Gyrodactylus salaris (Gs)
Contingency Plan
for Tweed

Part 1
(Risk Assessment and Catchment Characteristics relevant to Gs transmission and control)

Report compiled by

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Introduction

Tweed Contingency Planning & Biosecurity for Gyrodactylus salaris (Gs)

Gyrodactylus salaris (Gs) is a very small parasite of salmon which is highly contagious. It originates in the Baltic where strains of salmon are immune to it. However, some years ago it was inadvertently transferred to Norway from whence it has spread down, through Europe, where it is deadly to non-Baltic strains of salmon and has devastated freshwater salmon stocks in a number of countries. In Norway for example, salmon stocks in 20 rivers have been virtually wiped out. Denmark, Finland, France, Germany, Italy, Portugal, Russia, Spain and Sweden have also been affected by Gs. Currently Gs does not exist in the British Isles and it is absolutely critical that it is not allowed to enter our islands. Gs could be introduced inadvertently by the import of live fish, which is controlled by law, but also by anyone (such as fishermen or water sports enthusiasts), visiting rivers in affected areas for work or pleasure and then using the same equipment in Scotland without taking the necessary precautionary measures. Gs is capable of surviving for several days in damp conditions but cannot survive in sea water, off fish for more than 6 days, being frozen, being dried or at temperatures above 60 degrees C.

The Scottish Government has published a Contingency Plan for dealing with Suspicion and/or confirmation of Gyrodactylus salaris in Scottish Waters including the Tweed. Similar Plans have also been produced by DEFRA and the Welsh Government. The River Tweed Commission wish to appraise, assess and update this Plan with specific reference to Tweed's local characteristics. It wishes to prepare and collate all the information that would be required if such a plan were required to be put into action.

Tweed's supplementary planning preparation to the Government's Contingency Plan in the event of a Gs outbreak will firstly address the risk assessment specifically appropriate to the Tweed (and Eye) District.

Specifically the RTC wishes to address the following areas:

Part 1- Risk Assessment and Control *(the basis for this report)*

Risk assessment:

To define the extent of the risk of Gs on Tweed and specifically appraise the Risk Assessment in **Appendix 4, Annex 1** with particular reference to the Tweed (and Eye) District.

- In relation to the above to specifically address the realistic location of risks and invasive pathways for Tweed before contingency work could be undertaken: ship ballast water, ornamental fish imports, fish farms, absorbent materials such as felt-soled waders, canoes, etc.

Control:

To assemble, as per **Appendix 4, Annex 2** of the national plan, the River Tweed (and Eye) Catchment Characteristics data and information relevant to Gs transmission and control

- Location of existing or potential barriers
- Collation of hydro-geographical data
- Collation of water use and abstraction information
- GIS datasets to include:
- Fish farms
- River flows and transfers
- Biological information (habitats, species) including transfer hosts
- Socio-economic information – settlements, domestic and commercial water supplies, to include catchment and downstream delineation.

Part 2 - Planning and Research *(the basis for a separate report by Tweed Foundation)*

Research to encompass all biodiversity risks to the River from many organisms – with special emphasis on Gs (mechanics of transmission, etc.) and mitigation and/or control of them will be addressed through the Rivers and Fisheries Trusts of Scotland (RAFTS) Biosecurity Planning process.

Distribution, Impact and Pathways for the Introduction and Spread of the Invasive Non Native Species (INNS) on the Biosecurity Planning List, in addition to Gs, will be examined and presented in terms of both ecological and economic impact. Examination of the pathways shows that many species spread, or are spread, by similar means: this is particularly true for the aquatic, riparian and coastal species.

Pathways that can introduce or spread the NNI species on the list are:

- Marine ballast water
- Hull fouling
- Contaminated mariculture products (e.g. oyster spat)
- Contaminated aquaculture products (e.g. fish)
- Water from contaminated areas used to transport aquaculture produce discharged in uncontaminated areas
- Transport of contaminated soil (including erosion as well as mechanical transport)
- Garden escapes
- Pond escapes
- Disposal of contaminated plant or animal material near or in water
- Fragmentation and transport by wind and water
- Deliberate introduction
- Migration
- Accidental introduction through contaminated clothing or equipment

The Tweed bio-security plan will incorporate rapid response protocols and will include awareness raising and training. Publicity of the “risk” to other organisation such as canoeists via their magazines, websites, etc. will be undertaken possibly by alerting Council education departments both sides of the Border as large school parties sometimes use the River.

This report collates the necessary information relevant to the risk from Gs entering the Tweed (and Eye) Catchments and the information relevant to the subsequent control of Gs (ie containment or eradication), should it enter the Catchments. This report refers to Part 1 only (above). Part 2 is the subject of separate report.

Risk Assessment – The extent of the risk of Gs on Tweed.
(as per Scottish Government Contingency Plan - Appendix 4, Annex 1)

A risk assessment has been carried out which addresses the following terms of reference:

‘ To develop preventative measures within the Tweed and outwith the Tweed Catchment, to exclude G salaris from the Tweed Catchment through the control of -’

a)- Commercial activities, including the movement of ova, live and dead fish, aquatic plants and ballast water for whatever purpose.

b)- Research activities, including fish, disease and fisheries research.

c)- Recreational activities including angling, boating and other water based activities.

‘and …..To develop containment measures within Tweed (and Eye) Catchments to contain the spread of G salaries through the control of’-

a)- The movement of live and dead fish and their ova, for whatever purpose.

b)- The transfer of water between catchments for whatever purpose.

c)- The transfer of equipment associated with waterborne activities for whatever purpose.

The risk assessment categories include high, medium and low risk and is summarised below. Whilst the risk assessment is aimed primarily at keeping G salaris out of the Tweed Catchment, it can equally provide a basis for action to contain the spread of disease, were it to enter the Tweed Catchment. The assessment details the likely constraints on the effectiveness of the measures, the surveillance of preventative measures and which organisations have key interests.

Risk Assessment

Highest risk
Moderate risk
Lowest risk

Vector	Measures	Risk	Likely constraints on effectiveness of measures	Surveillance of preventative measures	Key interests
Recreational Activity					
Anglers Transmission on wet fishing tackle and clothing. Transmission via imported live bait used principally at stocked trout fishing lochs	Publicity and awareness at harbours of Berwick and Eyemouth. Declarations and guidance at points of entry to water. Clear advice on disinfection procedures and ready availability of treatments.		Difficulties with enforcement at local level. Apathy amongst angling stakeholders. Difficulty in covering all sectors and convincing low-risk groups.	Enforcement at local level.	Scottish Government ASFB RAFTS S & TA SFCA SANA IFM SEPA Visit Scotland EHT BHC (s)BAF
Canoeists Transmission on wet craft, clothing and equipment	Publicity and awareness at harbours of Berwick and Eyemouth. Declarations and guidance at points of entry to water. Clear advice on disinfection procedures and ready availability of treatments..		Difficulties with enforcement at local level. Apathy amongst canoeists. Difficulty in covering all sectors and convincing low-risk groups.	Enforcement at local level	SCA BCU Sport Scotland Visit Scotland EHT BHC (s)BAF
Leisure craft and towed vessels Transmission on and within craft	Publicity and awareness at harbours of Berwick and Eyemouth. Declarations and guidance at points of entry to water. Clear advice on disinfection procedures and ready availability of treatments.		Potential lack of understanding of risks/consequences by users. Difficulties with enforcement at local level.	Enforcement at local level	British Waterways HMRC Visit Scotland EHT BHC

Rafting activity Transmission on wet craft and clothing	Publicity and awareness at harbours of Berwick and Eyemouth. Declarations and guidance at points of entry to water. Clear advice on disinfection procedures and ready availability of treatments.		Potential lack of understanding of risks/consequences by users. Difficulties with enforcement at local level.	Enforcement at local level	SRA Sport Scotland Visit Scotland EHT BHC (s)BAF
Other water activity Gold panning, Canyoning etc Transmission on clothing/equipment	Publicity and awareness at harbours of Berwick and Eyemouth Declarations and guidance at points of entry to water. Clear advice on disinfection procedures and ready availability of treatments		Making connection between participants activity and risks could be difficult	Best Practice guideleines	Visit Scotland
Fishery/aquatic researchers Transmission on clothing/equipment	Publicity and awareness at harbours of Berwick and Eyemouth. Declarations and guidance at points of entry to water. Clear advice on disinfection procedures and ready availability of treatments.		Relatively small sector. Guidelines could be produced with some effectiveness.	Clear national protocols for operators.	EHT BHC (s)BAF
Commercial Activity					
Movement of ova	Publicity and awareness at harbours of Berwick and Eyemouth. Statutory controls and protocols for treatment.		Persons operating outwith the law. Lack of effective enforcement activity. (Refer to notes below)	Statutory enforcement and random inspections.	Scottish Government SSPO BTA EHT BHC
Movement of live fish (salmonids)	Publicity and awareness at harbours of Berwick and Eyemouth. Statutory controls and protocols for treatment. 'Border' issues.		Persons operating outwith the law. (Refer to notes below) Lack of effective enforcement activity. Political issues associated with EU trade issues.	Statutory enforcement and random inspections.	Scottish Government SSPO BTA EHT BHC

Movement of live fish (cyprinids)	Publicity and awareness at harbours of Berwick and Eyemouth. Statutory controls and protocols for treatment. 'Border' issues.		Persons operating outwith the law. Lack of effective enforcement activity. (Refer to notes below)	Statutory enforcement and random inspections	SFCA EHT BHC
Movement of live fish (ornamentals)	Publicity and awareness at harbours of Berwick and Eyemouth. Statutory controls. -Border issues.		Persons operating outwith the law. Lack of effective enforcement activity (Refer to notes below)	Existing regulatory controls.	EHT BHC
Ballast water movement	Publicity and awareness at Harbours of Berwick and Eyemouth		Adherence to best practice guidelines (Refer to notes below)	Enforcement at local level	EHT BHC
Import of aquatic plants	Publicity and awareness at Harbours of Berwick and Eyemouth		Adherence to best practice guidelines (Refer to notes below)	Enforcement at local level	EHT BHC

Key

ASFB *– Association of Salmon Fishery Boards*

RAFTS *– River and Fisheries Trusts of Scotland*

S&TA *– Salmon & Trout Association*

SFCA *– Scottish Federation for Coarse Angling*

SANA *– Scottish Anglers National Association*

IFM *– Institute of Fisheries Management*

SEPA *– Scottish Environment Protection Agency*

SCA *– Scottish Canoe Association*

BCU *– British Canoe Union*

SRA *– Scottish Rafting Association*

HMRC *– Her Majesties Revenue and Customs*

SSPO *– Scottish Salmon Producers Organisation*

BTA *– British Transport Authority*

EHT *– Eyemouth Harbour Trust*

BCT *– Berwick Harbour Commission*

(s)BAF – *(Secretary)Borders Angling Federation*

Additional Notes on Ports, Harbours and Estuaries

Refer to Appendix 13- For full contact details for Harbour Masters, Owners and Trusts.

Cove Harbour- Private Harbour with only 2 fishing boats setting creels for Lobster and Crab. Small Pleasure craft occasionally. Harbour not connected to watercourse. Publicity and awareness information desirable around Harbour.

Burnmouth Harbour-Administered by Burnmouth Harbour Trust with only a very small number of boats setting creels for Lobster and Crab. Small Pleasure craft occasionally. Harbour not connected to watercourse. Publicity and awareness information desirable around Harbour.

St. Abbs Harbour- Administered by St. Abbs Harbour Trust with only a small number of fishing boats setting creels for Lobster and Crab. The harbour is a well known dive centre attracting divers from all over the UK and abroad. Dive boats operate in harbour. Small pleasure craft occasionally. Harbour not connected to watercourse. Publicity and awareness information desirable around Harbour.

Berwick Harbour-

Berwick upon Tweed Harbour Commission
Mr Duncan Wood / Mr Brian Watson
Harbour Master's Office
Tweedmouth
Berwick upon Tweed
TD15 2AB

Tel: 01289 307404
E-mail: berwickharbour@onetel.com
Web: www.portofberwick.co.uk/welcome.htm

The Port of Berwick is the second largest Northumbrian port, handling in excess of 150,000 tonnes of cargo, with capacity to handle significant additional tonnage and around 250 shipping movements annually.

Recent regenerative projects have included the widening of the dock entrance in 1993, to accommodate larger vessels; the Harbour wall has been strengthened and the working surfaces increased. In 2000 an extensive dredging programme was initiated, which improved the working berths and facilitates larger vessel movements within the dock.

Future projects include plans for the increase in facilities for visiting yachtsmen. A much larger project is the recent completion of a pontoon on the Berwick Quay, on the North bank, which is a new venture in promoting the port to cruise ships.

Potential Threats form Recreational Activity-

Anglers- Fresh water anglers that go sea fishing from harbour boats, need to be made aware of disease and transmission from wet craft and clothing. Publicity desirable in Berwick harbour area.

Canoeists- Canoeists need to be made aware of disease and transmission from wet craft and clothing. Publicity desirable in Berwick harbour area.

Leisure crafts- Leisure craft users need to be made aware of disease and transmission from wet craft and clothing. Publicity desirable in Berwick harbour area.

Potential Threats from Commercial Activity-

Movement of Ova (live fish eggs) - Not applicable at Berwick

Movement of Live Fish (salmonids) – Not applicable at Berwick

Movement of Live Fish (cyprinids)- Not applicable at Berwick

Movement of Live Fish(ornamentals)- Not applicable at Berwick

Other Potential Threats-

Ships Cargo- All ships are required to lodge a full list of cargo with the Harbour Master prior to entering Berwick harbour

Hull fouling- Most cargo ships and pleasure craft have some form of hull fouling. Parasite does not survive in salt water however.

Cleaning bilge tanks- Boats are not permitted to clean out bilges in Berwick harbour.

Contaminated mariculture products (ie oyster spat) – Not applicable at Berwick.

Contaminated aquaculture products (eg fish) – All fish landed at Berwick are dead (salt water) fish.

Import of aquatic plants- Not applicable at Berwick.

Fish Migration- In coming migrating Salmon are unlikely to be carrying the Gs disease. (Sea going migrating salmon have the potential to be carry Gs out from the Tweed Catchment, if caught in nets in the estuary and taken overseas.)

Water from contaminated areas used to transport aquaculture produce discharged to uncontaminated area- Harbour Master is not aware of any coming into Berwick Harbour .

Transport of contaminated soil- Harbour Master is not aware of any entering Berwick Harbour.

Ballast Water treatment- Berwick harbour is primarily a port for loading and unloading cargo. It is not a fishing port. At Berwick, during low tide, the water in the harbour is approximately 50% freshwater and 50% salt water. At high tide it is 100% salt water. Cargo ships entering harbour are legally obliged to empty (discharge) their ballast tanks and refill (load) their ballast tanks when tied

up at the quayside. The largest cargo ships can take on board up to 800 tons of water ballast. The norm is nearer 300 tons. The ballast water therefore could potentially be a mixture of salt and fresh water. The Harbour master suggests ships captains could arrange to place a chemical agent into the ballast tanks on route to the harbour and from the harbour, to kill any potential Gs parasites in the ballast water, prior to docking and discharging/loading ballast. A similar ballast water situation could exist within the harbour areas from where the cargo ships have come. If G salaris can live off fish but in fresh water for up to 6 days, then there is a potential risk present. Several ships docking at Berwick regularly make trips to the Baltic States.

Deliberate Introduction- Little can be done to prevent this at Berwick other than through constant vigilance.

Accidental Introduction through contaminated clothing or equipment- This remains the most likely route for Gs to enter the Tweed System. This could occur through the port at Berwick or at any point across the entire River Catchment.

Comment- Because Berwick harbour is linked directly to the Tweed River system and its tributaries, there should be due diligence at all times (with regard to Gs Biosecurity) within the port area. Publicity and Gs awareness information is desirable around the harbour area.

Eyemouth Harbour-

Eyemouth Harbour Trust
Mr Ivan Stevenson / Mr Alex Thorburn
Harbour Masters Office
Gunsgreen Basin
Eyemouth
TD14 5SD

Tel: 01890 750223
E-mail: eyemouth@msn.com
Web: www.eyemouthharbour.org

Eyemouth provides an important landing place for boats and vessels from Berwickshire, Lothian & Northumbria. Eyemouth harbour has been dramatically improved (deepend and extended) over recent years. The bay is virtually the only safe landing place in Berwickshire.

Fishing in Eyemouth has been a daily occurrence since the 13th century when monks in Coldingham Priory obtained rights to sea fishing. In the 18th century the place was a major centre for smuggling and massive amounts of brandy, gin, tobacco, tea and even luxury items like spectacles were landed illegally in the village. Today 14 fishing boats land all manner of sea fish. There are also a small number of boats landing Lobster and Crab. Occasional pleasure boats and yachts tie up at the quay.

Potential Threats form Recreational Activity-

Anglers- Fresh water anglers that go sea fishing from harbour boats, need to be made aware of disease and transmission from wet craft and clothing.Publicity desirable in Eyemouth harbour area.

Canoeists- Canoeists need to be made aware of disease and transmission from wet craft and clothing.Publicity desirable in Eyemouth harbour area.

Leisure crafts- Leisure craft users need to be made aware of disease and transmission from wet craft and clothing. Publicity desirable in Eyemouth harbour area.

Potential Threats from Commercial Activity-

Movement of Ova (live fish eggs) - Not applicable at Eyemouth

Movement of Live Fish (salmonids) – Not applicable at Eyemouth

Movement of Live Fish (cyprinids)- Not applicable at Eyemouth

Movement of Live Fish (ornamentals)- Not applicable at Eyemouth

Other Potential Threats-

Ships Cargo- Because Eyemouth is a fishing harbour, very few cargo ships dock here.

Hull fouling- Most fishing boats and pleasure craft have some form of hull fouling. Parasite does not survive in salt water however.

Cleaning bilge tanks- Boats are not permitted to clean out bilges in Eyemouth harbour.

Contaminated mariculture products (ie oyster spat) –All Oyster spat, Scallops, Shrimps and Prawns landed at Eyemouth are frozen, bagged and shipped out on lorries.

Contaminated aquaculture products (eg fish) – All fish landed at Eyemouth are dead (salt water) fish.

Import of aquatic plants- Not applicable at Eyemouth.

Fish Migration- In coming migrating fish are unlikely to be carrying the Gs parasite. The Eye Catchment is relatively small and is not directly connected via a watercourse to the Tweed Catchment. (Sea going migrating fish have the potential to be carry Gs out from the Eye Catchment, if caught in nets in the estuary and then taken overseas.)

Water from contaminated areas used to transport aquaculture produce discharged to uncontaminated area- Harbour Master is not aware of any coming into Eyemouth Harbour.

Transport of contaminated soil- Harbour Master is not aware of any entering Eyemouth Harbour.

Ballast Water treatment- Eyemouth harbour is primarily a fishing port, not a cargo port. At Eyemouth, any boats entering harbour are legally obliged to empty (discharge) their and Ballast tanks and refill (load) their ballast tanks when tied up at the quayside. Ballast water is generally salt water, however, depending on the level of the tides, the ballast water could be a mixture of salt and fresh water. The harbour master at Berwick suggests that boat operators could place a chemical agent into the ballast tanks on route to the harbour and from the harbour, to kill any potential Gs parasites in the ballast water, prior to docking and discharging/loading ballast. Perhaps this should be considered for Eyemouth harbour also .

Deliberate Introduction- Little can be done to prevent this at Eyemouth, other than through constant vigilance.

Accidental Introduction through contaminated clothing or equipment- This remains the most likely route for Gs to enter the Eye Water System. This could occur through the port at Eyemouth or at any point across the entire Eye Catchment.

Comment- Because Eyemouth harbour is not linked directly to the Tweed River system and its tributaries, there should be a reduced risk of Gs entering the Tweed Catchment. There should be due diligence at all times (with regard to Gs Biosecurity) within the port area however. Publicity and Gs awareness information is desirable around harbour area.

Control - The Catchment Characteristics and information relevant to Gs transmission and control (as per Scottish Government Contingency Plan – Appendix 4, Annex 2)

1.Flow Information

Mean daily flow – (taken at the lowest gauging station on Tweed at Norham) – 80.88 cumecs, maximum – 1,511 cumecs, minimum – 7 cumecs. Data collected from period 1960-2000.

Refer to Appendix 1(1) for map showing location of flow gauging stations (by name) within Tweed Catchment (SEPA operate most of the stations, EA operate 3 on Till, Scottish Water operate none)
Refer to Appendix 1(2) for map showing flow gauging stations (by number) within Tweed Catchment
Refer to Appendix 1(3) for spreadsheet listing water flow information at each gauging station within Tweed Catchment
Refer to Appendix 1(4) for spreadsheets listing archived data showing maximum (peak) flows at each of the gauging stations within Tweed Catchment
Refer to Appendix 1(5) for spreadsheets listing archived data showing minimum flows at each of the gauging stations within Tweed Catchment

2. Length of Main Stem and Major Tributaries

Main stem / Tributary	**Length**
Eye Water	**144km**
Whiteadder Water	**483km**
(including Blackadder Water)	
Leader Water	**254km**
Gala Water	**183km**
Upper Tweed	**846km**
(including Leithen Water)	
(including Eddleston Water)	
(including Lyne Water)	
(including Biggar Water)	
(including Cor Water)	
(including Manor Water)	
(including Quair Water)	
Ettrick Water	**438km**
(including Yarrow Water)	
River Teviot	**1001km**
(including Bowmont Water)	
(including Kale Water)	
(including Jed Water)	
(including Rule Water)	
(including Borthwick Water)	
(Including Ale Water)	
Middle Tweed (main channel)	**37km**
Eden Water	**136km**
Leet Water	**99km**
Lower Tweed (main channel)	**36km**
Till	**600km**

Refer to Appendix 2(1) for map of main stem and major tributaries within Tweed Catchment

3. Location and size of Lochs

Included here is a list of the main 'still' water bodies (lochs /reservoirs) within Tweed Catchment (with a surface area of more than 5.00 ha / 50,000 m²)

Easting	Northing	Name of Waterbody	Tributary	Area m^2
365296	663574	Whiteadder Reservoir	Whiteadder	811,533
366016	656426	Watch Water Reservoir	Whiteadder	280,126
377947	654824	Hen Poo at Duns Castle	Whiteadder	76,651
371410	649093	Hule Moss 1	Whiteadder	75,935
312899	655893	Baddinsgill Reservoir	Upper Tweed 2	229,131
311744	652365	West Water Reservoir	Upper Tweed 2	374,511
382511	640284	The Hirsel	Lower Tweed	104,028
343076	639444	Stantling Craig Reservoir	Upper Tweed 1	90,038
351226	632235	Cauldshiels Loch	Middle Tweed	96,195
380855	631850	Hoselaw Loch	Till	120,989
350059	629100	Lindean Reservoir	Middle Tweed	89,723
379550	627249	Yetholm Loch	Till	162,257
346933	627753	The Haining	Ettrick	94,024
349900	627333	Whitmuir Loch	Teviot	73,525
370890	625443	Wooden Loch	Teviot	52,067
324912	622818	St Marys Loch	Ettrick	2,534,798
345976	623589	Headshaw Loch	Teviot	70,075
319126	622178	Meggat Reservoir	Ettrick	2,482,455
311847	621516	Talla Reservoir	Upper Tweed 2	1,224,397
340698	621007	Akermoor Loch	Teviot	115,456
345138	620712	Essenside Loch	Teviot	74,299
309754	619199	Fruid Water	Upper Tweed 2	1,110,264
323743	619781	Loch of the Lowes	Ettrick	389,067
339498	619441	Shaw Under Loch	Teviot	148,707
345351	619088	Shielswood Loch	Teviot	57,253
338569	616881	Hellmoor Loch	Teviot	267,204
339926	615250	Alemoor Loch	Teviot	542,839
334087	615515	Clearburn loch	Ettrick	63,809
334176	613427	Kingside Loch	Teviot	61,038
343417	611828	Branxholme Easter Loch	Teviot	67,673
349150	611483	Williestruther	Teviot	58,236
349486	610645	Acreknowe Reservoir	Teviot	82,629
348941	608132	Barnes Loch	Teviot	57,959
325951	607853	Loch Tima	Ettrick	55,899
389515	668575	Coldingham Loch	Coastal Tweed	85,452

Refer to Appendix 3(1) –for more complete list of location and area of open water bodies (lochs) within Tweed Catchment

4. Presence of Water Abstraction/Transfer Sites

Water Abstraction-

Refer to Appendix 4(1) – for spreadsheet listing surface water abstraction licences issued by SEPA within Tweed Catchment (with grid references) and maximum abstraction rates permitted.

This spreadsheet relates to 'non Scottish Water' surface water abstraction details for the Borders Area. The fourth column relates to the licensed volume for a particular authorisation. The fifth column relates to licensed volume per abstraction point. A number of authorisations have more than one licensed location. However, the aggregate of the location volumes will not always equal the total authorised volume.

Information held by SEPA regarding business/private water supply data is sensitive and less readily available. The most sensible approach within the contingency plan (should the presence of G salaris on Tweed be confirmed) is to contact SEPA immediately, on their 24hr contact number (0800-80-70-60) at their communications centre in Perth. At that point, the necessary water abstraction information would be made available to the co-ordinators of the response to the disease. This is a practical approach, as any data supplied now (for the contingency plan) would be changing constantly and requiring updating anyway. Please refer to the SEPA's – 'Conditions of using our information' sheet in Appendix 4(1) for detail regarding use of data.

With regard to Scottish Water (business/private water supply) abstraction data (locations, volumes and areas/towns supplied), this information is considered sensitive and a similar approach is deemed appropriate here. Scottish Water's (24hr) emergency contact number is- 0845 600885.

Refer to Appendix 4(2)- for information and spreadsheet listing 'consented limits' for surface water abstraction licences issued by the Environment Agency/Natural England within Tweed Catchment (River Till sub catchment).

This spreadsheet lists the grid references and volumes for each abstraction consent. All uses of the water are for spray irrigation of crops. Please refer to the Environment Agency 'River Till- licensing situation' sheet and 'Standard Notice -for commercial data' information sheet in Appendix 4(2) for detail regarding use of data.

With regard to Environment Agency (business/private water supply) abstraction data (locations, volumes and areas/towns supplied), this information is considered sensitive and a similar approach to that suggested by SEPA and Scottish Water is deemed appropriate here. The Environment Agency's (24hr) emergency contact number is- 0800-807060.

Business or private water supply information held by Northumbrian Water is considered sensitive. A similar approach to that offered by SEPA, Scottish Water and the Environment Agency should be adopted here. In the event of an outbreak of Gs on the Till Catchment, Northumbrian Water's (24hr) emergency contact number is 0800 3287648

Water Transfer-

SEPA confirm that they know of no recorded water transfers either 'into or out of' the Tweed Catchment, other than (possibly for) drinking water supplies (by Scottish Water, see below).

The SEPA Environmental Protection and Improvement team have confirmed; *With regard to the 'out of' and 'in to' catchment water transfers the only information which SEPA holds would relate to the activities that they regulate, which in this context would be abstractions. However this may not necessarily assist in identifying any such water transfers. It is considered likely that most water transfers would relate to the operation of Scottish Water assets and as such Scottish Water may be able to provide further information. It is possible however that some agricultural abstractions could involve the transfer of water, for example abstraction from a watercourse to a pond for storage and subsequent use/return to a watercourse, however SEPA would only regulate the abstraction element of the activity.* Therefore the information is excepted under Regulation 10(4)(a) of the Environmental Information Regulations 2004. The text of which is reproduced below; *(4) A Scottish public authority may refuse to make environmental information available to the extent that- (a) it does not hold that information when an applicant's request is received.*

Scottish Water confirm that there are generally 2 'into catchment' water transfers and 2 'out of catchment' water transfers. No detail is made available here. In the event of G salaris being confirmed on Tweed, the detail would be made available to the coordinators of the response to the disease by contacting- Scottish Water's emergency number- 0845 600885.

The Environment Agency would not confirm any 'into Till catchment' water transfers and 'out of Till catchment' water transfers. No detail is made available here. In the event of G salaris being confirmed on Tweed, the detail would be made available to the coordinators of the response to the disease by contacting- Environment Agency's (24hr) emergency contact number is- 0800-807060.

Similarly, Northumbrian Water's (24hr) emergency contact number is 0800 3287648 for information relating to water transfer data, should the need arise.

5. Location of Weirs and Fish Passes (including Water Falls in the appendix)

Location of the main Man Made, Weirs and Fish passes within Tweed Catchment

Easting	Northing	Name/Type of Obstruction	Catchment	Tributary	Weir height	Condition
386650	662600	Reston Cauld	Eye Water	Eye		
387800	644150	Milne Graden Cauld	Tweed	Tweed		
384950	640100	Coldstream Slap	Tweed	Tweed		
		Lees Cauld				
		Banff Mill				
372250	634200	Kelso Cauld	Tweed	Tweed		
360900	632150	Mertoun Cauld	Tweed	Tweed		
326925	623850	St Marys Regulator	Tweed	Yarrow water		
344950	627375	Philiphaugh Cauld	Tweed	Ettrick Water		
348700	636700	Skinworks Cauld	Tweed	Gala Water		
355575	653800	Earnscleuch Water Intake	Tweed	Earnsleuch Burn		
383060	640660	The Hirsel	Tweed	Leet Water		
333600	638500	Leithen cauld	Tweed	Leithen Water		
		Haystoun				
358649	612275	Weens Cauld	Tweed	Rule Water		
349450	614600	Hawick Cauld (Cobble)	Tweed	Teviot Water		
365300	621000	Anna Cauld	Tweed	Jed Water		
		Glebe Cauld				
400100	625750	Haugh Head	Tweed	Wooler Water		
400200	630200	Wooler Mouth	Tweed	Wooler Water		
405970	617150	Hedgeley Rail Bridge	Tweed	Breamish		
405850	617120	Hedgeley Road Bridge	Tweed	Breamish		
402600	624200	Lilburn Bridge	Tweed	Lilburn Burn		
399450	628250	Wooler Caulds	Tweed	Wooler Water		
388551	643200	Twizel	Tweed	Shellacres Burn		
388200	643200	Twizel	Tweed	Shelacres Burn		
388400	643350	Twizel	Tweed	Shelacres Burn		
399550	627865	Wooler Caulds	Tweed	Wooler Water		
403600	624200	Lilburn Gravel Trap	Tweed	Lilburn Burn		
381700	651600	Kimmerghame	Tweed	Blackadder		
384790	656425	Dexters cauld	Tweed	Whiteadder		
389100	654950	Edington Mill	Tweed	Whiteadder		
395050	652950	Newmills Cauld	Tweed	Whiteadder		
364600	657875	Dye Water intake	Tweed	Dye water		

Refer to Appendix 5(1) for full list of locations of Man Made Obstructions, Weirs and Fish passes
Refer to Appendix 5(2) for map of main man made obstructions with fish passes
Refer to Appendix 5(3) for map of fish accessibility to tributaries within the Tweed Catchment
Refer to Appendix 5(4) for full list of locations of natural waterfalls within the Tweed Catchment

6. Presence / Absence of Fish Fauna

The Fish Species found in the Tweed and Eye Systems :

There are, at present, 20 fish species that can be found in the River Tweed and its tributaries and 9 in the Eye and its burns, which are listed below. Species marked with "F" live in fresh water as adults, while those marked with "S" live in salt water and their breeding environments are indicated in the same way. Brackets have been put round the symbols if natural breeding in the rivers is unknown and a "?" given if it is uncertain: "T" denotes species recorded from the Tweed catchment and "E" those from the Eye catchment.

A: NATIVE, breeding in fresh water

Common Name	Scientific Name	Juveniles	Adults	Breeds	River
Atlantic Salmon	*Salmo salar*	F / S	F/ S	F	
Sea-trout	*Salmo trutta trutta*	F / S	F/ S	F	
Brown-trout	*Salmo trutta fario*	F	F	F	
Arctic Charr [1]	*Salvelinus alpinus*	F / S	F/ S	F	
Three-spined Stickleback	*Gasterosteus aculeatus*	F	F/ S	F	
European Eel	*Anguilla anguilla*	F / S	F/ S	S	

Taxonomically not "fish" but generally included with them

Brook Lamprey	*Lampetra planeri*	F	F	F	
River Lamprey	*Lampetra fluviatilis*	F / S	F / S	F	
Sea Lamprey	*Petromyzon marinus*	F / S	F / S	F	

B: NATIVE, not breeding in fresh water

Flounder	*Platichthys flesus*	F / S	F/ S	S	
Allis Shad	*Alosa alosa*	F / S	F/ S	(F)	

C: ALIEN, BREEDING

Baggie / Minnow[2]	*Phoxinus phoxinus*	F	F	F	T
Beardie / Stone Loach[2]	*Barbatulus barbatulus*	F	F	F	T
Perch	*Perca fluviatilis*	F	F	F	T
Pike	*Esox lucius*	F	F	F	T
Grayling	*Thymallus thymallus*	F	F	F	T
Roach	*Rutilus rutilus*	F	F	F	T
Dace	*Leuciscus leuciscus*	F	F	F	T
Gudgeon	*Gobio gobio*	F	F	F	T
Bullhead	*Cottus gobio*	F	F	F	T

D: ALIEN, NON-BREEDING

Rainbow Trout	*Oncorynchus mykiss*	F	F	F ?	T

E: Vagrants and Visitors, not breeding in the District

Baltic Sturgeon	*Acipenser sturio*	F / S	F / S	F	T
Sparling / Smelt	*Osmerus eperlanus*	F / S	F / S	F	T
Baltic Sturgeon	*Acipenser sturio*	F / S	F / S	F	T

F: Possible Visitors

Twaite Shad: There are some records of this in nearby estuaries, but none from the Tweed estuary.

G: Escapes

Ornamental fish species such as Carp and Tench occasionally escape into the rivers.

(1) Arctic Charr were originally present in St. Mary's Loch but became extinct. They have since been re-introduced to the catchment.

(2) Could possibly have arrived by natural means and therefore be natives

Presence / absence of fish species per sub- catchment on Tweed

Please refer to Appendix 6(1) which shows a spreadsheet listing the presence / absence of fish species per sub catchment on Tweed. Appendix 6(2) shows a map of the sub-catchments by number (catchment ID's) as referred to in Appendix 6(1).

Please note- The map used to show the fish species present per sub-catchment (Appendix 6(2) has different sub-catchments to that shown on Appendix 2(1) (Map of main stem and tributaries on Tweed). This is because the sub catchments used for map 6(2) are the sub catchments used by Tweed Foundation for stocking policy where they are trying to maintain the current species assemblage in these units. The catchments are based largely on obstructions to fish passage (eg Skinworks cauld, Gala) or are based on tributaries (ie Leader). The number for each sub catchment shown on the map -Appendix 6(2)- matches the code on the spreadsheet -Appendix 6(1). Fish species recorded in standing water as well as running water within the sub catchments are also recorded.

7. Relevant Designations

In 1976, the Scottish section of the River Tweed, including all its major tributaries, was designated a Site of Special Scientific Interest (SSSI) under the National Parks and Access to the Countryside Act 1949 for its biological interest. This is called the Tweed River SSSI.

In the English section of the catchment, the England:Till Catchment SSSI was notified in 1999. The main stem of the Tweed and the Whiteadder was notified in 2001 as the Tweed Catchment Rivers- England:Lower Tweed and Whiteadder SSSI.

The River Tweed and some of its most characteristic tributaries (Blackadder, Bowmont, Ettrick, Teviot, Tweed, Whiteadder and Yarrow) were also designated in 2001 under the more recent 1981 Wildlife and Countryside Act for its biological interest, particularly as a prime example of a 'whole river system'. This is called the River Tweed SSSI.

The designated status of the River Tweed as a SSSI means that the features that make it important have legal protection. All owners and occupiers of the river are therefore required to consult Scottish Natural Heritage or Natural England before carrying out activities which could damage the scientific interest of the river.

The River Tweed and its selected tributaries, were also designated in 2005, as a Special Area of Conservation (SAC) under the European Habitats Directive, making it part of the Natura 2000 network, which represents some of the finest nature and conservation areas in the European Community.

The designation is for its biological interest, including: River lamprey, Brook lamprey, Sea lamprey, Atlantic salmon, Otter and for floating vegetation such as Water-crowfoot. All these species are vulnerable within a European context.

Refer to Appendix 7(1) for River Tweed SSSI Designation
Refer to Appendix 7(2) for River Tweed Special Area of Conservation (SAC) Designation
Refer to Appendix 7(3) for River Tweed SAC Conservation Objectives

8. Presence / Absence of Fish Farming and Rainbow Trout Fisheries

Fish Farms-

There are 3 commercial fish farms operating within the catchment. Plus a fourth that is currently inoperative / moth balled (Lugate). They all draw water from adjacent watercourse.

Fish Farm	Tributary (fish species)	Grid Reference
Gala Fish Farming Ltd Torwoodlee Galashiels Selkirkshire TD1 2NE	Gala Water (Rainbow trout	NT/47730/38634
The Yarrow Fishery Yarrowford Selkirk TD7 5JZ	Yarrow (Rainbow trout)	NT/37166/28130
Galashiels Trout Farmers Ltd (Stagehall Farm), 35 Townfoot, Stow, Galashiels TD1 2QN	Lugate (Rainbow trout) (Currently inoperative/moth balled)	NT/ 441 443
Abbey St. Bathans trout farm Duns Berwickshire TD11 3TX	Whiteadder (Rainbow trout)	NT/76168/62005

Trout Fisheries-

Stocked Game (Trout) 'put and take' fisheries operate at the following (*Reservoir/Loch) locations.

Location	Fish species	Grid Reference	Contact/Telephone
Headshaw, Selkirk	Rainbow, Brown trout	345976/623589	01750 32233
Watch Water, Duns	Rainbow, Brown trout		01361 890331
Kailzie, Peebles	Rainbow, Brown, Blue trout		01721 729020
Whinney, Coldingham	Rainbow, Brown, Blue trout		01890 771838
Coldingham Loch, Eyemouth	Rainbow, Brown, Blue trout	389515/668575	01890 771270
*St.Marys Loch, Selkirk	Brown trout	324912/622818	01896 751620
Acreknowe, Hawick	Rainbow trout	349486/610645	Sandbed P.O Hawick
*Heatherhope, Morebattle	Rainbow trout		Morebattle P. O
*Lindean, Selkirk	Rainbow trout	350059/629100	01750 20749
*Stantling Crag, Clovenforfds	Rainbow trout		A Elliot, Blackhaugh Farm, Clovenfords
*Watch Water Reservoir, Longformacus	Rainbow trout	366016/656426	01361 890144
Williestruther Loch	Rainbow trout		Sandbed P. O Hawick
Acremoor, Hawick	Rainbow trout	340698/621007	Sandbed P.O. Hawick
Hellmoor, Hawick	Rainbow trout	338569/616881	Sandbed P.O Hawick
Clearburn, Ettrick Valley	Rainbow trout		0175062205
Cuddy, Ettrickbridge	Rainbow trout	339319/622812	01750 62205
Hass, Jedburgh	Rainbow trout	368173/610910	01835 862377
Upper Loch, Bowhill	Rainbow trout		01750 20753
Clerklands, St.Boswells	Rainbow trout		01835 870757
Lochside, Yetholm	Rainbow trout	379550/627249	
Chatton Trout Fishery	Rainbow trout	NT/ 063275	01668 215226

Stocked Coarse fisheries operate at the following locations.

Location	Fish species	Grid Reference	Telephone
Byers Loch, Galashiels	Carp, Crucian, Roach, Rudd, Tench, Perch, Ide		01896 751620
Loch of the Lowes, Selkirk	Perch, Pike	323743/619781	01750 42243
St.Marys Loch, Selkirk	Perch, Pike	324912/622818	01896 751620
Alemoor Loch, Hawick	Pike, Perch, Roach	339926/615250	07599 500151

Wild Game Fisheries operate at the following locations.

Location	Fish species	Grid Reference	Telephone/Contact
Throughout the River Tweed Catchment	Salmon, Brown trout, Sea trout, Grayling		
Whiteadder Reservoir	Brown trout	365296/663574	01361 890397
River Till	Salmon, Brown trout, Sea trout, Grayling		www.fellingflyfishers.co.uk

9. Angling Information

The River Tweed Commission (RTC) was established by an Act of Parliament in 1807, to protect fish stocks in the Tweed River system.

The River Tweed Commission is charged under The Scotland Act 1998 (River Tweed) Order 2006 with the general preservation and increase of salmon, sea trout, trout and other freshwater fish in the River Tweed and its Tributaries, and in particular with the regulation of fisheries, the removal of nuisances and obstructions and the prevention of illegal fishing. The area of jurisdiction extends five miles out to sea and includes the coastline between Cockburnspath and Holy Island. Powers under the above legislation are granted to the Commission to fulfill these duties

The Commission holds a contact list for all salmon fishery proprietors across the catchment and can be contacted at: River Tweed Commission, The North Court, Drygrange Steading, Melrose, Roxburghshire, TD6 9DJ. Tel - 01896 848294. E-mail-enquiries'rtc.org.uk. The Clerk to the Commission is Mr N P Yonge.

A number of Angling Associations can be found throughout the catchment.

Please refer to Appendix 9(1) for local Angling Association/Fishing club contact details

Please refer to Appendix 9(2)- for Location map of Tweed Catchment Trout clubs and their waters

10. Presence / Absence of Wild Fish Hatcheries

There are no wild fish hatcheries in the Tweed Catchment.

11. Levels of Monitoring

The Tweed Foundation has been monitoring (salmonid) fish stocks in the River Tweed since 1998. It regularly monitors sites across the whole catchment. Monitoring is undertaken in full compliance with the National Aquatic Animal Health Regulations. Currently, there is no systematic survey of the health status of fish stocks across the Tweed Catchment on an annual basis.

Electro-fishing-
The Tweed Foundation undertakes an annual electro-fishing monitoring programme for juvenile Salmonids. There is generally a large spatial coverage but each monitored site is only visited once every three years. The Main channel (Tweed) downstream of Innerleithen and the Lower Till, are not sampled, due to practical difficulties in operating the electro-fishing equipment effectively. Ettrick Water, which has a similar method to the rest of the catchment, is monitored on an annual basis.

Fish Counters-
Two Vaki infra-red fish counters, one located at Philliphaugh just downstream of the confluence of the Ettrick and Yarrow Waters (on the Ettrick Water). The second, is located at skinworks cauld in Galashiels (on the River Tweed). The Tweed Foundation has historical records going back to 1998.

Fish Traps-
Fish traps that monitor the spawning run primarily for Brown Trout and Sea Trout are located at: Peebles (Haystoun Burn), Upper Tweed (Stanhope Burn), Middle Tweed (Maxton Burn) and Jedburgh (Black Burn). The traps at Peebles and Upper Tweed are also used to monitor Smolt output from these tributaries.

Refer to Appendix 11(1) for map of electro-fishing sites on Ettrick and Yarrow Water .
Refer to Appendix 11(2) for map of electro-fishing sites within Tweed Catchment (excluding Ettrick and Yarrow Water)
Refer to Appendix 11(3) for map of fish counter locations within Tweed Catchment
Refer to Appendix 11(4) for map of fish trap locations within Tweed Catchment

12. Recreational Activities

Activity	Representative Bodies	Contact	Phone	E-mail/Web/information
Game Fishing	Refer to section 8 and 9			
Coarse fishing	Refer to section 8 and 9			
Fly fishing coaching / instruction	Eion Fairgreive's Centre of Excellence	Eion Fairgrieve	01573 226700	eion@centre-of- excellence.com
Sea fishing	Eyemouth	Iain Easingwood	01890 771676	Harbour mouth and inshore for Cod,Ling,Mackerel,Pollack
	Eyemouth	Martin Spouse	01890 751477	Harbour mouth and inshore for Cod,Ling, Coalfish
	Berwick	David Thompson	01289 302749	Harbour mouth and inshore for Cod,Ling,Pollack,Coalfish
Canoeing	Scottish Canoe Association	Head office	0131 317 7314	www.general.office@canoescotalnd.com
	Berwickshire K.C	Ian Fingland		fingland@doctors.org.uk
	Borders K.C	Bob Baird	01890 751331	malinulva@hotmail.co.uk
	Leithen Water Paddlers	Jane Sargeant	01896 830175	
	Selkirk C.C	Marion Dickie	01750 52212 (e)	mariondickie@googlemail.com
	Tweed C.C	Bruce Bell	01896 750257	kayak@tweedcanoeclub.org.uk
Rowing*	Berwick Amateur Rowing Club (BARC)	Estelle Dods	01289 308428	enquiries@berwick-amateur-rowing-club.co.uk
Sailing	St. Marys Loch S.C	Ian Malcolm	0131 663 2079	www.stmlsc.org.uk
Wind surfing	Whiteadder Water W.C. c/o Scottish Borders Council Education Department St.Marys Loch W.C.	John Hall Ian Malcolm	01835 824000 (e) 0131 663 2079	www.scotborders.gov.uk www.stmlsc.org.uk
Borders schools outdoor education activities	Scottish Borders Council Education Department	John Hall	01835 824000 (e)	www.scotborders.gov.uk

***** *BARC race from West Ord (Royal Tweed Bridge), up river to the chain Bridge at Horncliffe where the tidal limit runs out***.**

13. Relevant Agencies and Organisations within the Tweed Catchment

Berwick upon Tweed Harbour Commission	Harbour Master's Office, Tweedmouth, Berwick on Tweed TD15 2AB
Borders Forest Trust	Monteviot Nurseries, Ancrum, Jedburgh, TD8 6TU
Burnmouth Harbour Trust	c/o John Aitchison, Harbour Master, 16 Partanhall, Burnmouth, Eyemouth
Cove Harbour Conservation Ltd	Ben Tindall, Tel: 0131 668 2325, Email: ben@hermitsandtermits.co.uk
Department for the Environment, Food and Rural Affairs (DEFRA)	Rural Development Service, Government Buildings, Kenton Bar, Newcastle upon Tyne, NE5 3EW
Environment Agency	Northumbria Area, Tyneside House, Skinnerburn Road, Newcastle upon Tyne, NE4 7AR
Eyemouth Harbour Trust	Harbour Master Office, Gunsgreen Basin, Eyemouth TD14 5SD
Farming Wildlife Advisory Group (FWAG)	15 Glendale Business Park, Haugh Head, Wooler, NE71 6QP
Federation of Borders Angling Associations	Crask, Leithen Mills, Innerleithen, EH44 6JJ
Forestry Commission	South Scotland Conservancy Area Office, North Wheatland Mill, Wheatlands Road, Galashiels, TD1 2HQ North East England Conservancy Area Office, 1 Walby Hill, Rothbury, Morpeth, NE65 7NT
National Farmers Union	NFU Scotland Eildon House, Newtown St Boswells, TD6 0PP NFU England & Wales Agriculture House, 207 Tadcaster House, York, YO24 1UD
Natural England	North East Region, The Quadrant, Newburn Riverside, Newcastle upon Tyne, NE15 8NZ
Northumberland County Council	County Hall, Morpeth, NE61 2EF
Northumberland National Park	Eastburn South Park, Hexham, NE46 1BS
Northumbrian Water	Customer Contact Centre, Abbey Road, Pity Me, Durham, DH1 5FJ
River Tweed Commissioners	The North Court, Drygrange Steading, Melrose, TD6 9DJ
Royal Society for the Protection of Birds	Lindean Mill, 2nd Floor, Galashiels, TD1 3PE Denby Dale Office, Westleigh Mews, Wakefield Road, Denby Dale, Huddersfield, HD8 8QD
Scottish Agricultural College	Greycrook, St Boswells, TD6 0EU Wooler Livestock Centre, Berwick Road, Wooler, NE71 6SL
Scottish Borders Council	Council Headquarters, Newtown St Boswells, TD6 0SA
Scottish Environment Protection Agency	Burnbrae, Mossilee Road, Galashiels, TD1 1NF
Scottish Natural Heritage	Anderson's Chambers, Market Street, Galashiels, TD1 3AF
Scottish Rural Property and Business Association	Stuart House, Eskmills Business Park, Musselburgh, EH21 7PB

Scottish Water	PO Box 855, Edinburgh, EH10 6YQ
Southern Upland Partnership	Studio 2, Lindean Mill, Galashiels, TD1 3PE
St. Abbs Harbour Trust	Harbour Masters Office, St. Abbs, Berwickshire
Tweed Foundation	Drygrange Steading, Melrose, TD6 9DJ
Visit North East England	Aykley Heads, Durham, DH1 5UX
Visit Scotland	Shepherd's Mill, Whinfield Road, Selkirk, TD7 5DT

Refer to Appendix 13 – For full contact details of Relevant Agencies within the Tweed Catchment

Conclusion

There is a significant risk from Gs entering the Tweed River system. The main risk stems from contaminated fishing gear, via fishermen making overseas fishing trips. Contaminated freshwater ballast in cargo boats entering Berwick harbour is an additional (though lesser) threat.

This report is intended to help with provision of necessary information relevant to the risk from Gs entering the Tweed (and Eye) Catchments and the information relevant to the subsequent control of Gs (ie containment or eradication), should it enter the Catchments.