Advice for producing Himalayan balsam (*Impatiens glandulifera*)

Widely Spread Species Management Measures

- Please consider the treatment measures you put in place on a site-specific basis. Following some best practice publications, (Including the out-of-date Invasive Species Ireland publications) will not always achieve the desired results on your site. For example, those that recommend months and dates have often not been adjusted to take climate change and local weather patterns into consideration.

- If the infestation extends beyond your land ownership and you think that adjacent infestations are preventing you from eradicating at your location, please report other locations, anonymously if you wish, @ https://invasivespeciesni.co.uk/report-sighting

- Cordon off the site to restrict access and avoid further accidental spread of the plant. The best method for demarcation of the infested area is to erect fencing, but sometimes just defining the area with coloured tape or sporadic signage can be adequate in areas of low footfall. You can use warning signage to mark your treatment area:

Treatment methods

- The Department will always encourage landowners to attempt to treat invasive plants without the use of herbicides wherever possible - Chemical treatment must only be considered as a last resort

Some points to consider before choosing your management measures:

- Is the site in a designated area (web viewer is handy for checking), this will limit available options

- The use of herbicide will almost certainly be a notifiable operation and therefore need 'consent' from Conservation Designation & Protection (CDP) team in NIEA.

- If the location is not a protected/designated site, there is no requirement to notify NIEA of the use of herbicide (some outdated documents/websites state that there is a requirement)

- Please detail which method/s are being used on your site – you may have more than one – e.g. manual removal and weed wiping at either end of growing season

- Verify and provide details of the operative's' suitability for application i.e. if your location is adjacent to water, operative using herbicide must hold a PA6Aw certificate. They must at least hold a PA6 certificate for any herbicide application

- You must provide annual records of the amount of herbicide used on the site and at what dilution levels they were applied at; it is a legal requirement (under COSHH (NI)) to keep records of all herbicide applications; this will be especially important if your location is in or adjacent to a designated site or water body

Mechanical treatment

- Mechanical control refers to the mowing, digging out or mechanical cutting of an invasive plant infestation to limit seed production

- With mowing, timing is essential. Invasive plants must be removed before the plants go to seed in order to be an effective method of control

- Plants should be cut as close to the ground as possible and may have to be treated more than once in a growing season to achieve desired results

- This works particularly well in relation to Himalayan balsam, as cutting back multiple times can eventually weaken the regrowth of the plant the next growing season

Benefits of mechanical control:

- Works well for areas that have favourable terrain that is accessible

- Can be used in environmentally sensitive areas

- Reduces seed production

- Effective on annual plants like Himalayan balsam

- It is unlikely that using ploughing alone will eradicate the plant and hence may need to be repeated

- Other control measures such as herbicidal control may need to be integrated into mechanical management measures

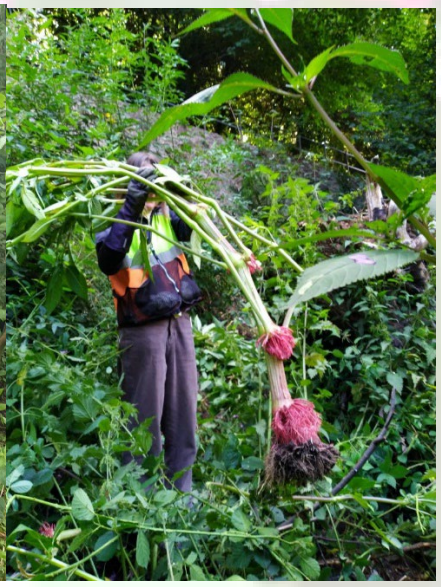
Limitations of mechanical control:

- Plants must be mowed, strimmed or cut before they produce seed
- May not be suitable in some environmentally sensitive areas - non-target vegetation may be impacted
- Not suitable for steep slopes or rocky, unstable terrain
- Will not always kill plants, but will decrease seed production for that year
- Plants need to be cut as close to the ground as possible, below the lowest node
- Must be done repeatedly to exhaust seed bank in the soil

Manual Control

- Manual invasive plant control usually refers to hand pulling or digging out
- Manual control works well for dealing with single plants or small infestations that can be eradicated with a small amount of labour
- This method is very effective for managing Himalayan balsam, as it is shallow rooted and usually grows in loose, moist soil
- Some plants can grow to very large sizes if left to thrive (below right)

Volunteers Hand pulling Himalayan balsam



Considerations for manual control of Himalayan balsam:

- Ensure whole plant is uprooted (normally best done if pulled from low down the plant)
- If snapping occurs at a node, the pulling must be completed to include roots
- If broken off stems are left (even low down on the plant), it will re-shoot and send up new flower heads
- As treatment has been undertaken before the plant has gone to seed, treated material can be left in situ to decompose
- Make sure to check again late season as it is known to re - grow if removed in spring

Volunteers piling up Himalayan balsam for composting

Photo credit: C

Benefits of manual control:

- Can be used in environmentally sensitive areas
- Can be used to manage small patches or individual plants
- Works best in moist, loose soils
- Persistent cutting, grazing, pulling can be effective

Limitations of manual control:

- Labour intensive
- Limited to small infestations
- Plants must be pulled before seeds are set
- Pulling must be done repeatedly to exhaust seed bank in the soil - seeds can survive in the soil for around 18 months, so this can usually be achieved in 2-3 years

See species account on Invasive Species Northern Ireland website for further details: https://invasivespeciesni.co.uk/species-accounts/established/terrestrial/himalayan-balsam

and: Site management resources - https://invasivespeciesni.co.uk/download-resources/ site-management-resources/himalayan-balsam-management-resources/

Grazing control

- This type of control involves the use of livestock which consume invasive plant species as a control method
- Grazing can be effective for Himalayan balsam provided the site is not susceptible to erosion, e.g. on a river bankside
- Sheep and cattle such as Dexters, have been most successful in trials
- The best way to approach this method is to start grazing low numbers of animals and work up as the grazing season continues to avoid over grazing
- Sheep can always be left to graze for an extra few weeks at the end of the season to clear any remaining plants but ensure they are removed before they cause bare patches of land which are much harder to resolve
- Continued grazing below the lowest node on the stem will prevent regrowth and

Benefits of grazing control:

- Effective method for clearing large areas of infested land
- Sheep will feed on everything from new saplings to plants up to 1.5m
- Some cattle breeds also graze happily on Himalayan balsam
- Minimal time commitment required from landowner
- Avoids adding unnecessary chemicals to the environment
- Cheaper method of control

Limitations of grazing control:

- Too many sheep or leaving sheep too long on a patch of land, can lead to over grazing. This will leave bare ground and potentially prime the land for further seeds to germinate
- The same precautions would apply to cattle grazing too
- Larger plants that sheep are unable to reach will need removed before going to seed
- Annual inspections and periodic monitoring still required
- Important to research which breed of livestock is best suited to the site – larger animals such as cattle may cause damage (poaching) and others may need fencing to encourage animals to graze on the desired target species

Chemical treatment

- The Department will always encourage landowners to attempt to treat invasive plants without the use of herbicides wherever possible - Chemical treatment must only be considered as a last resort
- If a particular brand of herbicide is mentioned in the management measures, the land manager must have checked that it is approved for their planned use. This can be done by accessing the HSE approved pesticides register - https://secure.pesticides.gov.uk/pestreg/ProdSearch.asp
- As a government agency we cannot recommend a specific branded product, we can only recommend the generic type such as Glyphosate systemic based herbicides which are the most successful for dealing with invasive non-native plants and many are also approved for use near water
- Herbicides can be applied by a variety of means including boom sprayers (tractor or quad mounted), weed wipers, backpack sprayers, hand lance, spot spraying and stem injection
- Selection of herbicide should depend on other crops or plants on site, environmental considerations, and meeting your management measures objectives
- Large infestations, infestations near water, or infestations on steep slopes may be too costly or too environmentally sensitive to control by chemical means. In these situations, it is important to look at other management measure options

First, consider if the location is suitable for application of herbicides:

1. Is it on a designated site and have you got 'consent' from NIEA CDP team
2. Are there any protected species on site that could be damaged by applying herbicides in a non- target manner
3. Is it an adequate distance away from watercourses and ditches
4. Is it away from existing amenity areas, lawns, and gardens with large amount of footfall
5. Is it free from disturbance by people or livestock
6. Is it a suitable distance away from neighbouring properties

Also, if chemical control leaves a site bare, it is important to consider, before you apply a herbicide regime, how you plan to re-vegetate the site so that control is achieved over the long-term (see notes on Site Restoration).

Factors that can affect the effectiveness of herbicides include:

- Invasive plants are most susceptible to systemic herbicides, such as those that contain glyphosate, during its active growth stage, so timing of treatment is critical
- Soils with high organic matter or clay content may require higher rates of chemical than sandy soils
- Soil moisture and pH can also affect persistence and effectiveness of some herbicides - importance of site-specific considerations!!
- DAERA – Code of Practice for Using Plant Protection Pesticides

- The 'DAERA – https://www.daera-ni.gov.uk/publications/code-practice-using-plant-protection-products is commonly referenced, although published in 2011, much of the document is still relevant and of use. However just note that, with regards spraying pesticides *'grandfather rights'* no longer exist & the document also states that "*Before you use any product approved for use in or near water (this is usually a herbicide used to remove plants in or around water) first contact the NI Environment Agency (NIEA) on 028 9263 3445*." As mentioned previously this is not the case anymore, there is no requirement to contact NIEA, unless it is in a designated site/ASSI/SAC etc. when you must get 'consent/assent' from the Conservation, Designations and Protection Casework Team https://www.daera-ni.gov.uk/publications/request-assent-carry-out-notifiable-operation-assi

Benefits of chemical control:

- Effective tool for new and small infestations of Himalayan balsam
- Less labour intensive than alternative mechanical and manual methods

Limitations of chemical control:

- Precautions need to be taken to limit the effects on surrounding non-target plants
- Precautions must always be taken to avoid spraying or applying herbicides where pollinators are actively feeding, i.e. when plants are in flower
- Limited use in environmentally sensitive areas or steep slopes
- May have limitations on certain soil conditions or presence of water
- Some concern from public/community groups and local councils about the use of glyphosate-based products
- Not always successful

On – site biosecurity

- Strict biosecurity measures must be put in place on treatment sites to ensure landowners/ contractors/ members of the public do not act as vectors in spreading invasive plant species
- To reduce the spread of the invasive species, it may be necessary to set up cordoned off areas/ exclusion zones to stop people entering these areas whilst treatment is ongoing
- Create an exclusion zone (should include a buffer zone if possible), put up signs to make people aware
- Ensuring recreational (boats, boots, angling) and mechanical equipment is drained if operating in infested riparian locations and cleaned before leaving any infested water body (CHECK CLEAN DRY)
- Restrict access and cordon off stands or infestations until treatment is complete
- Thorough inspection and removal of contaminants by brushing is recommended for all tools and equipment used on site - this should include clothing and boots - if carrying-out management, check clean any equipment, E.g., clean soil off spade

- Ensure that soils from within infested areas are not spread to other areas, treat contaminated soils carefully

- If manual removal must take place after the plants have flowered/seeded, make sure plant heads are placed in bags and sealed off to prevent further seed dispersal when the plant head is cut off

Disposing of Plant Material

- Ideally, management should take place before the plant goes to seed

- Provided the plant has not yet gone to seed, plant material generated from treatment can be composted on site

- Care must be taken when composting on site. Wrap the plant material in a barrier membrane such as tarpaulin to prevent re-rooting/regrowth

- If the plant has already gone to seed when treatment takes place, plant material generated from treatment will now be considered as ‘controlled waste’

- This plant material can either be buried on site, within a non - permeable membrane, or transported off site as controlled waste

- Any waste containing seeds being transported off-site, must be appropriately transported by a licensed waste carrier who is informed that the waste material contains an invasive species as part of the waste transfer documentation

- It is important to contact the licensed landfill site in advance to ensure they will accept the waste material

- Failure to inform the landfill site that the material contains an invasive species would be an offence under both wildlife and waste legislation

Site restoration

- This will depend on the site in question and what its main characteristics are – location, soil types, designation status etc.

- Many plant invasions can be reversed, halted or slowed, and in certain situations, even badly infested areas can be restored to healthy systems dominated by native species

- An invasive plant control regime is best viewed as part of an overall restoration program - focus on what should be in place of the invasive plant species after removal, rather than simply eliminating the weed then thinking about what is to go in its place afterwards

- This is especially important along riverbanks (riparian habitats) due to the potential erosion and bank instability that could be caused by removing the invasive plant species

- Establishing a good sward of grass soon after treatment will help reduce the risk of re- colonisation of the same or other INNS – this can also help supress regrowth of seedlings from the seedbank

- When selecting control methods, keep in mind that the ultimate purpose of the work is to preserve native species, communities, and/or functioning ecosystems

- Restoration management aims at restoring habitat functions and processes on sites disturbed by human activities - it requires that you replace the invasive non – native plants that have been removed with native plants which are able to provide the desired habitat structure and functions

- It is recommended you consult a professional ecologist to assist selection and sourcing on native species to plant

- Make sure all necessary precautions are taken to ensure that any topsoil brought onsite for restoration purposes is certified free from invasive plant species

Riverbank restoration

Photo credit: Mountain Visions/NOAA