

Scottish Invasive Species Initiative Site Case Study

Giant hogweed control - Castle Water, River Spey at Fochabers and Mosstodloch

Summary

The Castle Water is a significant fishing beat on the River Spey and part of the Gordon Castle Estate. The Scottish Invasive Species Initiative identified large fields of giant hogweed behind a wall of Japanese knotweed at the site in 2018. Whilst the Japanese knotweed along the river frontage had been kept in check to allow angler access, no control of the giant hogweed had taken place.

On the River Spey upstream of the Castle Water, a management plan and work programme was underway to control giant hogweed. However, the absence of control at the Castle Water itself meant that the site represented a significant seed source for lower parts of the river. As such, it was identified as a priority control site by the Scottish Invasive Species Initiative.

Initial control was started in 2018 but a more comprehensive control plan was put in place in 2019. Since 2019, Scottish Invasive Species Initiative staff, Spey Fishery Board staff, volunteers and ghillies have delivered annual control with contractors deployed at the site in 2019 and 2020. This control effort has reduced the abundance of giant hogweed at the site and also the effort (time) and chemical volume needed to deliver control.

Annual monitoring and control will be required at Castle Water for a number of years from 2022 onwards. This will be necessary to treat giant hogweed seedlings emerging from the seedbank present and stop any remaining mature plants setting seed. By preventing plant maturation and seed setting, the seed bank will be diminished and the infestation reduced. This will take several years but initial control efforts have made this a more manageable task.

Now that annual control is more manageable, the project intends to discuss ongoing management and control of the site with landowners.

1. Site description

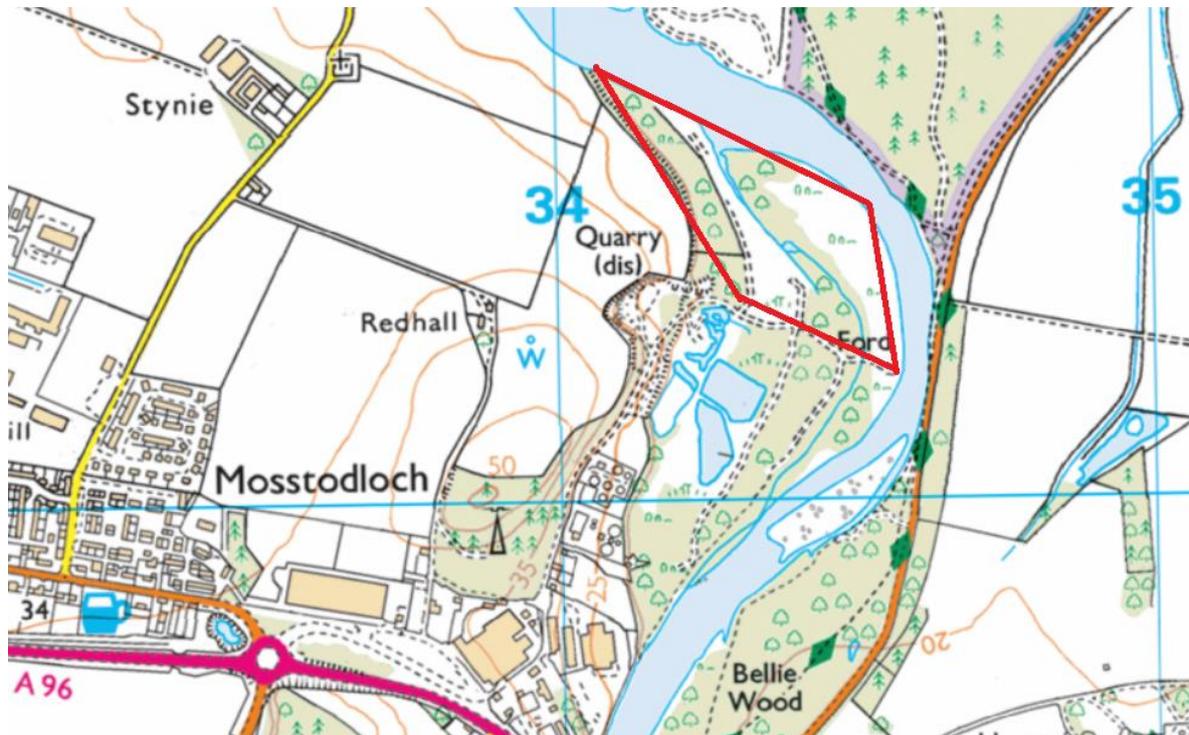
The Castle Water, owned by Gordon Castle Estate, is located on the main stem of the River Spey, north of the A96 road bridge at Fochabers and Mosstodloch (grid reference NJ 344 604). The main area of control, located on the left bank, is 500m long by 170m wide and covers an area of approximately 8.5ha. The site location is shown in **Map 1**.

In 2018 approximately 30% of this area was dominated by dense stands of giant hogweed with approximately a further 30% dominated by Japanese knotweed. The remainder of the site was gorse and scrub land interspersed with lower densities of giant hogweed and Japanese knotweed.

Within the Scottish Invasive Species Initiative partnership the Spey catchment is covered by the Spey Fishery Board.

The River Spey is designated a Special Area of Conservation (SAC) – with qualifying interests being the Atlantic salmon, freshwater pearl mussel, sea lamprey and otter.

Map 1: Location of giant hogweed control site at the Castle Water on River Spey



2. Background

It is unclear when giant hogweed became established on the River Spey catchment. However, the plant is now widespread and at the Castle Water site there is a substantial giant hogweed infestation providing a significant seed source for downstream sites.

The Scottish Invasive Species Initiative identified the site as a priority for control during a visit to the upper beat in 2018. A walk downstream and along the various side channels, seldom visited by ghillies or anglers, revealed the dense stands that had established. The extent of the area was confirmed by a drone survey of the lower river in June of the same year (see **Figure 1a**).

Limited control work had been undertaken along the riverbank – principally to keep access routes to the river clear for anglers – but this extended only to 5-10m from the river channel. The remainder of the infestation was largely untreated.

The project started giant hogweed control at the site in 2018 and has undertaken annual control since then.

3. Management works

From 2018 to 2021, control at the site has been delivered by a combination of project and Spey Fishery Board staff, appointed contractors, volunteers and ghillies.

In 2018 herbicide treatment was limited as giant hogweed plants were already at shoulder height when the site was identified. Working in high density stands of plants of this size is unsafe. Therefore, initial herbicide

application was followed up by project and Spey Fishery Board staff cutting flowering heads to prevent seed setting and dispersal.

In 2019 and 2020, control work was completed earlier in the growing season and contractors (in addition to project and Spey Fishery Board staff, volunteers and ghillies) were deployed due to the extent and density of the infestation. The site was treated in 2021 with a more significant contribution from volunteers as coronavirus restrictions were eased.

Table 1 (below) shows a summary of the control treatments.

Table 1 – Summary of control treatments (2018 – 2021) at Castle Water, River Spey

Year	Invasive Species	Work Completed By	Control Work – Date and Method
2018	Giant hogweed	Project and Spey Fishery Board staff	Foliar Spray – Late May Cutting - June
2019	Giant hogweed	Project and Spey Fishery Board staff, volunteers, contractors	Foliar Spray – Early May Cutting - June
2020	Giant hogweed	Project and Spey Fishery Board staff, volunteers, contractors, ghillies	Foliar Spray – Early May, Early June Cutting - July
2021	Giant hogweed	Project and Spey Fishery Board staff, volunteers, ghillies	Foliar Spray – May Cutting - June

4. Results

4.1 Invasive species abundance

Monitoring was undertaken at a single representative point within the site from 2018 to 2021 and the abundance of giant hogweed measured using the DAFOR scale*. Prior to control in 2018, giant hogweed was ‘dominant’ at the site.

Following treatments and control from 2018 to 2021, giant hogweed abundance at the site has reduced from ‘dominant’ in 2018 and 2019 to ‘abundant’ in 2020 and 2021 (see **Table 2**). This is an encouraging reduction but still confirms a significant infestation of giant hogweed within the site.

The age class of the giant hogweed plants has changed during the period of control. In 2018 there was a full range of age classes present, with the majority of plants fully mature and able to flower and set seed that year. By 2021 the majority of plants were <1 year old, with very few mature plants remaining.

Table 2 - Annual giant hogweed abundance from surveys (2018 – 2021) at Castle Water, River Spey

Site name	Giant hogweed abundance by year (DAFOR* scale)			
	2018	2019	2020	2021
Castle Water	D	D	A	A

* - **DAFOR Scale of abundance** – D = Dominant (50 – 100% cover), A = Abundant (30 – 50% cover), F = Frequent (15 – 30% cover), O = Occasional (5 – 15 % cover), R = Rare (<5% cover)

Figure 1a – Drone survey of giant hogweed at Castle Water, River Spey – June 2018. Giant hogweed flowers appear as white dots dispersed in the area between the field on the left side of the image and the river.



4.2 Chemical usage

Foliar spray applications of glyphosate (Roundup ProVantage 480mg/l) were made in 2018, 2019, 2020 and 2021 using a backpack sprayer and delivered at a concentration of 20ml per litre. Control work was limited in 2018 due to safety concerns caused by the large size of the giant hogweed plants present after initial site identification.

Table 3 – Volume of glyphosate used to control giant hogweed (2018 – 2021) at Castle Water, River Spey

Site name	Glyphosate used (litres) by year			
	2018	2019	2020	2021
Castle Water	4.4	10.2	11.1	5.4

4.3 People effort

From 2018 to 2021, control at Castle Water was delivered by a combination of Scottish Invasive Species Initiative and Spey Fishery Board staff, volunteers and ghillies. In 2019 and 2020 contractors were also deployed at the site.

Table 4 (below) details the number of hours of control work each year at the Castle Water site. This includes the time required for each control method used and the total for all methods. A full control programme was not implemented until 2019.

Table 4 – People hours used to control Giant hogweed (2018 – 2021) at Castle Water, River Spey

Method	Hours of control work by year			
	2018	2019	2020	2021
Herbicide	17	83	82	24
Cutting Flowering Heads	9	20	16	6
All methods	26	103	98	30

5. Conclusions and Progress Made

Control work at Castle Water has reduced the abundance of giant hogweed and the time and chemical volume required to deliver annual control.

This is demonstrated by the change in abundance of the plant as recorded at the site monitoring point (see **Table 2**). Giant hogweed abundance has reduced from ‘dominant’ in 2018 and 2019 to ‘abundant’ in 2020 and 2021. This is encouraging, but there remains a significant infestation at the Castle Water site and further control work will be required in future years.

Established giant hogweed stands generally take at least 3-4 years of continuous effective treatment in order to reduce plant density as the various age classes are treated. Our approach - delivering chemical control to emerging plants, combined with cutting of flowering heads to prevent seed dispersal - will remove young and maturing plants, progressively deplete the seed bank, prevent seeds dispersing downstream and continue to reduce the giant hogweed population present on the site. However, giant hogweed seeds can remain viable in the soil for many years (up to 10 years) and so ongoing control will be required.

Progress is also shown in the hours of work needed to treat the giant hogweed infestation (see **Table 4**). The hours required to deliver control has reduced by 71% from 2019 to 2021. We have considered 2019 as the baseline control year as only initial work was completed in 2018 – the site was identified in the summer of that year, by which point the plants were too large for a full treatment of the site to be carried out safely. We expect to see further reductions in time taken to deliver annual control, but at a relatively extensive site there will always be a certain amount of effort needed to cover the ground and treat plants wherever they are found.

The chemical volume used to complete treatment each year has reduced by 47% from 2019 to 2021 (see **Table 3**). This reflects the reduced giant hogweed abundance at the site - there are fewer plants to treat, therefore less chemical is required. The slight increase in chemical use in 2020 is a result of the delayed start of contractor control due to the Covid19 pandemic, meaning that plants were larger when control commenced in early June. A larger plant requires more chemical for control to be effective.

The combination of contractors, project staff, Spey Fishery Board staff, volunteers and ghillies has been effective to deliver control. In the Scottish Invasive Species Initiative our approach is to deploy contractors to the worst sites initially, with a view to transition towards project, partner, volunteer and/or land manager control when the scale of the problem has been reduced. In the coming years we will seek to continue that transition at Castle Water.

6. Next Steps

The giant hogweed infestation at Castle Water is well established and has been present for many years. This means that a significant seed bank is present at the site and giant hogweed seedlings will emerge annually for a number of years.

The primary objective at the site is to continue to control annually emerging plants to prevent them maturing and setting seed. If achieved, the extent of regrowth will decline as the seed bank is progressively exhausted and, in time, the site will move towards being clear of giant hogweed. However, this will take a number of years to achieve and will require effective annual control and monitoring. Ensuring that no plants set seed at Castle Water will also prevent re-infestation of other control areas further downstream.

The control effort (hours) and chemical volume required to deliver control has reduced since 2019. However, control levels similar to those recorded in 2021 are anticipated over the coming years – even when and if plant abundance continues to be reduced.

In 2022 the Scottish Invasive Species Initiative will continue to manage and deliver a programme of giant hogweed control and monitoring at the Castle Water site. Alongside this work, now that these annual and recurring tasks have been significantly reduced and are more manageable and predictable, discussions with the land owners will be initiated to transfer or agree on future responsibilities for management of the site.

Once achieved, this transfer or sharing of responsibilities will allow future giant hogweed control projects to target new sites downstream, safe in the knowledge that control at Castle Water is in hand.

Further Information

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