Scottish Invasive Species Initiative

Developing a classification system for invasive plant control activities

Shared Island - Local Action Group Forum
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NatureScot
Scotland's Nature Agency

NATURE RESTORATION FUND

Net Zero Scotland
Scottish Government

LET'S DO NET ZERO

HERITAGE FUND

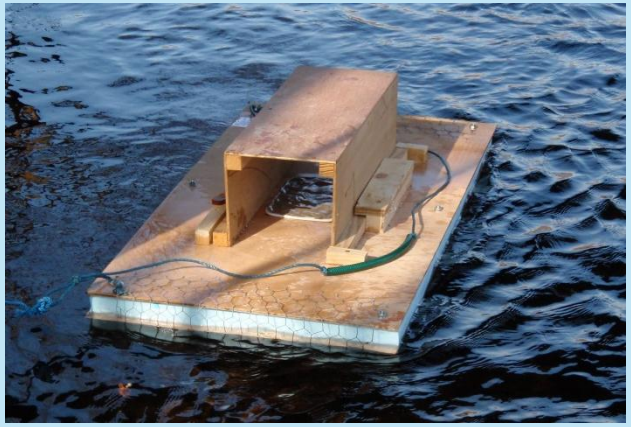
Scottish Invasive Species Initiative

Scottish Invasive Species Initiative

- 10-year project: 2018–2023, 2023-2026 and 2026-2028 and more
- Working at a local level with partners and volunteers to establish community-based strategic invasive non-native species management across 29,500km^2 of mainland Scotland
- Engaging people with their local river environment
- Largest invasive species control project in British Isles

Project activities -

American mink control



Invasive plant control

Education & awareness

Developing a system to classify control sites and their management - why?

- We have >400 geographically defined plant control sites / management units – most with one target species but some with >1 species present.

- In 2024 –
  - 1,043km of riverbank managed for giant hogweed
  - 436km of riverbank managed for Japanese knotweed
  - 133km of riverbank managed for Himalayan balsam
  - 43 American skunk cabbage sites controlled

- Some sites treated since 2018 - most for multiple years

- We know that invasive plants do not disappear quickly but, given duration of our control work and money spent, we need to better show and report progress

- Otherwise, when asked about progress by funders and others, we don’t have anything very convincing to say

- In short, we need to be able to show and summarise the progress we are making and the success of our work to remain credible

What do we have now and what is missing?

- All control sites / management units (geographically defined) have, for each species controlled, records of –
  - method of control,
  - time taken to undertake control,
  - chemical volumes used.

- Control and monitoring spreadsheets
  - archive all control and monitoring by partner, year, species for all sites
  - essential data but not easily reportable in a public way

- Control case studies (https://invasivespecies.scot/case-studies/)
  - being updated and cover a small number of control sites
  - not feasible to prepare in large numbers

- These don't allow us to
  - show progress to others in totality or in summary form e.g. by species or catchment
  - help us assess status of sites and manage our control work going forward

Developing a plant classification scheme – a 2-stage system

1. **Stage 1 – status of each infestation**
   - Assign a status to current infestation
     - Healthy OR
     - Diminished OR
     - Eradicated and site in recovery OR
     - Never present (but monitored) by species
   - Criteria to support assigning status by species

2. **Stage 2 – management response to infestation**
   - What are our management responses to each growth status by species?
     - Annual control (all healthy or new and some diminished infestations) OR
     - Two yearly control (some diminished populations – mostly Japanese knotweed) OR
     - Monitoring (1, 2 or 3 yearly) (all eradication and sites in recovery) OR
     - No Control (for sites with invasive species never present)

Thinking about the species we control

Each species responds differently to control and has different future management needs –

- **Giant hogweed -**

Long lived seed bank requires long term control. Even when density is reduced and flowering plants less likely to emerge, we still probably need annual control

- **Japanese knotweed -**

Can respond quickly to control. With no seeds to worry about, can we reduce populations to the stage where annual control is not needed?

- **Himalayan balsam -**

We can reduce densities of growth relatively quickly but, as plant flowers annually, annual control is needed until eradicated

- **American skunk cabbage -**

We can reduce densities after 2-3 years of treatment but still need to prevent mature plants seeding. Annual control may still be needed even where we are making progress

Stage 1 – Supporting decision making, when to move an infestation from “healthy” to “diminished”

- Based on basic plant ecology, management actions required and using standardised decision-making criteria, management response will not and should not be the same for all species

Giant hogweed

- Diminished if **at least 2 out of 3** of the below apply –
  - Flowering plants not expected or present
  - Chemical application is reduced by >60% from initial control
  - Time to control is reduced by >60% from initial control
- Annual control probably still needed at healthy and diminished sites

Himalayan balsam

- We do not use chemicals to control this plant, so, have limited options to determine a diminished population
- Diminished if the below applies –
  - Time to control is reduced by >60% from initial control
- Annual control still needed at healthy and diminished sites

Japanese knotweed

- Diminished if **at least 2 out of 3** of the below apply –
  - Flowering plants not present, and only small or sickly, spindly stems are emergent
  - Chemical application is reduced by >60% from initial control
  - Time to control is reduced by >60% from initial control
- Annual control may not be required at diminished sites – can move to biennial control

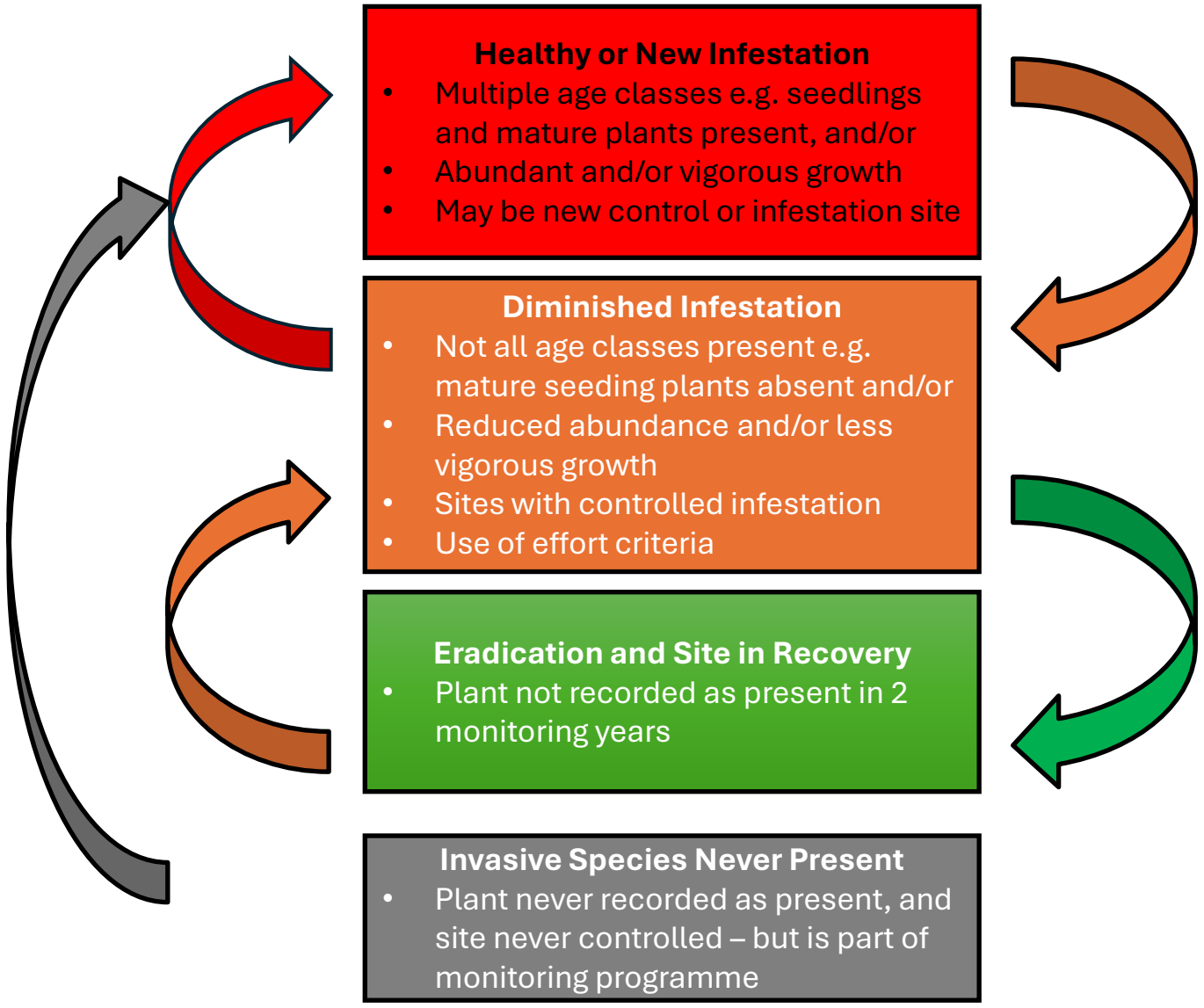
American skunk cabbage

- Diminished if **at least 2 out of 3** of the below apply –
  - Flowering heads not expected or present
  - Chemical application is reduced by >60% from initial control
  - Time to control is reduced by >60% from initial control
- Annual control may or may not be needed at diminished sites

Stage 1 – categorise growth of control species at site

- Consider the state of the plant population for the species present

- Allocate to
  1. Healthy or New Infestation OR
  2. Diminished OR
  3. Eradication and Site in Recovery OR
  4. Invasive Species Never Present



Stage 1 + Stage 2 = what?

Stage 1 -

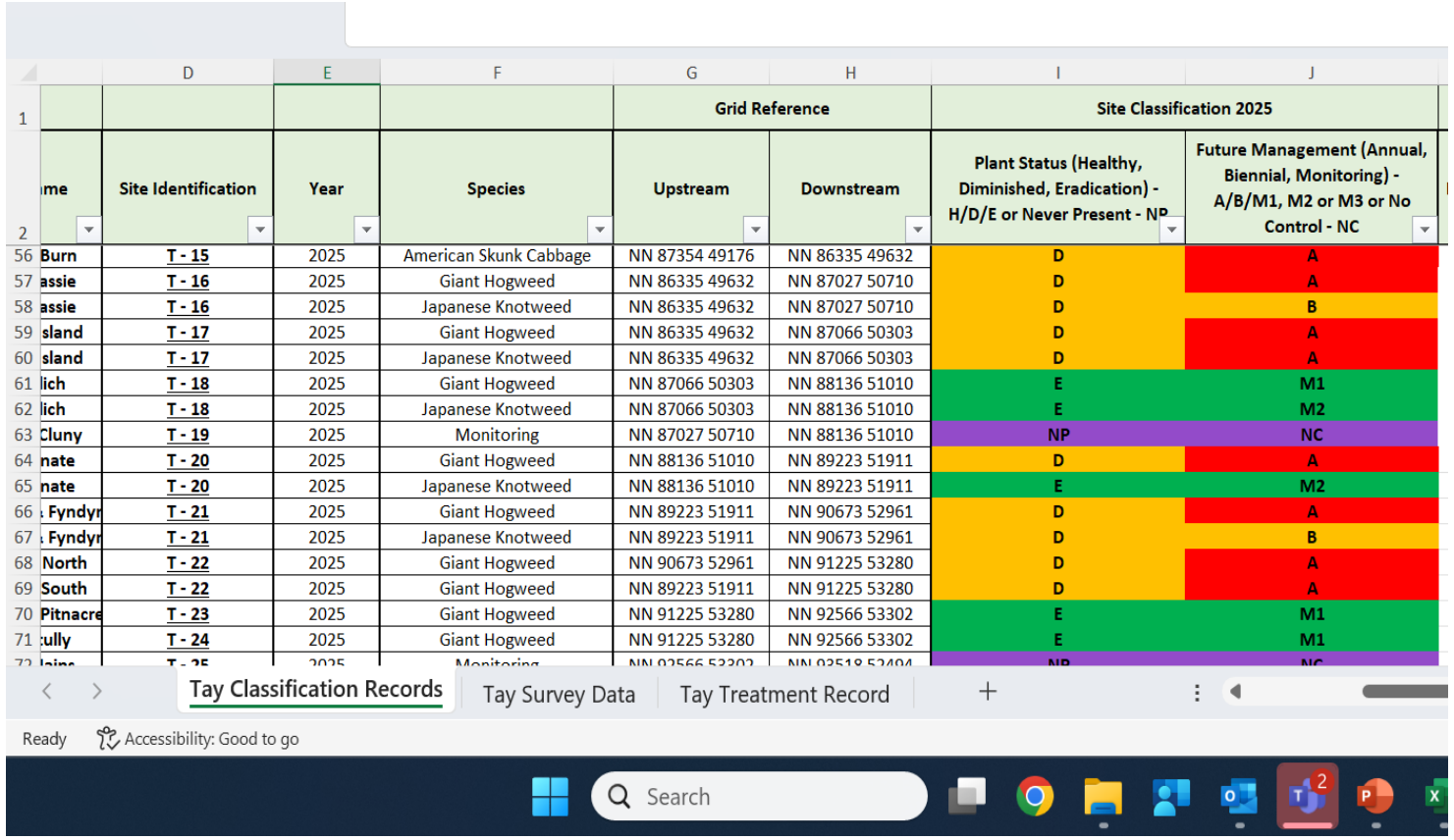
- Assign growth status using expert judgement of site situation
- Combine with effort criteria (time and chemical use) using available data

Stage 2 –

- Allocate a management or monitoring response appropriate to status of growth and plant species

Combination –

- Two elements in system allow us to
  - Summarise plant status and show progress
  - Allocate management and monitoring responses allowing us to better plan and allocate time to these activities each year



	D	E	F	G	H	I	J
1				Grid Reference		Site Classification 2025	
2	Site Identification	Year	Species	Upstream	Downstream	Plant Status (Healthy, Diminished, Eradication) - H/D/E or Never Present - NP	Future Management (Annual, Biennial, Monitoring) - A/B/M1, M2 or M3 or No Control - NC
56	T - 15	2025	American Skunk Cabbage	NN 87354 49176	NN 86335 49632	D	A
57	T - 16	2025	Giant Hogweed	NN 86335 49632	NN 87027 50710	D	A
58	T - 16	2025	Japanese Knotweed	NN 86335 49632	NN 87027 50710	D	B
59	T - 17	2025	Giant Hogweed	NN 86335 49632	NN 87066 50303	D	A
60	T - 17	2025	Japanese Knotweed	NN 86335 49632	NN 87066 50303	D	A
61	T - 18	2025	Giant Hogweed	NN 87066 50303	NN 88136 51010	E	M1
62	T - 18	2025	Japanese Knotweed	NN 87066 50303	NN 88136 51010	E	M2
63	T - 19	2025	Monitoring	NN 87027 50710	NN 88136 51010	NP	NC
64	T - 20	2025	Giant Hogweed	NN 88136 51010	NN 89223 51911	D	A
65	T - 20	2025	Japanese Knotweed	NN 88136 51010	NN 89223 51911	E	M2
66	T - 21	2025	Giant Hogweed	NN 89223 51911	NN 90673 52961	D	A
67	T - 21	2025	Japanese Knotweed	NN 89223 51911	NN 90673 52961	D	B
68	T - 22	2025	Giant Hogweed	NN 90673 52961	NN 91225 53280	D	A
69	T - 22	2025	Giant Hogweed	NN 89223 51911	NN 91225 53280	D	A
70	T - 23	2025	Giant Hogweed	NN 91225 53280	NN 92566 53302	E	M1
71	T - 24	2025	Giant Hogweed	NN 91225 53280	NN 92566 53302	E	M1

Example classification matrix

	Year 1		Year 2		Year 3	
Species	**Status of plant growth**	**Next management**	**Status of plant growth**	**Next management**	**Status of plant growth**	**Next management**
Giant hogweed	Healthy	Annual control	Healthy	Annual control	Diminished	Annual control
Giant hogweed	Diminished	Annual control	Diminished	Annual control	Diminished	Annual control
Giant hogweed	Never Present	No control Monitoring based on risk	Never Present	No control Monitoring based on risk	Healthy	Annual control
Japanese knotweed	Healthy	Annual control	Diminished	Two yearly control	Diminished	Two yearly control
Japanese knotweed	Diminished	Two Yearly control	Diminished	Two yearly control	Eradicated and recovering	No control Monitoring every 1, 2 or 3 years
Japanese knotweed	Never Present	No control Monitoring based on risk	Never Present	No control Monitoring based on risk	Never Present	No control Monitoring based on risk
Himalayan balsam	Healthy	Annual control	Diminished	Annual control	Diminished	Annual control
Himalayan balsam	Diminished	Annual control	Diminished	Annual control	Eradicated and recovering	No control Monitoring every 1, 2 or 3 years
American skunk cabbage	Healthy	Annual control	Healthy	Annual control	Diminished	Annual control
American skunk cabbage	Diminished	Annual control	Diminished	Two yearly control	Eradicated and recovering	No control Monitoring every 1, 2 or 3 years

What does this look like for a species assessment?
American skunk cabbage - 2025

Species	Partner	Classified Sites		Healthy		Diminished		Eradicated		Diminished and Eradicated Combined	
		Number of sites	Total length (m)	Number of sites	Length (m)	Number of sites	Length (m)	Number of sites	Length (m)	Number of sites	Length (m)
American skunk cabbage	Beauly	7	9210	6	7090	1	2120	0	0	1	2120
	Cromarty	11	25380	7	9080	3	14500	1	1800	4	16300
	Dee & Don	19	45400	7	10800	11	34000	1	600	12	34600
	Deveron	2	2100	1	1700	0	0	1	400	1	400
	Esks	0	0	0	0	0	0	0	0	0	0
	Findhorn, Nairn and Lossie	0	0	0	0	0	0	0	0	0	0
	Ness	4	6300	3	2800	0	0	1	3500	1	3500
	Spey	10	16000	9	14000	0	0	1	2000	1	2000
	Tay	13	41710	4	10360	4	16000	5	15350	9	31350
SUMMARY	**Sites**	**66**		**37**		**19**		**10**		**29**	
	% of total sites	**100**		**56.1**		**28.8**		**15.2**		**43.9**	
	Total site length (m)		**146100**		**55830**		**66620**		**23650**		**90270**
	% of total site length		**100**		**38.2**		**45.6**		**16.2**		**61.8**

Tay 2025 site classification summary (draft)

- 92 active management / control sites
- 124 species control actions as some sites >1 species
- Control section plant status at end 2025
    - 11 Healthy
    - 98 Diminished
    - 15 Eradication
- Control/visiting site schedule 2026
    - 69 annual
    - 40 biennial
    - 7 triennial
    - 15 eradication sites now being monitored

Giant hogweed at Bertha Park Bridge, River Almond

2022

Pre control

2023

105 hours control
8.64L neat herbicide
Foliar spray
DOMINANT (50-100%)

2024

52 hours control
3.7L neat herbicide
Foliar spray
DOMINANT (50-100%)

2025

28 hours control
1.12L neat herbicide
Foliar spray
ABUNDANT (30-50%)

2023 to 2025
73% reduction in control time
87% reduction in chemical volume

Site classification for 2026
Plant status = D – Diminished
Plant control = A - Annual

Sites moved to Eradication

Cultullich, River Tay

2021

No knotweed recorded since 2021
No hogweed recorded since 2023

Site classification for 2026

Knotweed =
Plant status = Eradicated
Plant control = Monitor

Hogweed =
Plant status = Eradicated
Plant control = Monitor

2023

Summary and Conclusions - What does this give us?

1. For each species and site, an assessment of the status of the plant growth present
2. Show change of infestation status over time
3. Specify future control (annual, biennial or triennial) based upon status of plant growth AND species being managed
4. Determine frequency of monitoring at eradication sites based on risk (species and location) of reinfestation
5. Include sites where invasive plants have never been present, but where we monitor for presence – and respond to new records
6. Summarise, by species, plant status and control for each year (and across years) to show impact of our work, progress made and report more clearly
7. Plan future control based on site assessment and management need of species – helps manage staff time and plan control commitments

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