



ALMONDBANK FLOOD PROTECTION SCHEME

FRESHWATER PEARL MUSSEL SURVEY

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1. INTRODUCTION

1.1. Background Information

- 1.1.1. Young Associates conducted a freshwater pearl mussel *Margaritifera margaritifera* survey on the River Almond and East Pow Burn, near Almondbank, Perthshire on the 22nd October 2007 (Figure 1). This survey was commissioned by Mouchel to inform an Environmental Impact Assessment of the proposed Flood Protection Scheme for Almondbank. The scheme will involve the installation of sluice gates, flood walls, pumping station, flood embankment, abutments and construction of a footbridge, sheet piling, gabion baskets and a new road bridge to Lochty Park.
- 1.1.2. This report is confidential due to the information it contains on freshwater pearl mussels. It is important that its distribution is strictly limited and that persons allowed to view the report are aware of the sensitive nature of the information it contains.
- 1.1.3. The freshwater pearl mussel is fully protected in Great Britain under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) as detailed in Section 1.1.4, below. The legislation makes it an offence to intentionally or recklessly kill, injure or take this species from the wild. In addition, through paragraph 9(4a and 4b) of the Act, the fresh water pearl mussel is protected against intentional or reckless, damage/destruction to, or obstruction of, “*any structure or place which any wild animal (included in the schedule) uses for shelter and protection*” and against disturbance whilst in such places.
- 1.1.4. Fresh water pearl mussels are provided protection through inclusion in Annexe II and V of the European Community’s Habitats Directive (92/43/EEC) transposed into UK Law via The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended by the The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007) and are a species of community importance at a European level.
- 1.1.5. The fresh water pearl mussel is included within the UK Biodiversity Action Plan (UKBAP) as a ‘Priority Species’, whilst Scotland is considered to be the stronghold for the species. It is also listed on Appendix III of the Bern Convention. In addition to the above, the freshwater pearl mussel is listed as ‘Endangered’ within the International Union for Conservation of Nature (IUCN) 1996 Red Data Book.

1.2. Consultation

- 1.2.1. Consultation with Scottish Natural Heritage (SNH) and Scottish Environment Protection Agency (SEPA) was undertaken by Mouchel, and ecological information distributed to Young Associates as part of this process.
- 1.2.2. Consultation responses revealed that both the River Almond and the East Pow Burn lie within the River Tay – Special Area of Conservation (SAC). The River Tay SAC has no primary habitats associated with its designation; however Atlantic salmon *Salmo salar* is the primary species responsible for its designation. In addition, four qualifying species are also listed on the River Tay designation, these are: river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus*, brook lamprey *Lampetra planeri* and otter *Lutra lutra*; whilst one habitat - oligo-mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoëte-Nanojuncetea* is also listed as a qualifying habitat under this designation.

2. METHODOLOGY

2.1. General Methodology

- 2.1.1. A general survey was made for freshwater pearl mussels and a record of substrate types within the main stem of the River Almond and East Pow Burn was made in accordance with the methodology described by Young (2001).
- 2.1.2. The aim of the survey was to identify specific areas that are most likely to harbour freshwater pearl mussels using information on their habitat preferences from previous studies and experience. Given the nature and length affected of the proposed works, it was concluded that the surveyors would survey the entire length of those areas likely to be directly impacted by the proposed flood defence works.
- 2.1.3. In addition to direct effects, indirect effects of the proposed works were also considered and through consultation with SNH (Nicki McIntyre *pers.comm.*), confirmed that no further downstream surveys would be required to assess any indirect effects downstream on the River Almond.
- 2.1.4. The river was entered at each survey stretch, at the downstream end and a search conducted, concentrating in areas of the most favourable substrate types so as to optimise search efficiency. To ensure compatibility with other surveys, searches were made:
- using a glass-bottomed viewing bucket, as well as, polarised sunglasses;
 - under favourable conditions i.e. bright light, clear water, low flow regime (based on gauging station results);
 - in water sufficiently shallow for safe wading;
 - in an upstream direction, checking favourable sites e.g. in the shelter of cobbles, boulders or overhanging banks; and
 - loose debris and trailing weed should be moved gently aside but no disturbance of the river bed is required.
- 2.1.5. A systematic search was undertaken of the river and substrate within the scheme extents defined in Figures 2-5. This involved a search using a transect (50m long by 1m wide) laid out so as to traverse the main area of channel.
- 2.1.6. Where an initial search of the whole transect indicates that there are likely to be fewer than 250 mussels, all mussels present would be counted and their longest dimension measured to the nearest 1 mm (using dial callipers), in order that a size/age profile could be produced. Where visible adult mussels are recorded, further searches would be undertaken to assess whether juvenile mussels are present, as the presence of juvenile mussels would indicate an active recruitment at that location. (A pearl mussel is considered 'juvenile' if it is <65 mm long; mussels <20 mm long are likely to be under 5 years old and their presence is especially important as they indicate *recent* recruitment).
- 2.1.7. If there are too many mussels in the transect to count accurately (i.e. >250), then 1 m x 1 m quadrats should be laid at 10, 20, 30, 40, and 50 m intervals. Counts and

measurements of the mussels in these five quadrats would then be used to provide an extrapolated estimate for the whole 50 m transect.

3. RESULTS

- 3.1.1. The results of the 1 x 50m transects carried out along both the River Almond and East Pow Burn are detailed in Table 1 below.
- 3.1.2. Scottish Environment Protection Agency (SEPA), provided data in relation to the water quality of both the River Almond and East Pow Burn
- 3.1.3. A total of thirty seven (50m) transects were undertaken within the scheme extents. Substrate characteristics differed between the main stem of the River Almond and East Pow Burn, with the substrate within the main river generally more suitable to support freshwater pearl mussels *i.e.* it is dominated by cobble and boulder substrate with a sub-dominant layer of finer pebble, gravels and sands.
- 3.1.4. In contrast, the East Pow Burn, was considered to have less substrate suitable to support freshwater pearl mussels, given that the substrate was dominated by smaller sized substrate *i.e.* gravels and pebbles, with cobbles generally sub-dominant; suggesting that the substrate within the East Pow Burn is generally more subject to the influences of hydrological processes in comparison to the River Almond.
- 3.1.5. The following influences on the watercourses were noted during the field survey:
- Road runoff.
 - Possible septic tank discharges from the Lochty Park residential estate;
 - Effluent discharge from the Almondbank Waste Water Treatment Works.
 - Discharge from College Mill fish farm.
 - Heavy filamentous algal growth across the channel substrate.
 - Discharge of effluent from road drains and possible septic tank.

Table 1: Survey Results – Transect Findings

Watercourse	Transect	GB OS Grid Reference	Habitat	No of visible adult FWPMs
Almond d/s	1	NO 07135 25855	CO 50% GP 50%	0
Almond d/s	2	NO 07092 25773	BO 10% CO 60% GP 30%	0
Almond d/s	3	NO 07133 25766	BO 30% CO 35% GP 30% SA 5%	0
Almond d/s	4	NO 07053 25693	BO 40% CO 40% GP 20%	0
Almond d/s	5	NO 06979 25642	BO 30% CO 60% SA 10%	0

Watercourse	Transect	GB OS Grid Reference	Habitat	No of visible adult FWPMs
Almond d/s	6	NO 06869 25690	BO 20% CO 40% GP 40%	0
Almond d/s	7	NO 06856 25699	CO 30% GP 60% SA 10%	0
Almond d/s	8	NO 06811 25736	CO 30% GP 60% SA 10%	0
Almond d/s	9	NO 06756 25756	CO 30% GP 60% SA 10%	0
Almond d/s	10	NO 06754 25777	CO 45% GP 45% SA 10%	0
Almond u/s	11	NO 06726 25812		0
Almond u/s	12	NO 06654 25870	95% CO 5% GP	0
Almond u/s	13	NO 06638 25955		0
Almond u/s	14	NO 06638 25955		0
Almond u/s	15	NO 06594 26025	BO 30% CO 60% GP 10%	0
Almond u/s	16	NO 06556 26087		0
Almond u/s	17	NO 06618 26051	BO 30% CO 40% GP 30%	0
Almond u/s	18	NO 06572 26122	BO 40% CO 50% GP 10%	0
Almond u/s	19	NO 06544 26198	CO 70% GP 25% SA 5%	0
Almond u/s	20	NO 06522 26159	BO 50% CO 45% SA 5%	0
Almond u/s	21	NO 06521 26292	GP 70% SA 30%	0
E. Pow Burn d/s	1	NO 06864 25470	BO 10% CO 40% GP 30%	0
E. Pow Burn d/s	2	NO 06893 25529	CO 30% GP 50% SA 20%	0

Watercourse	Transect	GB OS Grid Reference	Habitat	No of visible adult FWPMs
E. Pow Burn d/s	3	NO 06885 25518	CO 30% GP 50% SA 20%	0
E. Pow Burn d/s	4	NO 06871 25484	CO 30% GP 50% SA 20%	0
E. Pow Burn d/s	5	NO 06851 25446	CO 30% GP 50% SA 20%	0
E. Pow Burn d/s	6	NO 06849 25421	CO 50% GP 30% SA 20%	0
E. Pow Burn d/s	7	NO 06763 25383	CO 10% GP 70% SA 20%	0
E. Pow Burn d/s	8	NO 06735 25411	CO 10% GP 70% SA 20%	0
E. Pow Burn d/s	9	NO 06701 25387	CO 10% GP 70% SA 20%	0
E. Pow Burn d/s	10	NO 06596 25374	GP 70% SA 30%	0
E. Pow Burn d/s	11	NO 06570 25334	GP 70% SA 30%	0
E. Pow Burn u/s	12	NO 06620 25171	GP 70% SA 30%	0
E. Pow Burn u/s	13	NO 06605 25205	CO 40% GP 40% SA 20%	0
E. Pow Burn u/s	14	NO 06560 25221	CO 40% GP 40% SA 20%	0
E. Pow Burn u/s	15	NO 06567 25268	GP 80% SA 20%	0
E. Pow Burn u/s	16	NO 06553 25296	BO 25% CO 50% SA 15%	0

3.1.6. Juvenile salmonids were observed within both the River Almond and East Pow Burn, with a number of large dead Atlantic salmon also observed.

4. DISCUSSION

- 4.1.1. Records indicate previous presence of freshwater pearl mussels within the River Almond system in a stretch upstream of the 2007 survey area.
- 4.1.2. However, no freshwater pearl mussels were found during the 2007 transect survey of the River Almond and East Pow Burn. Furthermore, no evidence of their presence historically, i.e. dead shells on the river banks, was found and it is concluded that the watercourse no longer supports a functional population of the species within the survey area.
- 4.1.3. The overall amount of suitable habitat within the survey area was fairly minimal, with only section 2 of the River Almond exhibiting any prolonged stretch of substrate considered optimal for freshwater pearl mussel colonisation. Cobble substrate is dominant within this section, with small patches of gravel deposition scattered frequently throughout.
- 4.1.4. Both watercourses within the survey area were seen to support salmonids, with numerous juvenile salmonids observed within the East Pow Burn. The presence of salmonids with the watercourse is vital for freshwater pearl mussel colonisation due to the symbiosis that occurs between the two species during the mussel's larval stage.
- 4.1.5. A number of point discharges are present along the banks of both watercourses, with varying visible effects on the habitat at these points. An outflow from the fish farm hatchery at around NO066256 has resulted in siltation of the river bed here, rendering it unsuitable for mussel colonisation. Further non-visible impacts upon the watercourse are likely elsewhere, including at the mouth of the East Pow Burn, where a sewage treatment outflow is situated.

5. CONCLUSIONS AND RECOMMENDATIONS

- 5.1.1. In light of the findings, which confirm the absence of a functional freshwater pearl mussel population within the survey area, it is suggested that the proposed development will not affect the status of freshwater pearl mussel in the area. However, it should be ensured that water quality is not impacted upon by the proposals, and that suitable freshwater pearl mussel habitat, where present, is maintained so as to make conditions favourable for a potential future colonisation by the species. This is particularly relevant given the occurrence of mussels further upstream within the River Almond, as confirmed during previous studies.
- 5.1.2. Appropriate measures should be implemented to prevent water quality from being impacted upon, both directly and indirectly, i.e. through run-off and direct pollution incidents.

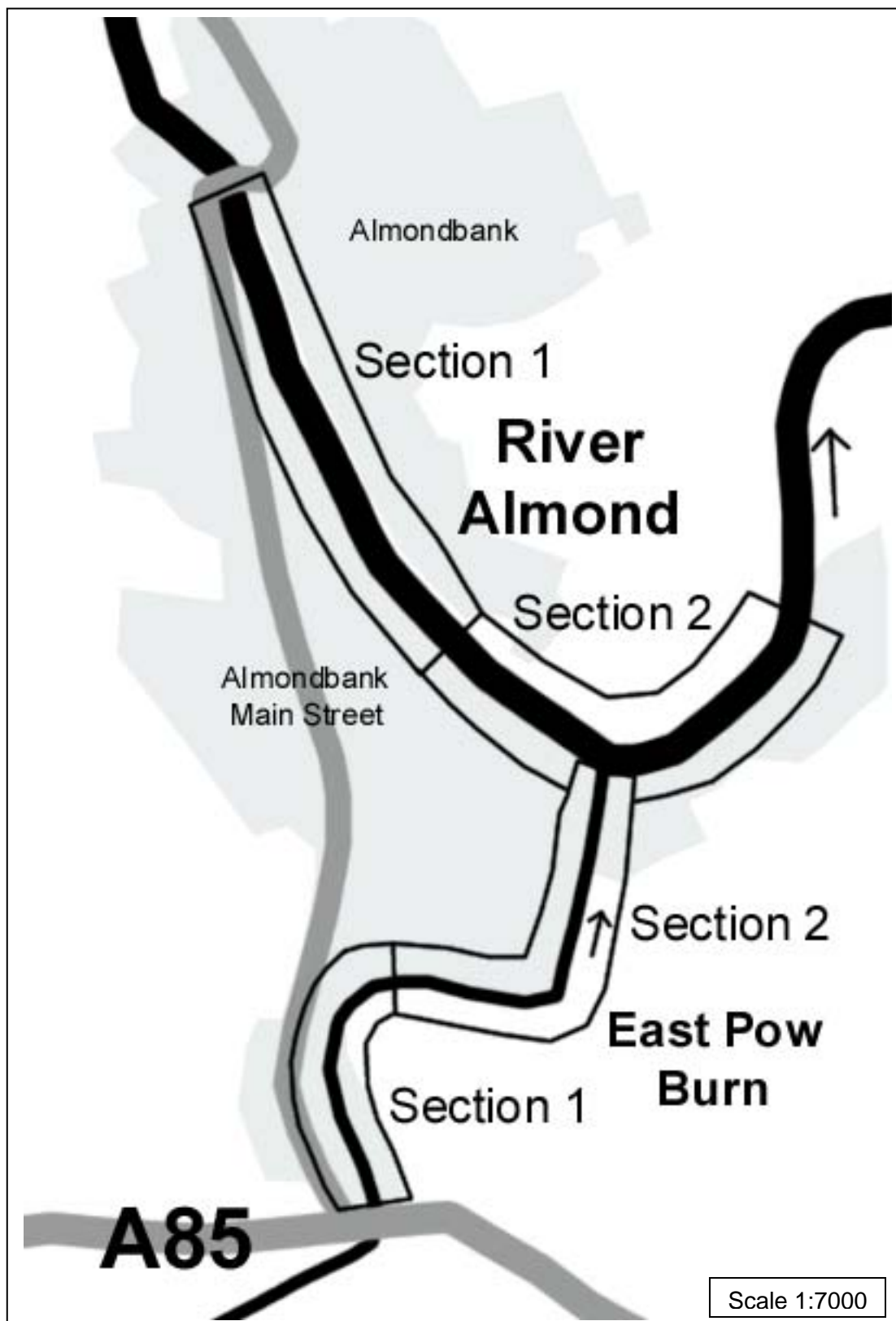


Figure 1

Project: Almondbank Flood Relief Scheme

Title:

Location of FWPM Survey Sections

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Figure 2 – River Almond Section 1

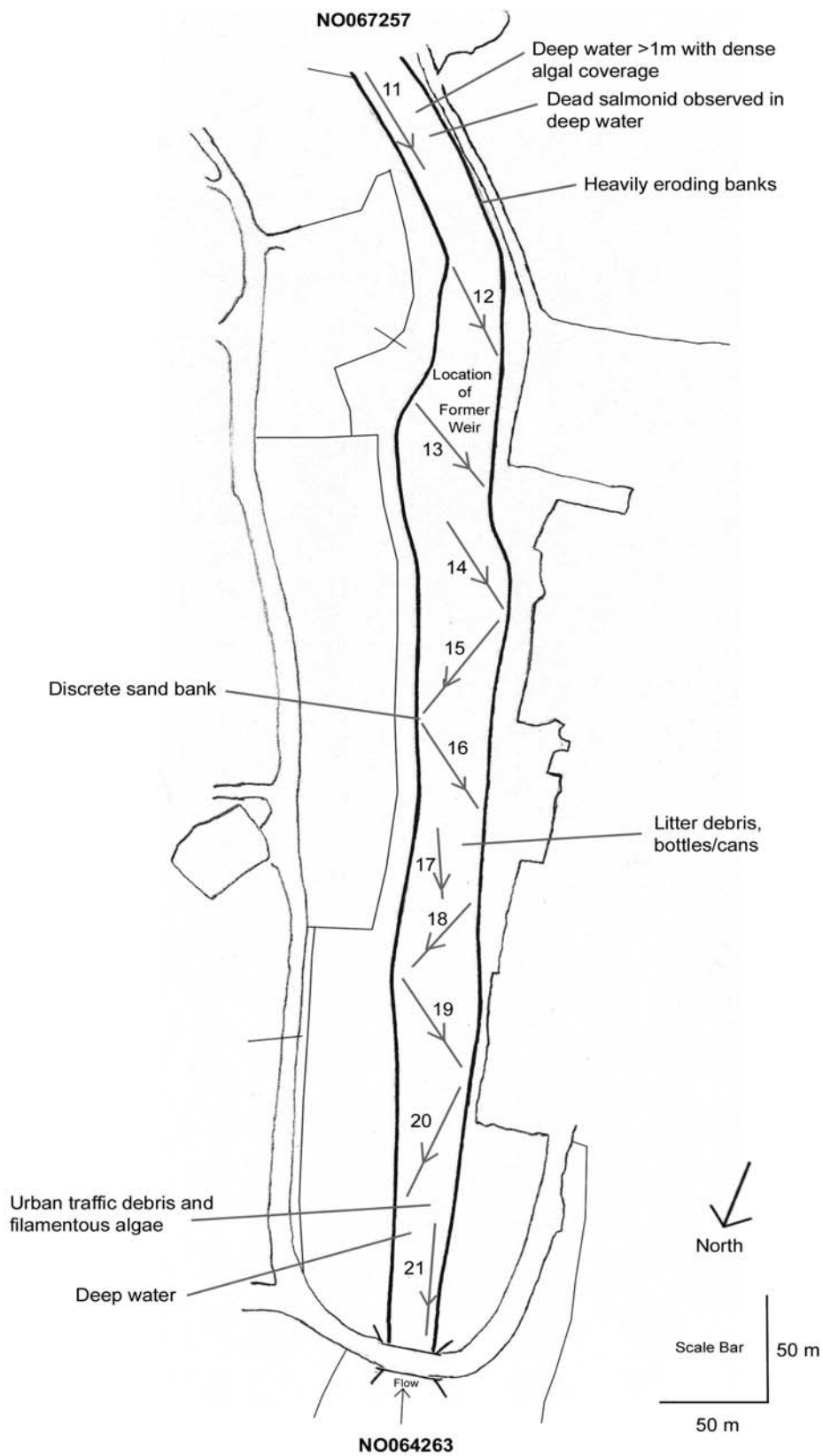


Figure 3 – River Almond Section 2

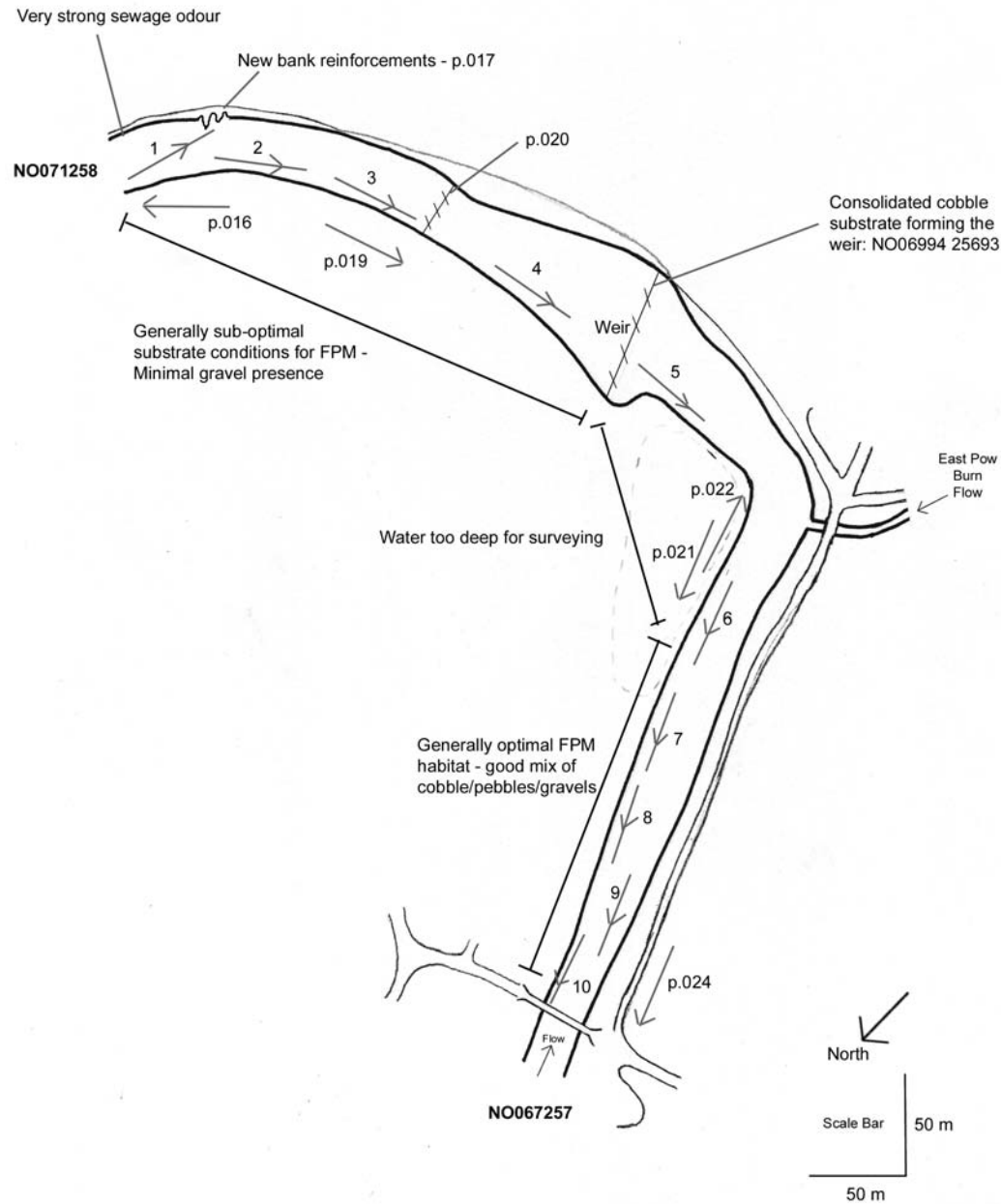


Figure 4 – East Pow Burn Section 1

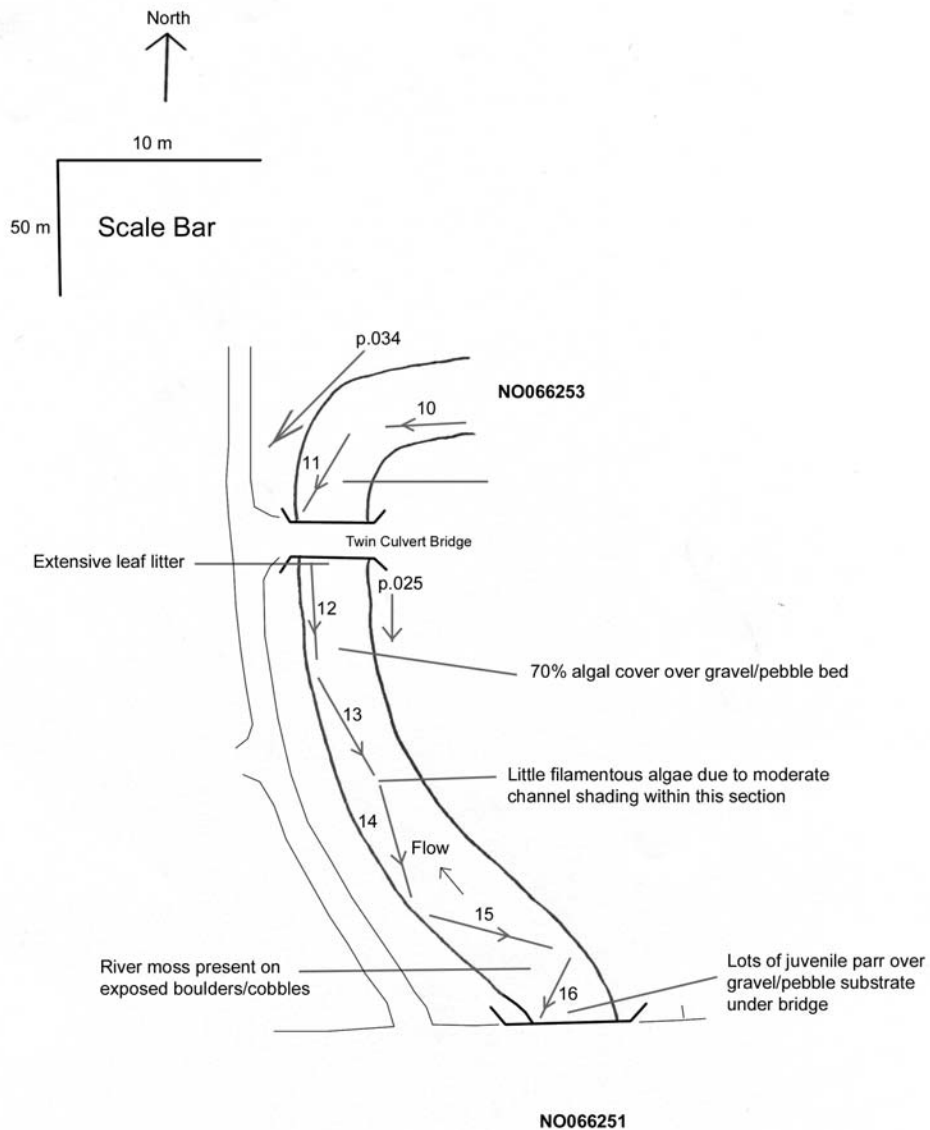


Figure 5 – East Pow Burn Section 2

