

- Reduces seed production
- When **American skunk cabbage** colonies are discovered early and are relatively small, excavation is advantageous because it doesn't reproduce for the first couple of years

Limitations of mechanical control:

- If the whole **American skunk cabbage** and all its rhizomes are not excavated, it can lead to further vegetative reproduction and a higher level of regeneration
- It is unlikely that a single treatment using ploughing will eradicate the plant and hence it needs to be repeated or other control measures will need to be integrated into the management measures
- May not be suitable in some environmentally sensitive areas
- Not suitable for steep slopes or rocky, unstable terrain
- Will not always kill plants, but will decrease seed production for that year
- Non-target vegetation may be impacted
- 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. This type of control may not be effective for **American skunk cabbage**, which also reproduce by roots and rhizomes. In these instances, limited hand-pulling or digging may actually increase the size of the infestation.

The risk of the spread of **American skunk Cabbage** can be reduced in the short term by cutting the flower before it sets seed.

Considerations for manual control of American skunk cabbage:

- If digging out manually, the whole plant and rhizomes must be removed completely – it has a defence mechanism which instigates a sped-up regeneration if any fragments are left in the ground
- Weather/ground conditions - Easiest treatment during dry seasons where access to



wet margins and muddy areas becomes firmer

- Labour intensive – may require repeating in one season
- The colourful large blooms with their penetrating smell often are a first indication of its presence

Benefits of manual control:

- The risk of the spread of **American skunk cabbage** can be reduced in the short term by cutting the flower before it sets seed - this plant usually flowers in spring before leaves appear
- Available control reports all describe removal by hand as the method of choice

Limitations of manual control:

- Labour intensive (manual) and can be difficult to ensure that all root material is removed, as plants can re-establish from any small root fragments left behind
- This is often not easy because it may be deep in the wet ground (over 30 cm) and hard to remove
- Shading out **American skunk cabbage** through promotion of native plants or use of barrier materials are generally unsuccessful
- As with many plants, the sap of **American skunk cabbage** can irritate the skin. Please wear suitable gloves and protective clothing when working with and removing plants.

See species account on Invasive Species Northern Ireland website for further details - <https://invasivespeciesni.co.uk/species-accounts/established/terrestrial/american-skunk-cabbage>

Digging out American skunk cabbage



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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](#).
- 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 weeds and are also products approved for use near water.
- Herbicides can be applied by a variety of means including weed wipers, back pack 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
- To reduce side-effects, one can use the method of stem injection. For this purpose, stem injection equipment should be used to inject a dose of herbicide directly into the taproot of established plants or make a hole in the centre of the plant using a small spade or pinch bar and spray herbicide onto the white stump (RAPID, 2018)

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 detail, **before you apply herbicide regime**, how you plan to re-vegetate the site so that control is achieved over the long-term (**see notes on Site Restoration below**).

Factors that can affect the effectiveness of herbicides include:

- There are no reports of chemical treatment being a successful method of eradication for **American skunk cabbage** – also it should be expected that chemical control would do considerable collateral damage to the sensitive aquatic environment where it grows
- The waxy leaves of American skunk cabbage may not easily adsorb the required amount chemical to kill the plant
- 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
- DAERA – Code of Practice for Using Plant Protection Pesticides
- The 'DAERA – [Code of Practice for Using Plant Protection Pesticides](#)' 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’ from the [Conservation Designation & Protection \(CDP\) team](#)

Benefits of chemical control:

- Can have residual control of seed-bank for future years depending on the chemical selected
- Less labour intensive than alternative mechanical and manual methods
- In sensitive areas stem injection could be used as it reduces risk to surrounding habitat

Limitations of chemical control:

- It is better to remove **American skunk cabbage** mechanically or manually although there has been some success with a combination of chemical and manual/mechanical methods
- A study in GB (European and Mediterranean Plant Protection Organisation 2009) found that use of 2, 4-D amine at a concentration of 9 litres/ha eradicated **American skunk cabbage**, whereas glyphosate did not eradicate skunk cabbage and caused only limited reduction of growth of the plants
- 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.

Spraying American skunk cabbage



On-site biosecurity

- Strict biosecurity measures must be put in place on treatment sites to ensure land owners/ 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 as **American skunk cabbage** can spread through fragments of its rhizomes.



Disposing of plant material

Any plant material generated from treatment, including soil that contains plant and rhizome fragments, must be dealt with in one of the following ways listed below. Failure to remove

all fragments will likely only exacerbate the problem and could aid in spreading the plant into new areas.

- Any above-ground plant material generated from treatment prior to the plant going to seed (i.e. excluding rhizomes) can be dried out (well away from water) or securely composted on site
- If the plant has already gone to seed when treatment takes place, plant material generated from treatment will now be considered as 'controlled waste'
- Rhizomes are also considered as 'controlled waste'
- This 'controlled waste' can either be buried on site or transported off site (see further details below)

On-site burial

- This is usually carried out on larger sites
- It is suggested that contaminated soil and plant material are buried at depths of > 5 metres
- Shallower burials will require encapsulation in a root resistant barrier membrane

Drying out

- Place on a barrier membrane such as tarpaulin
- Ensure this is carried out well away from water bodies
- When plants are fully dried, compost securely

Secure composting

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

Transfer to a licenced facility

- Any wastes (with or without propagules) 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 river banks (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 suppress 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 of 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.