Invasive Species Management Plan

Eradication of Brazilian jasmine *Jasminum fluminense* from Anguilla

This document presents an eradication plan for Brazilian jasmine *Jasminum fluminense* from Anguilla. Brazilian jasmine is a woody vine frequently planted within hotel landscapes that could be relatively easily eradicated from the limited populations in which it is currently found on Anguilla.

The plan includes biosecurity actions to reduce the risk of reinvasion.

There are four main sections:

Section I Situation analysis: provides the background, justification and general information on the problem: why this species needs to be managed, who is concerned and who will be involved in implementing the action plan.

Section II Technical considerations: identifies and assesses the different management options available, with their respective pros and cons.

Section III Action plan: outlines the proposed procedure, based on the information and constraints outlined in Sections I and II.

Section IV Further information: references and links for further information on the target species and management methods considered.

Annexes include information on the target species, and any best practice guidelines appropriate for managing it.

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Section I. Situation analysis

This section provides background, justification and general information on the problem.

Title	Response
Target species	(Give common and scientific names) Brazilian jasmine *Jasminum fluminense*
Distribution in territory	(As detailed as possible) Currently thought to occur only in a small number of populations (5-10) and small total area (<1ha) on the main island of Anguilla, probably associated with hotels. However, the exact distribution of the species is not known and there is low confidence in the situation assessment for this species.
Why is the species a problem?	(Justify why this species needs to be managed, summarising it's impacts on biodiversity, the economy and/or public health) Known to be highly invasive in the tropics and can form dense thickets, smothering native vegetation, modifying ecosystems and reducing plant diversity.
Does the species provide any beneficial effects?	(Identify any benefits this species provides) Popular ornamental species for landscaping and in gardens.
Previous or current management in the territory	(Summarise previous successes and failures at managing this species, if any) This species has not been managed before in Anguilla.
Pathways of entry	(How does this species arrive in the territory?) Intentional introduction as an ornamental, most likely imported for planting around hotels.
Pathways of spread	(How does the species spread within the territory? This may be different for different life stages) Moved and planted by people. *J. fluminense* spreads by seeds and vegetatively by cuttings and lateral extensions of the stems.
Gaps in knowledge?	(Identify any key areas where knowledge is lacking, if any) Mapping required to confirm the current distribution and abundance. It is not known how much it reproduces sexually versus asexually in Anguilla. This might have a bearing on the management and monitoring strategy in terms of speed and timing of recovery of remaining populations post-treatment.
Legal framework	(Identify the legislation covering management actions for this species in terms of what can be done, gaps) • Plant Protection Act: ○ Can restrict the importation of plants that may pose a pest or disease risk

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Key stakeholders affected by this species	(List the key stakeholders and note briefly their interest in this species – impacts or benefits. Add lines as necessary)	
	Stakeholder	**Interests**
	Hoteliers	Reluctant to lose landscaping plants
	Householders	Reluctant to lose landscaping plants
	Environment	Concerned about invasion into the wider environment
	National Trust	Concerned about invasion into the wider environment
Agencies involved in management	(List the agencies or bodies who would be involved in managing this species. Add lines as necessary)	
	Agency	**Role**
	Environment	Lead agency Implement the action plan
	National Trust	TBC
	Hoteliers	Follow-up monitoring for new sprouts, removing seedlings
	Householders	Follow-up monitoring for new sprouts, removing seedlings
Any other relevant information	(Include any other information relevant to management of this species) Identified in the prioritisation exercise in March 2020 as a species with a high feasibility of eradication[1]. Eradication is thought to be very feasible, given the current situation and relative ease and effectiveness of methods. However, confidence in the situation assessment is low and the species distribution needs to be confirmed. There is a substantial risk of reinvasion post-eradication and regulation may be required to prevent further import / use of this plant.	

[1] See the workshop report at http://www.nonnativespecies.org//downloadDocument.cfm?id=2285

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Section II. Technical considerations

This section assesses the different management options available.

Goal	(Identify where you want to be in the future. For example: eradication of species X from Y Cay) Brazilian jasmine will have been completely eradicated from the territory of Anguilla, with a low, managed, risk of reintroduction.
Objectives	(What you want to happen in order to reach the goal. Add extra lines if required)
	1. Removal of mature plants
	2. Programme of manual removal of seedlings and small plants.
	3. Promotion of alternative native or non-invasive species

Assessment of possible management methods

List the possible methods for management if there are more than one. Examples are: manual removal; using pesticides; biocontrol, etc.). Add extra lines if required.

Method	**Summary outline of the method**	**Pros** Consider: effectiveness, practicality, existing expertise, cost, negative impacts, and acceptability	**Cons**	**Conclusion on feasibility**
Manual removal	Seedlings and small plants can be removed by hand.	Very effective and practical, no negative impact	Cheap: labour costs only. Can be done by volunteers	Very feasible: stops re-growth
Manual removal and herbicide treatment	Larger plants can be cut at ground level and stump treated using triclopyr herbicide. Follow up treatments and repeated applications will likely be necessary. Given the assumed restricted distribution of this species, hotels would need to agree to	Very effective and practical. Impact of herbicides on the environment minimised by using	Hoteliers and householders may be reluctant to lose large feature vines	Very feasible: would require communications actions with stakeholders to ensure acceptance. Formulations of suitable herbicides are available for spot

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	remove the plant as well as any plants being removed from the wild.	stump treatment (not applying a general spray)	Concerns about the use of herbicides on the high water table in Anguilla. Cost includes labour plus cutting equipment, and herbicides / herbicide application equipment / PPE	application, and application near water sources. Non-invasive replacement species could be recommended and/or arranged.
Biocontrol	No species-specific biocontrol agent currently known.	Overcomes hoteliers' and householders' reluctance to accept the loss of landscaping plants	Expensive, and no known agent at the present	Not currently feasible

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Section III Action Plan

This is the proposed procedure, based on the information and constraints outlined in Sections I and II.

Title	**Response**		
Strategy to be used	(Note that this may use a combination of the methods outlined in Section II) Manual removal and herbicide treatment of Brazilian jasmine		
Budget (add extra lines as required)	**Item/action**	**Sources of funding**	**Cost $**
	Labour	TBC	$ TBC
	Transport, fuel	TBC	$ TBC
	Herbicides, application equipment, PPE	TBC	$ TBC
	Communications materials	TBC	$ TBC

Actions

The objectives come from the table in Section II. Actions should include stakeholder engagement, and post-management surveillance. Add further objectives if required.

Objective 1. Removal of mature plants		
Proposed procedure (add more lines as necessary)		
Timeline	**Action**	**Responsible**
TBC	Map existing distribution of Brazilian jasmine	TBC
TBC	Train teams in safe herbicide application techniques for stump treatment in the context of concerns about herbicide impact on the water table. Teams will also be trained in the disposal of cut plant material	TBC
TBC	Communications and awareness programme with the community to raise awareness and promote compliance	TBC
TBC	Arrange access to plants on private property as necessary	TBC

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TBC	Implement programme of cutting and stump treatment	TBC

Objective 2. Programme of manual removal of seedlings and small plants.		
Proposed procedure (add more lines as necessary)		
Timeline	**Action**	**Responsible**
TBC	Manual removal of seedlings post-treatment of mature plants	TBC
TBC	Campaign of public engagement to check for and remove seedlings in private property	TBC
TBC	Training of DECR, Public Works, Agriculture and National Trust staff on identification of Brazilian jasmine seedling and adult stages	TBC
TBC	Monitoring post-eradication of all affected areas and buffer zone to ensure all plants and new seedlings are removed.	TBC

Objective 3. Promotion of alternative native or non-invasive species		
Proposed procedure (add more lines as necessary)		
Timeline	**Action**	**Responsible**
TBC	Communications and awareness programme with the community (and particularly for hoteliers) on alternative native and non-invasive species	TBC
TBC	Nurseries encouraged to propagate native species?	TBC
TBC	Information materials on suitable alternative species prepared and distributed?	TBC

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	Materials created for this purpose could be for multiple species, similar to Hawaii's "Plant Pono" campaign: https://plantpono.org/pono-plants/	

Biosecurity measures required to prevent reinvasion		
Proposed procedure (add more lines as necessary)		
Timeline	**Action**	**Responsible**
TBC	Importation of Brazilian jasmine into Anguilla to be prohibited.	TBC
TBC	Biosecurity inspectors and agriculture officers trained in identifying this species.	TBC
TBC	Factsheets developed for biosecurity inspectors and customs officers. Information shared with all ports of entry	TBC
TBC	Inter-island biosecurity measures implemented	TBC

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Section IV Further information

For further information see the references and links below.

References

IUCN (2018). Guidelines for invasive species planning and management on islands. Cambridge, UK and Gland, Switzerland: IUCN. Viii + 40pp.

Booy, O. *et al*. (2020). Prioritising the management of established invasive non-native species in Anguilla: eradication and spread prevention. March 2020. http://www.nonnativespecies.org//downloadDocument.cfm?id=2285

Links

- CABI Datasheet https://www.cabi.org/isc/datasheet/115014
- University of Florida Center for Aquatic and Invasive Plants http://plants.ifas.ufl.edu/plant-directory/jasminum-fluminense/
- USDA https://plants.usda.gov/core/profile?symbol=JAFL
- Risk assessment for Hawaii https://plantpono.org/hpwra/jasminum-fluminense/

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Annex 1. Information on the target species

Species name	(Common and scientific names) Brazilian jasmine *Jasminum fluminense*
Description	(Give details of all stages in the life cycle) *J. fluminense* is native to Tropical Africa and the Arabian Peninsula. Evergreen, woody, and twining vine reaching 4-6 metres in length. Stems are cylindrical, up to 1 cm in diameter, glabrescent when mature, with numerous lateral branches. Leaves are 5-10 cm long; leaflets 2-5 × 2-3.5 cm (terminal leaflet larger than the lateral ones), broadly oval in shape. Numerous fragrant white flowers. Fruit is shiny purple / black, 5-8 mm in diameter.
Similar species	(Give details of any other species which could be confused with the target species) None present in Anguilla.
Life cycle	(Include seed bank longevity for plants) *J. fluminense* can be found flowering throughout the year. In Puerto Rico, this species commonly flowers from September to December and fruiting is from January to August. Under favourable conditions, plants of *J. fluminense* can survive for several years and fruits are produced in abundance. Germination rates are high and dense plots of seedlings can be found in the field. *J. fluminense* also roots whenever stems come in contact with the ground. The stems of established plants may extend as much as 2 or 3 m in one year. Seedlings grow much more slowly. *J. fluminense* spreads by seeds and vegetatively by cuttings and lateral extensions of the stems.
Ecology and behaviour	It has great dispersal capacity due to seeds which can be easily dispersed by birds and mammals. *J. fluminense* prefers to grow in areas receiving about 750 to 1800 mm of annual rainfall, from near sea level to more than 600-800 metres in elevation. This species is adapted to a great variety of soil types but does not tolerate poorly drained soils. It is restricted to areas with minimum temperatures above 1.7°C and is able to grow on the coast in areas that do not receive salt spray. The plant tolerates partial shade, but grows rapidly climbing up areas in the canopy of the forest with better sunlight.
Habitats	*J. fluminense* can be found growing along roads, in pastures, riverbanks, agricultural fields, forest gaps, and disturbed areas as well as in moist undisturbed forests in tropical and subtropical regions. It is commonly planted as an ornamental in gardens, yards, fence-lines and hedges.

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Any other relevant information	The risk of introduction of *J. fluminense* is very high. This species has been intentionally planted as an ornamental in many tropical and subtropical regions. It has escaped from gardens and spreads rapidly into natural forest, climbing into the canopy of mature trees completely engulfing native vegetation. Widely available on the internet.

Brazilian jasmine. Image © Forest Starr & Kim Starr - CC BY 4.0

Brazilian jasmine mature fruits. Image ©Smithsonian Institution/Pedro Acevedo-Rodriguez- CC BY 4.0

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Annex 2. Best practice guidelines

A. General guidelines

General guidelines for weed control are:

- Timing is important, you need to hit weeds before they start flowering: “1 years weed is 7 years seed”
- Do not start without planning for follow-up.
- Look at the big picture: what will happen when the target weed is removed? Worse ones can come in, especially if removal results in disturbed land, and some weeds can be useful in sheltering newly planted endemic species.
- Pick the right method for the job - not just with regards the weed species but also taking into consideration the context. There are two main approaches:
    - Large-scale short-term action with relatively little input: typically for agricultural and pasture clearing.
    - Longer term action, of varying scale and often with high input: typically for conservation work.
- When tackling a widespread weed, start with the outliers. Remove these first, and then focus on the main area of infestation.
- Success can be achieved only by on-going removal. Don’t think you can do it with a single one-off treatment.

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B. Best practice guidelines on disposing of cut weeds

Poor disposal, such as dumping green waste over a fence or in the forest is one of the main ways that weeds escape from gardens and start spreading. Some of the ways to minimise the spread of weeds through responsible disposal of green waste include:

- Drying (any weed):
    - Leave weeds in the sun to dry before disposing of them.
    - Rhizomes or tubers can be hung up in trees in dry regions to wither. Then burn them or take them to the landfill site.
- Burning (rushes, grasses, woody weeds):
    - Dry cut weeds and then burn them in a bonfire or simple incinerator made from a 40 gallon oil drum. Be careful not to create a large fire which can go out of control.
- Bagging and rotting down (weed with seeds, weeds with bulbs and tubers):
    - Dispose of weeds that are already seeding or readily able to reproduce vegetatively, including through suckers and bulbs, by placing them in a black plastic bag, sealing it and 'baking it' in the sun until destroyed.
- Composting (any small weeds, the leafy parts of larger weeds and woody weeds)
    - Remove any problem parts (tubers, rhizomes, berries & fruit) and either take them to the landfill site, rot them down in a black bag or dry them for burning, as described above. Compost the other parts of the plant.
    - Cover your compost so that seeds cannot be distributed by wind or animals.
    - Do not compost tubers or roots such as ginger that are likely to re-sprout and are not likely to be killed in compost heaps.
- Mulching and chipping (larger leafy and woody weeds):
    - Finely shredding weeds in a garden mulcher before burying or composting will increase the rate of breakdown.
    - Mulched weeds such make an excellent slow-release feed for fruit trees.
    - Mulches and wood chip ground covering help suppress new weed growth and hold moisture in.
- Transporting to the landfill site (any weed material):
    - Always cover trailers when transporting plant material to prevent seeds and other live plant material falling off.
    - Don’t fill the trailer or truck so full that weeds can fall off.
    - Never transport weeds in full seed or you will just spread seeds across the land. Bag up any plants with seeds before transporting them off the site.
- Leaving in situ (any weed with seed heads or fruit, any weeds where moving cut plant material would cause damage):
    - Cut weeds can be piled, or left lying as they fall, depending on the situation.
    - Note that rats can use piles of cut plant stems as refuges.

C. Best practice guidelines for spraying herbicides

Main points are:

- Always read the product label for dose rate, conditions of use and the personal protective equipment required.
- The standard minimum personal protective equipment is: rubber boots, nitrile gloves and coveralls. A face shield is also recommended, especially when mixing the herbicide in the tank.
- Never spray when it is windy or when it is wet.
- The best time to spray is early in the morning or late in the day.
- Most herbicides only work on growing plants, they need to be lush and green at the time of spraying.
- Most herbicides are applied by spray set at low pressure, and fitted with a solid cone nozzle. This is a different nozzle to what would be used to apply insecticides.
- Spraying drought stressed plants should be avoided as plants in this condition will not absorb sufficient herbicide to kill them.
- Try to ensure an ever coverage of spray, including on the undersides of the leaves.
- Always check the product label.

Some herbicides commonly used:

Glyphosate (eg Roundup, Roundup Probioactive)

- A general broad-spectrum herbicide which kills a wide range of weeds and is particularly good at annual broadleaf weeds and grasses.
- Has systemic action, absorbed mainly through the leaves. There is little absorption through the roots.
- Binds strongly to soil and can persist for up to 6 months. Water pollution is minimal. Under the right conditions it is also readily degraded by soil microorganisms.
- May be carcinogenic to people, but does not pass easily through the skin.
- Pure glyphosate is low in toxicity to fish and wildlife, but some products containing glyphosate may be toxic because of the other ingredients in them.

Triclopyr (eg Garlon 480, Garlon Max)

- More selective than glyphosate, particularly good at annual broadleaf weeds and woody weeds. It will not kill grasses or conifers if used at the correct dose as prescribed by the label.
- Has systemic action, absorbed through the leaves, green stems, and roots.
- Does not bind to soil, and risk of water pollution exists, but sunlight rapidly breaks down triclopyr in water. It is readily degraded by soil microorganisms.
- No evidence of carcinogenic action in people, and not very toxic to people, animals or aquatic organisms.

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