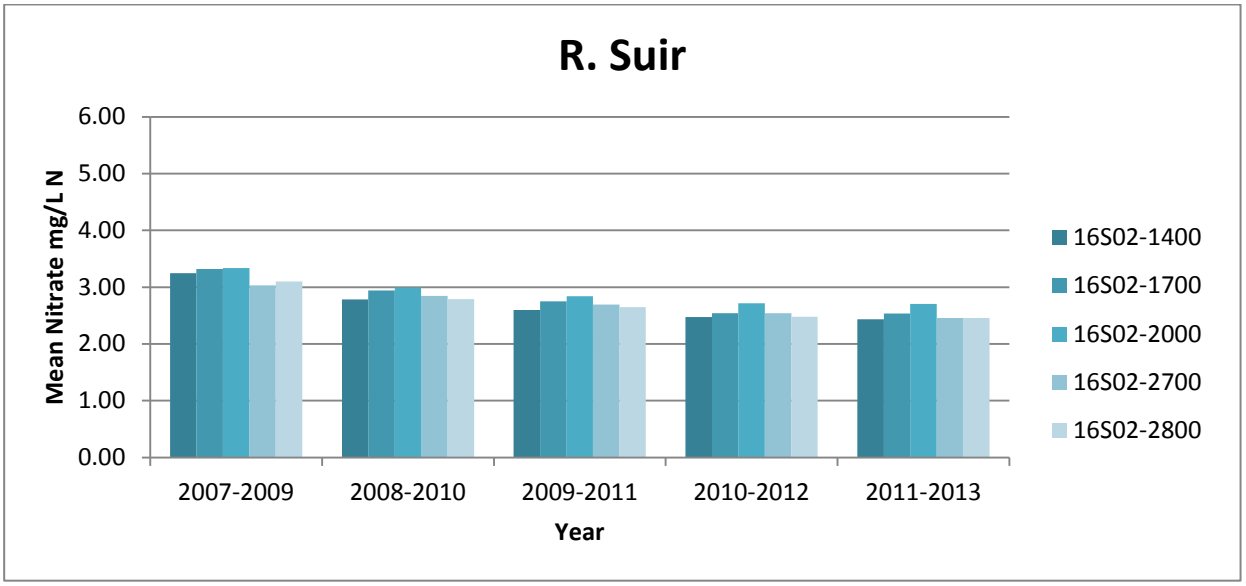
R. Suir
Mean Nitrate mg/L N
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5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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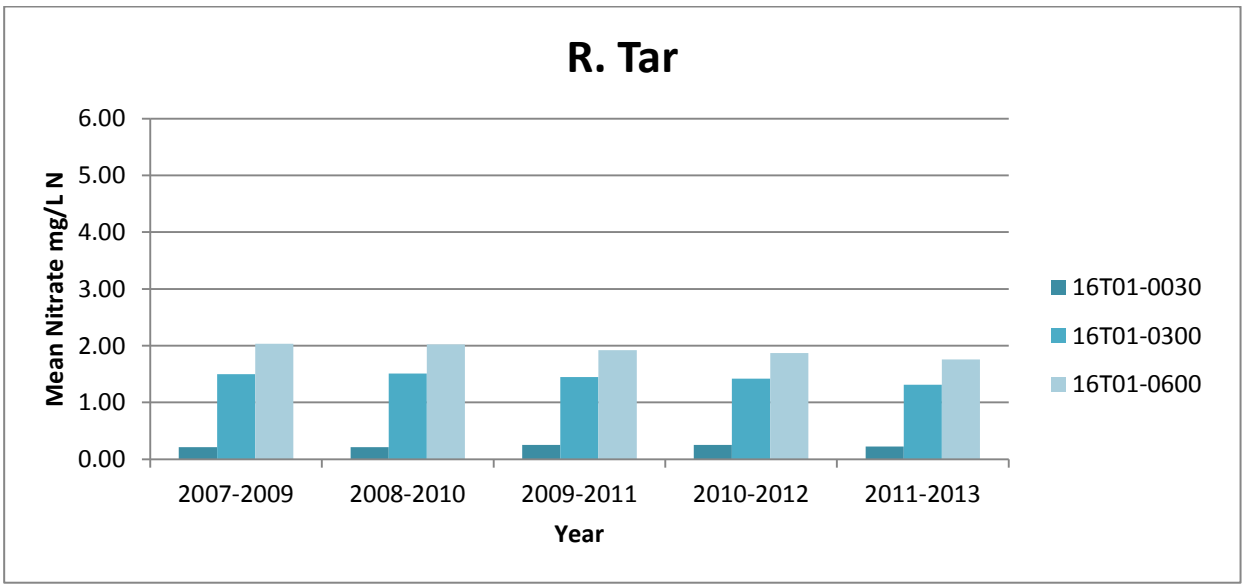
16S02-1700
16S02-2000
16S02-2700
16S02-2800


R. Tar
Mean Nitrate mg/L N
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4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
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Year
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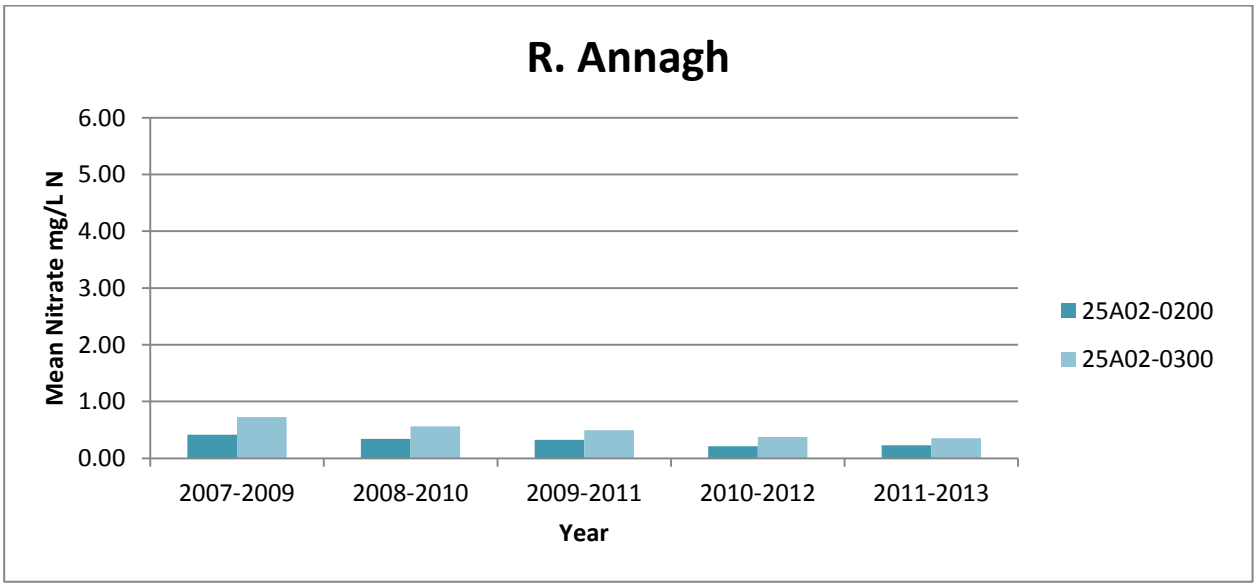
16T01-0300
16T01-0600


R. Annagh
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
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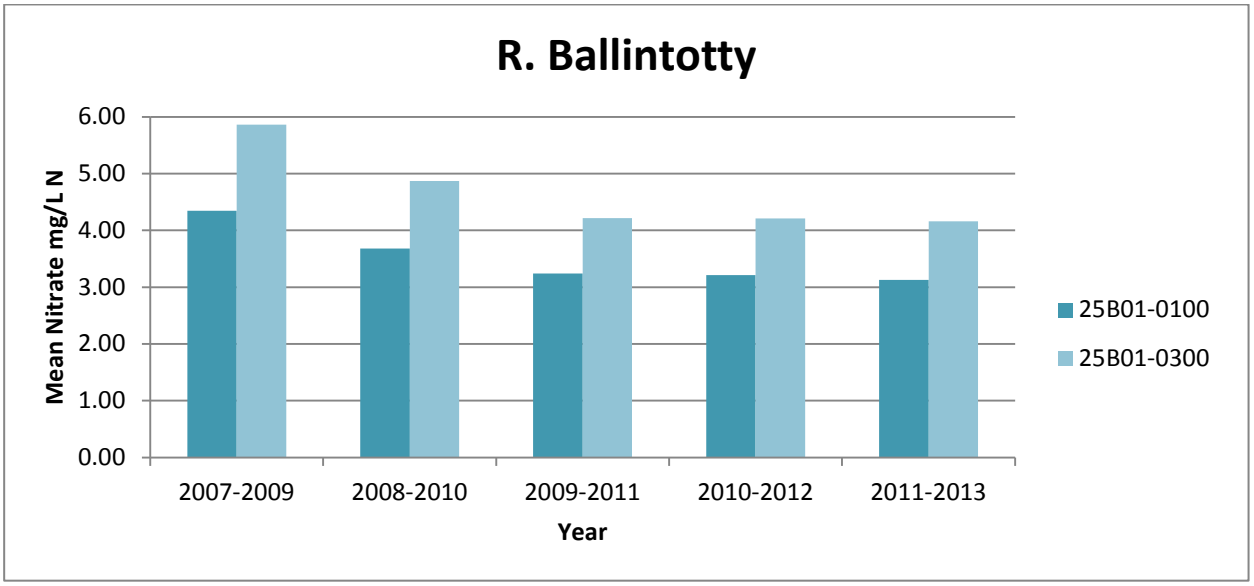
Year
25A02-0200
25A02-0300


R. Ballintotty
Mean Nitrate mg/L N
6.00
5.00
4.00
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2.00
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0.00
2007-2009
2008-2010
2009-2011
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2011-2013
Year
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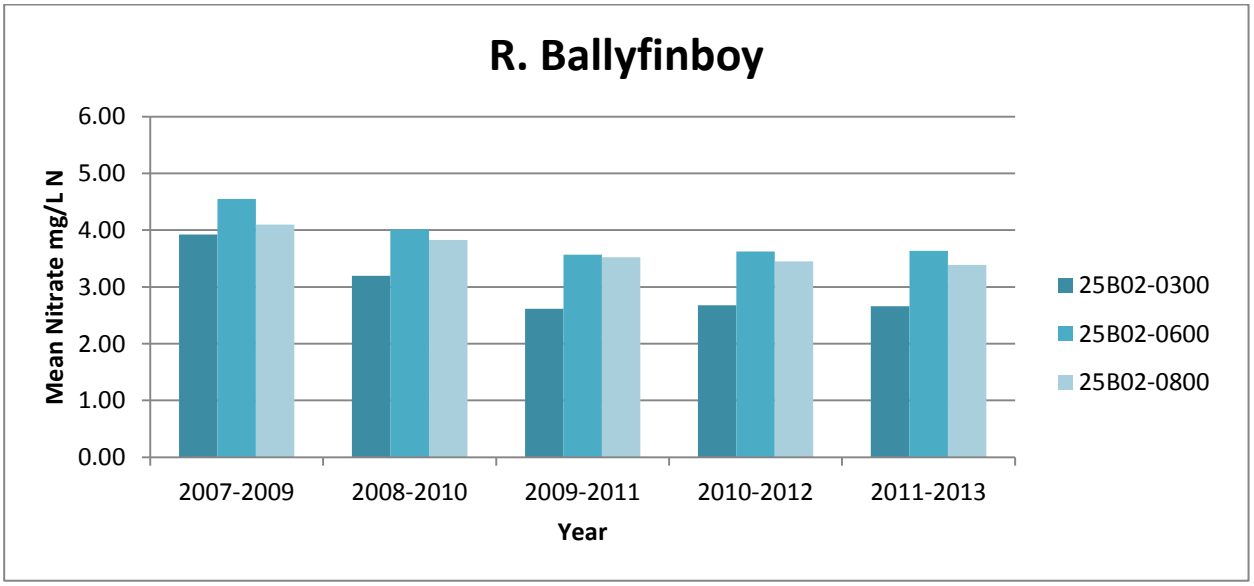
25B01-0300


R. Ballyfinboy
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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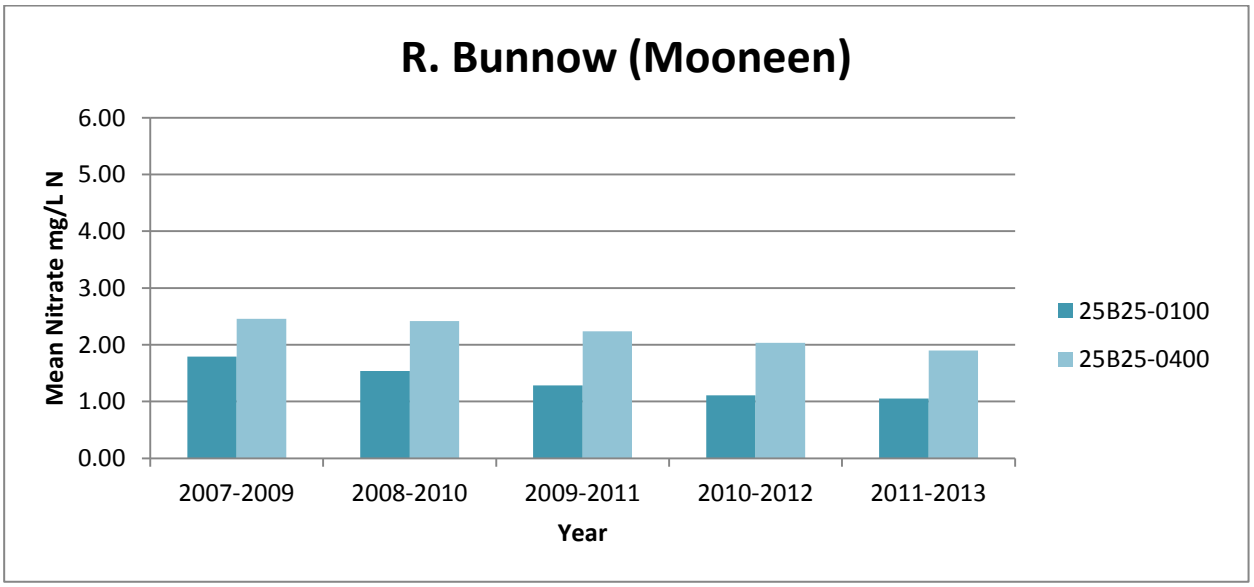
25B02-0600
25B02-0800


R. Bunnow (Mooneen)
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
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0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
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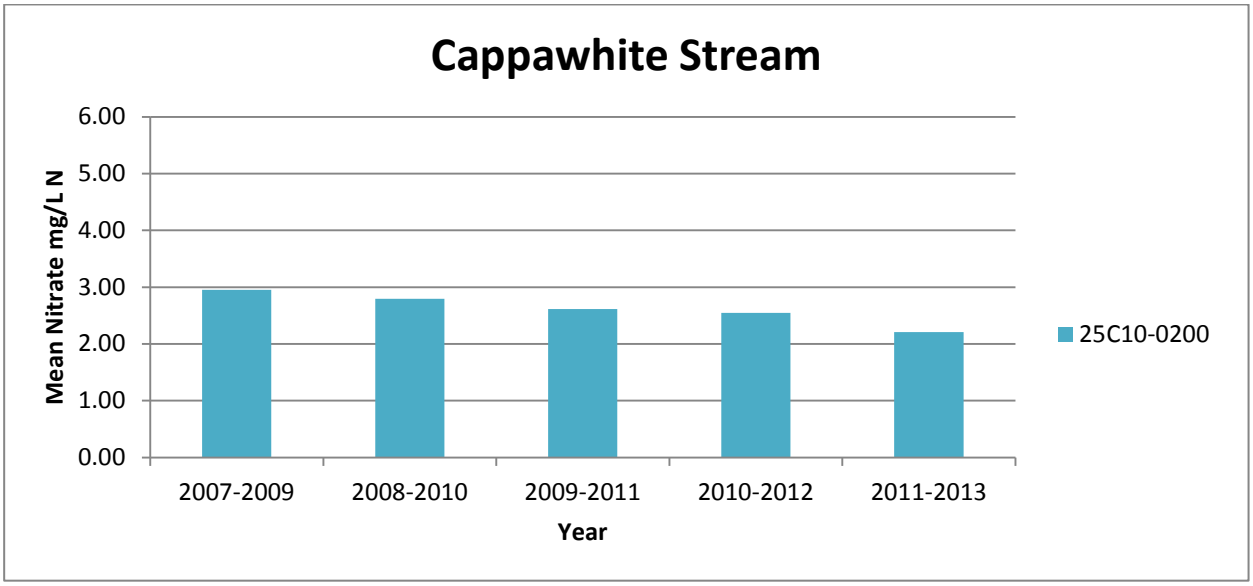
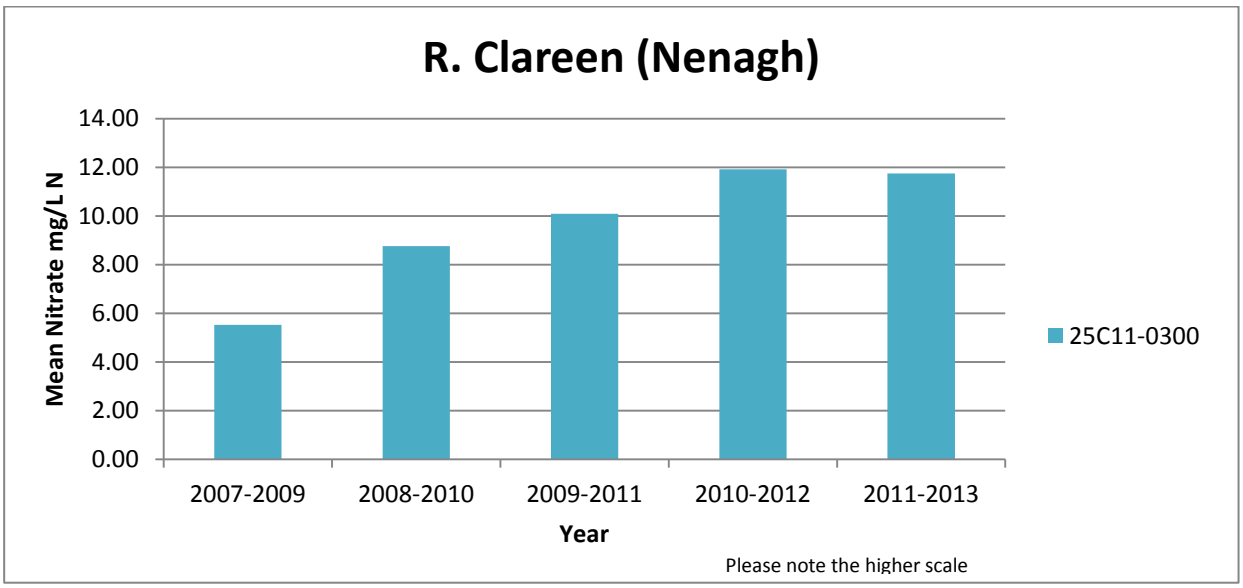
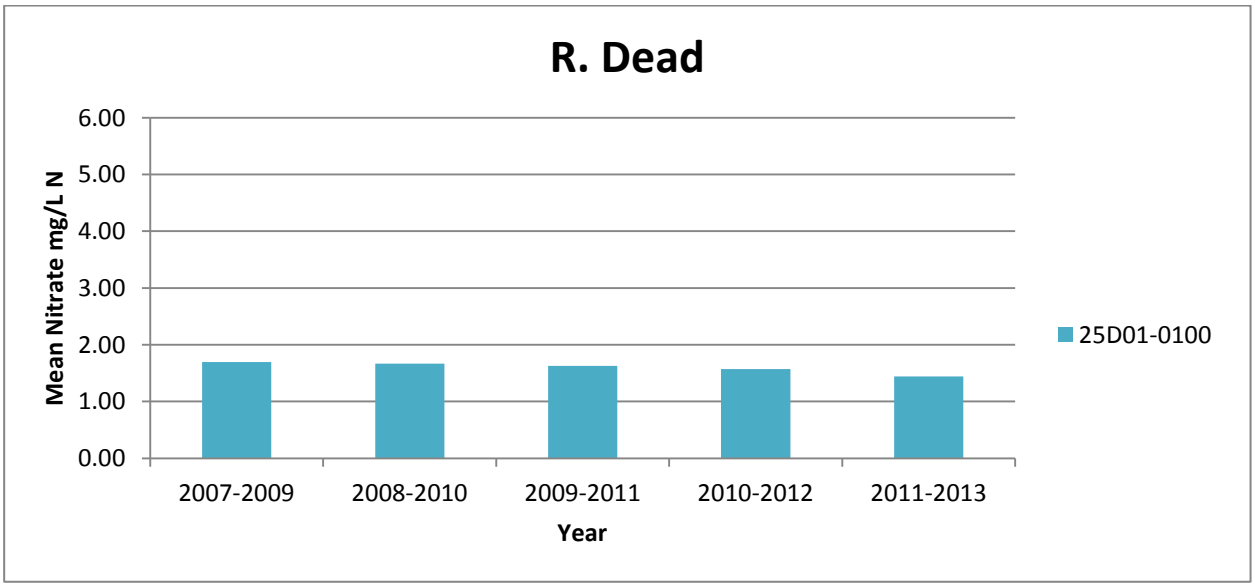

Cappawhite Stream
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25C10-0200


R. Clareen (Nenagh)
Mean Nitrate mg/L N
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25C11-0300
Please note the higher scale


R. Dead
Mean Nitrate mg/L N
6.00
5.00
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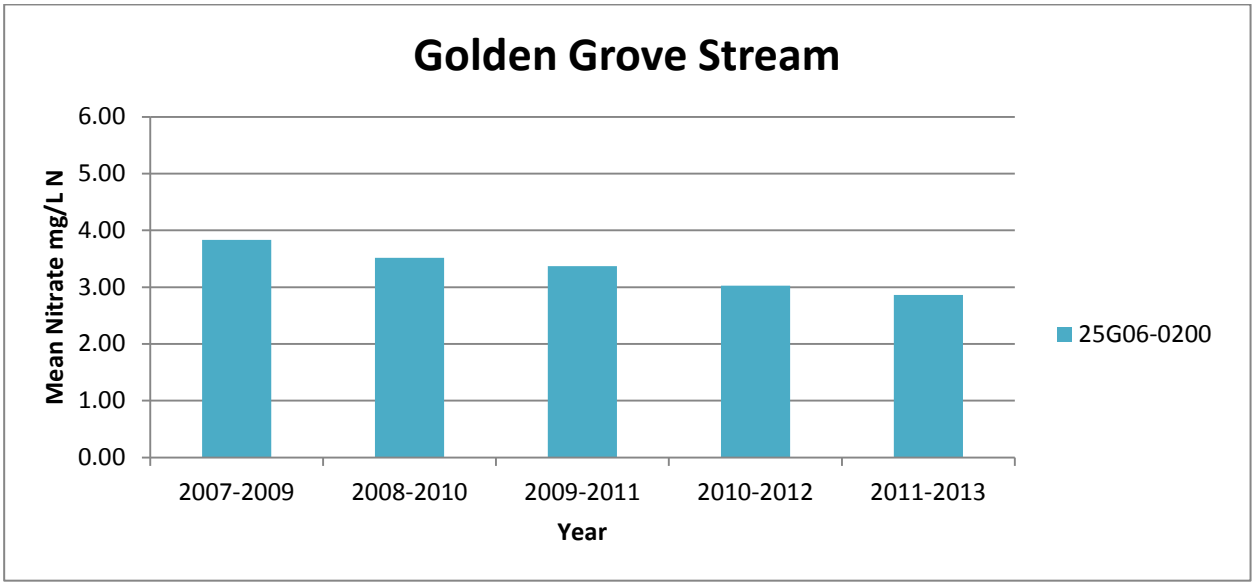
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25D01-0100


Golden Grove Stream
Mean Nitrate mg/L N
6.00
5.00
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3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
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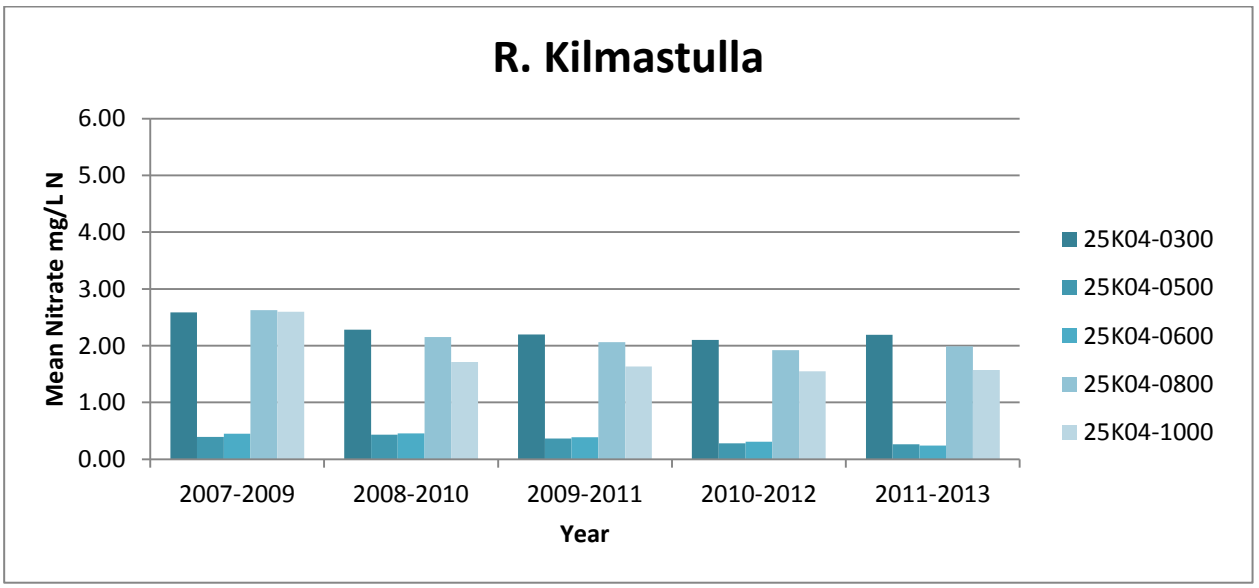
Year
25G06-0200


R. Kilmastulla
Mean Nitrate mg/L N
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5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
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Year
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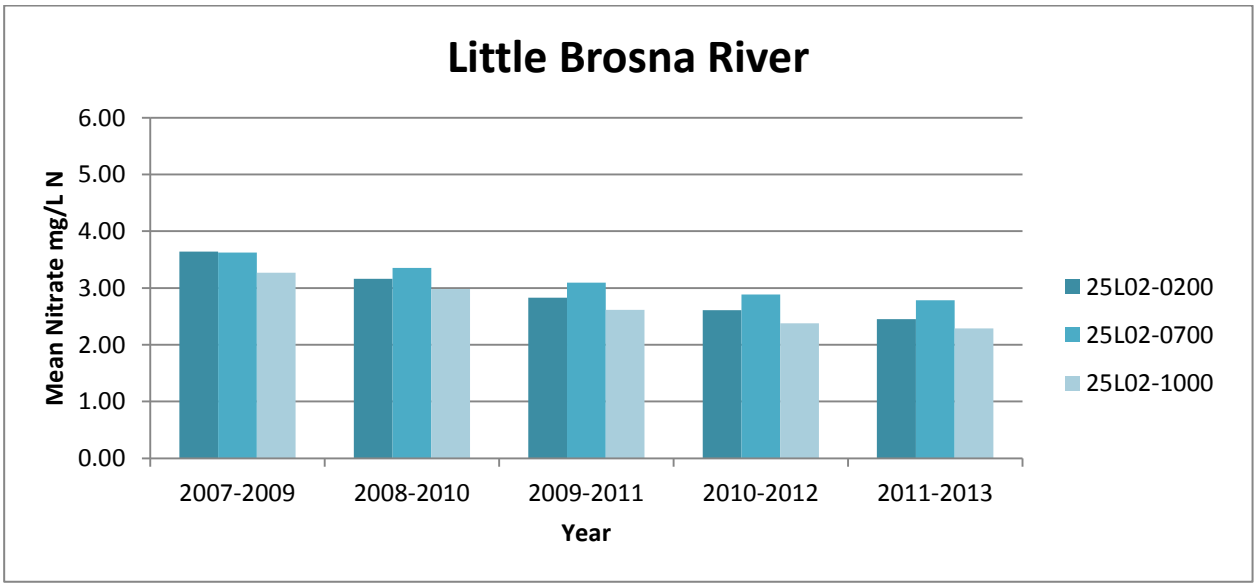
Little Brosna River
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
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Year
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25L02-0700
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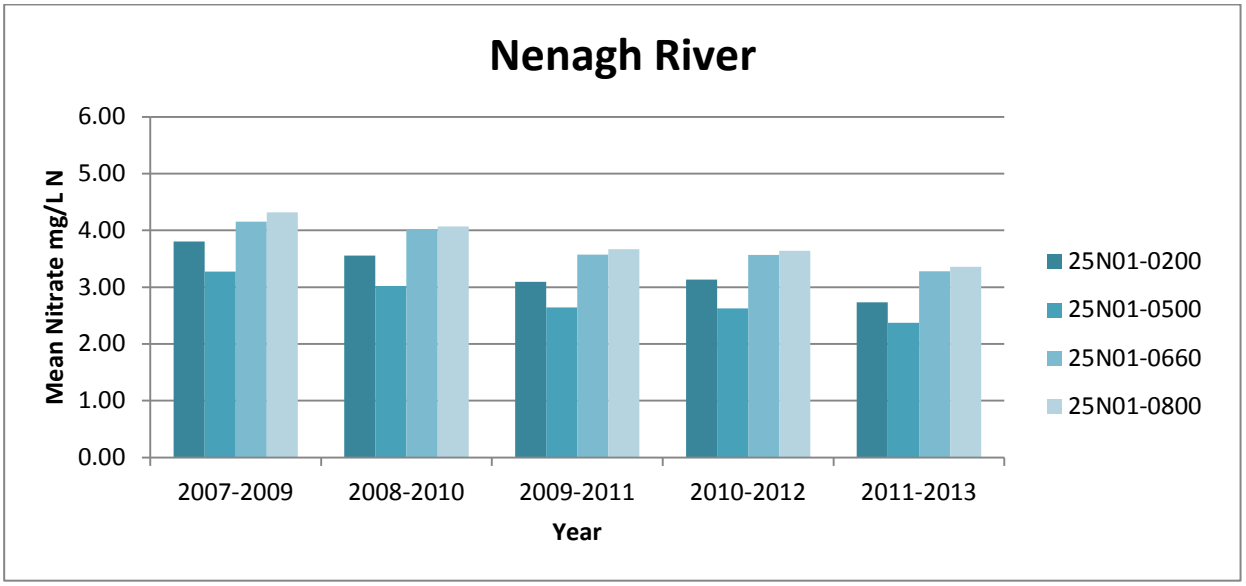
Nenagh River
Mean Nitrate mg/L N
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4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
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Year
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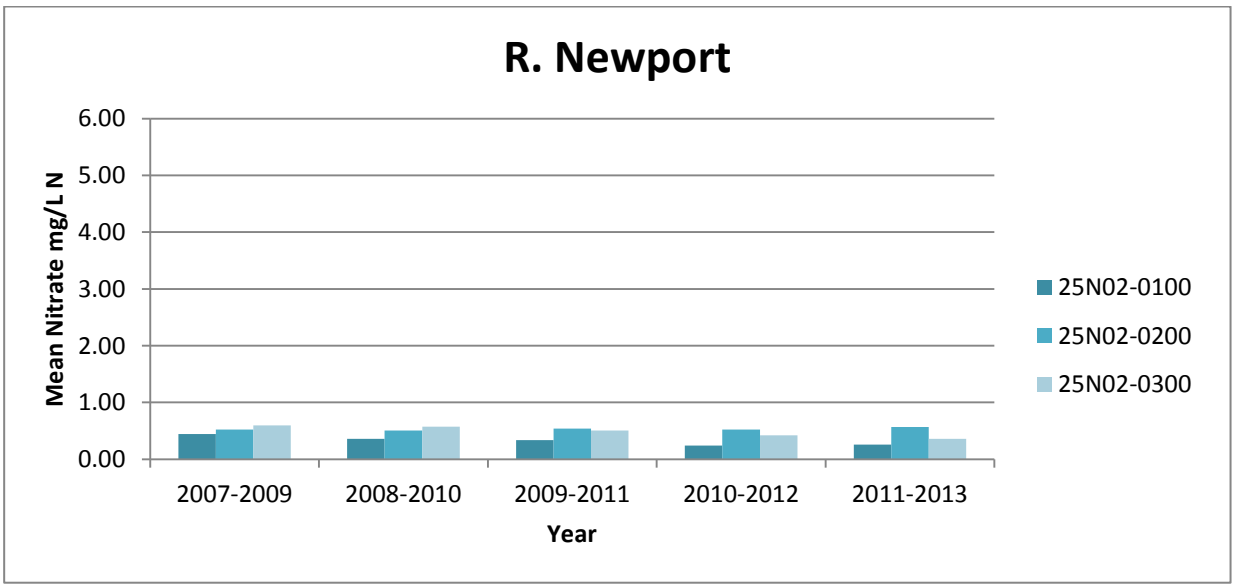
R. Newport
Mean Nitrate mg/L N
6.00
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2007-2009
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Year
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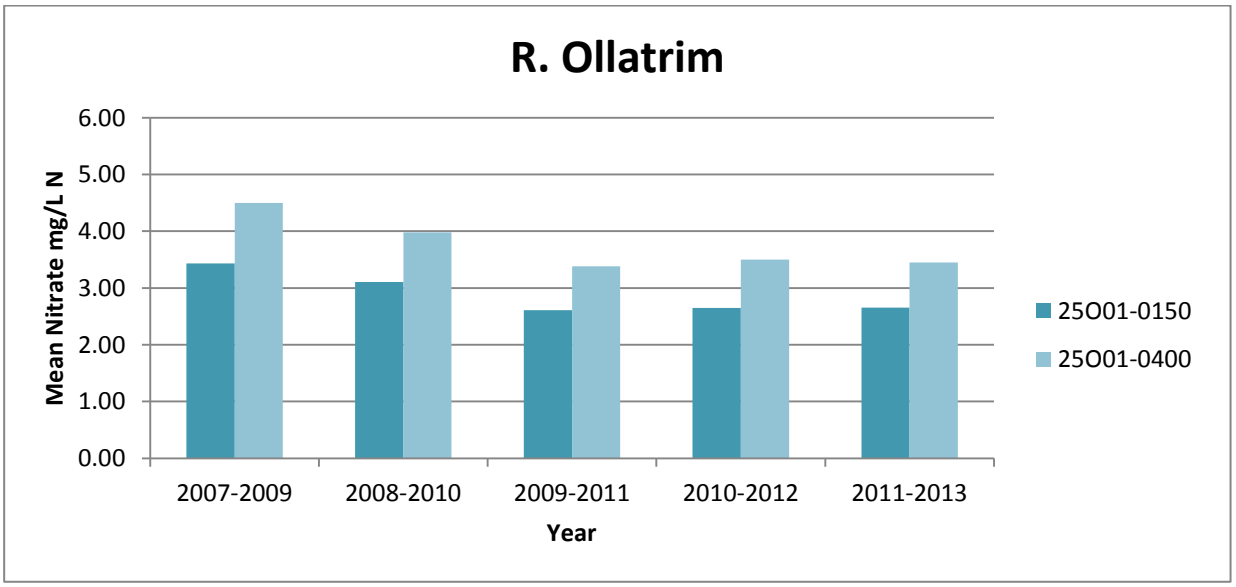
R. Ollatrim
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
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2007-2009
2008-2010
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Year
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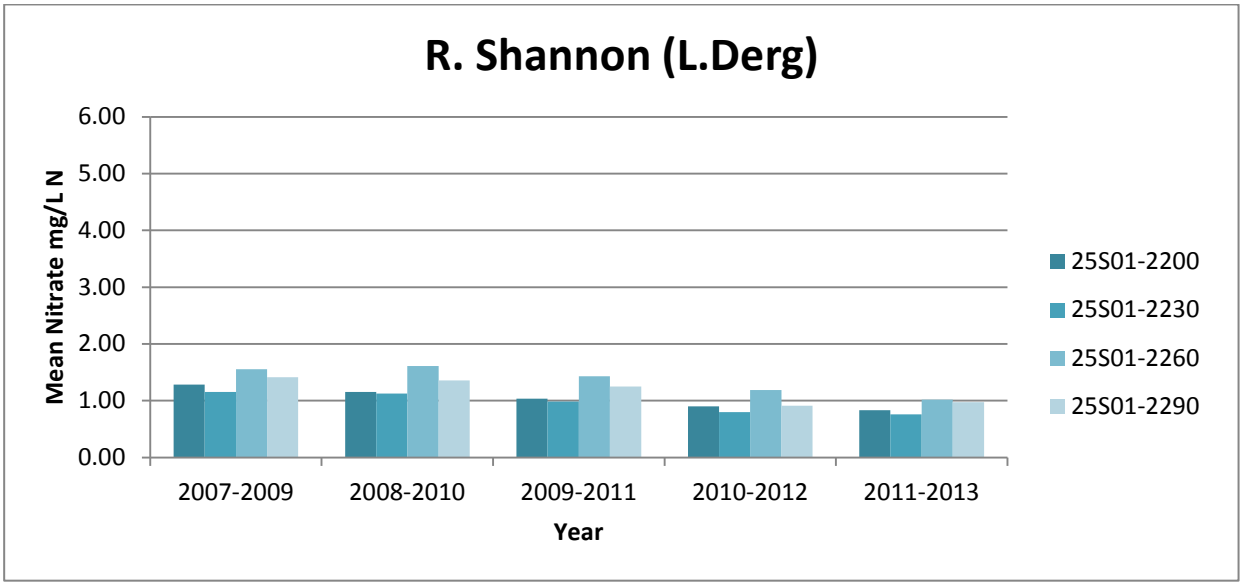
R. Shannon (L.Derg)
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
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Year
25S01-2200
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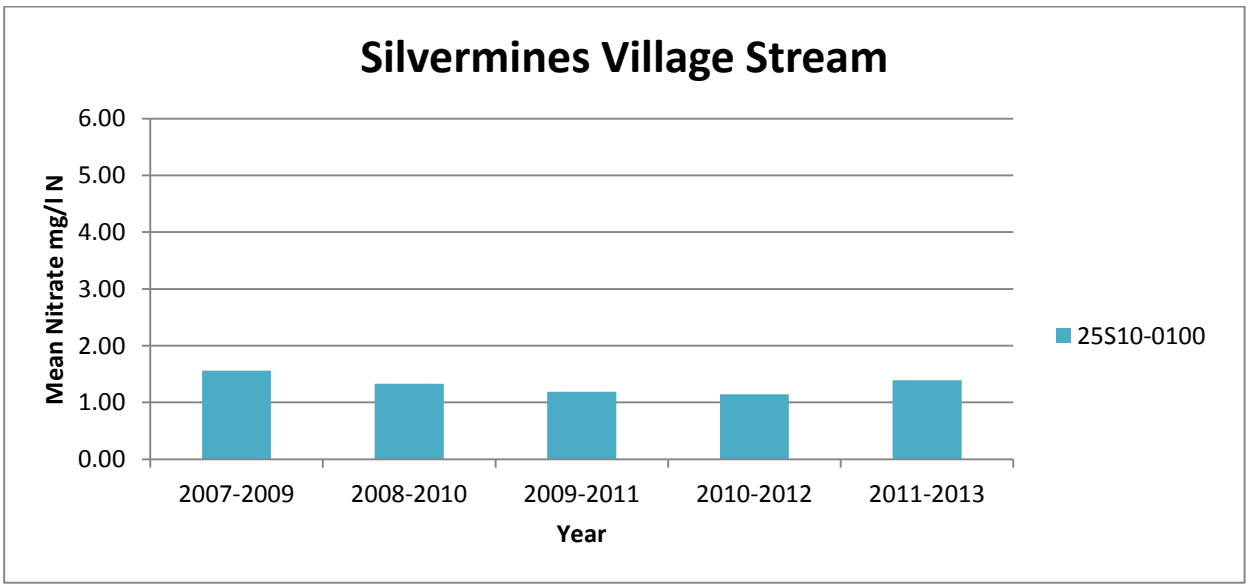
Silvermines Village Stream
Mean Nitrate mg/l N
6.00
5.00
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2.00
1.00
0.00
2007-2009
2008-2010
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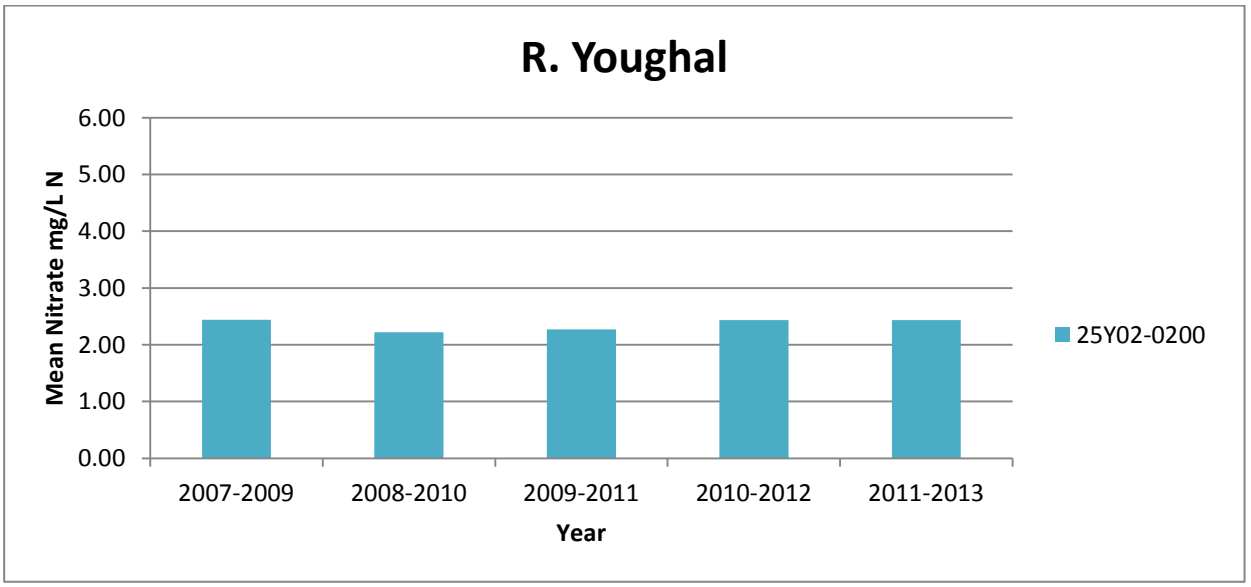
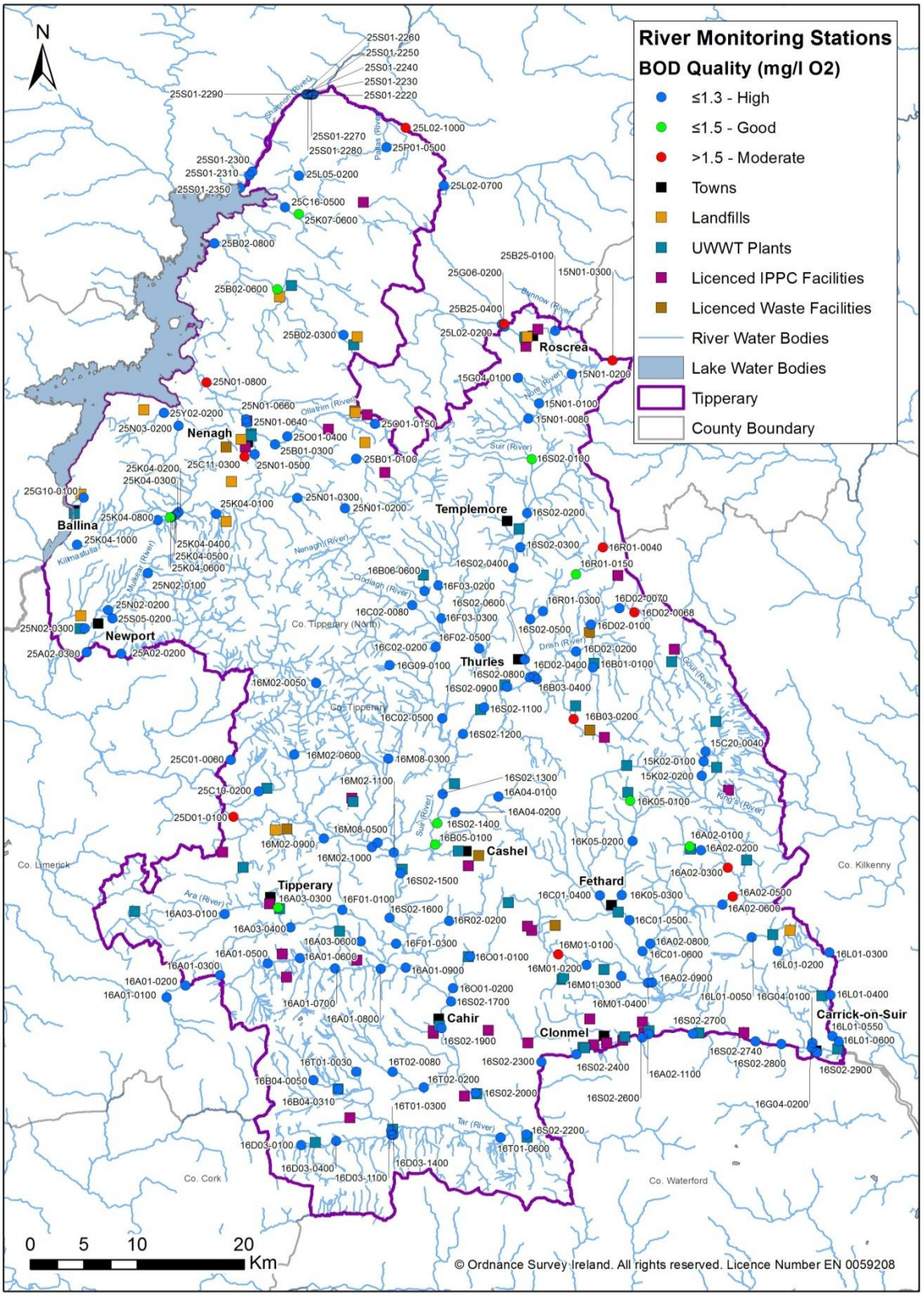
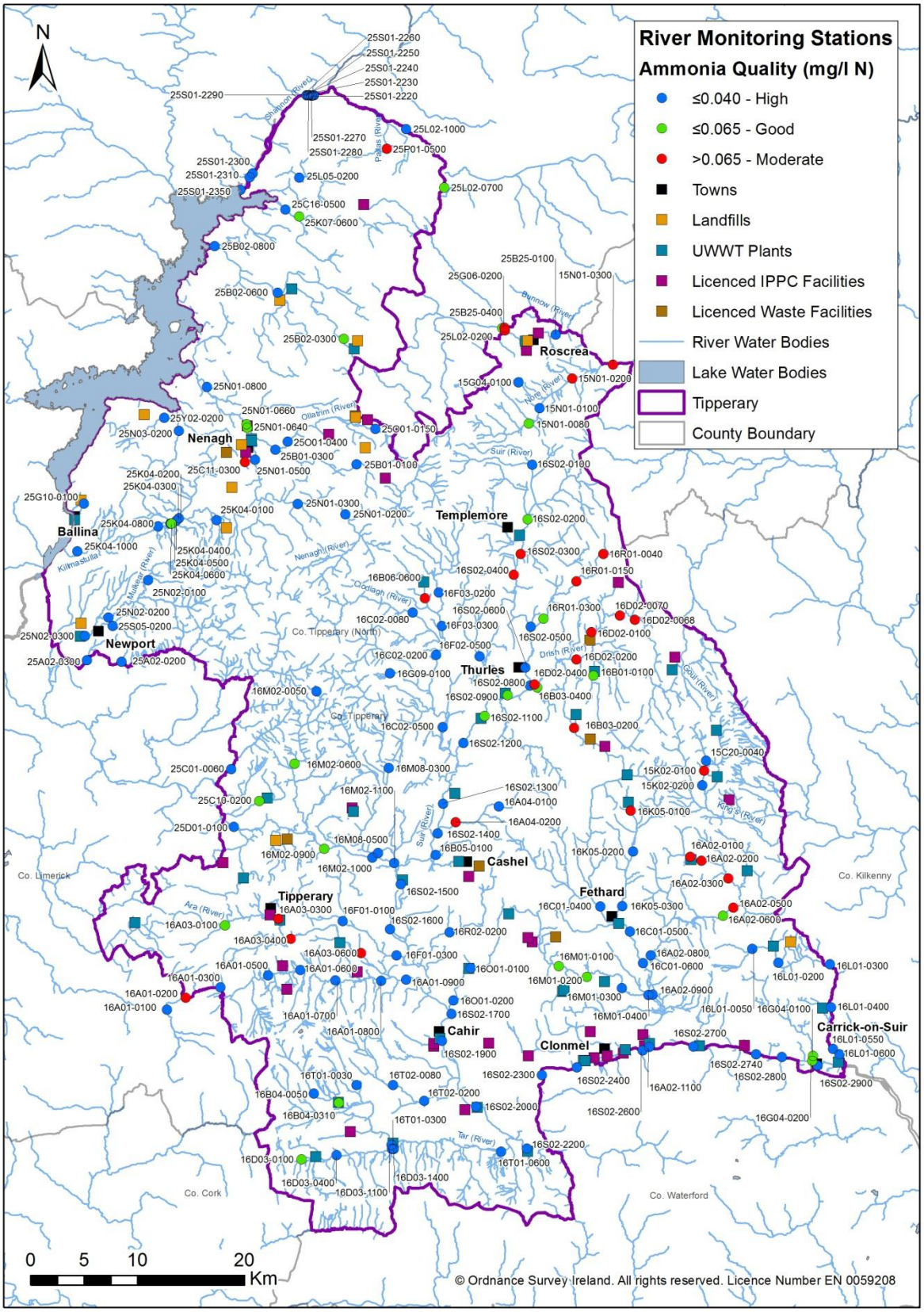

R. Youghal
Mean Nitrate mg/L N
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2007-2009
2008-2010
2009-2011
2010-2012
2011-2013
Year
25Y02-0200

7. River Water Quality Maps

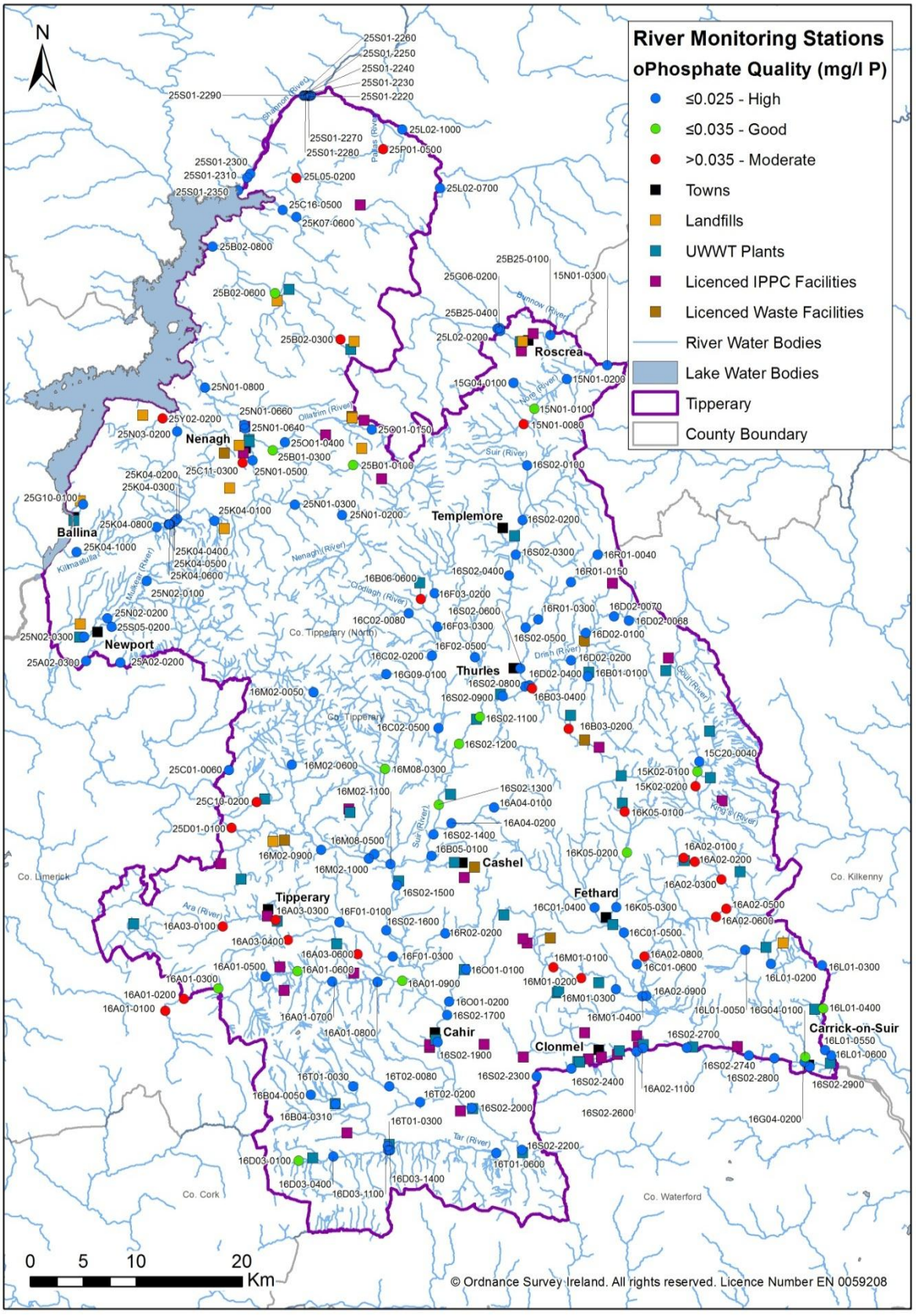
Map 1. River Water Quality: Tipperary BOD Assessment 2013



Map 2. River Water Quality: Tipperary Ammonia Assessment 2013



Map 3. River Water Quality: Tipperary ortho-Phosphate Assessment 2013



Map 4. River Water Quality: Tipperary Total Oxidised Nitrogen (TON) Assessment 2013