

# THE TWEED INVASIVES PROJECT



## *The long-term control of Giant Hogweed and Japanese Knotweed:*

*A case study of the Tweed and practical steps  
to establishing and delivering a successful, long-term control strategy*



THE  
TWEED  
INVASIVES  
PROJECT





## Foreword:

The consideration of “non-native” and “alien” species seems to arouse strong emotions nowadays in the politically-correct breast! Those species which have recently arrived on the British island, have not evolved here, and are invasive, and are likely to impinge upon the healthy functioning of otherwise stable ecosystems and their dependent species, do, however, demand some serious attention. Essentially, they are equivalent to pests which we accept as having to be controlled in any other desired system or crop.

Rivers, with their fluctuating levels, exposed silts and gravels and long use as virtual open “drains” for our domestic, industrial and agricultural waste, are especially prone to invasions by incoming species. The Tweed is no exception. By the turn of the 20th century, a hundred and fifty years of textiles based on wool from all parts of the world had left a legacy of over one hundred and ten flowering plants which had gained entry on uncarded fleece. Others arrived as ornamentals for the post-eighteenth century vogue for designed polices and gardens. Most have not survived, or have done so only locally. They are not invasive. Some have, however, and Pirri-pirri Bur, (*Acaena novae-zelandiae*), Few-flowered Leek (*Allium paradoxum*) Giant Hogweed, (*Heracleum mantegazzianum*), Himalayan or Indian Balsam, (*Impatiens glandulifera*) Japanese Knotweed (*Fallopia japonica*) and Giant Knotweed (*Fallopia sachalinensis*) are among the most obvious along the river now. It is to the last four of these that Tweed Forum has turned its attention in this fascinating account.

Methods of control have been tried sporadically on other river systems in U.K. without much success. The Tweed Invasives project is different, however, in four chief respects. Firstly, it has utilised the strength and common aims of the thirty or so partner-members of Tweed Forum, on both sides of the Border, to determine policy, strategy and method, as well as resolving the statutory issues. Secondly, it viewed the problem rationally from the viewpoint of the whole river catchment. Thirdly, it has placed great emphasis on continued, integrated working with landowners, managers and communities keeping up a good flow of information to all. Lastly, to achieve all the above, the project has had dedicated staff who could steer the project on a day-to-day basis and rapidly provide practical advice, guidance, follow-up and reporting.

The value of this project then perhaps lies less in its control achievements - which are spectacular - than in its exemplary modus of integrated working and the broader raising of awareness of the important river resource. In this example - of many - Tweed Forum has provided a real stimulus for other groups to take up the Scottish Executive call for better integrated land-use. It is cost-effective and common-sense and has obvious and measurable success.

A handwritten signature in black ink, reading "Chris Ogilvie Badenoch". The signature is written in a cursive style and is positioned above a horizontal line.

Christopher Ogilvie Badenoch  
Co-founder & Director of Tweed Forum.





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INTRODUCTION  
&  
BACKGROUND  
TO THE  
TWEED INVASIVES  
PROJECT







## INTRODUCTION

This review of non-native invasive species control strategies will focus primarily on Giant Hogweed (*Heracleum mantegazzianum*) and Japanese Knotweed (*Fallopia japonica*) and the experience gained four years into a long-term, catchment scale control programme based on the River Tweed. The review will look at how the project was set-up, the problems it faced and how it overcame them as well as looking at the practical successes and failures of the various approaches adopted. This review will also look at the pilot work carried out into the control of Himalayan Balsam (*Impatiens glandulifera*) and the practicality of sustainable control.

## Tweed

The Tweed catchment in Northeast Britain straddles the national and administrative border between English Northumberland and the Scottish Borders. The Tweed catchment is bounded to the North and West by the Lammermoor and Moorfoot Hills and to the South by the Cheviots which form part of Northumberland National Park. These upland areas are characterised by rounded hills with steep valleys or cleuchs eroded into their sides. The uplands eventually give way to the more open, rolling lowlands to the East, with flatter, more fertile land. The Borders is noted for its diverse and traditional landscapes which have helped sustain a rich variety of habitats and species, this is reflected in the designation of the River Tweed and its major tributaries as both a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC).

Today the Tweed is probably best known for its Salmon, as it boasts one of the best wild stocks of Atlantic Salmon in Europe. The rod fishery for Tweed Salmon, which is carefully managed by the River Tweed Commissioners, now catches well in excess of 10,000 Salmon annually with the majority of Salmon being returned under the voluntary catch and release code. The Salmon fishing on the Tweed contributes around £13m per year to the local economy and supports over 500 jobs. This combined with the stunning scenery and the rich built and cultural heritage all help make tourism one of the mainstays of the regions economy.



## TWEED FORUM

The majority of the Tweed (over 80%) falls under one administrative boundary, the Scottish Borders Council. However, the management of the river is complicated by the fact that in its lower reaches it forms the border between England and Scotland, with one major tributary, the Till, being entirely in Northumberland. This means there are two different legal, administrative and fiscal systems, as well as the corresponding number of agencies to deal with, and this poses its own challenges. However, there is a long history of the Tweed being managed as a discrete catchment with issues such as fisheries falling under Scottish Law through the Tweed Fisheries Act of 1857, and more recently it has built-up a reputation as an area prepared to proactively tackle issues affecting the catchment and pioneer new and innovative approaches to delivering lasting and sustainable solutions.

The Tweed Forum was established in 1991 to “*promote the wise and sustainable use of the Tweed and its tributaries through holistic and integrated management and planning*”. In the early years the Forum acted as an un-staffed, informal liaison group for all the statutory and non-statutory bodies with an interest in the Tweed, from both sides of the border, and gave them an opportunity to get together and discuss catchment scale and cross border issues. It wasn't until the late 1990's when the Tweed Forum members developed an ambitious and multidisciplinary initiative – the Tweed Rivers Heritage Project – that the Tweed Forum was consolidated as a company limited by guarantee and registered as a charity.

The Tweed Rivers Heritage Project was developed in partnership by the Tweed Forum's 30 or so member organisations as a result of extensive consultation with local communities, organisations and interest groups, to determine the breadth and scope of the projects they collectively wanted to see happen. The £9 million project, largely supported by the Heritage Lottery Fund (HLF), aims to ‘conserve, enhance and raise awareness of the natural, built and cultural heritage of the rivers and valleys of the Tweed catchment and develop the recreational opportunities and the quality of life in the region.’ The fifty constituent projects (of which the Tweed Invasives Project is one) fall into four broad themes of Built and Cultural Heritage, Natural Heritage, Access and Recreation, and Education and Interpretation. The Tweed Forum's approach to developing and delivering projects focuses on developing consensus and priorities amongst the membership, agreeing the appropriate method and means of delivery before securing funding on behalf of lead partner(s) delivering the project. The project is now seen as a blue print for the HLF's Landscape Partnership Schemes and a model of integrated management and partnership working.



## The Power of Partnership - An example of Tweed Forum's approach

One of the main priorities of the Tweed Forum members and focus of the Tweed Rivers Heritage Project was the conservation and enhancement of riparian habitats. A number of Forum members developed and submitted riparian related habitat work for different strategic reasons – salmonids, black grouse, ponds/wetlands, diffuse pollution control, ancient woodland expansion. This robust £1.5 million portfolio of projects received HLF support under the overall scheme in recognition of the scale of impacts across such a large area.

- *The flagship project delivered through this suite of funding was a six year, £690,000 riparian habitat improvement programme targeting priority salmon and trout spawning grounds affected by cattle poaching and overgrazing as well as the removal of obstacles to migratory fish passage. The riparian habitat improvement work was delivered by the River Tweed Commissioners/Tweed Foundation and to date has protected and managed over 140 kilometres of river.*



Scottish Wildlife Trust riparian tree planting

- *The second largest scheme was delivered by Borders Forest Trust who through their six year, £396,000 riparian woodlands and wood pasture schemes helped restore, expand and create new native riparian woodland and wood pasture. This project not only helps improve the water quality and riparian habitat but also meets local LBAP targets for the protection and expansion of the catchments fragmented woodland habitat.*



Riparian woodland at Linghope





Ponds for biodiversity – new wetlands and ponds created to encourage biodiversity on farms

- *The local Farming and Wildlife Advisory Group (FWAG) delivered two schemes totalling £225,000 over the six years. The first three year scheme was “Ponds for Biodiversity” which supported the establishment of new ponds, scrapes and small wetland areas on farms. The second three year scheme targeted diffuse pollution by establishing ponds and wetlands to treat dirty water run off from farm steadings and arable land.*

- *Other projects were delivered in partnership with Northumberland National Park, Forestry Commission and Northumberland Estates to improve riparian habitats in forested areas and restore wetland and riparian areas in the Cheviots.*



Wetland Restoration



- *The Future – the Tweed Forum is involved in developing a £1m wetland and flood plain restoration initiative on the Till in partnership with the Environment Agency and landowners with support from the local FWAG officers, English Nature and Northumberland Wildlife Trust and is in the process of developing a similar scale wetland restoration scheme on the Scottish section of the catchment which is aimed at sustainable flood management with associated biodiversity and habitat benefits.*



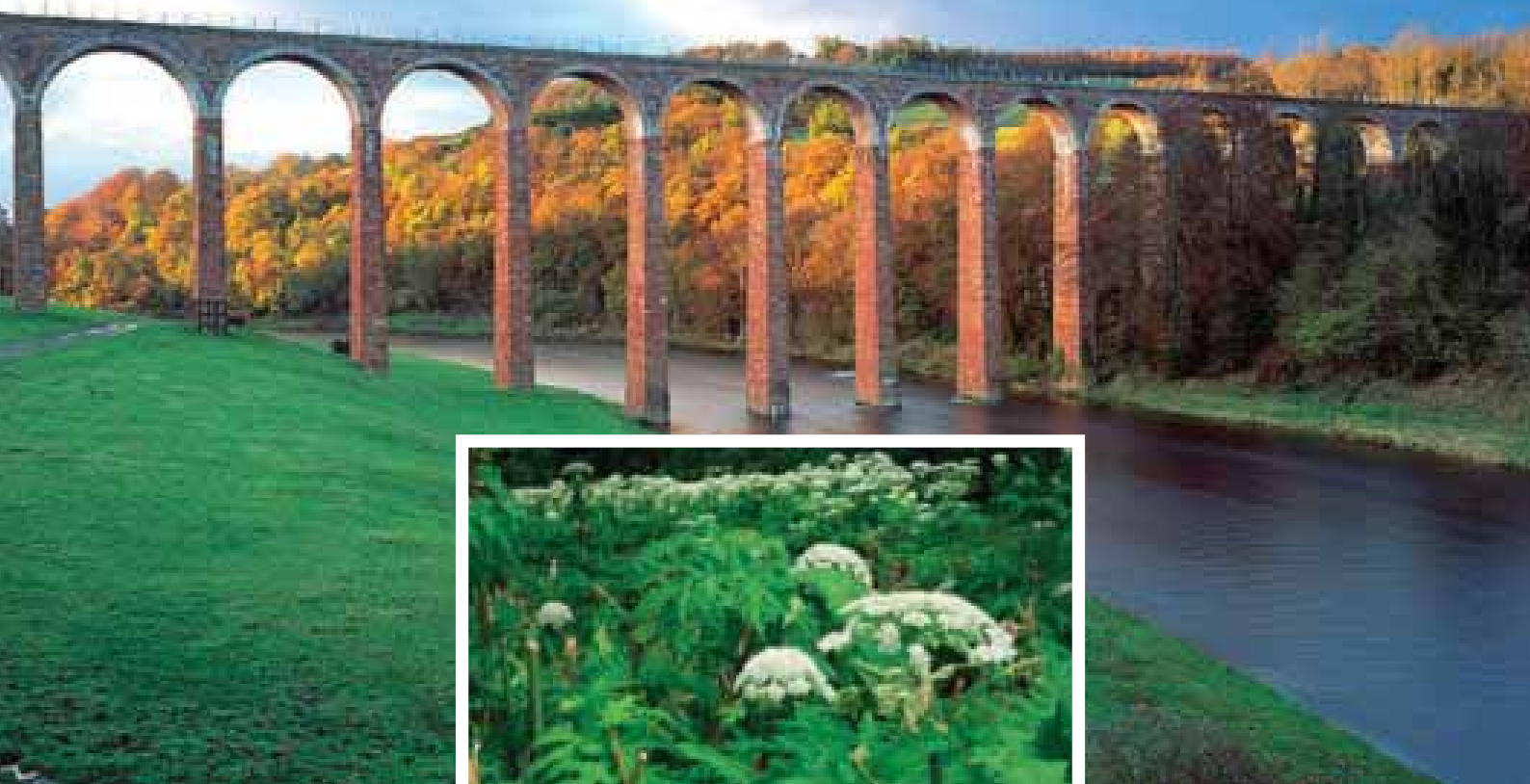
**The reinstatement of seasonally inundated wetlands can help reduce the severity of flood events**

*Whilst these projects in isolation are relatively small and take place for a variety of strategic reasons, the overall impact is making a real difference to the ecological network at the catchment scale. This brings a multitude of different impacts and benefits on the ground including enhanced wildlife and landscape; increased recreational opportunities; improved water quality; carbon sequestration and the socio-economic benefits of flood alleviation. This added value is testament to the adage that ‘the whole is very much greater than the sum of its parts.’*





# THE TWEED INVASIVES PROJECT



## *Case Study:*

*Developing and Delivering a Comprehensive Control Strategy:  
Methodology and Approach on the Tweed*





**CASE STUDY:****Developing and delivering a comprehensive control strategy: methodology and approach on the Tweed****The History of Control on the Tweed**

As in many parts of the UK, Giant Hogweed and Japanese Knotweed have been growing largely unchecked in the Tweed catchment since their introduction in the 19th Century via botanical collections. The Tweed catchment was once a very prosperous area of Britain with a strong economy based around woollen mills and the rich agricultural lands of the Merse and North Northumberland, which helped fund a proliferation of stately homes with their associated gardens. It was largely through these garden collections that exotic plants were introduced to the Tweed catchment, these eventually began to grow outside the confines of the garden and started the infestation of the Tweed system. Once released into the natural environment the Giant Hogweed and Japanese Knotweed were able to spread rapidly as the River Tweed and its numerous tributaries acted as the primary vector for infestation, carrying seeds and rhizome sections downstream to colonise new areas.

By the early 1980s however, the distribution and abundance of Giant Hogweed throughout the catchment began to become more of a nuisance, with numerous reports of people cutting, strimming or mowing the plants in attempts to control it suffering horrendous blistering and burns from contact with the plants photo-reactive sap. As a result of these increasing incidents of chemical burns from Giant Hogweed, landowners made sporadic efforts to control it but after a few years they came to realise that it was a case of too little, too late. Many landowners persevered either out of principal, a simple dislike for the plant, or for access and health and safety reasons.

Towards the end of the 1980s, Scottish Borders Council made concerted efforts to control Giant Hogweed and commissioned a survey to try and establish the full extent of the problem. This initiative had limited resources and was confined to the administrative boundaries of the Council's area, and as a result the initiative was of limited success and was short lived. By the start of the Tweed Invasives Project in 2002 (which initially focused primarily on Giant Hogweed), there were millions of plants, covering hundreds of acres and over 300 miles of riverbank within the 3,080 square miles of the Tweed catchment. The impetus to start the Project was a result of not only the virtual dominance of Giant Hogweed on the un-grazed riparian land of the lower reaches of the River Tweed, but also due to the fact that Giant Hogweed was increasingly breaking the bounds of its traditional riparian habitat.



## The Problem

The problems posed by invasive species are seen by some purely as an ecological threat, while others see it as an economic or amenity problem, but whatever standpoint is taken, the difficulties and complexities of ensuring long-term sustainable control are the same.

## Legislation

The status of legislation relating to invasives species at present in the UK is relatively limited. The Wildlife and Countryside Act 1981 states that “...it is an offence to cause to grow...” in relation to Japanese Knotweed and Giant Hogweed and the Environmental Protection Act, 1990 classifies Japanese Knotweed as a “Level C” contaminate. It has been suggested that Giant Hogweed, Japanese Knotweed and Himalayan Balsam should be re-classified as notifiable weeds such as ragwort however the ubiquitous presence of ragwort and other notifiable weeds throughout the UK would suggest that this would not improve the situation. Subsequent policy reviews have failed to strengthen the statutory framework for invasives and specifically their control. Recent changes to the CAP have acknowledged invasives and the need to control them however the effectiveness of their inclusion remains to be seen. While these recent revisions to the CAP are potentially extremely useful tools in combating invasives, they obviously relate solely to agricultural land.

## Ecological Threats

The River Tweed and the majority of its major tributaries are designated Sites of Special Scientific Interest (SSSI – the highest national level of environmental protection) and since the start of the Tweed Invasives Project the Tweed has also been designated as a Special Area of Conservation (SAC – the highest European level of environmental protection). The Tweed system is primarily designated for its internationally important populations of Salmon, its three species of lamprey (brook, river and sea lamprey), otters and water crowfoot.

In addition to these catchment-wide species, there are many localised protected species and habitats, such as important invertebrate communities (including *Hydroporus rufifrons*) associated with sparsely vegetated shingle banks, the rare river jelly lichen and ancient riparian woodlands, all of which are threatened either directly or indirectly by invasives.

Aggressive colonisers such as Giant Hogweed and Japanese Knotweed pose a very real and significant threat to the ecology of any river system, however these problems are more acute on a river with such a high level of ecological diversity. The most extensive and obvious problem caused by both Giant Hogweed and Japanese Knotweed is one of simple competition: both species are shade tolerant, have dense vegetation and form a canopy well above the height of



the native riparian flora. Both species are also tolerant of a wide range of soil and site conditions from saline estuarine areas, to cracks in cliff faces and on nutrient depleted upland sites, as well as forming the understory in broadleaved woodlands. Areas where either of these two species are allowed to colonise rapidly lose their pre-existing floral diversity, as nothing can out-compete them or survive in the environment underneath.



Giant Hogweed on the Leet Water



One of the major problems that also emerges from areas infested by Giant Hogweed is that of erosion. Giant Hogweed takes 3 to 5 years to grow to maturity, depending on site conditions, and once mature the plant sends up its characteristic tall flowerhead before setting seed and dying. Ironically it is when the Giant Hogweed dies-off that it creates the problem; Giant Hogweed is a member of the parsley/carrot family and has a large, deep tap-root, that once dead leaves a hole up to 15cm/6 inches across and 30cm/12 inches deep. In isolation these holes are not a significant issue, however, on a stretch of infested river 100m in length there can be several thousand plants and once the winter floods arrive whole sections of riverbank can disappear at once.

The effects of flooding on these areas are further compounded by the fact that due to the extensive shading of the infested areas there is no vegetation sward or associated root mat to bind the soil, leaving the soil exposed to the full erosive force of the river. The effects of losing the native riparian vegetation and the resulting bank erosion are many and far reaching. The erosion of the riverbank has the effect of making the river transect wider and shallower, which in lower water conditions can lead to rapid temperature spikes as a result of a larger surface area to volume ratio, these temperature spikes in turn lead to fish kills, especially amongst salmonids. The increased sediment loads carried by the rivers as a result of increased erosion can have detrimental effects on the benthic invertebrate populations through the smothering and the covering of their natural gravel habitat. The sedimentation of gravel habitats as a result of increased erosion also threatens salmonids and other fish species that rely on clean, well aerated gravels for egg deposition and incubation.

#### Examples of Giant Hogweed causing erosion after winter floods



## Economic Threats

The River Tweed is probably best known for its world class Salmon fishing. The majority of the fishing beats are along the middle and lower reaches of the Tweed system, which are also the most heavily infested areas with both Giant Hogweed and Japanese Knotweed. In the worst affected areas the invasive plants form a virtually impenetrable barrier between the river and the bankside, with the Giant Hogweed representing a further health and safety risk from contact between the plant and human skin. Salmon fishing contributes in excess of £13m per year to the local economy, which in turn forms a major part of the tourism industry which is a mainstay of the regional economy.



Salmon fishing at Coldstream

The Tweed catchment encompasses the whole of the Scottish Borders (which is marketed as Scotland's top short break destination) and around 40% of Northumberland National Park and as such the amenity value of the Tweed catchment is of major importance. A key component of the region's attraction to tourists is its river dominated landscape, with all major towns, settlements and communication networks following the River Tweed and its tributaries.

The other mainstay of the regional economy is agriculture and it is often farmers who are at the sharp end of invasive species control. Many farmers who undertake invasives control (spot spraying using a knapsack sprayer) are the only worker on the farm. They are expected to



carry out the spraying in spring which for sheep farmers is towards the tail end of the lambing season and for cereal farmers it is at the peak of their crop spraying season. This hidden economic impact for invasives control is often overlooked but at the individual level it is highly significant.

## Developing a Workable Invasives Control Strategy

The Tweed Invasives Project was programmed to start in September 2002 with the initial funding lasting for 3 years. However, before the Project got to this stage a series of crucial steps were taken to determine if and how the Project should be run. In developing the suite of projects to go forward to the Heritage Lottery Fund, extensive stakeholder and public consultation was carried out to ascertain the key issues associated with the river and its management. One of the strongest common themes was the control of Giant Hogweed. Having established the demand for action relating to invasives control within the Tweed, an invasives conference and consultation was held to establish what the real and perceived problems were that prevented landowners from controlling Giant Hogweed and what, if any, solutions could be found to mitigate these barriers. The results of the questionnaire are summarised in Table 1 on page 21.

The Tweed near Kelso



**Table 1.**

**The findings of the consultation into the barriers and potential solutions to Giant Hogweed control on the Tweed.**

What are the main things stopping you from controlling Giant Hogweed?	What do you think are the possible solutions to these problems?
I don't know what chemicals to use or when to use them	Advice and guidance as to what chemicals to use and when to use them
I can't afford the chemical or equipment to carry out the work	Provide cheap/free chemical and equipment.
I'm not licensed to use the chemicals or the sprayer	Provide certification courses for using the chemicals and equipment.
We're not allowed to spray near water/within the SSSI	Make it easier to apply for a license to spray near water/within the SSSI.
My infestations are too large to do on my own/some of the areas are too difficult to spray	Provide contract labour for those infestations too large and/or too difficult to do single handedly.
I'll be the only one doing it!	Have someone who can co-ordinate control and chase-up anyone not carrying out their control.
It's the only plant on the river bank, what will happen to the bank when it's gone?	Advice on replanting of appropriate riparian species and provenance.
I haven't got the time to carry out control work	Pay someone else to do it.

Having identified invasives control as a major issue and something that required action, the consultation encouraged participants to give a considered response to the situation realising that if they wanted to see action they would need to take a measure of ownership of the issue. The responses to the consultation were varied with many more respondents being able to identify the problems rather than the potential solutions. In parallel to these discussions a new Giant Hogweed distribution survey was conducted to ascertain the extent of the problem and spraying contractors were consulted as to the practicalities of controlling the steeper, extensive and harder to access sites.



## Timescale

Throughout the consultation process and throughout the subsequent life of the Project one of the key issues that has been addressed is that of timescale. The Tweed Invasives Project doesn't offer a quick fix: it is a commitment by all the partners involved, including the funding partners, to a long-term control strategy. For species such as Giant Hogweed (where plants have often been growing unchecked for decades, producing millions of seeds, which remain viable for many years), a three year "push" is going to have a limited long-term effect. Through pragmatism the Tweed Invasive Project has been set up with funds to operate for three years at a time, as few, if any funding bodies have the control or flexibility over their own budgets to be able to commit funds over longer periods. However, in all situations it is made quite clear that the funding is part of a long-term strategy.

## Turning words into action

Based on the findings of the consultation process and discussions with contractors and landowners with experience in tackling Giant Hogweed, a strategy was drawn-up for controlling it. The strategy took a holistic approach to the issue, covering the entire 3,080 square miles of the Tweed catchment, including both Scottish and English sections of the catchment. The strategy attempted to address all the issues identified in the consultation process that were preventing landowners from carrying out invasives control work, and culminated with a list of budget headings and costs to try and determine the financial implications of the proposed control work.

## Table 2.

**Problems identified as stopping landowners from carrying out control work on Giant Hogweed and the solutions offered through the Tweed Invasives Project.**

What are the main things stopping you from controlling Giant Hogweed?	Solutions delivered through the Tweed Invasives Project:
I don't know what chemicals to use or when to use them	The Project produced an identification and information leaflet with a pull out laminated ID sheet with control guidelines, specifying when and how to control Giant Hogweed and Japanese Knotweed.
I can't afford the chemical or equipment to carry out the work	The Project provides free Roundup Pro Biactive (glyphosate based herbicide approved for use near water) for participating landowners, along with the free use of knapsack sprayers.

What are the main things stopping you from controlling Giant Hogweed?	Solutions delivered through the Tweed Invasives Project:
I'm not licensed to use the chemicals or the sprayer	The reality of control work for Giant Hogweed and Japanese Knotweed means that it is necessary for people to use herbicides and spraying equipment and to do this they need to be trained and certified to do so. The Project provided free Pesticide Application 1 (Chemical storage and handling) and Pesticide Application 6 (maintenance and use of knapsack sprayers), the nationally recognized certification necessary for the control work.
We're not allowed to spray near water/within the SSSI	To use herbicides within 2m of a watercourse it is necessary to apply to the relevant authority for permission to do so; in England this is the Environment Agency and in Scotland it is the Scottish Environment Protection Agency (SEPA). Because the whole of the Tweed and the majority of its major tributaries are designated as a SSSI and SAC it is also necessary to get the approval of the relevant authority; in England it is English Nature and in Scotland it is Scottish Natural Heritage. Through the Project a blanket licence agreement with all the relevant authorities was produced so that each year participants can sign-up once under the agreement for the purposes of invasives control.
My infestations are too large to do on my own/ some of the areas are too difficult to spray	The Project budgeted for the use of contract labour on some of the more extreme sites within the catchment. The Tweed has a number of very long, steep river cliffs and it also had a number of sites with over 5 hectares of continuous Giant Hogweed cover, which were either too dangerous or too large to be tackled by the landowner and it was these areas where contract labour was targeted.
I'll be the only one doing it!	The Project employed a dedicated Officer to get the Project established, co-ordinate and manage the control work and to act as a neutral third party for landowners to report neighbours who were not carrying out the necessary invasives control work.
It's the only plant on the river bank: What will happen to the bank when it's gone?	This was in part an education issue, in as much as erosion was felt to be accelerating on infested areas and so landowners were scared of removing the little vegetation left. If control is carried out at the optimum time of year i.e. mid-April to mid-May, then natural regeneration of the site could occur before the floods of the following winter. For some of the worst affected sites however there was a small budget for native re-seeding and planting works.



<p><b>What are the main things stopping you from controlling Giant Hogweed?</b></p>	<p><b>Solutions delivered through the Tweed Invasives Project:</b></p>
<p>I haven't got the time to carry out control work</p>	<p>This is the one element of the invasives issue that the Project simply couldn't replace as it is through this control work undertaken by the landowners that they take ownership of the issue.</p>



### River Champions

One of the other issues highlighted in the consultation process was the fact that many landowners/managers were weary of being told what to do by people with little or no practical experience in the field. The Project attempted to address this issue by co-opting a series of River Champions: local farmers, landowners or fishermen involved themselves in the control process, who could take on and oversee a section of river. The role of River Champion was really one of monitoring the invasives on their stretch and persuading reluctant participants to carry out their share of the control work, therefore it was vital that the River Champion was diplomatic and prepared to lead by example. The original intention was to have in the region of 12 River Champions throughout the catchment, each covering a given stretch of water with the offer of paying any out of pocket expenses and mileage.

### The Budget

The budget for the first three years of the Tweed Invasives Project worked out to be £382,300 with over £105,000 of the costs coming from landowners, farmers, fishing interests etc in the form of in-kind labour i.e. individuals carrying out their own control work. The budget headings and the monies allocated to them as they were predicted at the start of the Project can be seen in table 3 below and although the amounts shown in the various headings changed slightly, by the end of the initial 3 years of the Project the bottom line remained the same.



**Table 3.**

**Cost headings and the allocated budget at the start of the initial 3 year phase of the Tweed Invasives Project.**

Cost Description	Year 1	Year 2	Year 3	Total
Project Officer	20,000	21,600	25,200	66,800
River Champions	10,000	10,000	10,000	30,000
Travel & Subsistence	3,800	5,100	6,100	15,000
Computing *	1,702	0	0	1,702
Training	6,383	1,702	1,702	9,787
Control Chemicals *	17,021	17,021	8,511	42,553
Contract Labour *	34,043	25,532	17,021	76,596
Control work by landowners, farmers and fishing interests	45,000	35,000	25,000	105,000
Publicity *	1,702	0	0	1,702
Replanting *	0	4,255	4,255	8,510
Annual Cost	134,651	120,210	102,789	357,650
* VAT	10,649	8,490	5,511	24,650
<b>Total Cost</b>	<b>150,300</b>	<b>128,700</b>	<b>103,300</b>	<b>382,300</b>



## Funding

Having identified the potential itemised costs for the Project, the next stage was to identify and approach potential funding partners. Many of the potential funding partners such as local government and the statutory bodies for conservation were already aware of the need for funding as they had been intimately involved in the consultation process and in supporting the survey work. This close support both financial and in principle from these key partners meant that finding outside sources of funding was a lot easier as there was a rationale and a degree of financial support behind the Project.

The funding application was supported not only by the evidence gained through the consultation process, but also through the Tweed Catchment Management Plan. The catchment management process takes a broad partnership of organisations and looks at all socio-economic and environmental issues facing the Tweed catchment and sets out agreed objectives, targets and delivery actions for achieving the objectives. The Tweed Catchment Management Plan had identified invasives as a key issue that needed to be addressed within the catchment. The control of invasives was further supported by the Local Biodiversity Action Plans (LBAP) and Habitat Action Plans (HAPs) for the Scottish Borders and Northumberland that specifically included actions relating to the control of invasives.

For funding organisations which might not be familiar with the area or the specific issues surrounding invasives it was important not only to include the findings of any consultation work and HAPs but also to stress that the problems posed by invasives are social (recreation and access) and economic and not just environmental. The funding partners for the first three year phase of the Tweed Invasives Project were a combination of local authorities, statutory bodies and Lottery monies, as well as in-kind support coming from other partners, most notably the landowners, farmers and fishing interests, as well as Monsanto, who donated £5,000 worth of Roundup Pro Biactive to the Project each year. The contributions made to the Project are set out in table 4 on page 27.



Table 4.

## Contributing partners to the initial 3 year phase of the Tweed Invasives Project.

Contributing Party:	Year 1	Year 2	Year 3	Total
Heritage Lottery Fund	68,700	56,500	46,100	171,300
Scottish Natural Heritage	5,000	10,000	10,000	25,000
Landfill Tax Credit (Scottish Borders)	10,000	10,000	10,000	30,000
Scottish Environment Protection Agency	2,000	2,000	2,000	6,000
Berwick Borough Council	5,000	5,000	5,000	15,000
English Nature	2,000	2,000	2,000	6,000
East of Scotland Water	2,600	3,200	3,200	9,000
<b>Total Cash:</b>	<b>95,300</b>	<b>88,700</b>	<b>79,000</b>	<b>262,300</b>
<b>In-Kind</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
Farmers, landowners and fishing interests – via control work	45,000	35,000	25,000	105,000
Monsanto – free Roundup Pro Biactive	5,000	5,000	5,000	15,000
<b>Total In-kind:</b>	<b>50,000</b>	<b>40,000</b>	<b>30,000</b>	<b>120,000</b>
<b>Total Project: Cash and In-Kind</b>	<b>145,300</b>	<b>128,700</b>	<b>109,000</b>	<b>382,300</b>







### Giant Hogweed on one of the smaller island on the lower reaches of the River Tweed

The first major issue faced in the delivery of the Project was that of contacting all the relevant landowners. Landownership can be a difficult and contentious issue, especially when the intention is to encourage active management of unproductive and difficult to access areas (the places usually worst infested by invasives). Many existing organisations had comprehensive databases for their interest groups, however due to the restrictions of the Data Protection Act there were issues surrounding the sharing of this data.

The partnership approach adopted from the outset helped greatly, as this meant the Tweed Forum could go to all its project partners and get them to send out the relevant information to the people on their mailing lists either as a letter and/or through articles in their annual newsletters. Using this approach we were quickly able to communicate with all the riparian landowners under the SSSI/SAC designation thanks to Scottish Natural Heritage and English Nature, all the farming interests thanks to the Local NFU and FWAG offices and all the fishing interests thanks to the River Tweed Commissioners.

In addition to this there was a campaign to raise awareness with the wider public through contact with Community/Parish Councils, curriculum-linked education packs for the local schools and large annual press, radio and television campaigns. All the information sent out by the Project partners and via the media channelled responses to the Tweed Forum, which helped to establish Tweed Forum as the people to contact about Giant Hogweed and Japanese Knotweed. This in turn helped the Project build its own database for future work.



## The Control Work

In the first year of the Project, following all practical advice and thinking, the focus of the control efforts was to work from the uppermost infested areas within the catchment, downstream, with the intention of controlling the whole length of the catchment by the end of the control season. The optimum time for Giant Hogweed control runs from early/mid April through to early/mid May, as from mid May onwards the plants start to flower. For Japanese Knotweed the season runs from May through to September, with the optimum time for control window being around the end of May when the plants are waist high.

The time-frame for Giant Hogweed control, which was initially the primary focus of the Project, is only around 6 to 8 weeks in spring before the work becomes even more laborious involving cutting the flowering plants and destroying the flowerheads before spraying the plant. This work requires calm, dry weather; two conditions not synonymous with Northeast Britain at this time of year. The Spring of 2003 however was particularly calm and mild, providing an ideal start to the Project's control work, which by the end of the summer had made significant in-roads to what was almost universally thought to be an impossible task.

The effectiveness of the control programme is measured by mapping the abundance of flowering (and therefore seeding) Giant Hogweed plants before the start of the Project and after the subsequent years of control work. These maps were distributed to all the people contacted through the various partner organisations at the start of the Project at both the catchment scale and with a more detailed map of their local area with an accompanying note of how the control work had gone for the year.



Essential equipment for invasives control

The use of maps had three main objectives: firstly to show that work was being done through the catchment to address the “I’ll be the only one doing it” objection; secondly, we actively encouraged people to challenge the accuracy of the maps, if small areas had been missed and were on the map as having been controlled or vice versa it was a quick and simple means of soliciting a response; and thirdly, especially with regards to the more localised maps, it was possible, without naming and shaming, to see exactly who was and who wasn’t carrying out their control work. Figure 1 below shows two maps, the first is the distribution of flowering Giant Hogweed plants before the start of the Project in 2002 and the second is an example of one of the more localised maps showing the distribution of flowering Giant Hogweed plants after the first year’s control season.

Detailed maps of Giant Hogweed distribution are sent out annually to all landowners and project participants, clearly identifying bad areas without naming and shaming individuals



Following the experience gained from the first year, several changes were made to the operation of the control programme in the subsequent years. In the first year of the Project it was uncertain whether it would be logistically possible to cover the full extent of the infested catchment within the April to June timescale but it eventually proved just about possible. The main lesson learnt in the first year was the importance of timing for the control of both Giant Hogweed and Japanese Knotweed and it also revealed that there was a lot more Japanese Knotweed than anyone realised.

## Timing

Broadly, the timing of the work carried out in the first year of the Project was just about right, ie. starting in mid-April however, some sites had to be treated 2 or 3 times. Once it was established that it was practical to tackle the whole of the affected catchment in one season, the next step for the subsequent control seasons was to refine the site specific timing of the control work. In the first year of the Project the control efforts had focused on working from the top of the catchment, downstream. However, experience demonstrated that certain sites were ready for spraying earlier than others, and that aspect and importantly altitude have huge significance.

From the start of the second year onwards infested areas were tackled in accordance to their site specific conditions and readiness for spraying, with readiness for spraying being defined as having large (> 50cm length) leaves and/or signs of flower stem development for Giant Hogweed. This effectively meant turning the previous year's philosophy on its head and starting at the lowest sites which were ready for spraying 3 to 6 weeks earlier than sites higher up in the catchment e.g. plants next to the A1 bridge at Berwick at 5m above sea level were ready to spray at the end of March, while the plants in Hawick at 120m above sea level weren't ready to spray until the middle of May.

The site specific timing of control work is very important as Giant Hogweed can start to grow at any time from the end of January, right the way through to the beginning of July and it won't necessarily all start to grow at the same time on the same site. Project participants begin to talk about starting control as early as the end of February. One of the most critical points to get across to participants was that they should wait until at least mid-April to start control work to allow the later sprouting plants time to emerge otherwise they will have to repeat their control work. It is this staggering of the sprouting times of the over wintering Giant Hogweed plants that has given rise to the misnomer that Roundup doesn't work, as people had sprayed every plant they could find in early March and seen them apparently die only to have more (different) plants grow in the same area a month or two later.

The staggered emergence of over wintering Giant Hogweed plants was seemingly confirmed in germination studies carried out through the Project, using Giant Hogweed seeds from a single



plant. Seeds planted in October and kept in identical conditions, started to germinate as early as February and continued to germinate right the way through into July.

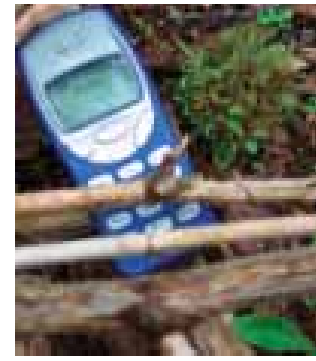
While timing is very important to the efficient operation of the control programme, it is also important to realise that for effective control many heavily infested sites had to be sprayed at least twice a year for the first two control seasons. Even the most diligent workmen inevitably miss some Giant Hogweed plants due to over shading by larger plants, or for the simple fact that some Giant Hogweed plants hadn't emerged by the time the site was sprayed.

## Japanese Knotweed

The need to revisit sites for optimum control is very important for Giant Hogweed however it is absolutely vital for Japanese Knotweed, if any substantial control efforts are to be successful. The first year of the Tweed Invasives Project highlighted the fact that there was a huge, virtually unnoticed infestation of Japanese Knotweed within the Tweed catchment and that it was far more widespread and posed a far more significant control issue than Giant Hogweed. Japanese Knotweed occurs from Tweedsmuir, less than two miles from the source of the Tweed, right down to the mouth of the estuary at Berwick, with new areas being found all the time, often some distance from the river. Japanese Knotweed is an incredibly aggressive and resilient plant able to grow in virtually any conditions and capable of withstanding repeated cutting, digging, grazing and spraying.



The present recommended means of controlling Japanese Knotweed is either to spray it with Roundup until it no longer grows, a process that can take several years, or to dig down and remove all root material and all soil including a 2m halo of soil around the furthest extent of the rhizome system using a registered contractor. The first method is the most commonly employed especially in a riparian context as it is relatively cheap and it is a method available to a greater cross section of the people likely to be dealing with the problem. The second option is increasingly being employed but is most commonly used on large, flat development sites where the costs and disturbance caused by the process are mitigated by the potential gains and the expediency of the solution. Other methods are also being trialled in the UK including heat treatment and the new HIT chemical control system pioneered by TCM Ltd.



After a few years of treatment Japanese Knotweed may start to produce stunted shoots as pictured above here

The method presently used on the Tweed involves spraying the Japanese Knotweed when it has reached 50-90cm in height using the standard recommended application rate of Roundup. This first application carried out in mid to late May, usually kills-off the majority of the visible surface growth but within 3 or 4 weeks gives way to a new flush of growth at which point the process is repeated again. Depending on how vigorously the Japanese Knotweed comes away after each successive treatment this process can be repeated up to 3 or 4 times a year (although 2 or 3 times is more usual) and can be carried out until the first heavy frosts of autumn.

One of the problematic characteristics of Japanese Knotweed is its ability to remain dormant for extended periods of time, caused by a detrimental change in site conditions, or in this case, the repeated application of



Roundup. Regeneration from this dormant state can be triggered by a change in site conditions or more often by site disturbance, which is commonly the case on riverbanks. Ideally if a site which has been treated using repeated spraying does appear to be completely controlled after a few years, then the site should be disturbed to try and trigger further regeneration. Site disturbance is not always practical or desirable in a riparian setting and so the alternative is regular site monitoring at the beginning and middle of subsequent control seasons for several years to come to check for re-growth.



## The outcome after three years of control work

After three years of control work on the Tweed, huge advances had been made in combating Giant Hogweed with virtually no flowering plants present. The importance of preventing Giant Hogweed from flowering (and subsequently setting seed) cannot be stressed highly enough as each flowering plant can produce well in excess of 10,000 seeds. The Tweed Invasives Project uses the annual distribution and abundance of flowering Giant Hogweed plants to demonstrate the effectiveness of control work, as can be seen in maps 1 to 3 below.



1. Maps showing the distribution of flowering Giant Hogweed plants 1) before the start of control work, 2) after one year of control work and 3) after two years of control work.



3.



The maps above are always shown with the caveat that they in no way represent areas where Giant Hogweed has been eradicated, these maps show the distribution of mature, flowering plants before the start of control work and after subsequent control work. If the control work was stopped after the first year or two, the distribution of flowering plants would be back to the original situation within two or three years, i.e. in the time it would take the seedlings to grow to maturity.

All the major infestations of Japanese Knotweed were receiving regular biannual treatments by the end of the first three years, with the number of known sites rising from 47 at the start of the Project to over 204 by 2005. In the third year of the Project a pilot study looking into the practicalities of controlling Himalayan Balsam was undertaken on the River Till, one of the major tributaries of the Tweed. Himalayan Balsam is a problem along the length of the Tweed and its tributaries and while largely seen as a less invasive species it can still be highly invasive especially in areas with very high soil moisture such as riverbanks.



## Himalayan Balsam Pilot Study

*The pilot study took place on around 30 miles of infested river and attempted to control the Himalayan Balsam by hand-pulling the plants between mid-May and the end of June. This method of control is highly labour intensive, however it was agreed that due to the extent of the infestation and the fact that the Balsam grows in amongst other native riparian species that hand pulling was the only means of targeted treatment. The advantages of controlling*



Balsam flower

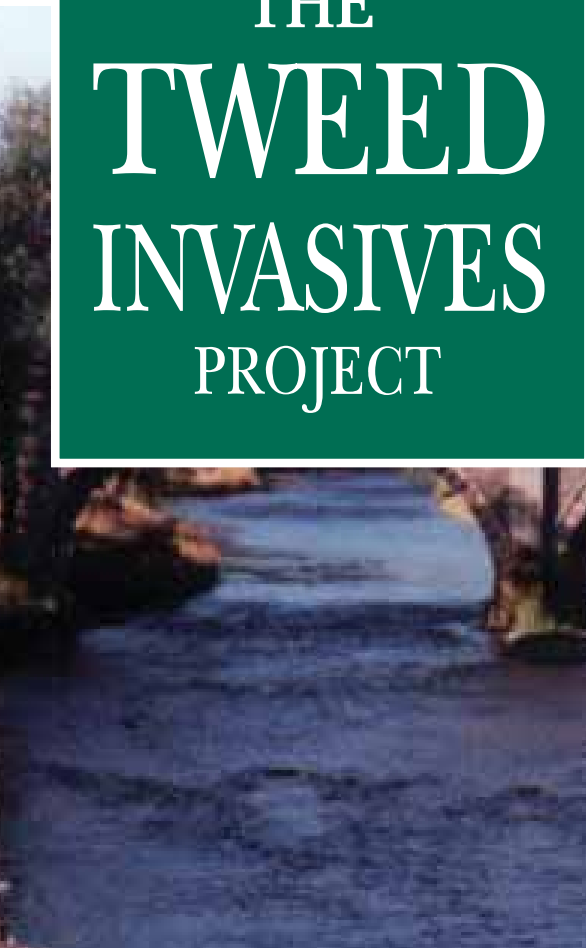
*Giant Hogweed and Japanese Knotweed are that the plants are both large and form dense monocultures which lend themselves to spot spraying, whereas Balsam for the majority of its distribution is interspersed with desirable native species.*

- Himalayan Balsam is an annual, that is it germinates, flowers and sets seed before dying all in the same year. The objective of the pilot study was to prevent any Balsam flowers from setting seed, as with the Giant Hogweed. Himalayan Balsam seeds are larger and remain viable for a shorter period of time than the seeds of Giant Hogweed and as such the potential to get the plant under control in a shorter period of time is possible. The full results of the trial are yet to be seen as the effectiveness of the scheme will only be visible next year after the Balsam grows again.
- One of the drawbacks in this control strategy was the cost, which for a 30 mile stretch of river was around £20,000 as the Project paid contractors to carry out the hand pulling due to the logistics of getting landowners to carry out this additional work themselves. The physical work is incredibly difficult as it involves meticulously pulling every single Balsam plant from the base of the stem gently so as to remove the plant and its shallow root system; if the fleshy stem breaks, the roots will re-shoot. The Balsam tends to grow in un-grazed areas such as set aside or areas in agri-environment schemes which rapidly become colonised by a complex of willows, nettles, grasses and Himalayan Balsam. The work is back-breaking and hot, with stings and scratches on the arms and face, an unavoidable hazard even with protective clothing.
- The pilot study is going to be continued in 2006 with follow-up site monitoring and further control work with a landowner contribution towards the work being implemented. After consultation with the riparian landowners with regards to the Himalayan Balsam issue it was agreed that they would pay a contribution towards the cost of the control work on their land. Getting landowners to contribute towards the costs of the work was the only workable solution as on one of the worst affected stretches, a team of five workers managed less than a mile per week in the first year of the pilot; if this was translated into a lone farmer carrying out the work it would take over 5 weeks to hand pull a 1 mile stretch of water.





# THE TWEED INVASIVES PROJECT



## ***Lessons Learnt:***

*Issues to consider when planning  
an invasives control programme*



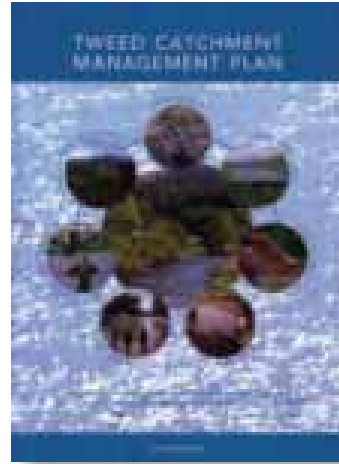


## LESSONS LEARNT -

Issues to consider when developing an invasives control programme:

### How to demonstrate the Need?

Many areas around the UK are experiencing increasing problems as a result of invasives and while these problems are undeniable, it is increasingly important to quantify these problems and articulate them in a format that is understandable to someone who is detached from the situation and circumstances. Most of the issues identified in the following section relating to consultation, identifying issues, agreeing actions and the delivery of the actions were covered in the Tweed example through partnership working and the Tweed Catchment Management Plan, however the steps that need to be taken are laid out below for clarity.



The Tweed Catchment Management Plan



The Scottish Borders Rivers and Burns Habitat Action Plan (HAP)

One of the first steps in demonstrating the potential need for an invasives control project is a survey of the species in question; assessing the scale and extent of the problem and helping to determine how much the control work is likely to cost. A key means of demonstrating the need from the ecological standpoint is to ensure that specific invasives are made a prominent point in local Habitat Action Plans (HAPs) with clearly identified actions e.g. catchment wide control, specified. It is rare for any river catchment to fall solely in the area of one single Local Biodiversity Action Plan (LBAP) area therefore it will be necessary to ensure that invasives are included in all the relevant LBAP areas. When it comes to applying for funding, having the support of several LBAP areas lends far more weight to the application.



From a social, economic and community standpoint one of the most beneficial things that can be done to demonstrate the need for an invasives control project is to carry out public consultation with potential stakeholders such as community/parish councils, access groups, farmers, landowners, other groups such as fishing or canoeing clubs, and crucially potential funding/operational partners in the Project. Through this inclusive means of consensus building with demonstrable input and support from the grassroots network of local individuals, businesses and organisations, an extremely strong case for the need for an invasive control project can be built. These initial consultations are also a vital starting point in building-up the strong communication networks that are vital to the operation of a successful invasives project. It is these individuals, and the networks they in turn have contact with, that will feed back to report invasives sightings over the coming years and provide volunteers to carry out survey work, or actively engage in control work.

### Who is the most appropriate body to take this forward?

Many of the actions identified above require the input of an individual or organisation with the necessary time, skills and resources to devote to setting-up community consultations, engaging with Local Biodiversity Action Plan groups, conducting or contracting invasives survey work and seeking funding. In the absence of a policy framework making either landowners or a statutory body the legal incumbent for non-native species control work, the question of who should take on the responsibility of setting-up a co-ordinated control programme is not straightforward. One of the biggest problems perceived by any organisation considering taking on the co-ordination of an invasives control programme is that the wider public and other agencies will then assume that the implicit legal and associated financial obligation is theirs too. It is for these reasons that the task of controlling invasives continues to be a 'hot potato' to be passed on quickly or something to be quietly ignored in the hope that it will go away which naturally results in failure.

Most of the documented attempts to control invasives have been through either County or local Councils, especially with regards to Giant Hogweed, but almost without exception the control efforts tend to be focused on Council owned land or on areas of land with public access e.g. public rights of way. While valiant efforts have been made by some Councils, their efforts are inherently constrained by the geographical extent of their authority area, which for the vast majority of situations is not the appropriate scale to be carrying out the invasives control work. This is not to say that Councils are not able to take this work forward, indeed they often have the physical and human resources needed to carry out such work. Increasingly Councils in neighbouring authorities are having to looking at more innovative and flexible means of working together to achieve common objectives such as invasives control, especially if the catchment scale approach is to be adopted.



Councils are not the only option however, as an increasing number of rivers around the UK have set-up river trusts to look into tackling issues such as invasives. There are also a number of other organisations throughout the UK who, given the local context, may be more appropriate to take forward ambitious invasives control projects. These include the local Wildlife Trust, British Trust for Conservation Volunteers (BTCV), Areas of Outstanding Natural Beauty (AONB) or any other local environment group or partnership. One of the key issues, regardless of who the lead partner is in the Project, is that there must be a good communication network between all the partners and there needs to be an agreed strategy in place before the project starts.

One of the great assets of the Tweed Forum is that everyone concerned is already around the table and this existing integrated platform made it a great deal easier to develop and launch an effective invasives campaign. There is also strength in being a neutral body and a non 'agency', this is especially important in delivering the invasives control work as the Tweed Forum provides a honest broker to report areas where control is not being carried out, helping to avoid friction between, for example neighbouring landowners.

## What is the appropriate scale for control?

The work carried out by the Tweed Forum focused on a catchment scale approach as this is widely viewed as the most effective means of controlling invasives in that it is the closest practical thing to a closed geographical system. The main vector for spreading Giant Hogweed and Japanese Knotweed (outwith human interference) is the physical movement of seeds/rhizomes down watercourses and so from this standpoint it is the obvious scale at which to operate. Where this becomes particularly difficult is where, as with the River Tweed, the catchment encompasses multiple administrative and/or national boundaries.

Forthcoming legislation under the European Water Framework Directive (WFD) will ensure that a whole range of issues including water quality and quantity, channel morphology and ecological status, are addressed at the catchment scale. Under the WFD legislation there is an obligation to maintain and improve the ecological condition of the river system but at this juncture there does not seem to be any specific guidance or mention of invasives as a threat to achieving this standard.



## Who needs to be involved?

There are any number of organisations that can potentially be involved in an invasives control project from a lead partner, such as a local Council, who co-ordinates the work and reports to funding partners, to the local Ramblers group, fishing clubs, canoe clubs or members of the public who carry out surveys or simply report sightings. The important point is that all these organisations and individuals need to be given the information and the opportunity to participate and they need to have the confidence that if they do get involved the appropriate support will be available.

For the delivery of an invasives control programme the most important participants are the people who will be carrying out the majority of the control work, i.e. the farmers, landowners or other relevant individuals or groups who will physically go out and spray the Giant Hogweed and/or Japanese Knotweed. Without the support of this key group the physical control aspect of the work becomes untenable and the long-term success will not be sustainable or achievable.

When initially contacting farmers and landowners to discuss the control of invasive species it is common to get a range of responses from extremely positive, to pessimistic and inevitably some are negative. It is important to take the time with farmers and landowners to discuss their concerns, as well as issues surrounding invasives, land management and usually a range of other related (and some not so related) issues. This helps to establish common ground and a consensus on how and when the control work should be carried out. This vital but time consuming aspect of delivering an invasives control project is covered in more detail below (see dedicated coordination).

From a statutory body point of view, it is important to engage with the key environmental agencies at an early stage to discuss local control priorities and control options as well as exploring potential funding opportunities. In practical terms this means contacting English Nature/Scottish Natural Heritage/Countryside Commission for Wales to discuss sensitive sites, as well as the Environment Agency/Scottish Environment Protection Agency to discuss licensing to spray near water and potential funding. These agencies often have a number of field staff, many of whom will be well informed as to the local occurrence of invasives or able to report sightings in the course of their day to day operations.

## Dedicated Coordination

The importance of having a dedicated project coordinator to deliver an invasives control programme cannot be under estimated as it is often the rapport that this individual builds up with farmers, landowners and other groups and individuals as well as contractors that will make or break the project. It is therefore vital that above all else, anyone coordinating this kind of



project must be a personable and diplomatic communicator not only capable of communicating effectively in letters and through reports but crucially face to face with individuals and groups that will often be reluctant to participate. Building this kind of relationship with numerous individuals takes a great deal of time depending on the size of the area/catchment; for the Tweed it took the majority of the officer time for the first 12 to 18 months of the project and requires regular “maintenance” there after.

It is important that the individual, and indeed the organisation, running the project are going to be around long enough to build the necessary working relationships to deliver results on invasives, as invasives control is a long process. A key aspect of maintaining the motivation and support of landowners, farmers etc. is the provision of a neutral body/individual who they can go to and complain about neighbours who are not carrying out the necessary control work. This neutral stance allows the failing individual to be encouraged to improve their control work by the Project Officer without generating friction between neighbours.





# THE TWEED INVASIVES PROJECT



## *Practical and Technical Best Practice*

*The following section aims to give some concise insights into some of the practical lessons learnt from the delivery of the Tweed Invasives Project over the past three years, with particular emphasis on timing*





## PRACTICAL AND TECHNICAL BEST PRACTICE

The following section aims to give some concise insights into some of the practical lessons learnt from the delivery of the Tweed Invasives Project over the past three years, with particular emphasis on timing.

### Giant Hogweed

Germination tests on seeds taken from a single plant from the Tweed have shown that the seeds, all sown and propagated in identical conditions, will start to germinate at the end of February and will continue to germinate right the way through until the end of July. This staggered germination is reflected in the field not only in the germination of seedlings but also in the emergence of over wintering plants. There is a strong temptation to start spraying Giant Hogweed as soon as it emerges, indeed there can often be considerable pressure from farmers/landowners etc. to do so. However it is important that a degree of restraint is shown as if plants are sprayed too early, the control work will need to be repeated a few weeks later when the later emerging plants have come out. As a rough guide, the majority of Giant Hogweed plants will be visible between the last two weeks in April and the first two weeks in May, with site specific conditions such as aspect, soils and/or altitude capable of moving this window up to two weeks either way.

**Areas fenced off under riparian habitat improvement schemes must be managed annually otherwise Giant Hogweed infestation can quickly develop**



## Japanese Knotweed

If timing is important for successful Giant Hogweed control then it is essential for Japanese Knotweed as it is an incredibly resilient plant capable of withstanding a significant amount of prolonged herbicide control. Japanese Knotweed will start to grow as early as March however it will usually not show any significant signs of growth until early/mid May at which point it is crucial to apply the first annual treatment of Roundup when the stand of Japanese Knotweed is between knee and waist height. In these earlier stages of growth the plant is growing extremely fast and is far more succulent and as such it has a much more successful uptake rate of the Roundup applied. From a logistical point of view the Japanese Knotweed is also a lot easier and safer to spray at this height rather than at 8 to 12 feet high a few weeks later.

It is important that the Japanese Knotweed is monitored regularly after it has been sprayed for any signs of regeneration following the previous treatment – sometimes Japanese Knotweed will turn black and wither away right down to the base of the stem and other times it will simply wilt slightly before recovering and continuing to grow. Once the Japanese Knotweed has started to re-grow and reaches the optimum height for spraying, repeat the control work and post control monitoring again; this process can be repeated up to 3 or 4 times in a year as Japanese Knotweed can continue to grow into November or until the first hard frosts of winter.

Japanese Knotweed may take two or three years to show significant signs of the control efforts working, although with two or more treatments per year results can be faster. The effectiveness of the control

work can be seen in the strength, colour and form of the Japanese Knotweed as it regenerates, tending to produce less dense stands, that do not grow very high and have dwarf features. Again, it is important to continue monitoring sites even after apparent success as Japanese Knotweed can lay dormant for several years before regenerating. Where possible it is useful to disturb sites where Japanese Knotweed has apparently been controlled as the disturbance can activate dormant roots which can then be treated as before to kill off any remnants.



Japanese Knotweed can grow virtually anywhere including through tarmac and concrete or even straight out of the side of a building.





Young Japanese Knotweed shoots emerging following site disturbance

## Himalayan Balsam

The experience to date is fairly limited with control methods other than hand-pulling for Himalayan Balsam. Himalayan Balsam is an extremely succulent plant that readily snaps off if pulled too sharply, however it also has a relatively small, shallow root network which is easily pulled out with the rest of the plant if the plant is pulled firmly and steadily from the base of the plant. This method is marginally more labour and time intensive, however if the stem breaks off (even low down on the plant) then the Himalayan Balsam will re-shoot and send up new flowerheads. If this method of control is to be adopted, it is important to ensure it is done correctly otherwise a great deal of effort can be wasted – hand-pulling is laborious work so ensure it is done correctly and no roots are left in the ground to re-grow.

As with the previous two invasives species, timing is important, with the optimum time for control being when the Himalayan Balsam is just starting to develop flowering buds. In some rare instances Himalayan Balsam can grow in extremely dense, tall stands and in these situations it is possible to spray with Roundup, however these stands are an exception and not a rule and as such it is not advisable to recommend spraying as a means of control as it could result in entire lengths of riparian habitat being inadvertently destroyed, leading to a net loss in habitat and leaving river banks exposed to erosion.



## SUMMARY

The threats posed by invasive species in the UK, and the logistical problems associated with their control, are rapidly rising up the political agenda as the realisation sets in that the long term economic and environmental costs of invasives far exceed the short term convenience of ignoring the problem. As national and European legislation relating to invasives gets ever tighter, reflecting the policies in other countries such as Australia, New Zealand, America and South Africa, more and more people are looking to pro-actively address the issue at a local level. While some basic advice and guidelines are available for the identification and control of invasives, we hope that the information in this document will help guide anyone looking to establish their own control programme.





## Resources

For more information relating to the practical and legislative issues surrounding the control of invasives species the following websites can be recommended:

### General Invasives Sites:

[www.tweedforum.com/projects/inv](http://www.tweedforum.com/projects/inv)

[www.scotland.gov.uk/invasivespecies](http://www.scotland.gov.uk/invasivespecies)

<http://www.defra.gov.uk/wildlife-countryside/resprog/findings/non-native/execsummary.pdf> - gives a brief review of non-native species policy

<http://www.scotland.gov.uk/consultations/environment/rnpsc-00.asp> - gives a review of UK non-native species policy

<http://www.defra.gov.uk/wildlife-countryside/resprog/findings/non-native/index.htm> - gives the working group response to the above

<http://www.environment-agency.gov.uk/> and type in invasive species in the search box

### Japanese Knotweed Sites:

<http://www.ex.ac.uk/knotweed>

[http://www.cabi-bioscience.org/html/japanese\\_knotweed\\_alliance.htm](http://www.cabi-bioscience.org/html/japanese_knotweed_alliance.htm)

<http://dnr.metrokc.gov/wlr/LANDS/weeds/hogweed.htm>

<http://www.invasivespeciesinfo.gov/plants/knotweed.shtml>

### Tweed Catchment Management Plan:

<http://www.tweedforum.com/projects/cmp>

**The full Tweed Catchment Management Plan can be downloaded from the following website:**

<http://www.tweedforum.com/webdb/docs/tweedforum.pdf>





# THE TWEED INVASIVES PROJECT

*Produced by Tweed Forum, 2006 with support from:*



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## *Environmental Statement*

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