

INNS Strategy for the Clyde Catchment – collation report





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RESEARCH REPORT

Research Report No. 977

INNS Strategy for the Clyde Catchment – collation report

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RESEARCH REPORT

Summary

INNS Strategy for the Clyde Catchment – collation report

Research Report No. 977
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Keywords

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Background

The Clyde River Foundation (CRF) has been contracted by Scottish Natural Heritage (SNH) to develop an Invasive Non-native Plant Species (INNS) Management Strategy and Action Plan for the Clyde Catchment upstream of the Glasgow Tidal Weir in response to a priority action identified in the River Basin Management Plan. The three species of concern are Japanese knotweed (*Fallopia japonica*), Giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*) and the project will review and map the distribution of each and identify information gaps. This interim report describes the collation and review of existing data, and an assessment of its limitations.

Main findings

- A total of 2,516 usable records of the three species were collated from 10 data sources.
- Of the 2,692km of river length in the survey area, a minimum of 234km (8.71%) is affected by one of the three INNS of concern in this report.
- Limitations in the dataset require INNS to be surveyed from a total of 381 bridges in June and July 2015 to fill data gaps.
- Five anomalous records, which have the potential to affect extensive stretches of river, will also be investigated.

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We would like to thank those who took the time to send us their records.

Many thanks to

- Botanical Society of Britain and Ireland (BSBI)
- Central Scotland Green Network Trust
- Forestry Commission Scotland
- Network Rail
- North Lanarkshire Council
- Plant Tracker
- Royal Society for the Protection of Birds (RSPB)
- Scottish Wildlife Trust
- Scottish Environment Protection Agency (SEPA)
- Scottish Natural Heritage (SNH)

1. INTRODUCTION

The Clyde River Foundation (CRF) has been contracted by Scottish Natural Heritage (SNH) to develop an Invasive Non-native Plant Species (INNS) Management Strategy and Action Plan for the Clyde Catchment upstream of the Glasgow Tidal Weir in response to a priority action identified in the River Basin Management Plan. The three species of concern are Japanese knotweed (*Fallopia japonica*), Giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*) and the project will review and map the distribution of each and identify information gaps. A field method will be developed to complete the survey coverage and it will be deployed to prioritise areas for early action.

This interim report describes the collation and review of existing data, and an assessment of its limitations.

2. SURVEY AREA

The survey area covers parts of the City of Glasgow and North and South Lanarkshire. The area contains a total of 2,692km of linear riparian habitat (CEH Digital River Map 1:50 000) (Figure 1) although it is acknowledged that the species of interest may occur away from rivers. The following sections demonstrate the mechanisms by which data were obtained, collated and analysed to identify the known distributions of the three species of concern.

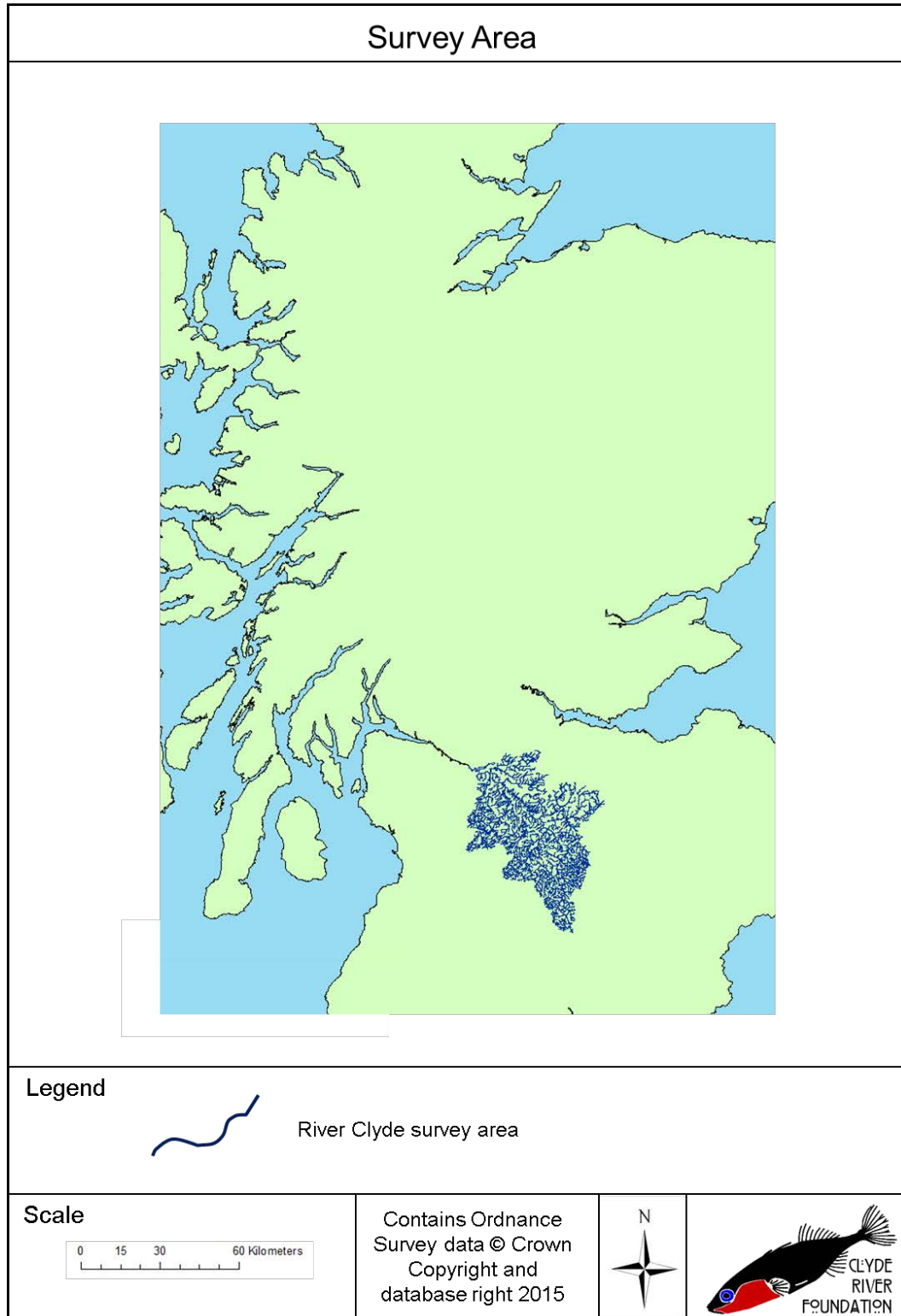


Figure 1. Survey Area © Crown copyright [and database rights] 2018 OS 100017908.

3. DATA

3.1 Data Sources

Following discussions with SNH, information was requested from a total of 17 sources, of which 10 provided datasets (those marked * below):

- Botanical Society of Britain and Ireland (BSBI)*
- British Waterways (Lowland Canals Office (Forth & Clyde, Monklands and Union)
- CAVLP
- Central Scotland Green Network Trust*
- Clyde River Foundation
- Forestry Commission Scotland*
- Forest Enterprise
- Glasgow City Council
- National Trust for Scotland
- Network Rail*
- North Lanarkshire Council*
- Plant Tracker*
- RSPB*
- Scottish Water
- Scottish Wildlife Trust*
- SEPA*
- SNH*
- South Lanarkshire Council

3.2 Data Obtained

A total of 2,560 usable records were received (although 33 from North Lanarkshire Council arrived after the data sift was completed). The origins and details of the records were as follows:

- Botanical Society of Britain and Ireland (BSBI) – 1,327 records in total of which 3 records were of precision of less than 100 square meters. Was supplied as an excel spreadsheet.
- Central Scotland Green Network Trust – 634 records in total of which – 549 were used, including 85 record for Rhododendron. Data was supplied as a GIS shape file
- Clyde River Foundation – 2,253 records supplied of which 1020 were used.
- Forestry Commission Scotland – total of twenty records of which 4 fell within the boundary of the survey area however none were within the river corridor.
- Network Rail – provided work detail logs of weed spraying along rail way track. Of the 1,337 job record sent 231 records were located within the survey area. The data supplied had no record of location of sprayed areas other than indicated by distance along track from point of work beginning a certain distance from the nearest railway station. To interrogate these data would have required additional information which Network Rail could not pass on, e.g. a GIS shape file of the railway lines and stations. This would then have been cross referenced against proximity to river corridors.
- North Lanarkshire Council – data was received 20 April 2015 and as such was received too late to be included in the desk survey and data interrogation. Of the 33 records received only one has the potential to alter our desk survey results, a record of Japanese knotweed located at the upstream point of the Tillan Burn; this will affect only four of the bridges it is intended to survey from.

- Plant Tracker – was obtained via a download from the national database. Filtered by the three species we downloaded 9,127 records of which 319 fell within the survey area. Of these, 27 records were located within the river corridor.
- RSPB – data was supplied in picture format from which a GIS layer was constructed. All records were within Barons Haugh reserve.
- SNH / CAVLP – received paper maps, upon which CRF data previously supplied to CAVLP was overlaid.
- Scottish Wildlife Trust – received a shape file with 11 useable records.

All data was used regardless of date recorded (where this was available) as it was agreed that once these INNS species become established they are far more likely to persist than to become extinct from a particular site.

4. FILTERING DATA

It was necessary to determine which of the data were likely to be influenced by the river network and which were not. Four filters were applied to sift the useful data from the other records (either data collected at low resolution which could not be mapped onto the river network or geographically accurate records which were identified as definitely remote from the river network).

- The first filter removed records from the BSBI recorded at 10,000 and 50,000 square meters.
- The second filter removed records from the BSBI recorded at 1,000 square meters.
- The third filter removed records from the BSBI recorded at 100 square meters.
- The fourth filter removed records from the HSHN recorded at 100 square meters.

The results of these filters are shown in the histograms found within Annexes 1-3 (Figures 13-60) and are supplied as GIS shape files separated by filter stage and species.

5. IDENTIFYING RIPARIAN INNS - CALCULATING DISTANCE FROM THE RIVER CHANNEL

The filtered records were analysed to determine the distance of each from the nearest river channel and to identify which occurrences could be considered as non-riparian. Table 1 summaries the distances of 25%, 50%, 75% and 95% of total filtered records for each species from the river channel. The distances were calculated by the proximity tool in ArcGIS (distance of record point location from river feature based on the CEH digitised river network).

Table 1. Percentage of records and maximum distance from river

Species		Japanese knotweed	Himalayan balsam	Giant hogweed
25 percent of total records	Number of Records	280	245	11
	Maximum distance from river (m)	9	17	11
50 percent of total records	Number of Records	559	489	22
	Maximum distance from river (m)	14	28	51
75 percent of total records	Number of Records	839	929	33
	Maximum distance from river (m)	38	57	175
95 percent of total records	Number of Records	1062	929	42
	Maximum distance from river (m)	247	138	480

Based upon Table 1, a nominal river corridor width of 100m would contain 50% of reported Giant hogweed occurrences and at least 75% of reported Himalayan balsam and Japanese knotweed records (Table 2). These records are shown in Figure 3, Figure 4 and Figure 5.

Table 2. Relationship between the occurrence of INNS records and distance from river

Species	Maximum distance from river (m)	Percentage of total records included
Japanese knotweed	40	75
Himalayan balsam	50	75
Giant hogweed	50	50

The red river channels marked on each map shows stretches of water where there is a known record upstream and therefore there is a high risk of re-colonisation from the upstream source. The minimum river lengths likely to be colonised by each of the three species are given in Table 3. The proportion of the total river length affected by each species was relatively low (about 3% for both Giant hogweed and Himalayan balsam, and 8% for Japanese knotweed), with the combined river length including overlapping ranges close to 9% (Table 3).

Table 3. Proportion of total river length invaded by riparian INNS

	m	km	% of total length
Total River Length	2692173	2692.173	100.00
Giant hogweed	85646	85.646	3.18
Japanese knotweed	220205	220.205	8.18
Himalayan balsam	82940	82.940	3.08
Combined	234562	234.562	8.71

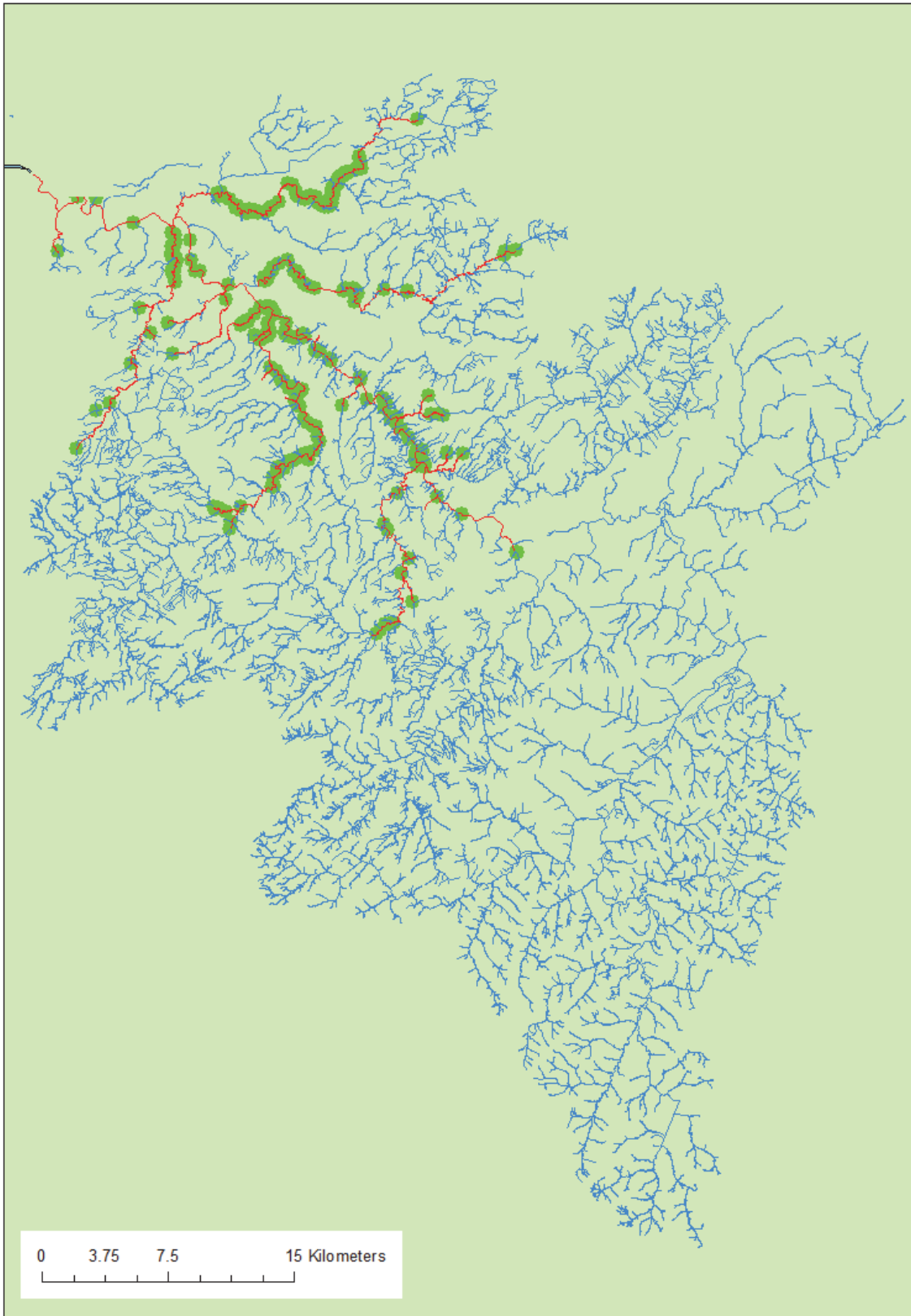


Figure 3. Japanese knotweed distribution and records (within 40m of river) © Crown copyright [and database rights] 2018 OS 100017908.

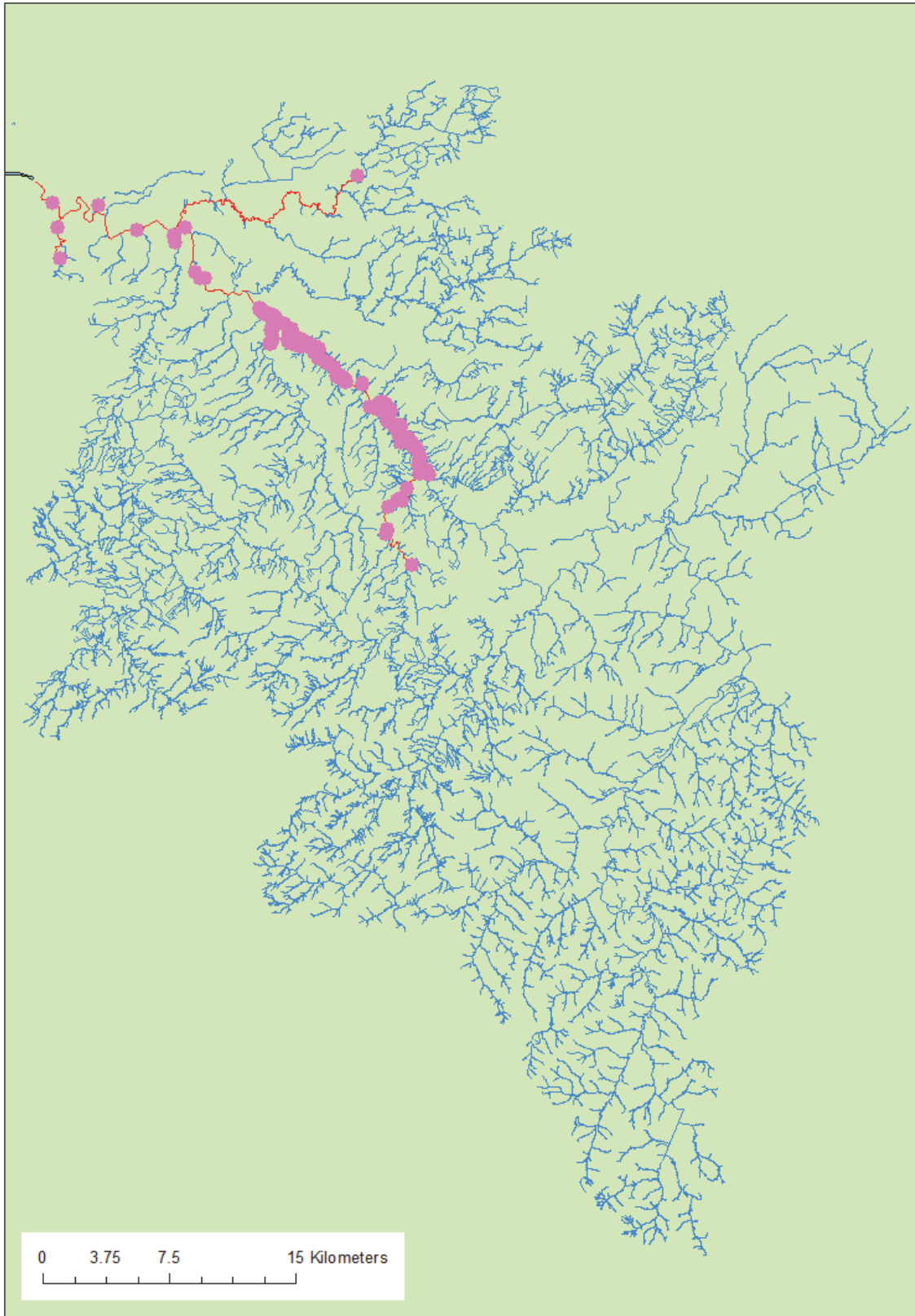


Figure 4. Himalayan balsam distribution and records (within 50m of river) © Crown copyright [and database rights] 2018 OS 100017908.

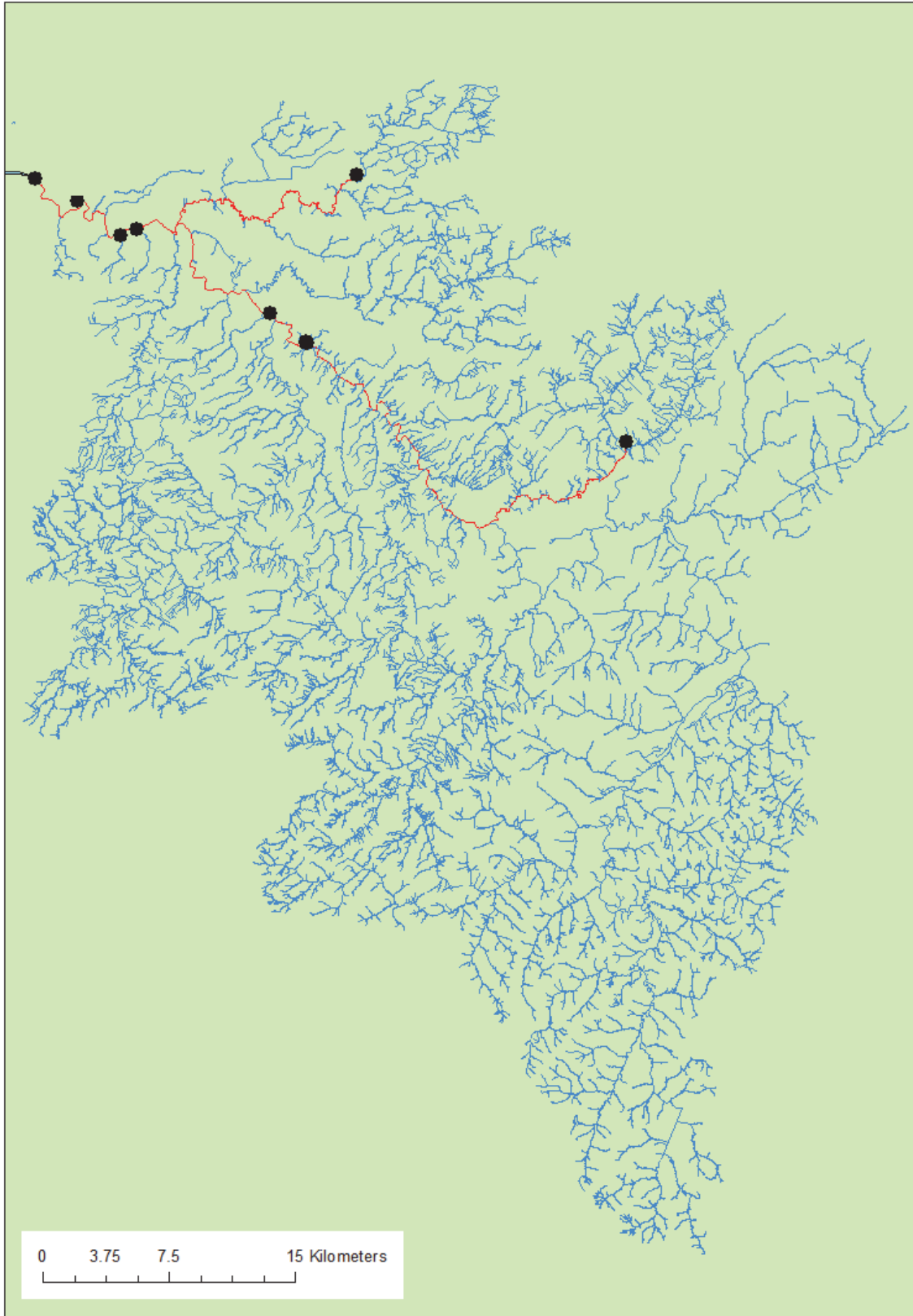


Figure 5. Giant hogweed distribution and records (within 50m of river) © Crown copyright [and database rights] 2018 OS 100017908.

6. BRIDGE SURVEYS

The final records (Figure 3, Figure 4 and Figure 5) were overlaid with road bridge locations. Of the 561 bridges found within the survey area (Figure 6) the Clyde River Foundation has previously used 83 to survey from (Figure 7), the results are included within the data provided in this report. The current study generated data using an additional 97 bridges (Figure 8) leaving a total of 381 bridges to be surveyed from (Figure 9 and Figure 10). We are not surveying from any bridges downstream of a known INNS record as we are assuming that the stretch of water it will have a very high likelihood of being colonised from the upstream record.

The survey from these bridges will commence on 15 June 2015 and is anticipated to be completed within one month.

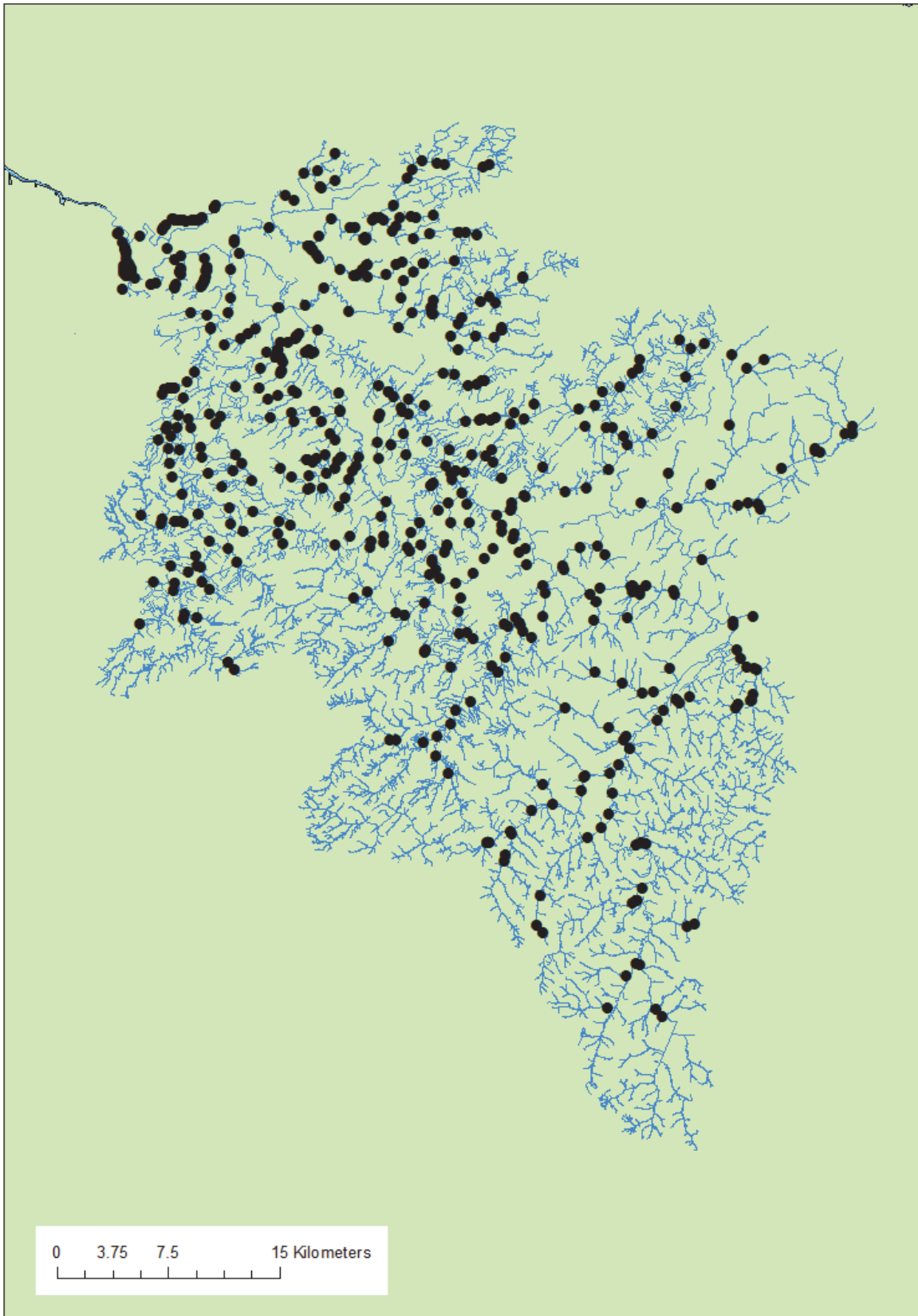


Figure 6. All 561 bridges located within the survey area © Crown copyright [and database rights] 2018 OS 100017908.

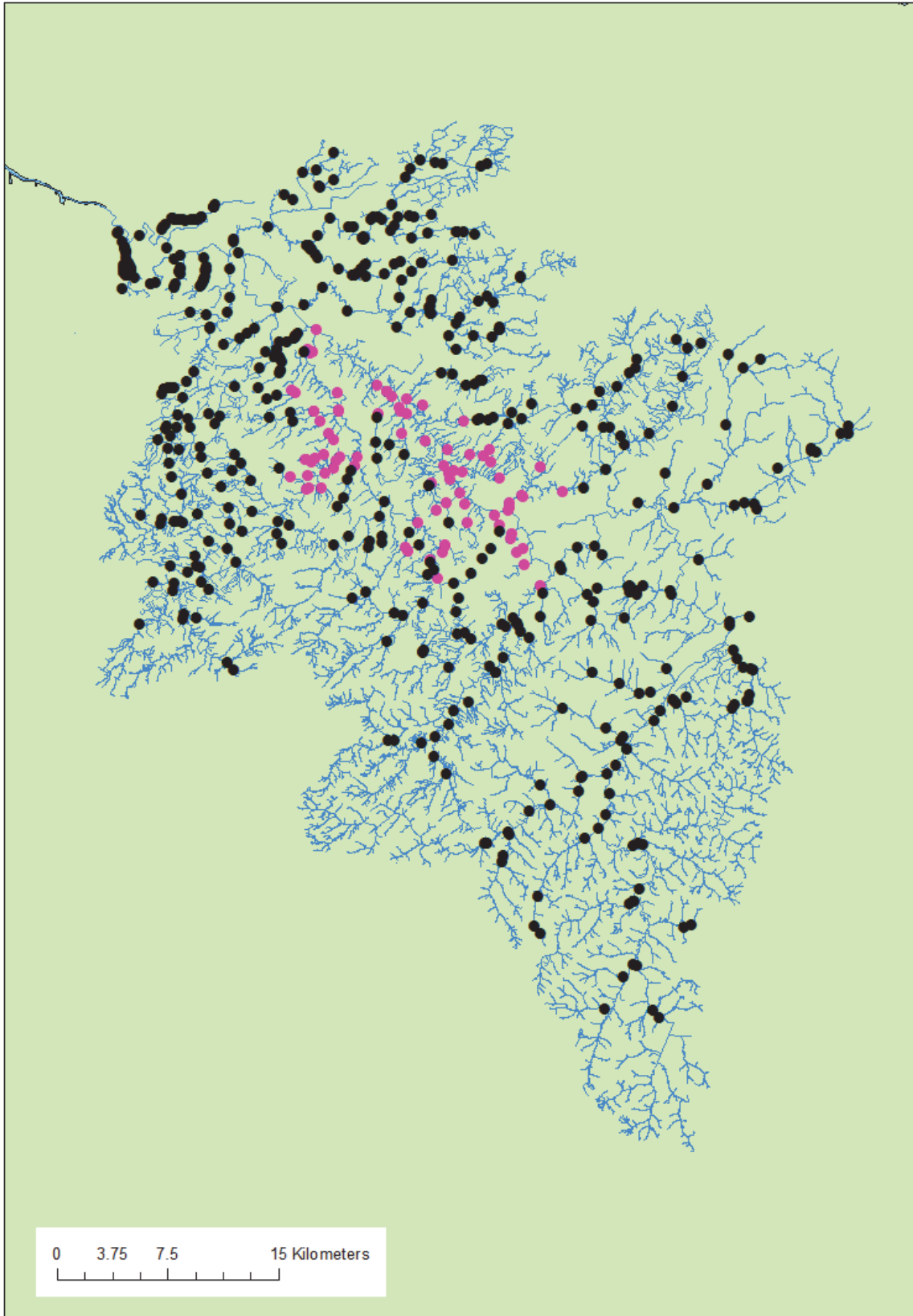


Figure 7. Bridges (83) previously surveyed from by Clyde River Foundation © Crown copyright [and database rights] 2018 OS 100017908.

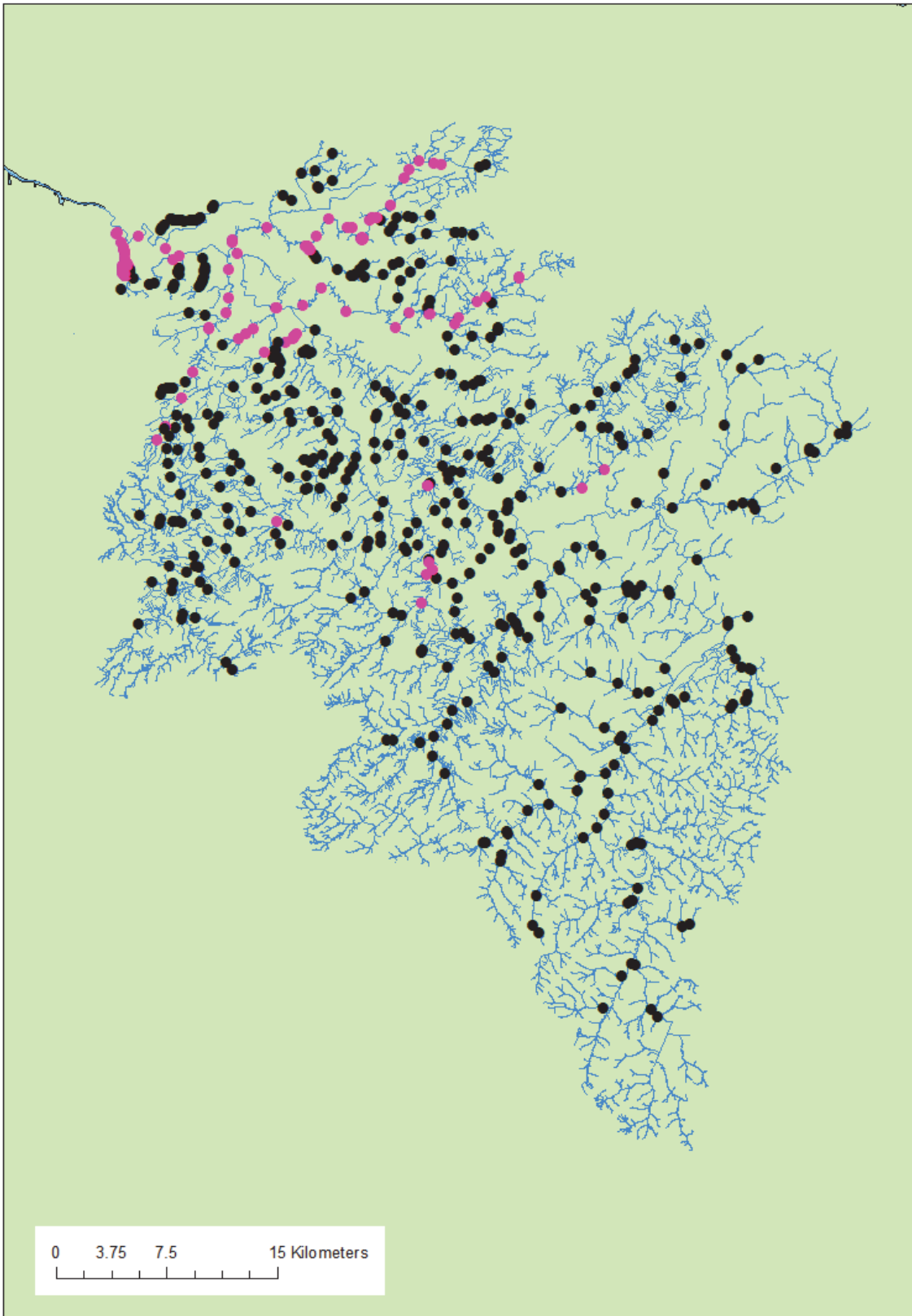


Figure 8. Bridges (97) covered by data received during desk study © Crown copyright [and database rights] 2018 OS 100017908.

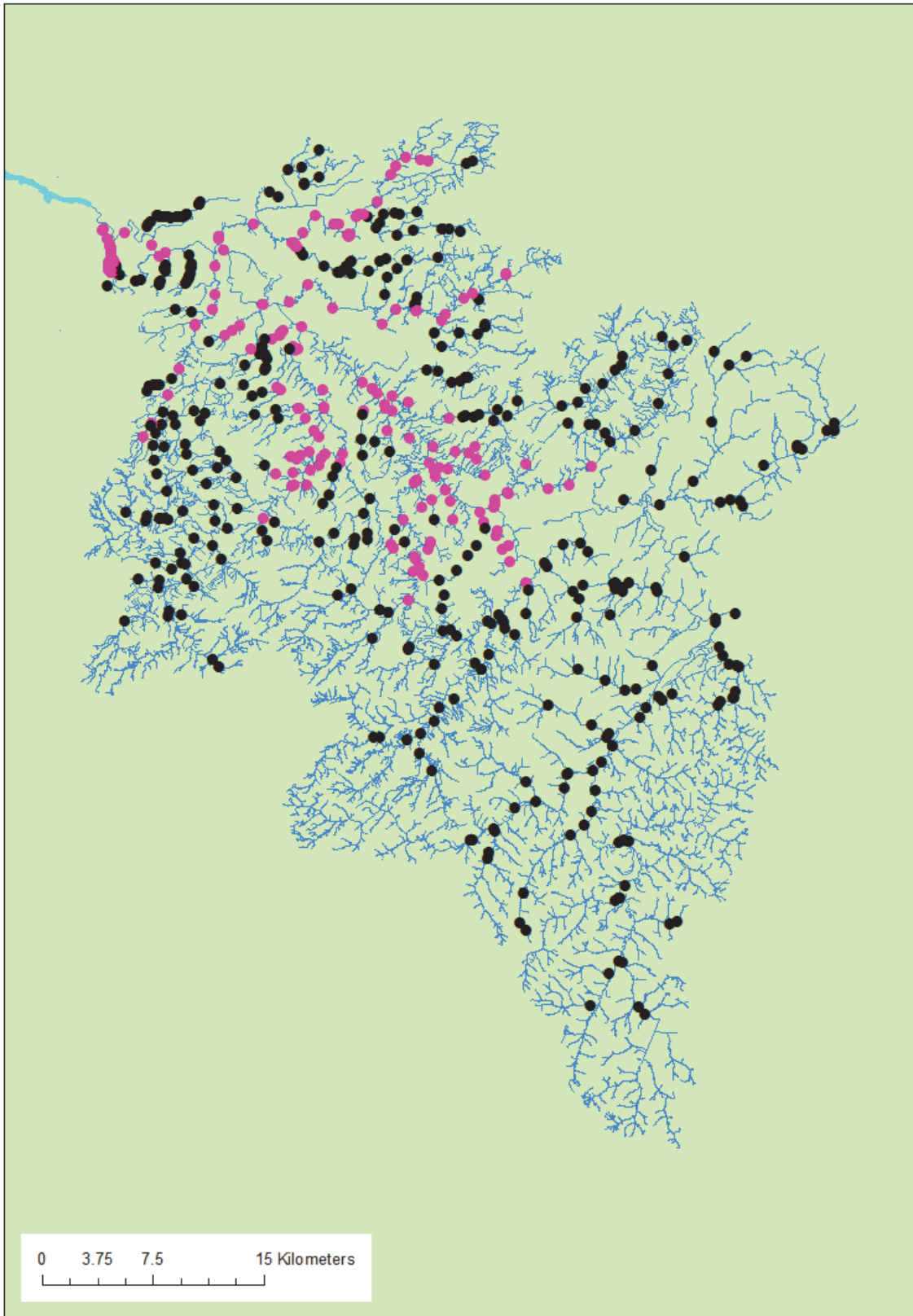


Figure 9. All bridges (180) previously surveyed from identified in combined desk study results (pink) and remaining bridges still to be surveyed from (black) © Crown copyright [and database rights] 2018 OS 100017908.

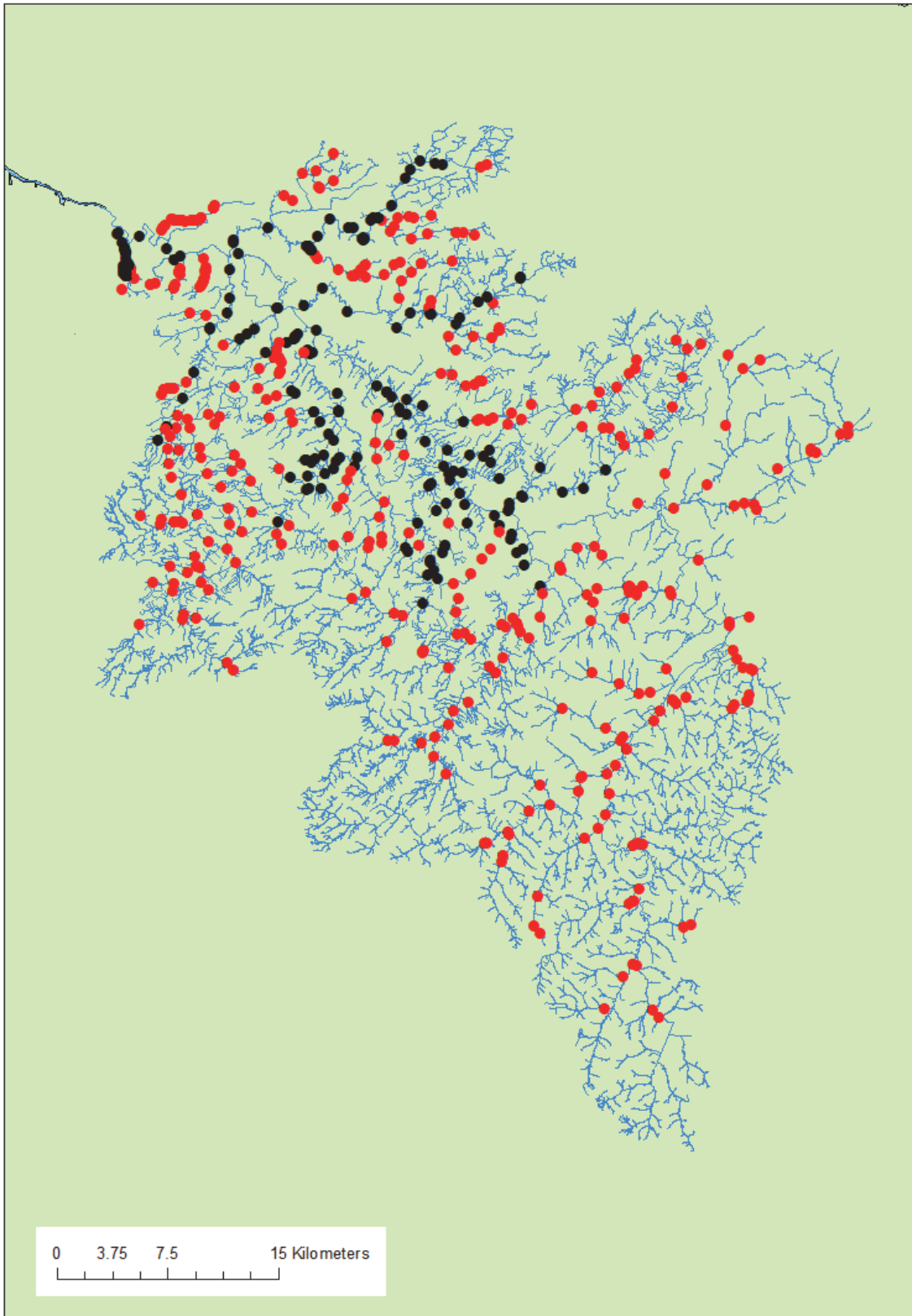


Figure 10. The remaining 381 bridges requiring survey (those coloured red) © Crown copyright [and database rights] 2018 OS 100017908.

7. RECORD ANOMALIES

For each of the three INNS of concern there are some records which due to their location should be specifically investigated and confirmed. They are located either some distance upstream from the nearest neighbouring record and/or located just outwith the distance from river channels determined in Table 2. They have the potential to affect extensive sections of river length downstream.

There are five records among the three species which require investigation. Figure 11 shows the location of the single Giant hogweed record, while Figure 12 and Figure 13 show the location of two records each for Himalayan balsam and Japanese knotweed to be confirmed.

Of these five records, that of most concern would be the record of Japanese knotweed from the upper Douglas Water. This has the potential to require additional survey of a further 28.5km of river (21km of the Douglas Water and 7.5km of the River Clyde main stem).

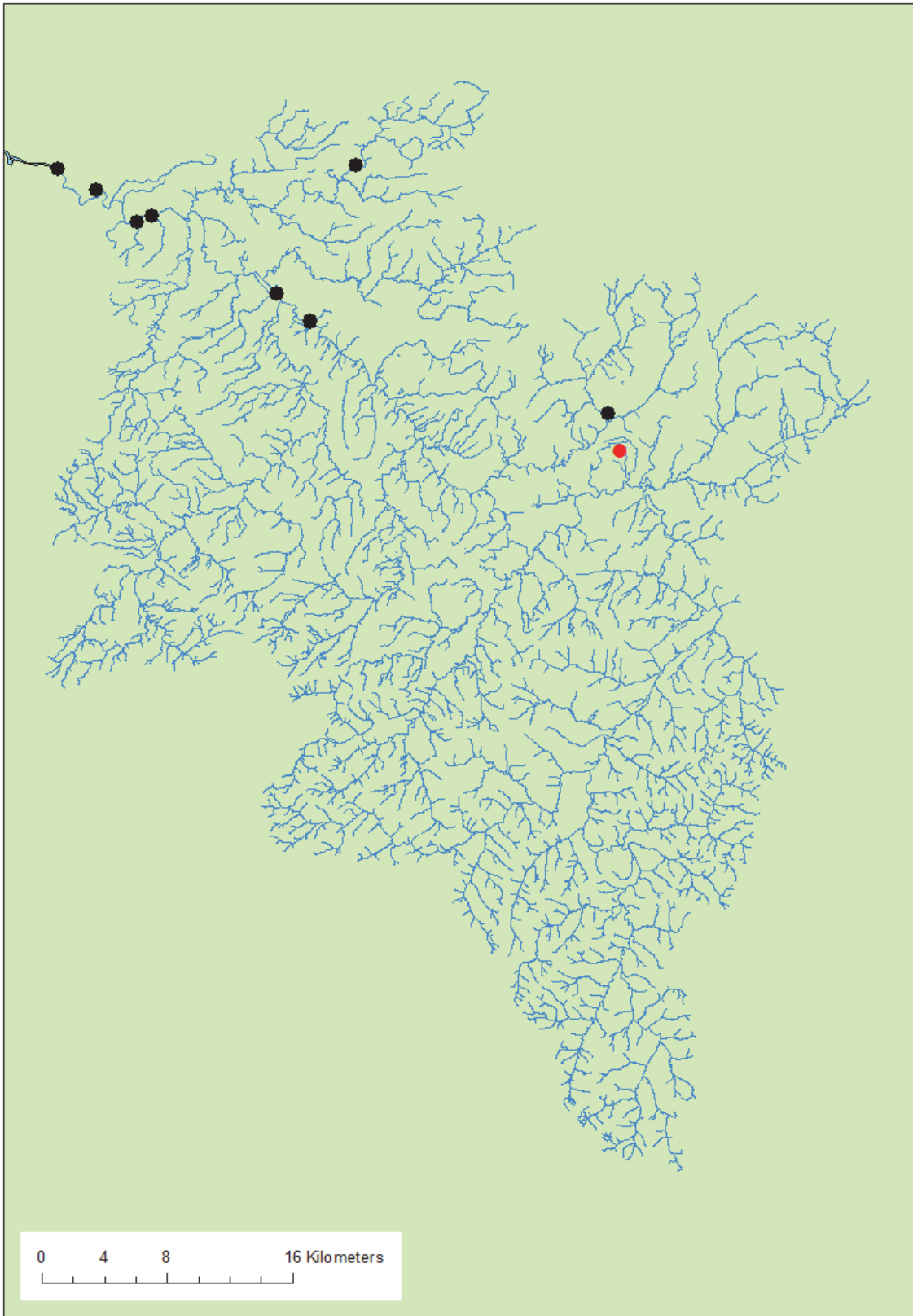


Figure 11. Giant hogweed record to be confirmed (that coloured red) © Crown copyright [and database rights] 2018 OS 100017908.

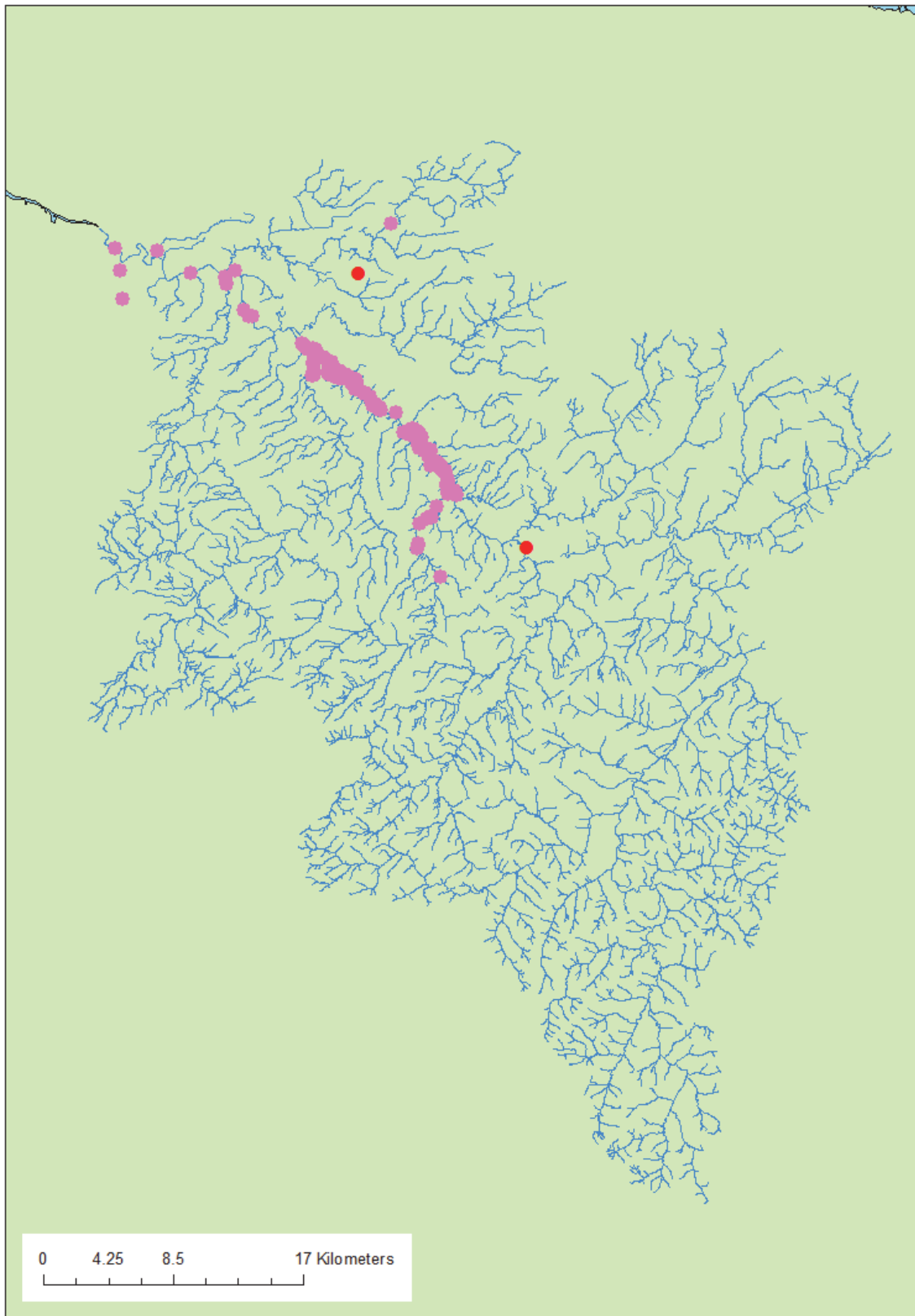


Figure 12. Himalayan balsam records to be confirmed (those coloured red) © Crown copyright [and database rights] 2018 OS 100017908.

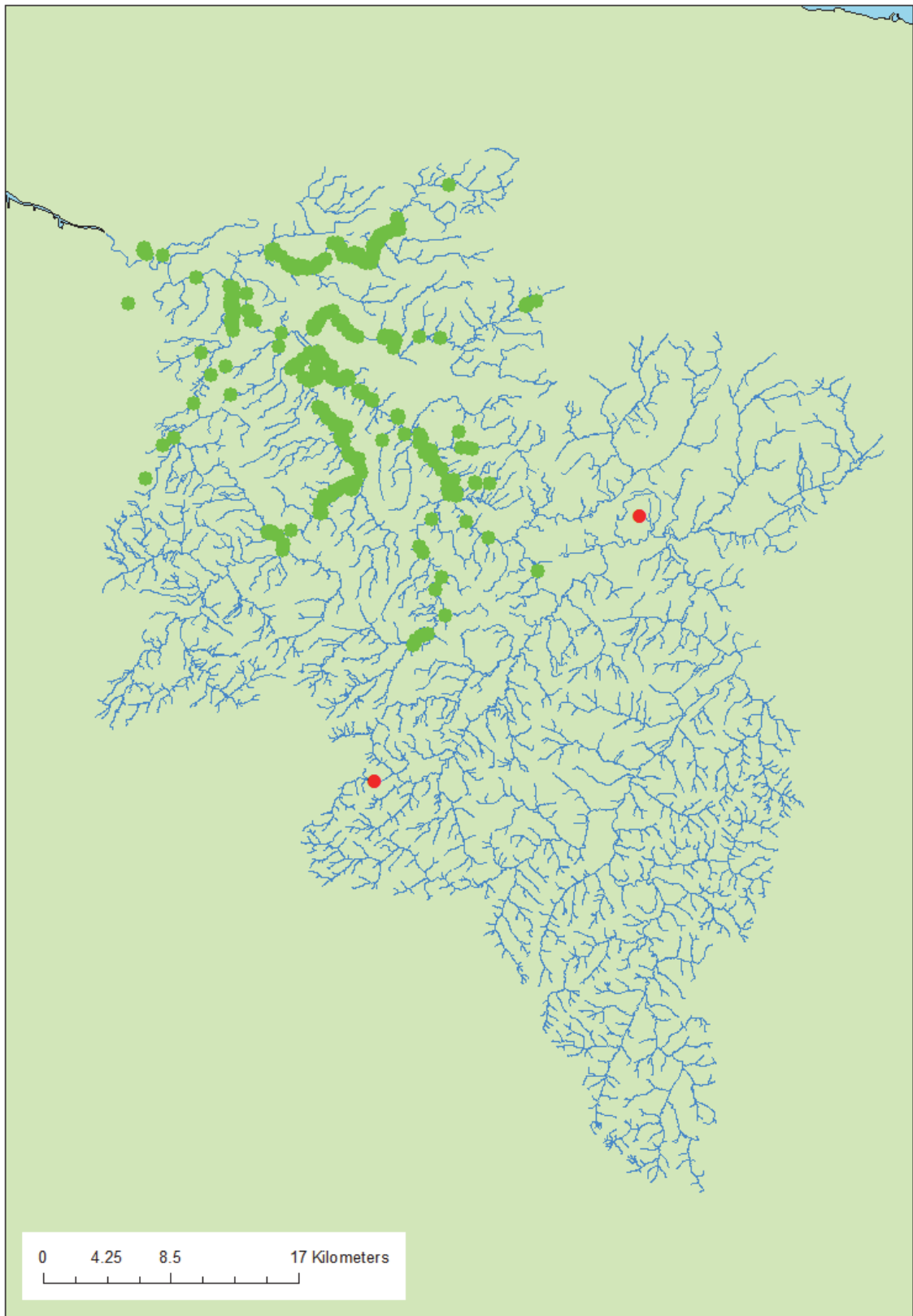


Figure 13. Japanese knotweed records to be confirmed (those coloured red) © Crown copyright [and database rights] 2018 OS 100017908.

ANNEX 1: JAPANESE KNOTWEED

Japanese knotweed records remaining after applying first filter

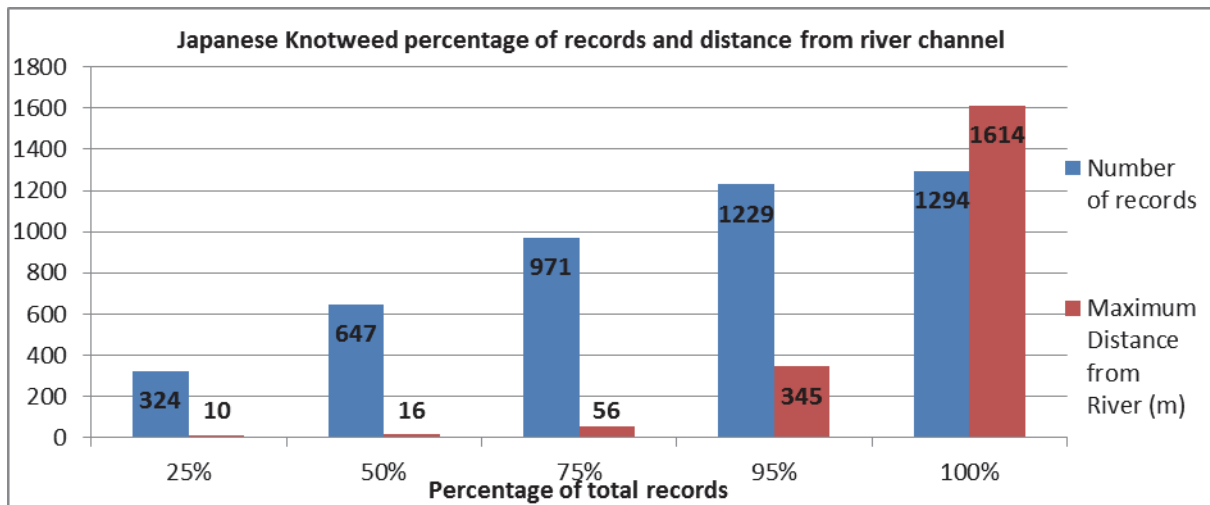


Figure 14. Japanese knotweed % of records and maximum distance from river channel (m) (first filter)

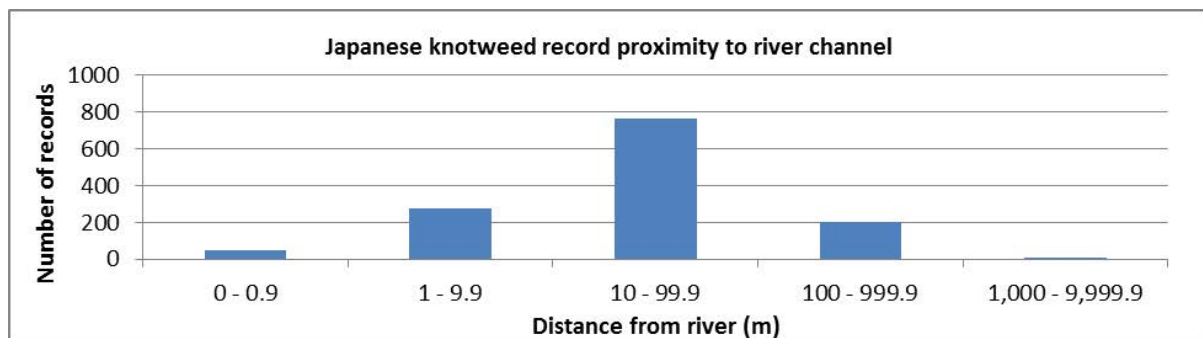


Figure 15. Japanese knotweed proximity from river (first filter)

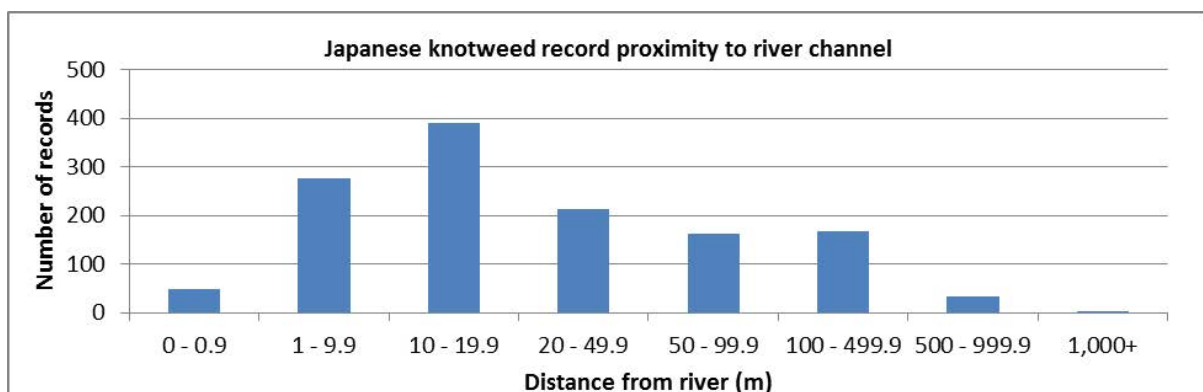


Figure 16. Japanese knotweed proximity from river (first filter)

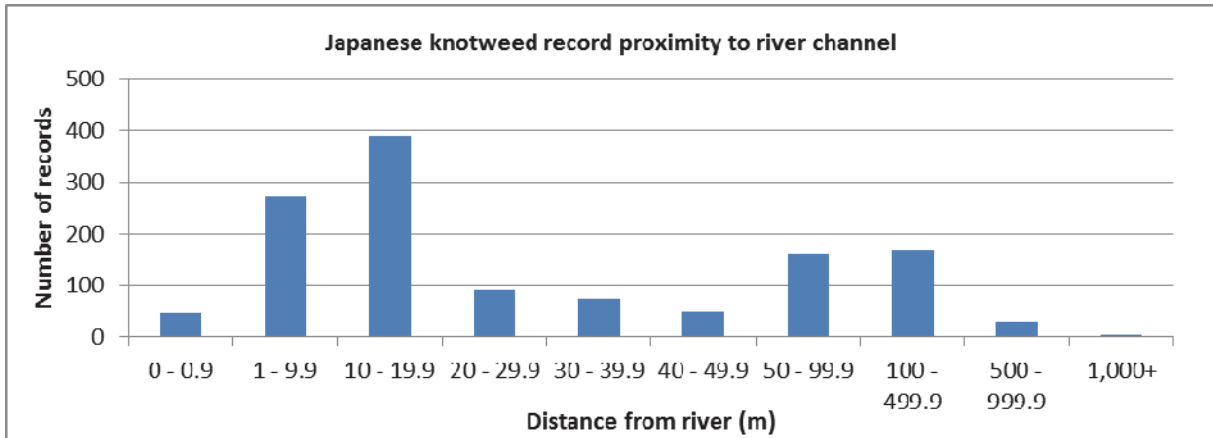


Figure 17. Japanese knotweed proximity from river (first filter)

Japanese knotweed records remaining after applying second filter

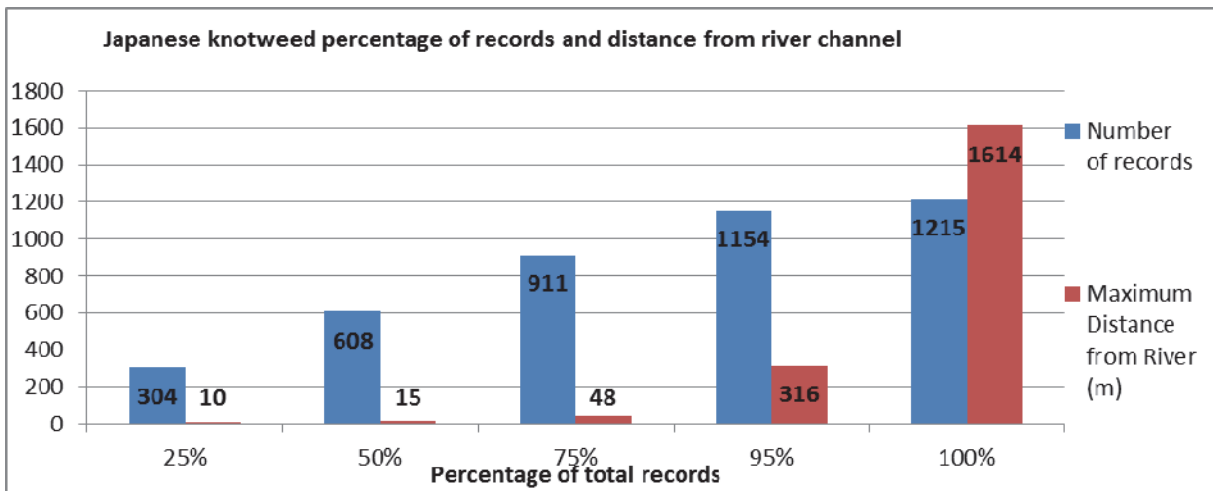


Figure 18. Japanese knotweed % of records and maximum distance from river channel (m) (second filter)

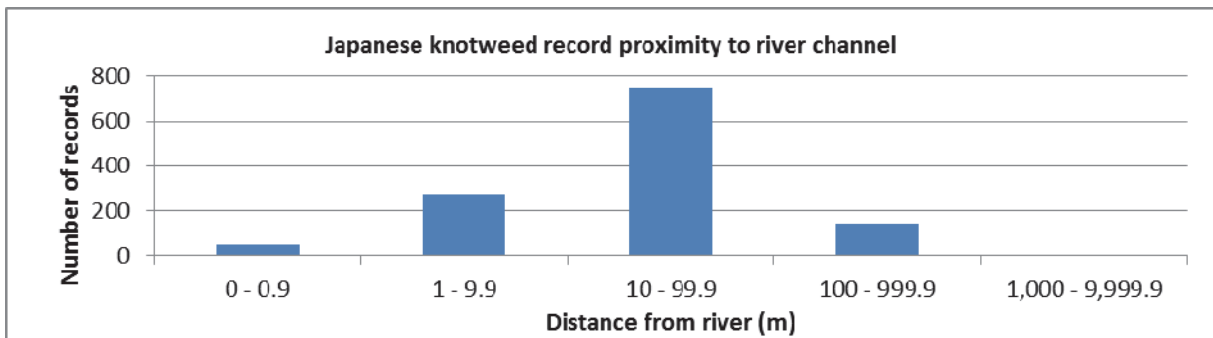


Figure 19. Japanese knotweed proximity from river (second filter)

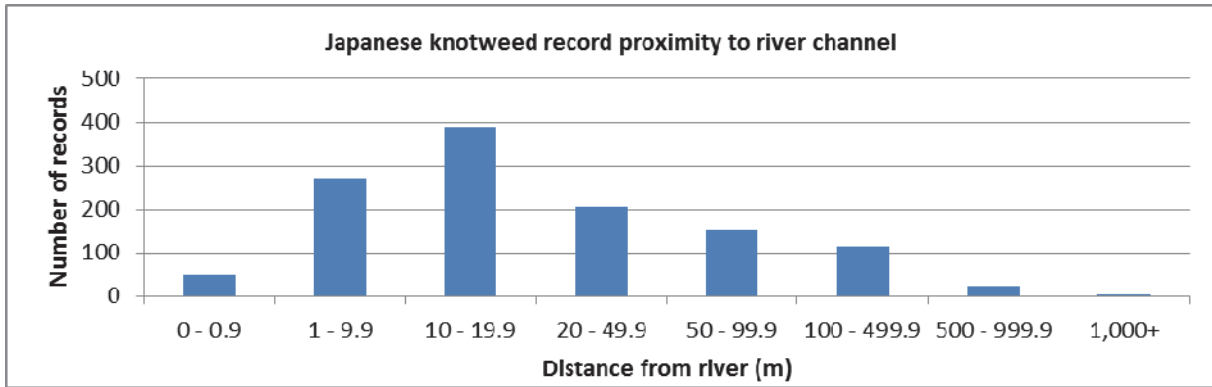


Figure 20. Japanese knotweed proximity from river (second filter)

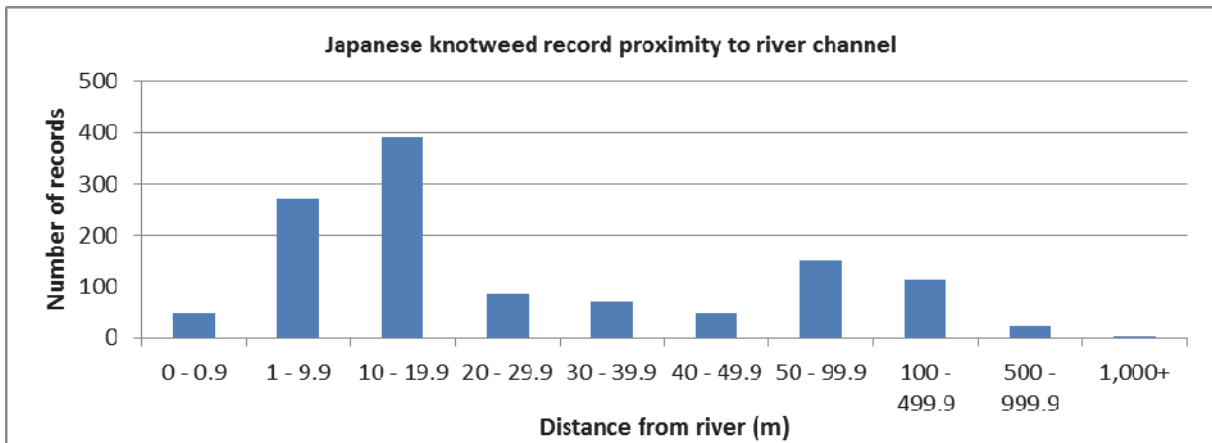


Figure 21. Japanese knotweed proximity from river (second filter)

Japanese knotweed records remaining after applying third filter

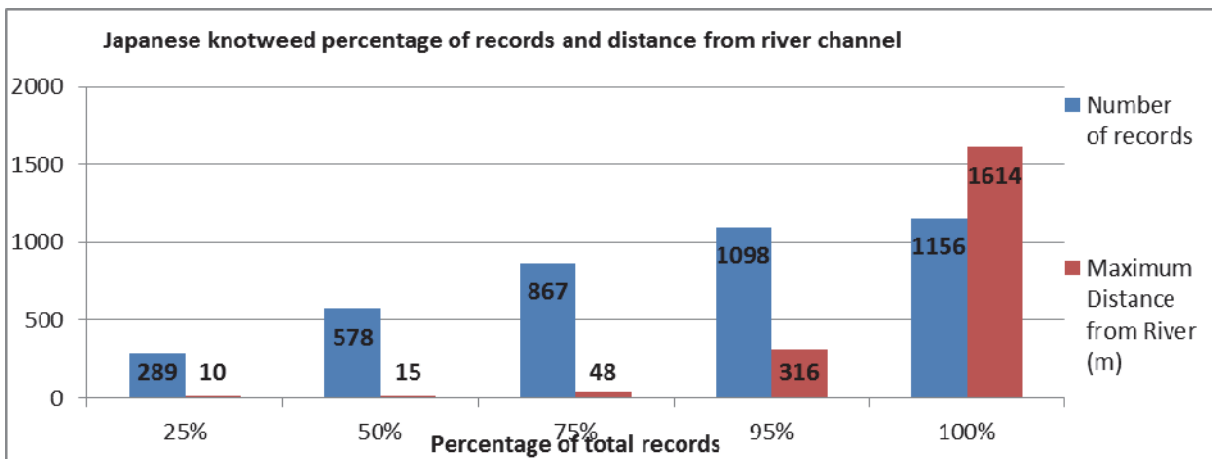


Figure 22. Japanese knotweed % of records and maximum distance from river channel (m) (third filter)

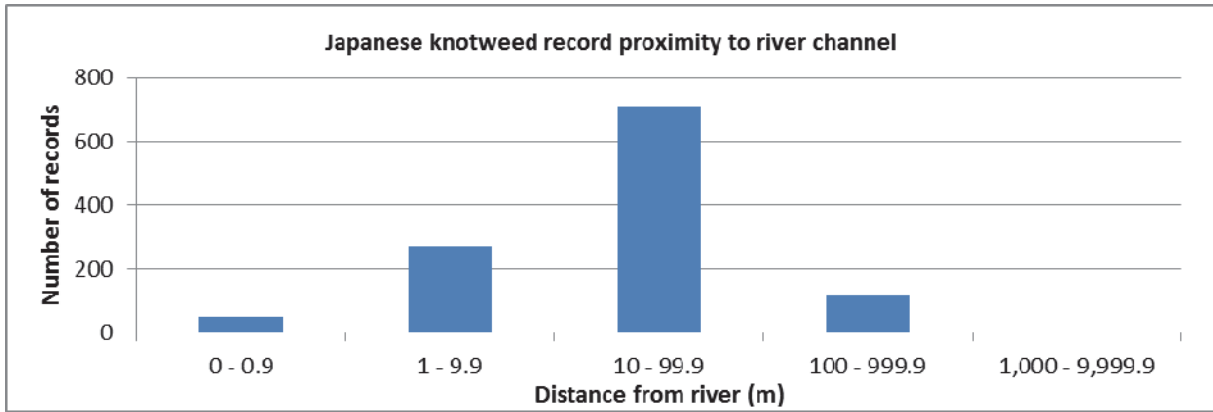


Figure 23. Japanese knotweed proximity from river channel (m) (third filter)

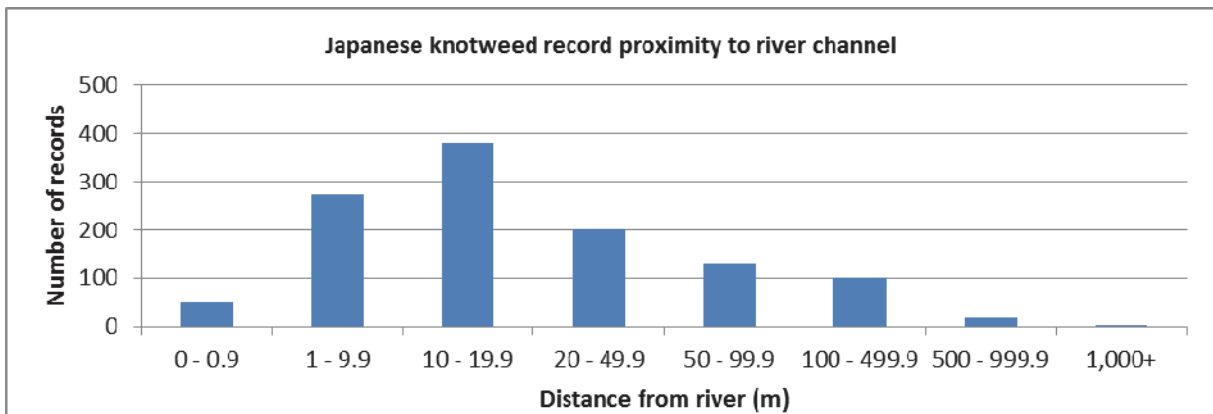


Figure 24. Japanese knotweed proximity from river channel (m) (third filter)

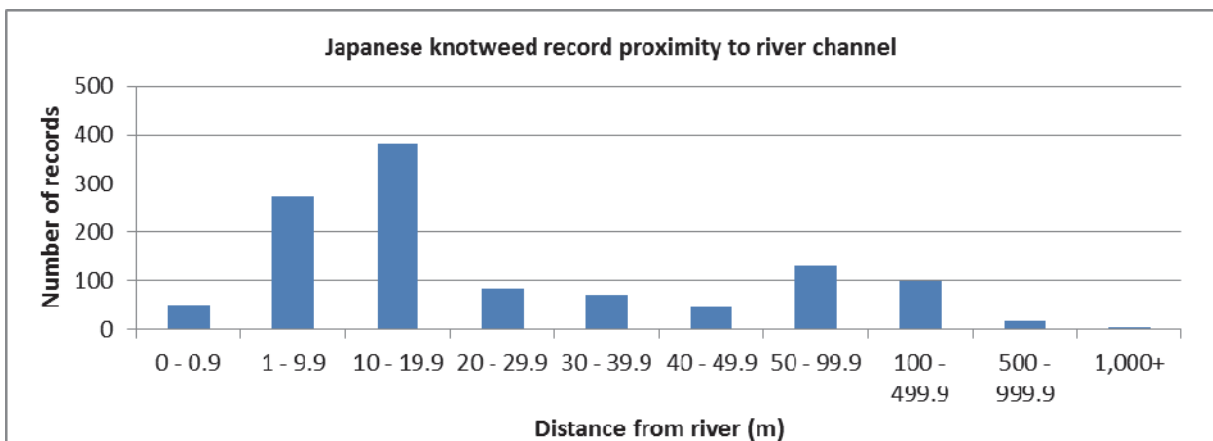


Figure 25. Japanese knotweed proximity from river channel (m) (third filter)

Japanese knotweed records remaining after applying fourth filter

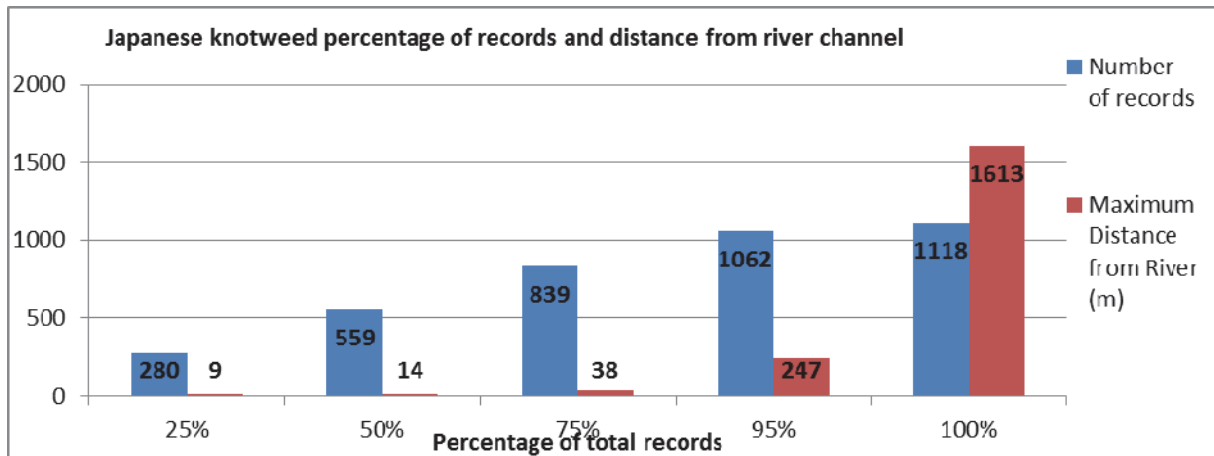


Figure 26. Japanese knotweed percentage of records and maximum distance from river (m) (fourth filter)

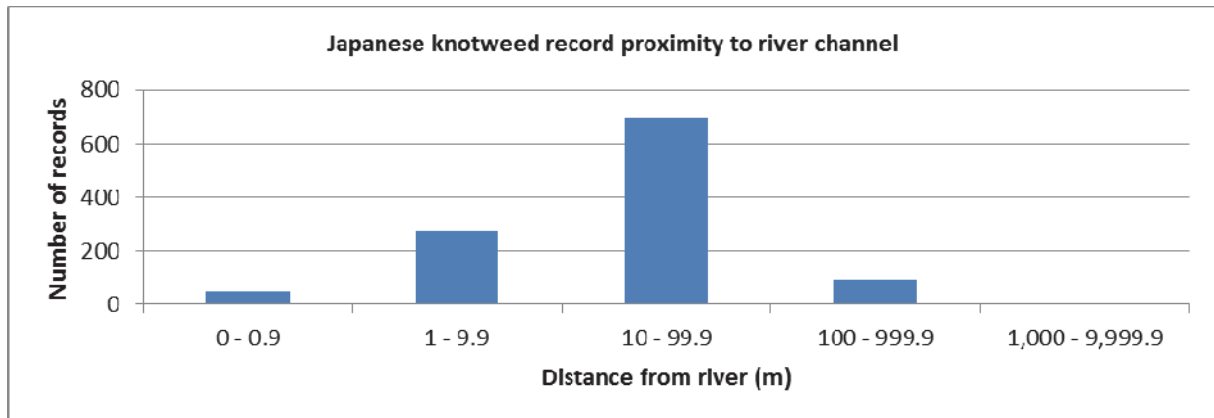


Figure 27. Japanese knotweed proximity from river (m) (fourth filter)

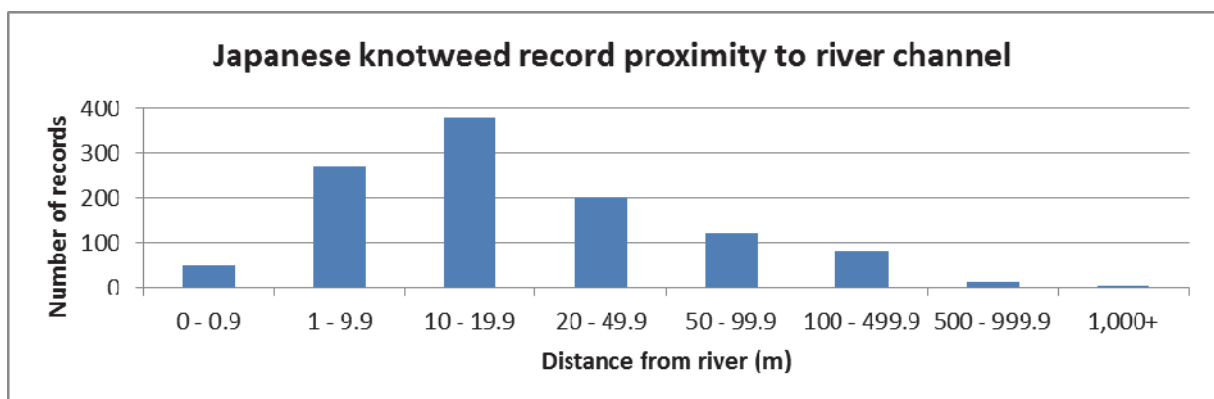


Figure 28. Japanese knotweed proximity from river (m) (fourth filter)

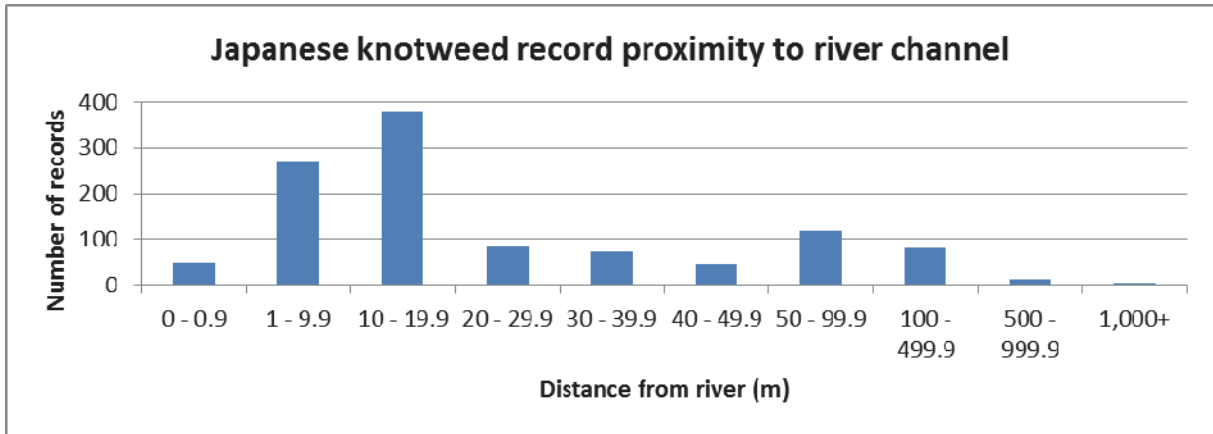


Figure 29. Japanese knotweed proximity from river (m) (fourth filter)

ANNEX 2: HIMALAYAN BALSAM

Himalayan balsam records remaining after applying first filter

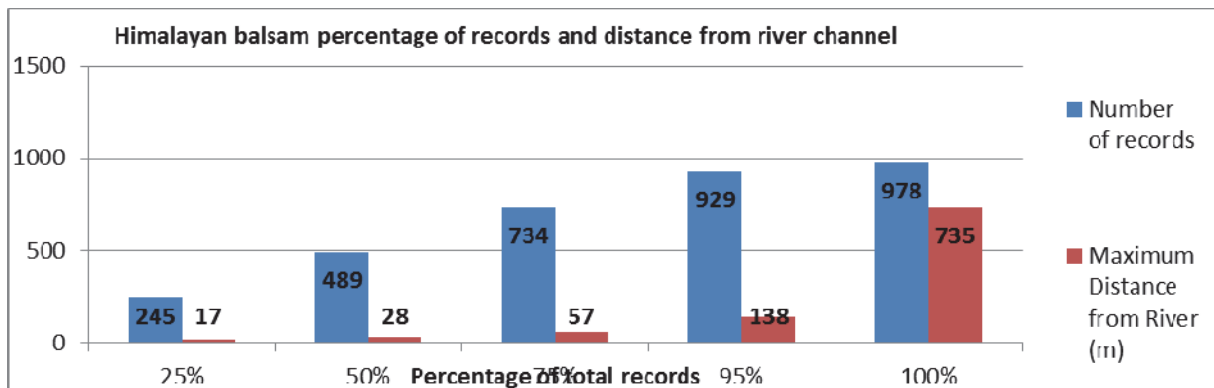


Figure 30. Himalayan balsam percentage of total records and maximum distance from river (m) (first filter)

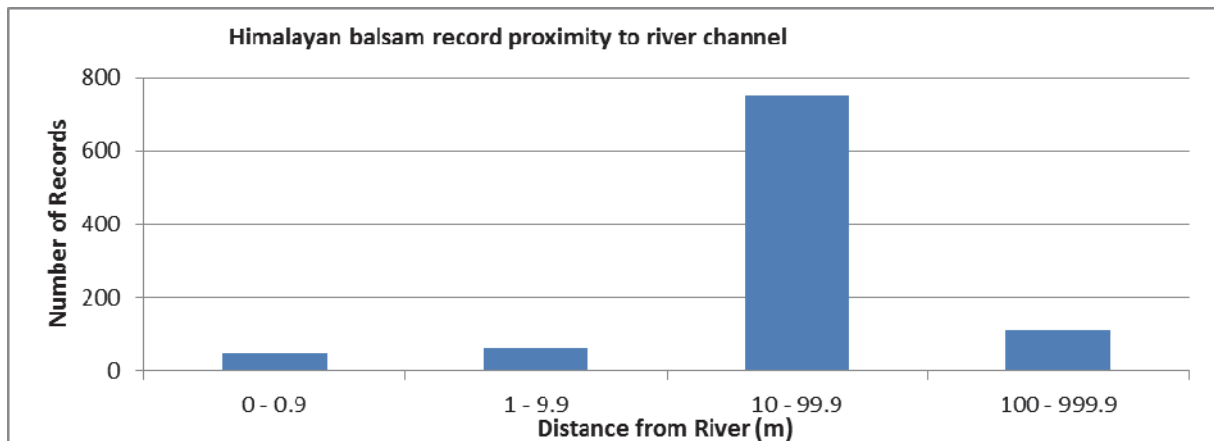


Figure 31. Himalayan balsam proximity from river (first filter)

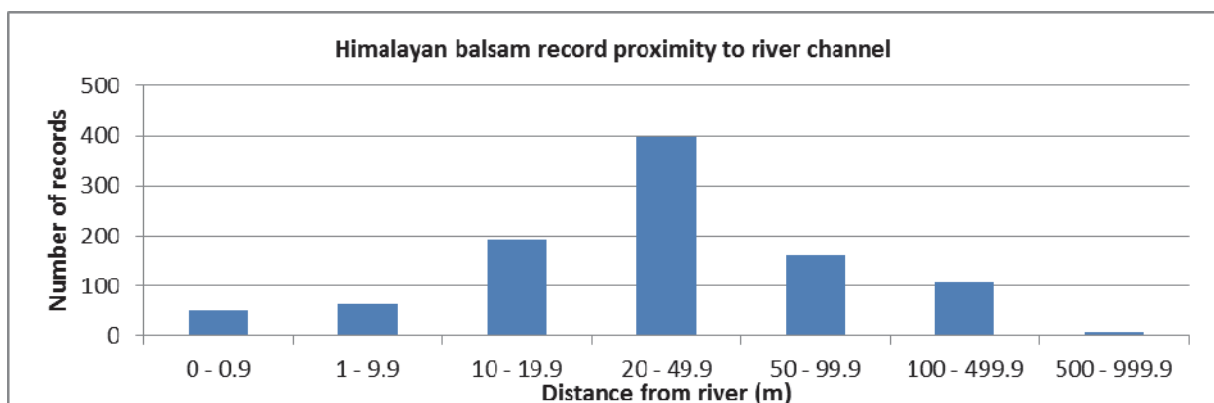


Figure 32. Himalayan balsam proximity from river (first filter)

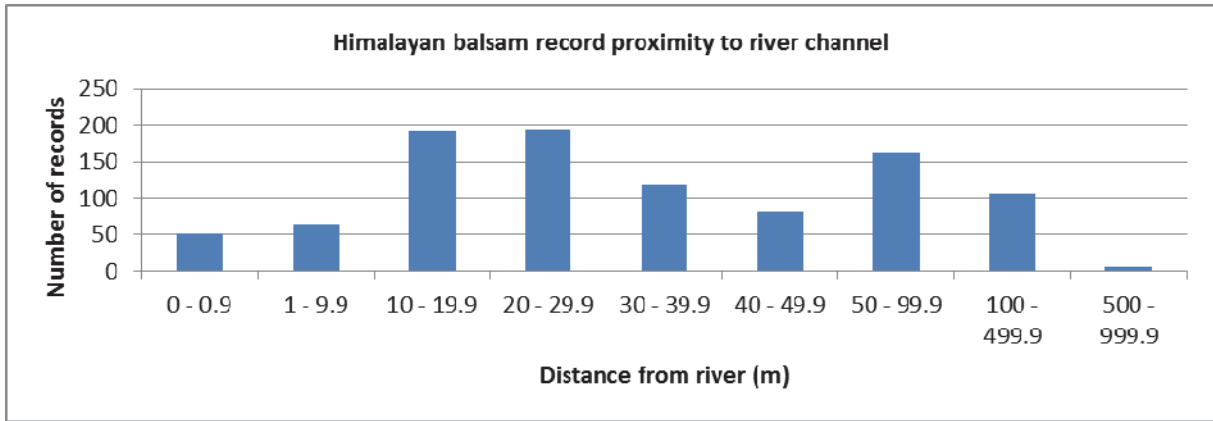


Figure 33. Himalayan balsam proximity from river (first filter)

Himalayan balsam records remaining after applying second filter

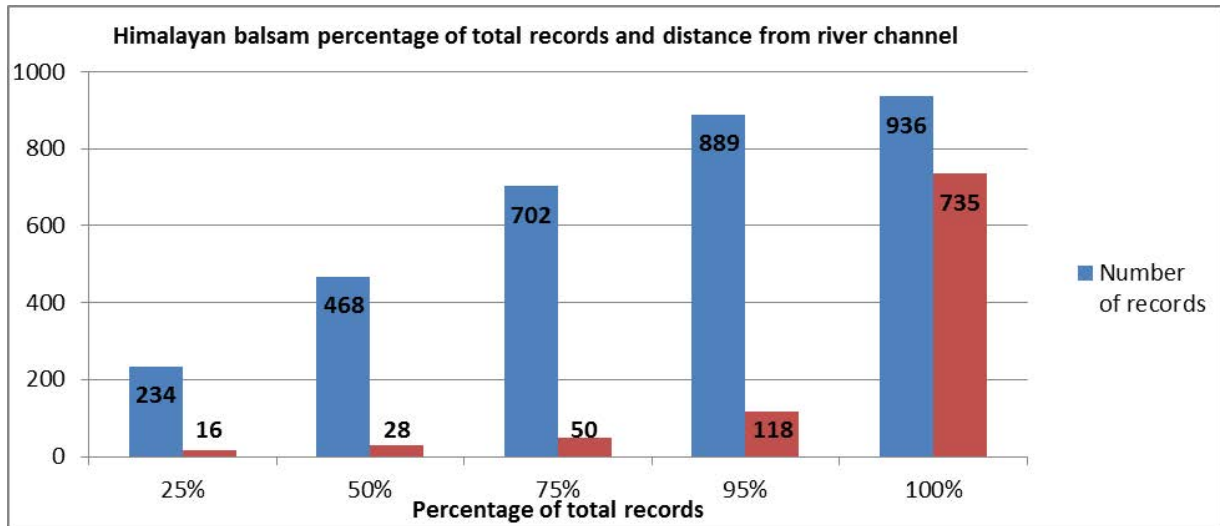


Figure 34. Himalayan balsam % of total records and maximum distance from river channel (first filter)

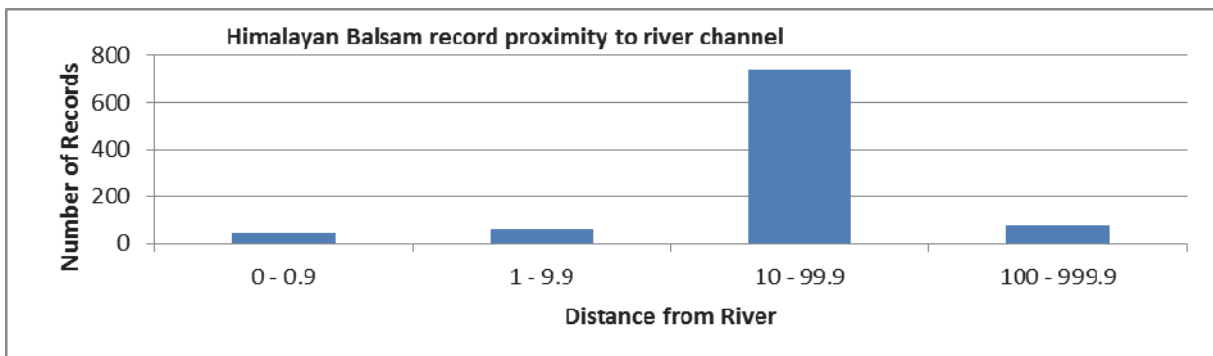


Figure 35. Himalayan balsam proximity from river (second filter)

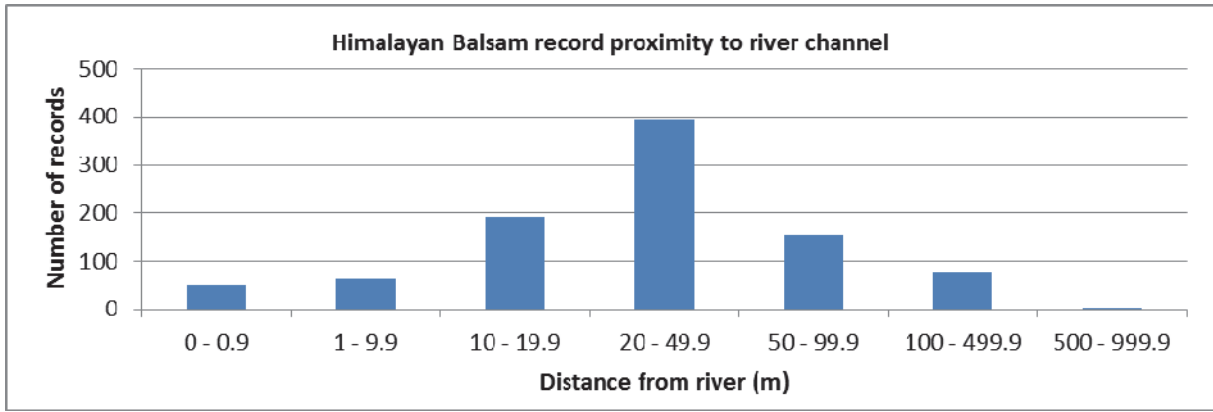


Figure 36. Himalayan balsam proximity from river (second filter)

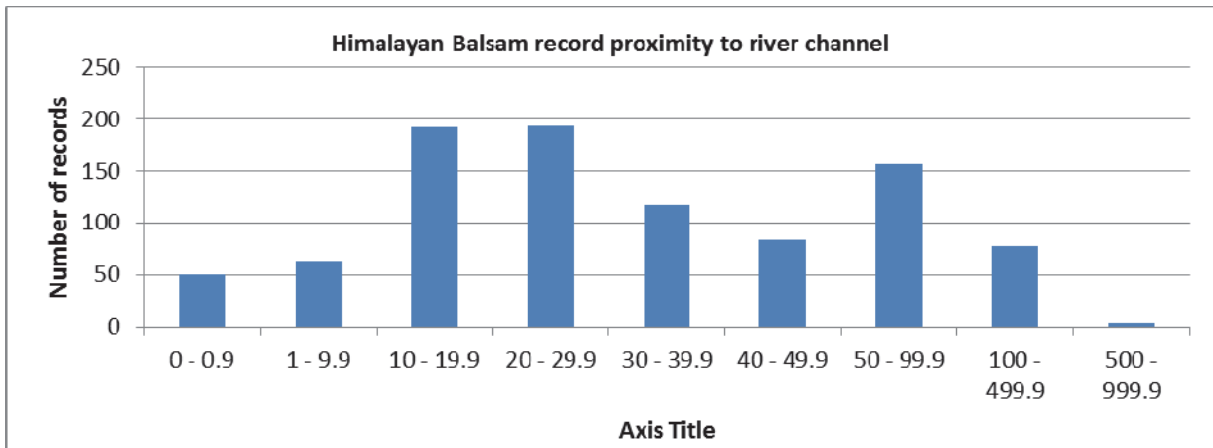


Figure 37. Himalayan balsam proximity from river (second filter)

Himalayan balsam records remaining after applying third filter

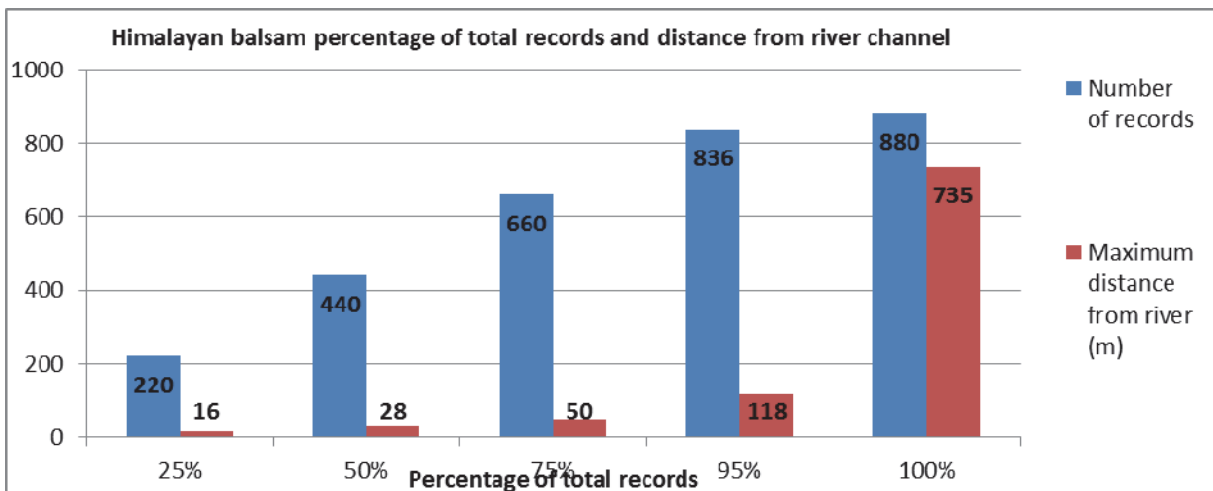


Figure 38. Himalayan balsam records and maximum distance from river channel (m) (third filter)

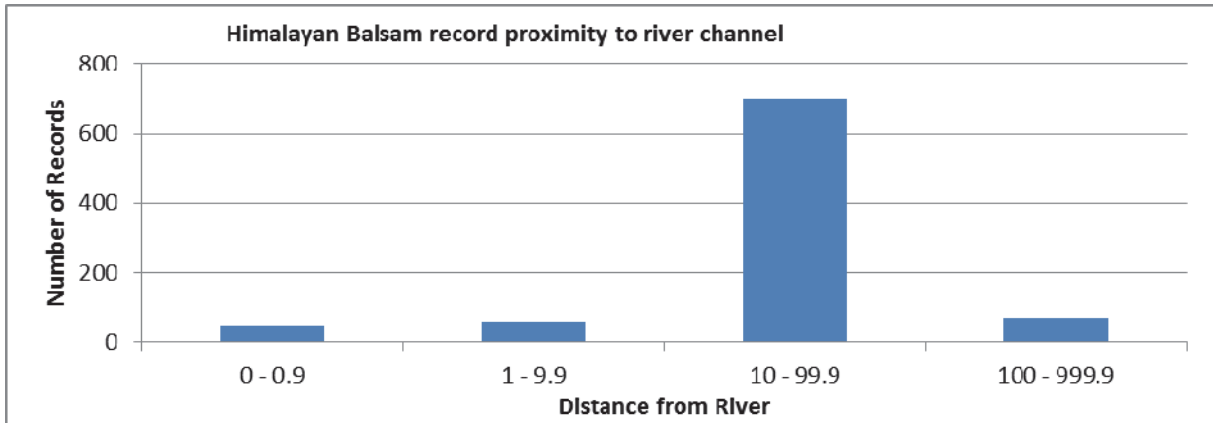


Figure 39. Himalayan balsam proximity from river (third filter)

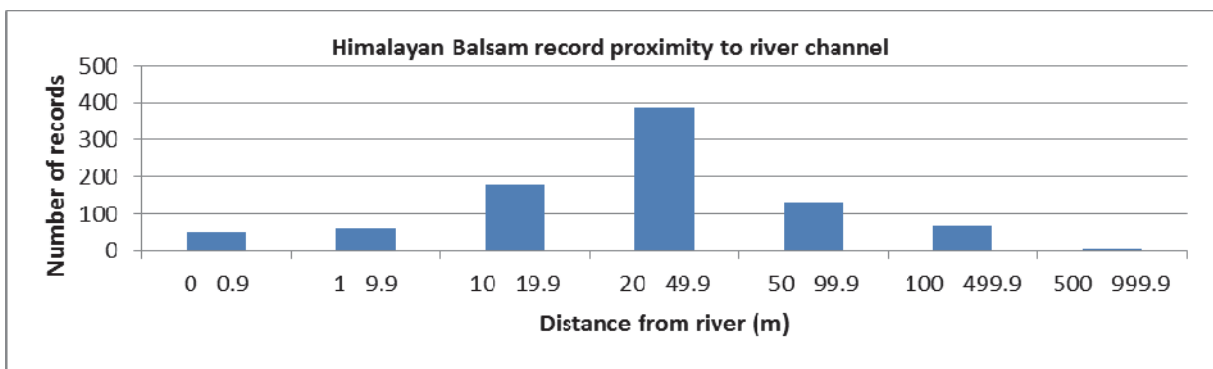


Figure 40. Himalayan balsam proximity from river (third filter)

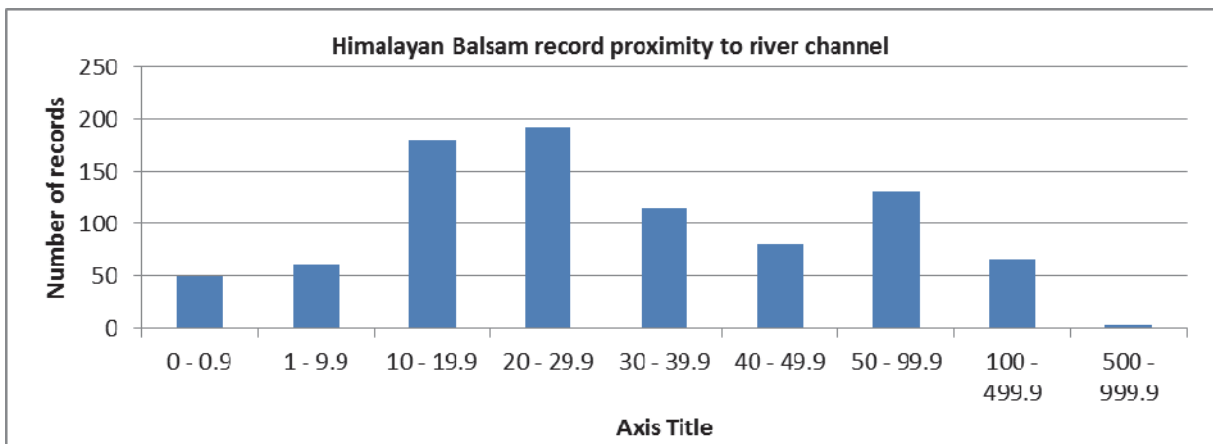


Figure 41. Himalayan balsam proximity from river (third filter)

Himalayan Balsam records remaining after applying fourth filter

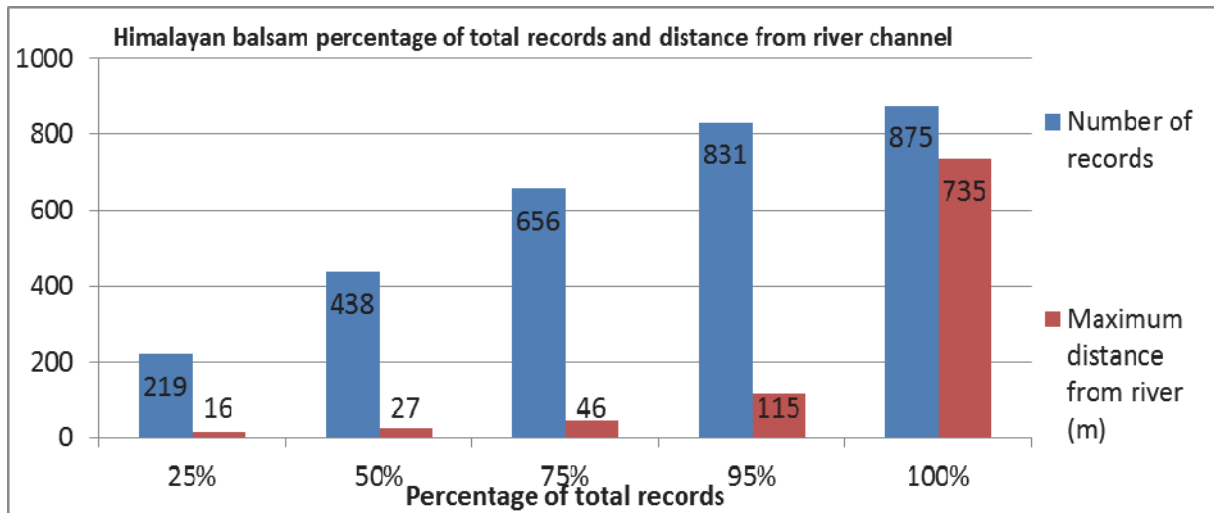


Figure 42. Himalayan balsam percentage of total records and proximity to river channel (m) (fourth filter)

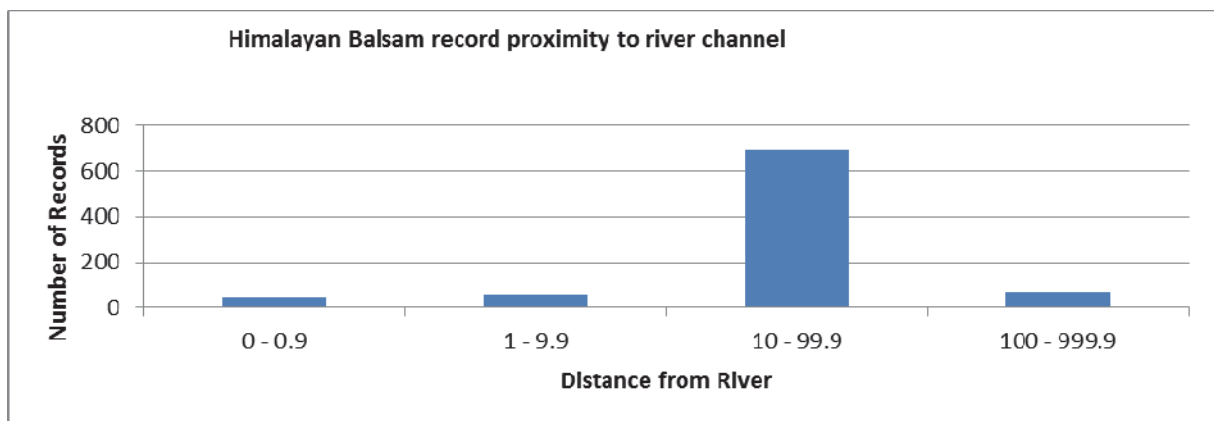


Figure 43. Himalayan balsam proximity from river (fourth filter)

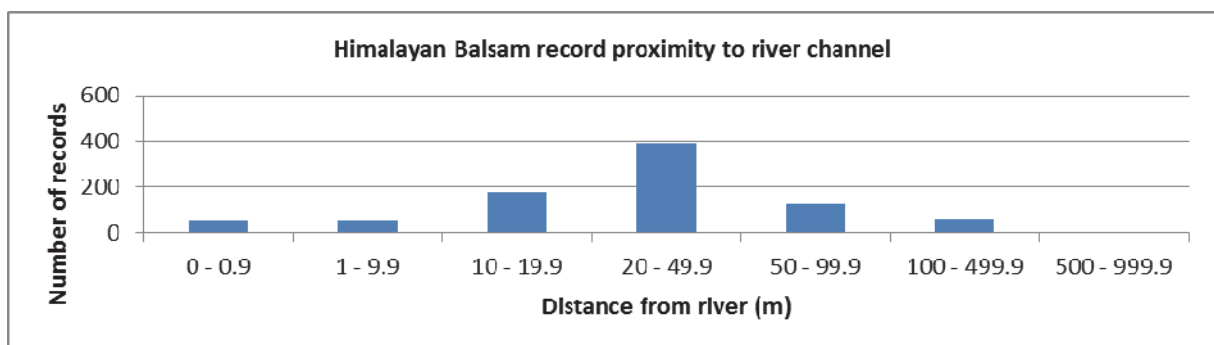


Figure 44. Himalayan balsam proximity from river (fourth filter)

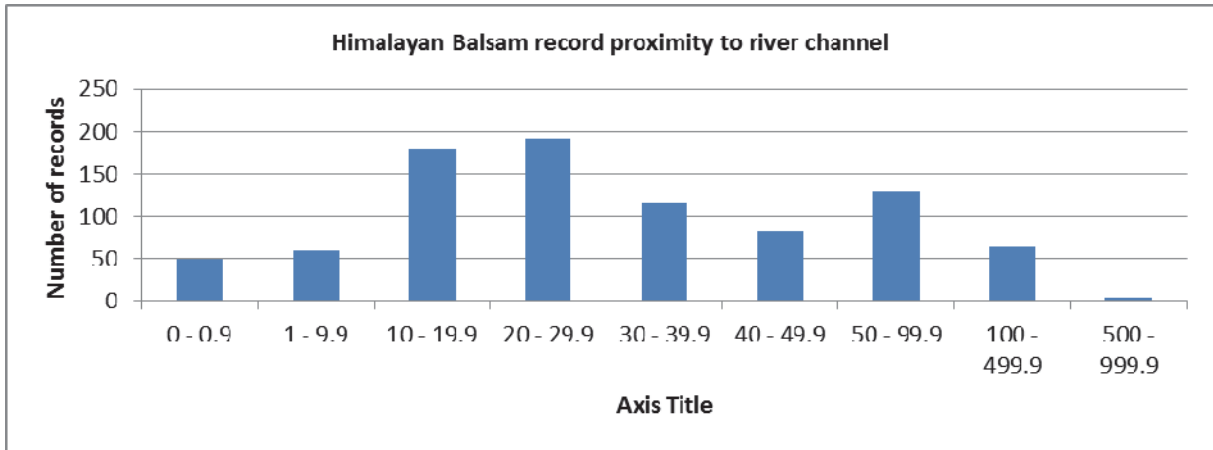


Figure 45. Himalayan balsam proximity from river (fourth filter)

ANNEX 3: GIANT HOGWEED

Giant hogweed records remaining after applying first filter

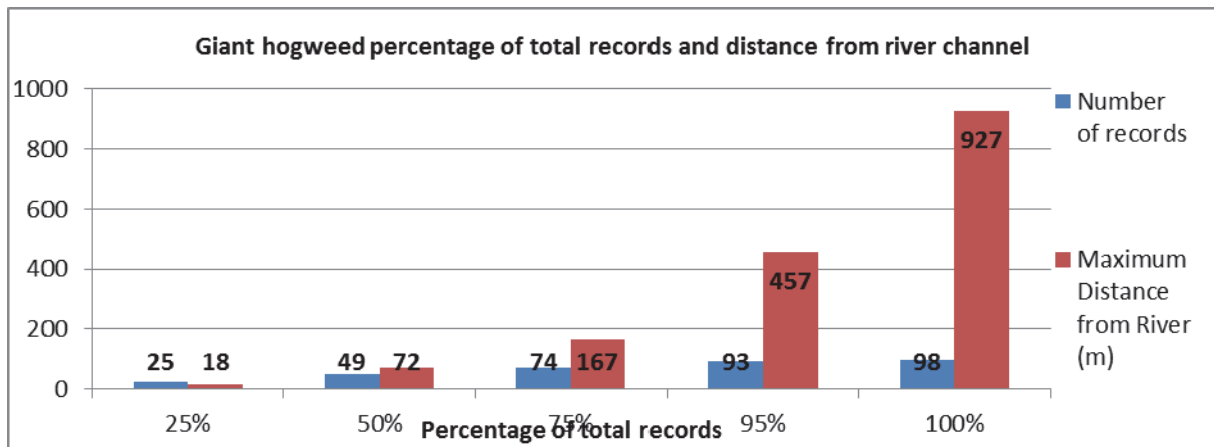


Figure 46. Giant hogweed percentage of total records and proximity to river channel (m) (first filter)

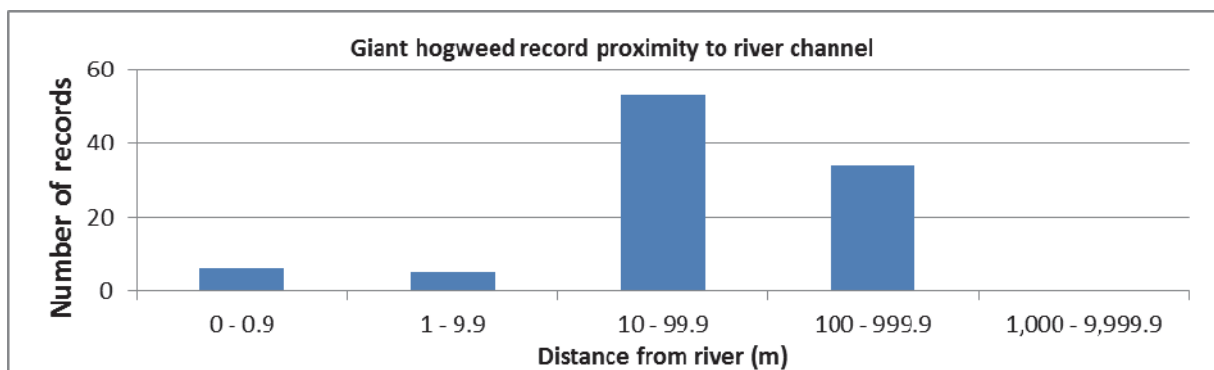


Figure 47. Giant hogweed proximity from river (first filter)

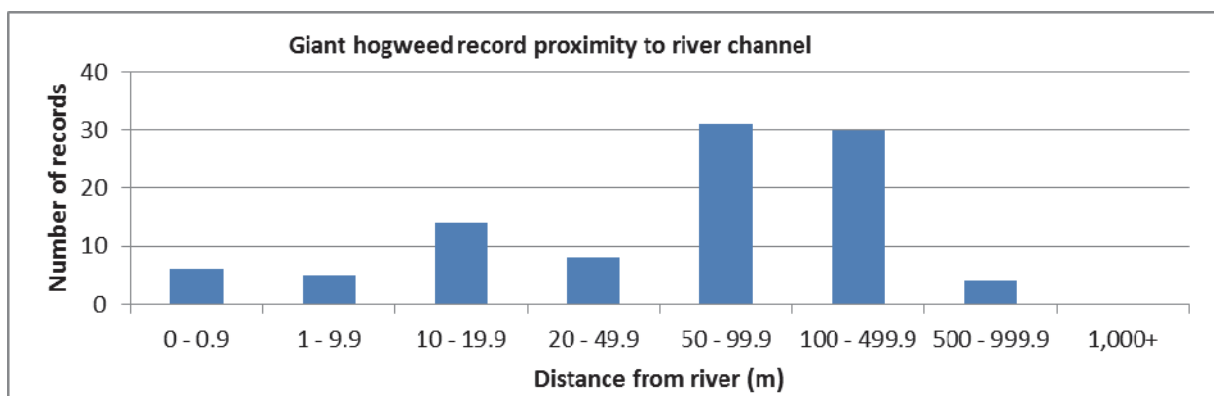


Figure 48. Giant hogweed proximity from river (first filter)

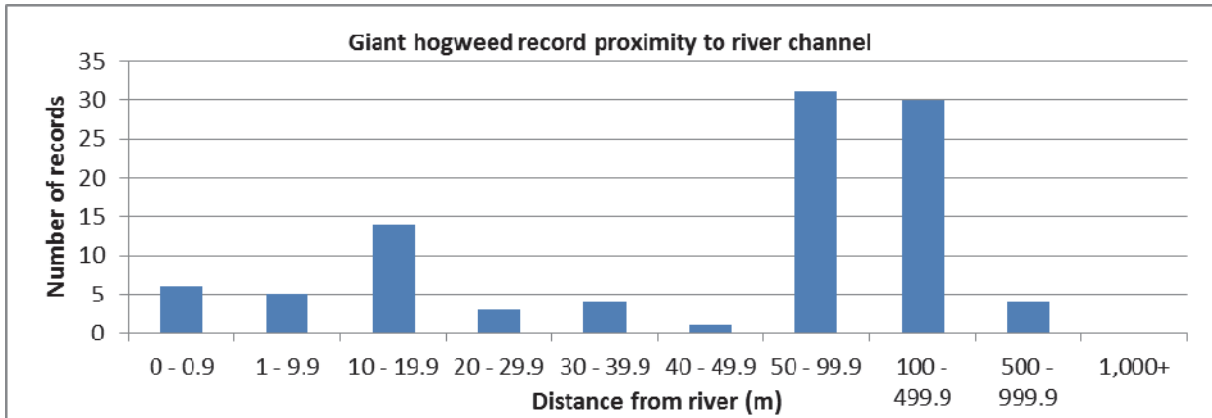


Figure 49. Giant hogweed proximity from river (first filter)

Giant hogweed records remaining after applying second filter

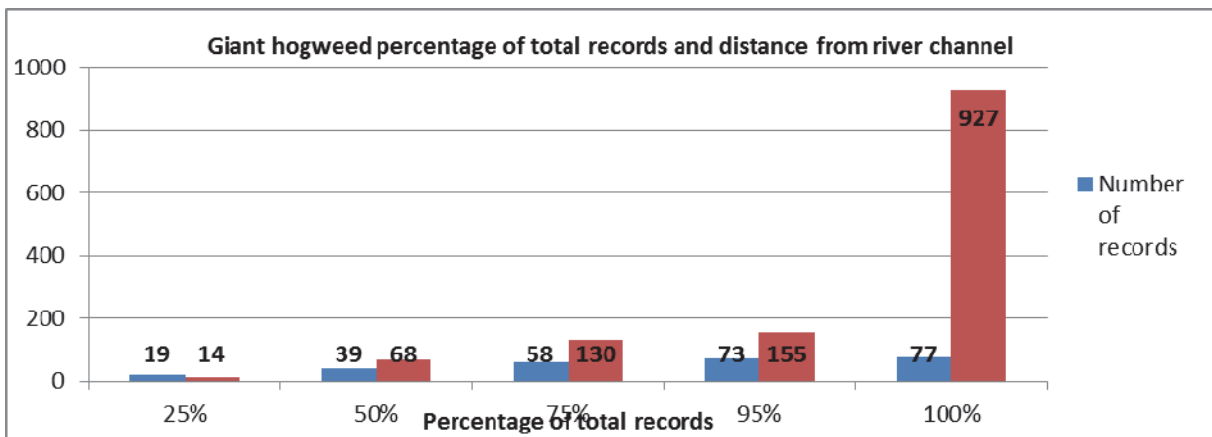


Figure 50. Giant hogweed percentage of records and maximum distance from river channel (m) (second filter)

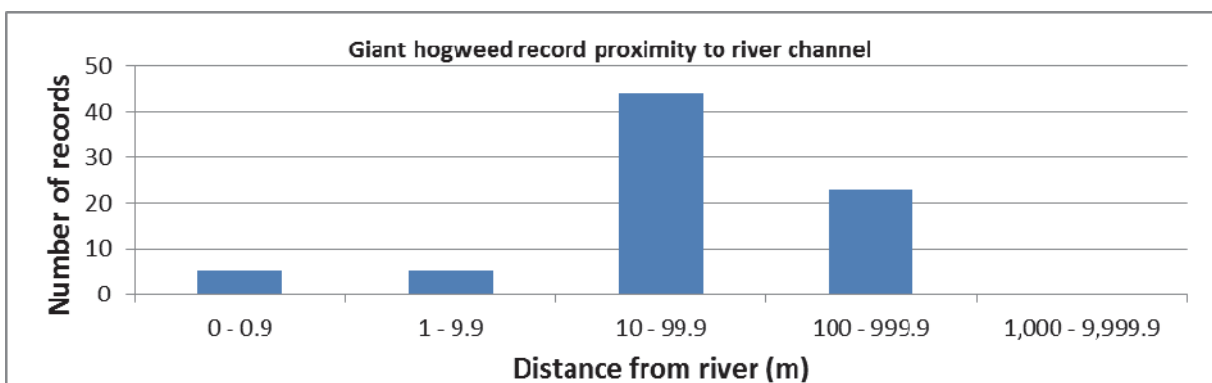


Figure 51. Giant hogweed proximity from river (second filter)

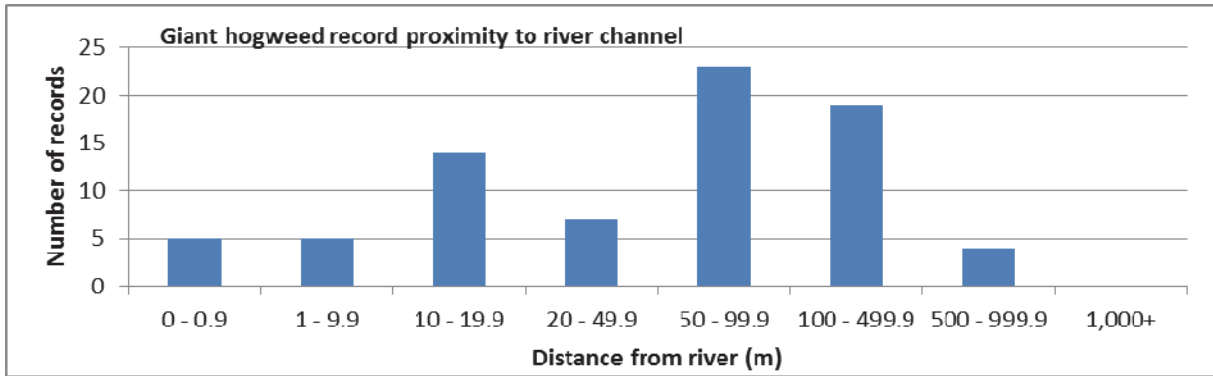


Figure 52. Giant hogweed proximity from river (second filter)

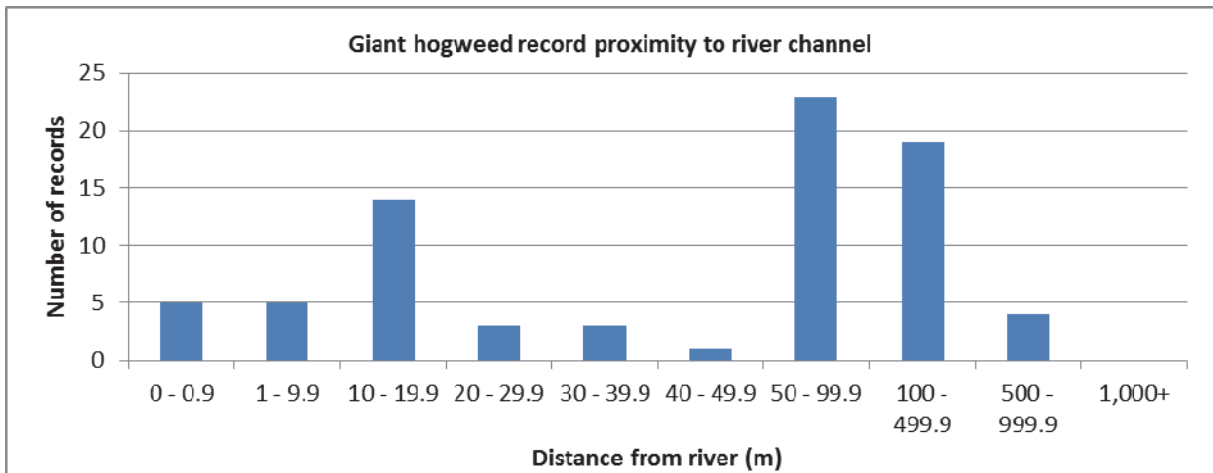


Figure 53. Giant hogweed proximity from river (second filter)

Giant hogweed records remaining after applying third filter

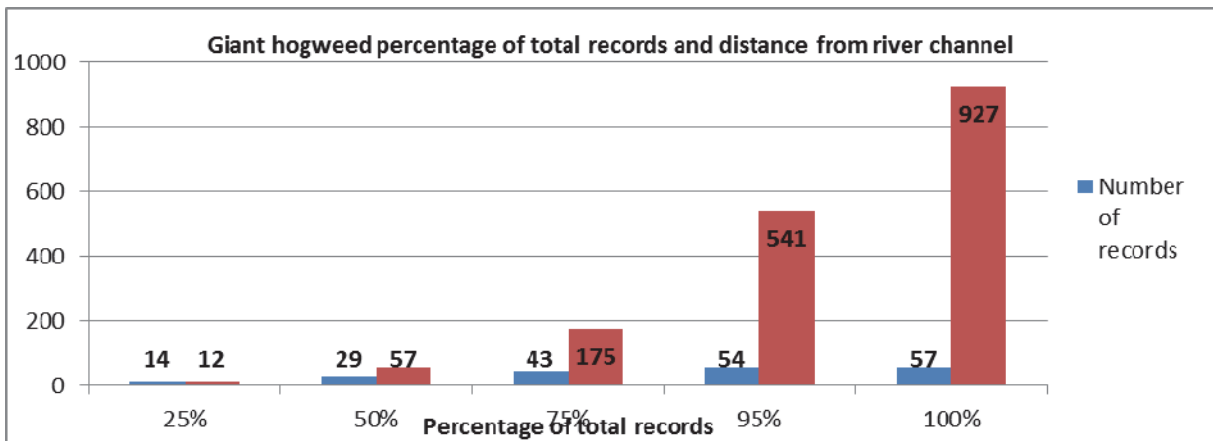


Figure 54. Giant hogweed percentage of records and maximum distance from river channel (m) (2nd filter)

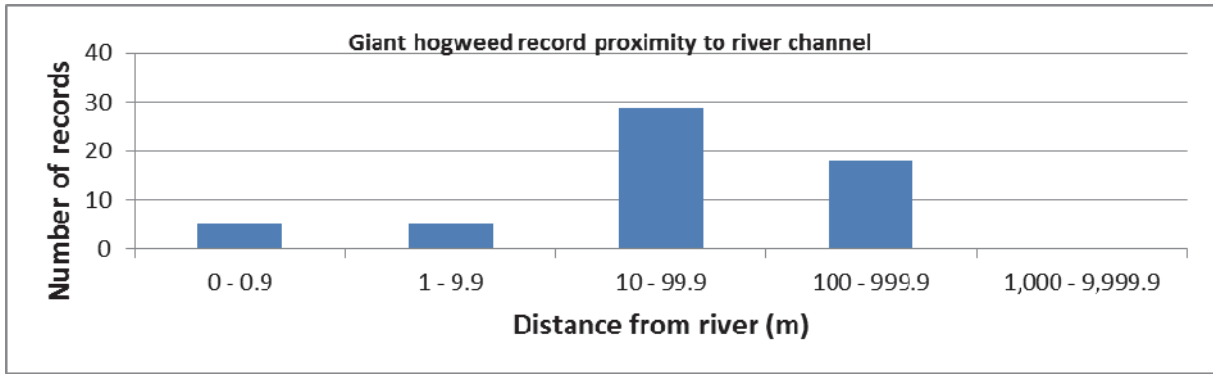


Figure 55. Giant hogweed proximity from river channel (m) (third filter)

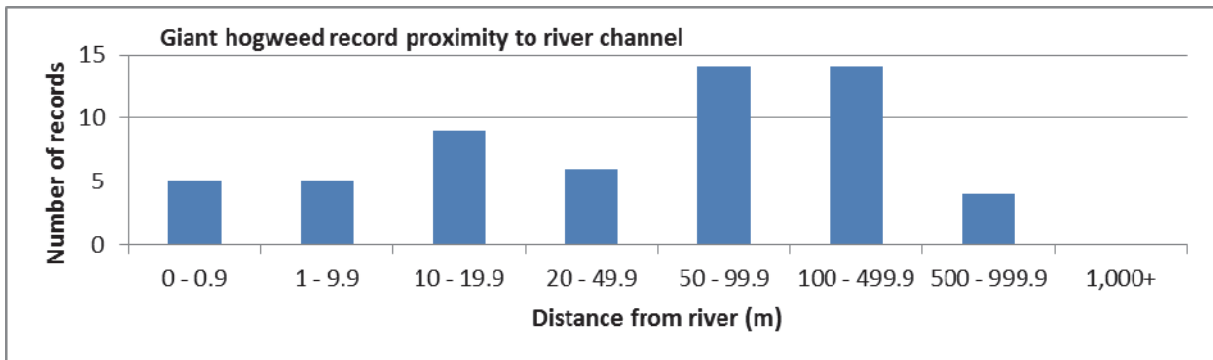


Figure 56. Giant hogweed proximity from river channel (m) (third filter)

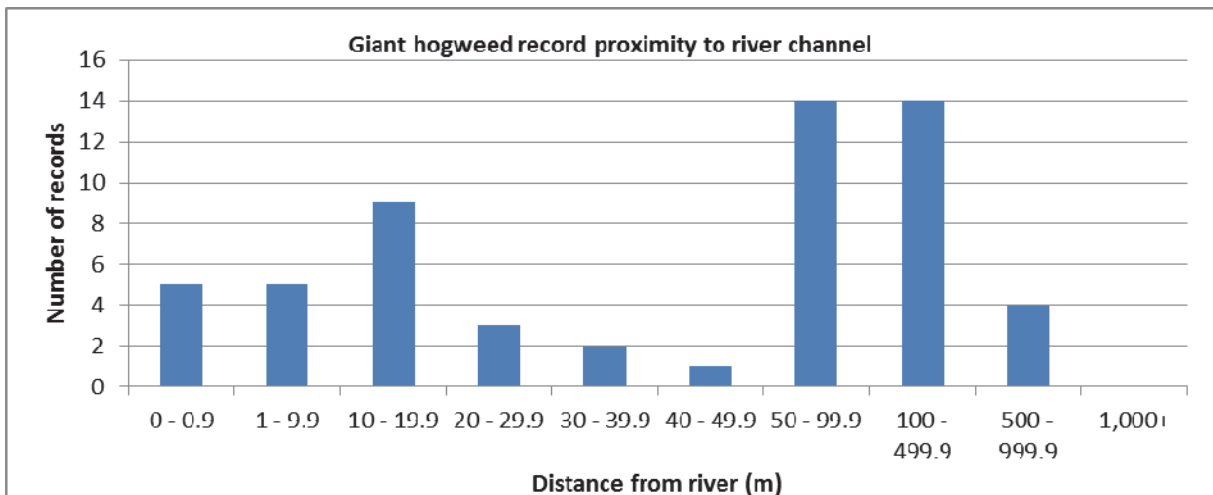


Figure 57. Giant hogweed proximity from river channel (m) (third filter)

Giant hogweed records remaining after applying fourth filter

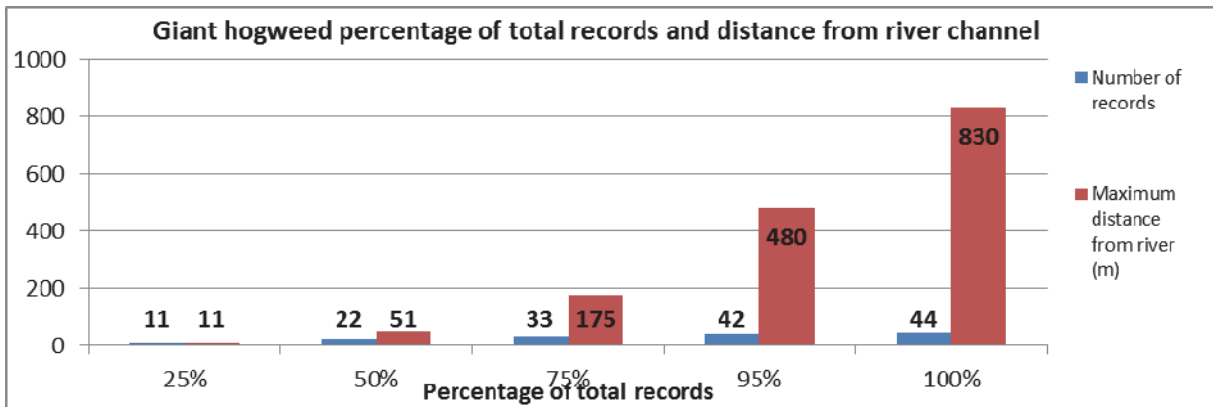


Figure 58. Giant hogweed percentage of records and maximum distance from river channel (m) (fourth filter)

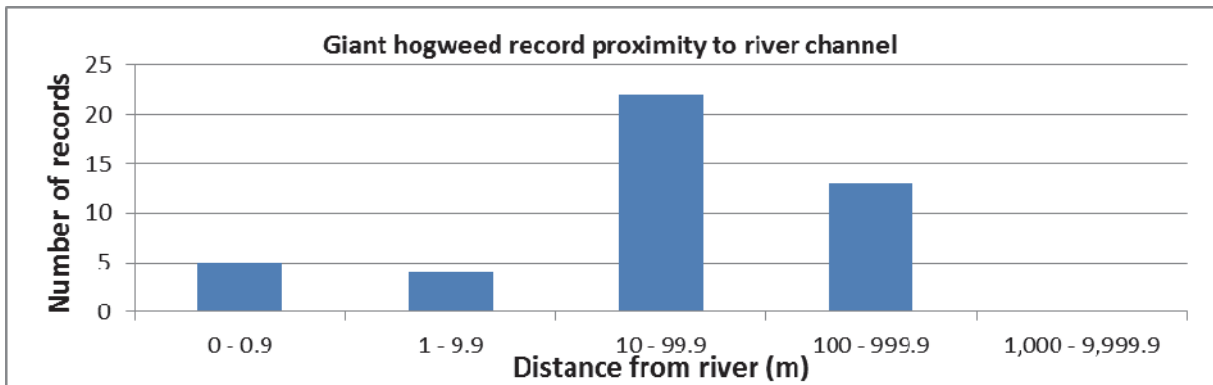


Figure 59. Giant hogweed proximity from river channel (m) (fourth filter)

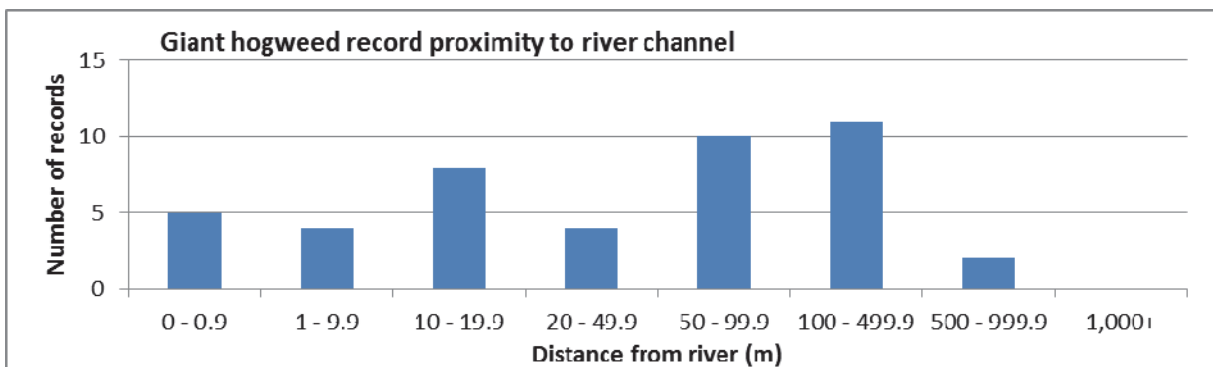


Figure 60. Giant hogweed proximity from river channel (m) (fourth filter)

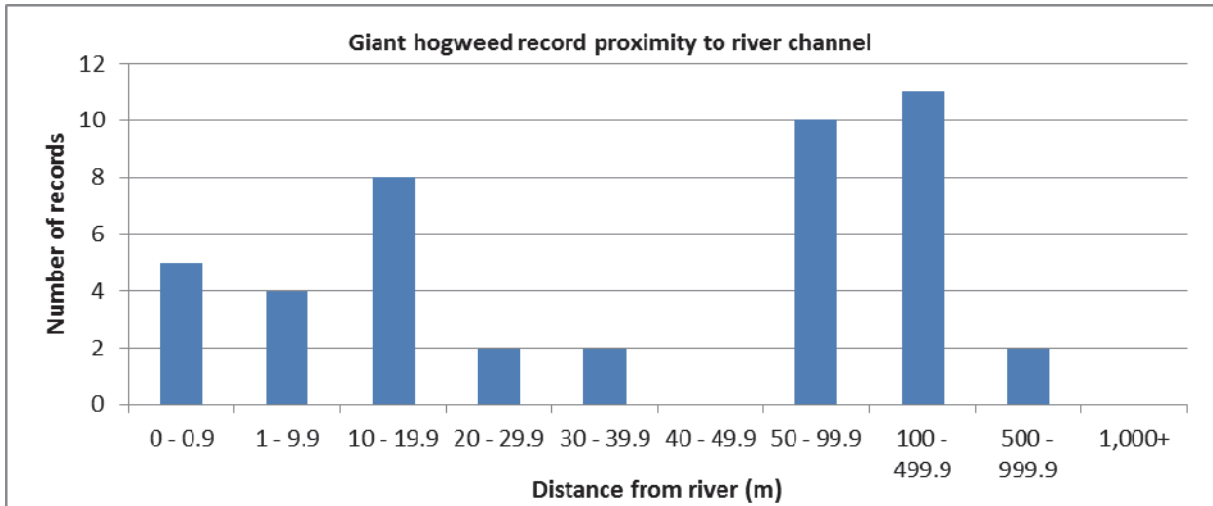


Figure 61. Giant hogweed proximity from river channel (m) (fourth filter)

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