

Inny Priority Area for Action

Desk Study



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Summary

The Inny area for action consists of four waterbodies: Owroe_010 and Inny (Kerry)_010, Inny (Kerry)_020 and Inny (Kerry)_030. They make up the subcatchment: 21_10 Inny[Kerry]_SC_010 within the Dunmanus-Bantry-Kenmare catchment (21). The Inny discharges into Ballinskelligs Bay and Inny Estuary SAC. There are several protected areas in the PAA; Inny strand (Waterville) (designated bathing water), Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC, and Knockroe Bog (NHA). There is also a public water supply abstraction at Maulin (PWSS 066H) in Inny (Kerry)_030.

All four waterbodies have deteriorated since the first WFD cycle, dropping from good to moderate ecological status. As such they are *At Risk* of not meeting their WFD objectives (good status). Owroe_010 dropped from good to moderate in 2012 and was still moderate in 2015. The other three dropped from good to moderate in 2015. They all remained at moderate status in 2018.

It is not evident what the significant issues are. Water chemistry is only available for Inny (Kerry)_030 where nutrient concentrations are low. Biologists' notes (2015) indicate slight siltation at Inny (Kerry)_010 and Inny (Kerry)_020 but the two other monitoring points had 'clean' substrate. Filamentous algae cover was 10-25% at Inny (Kerry)_030, which biologist noted as excessive for the site indicating a nutrient issue. The semi-natural habitat in the area is open heath and blanket bog; however, much of the land has been converted to forestry, pasture and peat extraction. There are also four licensed quarries in the area and a fish farm in Ballinskelligs Bay (Marine Harvest).

Rainfall volume in the headwaters (Owroe_010, Inny (Kerry)_010) is high – between 2500 and 3500 mm per year (source: Met Eireann). The area is underlain by poorly permeable bedrock (LI aquifer) poorly draining soils and steep slopes. Most of the rainfall is discharged rapidly to surface water courses via surface drains, overland or shallow groundwater pathways. Drainage density is high. Drainage associated with pasture, afforestation and peat extraction and phosphate release from agriculture and forest clear felling are potential pressures. As a result, the main issues are likely to be siltation of the channel bed and enrichment by phosphate (P) (and potentially nitrogen also).

Field assessment will involve carrying out ecological assessments (kick sampling) at bridge access points to narrow the focus. Beginning in the head waters first: Owroe_010 and Inny (Kerry)_010. Within each waterbody, assessment will work upstream from the EPA monitoring point. Forestry and improved pasture are in the lower reaches in both headwaters; by carrying out assessments upstream and downstream it should be possible to isolate the significant pressures. Some of the headwater streams drain intact heath and bog and so should exhibit good if not high status. The field assessment of Inny (Kerry)_020 will involve separate assessments of the main channel and lateral inflow streams. There is pasture directly along the main river channel and this is a high PIP area due to the poorly draining alluvial soils. Forestry, peat extraction and two quarries occur along the tributary streams. Carryout assessments to rule them in or out. Land use in Inny (Kerry)_030 is much more heterogenous, with mainly pasture and peat extraction throughout. Again, field assessment will involve assessments along the main channel and inflow streams to narrow the area to focus on.

1 Background

Table 1-1: Background information on the Inny PAA

Priority Area for Action	Catchment Number	Catchment Name	Sub catchment	Region	Local Authority
Inny	21	Dunmanus-Bantry-Kenmare	Inny[Kerry]_SC_010	Southwest	Kerry

Priority Area for Action	No. of <i>At Risk</i> WBs	No. of <i>Review</i> WBs	No. of dRBMP Prioritised WBs	No of WBs for Status Improvement:		
				2021	2027	Beyond 2027
Inny	4	0	4	0	4	0

Reason for selection	<ul style="list-style-type: none"> • Discharges into designated bathing area: Trá na hUíne (Inny Strand), Waterville) • Opportunity to work with Waterville rivers trust and interested local community. • Four deteriorated water bodies. • Two water bodies are failing to meet their protected area objectives for salmon.
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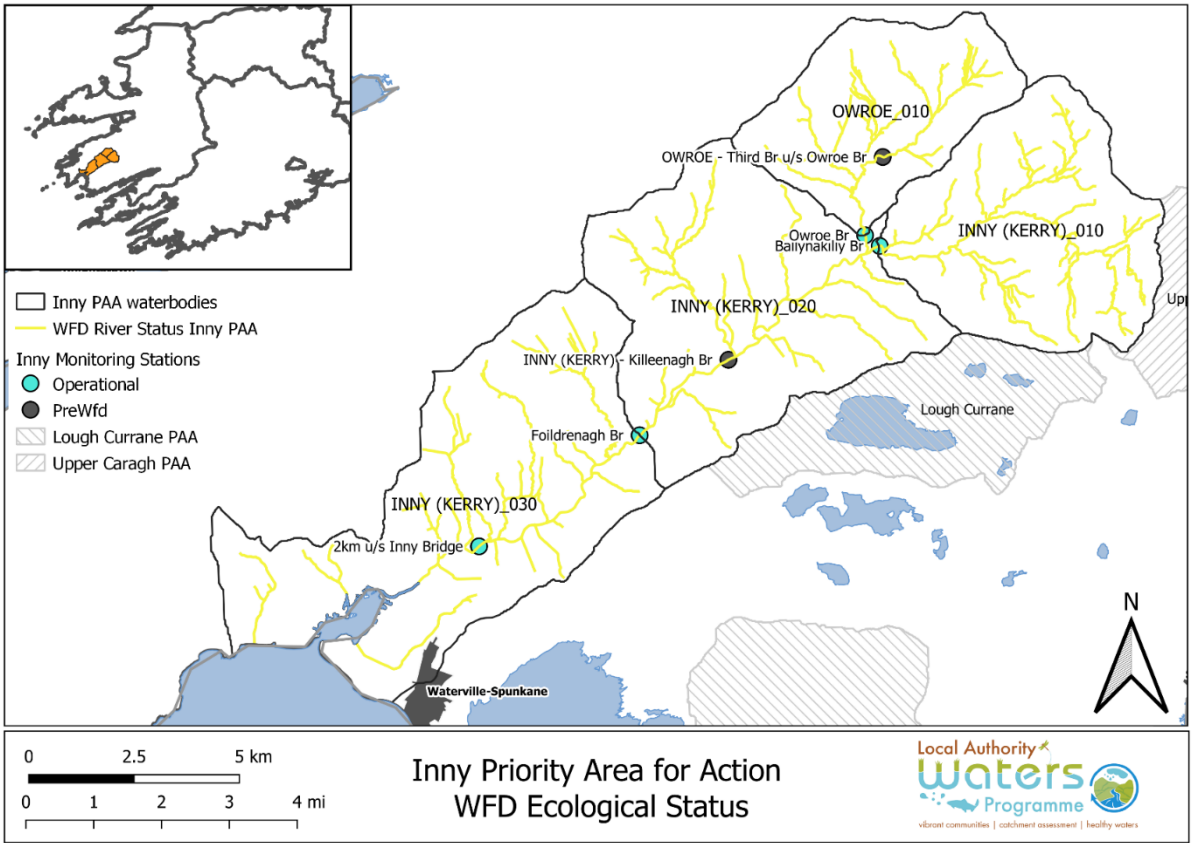


Figure 1-1: Inny Priority Area for Action Ecological Status (2018).

Table 1-2: Summary table of individual waterbodies within the Inny PAA

Water body Code	Water body Name	Risk	Obj.	Ecological Status				Pressures		
				2009	2012	2015	2018	Category	Subcategory	Sig? (Y/N)
IE_SW_210060200	OWROE_010	At risk	Good	Good	Good	Moderate	Moderate	Extractive Industry	Peat	N
								Forestry	Forestry	Y
								Hydromorphology	Land Drainage	Y
IE_SW_211010300	INNY (KERRY)_010	At risk	Good	Good	Moderate	Moderate	Moderate	Forestry	Clearfelling	Y
								Forestry	Forestry	Y
								Extractive Industry	Peat	N
IE_SW_211010500	INNY (KERRY)_020	At risk	Good	Good	Good	Moderate	Moderate	Forestry	Forestry	Y
								Extractive Industry	Peat	N
								Extractive Industry	Quarries	Y
								Forestry	Clearfelling	Y
IE_SW_211010900	INNY (KERRY)_030	At risk	Good	Good	Good	Moderate	Moderate	Extractive Industry	Peat	N
								Forestry	Clearfelling	Y

Source: EPA 2015

2 Receptor information

2.1 Overview table

Table 2-1: Receptor information for Inny PAA

		graph	Map Y/N	OWROE_010		INNY (KERRY)_010	INNY (KERRY)_020		INNY (KERRY)_030
Risk Category			Y	<i>At risk</i>		<i>At risk</i>	<i>At risk</i>		<i>At risk</i>
Monitoring points	Station		Y	Third Br u/s Owroe Br	Owroe Br	Ballynakilly Br	Killeenagh Br	Foildrenagh Br	2km u/s Inny Bridge
	Code			RS21O060100	RS21O060200	RS21I010300	RS21I010400	RS21I010500	RS21I010900
	Station Type			PreWfd	Operational	Operational	PreWfd	Operational	Operational
Biological Status (Inverts)	2010-2015			Moderate		Moderate	Moderate		Moderate
	2016-2018			Moderate		Moderate	Moderate		Moderate
	Trends in Q values	Table	N	Good and high between 2000 and 2006 (ends)	Dropped from good to moderate in 2000 and 2012 - 2015.	Consistently good Q4 (1990-2012) moderate (Q3-4) 2015	Consistently good Q4 (1990-2006 ends)	good (2003-2012) dropped to moderate in 2015	good (2003-2012) dropped to moderate in 2015
Biological Status (Fish)	2010-2015			No data	No data	No data	No data	No data	
Hydrochemistry	Ortho-P (mg/l P)	Y		No data	No data	No data	No data	No data	0.005, no trends, dist to threshold: far
	Ammonia (mg/l N)	Y		No data	No data	No data	No data	No data	0.019, no trends, dist to threshold: far
	TON (mg/l N)	Y		No data	No data	No data	No data	No data	0.124, increasing trend, dist to threshold: far
Other water quality data					No data	No data	No data	No data	Peak in suspended solids in Jan 2012

		Plot graph	Map Y/N	OWROE_010	INNY (KERRY)_010	INNY (KERRY)_020	INNY (KERRY)_030
Ecological status	2010-2015		Y	Moderate	Moderate	Moderate	Moderate
	Element driving status			macroinvertebrates	macroinvertebrates	macroinvertebrates	macroinvertebrates
	change (since 1st cycle)			deteriorated	deteriorated	deteriorated	deteriorated
Protected areas	Special Area of Conservation (SAC)		Y	Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC			Ballinskelligs Bay and Inny Estuary SAC. Water dependent SAC: Potential Atlantic salt meadows / Mediterranean salt meadows
	Natural heritage area (NHA)			Knockroe Bog NHA		Knockroe Bog NHA	
	Bathing water		Y				Waterville (Inny strand): quality deteriorated from high (2015,2016) to good (2017, 2018): (Appendix D)
	Drinking water						River and GWB abstraction Maulin PWSS 066H)
WFD objective.				Good	Good	Good	Good
Relevant info. from notes of EPA biologist (from storyboards)				Clean substrate in 2015. The substrate is difficult to sample- mostly bedrock and boulder. Site usually supports a few Class A taxa e.g. Ecdyonurus, Chloroperla that gave it 'Good' status. No Class A taxa in 2015.	Slight siltation in 2015. Also, some filamentous algae. No Class A taxa. Given the habitat at the site a few Class A taxa (e.g. Ecdyonurus) can be enough for 'Good' status.	Slight siltation in 2015. A few Ecdyonurus present but not enough for 'Good' status. Used be more Class A taxa present. Nemouridae (stonefly) (2012). Chloroperla and Nemouridae (2009)	Clean substrate in 2015, filamentous algae cover was 10-25%, which biologist noted as excessive for the site. Previous years had good numbers (5-20) of Class A taxa present.
Significant issue/impact for receptor (e.g. PO₄)				Siltation and phosphate (likely)	Siltation and phosphate (likely)	Siltation and phosphate (likely)	Siltation and phosphate (likely)

Table 2-2: Q values for Inny PAA

Waterbody	Station name		1990	1994	1997	2000	2003	2006	2009	2012	2015	2018
OWROE_010	OWROE - Third Br u/s Owroe Br	Pre WFD	4	4	4-5	4-5	4	4				
	Owroe Br	Operational	4	4	4	3-4	4	4	4	3-4	3-4	3-4
INNY (KERRY)_010	Ballynakilly Br	Operational	4	4	4	3-4	4	4	4	4	3-4	3-4
INNY (KERRY)_020	INNY (KERRY) - Killeenagh Br	Pre WFD	4	4	4	4	4	4				
	Foildrenagh Br	Operational	4	4	3-4	3-4	4	4	4	4	3-4	3-4
INNY (KERRY)_030	2km u/s Inny Bridge	Operational	4	4	4	4	4	4	4	4	3-4	3-4

2.2 Hydrochemistry

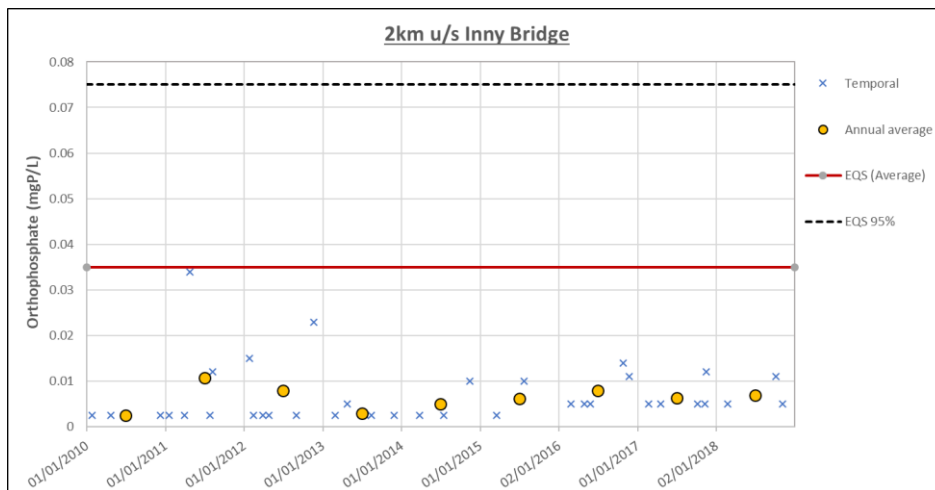


Figure 2-1: Orthophosphate chemistry INNY (KERRY)_030 at EPA monitoring station

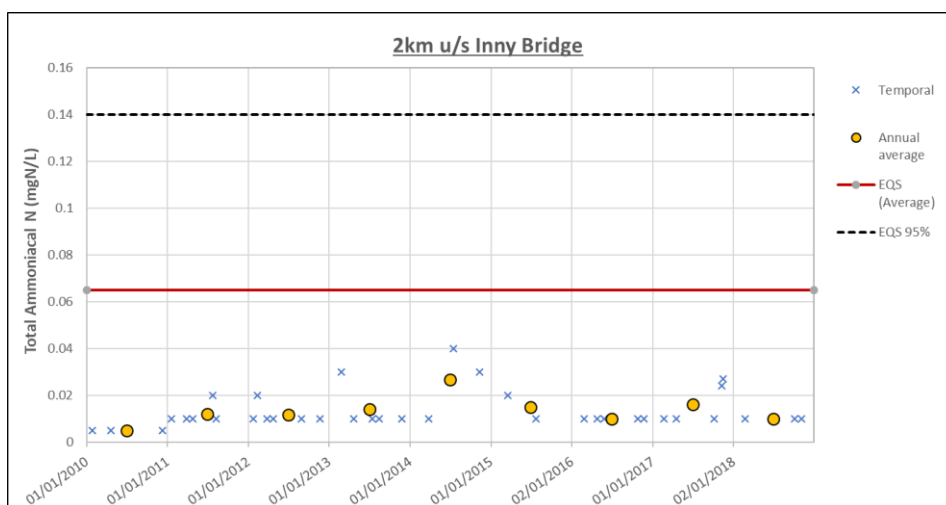


Figure 2-2: Ammonia chemistry INNY (KERRY)_030 at EPA monitoring station

3 Significant pressures

3.1 Initial EPA characterisation

Table 3-1: Initial EPA characterisation

Water body Name	Id	Category	Subcategory	Name	Significant?	Pressure & Impact details
OWROE_010	WBP0003945	Extractive Industry	Peat	n/a	No	
	WBP0005476	Forestry	Forestry	n/a	Yes	Nutrient Pollution, Altered habitat due to Morphological changes
	WBP0005477	Hydromorphology	Land Drainage	n/a	Yes	Altered habitat due to Morphological changes
INNY (KERRY)_010	WBP0003947	Forestry	Clearfelling	n/a	Yes	Nutrient Pollution, Altered habitat due to Morphological changes
	WBP0003948	Forestry	Forestry	n/a	Yes	Nutrient Pollution, Altered habitat due to Morphological changes
	WBP0003949	Extractive Industry	Peat	n/a	No	
INNY (KERRY)_020	WBP0003950	Forestry	Forestry	n/a	Yes	Nutrient Pollution, Altered habitat due to Morphological changes
	WBP0003952	Extractive Industry	Peat	n/a	No	
	WBP0005473	Extractive Industry	Quarries	n/a	Yes	Nutrient Pollution, Altered habitat due to Morphological changes
	WBP0005475	Forestry	Clearfelling	n/a	Yes	Nutrient Pollution, Altered habitat due to Morphological changes
INNY (KERRY)_030	WBP0003954	Extractive Industry	Peat	n/a	No	
	WBP0005474	Forestry	Clearfelling	n/a	Yes	Nutrient Pollution, Altered habitat due to Morphological changes

3.2 Interim conclusion on the Significant Pressures:

Both the headwater streams; Owroe_010 and Inny (Kerry) 010 dropped in status from good to moderate. They are hydrologically independent of each other, so there are significant pressures in each catchment. Owroe_010 has a relatively small proportion of cultivated land, primarily pasture and forestry (Appendix A). The area of afforestation is much more extensive in Inny (Kerry) 010. There has been some recent felling in both catchments, mostly in Inny (Kerry) 010 according to local information. Inny (Kerry) 010 also has peat extraction and a quarry. There are only a handful of houses in the area. Both catchments are characterised by invertebrate populations with tolerant mayfly (*Baetis rhodani*, *Serratella ignita*) common (Owroe_10) or abundant (Inny (Kerry) 010). This might indicate the presence of algae and nutrient enrichment. Potential source is fertiliser applications to reclaimed land along the river channel and phosphate release from recent felling.

INNY (KERRY)_020 and INNY (KERRY)_030 are much larger and less mountainous. INNY (KERRY)_020 has a lot of forestry in the lateral tributaries and reclaimed pasture along the river channel itself, as well as extensive areas of peat extraction. There are also two quarries: QY 135, now closed and QS-0132. Potential issues are siltation of the stream bed and phosphate due to drainage and phosphate applications from agriculture and forestry felling.

INNY (KERRY)_030 has mostly pasture, peat bogs and housing; there is little forestry. There is also a quarry (Qy036, Qs-1233). Again, potential issues are drainage and phosphate application associated with agriculture, and potentially domestic wastewater. Siltation and eutrophication by phosphate are likely the main issues, although concentrations are low, the ecologist's notes indicate filamentous algae cover was 10-25% in 2015, which biologist noted as excessive for the site.

4 Pathways information (diffuse pollution)

The areas of highest potential for diffuse phosphate runoff are ‘improved’ agricultural lands that occur on alluvial soils along the main river channel and localised areas of poorly draining mineral soils throughout the catchment (Table 4-1, Fig B-1, Fig B-2).

Table 4-1: Pathway information check list

Factor	Description
Aquifer type	Ll: locally important aquifer which is moderately productive only in local zones
Topography	glaciated valleys - high mountain steep slopes, rel flat valley floor
Bedrock unit	devonian old red sandstone
GWB	Beara Sneem (IE_SW_G_019) Poorly productive bedrock
Gwb flowpath	Due to the generally low permeability of the aquifers within this GWB and the high slopes, a high proportion of effective rainfall will runoff, or discharge rapidly to surface water courses via interflow and shallow flow. Baseflow to rivers and streams is likely to be relatively low. GW is generally concentrated in a thin zone at the top of the rock, although deeper groundwater flows along faults and major fractures.
Subsoil type	Rock, blanket peat, Alluvial and TDSS (Sandstone till Devonian)
Subsoil permeability	n/a in mountains, moderate in valley, low along riparian zone
Groundwater vulnerability	X&H on mountain slopes, moderate on valley, low by the river.
Soil type	Acid mineral shallow rocky peaty (AminSRPT), blanket peat (BkPT), acid mineral poorly draining peaty (AminPDPT), Alluvial mineral (AlluvMin), Acid min deep well drained (Inny (kerry) 30).
Soil drainage	Poor (blanket peat and poorly drained soil). Some well drained in Inny (Kerry) 30 south of river.
PO4 susceptibility (surface)	mostly moderate, high on alluvial soil near channel
NO3 susceptibility (surface)	low
NO3 susceptibility (sub surface)	very low
PO4 PIP (Surface water)	moderate to low
NO3 pip (Surface water)	low
NO3 pip (ground water)	low
likely main pathways	near surface - drainage and overland flow
likely CSAs (critical source areas)	improved pasture along riparian zone

5 Interim conclusions on the PAA

- The Inny area for action consists of four waterbodies: Owroe_010 and Inny (Kerry)_010, Inny (Kerry)_020 and Inny (Kerry)_030.
- All four waterbodies are 'Moderate' ecological status and thus *At Risk* of not meeting their WFD objectives (Good status).
- The four waterbodies deteriorated since the first WFD cycle, dropping from Good to Moderate:
 - Owroe 10 dropped from Good to Moderate in 2012
 - Inny 010, Inny 020 and Inny 030 dropped from Good to Moderate in 2015
- It is not evident what the significant issues are. Water chemistry is only available for Inny (Kerry)_030 and indicates that concentrations of ortho-P, TON and ammonia are low. Sediment could be an issue given the nature of the catchment – peaty soils, high rainfall, steep slopes.
- The significant pressures are likely to be agriculture and forestry. Drainage associated with pasture, afforestation and peat extraction is causing hydromorphological changes. In addition, there is the potential for diffuse phosphate from agriculture and forest clear-felling.
- Some areas along main river channel are high phosphate PIP areas due to the poorly draining alluvial and peaty-mineral soils and thus a potential critical source area for nutrient runoff. See maps Appendix B.
- Specific pressures per waterbody are outlined below:
 - Owroe 010 consists primarily of blanket bog and thin rocky soils. Most of the catchment is uninhabited. Little forestry. Localised land reclamation along the river channel.
 - Inny 010: recent afforestation in the northern half of the catchment. Land reclaimed for agriculture along the southwest upstream of the monitoring point. Extractive industry (QY 059) in the forestry in the headwaters.
 - Inny 020: two inactive quarries, extensive forestry on blanket bog, improved land on alluvial soils – high potential for phosphate runoff
 - Inny 030: much more extensive areas of pasture and less forestry. High phosphate PIP on alluvial soils along the southern bank of the river and in the northern half of the catchment.

6 Workplan

6.1 EPA further characterisation actions

WB Name	Id	Action	Responsible Organisation	Further Characterisation Action details
OWROE_010	FC002586	IA7 Multiple Sources in Multiple Areas	Local Authority Waters Programme (LAWPRO)	IA7 to focus on forestry pressures but also hydromorphological pressures including land reclamation. There is peat here but no extraction.
INNY (KERRY)_010	FC002583	IA7 Multiple Sources in Multiple Areas	Local Authority Waters Programme (LAWPRO)	Aim: forestry and associated activities have been identified as the pressure. Focus the investigation on forestry. Full IA7.
INNY (KERRY)_020	FC002584	IA7 Multiple Sources in Multiple Areas	Local Authority Waters Programme (LAWPRO)	Full IA7 to focus on both impacts from forestry and local quarries. (note: Qy135, not active)
INNY (KERRY)_030	FC002585	IA7 Multiple Sources in Multiple Areas	Local Authority Waters Programme (LAWPRO)	IA7 to focus on forestry and clearfelling (and related activities) Also GW abstraction (Maulin PWSS 066H); River WB abstraction (Maulin PWSS 066H) Extractive industry (Qy 036, QS-01233).

EPA 2018

6.2 Local Catchment Assessment

Local catchment assessment should involve carrying out assessments at bridge access points to isolate the issues (IA7: Catchment (stream) walk in rural areas for streams that are >1km in length). Focus on the head waters first: Owroe_010 and Inny (Kerry)_010 to determine if the issues here are impacting the receiving waters downstream. Forestry and improved pasture are in the lower reaches of both headwaters; by carrying out assessments upstream and downstream so it should be possible to isolate the significant pressures. Maps of proposed sites for assessment are included in Appendix B.

7 Review of possible mitigation options

Possible mitigation options include interpreting nutrient and sediment pathways to watercourses. Given the high rainfall and surface driven flow paths, this would involve buffer margins along waterways and restoring/enhancing retention within the catchment through wet grassland and peat habitat management and/or the use of alluvial/riparian woodland.

8 Communications

Public meeting Dromid Centre, Cillín Liath, Waterville, Co. Kerry. 5th June 2019.

Streamside meeting for farmers to be organised by Teagasc Agricultural Sustainability, Support and Advice Programme (ASSAP)

Appendix A: Catchment land use and licensed discharges

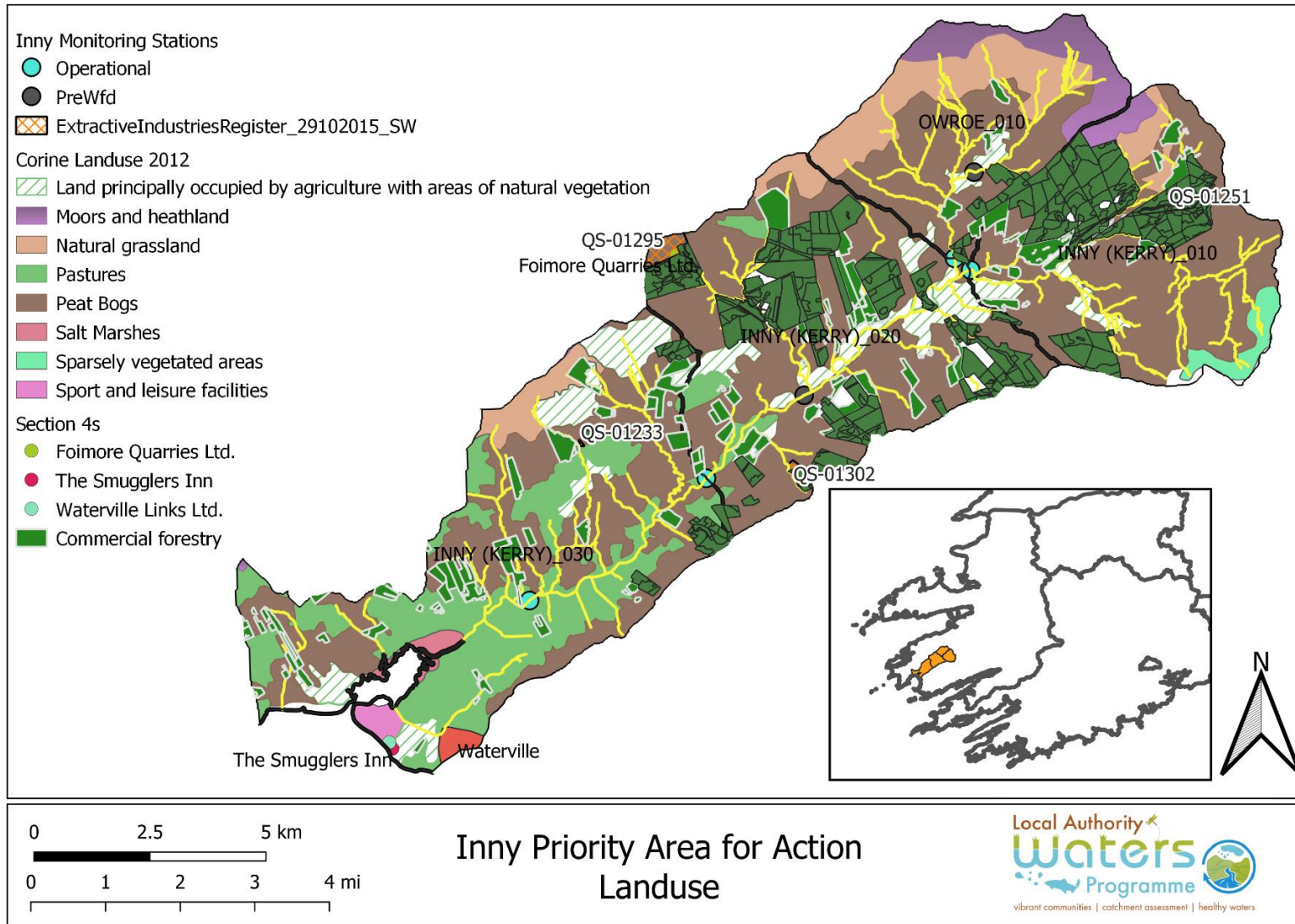


Figure A-1: Landuse and licensed discharges in the Inny PAA (Corine 2018, EPA 2018)

Appendix B: Surface water phosphate impact potential map

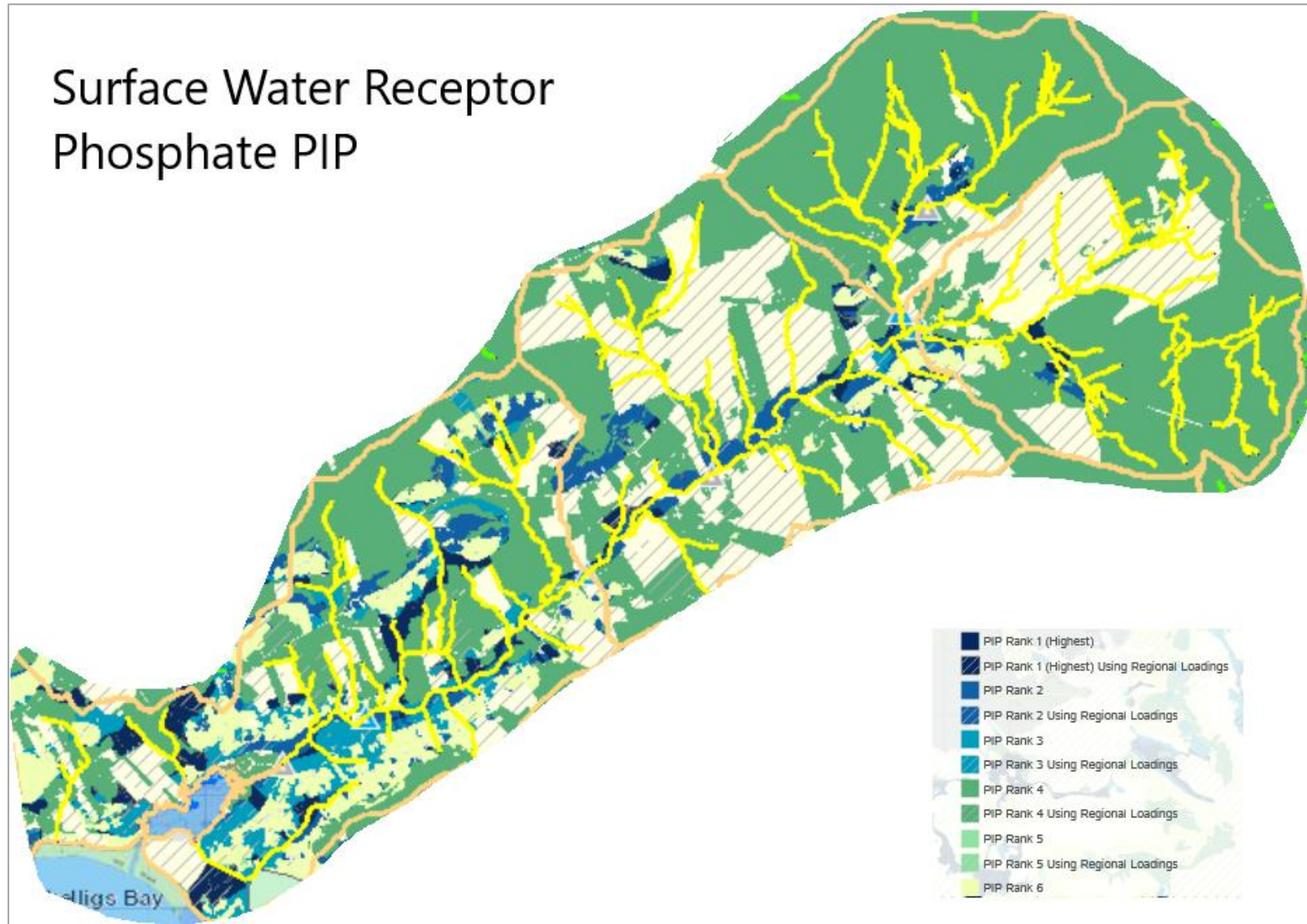


Figure B-1: Surface water phosphate impact potential map (EPA 2018)

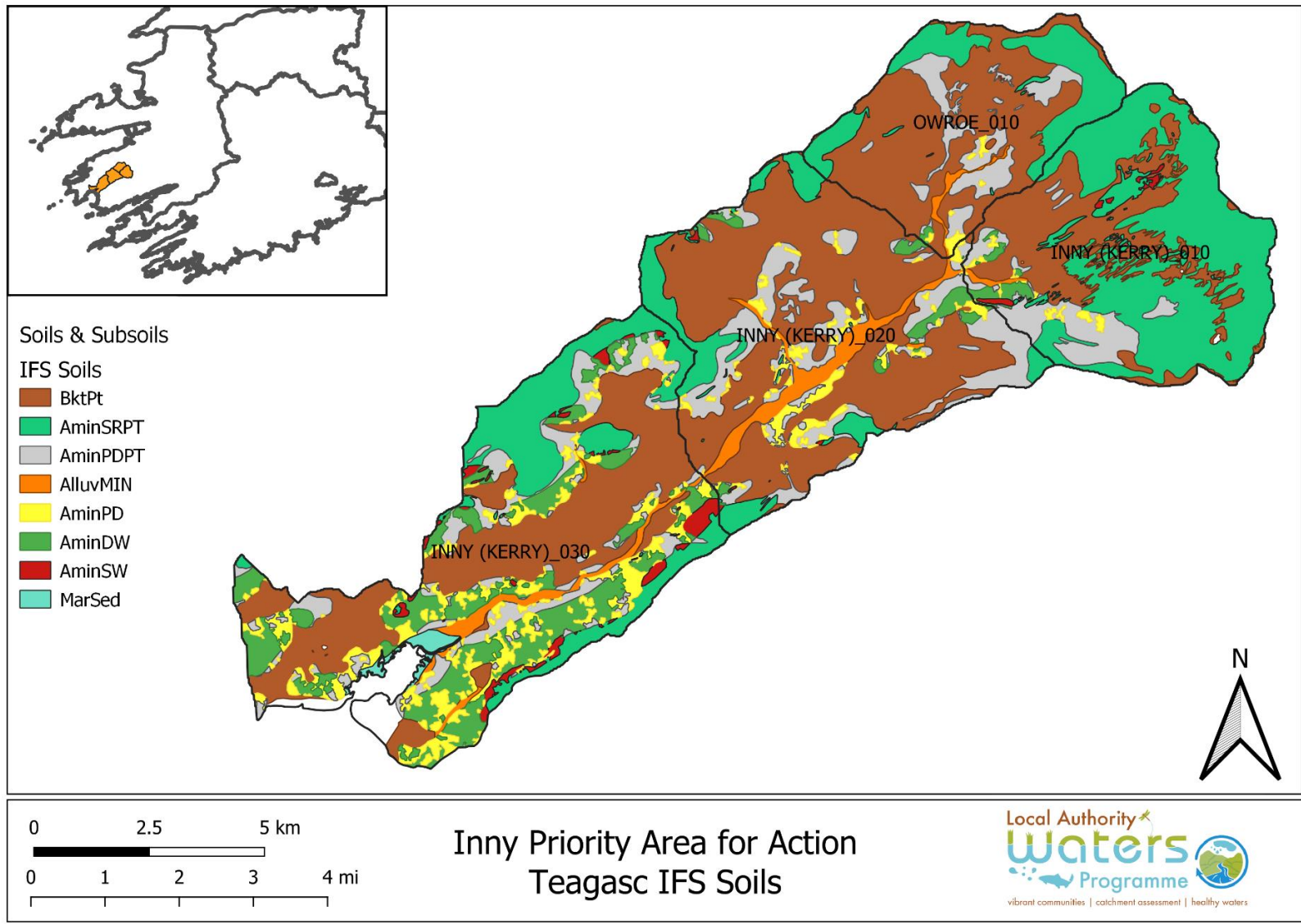
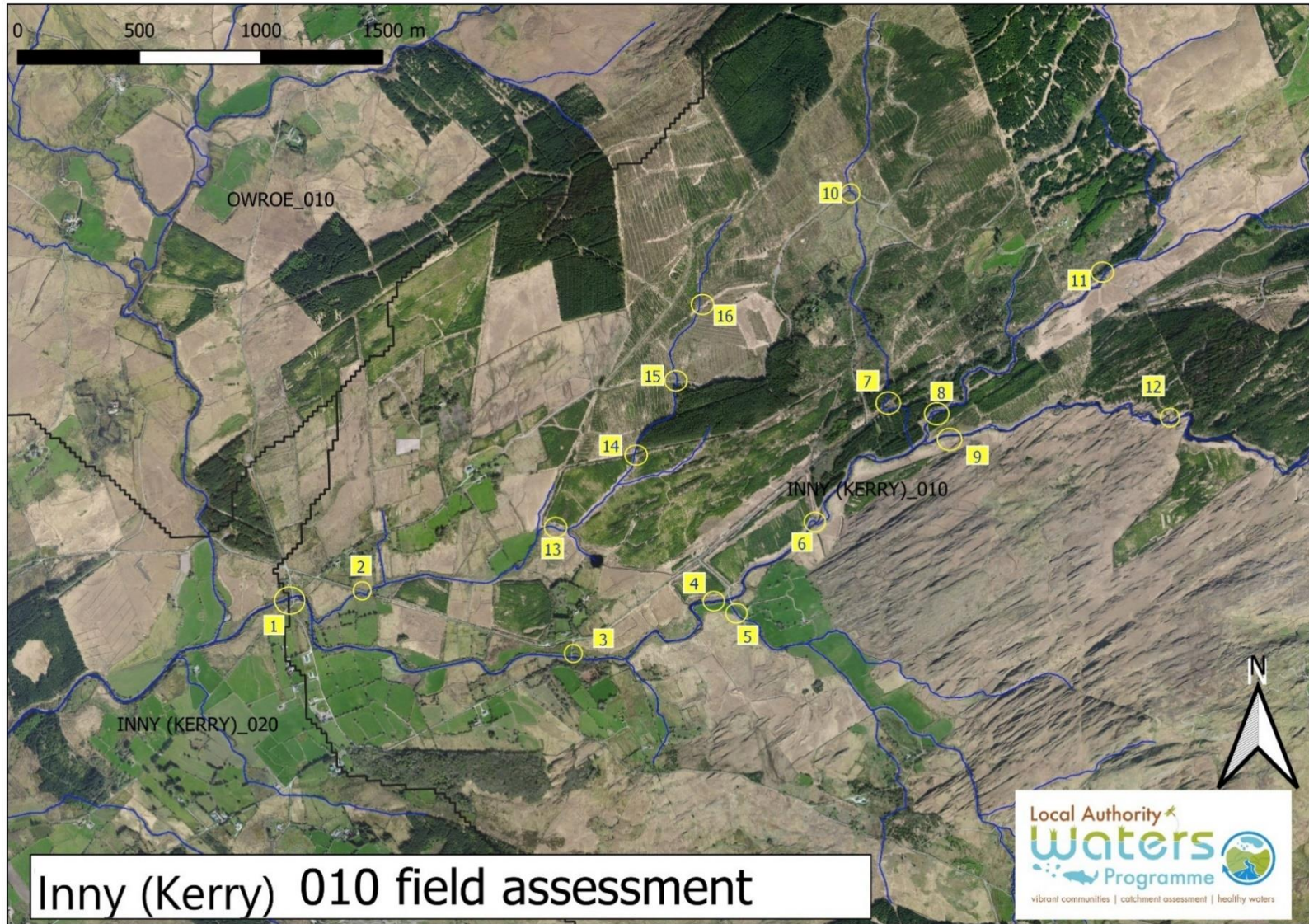
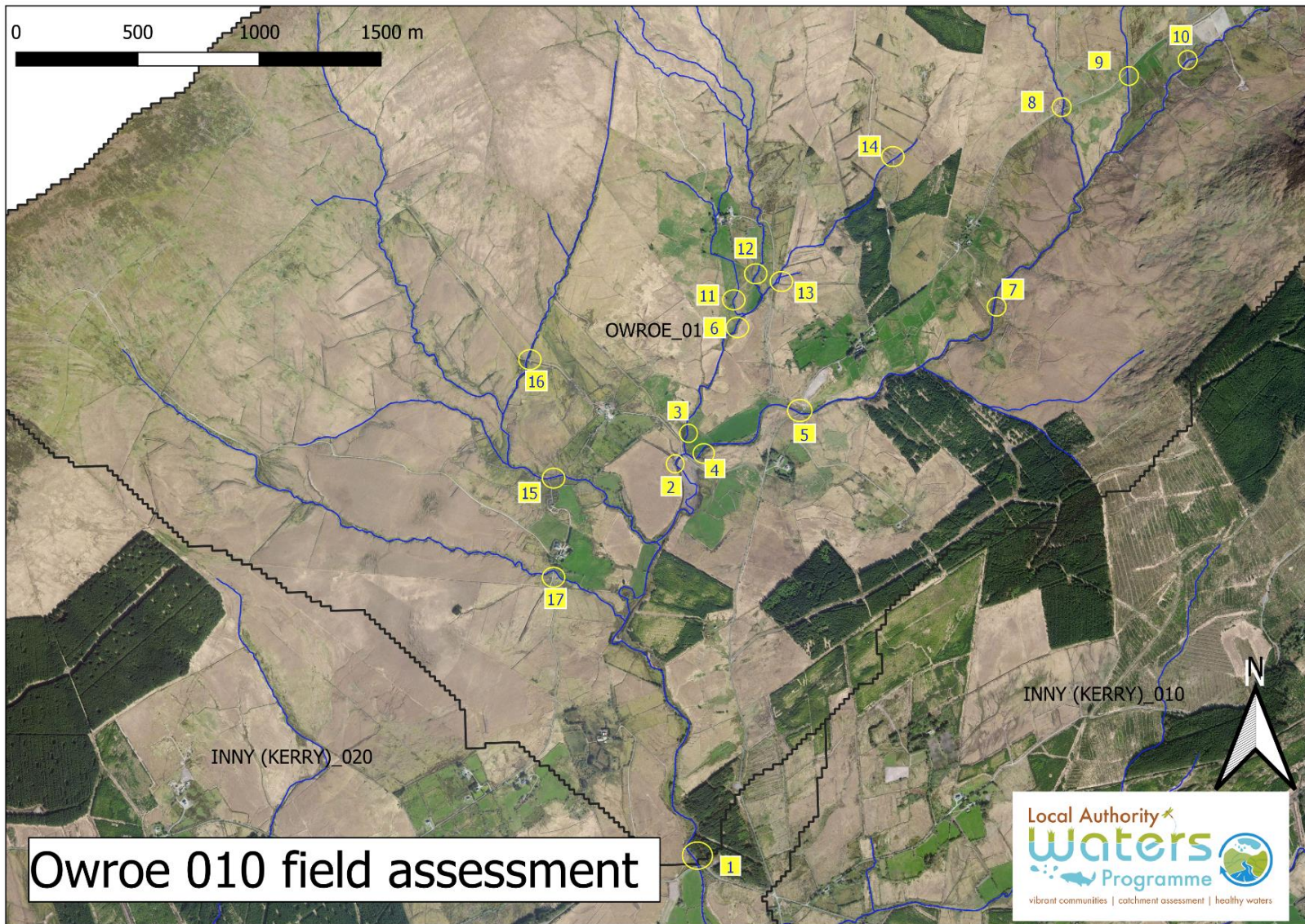


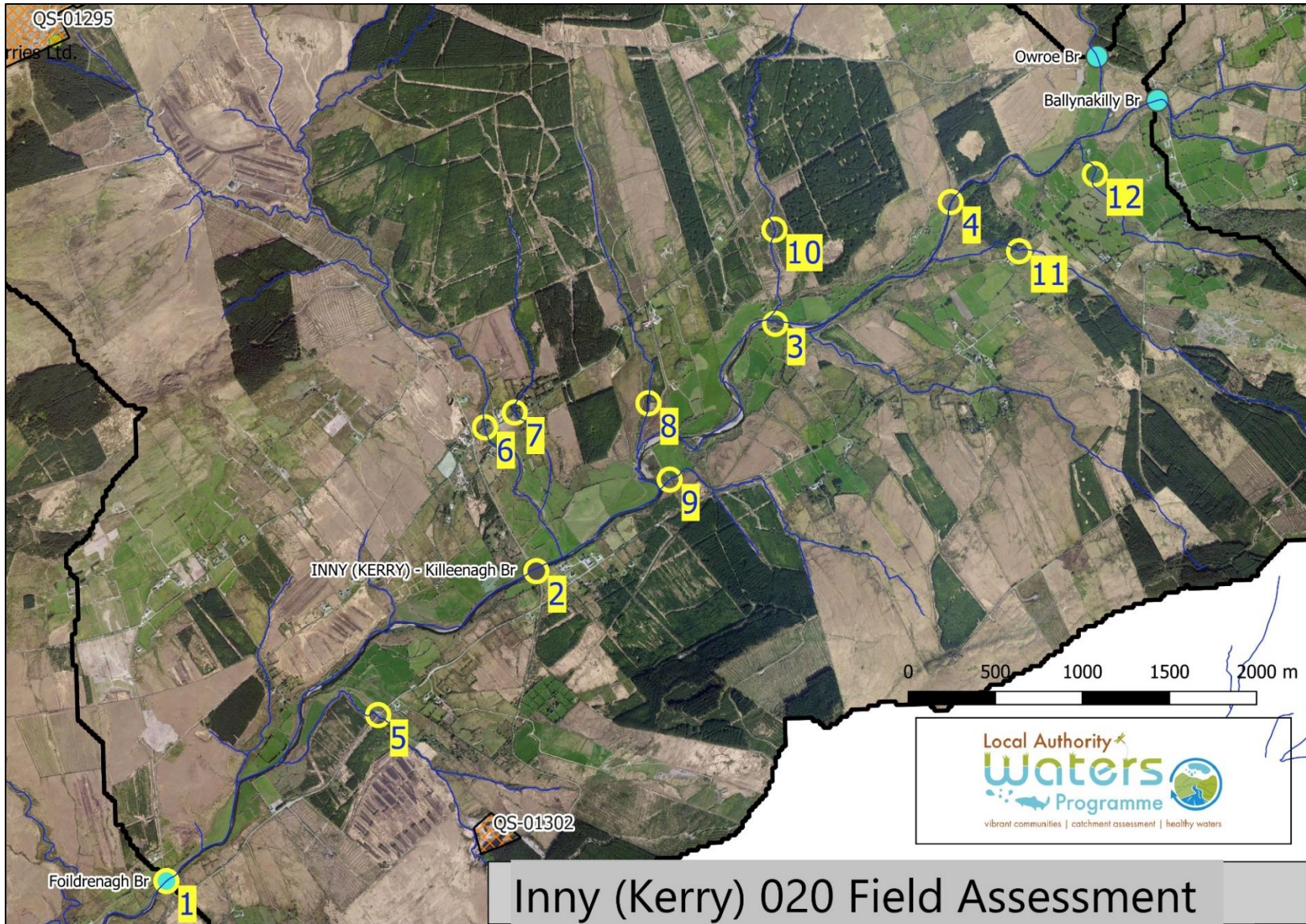
Figure B-2: Teagasc indicative forest soils map for the Inny PAA (Teagasc)

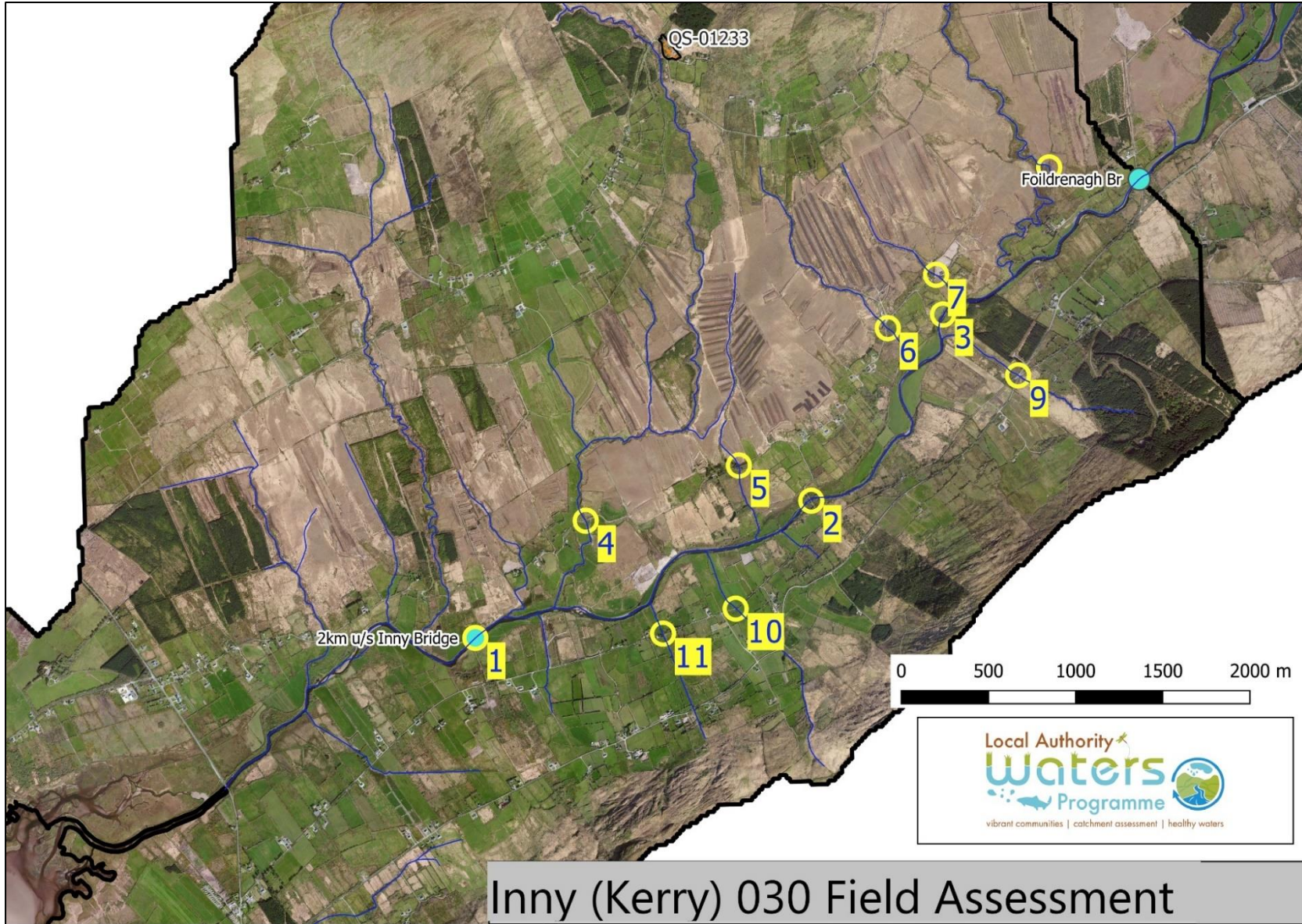
Appendix C: Preliminary workplan: proposed sites for sampling



Inny (Kerry) 010 field assessment







Inny (Kerry) 030 Field Assessment

Appendix D: Inny Strand Bathing Water Quality

Trá na hUíne (Inny Strand, Waterville) is classified as achieving Good Water Quality in 2018 based on the assessment of bacteriological results for the period 2015 to 2018. Trá na hUíne (Inny Strand, Waterville) had a Good Water Quality rating in 2017 and achieved an Excellent Water Quality rating in 2016 and 2015. Annual water quality ratings are generally calculated using monitoring results over a four-year period and are assessed against stringent bacterial limits to protect bather health.

Annual Water Quality Rating

2018	2017	2016	2015
Good Quality	Good Quality	Excellent Quality	Excellent Quality

Historical Results

Date	E-Coli Result	Intestinal Enterococci Result	Water Sample Status	Date	E-Coli Result	Intestinal Enterococci Result	Water Sample Status
09/09/2019	<10	<1	Excellent	08/08/2016	<10	3	Excellent
02/09/2019	64	5	Excellent	25/07/2016	10	3	Excellent
26/08/2019	<10	1	Excellent	18/07/2016	124	9	Excellent
19/08/2019	531	17	Sufficient	11/07/2016	20	2	Excellent
12/08/2019	178	3	Excellent	04/07/2016	20	22	Excellent
08/08/2019	10	<10	Excellent	20/06/2016	453	20	Good
24/07/2019	53	3	Excellent	13/06/2016	<10	<10	Excellent
22/07/2019	>2005	80	Poor	07/06/2016	<10	<1	Excellent
15/07/2019	10	1	Excellent	30/05/2016	20	<1	Excellent
08/07/2019	53	<1	Excellent	07/09/2015	<10	<1	Excellent
01/07/2019	<10	<1	Excellent	24/08/2015	87	4	Excellent
17/06/2019	<10	1	Excellent	10/08/2015	31	11	Excellent
10/06/2019	<10	<1	Excellent	04/08/2015	429	75	Good
04/06/2019	<10	2	Excellent	20/07/2015	42	9	Excellent
27/05/2019	10	<1	Excellent	13/07/2015	885	57	Sufficient
10/09/2018	64	69	Excellent	06/07/2015	53	10	Excellent
27/08/2018	406	53	Good	29/06/2015	178	8	Excellent
13/08/2018	<10	5	Excellent	15/06/2015	20	<1	Excellent
07/08/2018	<10	2	Excellent	08/06/2015	64	8	Excellent
23/07/2018	<10	1	Excellent	03/06/2015	53	9	Excellent
16/07/2018	<10	7	Excellent	25/05/2015	<10	2	Excellent
02/07/2018	<10	<1	Excellent	08/09/2014	42	4	Excellent
18/06/2018	64	1	Excellent	25/08/2014	53	8	Excellent
11/06/2018	<10	<1	Excellent	11/08/2014	20	15	Excellent
05/06/2018	<10	<1	Excellent	05/08/2014	42	1	Excellent
22/05/2018	10	<1	Excellent	21/07/2014	53	11	Excellent
11/09/2017	1184	12	Poor	07/07/2014	30	1	Excellent
28/08/2017	<10	5	Excellent	30/06/2014	<10	<1	Excellent
14/08/2017	<10	<1	Excellent	23/06/2014	<10	<1	Excellent
08/08/2017	192	1	Excellent	16/06/2014	<10	<1	Excellent
24/07/2017	<10	<1	Excellent	09/06/2014	42	15	Excellent
17/07/2017	<10	2	Excellent	03/06/2014	<10	1	Excellent

10/07/2017	31	4	Excellent	26/05/2014	10	2	Excellent
03/07/2017	<10	<1	Excellent	09/09/2013	10	<1	Good
26/06/2017	<10	<1	Excellent	26/08/2013	20	2	Good
19/06/2017	<10	<1	Excellent	12/08/2013	<10	<1	Good
06/06/2017	288	12	Good	06/08/2013	10	3	Good
29/05/2017	<10	<1	Excellent	22/07/2013	75	1	Good
13/09/2016	111	2	Excellent	08/07/2013	<10	<1	Good
30/08/2016	10	<1	Excellent	01/07/2013	75	3	Good
15/08/2016	10	<1	Excellent	24/06/2013	<10	2	Good

Source: www.beaches.ie

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