

Tweed Invasives Project 2016



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Executive Summary

This year marks the 14th year of targeted control on invasive non-native plant species in the Tweed catchment. The aim is still consistent from day one: to control Giant Hogweed and Knotweed species across the catchment alongside Himalayan Balsam control in targeted sub-catchments. American Skunk Cabbage is a recent addition to this list.

After years of the project running in the same way, this year we took the opportunity to refresh the system and improve methods. Instead of recording data via pen and paper, each control officer was issued with a hand-held GPS device and was asked to mark every plant they controlled. This is uploaded to a GIS system which allows very accurate distribution maps to be produced.

The riparian habitat has always been the worst affected area for these species, as water is the most common pathway for dispersal. The winter floods in early 2016 disturbed new areas of river bank, uncovering new Giant Hogweed seedlings that could have been present in the soil for 15+ years. It is expected this will continue until the residual seed source diminishes.

As the abundance of these species declines along riparian areas, it enables us to dedicate more time to focus on surveying new areas, and as a result more off-river sites are included on the hit-list year on year, (footpaths, viaducts, remote woodlands, river cliffs and private gardens).

As a result of carrying out extensive surveys of tributaries in the Upper Tweed, American skunk cabbage plants has been found at several locations growing along watercourses, in still water bodies and private properties. Control regimes have been planned for some of these areas.

Tweed Forum has always maintained emphasis on integrated working relationships with landowners, managers and communities and has been fortunate to have help from some truly outstanding volunteers. New volunteers have been trained as existing ones move on.

Over the years, Tweed Forum has been successful in harnessing various environmental funds in order to run the campaign. Donations from landowners and project supporters have also been hugely influential. As Tweed Forum has broadened its control area and more species have joined the list, we are busier than ever. Whilst we have been incredibly successful in securing external funding for the project, these sources have mostly been exhausted and we now face the prospect of having virtually no public funding. For this reason, land owner support, both cash and in kind, is more important than ever.

I. Control Methods:

Surveys began in early May and were carried out on foot along target watercourses. The team (made up of volunteers, professional services and Tweed Forum staff) being split to cover all areas. Blanket spraying licences were granted by Scottish Environment Protection Agency (SEPA) and the Environment Agency (EA). Dye was added to knapsack sprayers to mark controlled plants to avoid double dosing.

I.1 Giant Hogweed

The usual method of control for Giant Hogweed is to apply glyphosate (Roundup ProBiactive 450[®]) to the foliage (at 2% concentration), using a knapsack or hand sprayer. This plant is targeted in May - June, ideally before flowering. It is important not to conduct control surveys too early as there is a risk of missing plants that emerge in June. This would result in another survey being needed.

This species is relatively easy and successful to treat but can often be difficult to locate as it rarely favours flat, easily accessible ground. Indeed, many of the worst infestations were noted in dark, secluded woodland as shown in Figure 1.



Figure 1: Secluded woodland away from the river found through investigation. Photos taken 4 weeks apart.

1.2 Knotweed

Three species of Knotweed are present in the Tweed catchment: Japanese Knotweed, Giant Knotweed and Himalayan Knotweed with giant knotweed being the most common. Stem injection is a very successful albeit time consuming method of treating Knotweed species. Chemical (2ml of 50/50 glyphosate/water) is injected into each hollow stem, using a specialised stem injector. The best time to target this plant species is at the end of the growing season, when the plant draws back for the winter (August – September). In some cases, when the stand of Knotweed is particularly large, it will be sprayed using a knapsack, then injected on the return visit. This is to save time; spraying is effective but the odd stem nearly always gets missed. Treating Knotweed is a matter of patience and persistence as it can take several years to eradicate.



Figure 2: Japanese Knotweed in a garden near Hawick. Treatment was by stem injection and proved highly successful.

1.3 Himalayan Balsam

Control of this species should be carried out ideally when the plant has grown to a decent height and just before or during flowering, normally June - July, (varies according to weather). This species is so wide spread and the most challenging to control as it will germinate rapidly in cleared areas and can grow and flower even in October. It is sometimes necessary to control areas a further two times or even three times before winter. Plants can be controlled mechanically (strimming or hand pulling) or chemically (using glyphosate). Its Achilles'-heel is that seeds cannot stay viable in the soil for more than two years.

The team surveyed and chemically treated the riparian zone of the River Till. Tactics may change in the future to include non-chemical means as it is difficult to avoid damage to native vegetation when spraying. Other watercourses were surveyed for this species and the extents were mapped. The Gala, Lyne and Leader water tributaries were identified as being feasible to treat. These tributaries were walked and plants hand pulled (Figure 19).

Tweed Forum continues to work with CABI (Centre for Agriculture and Biosciences International) on the release of a rust pathogen (licenced by DEFRA). There are four sites on the Tweed in Northumberland, which are undergoing monitoring. It is hopeful that more releases will occur in 2017. For more information, visit <http://www.cabi.org/projects>



Figure 3: Rust fungus infected leaf and stunted plant.

1.4 American Skunk Cabbage

American Skunk Cabbage (*Lysichiton americanus*) produces bright yellow flowers in early spring and can reach up to 1.5m in height forming dense stands which can smother native vegetation and watercourses. Skunk cabbage is available in garden centres and has been heralded as a “must have” plant, however its growing presence in the countryside has raised concern. A new EU regulation was agreed in December 2015 which will place stringent controls on this and 13 other plant species. It will become an offence to keep, cultivate, breed, transport, sell or exchange these species, or release them, intentionally or unintentionally, into the environment.

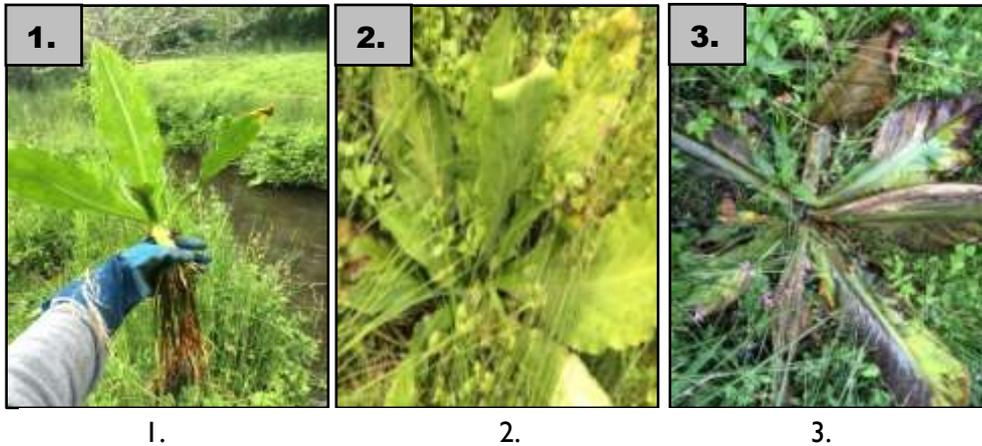


Figure 4: Skunk cabbage control methods

1. Manual removal was moderately successful; however, all rhizomes must be removed. The rhizome structure is almost as long as the plant, so this can be difficult and very time consuming.
2. Chemical treatment involved applying glyphosate to the foliage. This was the least successful method as the waxy leaves did not seem to absorb the chemical. The leaves curled and looked sick but the plant was still alive.
3. Root treatment was the most successful and quickest method. Using a tree-planting spear remove the white core of the plant and direct chemical via a stem injector or sprayer to the middle of the plant. Plants visibly died back within a fortnight with very little damage to surrounding vegetation.

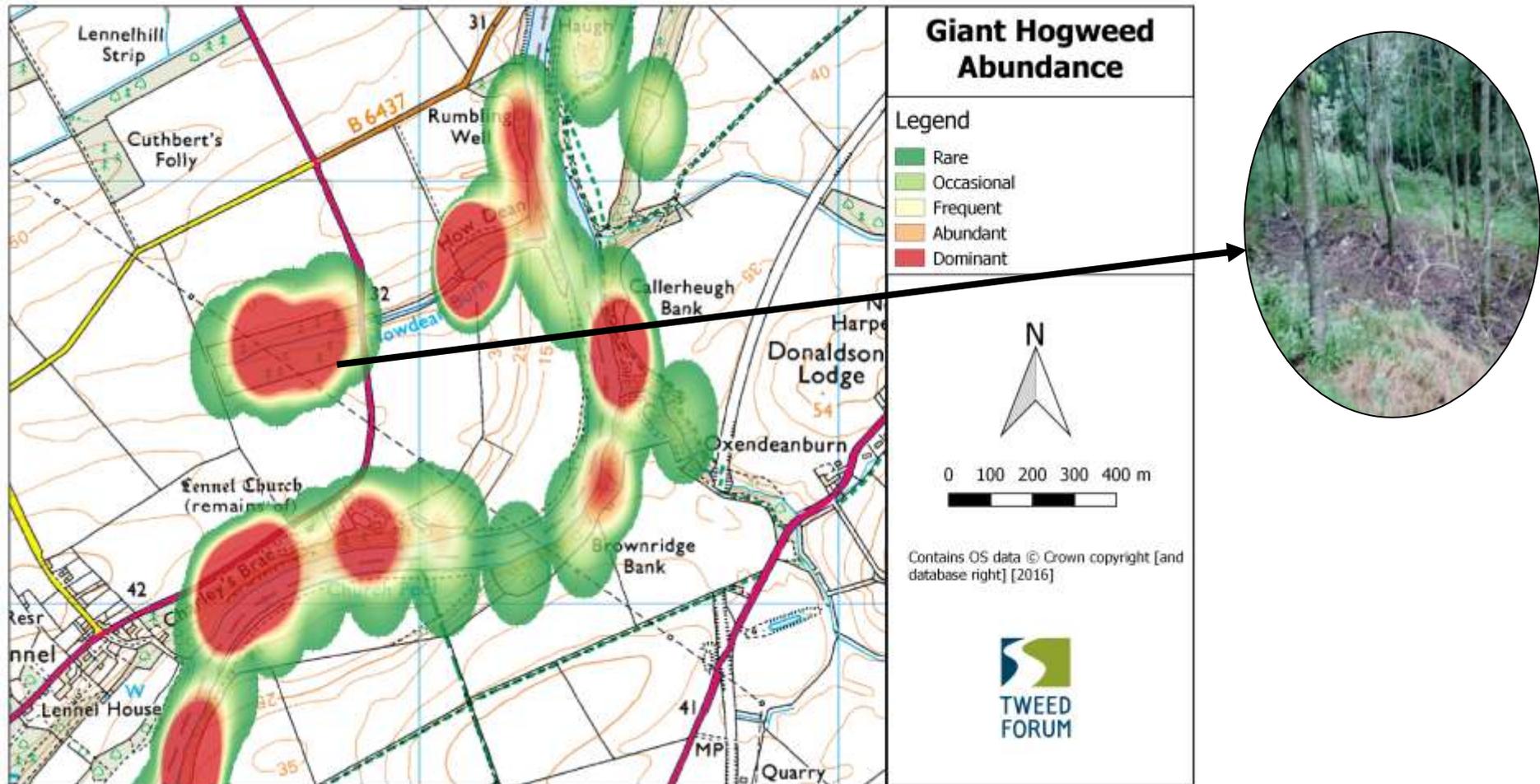
2. Control areas

2.1 Tweed

After 14 years, the results of a continued control effort on Giant Hogweed and Knotweed have been very positive. However, occasional flowering Giant Hogweed is still present, meaning individual plants have been missed for 3-4 years. This year was a good opportunity to review the system and make changes, starting with mapping exactly where volunteers, staff and contractors control and allocating specific areas, so there were no gaps. Volunteers were visited at the start of the season and supplied with equipment. New volunteers were enlisted and put through their sprayer operator training course. Professional services were again enlisted, but areas were confined to steep banks and islands, a new team that specialised in climbing were hired. Tweed Forum staff then filled in the gaps starting from the bottom and working up, different to most, but this is because plants grow faster in the east.

Previous data was recorded in linear lines along riparian zones, however, this didn't represent what was being found on the ground. To better capture data, all contractors and Forum staff were issued with a GPS device to record every plant. From this it was easy to see if areas were being covered effectively. GPS points were followed up with fixed point photography shots, to double check data points. A heat map is drawn to indicate abundance as shown in Figure 5.

Figure 5: Heatmap of Giant Hogweed abundance around Lennel. Photo to right shows the dominant nature of the Giant Hogweed observed.



Giant and Japanese Knotweed are present along the Tweed from Peebles to Berwick (see Figure 18). Giant Knotweed is more common and exists in larger stands. The good news is it is much easier to eradicate, as the leaf surface is so large, it takes up the herbicide well.



Figure 6: Giant Knotweed stand located south of Coldstream and extending for 50m. It was sprayed and will be continually visited and injected until no more shoots appear.

2.2 Upper Tweed

The Upper Tweed from Boleside to Tweedsmuir, is surveyed last, (as no Giant Hogweed is present). The adjoining tributaries are also surveyed, the Lyne Water, the Manor water and the Leithen Water. There a handful of Knotweed stands, which are recorded and treated annually and reducing (see map). The Knotweed on the Lyne has substantially reduced due to continued control pressure. The most concerning species present in this catchment is American Skunk cabbage. An article was published in the local paper asking local people to be vigilant for this plant. As a result of this and the survey work conducted, several plants were located growing along watercourses and in private gardens. The plants growing along watercourses were controlled. We are hoping to maintain relationships with landowners to educate and assist in removing these plants in a sensitive manor.



Figure 7: American skunk cabbage is widespread in the upper catchment.

1. Along banks of the Leithen Water near the confluence with the Tweed.
2. Infestation near Stobo.
3. Isolated plant next to Manor water.

2.3 Whiteadder

The Whiteadder is the most challenging of watercourses for survey and control, due to the steep nature of many of its banks. There are also no volunteers on this watercourse meaning it must be completely covered by Tweed Forum staff or contract labour. The extent of INNS however, is relatively short, starting from below Abby St Bathens to the confluence of the Tweed at Berwick (approximately 35km). Small stands of Japanese Knotweed are present and have received treatment each year. Over the years the density of Giant Hogweed has been reduced along flat sections of river. However, in areas of steep banking and inaccessible woodland Giant Hogweed remains rife. This makes the Whiteadder by far the worst affected in the catchment. It is envisioned that it will take a few more years of this kind of effort to get it in line with other watercourses. Much of the control work needed the use of climbing equipment and was therefore sub-contracted, which increased costs.



Figure 8: Steep sections such as that shown on the left require specialist climbing equipment to access. The team surveyed the watercourse, and surrounding adjacent woodlands, starting from the top and working down each run. Again, GPS points of each plant controlled were captured, along with photographs. Similar to other areas, the low-lying ground contained new seedlings.



Figure 9: Banking eroded by last winter's floods shows many new seedlings.

2.4 River Till

The River Till and its tributaries are designated SSSI & SAC for its diverse flora and fauna, it joins the Tweed near Coldstream. It is 130km long and given the density of Himalayan Balsam encountered, progress was slower than expected.

Himalayan Balsam control has taken place on the River Till since 2006. As a result, abundance of this species has declined over the years. However, a combination of a changeover in management and volunteers moving on, meant some areas were not being targeted effectively, resulting in some areas being allowed to flower and seed. Again, a change of tactic was adopted this year. Control was sub-contracted, with the aim of covering the ground twice but the density of Himalayan Balsam encountered meant that only one run was achieved. Giant Hogweed is present at the bottom of the catchment and there are small Japanese Knotweed stands found towards the top.



Figure 10: Himalayan Balsam found in a woodland just back from the river Till.

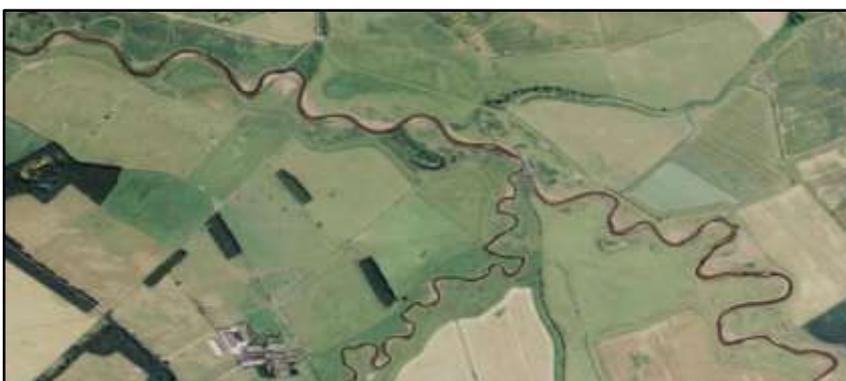


Figure 11: Aerial photo of the River Till's meanders.

2.5 Teviot and Ale

The length surveyed on the Teviot is roughly 50km from Northouse burn to its confluence with the Tweed. There are fewer steep sections, so it is quicker to complete than other watercourses. The works were subcontracted to a local smaller contracting team, who were supplied with GPS devices to record data. The lower section of the Teviot is controlled voluntarily by the landowner, with two steep sections being contracted to a ropes team. The volunteers are not supplied with a GPS device, so there is no data for this stretch of river. The abundance of Giant Hogweed on the Teviot has declined continually and this year most plants controlled were seedlings; likely uncovered by the winter floods. The Ale Water (Woll Burn confluence to Teviot Water) is 28.5 km, and has a much higher abundance of giant hogweed.

2.6 Ettrick & Yarrow

Whilst the Ettrick and Yarrow have relatively little Giant Hogweed. However, the Yarrow has the highest abundance of Japanese Knotweed in the catchment (see Figure 18). Therefore, riparian sites on the Yarrow and Ettrick were contracted out with Tweed Forum staff undertaking control of off-river sites.



Figure 12: Japanese Knotweed sites on the Yarrow.

2.7 Gala Water

Funds were raised from the Tesco Bags of Help Fund to control INNS along the Gala Water. Japanese Knotweed plants were sprayed/injected using contract services. A community Himalayan Balsam pulling evening was organised to promote the project and educate local people about INNS and their detrimental effects.



Figure 13: With funding from Tesco Bags of Help a group of local anglers and members of the Gala Waterways Group spent an evening hand pulling Himalayan Balsam and clearing over 200m of river bank.

3. Maps

Maps are drawn from the handheld GPS device data using Arc GIS. Where there is little or no presence of data i.e. Middle Tweed and Upper Teviot, it is either due to there being no presence of INNS or because volunteers do not get issued with GPS devices (in order to reduce costs).

See Figure 14 & 15: For Giant Hogweed, maps were drawn using point-count data across 100x50m² grid squares, a heat map is drawn and calibrated against the DAFOR scale (Dominant/red >75% Abundant/orange 51-75% Frequent/yellow 26-50% Occasional/pale green 11-25% Rare/dark green 1-10%).

See Figure 16: For Knotweed species, a location map is drawn using GPS data from field surveys. The green dots indicate a new or existing stand that received treatment in 2016. The black dots indicate a previous stand that has received treatment and has completely died in 2016 – these sites will still be surveyed for at least 3 years to ensure they are properly eradicated. The red dots indicate a stand of knotweed which was recorded in previous years and was either not found on arrival (no dead stems) or access was not possible (an island and high river level). These sites are still important, as they will need to be surveyed in 2017.

See Figure 17: For Himalayan balsam, walkover surveys were completed and density estimations from one operator were made in relation to the riparian zone, 20m from river. The DAFOR scale was used again. The darker pink highlights the higher abundance. These areas were quite often sandy soils, areas that had been disturbed by recent flooding and areas of riparian woodland.

See Figure 18: For American Skunk Cabbage, a location map is drawn using GPS data from field surveys.

4. Costs

2016 costs came in at just under £57k which is slight decrease on 2015 costs. This is in spite of taking on a project assistant and the extra areas included in control.

5 Closing Remarks

This season, we have walked hundreds of miles of watercourse and sprayed tens of thousands of plants to rid the Tweed catchment of INNS and ensure that our communities, tourism industries and native biodiversity are protected. We are passionate about keeping the momentum of this project going. We would like to thank all funders who have contributed, all funders are mentioned appropriately at public events, reports and social media updates.



The difference a few years of sustained effort can make to the river banks.

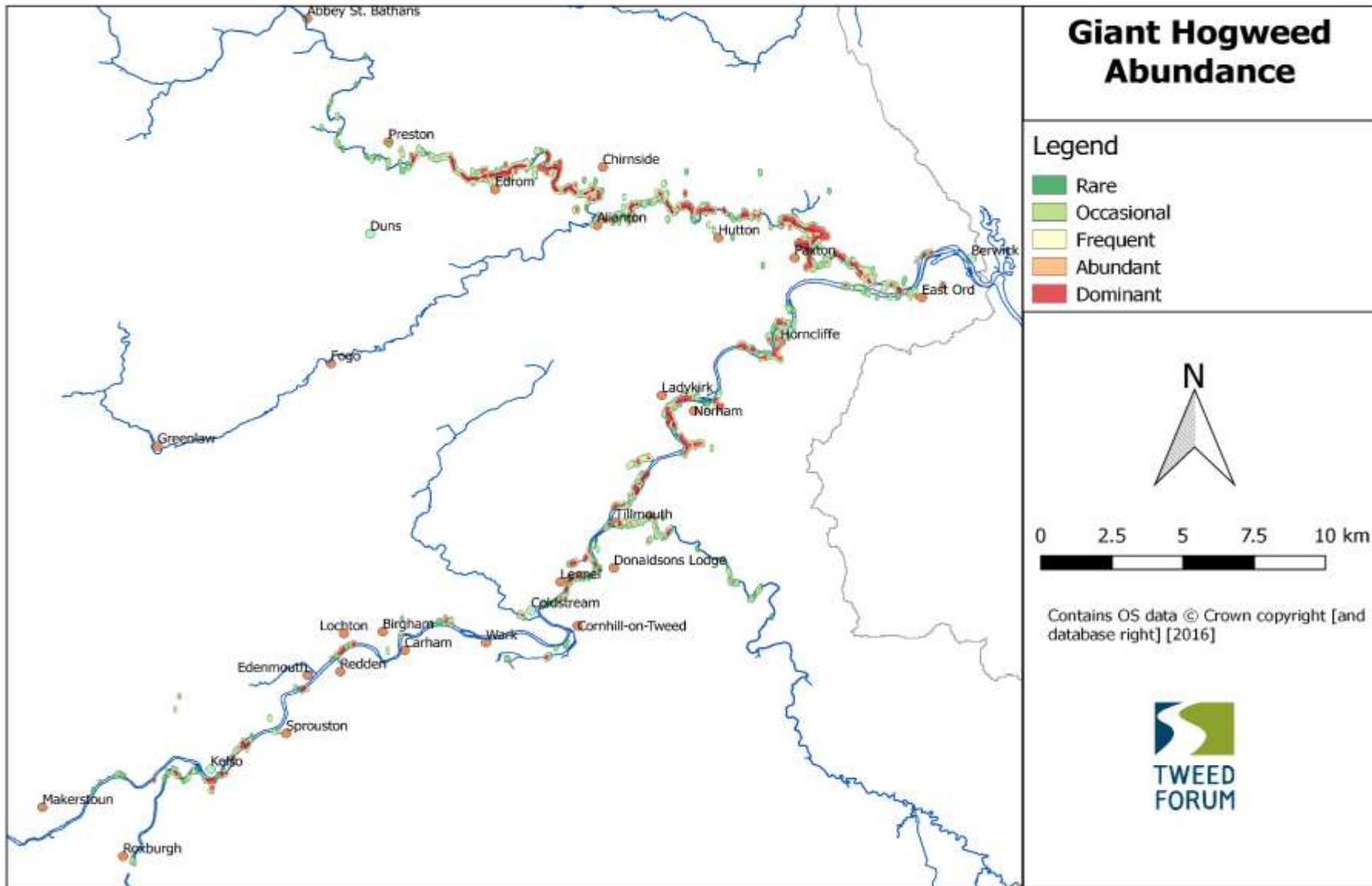


Figure 14: Giant Hogweed abundance in the Lower Catchment

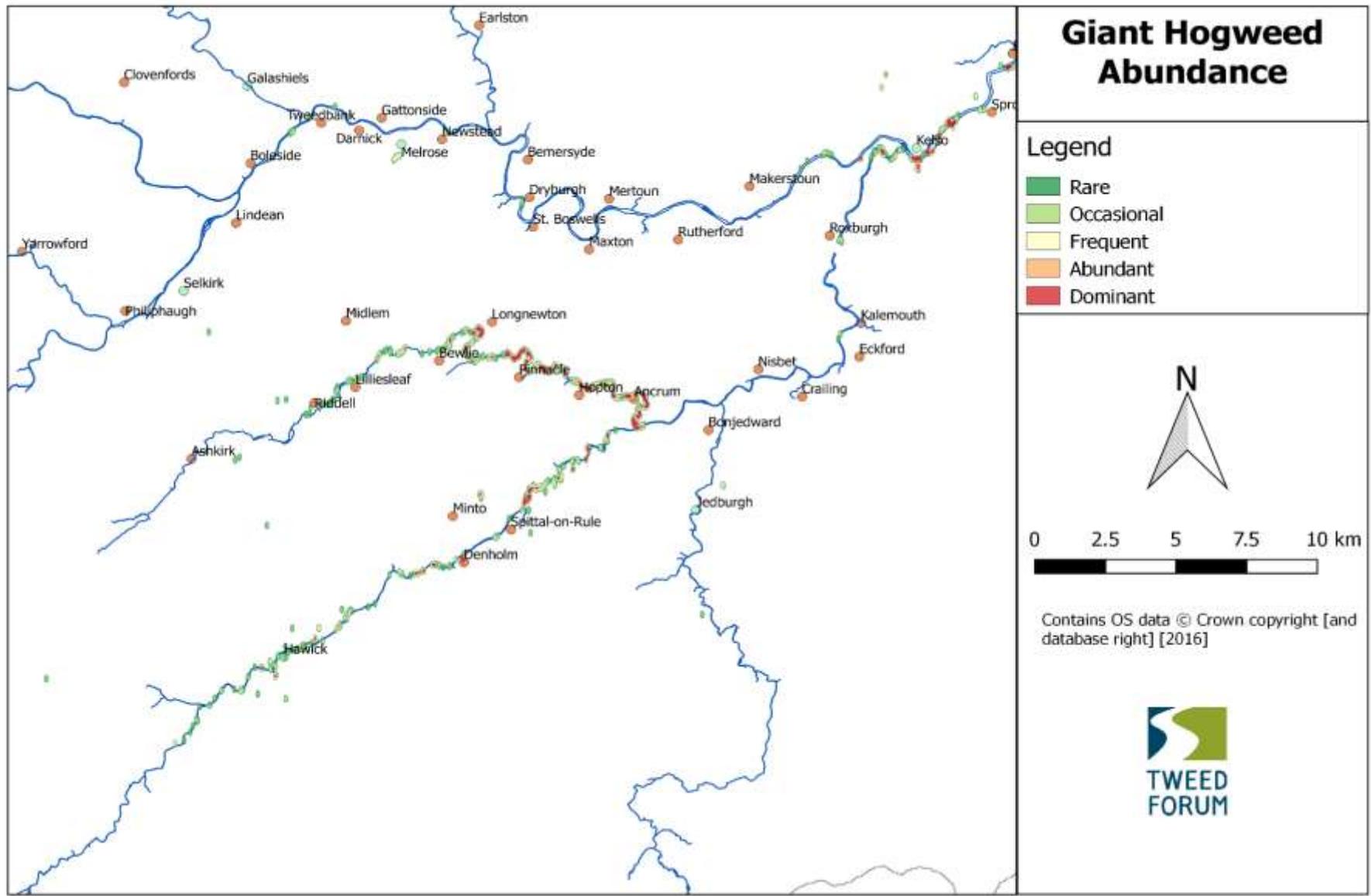


Figure 15: Giant Hogweed abundance in the Upper Catchment

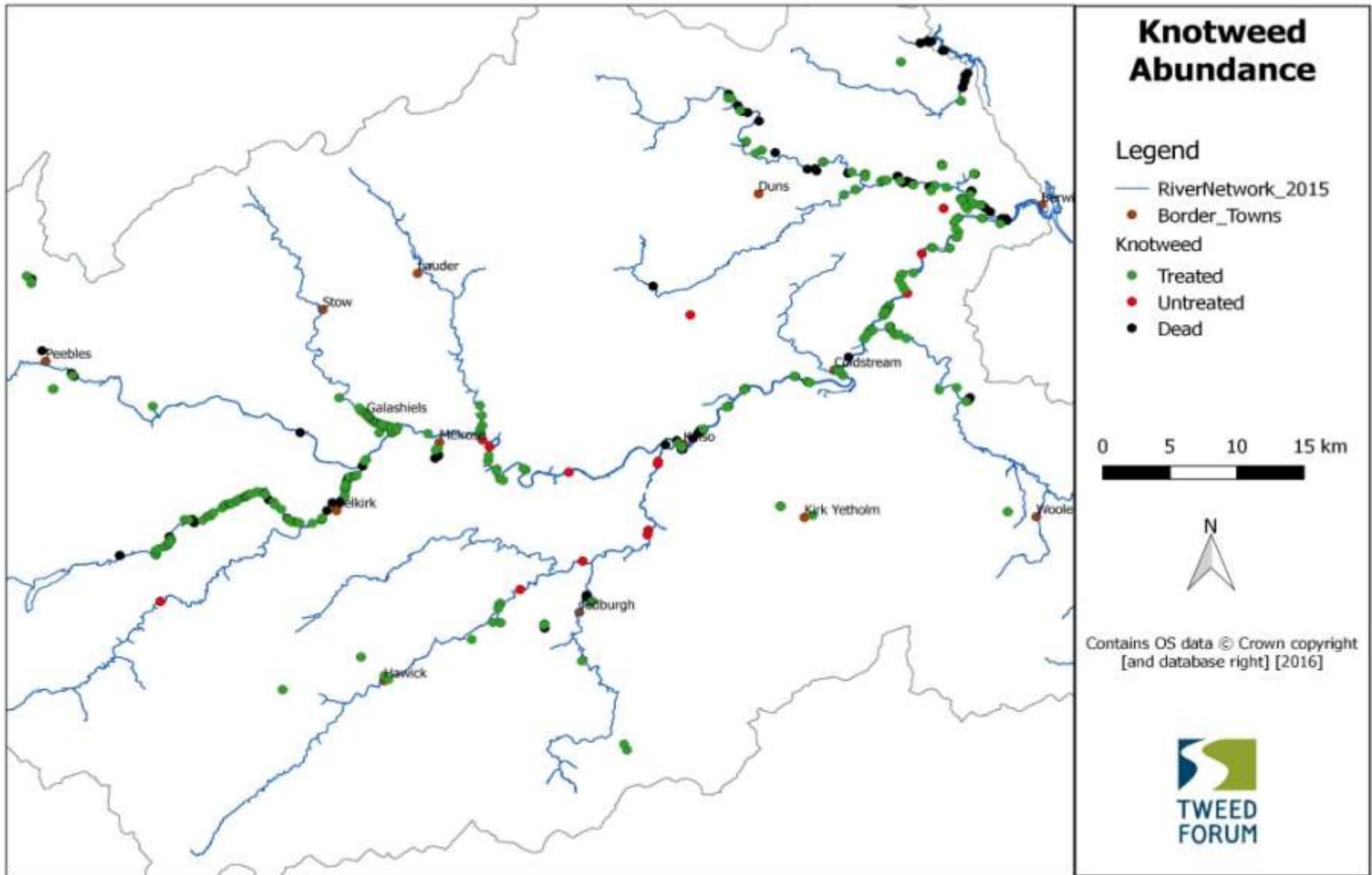


Figure 16: Knotweed Abundance

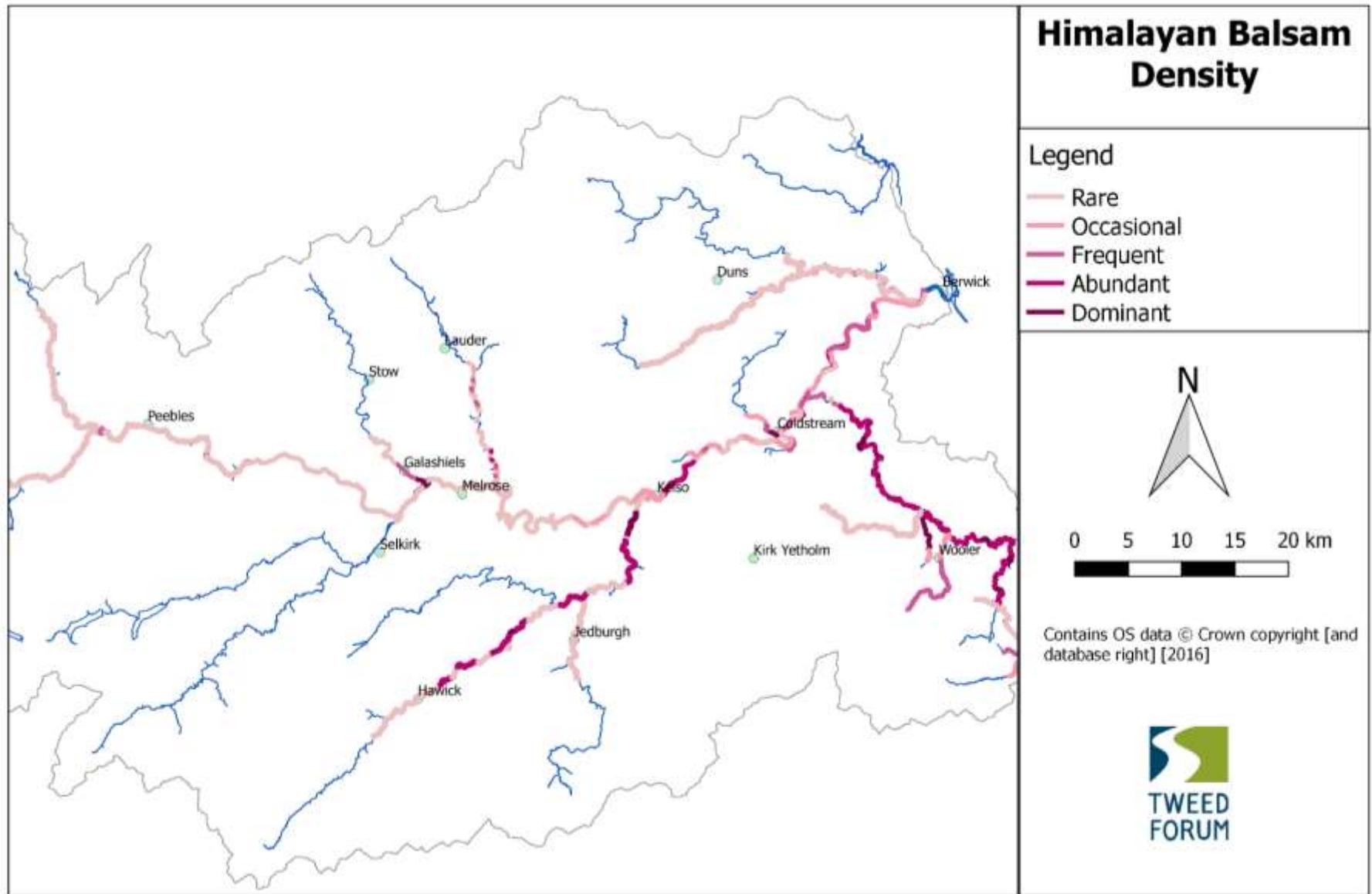


Figure 17: Himalayan Balsam Abundance across the Tweed catchment. The map highlights the ubiquitous nature of the plant across the catchment.

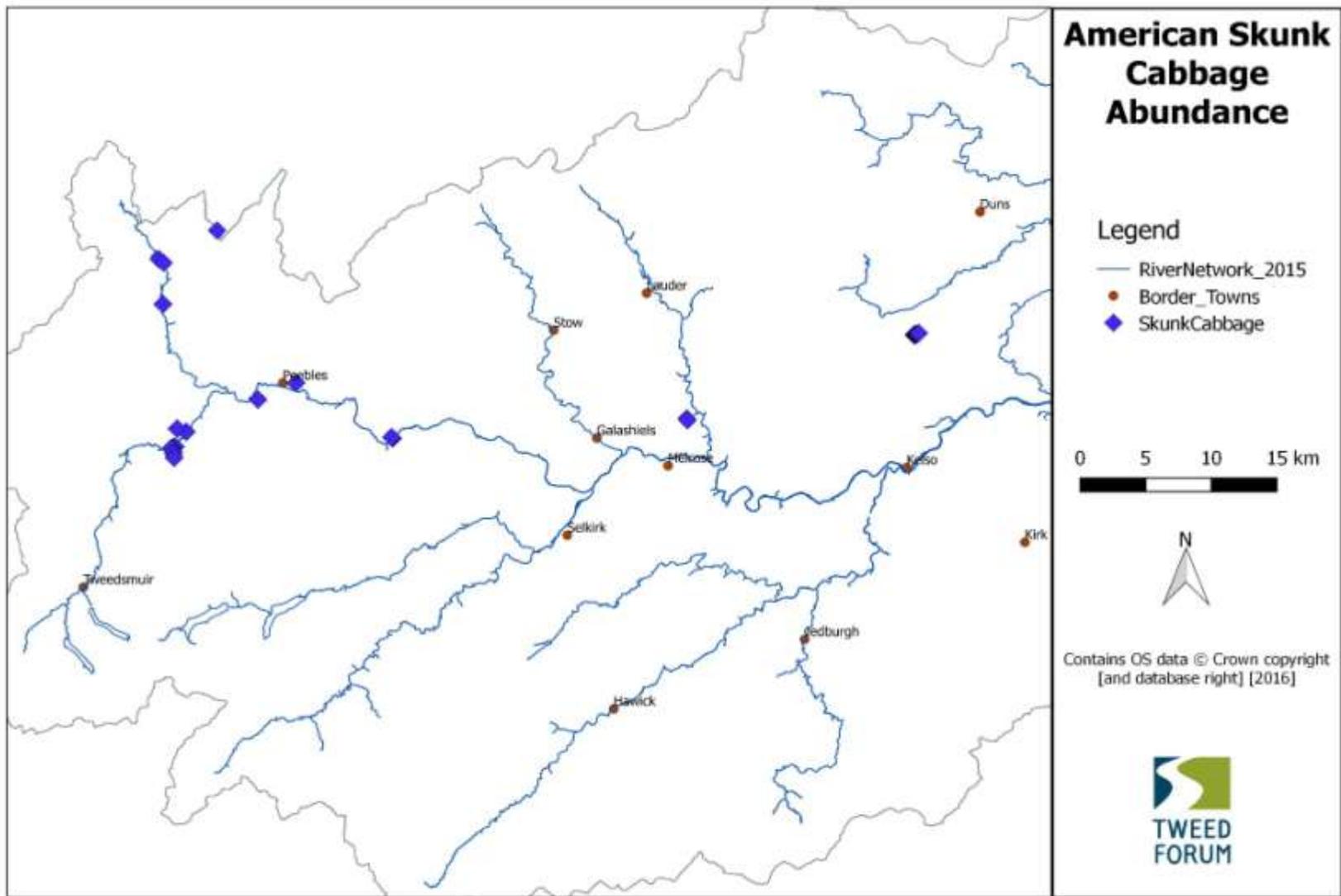


Figure 18: American skunk cabbage locations across the Tweed catchment. Mostly confined to the upper catchment at present. Many are the result of garden escapes.

