Scottish Natural Heritage
Research Report No. 978

INNS Strategy for the Clyde Catchment – field report

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RESEARCH REPORT

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RESEARCH REPORT

Summary

INNS Strategy for the Clyde Catchment – field report

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INNS; River Clyde Catchment; bridge-hopping survey; river walkover

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 field results collected during the rapid "bridge-hopping" baseline survey and the results of the trial walkover method for determining the upstream extent of the INNS in three sub-catchments.

Main findings

- A total of 535 bridges were used for surveying.
- Within the area surveyed an additional 374 bridges were located that were not detailed in the GIS data provided by the Central Scotland Green Network.
- Of the intended original 381 bridges to be used for surveying, 161 were surveyed from.
- 84 new INNS records found.
- Trial survey walkover methodology tested and considered successful.

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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 results of the field survey and the outcome of the trial walkover methodology for determining the upstream limit of INNS between bridges in three sub-catchments.

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 concern may occur away from rivers.

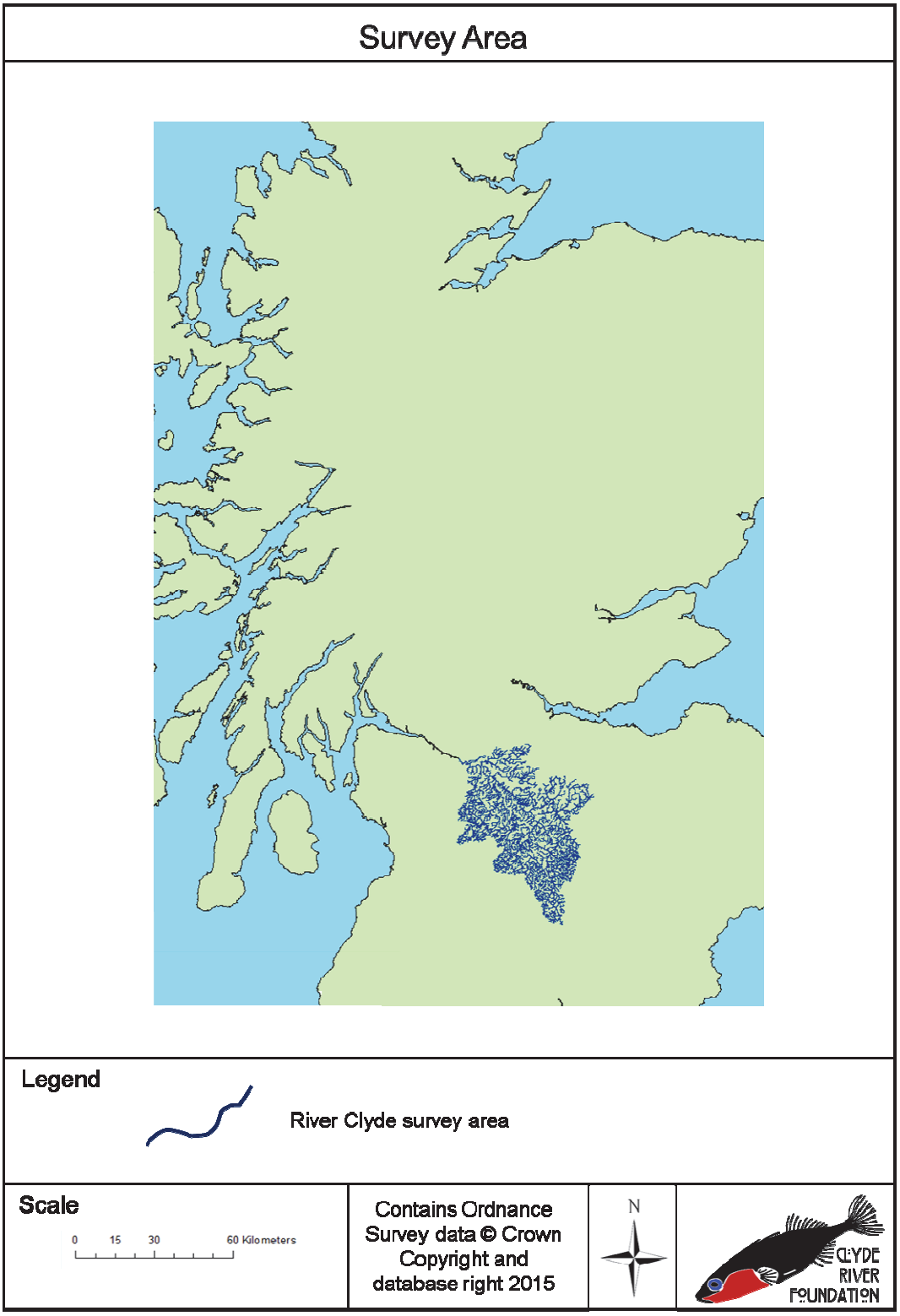

Figure 1. Survey Area: The River Clyde upstream of the Tidal Weir in Glasgow.

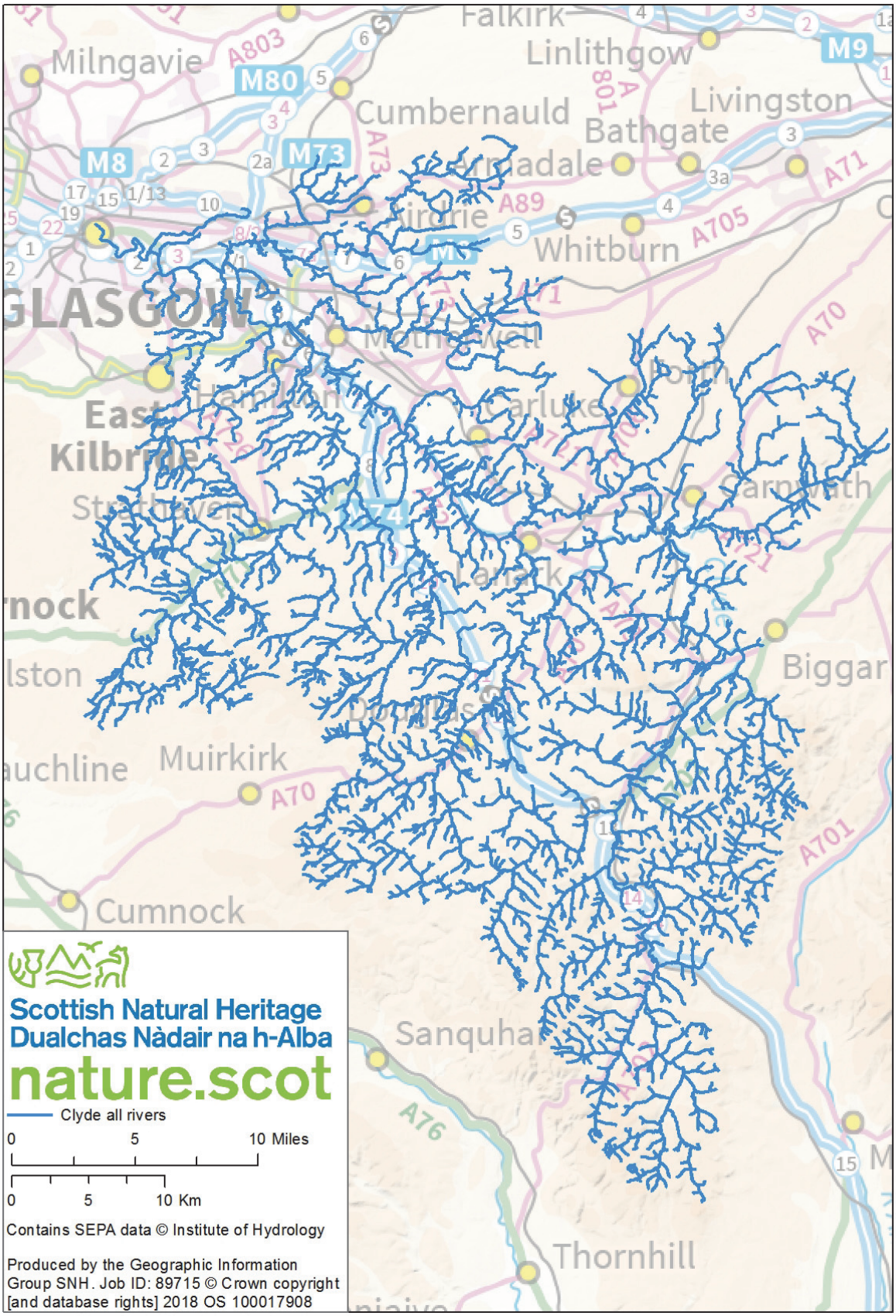

Figure 2a. Survey Area Expanded: The River Clyde upstream of the Tidal Weir in Glasgow.

2.1 Survey method and new data points

The rapid assessment “bridge-hopping” method, developed by the CRF, was used to collect INNS data for the reaches visible through binoculars upstream and downstream of road crossings. A sample field sheet is given in annex 1: Field Sheet. The desk study reported in “INNS Strategy for the Clyde Catchment - Collation Report (2015)” identified 381 bridges to be used for surveying in rivers upstream of known records of the three INNS (Figure 3). A total of 34 man-days were allocated to collecting data by bridge-hopping and it was intended to survey the entire area of interest during this project. The area to be surveyed was divided into a grid and the occurrence of INNS recorded systematically; the bridges to be used for surveying were grouped in sub-catchments.

The aspirational target of covering the full remaining catchment was not met because the data set of bridge locations provided by the Central Scotland Green Network Trust (CSGNT) was found to be incomplete. It is thought that the data sets used to produce the CSGNT GIS layer showing bridge crossings were referenced against a river network mapped at scale of 1:50,000, which frequently omits smaller watercourses. When reviewed, therefore, many existing road crossings were not identified (these were added from more detailed maps held by the CRF). Additionally, several new bridges and roads were discovered which were probably built after the CSGNT dataset was constructed. In total, an additional 374 bridge crossings were found in the areas surveyed, where only 161 had been previously identified (Figure 4). The very large number of “new” bridges identified resulted in the time originally allocated to the bridge-hopping ultimately being inadequate to complete the survey of the full geographical area.

A total of 535 bridges were surveyed from (Figure 5) at an average of 24 per day (12 per man-day). The desk study had previously identified areas colonised by INNS upstream of 107 bridges, which were therefore not surveyed from, but the bridge-hopping included 154 sites in excess of the number originally planned to cover the entire study area. It is thought that the sub-catchments still to be surveyed, because they are relatively rural, will contain fewer unidentified bridges but will take longer to survey on average because of increased travel time between sites. A total of 213 bridges remain to be surveyed from in the area of interest (Figure 5).

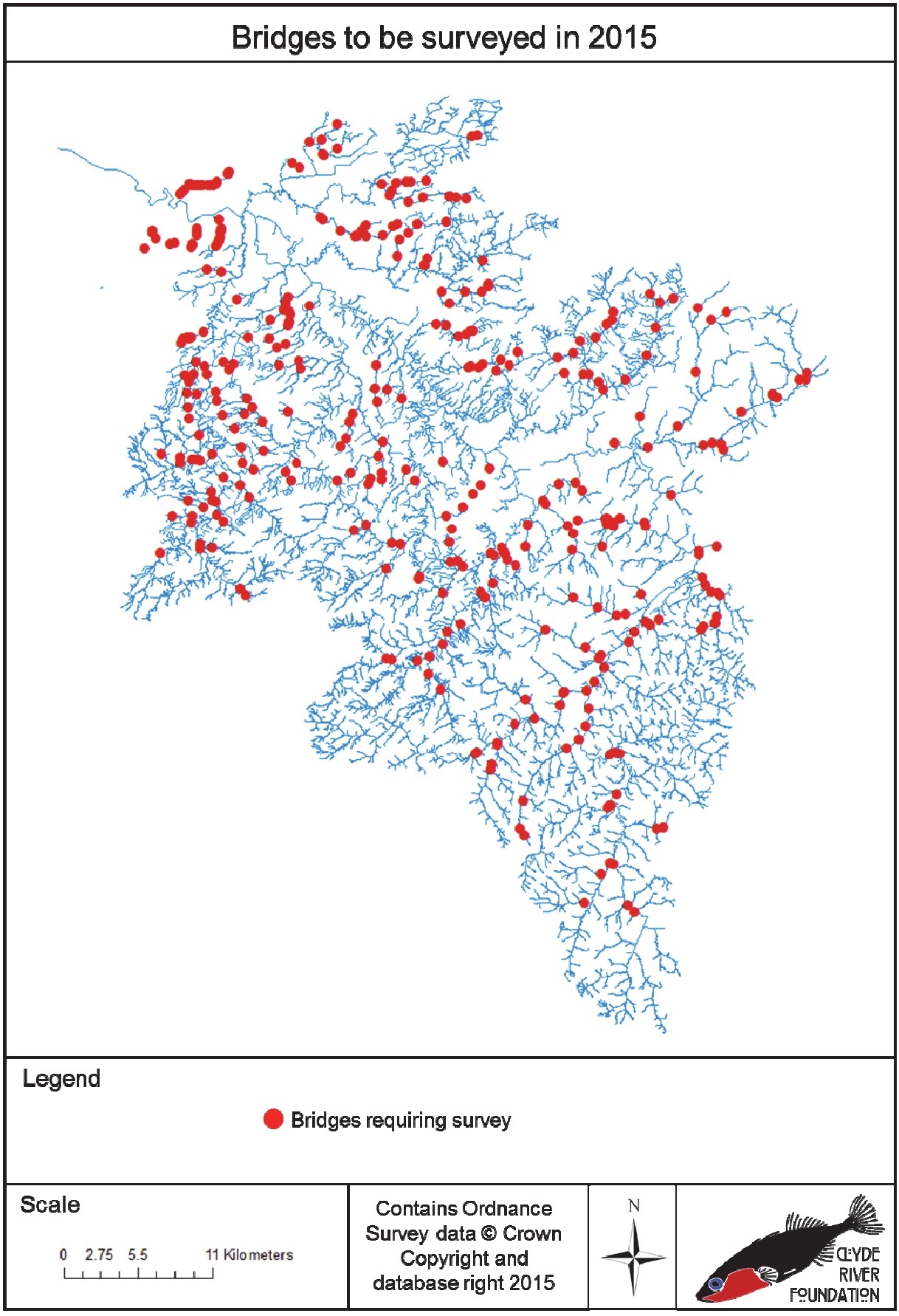

Figure 3. The aspirational 381 bridges requiring survey.

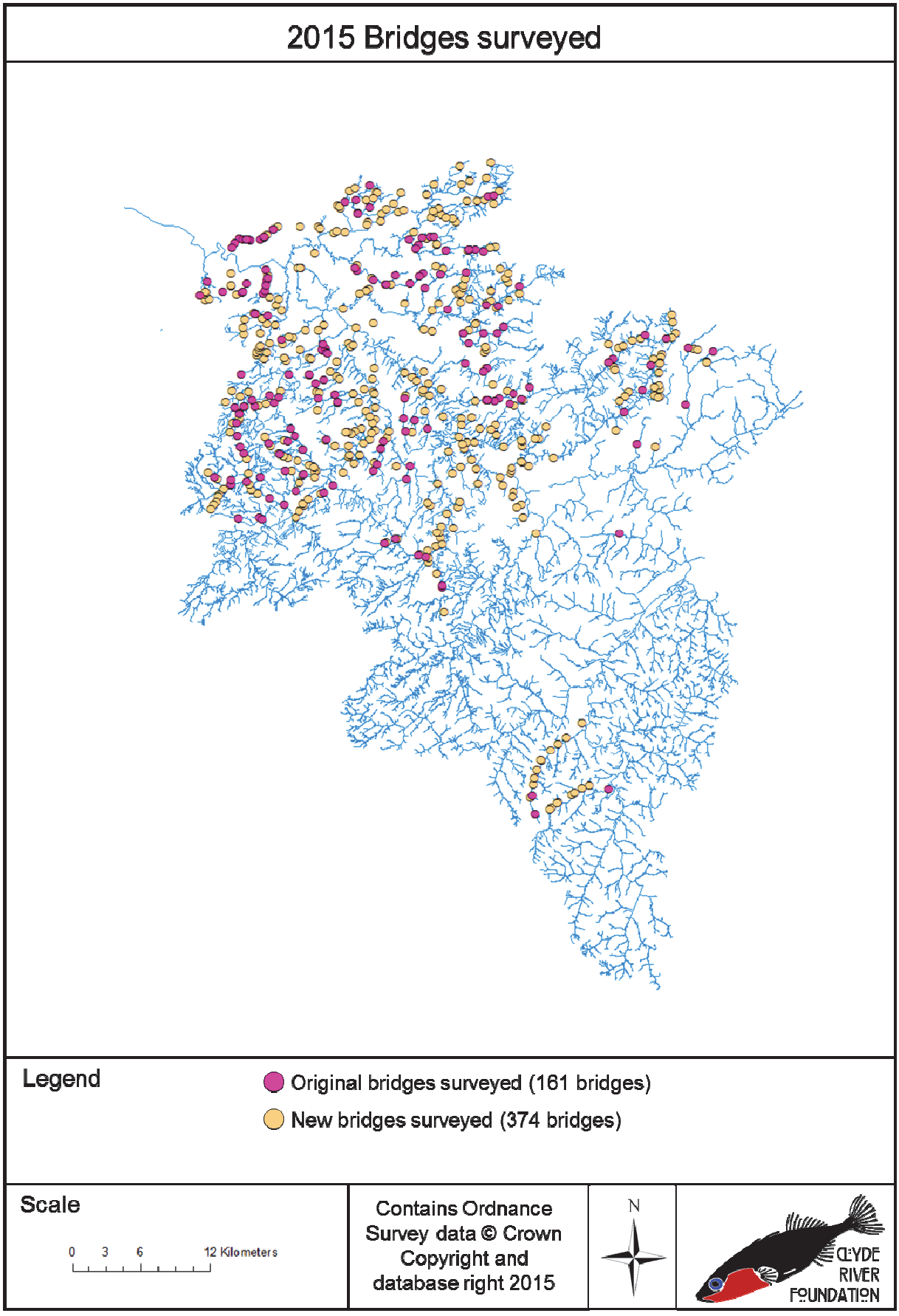

Figure 4. Locations of the newly-identified bridges in 2015.

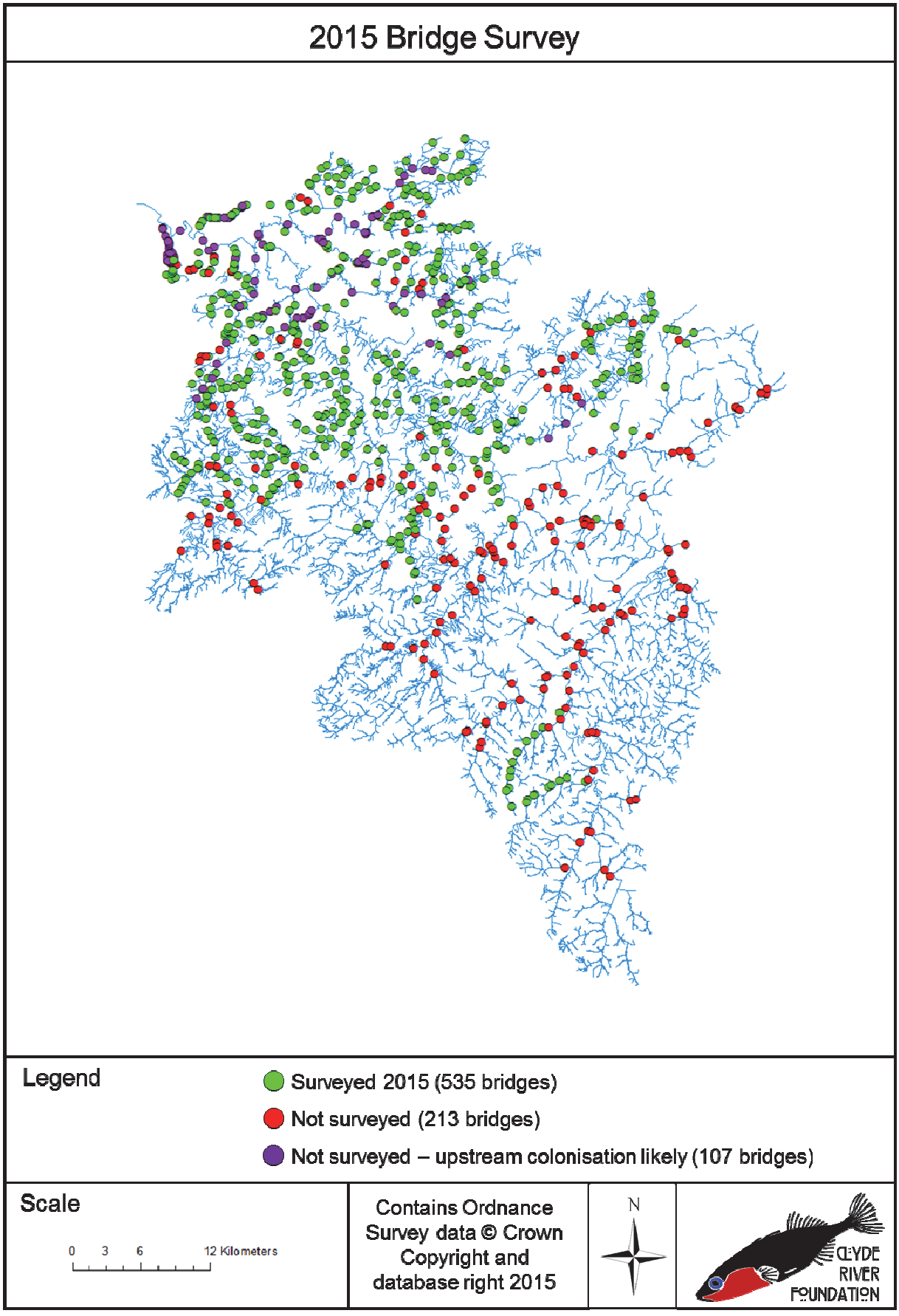

Figure 5. The 535 bridges actually surveyed in 2015.

2.2 Bridge-hopping Survey Results

Of the 535 bridges used for surveying, new INNS records were discovered at 87 locations (Figure 6). At 18 bridges, two or more different species were discovered resulting in a total of 105 new individual INNS records (Figure 7). In addition to the three INNS of primary interest, the opportunity was taken to record the occurrence of skunk cabbage and Rhododendron.

The information in Figure 7 allowed the derivation of Figure 8, Figure 9 and Figure 10. These illustrate the locations of each of the three species and the river reaches downstream with a high likelihood of colonisation from a known record.

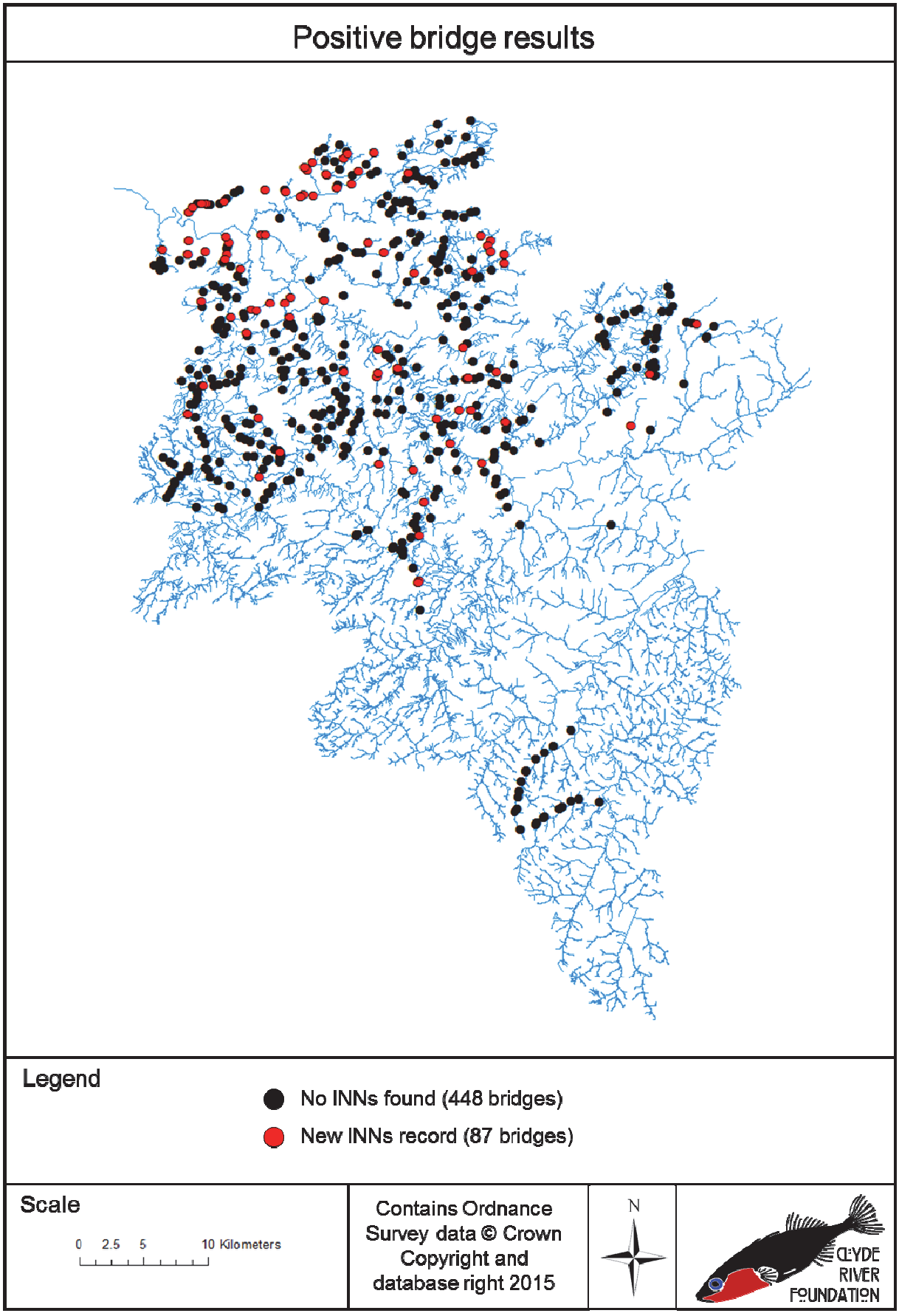

Figure 6. New INNS records – locations.

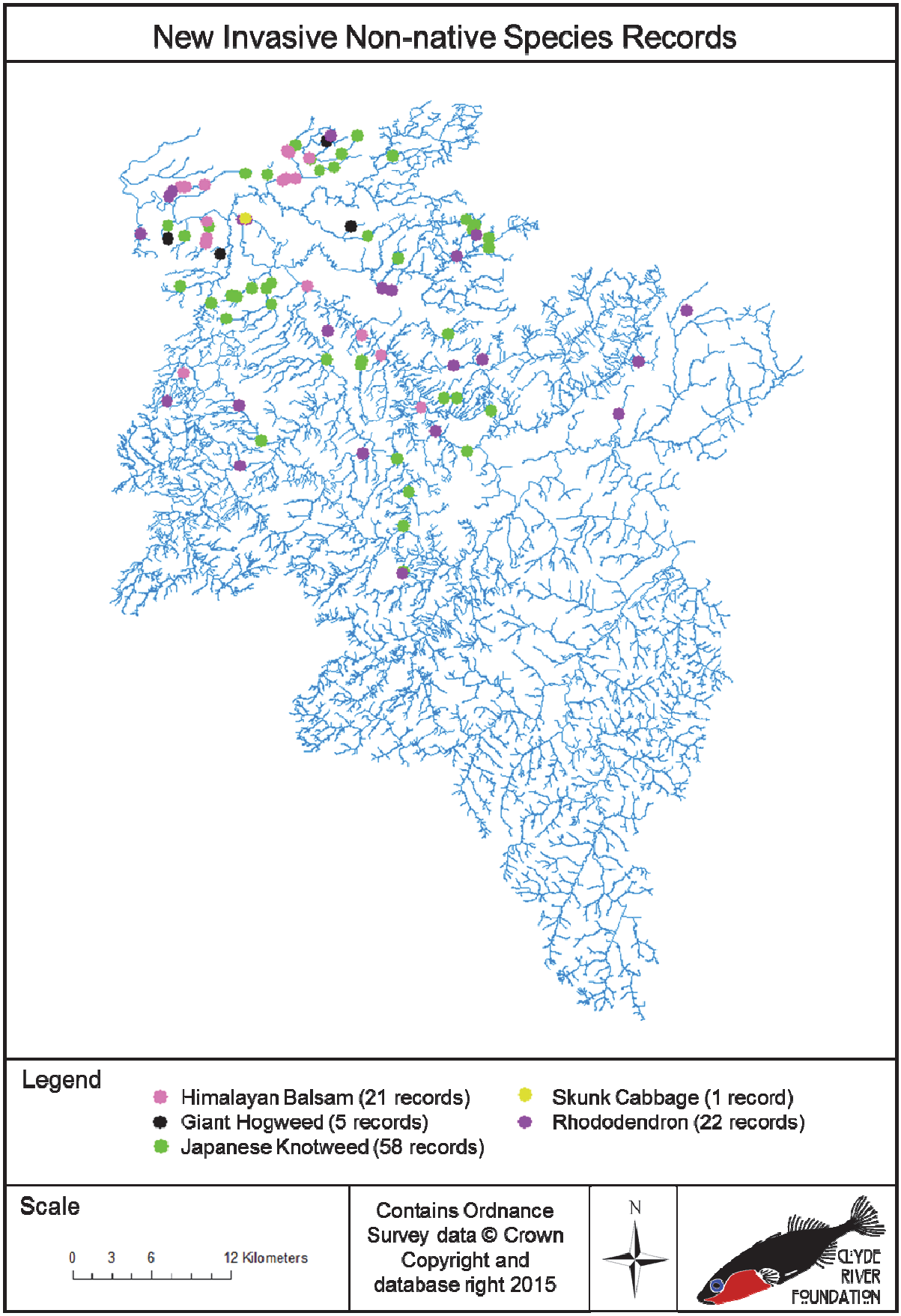

Figure 7. New INNS records – species.

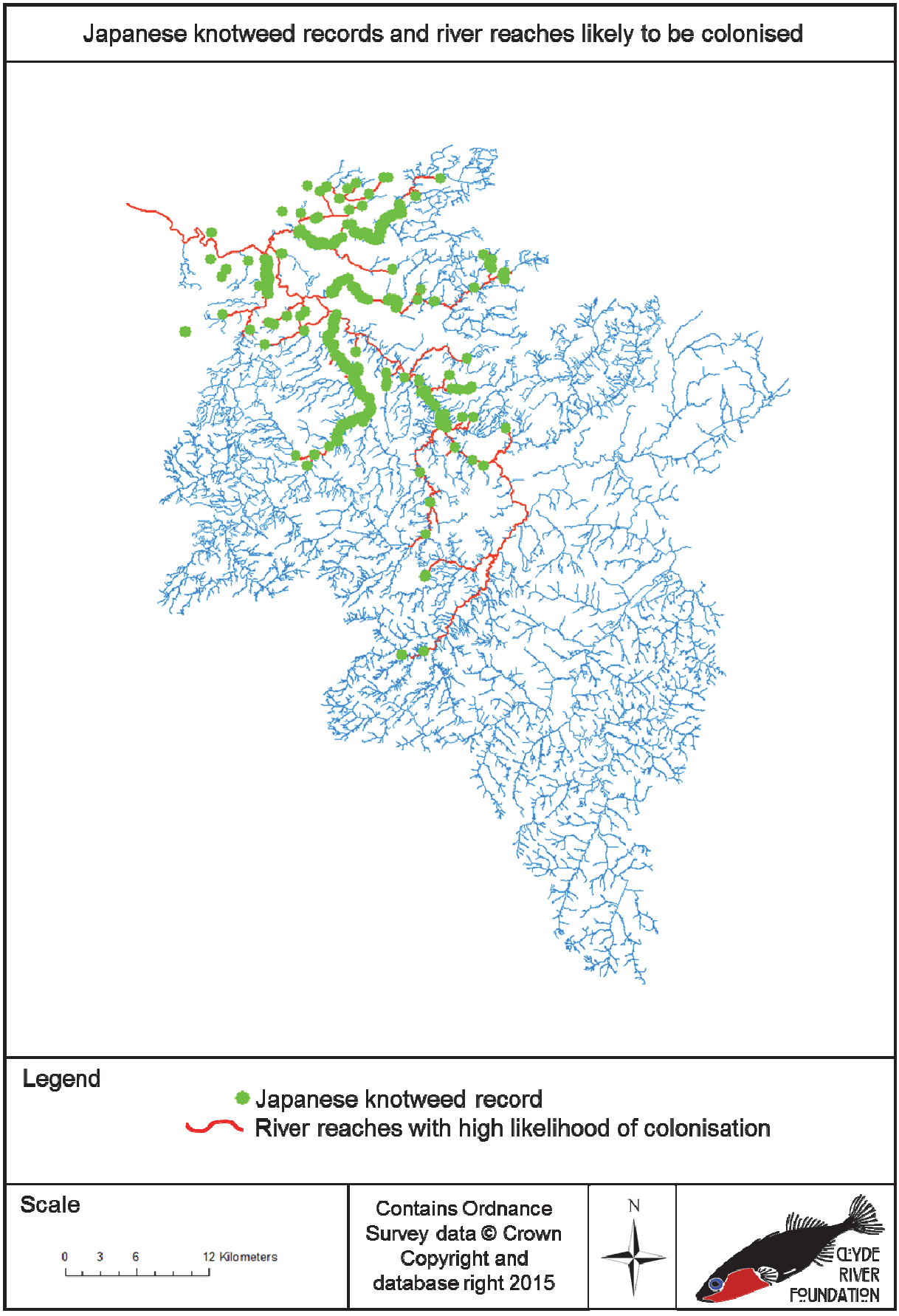

Figure 8. Japanese knotweed records.

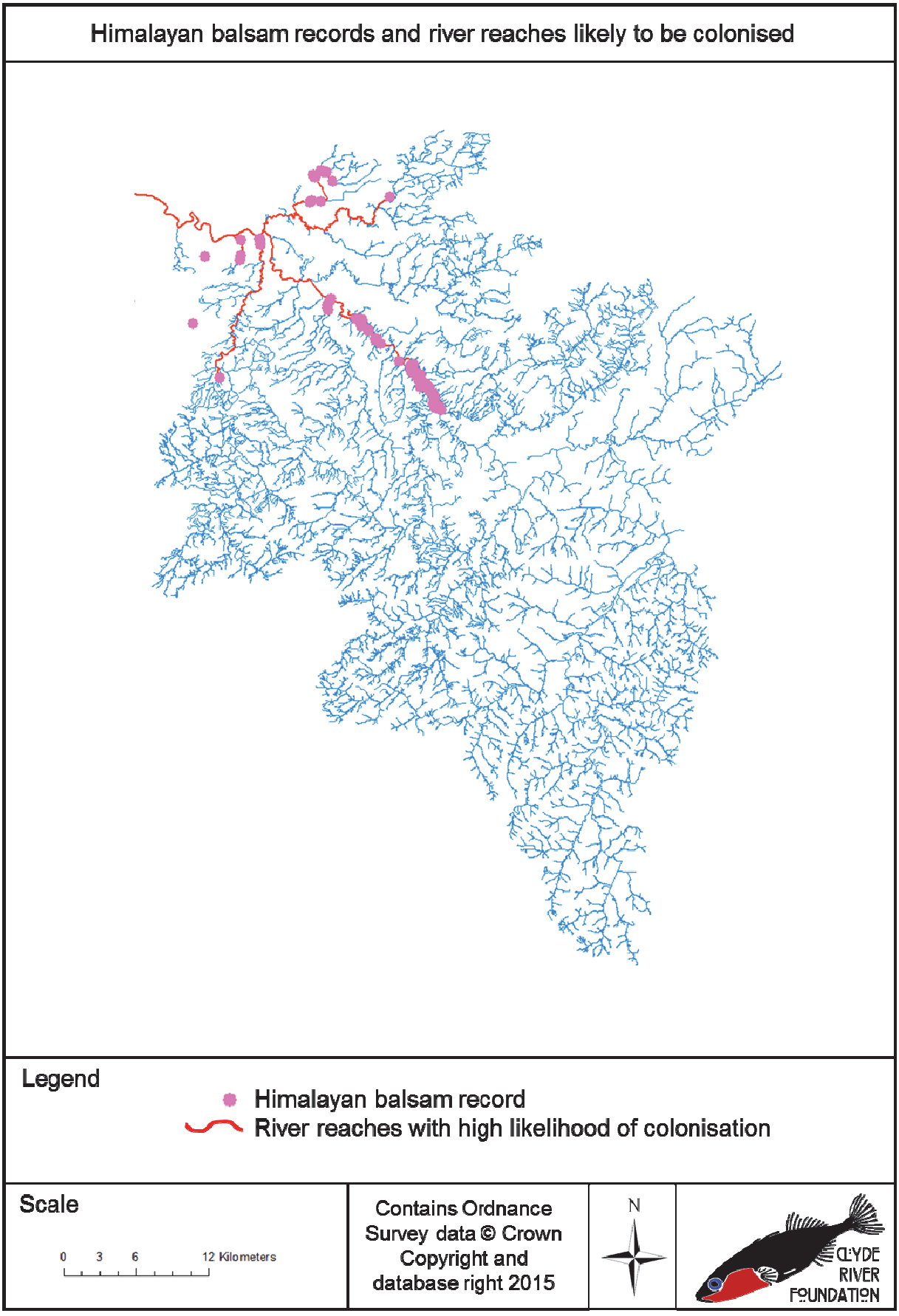

Figure 9. Himalayan balsam records.

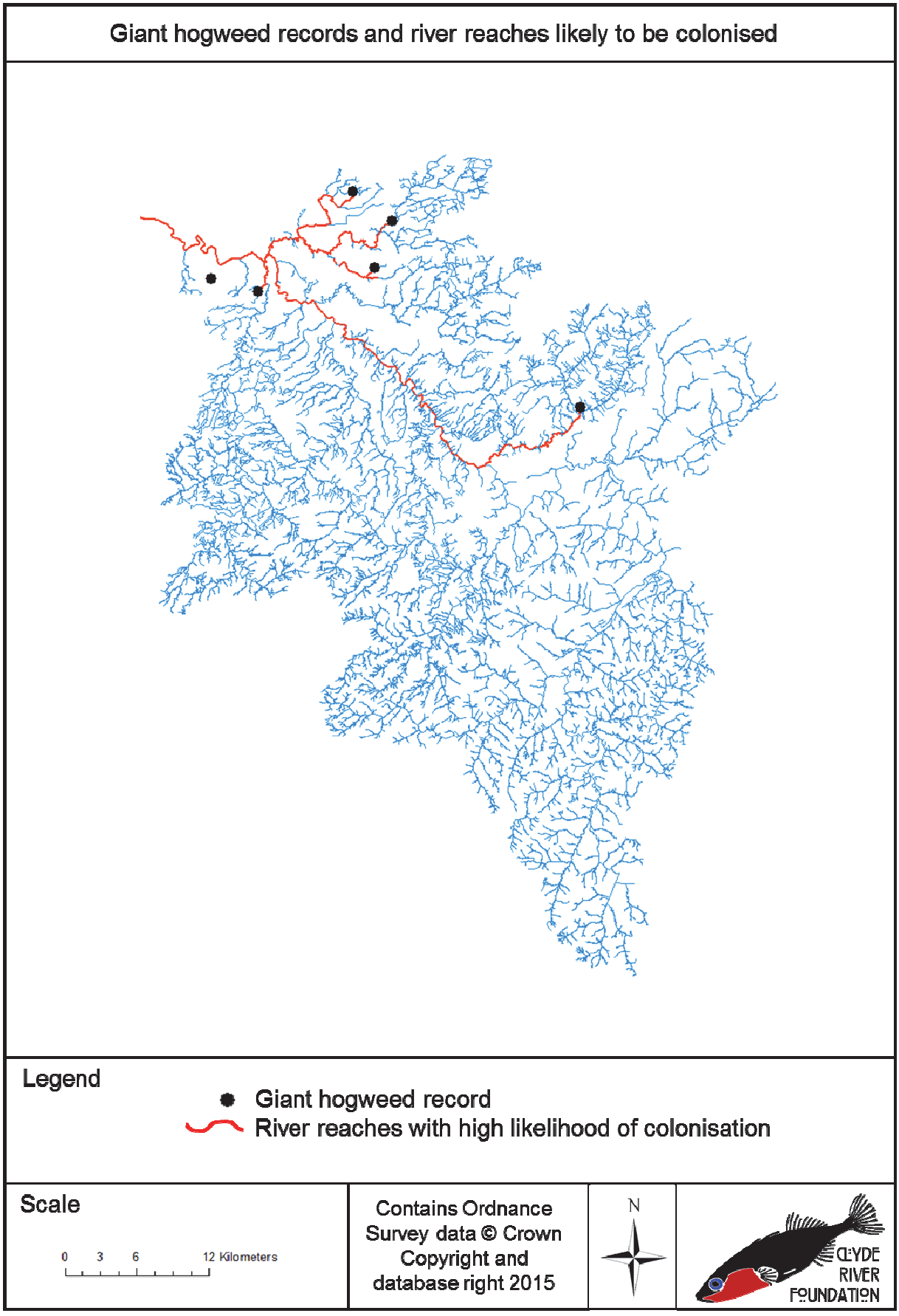

Figure 10. Giant hogweed records.

2.3 Record anomalies

There is a discrepancy in the recorded distribution of Japanese knotweed between the bridge-hopping survey records (Figure 7) and the mapped known distribution (Figure 8). As shown in Figure 8 the majority of the Douglas Water (the records to the far south-west) is highlighted at high risk of colonisation and there are records shown at the upstream point of the affected river length. These were recorded by Clyde River Foundation staff undertaking unrelated fieldwork after being highlighted in the previous desk study. These records are presented in the GIS shapefile but not within the bridge-hopping survey results.

The total percentage of river length already colonised or with a high likelihood of colonisation increased from 8.71% in the desk study to 12.21% following the bridge-hopping survey (Table 1). Japanese knotweed was the largest contributor, with an increased river length of 3.10% affected, primarily due to the new record found in the upper Douglas Water catchment.

Table 1. Proportion of total river length colonised or with high likelihood of colonisation by riparian INNS.

	Pre 2015 survey		2015 Survey Results		Newly affected river length (km)	% increase
	km	% total length	km	% total length		
Total river length	2692.17	100.00	2692.17	100.00	0.00	0.00
Japanese knotweed	220.21	8.18	303.70	11.28	83.50	3.10
Giant hogweed	85.65	3.18	118.03	4.38	32.38	1.20
Himalayan balsam	82.94	3.08	110.09	4.09	27.15	1.01
Combined	234.56	8.71	328.61	12.21	94.05	3.49

3. WALKOVER SURVEY

The bridge-hopping survey results were interrogated to yield three areas suitable to ground-truth the follow-up walkover method intended to identify the furthest upstream point of INNS colonisation in each sub-catchment.

3.1 Methodology

Where there were bridges upstream of the furthest upstream record of an INNS species, a walkover survey was undertaken between the last positive record and the next upstream bridge, to identify precisely the most upstream location of the species. Where the furthest upstream bridge on a watercourse provided a positive recording, we undertook a walkover survey above it until satisfied that the most upstream record had been encountered.

3.2 Walkover survey sites

The three sites selected for trial met the above conditions and had no positive records upstream. These were located on the North Calder Water, the Kirk Burn and the Cadzow Burn (Figure 11).

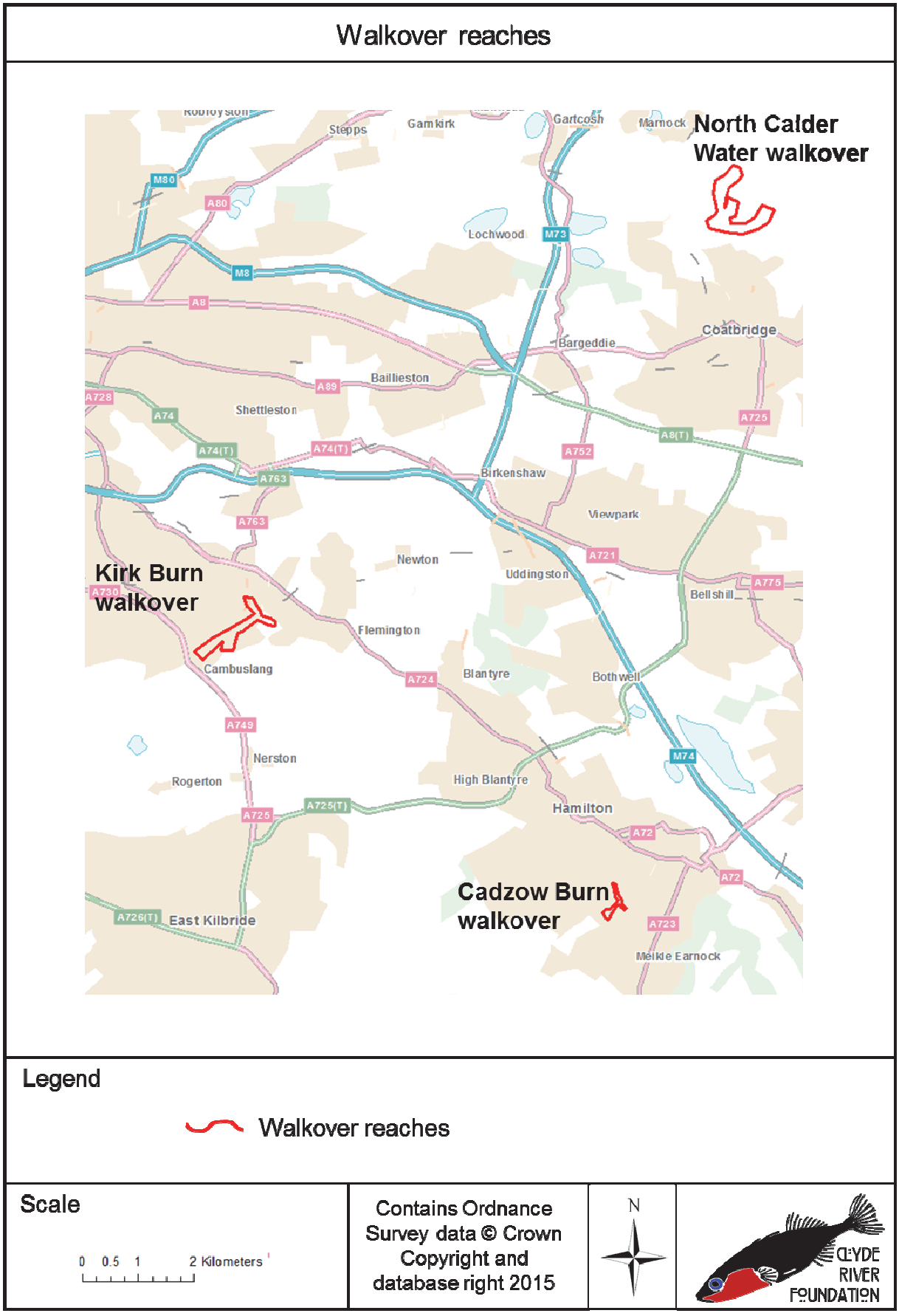

Figure 11. Walkover survey sites.

3.3 Walkover Results

3.3.1 North Calder Walkover

This survey started upstream from bridge number 111 (NGR 272860 66910) where there was a positive record for Japanese knotweed (Figure 12). This survey followed two tributaries; an unnamed tributary of the Luggie Burn to the north west and the Gartsherrie Burn to the east. This section was selected as there were positive records upstream on one of the tributaries but none on the other, which could determine whether the colonisation route could be predicted based on the distribution of upstream records.

3.3.2 Unnamed tributary

No further INNS species were recorded; the walkover survey method successfully identified the upstream limits of INNS in this instance.

3.3.3 Gartsherrie Burn

This reach was included to determine whether the route of colonisation by INNS could be predicted by the results of the bridge-hopping survey. This watercourse splits; the main stem of the Gartsherrie Burn lies to the North and had no positive INNS records and it is joined from the east by the North Burn which had upstream records of Japanese knotweed, Giant hogweed and Himalayan balsam. It was suspected that INNS colonising the Gartsherrie Burn originated in the North Burn and this was confirmed by the walkover survey. The Gartsherrie Burn was INNS-free upstream of its confluence with the North Burn but Himalayan balsam was found downstream.

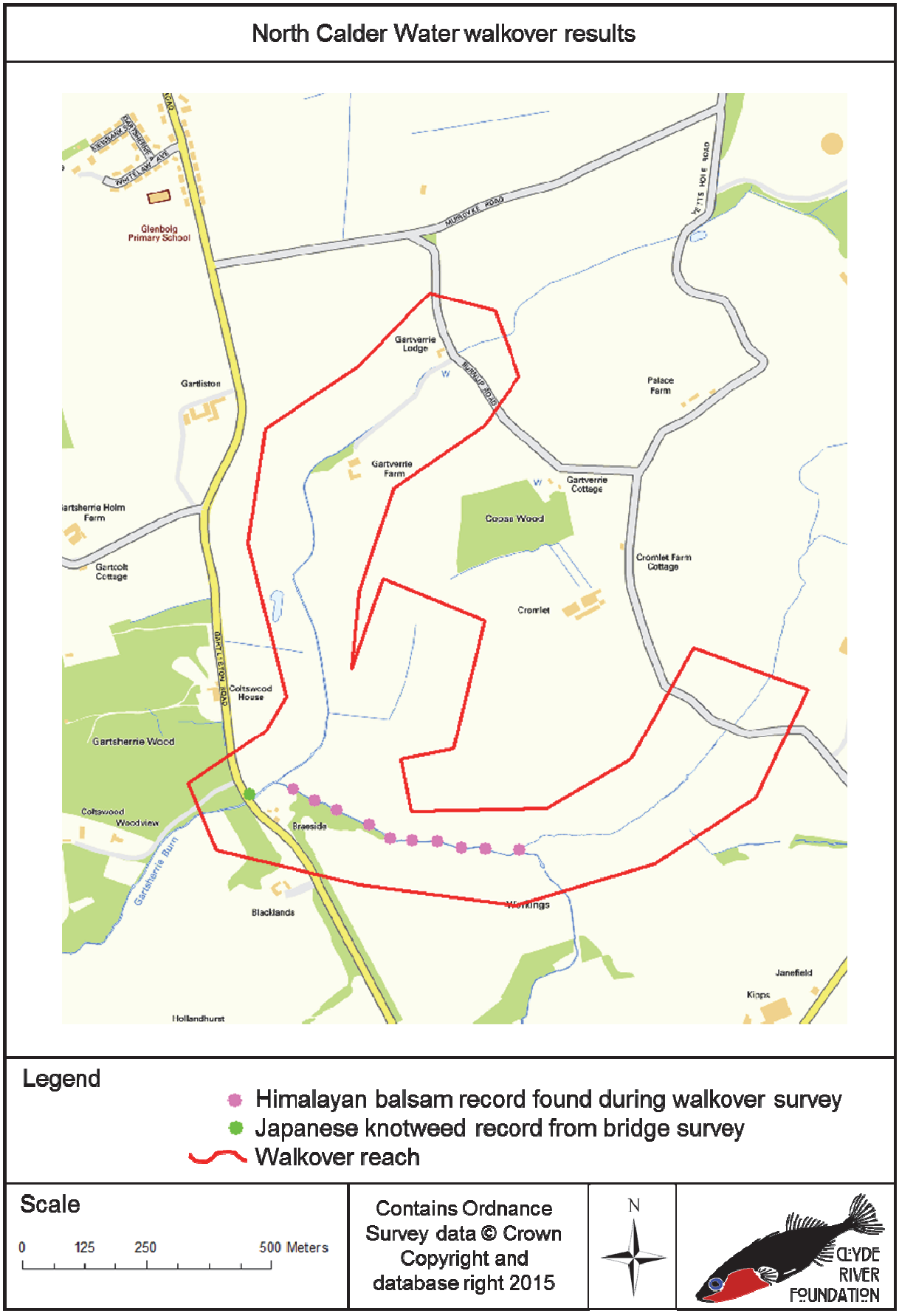

Figure 12. North Calder Water walkover survey area.

3.3.4 *Kirk Burn Walkover*

The survey was upstream of the record of Japanese knotweed at bridge number 219 (NGR 264501 660014) (Figure 13) and revealed one record of Japanese knotweed not visible from the bridge-hopping survey. Continuing upstream from this point did not reveal any further records of INNS.

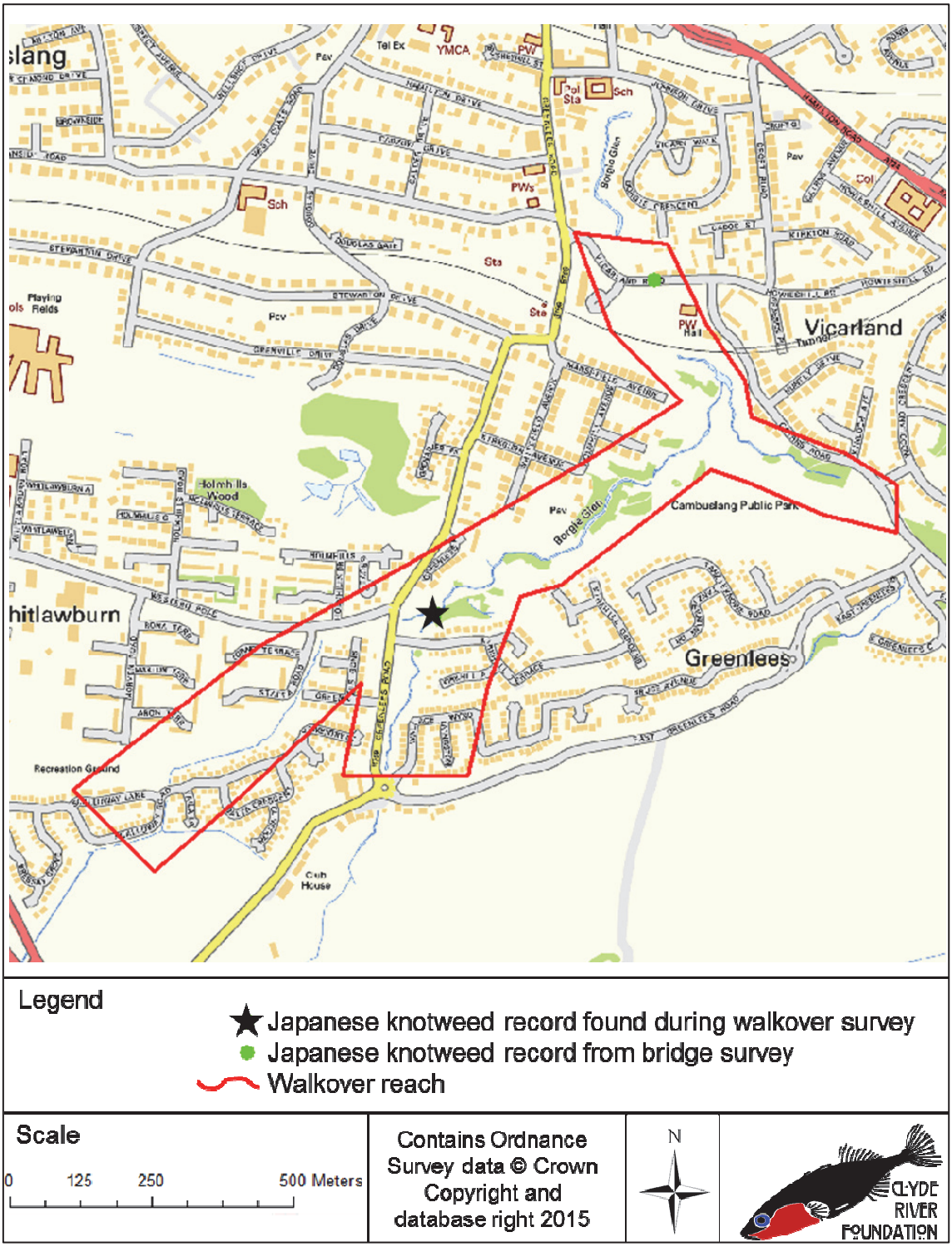

Figure 13. Kirk Burn walkover survey area.

3.3.5 *Cadzow Burn Walkover*

The survey was upstream from the record of Giant knotweed at bridge number 302 (NGR 271034 654888) (Figure 14). No further records of INNS were found during the walkover survey.

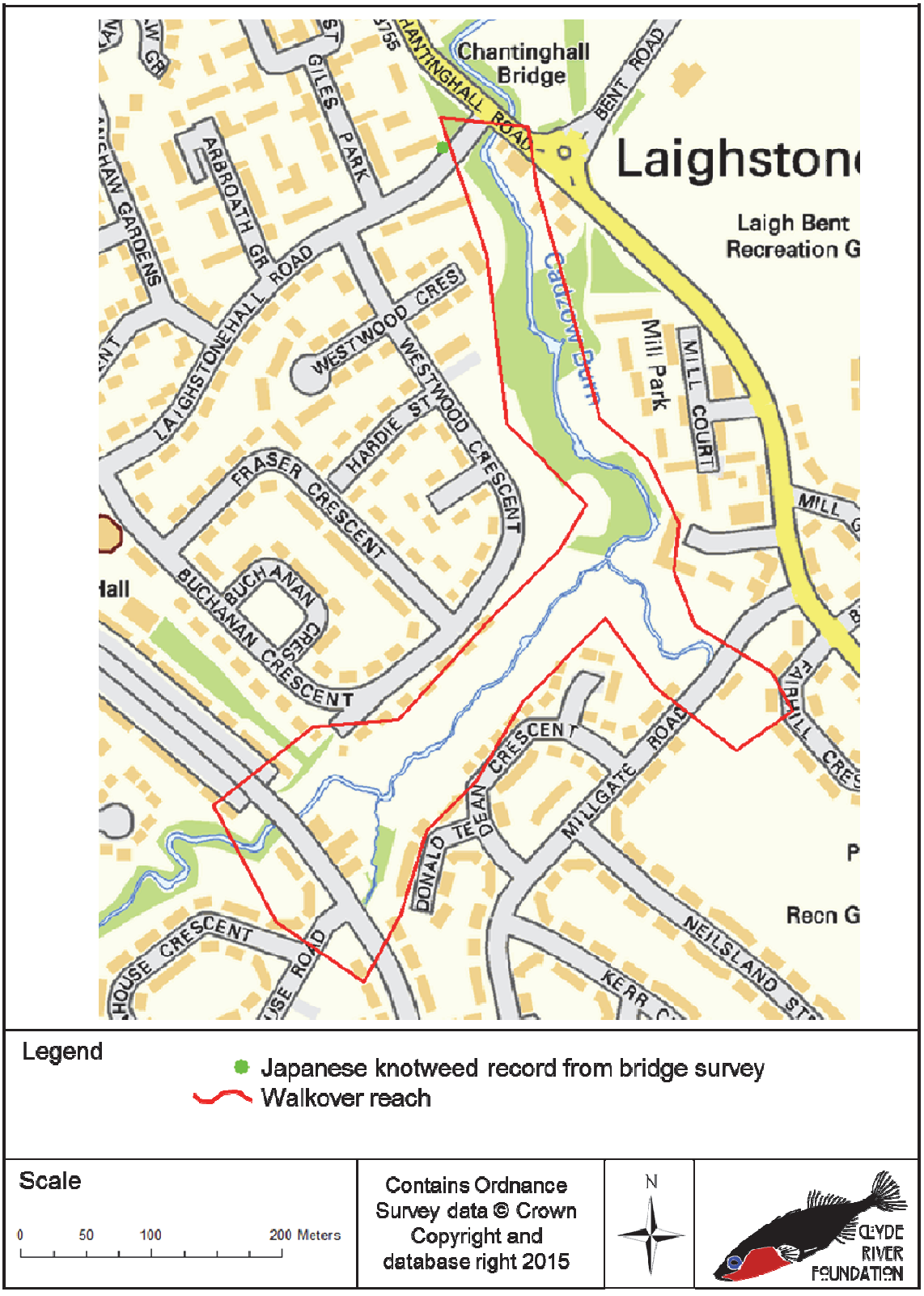

Figure 14. Cadzow Burn walkover survey area.

4. DISCUSSION

The ground-truthing carried out here suggests that bridge-hopping is a rapid and accurate method of determining the rough distribution of INNS across a river catchment. The walkover survey successfully demonstrated that the upstream distribution suggested by bridge-hopping can be accurately determined and that this method can fine-tune the distribution map. The combination of these methods will not determine the location of all plants requiring treatment during a control or eradication programme, and therefore it is not a substitute for full walkovers of affected reaches. The upstream limit of colonisation will, however, be found and this will provide a reference point from which to determine future management options for the control of INNS along the river corridor downstream.

ANNEX 1: FIELD SHEET

			Easting				Northing		
Catchment		**Bridge No.**	**River 2**		**Altitude**	**Time**	**Date**		
Plant sp:	**DAFOR:**	**Patch Size (Area sqm)**					**Plant sp:**	**DAFOR:**	**Patch Size (Area sqm)**
JK							JK		
HB							HB		
GH							GH		
SC			**Upstream Section Length:**				SC		
Rhododendron							Rhododendron		
			Photo		**Photo**				
Landuse:			**US RHB**			**US LHB**	**Landuse:**		
Banktop Veg:							**Banktop Veg:**		
Disturbance							**Disturbance**		
Litter.(No. of Items)							Litter.(No. of Items)		
Total Alcohol Bottles							Total Alcohol Bottles		
Buckie Ind.(No. of Items)							Buckie Ind.(No. of Items)		
Poaching (Propn of site)							Poaching (Propn of site)		
Flow type:									
Wet Width:									
Bank width:									
				Upstream River					
		Road Bridge							
				Downsteam River					
					Flow Direction				
Plant sp:	**DAFOR:**	**Patch Size (Area sqm)**					**Plant sp:**	**DAFOR:**	**Patch Size (Area sqm)**
JK							JK		
HB							HB		
GH							GH		
SC			**DS RHB**			**DS LHB**	SC		
Rhododendron							Rhododendron		
			Downstream Section Length:						
Landuse:							**Landuse:**		
Banktop Veg:			**Photo**		**Photo**		**Banktop Veg:**		
Disturbance							**Disturbance**		
Litter.(No. of Items)							Litter.(No. of Items)		
Total Alcohol Bottles							Total Alcohol Bottles		
Buckie Ind.(No. of Items)							Buckie Ind.(No. of Items)		
Poaching (Propn of site)							Poaching (Propn of site)		
Flow type:									
Wet Width:									
Bank width:									

Notes:		
	Litter 1-5	A
	Litter 6-10	B
	Litter 11-15	C
	Litter 16-20	D
	Litter 21-25	E
	Litter 26-30	F
	Litter 31-35	G
	Litter 36-40	H
	Litter 41-45	I
	Litter 46-50	J
	Litter 50+	K

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