Desk Study

Inch (Bilboa) Priority Area for Action

AFA0090

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Acknowledgements

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Data attribution

The following data sources were consulted in the preparation of this report:

Catchment boundaries; waterbodies and areas for action: EPA (2018); Bedrock Unit: GSI (2008); Aquifer Category: GSI (2015); Groundwater body: EPA Catchments Unit (2019); Soils & Subsoils Maps: Teagasc (2015); IFS Soils: EPA (2006); Susceptibility and Pollution Impact Potential Maps: EPA (2019); WFD waterbody status: EPA (2019); SAC boundaries: NPWS (2018).

1 Background

The Inch (Bilboa) PAA is located within the Lower Shannon Catchment in west County Tipperary near Kilcommon. It is one of the headwaters of the Mulkear catchment.

Catchment assessment workshops to collaboratively undertake a prioritisation process to select areas to be addressed during the 2nd river basin management planning cycle (2018-2021) were held in Limerick on the 29th of June 2017, Ballincollig on 4-5 June 2017 and Killarney on 6-7 June 2017. They were attended by representatives of the local authorities (Kerry, Cork City, Cork County, Tipperary, Limerick City and County, Clare and Galway), LAWCO, Irish Water, IFI, Forest Service, Coillte, NPWS, DHPLG, GSI, NFGWS, DAFM Marine Institute, Bord Iascaigh Mhara, Sea Fisheries Protection Authority, Waterways Ireland, National Water Forum, Raptor Life IRD Duhallow, Kerry Life Project, ESB and EPA. Based on the draft River Basin Management Plan priorities, a set of agreed principles and the priorities of the workshop attendees, 59 areas were recommended for action in the South West region and the Inch (Bilboa) PAA was chosen because:

- Opportunity to look at integration of planning and forestry activities.
- Headwaters of one of the most important spawning streams in the system.
- One deteriorated waterbody.
- Waterbody is not meeting protected area objectives for Salmon.

The Inch (Bilboa) is a single waterbody, illustrated in **Figure 1**. A summary of the initial characterisation carried out by the EPA, outlining the ecological status, pressures and associated significance is presented in **Table 1** below**.**

Table 1. Summary table of water bodies within the Inch (Bilboa) PAA.

WB Code	WB Name	WFD Risk	Status Obj.	Biological Status			Pressure Category	Pressure Subcat.	Sig. Pressure
				2012	2015	2018			
IE_SH_25I010008	Inch (Bilboa)_010	*At Risk*	Good	M	M	M	Forestry	Clear-felling	Yes
							Agriculture	Agriculture	Yes

1.1 EPA recommendations for further action in this area

The initial characterisation sub-catchment assessments undertaken by the Environmental Protection Agency (EPA) recommended that the following action be undertaken in this water body:

- Inch (Bilboa)_010: IA7 Multiple Sources in Multiple Areas
  Aim: to identify the main source of pollution on the RWB, focusing on forestry and agriculture.
  Details: Review existing SSRS. Catchment walk, lots of pressures spread throughout the sub-basin. Collect field parameters, use field parameters to guide location of SSRS and water quality samples.

2 Receptor Information and Assessment

2.1 Inch (Bilboa)_010

The Inch (Bilboa)_010 rises on the slopes of Knockmaroe Hill, in the Slievefelim mountains on the Tipperary/ Limerick border. It flows west into the Bilboa_010 and is one of the headwaters of the Mulkear River catchment.

There are two biological (or Q) monitoring stations in this water body:

- RS25I0100006 Br SE of Loughbrack and
- RSI0100008 Br u/s R Confl

There are no chemistry data available for the Inch (Bilboa)_010.

Biological quality at the downstream monitoring station (RSI0100008 Br u/s R Confl) which is just upstream of the confluence with the Bilboa river, has consistently been at good status (Q4) since 1999, except on one occasion in 2005 when it was at high status (Q4-5). However, at the upstream monitoring station (RS25I0100006 Br SE of Loughbrack) biological quality has been consistently moderate status. Silt deposition was recorded at this site in 2002 and in 2018 but not in other years.

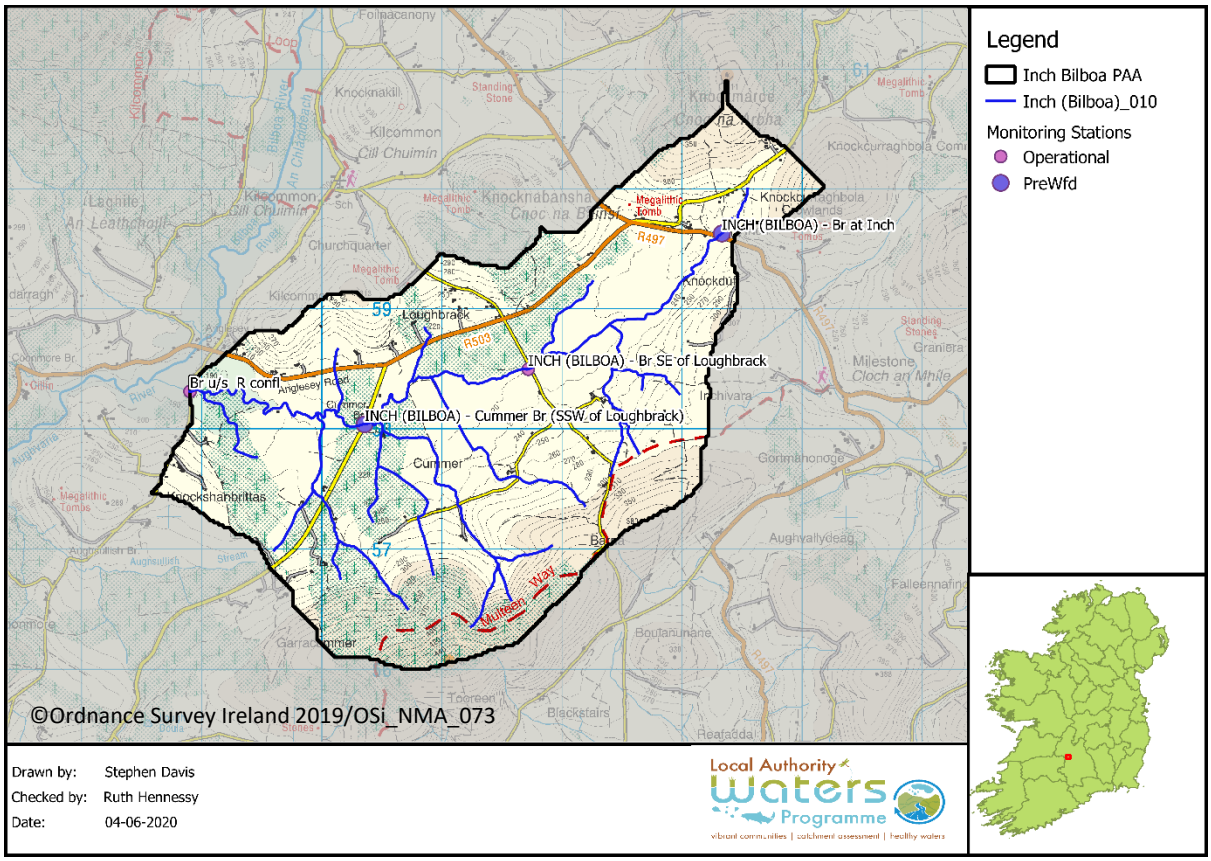
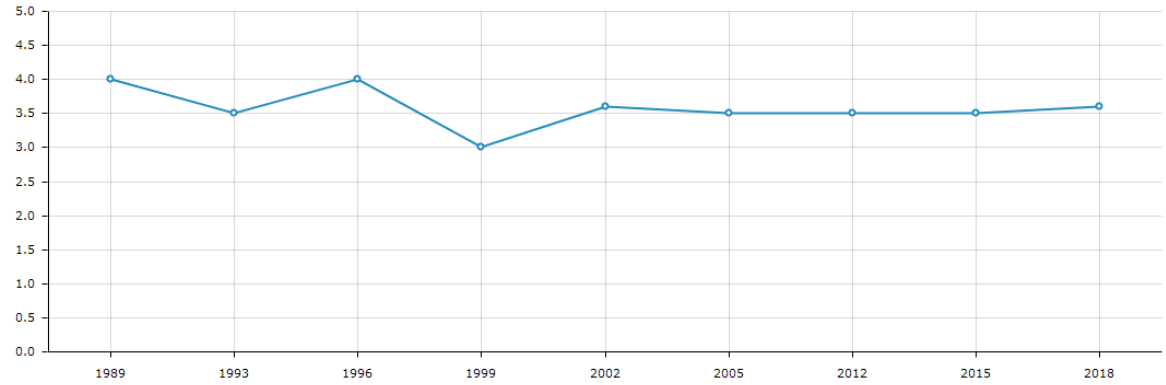


Figure 1. Monitoring stations located within the Inch (Bilboa) PAA.

Table 2. Receptor information for the Inch (Bilboa)_010.

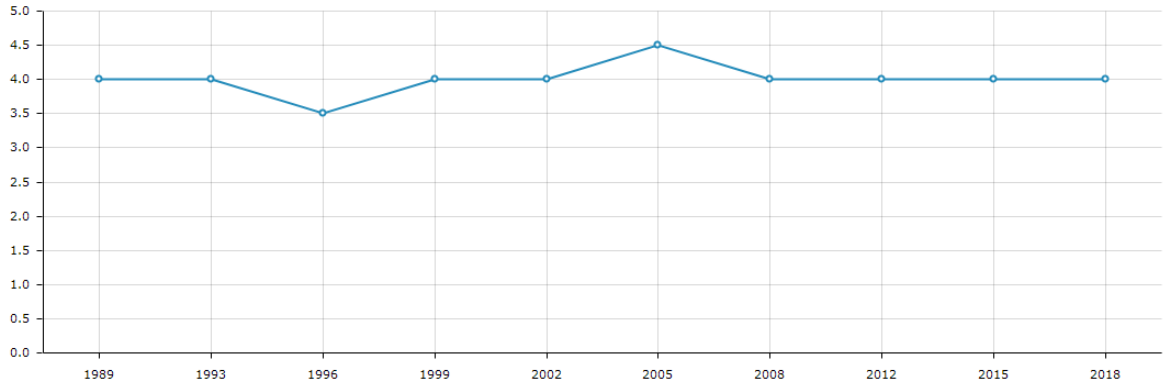
Factor	Br SE of Loughbrack	Br u/s of R Confl
Risk Category	*At Risk*	*At Risk*
Biological Status		
Monitoring Station(s) with Q-Values	Br SE of Loughbrack	Br u/s of R Confl
2015 Status	Moderate	Good
2012 Status	Moderate	Good
2008 Status	N/A	Good
2005 Status	Moderate	High
Trends in Q value since 2009	No change (Figure 2)	No change (Figure 3)
Hydrochemistry Data		
Monitoring Station(s) with data	None	None
Existing	N/A	N/A
New	N/A	N/A
Summary & Trends in PO_4, NH_3 and NO_3		
In App	N/A	N/A
All available data	N/A	N/A
Other water quality data	N/A	N/A
Baseline Concentration (mg/l)	N/A	N/A
Other relevant values	N/A	N/A
Distance to threshold	N/A	N/A
Supporting Conditions		
Chemical Conditions	N/A	N/A
Oxygenation Conditions	N/A	N/A
Acidification Conditions	N/A	N/A
Hydromorphology		
RHAT Score	N/A	N/A
Evidence of arterial drainage	None	None
Protected Areas	Lower River Shannon SAC	
WFD Objective	Good	
EPA biologist notes (if any)	The ecological conditions of the two sites assessed on the Inch (Bilboa) remained the same in 2018 as had been the case in 2011 and 2015. However, considerable silt deposition was noted at the upper site, probably exacerbated by low flow allowing silt to settle.	
Significant issue	Sediment at Br SE of Loughbrack & Unknown	Unknown

Inch (Bilboa) PAA



	1989	1993	1996	1999	2002	2005	2012	2015	2018
Result	4	3.5	4	3	3.6	3.5	3.5	3.5	3.6
Classification	Good	Moderate	Good	Poor	Moderate	Moderate	Moderate	Moderate	Moderate
Q-Value	4	3-4	4	3	3-4*	3-4	3-4	3-4	3-4*

Figure 2. Q-values from 1989 – 2018 at Br SE of Loughbrack.



	1989	1993	1996	1999	2002	2005	2008	2012	2015	2018
Result	4	4	3.5	4	4	4.5	4	4	4	4
Classification	Good	Good	Moderate	Good	Good	High	Good	Good	Good	Good
Q-Value	4	4	3-4	4	4	4-5	4	4	4	4

Figure 3. Q-values from 1989 – 2018 at Br u/s of R Confl.

2.2 Protected Areas

There are two Natura 2000 protected areas within the Inch (Bilboa) PAA (**Table 3**; **Fig. 4**).

Table 3. Protected areas within the Inch (Bilboa) PAA.

Protected Area	Water Body	Type	Association Type
Lower River Shannon SAC	Inch (Bilboa)_010	SAC	Overlapping/partly within protected area
Slievefelim to Silvermines Mountains SPA	Inch (Bilboa)_010	SPA	Overlapping with the PAA

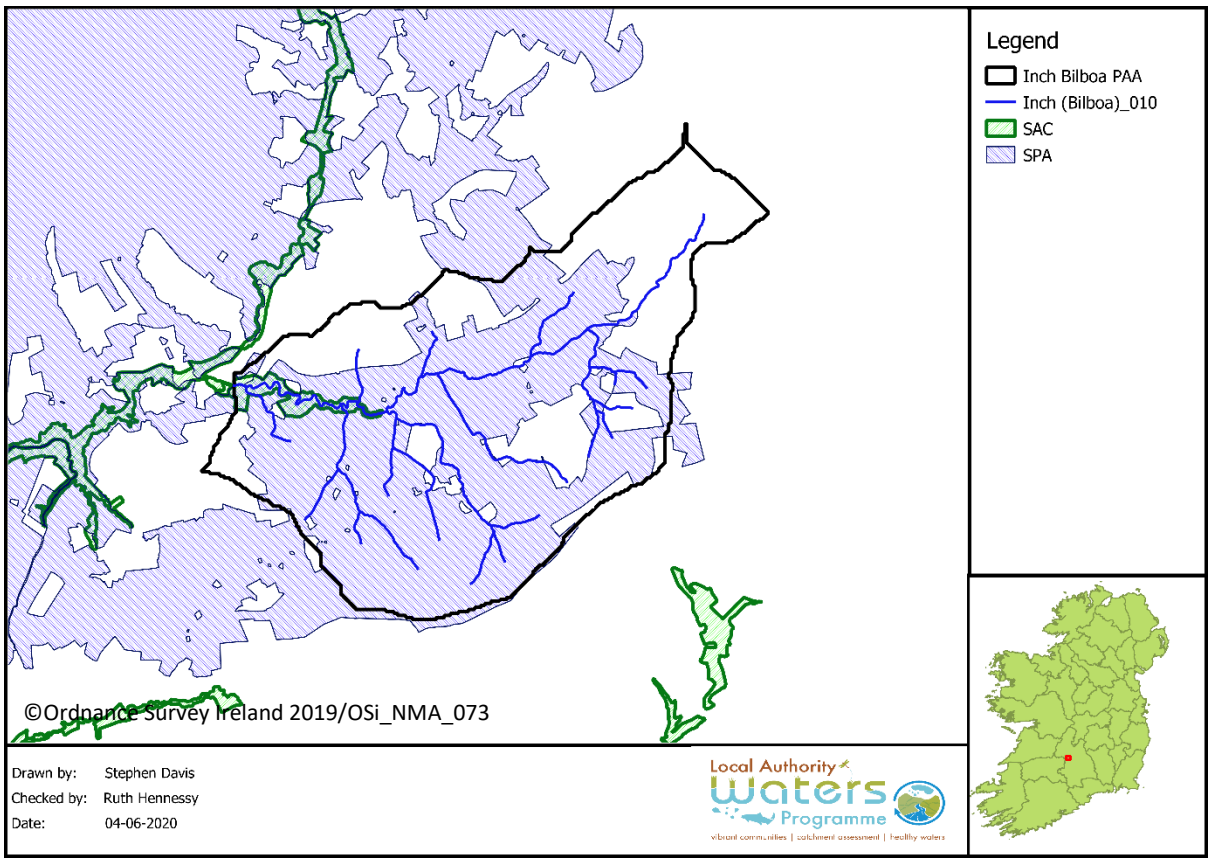


Figure 4. Protected areas within the Inch (Bilboa) PAA.

The Lower River Shannon SAC overlaps partly with the Inch (Bilboa) PAA. The overlapping occurs from the Br u/s of R Confl monitoring point to Cummer Bridge.

Much of the Inch (Bilboa) PAA is within the Slievefelim to Silvermines Mountains SPA. National Parks and Wildlife Service Natura 2000 database indicates the following:

Inch (Bilboa) PAA

- This Special Protection Area supports c. 3% of the all-Ireland population of Hen Harrier (*Circus cyaneus*) and among the top 5 most important sites in the country for the species. Habitat is excellent for both nesting and foraging purposes.
- Also has nesting Perregrine Falcon (*Falco peregrinus*), Merlin (*Falco columbarius*) and Red Grouse (*Lapopus lagopus*), the latter a Red Data Book species.

3 Significant Pressures

Forestry and agriculture have been identified as significant pressures within the PAA during the initial characterisation carried out by the EPA. The EPA biologist noted heavy sedimentation at the monitoring point Br SE of Loughbrack in 2018. The source of the sediment is not clear and sediment was also noted by the EPA biologist in 2002. The biologist suggests that the low water levels in 2018 may have made this issue more noticeable than in other years.

Table 4. Significant Pressures identified for the Inch (Bilboa) PAA by the Initial Characterisation process.

Waterbody	Pressure Category	Sub-category	Significant Pressure
Inch (Bilboa)_010	Forestry	Clear-felling	Yes
	Agriculture	Agriculture	Yes

3.1 Agriculture

Agriculture was identified by the EPA as a significant pressure during the initial characterisation and a potential source of nutrient pollution. There are no water quality data for this water body. The Corine land use map (**Fig. 5**) has categorised pasture as being the dominant land use in the PAA totalling 907 hectares. However, aerial photography maps indicate that this may be more likely to be rough grazing rather than permeant pasture intensive grasslands.

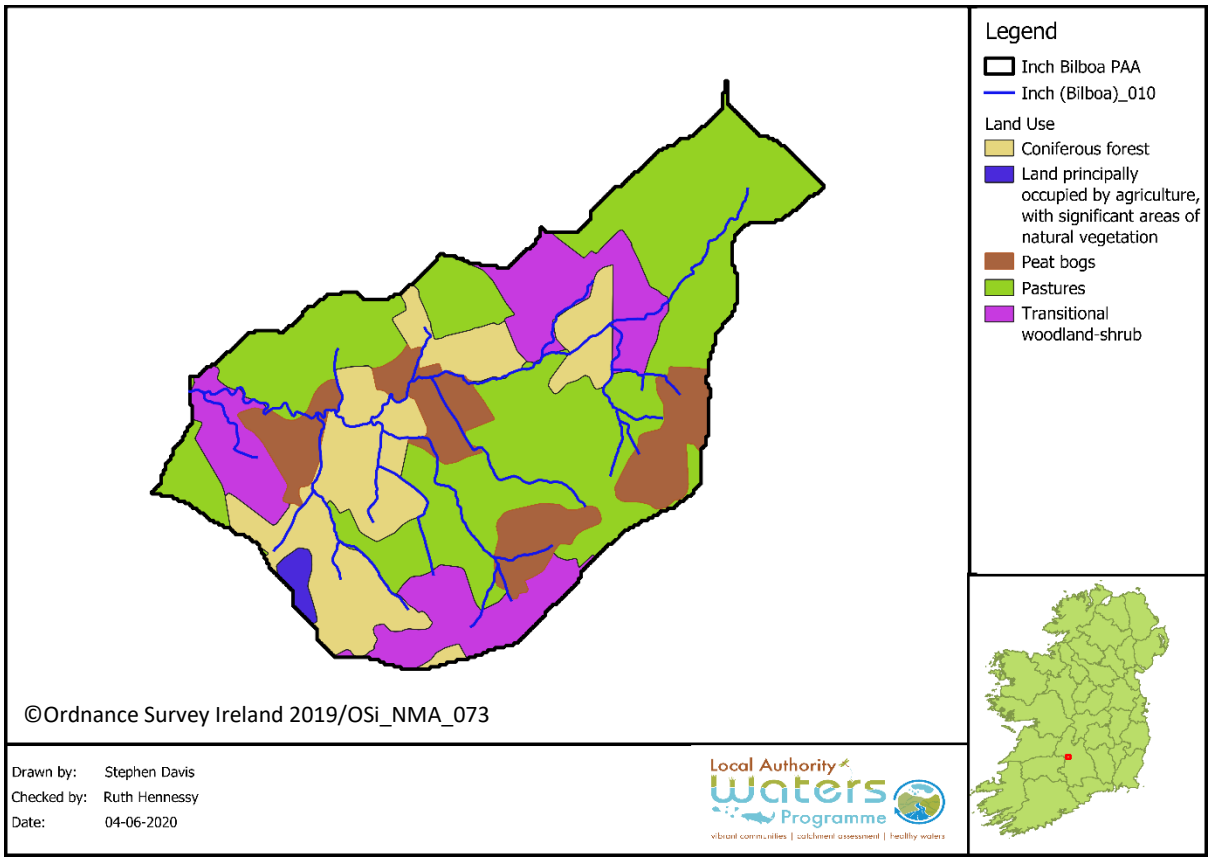


Figure 5. Land Use within the Inch (Bilboa) PAA.

3.2 Forestry

Forestry is the second most dominant land use within the PAA after agriculture (pasture), with privately owned segments accounting for 343 hectares and 205 hectares operated by Coillte, as illustrated in **Fig. 5**. The majority of the forestry occurring along the main river channel was planted in the 1990's and 2000's after the introduction of the Forestry and Water Quality Guidelines and therefore should have appropriate measures to protect water quality (e.g. water setbacks, native woodland buffers at reforestation). In both the private and Coillte forestry the main species planted is Sitka Spruce.

Information from the Department of Agriculture Forest Service confirms that there was an area of forestry clearfelled in 2017/2018 (**Fig. 6**), immediately upstream of the monitoring station where the EPA biologist recorded moderate status (Q3-4) and silt was observed in 2018 (RS25I0100006 Br SE of Loughbrack). This will require further assessment during Local Catchment Assessment to determine if this activity is a possible source of silt and sediment.

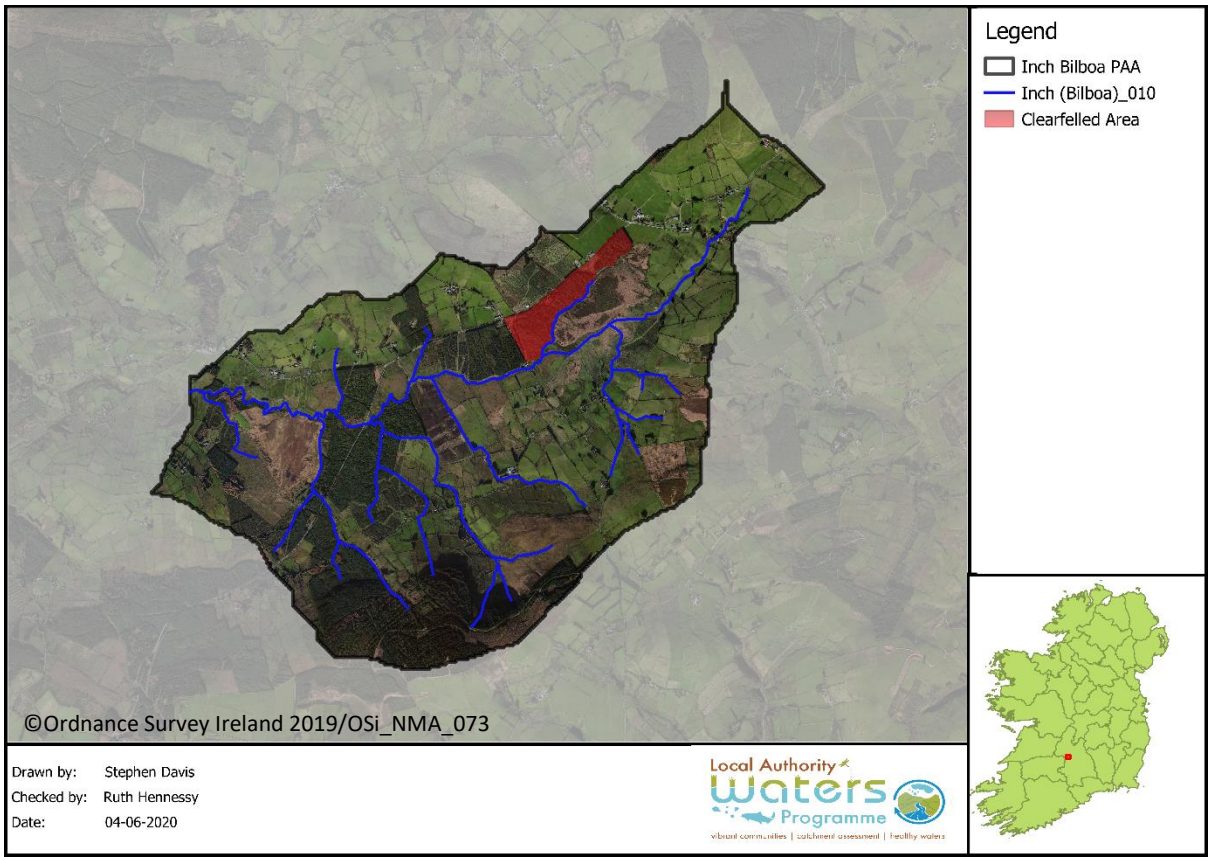


Figure 6. Area of Coillte forest clearfelled 2017/2018.

3.3 Peat

Although not identified as a significant pressure during initial characterisation, peat is considered to be a potential pressure on the Inch (Bilboa)_010. Soils within the water body are primarily poorly drained and peat soils occur adjacent to the main river channel. Agriculture, forestry and peat extraction are occurring on these peaty soils. There are four large areas of peat extraction within the PAA (**Fig. 5**), this is likely to be private peat harvesting rather than large scale commercial. This will require further assessment during Local Catchment Assessment to determine if this activity is a possible source of silt and sediment.

4 Pathway Information and Analysis

4.1 Overview of Pathways in the PAA

- The entire PAA is underlain by a poorly productive aquifer meaning groundwater transfers are unlikely to be significant.
- There is a large area of poorly drained soils which has the potential to contribute sediment and phosphorus.
- There is also a large area of peat in the PAA which could contribute ammonia and sediment.

4.2 Inch (Bilboa)_010

- Significant issue: Unknown
- Significant pressure: Forestry and agriculture have been identified by the EPA during initial catchment characterisation
- Relevant pathways: Due to the poorly productive bedrock aquifer underlying the catchment and predominantly poorly drained/peaty soils, overland flow pathways are likely to dominate.

4.3 Pathways for Potential Issues

As groundwater pathways are not considered significant this PAA was divided into compartments based on the wet/dry soils map. There are three compartments (**Table 5**; **Fig. 7**):

- Compartment 1 comprises of peat soils with overland flow identified as a potential pathway for ammonia and sediment.
- Compartment 2 is comprised of poorly drained soils with overland flow identified as a potential pathway for phosphate and sediment.
- Compartment 3 is comprised of well-drained soil with near surface flow identified as the pathway for nitrate.

Table 5. Overview of pathways in the Inch (Bilboa) PAA.

Table of Potential Pathways Information for the Inch (Bilboa)			
Sub-compartment	Compartment 1	Compartment 2	Compartment 3
Factor	Peat	Poorly Drained Soils	Well Drained soils
Potential Pressure	Ammonia & Phosphorus	Phosphorus	Nitrate
Main Flow Paths	Overland	Overland	Near Surface
Soil wet/dry	Poorly Drained	Poorly Drained	Well Drained
Sub-soil permeability	Moderate	Moderate	N/A DTB<3M
Aquifer (transmissivity)	Poor (Pl)	Poor (Pl)	Poor (Pl)
Bedrock	Silurian Metasediments and Volcanics	Silurian Metasediments and Volcanics	Silurian Metasediments and Volcanics
GW vulnerability	L	L, M	X
Karst features	none	none	none
Hydrology Drainage density	Unknown	Unknown	Unknown
Susceptibility PO_4 to SW	High	High	Low
Susceptibility NO_3 to SW	Moderate	Moderate	High
Susceptibility NO_4 to GW	Low	Low	Low

4.4 Pathways Conceptual Model

Agriculture and forestry have been identified as the significant pressures in the Inch (Bilboa) PAA. Given the hydrogeological setting, a poorly productive aquifer overlain by wet soils and peat soils, the dominant pathway is likely to be near surface/overland flow transporting nutrients (ortho-phosphate primarily but also ammonia) and sediment to the river in compartments 1 and 2. Small point sources (septic tanks, farmyards, drains etc) could be significant if they occur in large numbers and are close to the monitoring point, however the catchment is sparsely populated (approximately 60 houses) with low numbers of farmyards.

Areas of forestry with drainage channels connected directly to the river are potentially a pathway for sediment and nutrient losses particularly during felling and thinning operations.

Similarly, activities on peat soils, such as harvesting, with drainage channels connecting directly to the river are also a pathway for sediment and nutrient losses.

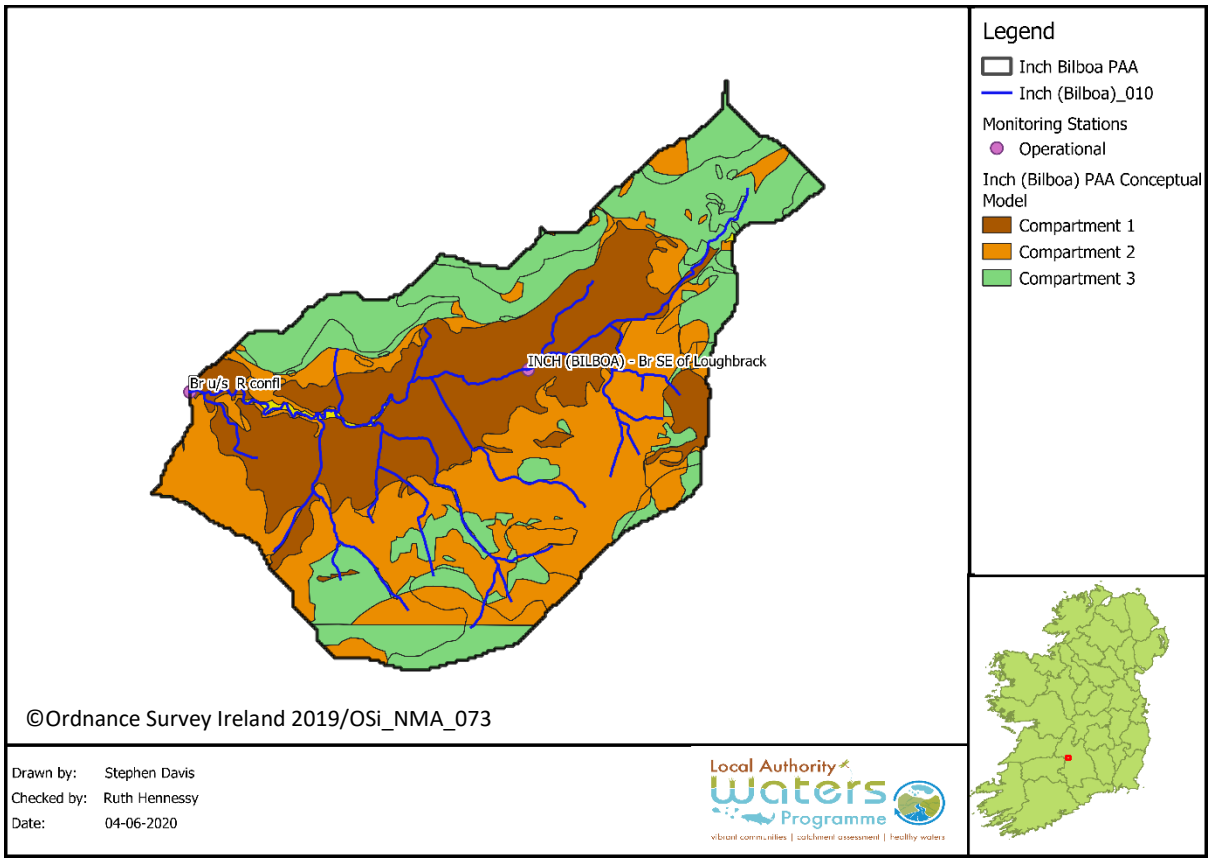


Figure 7. Conceptual model of the Inch (Bilboa) PAA based on the wet/dry soils map.

Inch (Bilboa) PAA

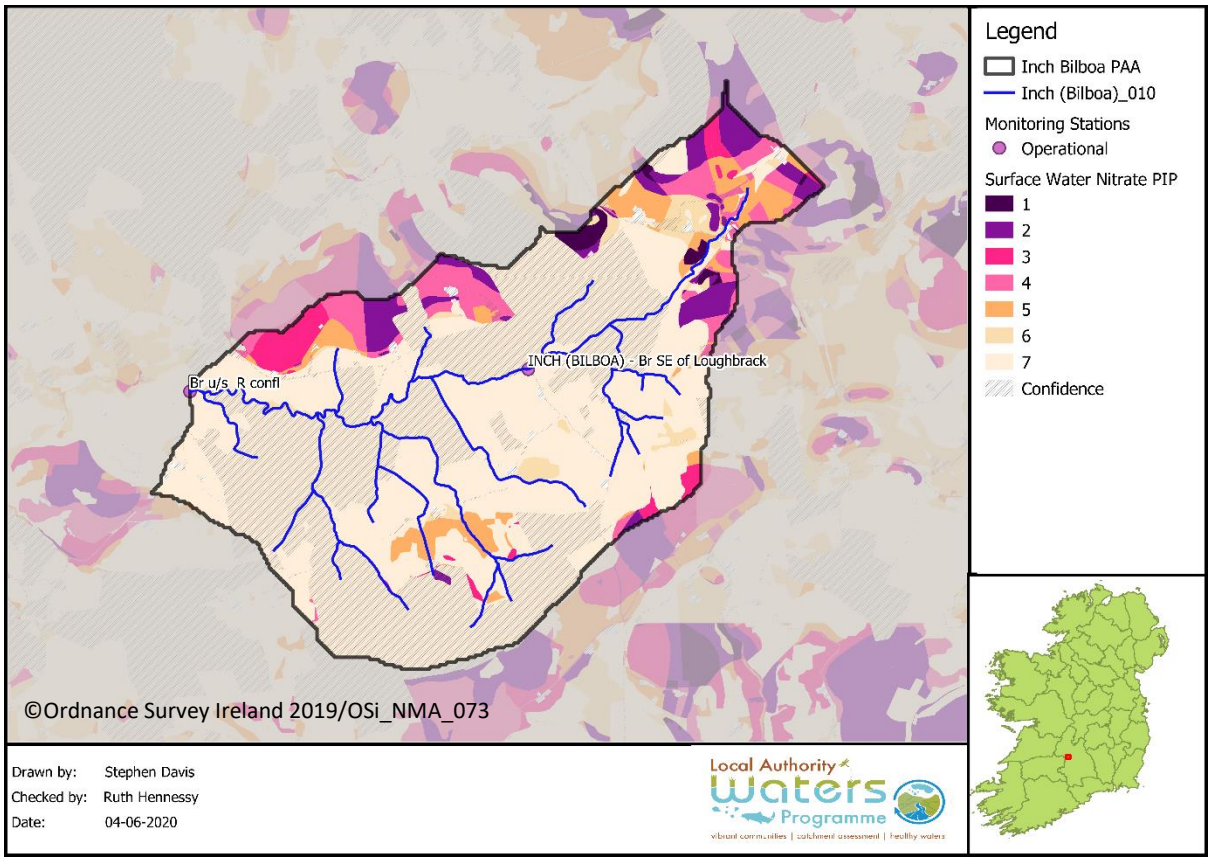


Figure 8. Nitrate surface water PIP map.

Inch (Bilboa) PAA

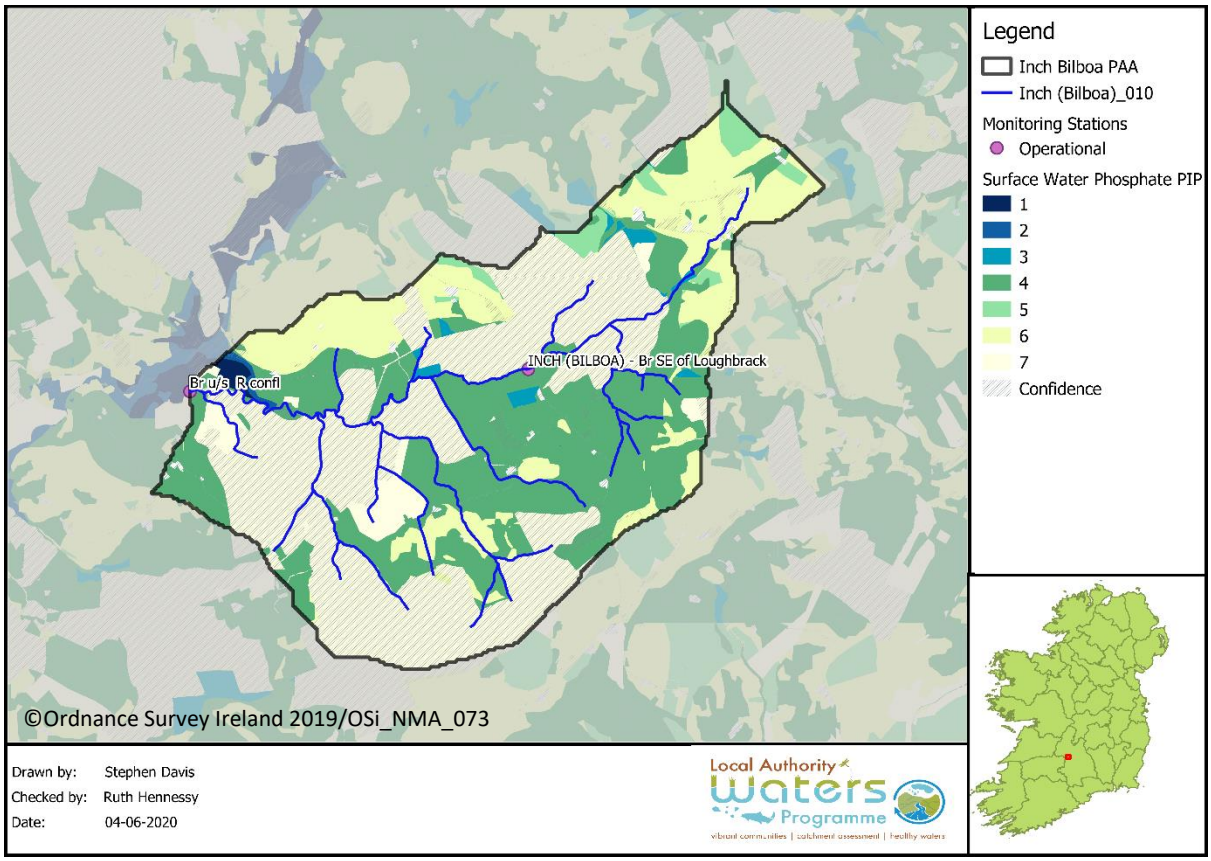


Figure 9. Surface water phosphate PIP.

5 Interim Story of the Inch (Bilboa) PAA

5.1 Inch (Bilboa)_010

- The Inch (Bilboa)_010 is classified as *At Risk.*
- At the Br SE of Loughbrack monitoring station is at moderate biological status. The Br u/s of R Confl is at good biological status. Therefore, the Inch (Bilboa)_010 is at moderate status based on the one out all out principal.
- There are no hydrochemical data available for the Inch (Bilboa)_010.
- Sediment has been identified as a potential significant issue. Due to the lack of hydrochemical data it is unknown if there are any other significant issues in the waterbody.
- The significant pressures identified during the initial characterisation were forestry and agriculture. Activities on peat soils may also be a pressure due to the large area of peat in the catchment.
- Past forest clearfelling may explain the intermittent sediment issues being picked up by the EPA biologists during monitoring in 2002 and 2018.

5.2 Work Plan

5.2.1 EPA Further Characterisation Actions

- IA7 Multiple Sources in Multiple Areas
    - Aim: to identify the main source of pollution on the RWB, focusing on forestry and agriculture. Detaills: Review existing SSRS. Catchment walk, lots of pressures spread throughout the sub-basin. Collect field parameters, use field parameters to guide location of SSRS and water quality samples.

5.2.2 Fieldwork Plan

- Water chemistry samples needed at Br SE of Loughbrack and at Br at R Confl in order to determine nutrient concentrations in the waterbody.
- Further work plan should only be developed after hydrochemical data have been obtained and it can be identified if nutrients are a significant issue.
- Likely that work plan will focus on area of waterbody upstream of Br SE of Loughbrack.

6 Possible Mitigation Options

- Agricultural Measures
  - Catchment wide farmer meeting / Discussion session
  - ASSAP to provide advice on farmyards maintenance and field scale nutrient management.
- Forestry Measures
  - Appropriate setbacks put in place from waterbody
  - Blocking drains to river to ensure overland flow across setback areas.
  - Watercourse protection during harvest events e.g. prevent sediment run-off
  - Prior to the commencement of operations, install silt traps within existing forest drains that connect with the waterbody
  - Silt traps should be staggered along the length of the drain, and not only at the lower reaches towards its outflow.
  - Apply silt fences where necessary, to block pathway for silt in areas where overland flow is possible.
  - Once silt traps and silt fences become functional, check regularly and maintain as necessary, in order to ensure continued effectiveness throughout operations.

7 Communications

7.1 Community information meeting

The Community Information Meeting was held in Kilcommon Community Hall on 25th March 2019. It was attended by approximately five people, including the Teagasc ASSAP advisor and representatives of Arrabawn Co-Op. The meeting involved presentations from the Community Water Officer for the area and the catchment scientist leading on the work in the PAA.

7.2 Farmers Information Meeting

The ASSAP advisors (from Teagasc and Arrabawn Co-Op) hosted a farmers meeting in Knockmare, Milestone on 06 September 2019. Farmers in the Inch (Bilboa) catchment were notified of the meeting by the Department of Agriculture, and the meeting was also attended by LAWPRO catchment scientists.