LOCAL INVASIVE PLANT CONTROL MANUAL

for Anguilla

PREPARED BY

DEPARTMENT OF NATURAL RESOURCES ANGUILLA

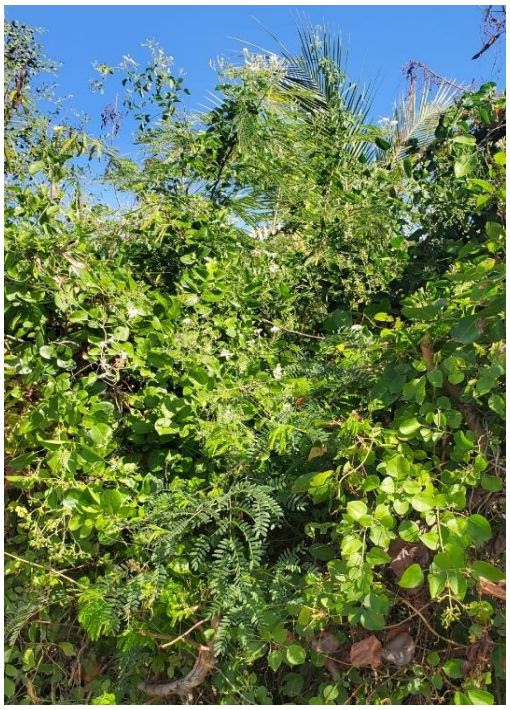
The Local Invasive Plant Control Manual for Anguilla has been produced under the project DPLUS125 "Protecting Anguilla's biodiversity by building capacity in invasive plant management" funded by Darwin Plus and administered by the Department of Natural Resources – Environment Unit. Project partners include the Great Britain Non-native Species Secretariat and Durham University.

Alan Tye and Zoya Buckmire of the project team have compiled these guidelines. For additional guidance or clarity on any of the methods or herbicides contained in this manual, feel free to contact the Agriculture Unit (DNaR).

Contents

Introduction

Anguilla has over 600 known species of plants, almost half of which are introduced (not native) to the country[1]. Throughout history, plants have been introduced for various reasons, including for food, lumber, traditional medicine, and landscaping purposes. Although most introduced plants are harmless, a small subset of these species are currently causing or have the potential to cause negative environmental, social, health, and/or economic impacts to the island, and these are termed **invasive species**.



Vines, like Brazilian jasmine shown here, can quickly overgrow and smother native vegetation

Problems caused by invasive plants include[2]:

- Competition with native plants and crops for light, water, and nutrients
- Smothering or overgrowth, reducing native plant diversity and making farming or gardening more difficult
- Displacement of food crops, resulting in economic losses and lowered food production
- Altering of soil nutrient cycles (e.g., nitrogen cycles) or likelihood of fires
- Hosting or providing habitat for other harmful organisms, including crop pests and carriers of human and animal diseases
- Physical risk to humans due to spines, thorns, irritation-causing sap/latex, etc.
- Poisoning risk to humans and livestock due to toxic seeds, which may also contaminate food crops
- Damaging roads, buildings and other structures, e.g., climbing vines and trees with strong roots
- Invading water bodies, reducing water quality and aquatic life
- Blocking waterways, reducing proper drainage and increasing the risk of flooding
- Preventing access to natural resources like the ponds, and blocking roads and paths

[1]Hochart, J., Buckmire, Z., and Tye, A. (in press 2024). Preliminary Checklist of the Flora of Anguilla. Anguilla Department of Natural Resources and Anguilla National Trust, The Valley. For a copy, contact the DNaR.
[2] Witt, A. 2024. Guide to the Naturalized and Invasive Plants of the Caribbean. CABI.

With these many negative impacts, it is clear that we need to manage invasive plants to minimize their effects on local ecosystems and people. However, there are several factors to consider that may influence invasive species control, including but not limited to:

- The extent (size) of the invasive plant population – smaller patches of plants will be easier to control, and are less likely to have outliers that you may miss
- How well-established the plants are – a newer infestation will be easier to get rid of, and less likely to have seeds in the soil that will continue to germinate after removal
- Type and size of the plants – herbs are generally easier to kill than hard-stemmed shrubs and trees, and taller plants will require different treatment methods (e.g., spraying the trunk rather than spraying the foliage)
- Density and distribution of population – dense populations may be easier to control but harder to walk through, while sparse populations are more accessible but may make detection of seedlings and outliers more difficult
- Costs of treatment in terms of both time (labour) and inputs (tools, herbicides)

Currently, the Department of Natural Resources - Environment Unit is undertaking an invasive plant project (DPLUS125) aimed at raising awareness of invasive plants and building local capacity to address them. This project, "**Protecting Anguilla's biodiversity by building capacity in invasive plant management**", is due to end in March 2025. The project focuses on five species of invasive plants that were identified in stakeholder consultations in 2020−2021; the mapped distribution of these five plants as of September 2024 is shown in Appendix 1. In particular, the project team is actively involved in the management of the Tropical Bull-nettle (shown right), which was selected due to its abundant fine spikes on all areas of the plant−including the leaves, stems, and seed pods−that cause painful irritation and are a risk to human health.

Although the scope of the DPLUS125 project does not include management of other invasives, we recognize their many impacts on Anguilla's ecosystems and acknowledge that other widespread

invasive species, like the wild moses, need to be managed as well. This document aims to equip you, the public, with the knowledge needed to manage invasive species on your own, whether in your gardens, farms, or workplaces. It is our hope that this resource is widely used by all interested in invasive plant management, towards a community-based and collaborative approach to invasive species prevention and management in Anguilla. As the project slogan says: "Together let's stop the spread of invasive plants in Anguilla!"

Throughout this document, we use local names for invasive plants on Anguilla. Scientific names of all plant species mentioned are given in Table 2 (pp. 11−17).

Control options for invasive plants

When choosing an option for controlling invasive plants, you should try to meet the following criteria:

1. **Effectiveness:** the best option is one that works perfectly, killing all of the targeted plants
2. **Safety:** the best option should be completely safe and cause little or no damage to anything else, including non-target vegetation, wildlife, and ourselves as operators
3. **Lowest cost:** the best option is free or at least affordable

We may never achieve all three criteria perfectly, but we should always aim to get as close as possible to these ideals.

There are three main types of treatment for invasive plants: biological, physical, and chemical.

Biological

Biological control (also known as biocontrol) involves introducing an insect, fungus, or other organism that attacks only the target plant species. Generally, the control agent will come from the same region as the invasive plant. This method is useful if such an agent is already known and well tested, and can be obtained "off-the-shelf" without the need for extensive research and testing; the initial costs for testing and introduction of a biocontrol agent are high, but if successful, it requires no long-term upkeep.

Biocontrol is best for target plants that are widespread and near impossible to control effectively by physical or chemical techniques. On Anguilla, this method may be suitable for the following plants, which have documented biocontrol agents used for management elsewhere[2]:

- a leaf beetle (*Acanthoscelides macrophthalmus*) for wild moses;

- two species of weevils (*Microlarinus lypriformis / layeynii*)[3] for the false puncture vine;
- a moth (*Euclasta whalleyi*) and a rust fungus (*Maravalia cryptostegiae*) for rubbervine;
- six known agents for burr weed.

However, these biocontrol agents would require specificity testing by the DNaR before they can be approved for use in Anguilla. Thus, no individual is allowed to import or release biocontrol agents; they can only be administered by the DNaR.

How does biological control match the criteria?

1. **Effectiveness**: variable, can be high but never 100%. ±
2. **Safety:** very safe, but only if proper specificity testing is done. √
3. **Cost:** minimal after initial testing and introduction. √

Physical

Physical control includes manual, mechanical, grazing, and fire, which are the use of human labour, heavy machinery, large animals, and burning, respectively, to clear target plants. Manual removal can be selective, but the other three methods are better suited for site-focused control as they can cover large areas, but are often indiscriminate and affect most or all of the vegetation. It is difficult to avoid damaging non-target species with mechanical, grazing, or fire control, so these methods should only be used in small or densely invaded areas where there are few important non-target plants you want to protect. Fire, animals, and heavy machinery can be difficult to control, so we recommend that trained specialists are hired for these methods. The use of machines and grazing animals can also spread seeds to new sites, so machines should be thoroughly cleaned after use and animals should be confined to the target site after grazing.

How do mechanical, grazing, and fire control match the criteria?

1. **Effectiveness**: generally low, potential regeneration from roots or seeds. ×
2. **Safety**: grazing safe √, mechanical and fire hazardous. ×
3. **Cost**: relatively low per unit area treated. √

[3] Great Britain Nonnative Species Secretariat. 2020. Invasive Species Management Plan: Eradication of the false puncture vine *Tribulus cistoides* from Anguilla.

Manual

On the other hand, manual control can be more selective and is well suited for some situations. Manual control mostly involves the use of sharp tools like a machete, saw, axe, hoe, spade, etc. Methods can include pulling out seedlings by hand, digging up (medium-sized) plants, cutting shrubs and vines, felling trees, or ring-barking trees. All of these methods are physically demanding and time-consuming, so the labour costs can be quite high. Use of sharp tools can also be a hazard to operators, as well as felling trees, so again trained personnel are needed. Manual methods can be used for almost any plant species, although special care must be taken when removing plants with thorns or spikes to minimize the risk to the operator. Uprooting works well for species with simple roots that are easy to pull up, like yerba porosa, and the difficulty of removing hardier plants will determine the tools necessary.

How does manual control match the criteria?

1. **Effectiveness**: variable, some species regrow. ±
2. **Safety**: variable, need staff training. ±
3. **Cost**: high, because labour-intensive. ×

The effectiveness of all physical control methods may be limited by plants surviving or regenerating from stumps, roots, and the seed bank. To avoid unnecessary repeated work, only use these methods on plants that cannot regenerate from their stumps or roots. New growth from the seed bank can then be treated by pulling out seedlings or with herbicides (see "Regrowth" under Chemical control). If possible, physical control should be done before the plant produces seed to reduce the need for continued treatment. The effectiveness of all physical control methods varies; see summarized in Table 1.

Chemical

Chemical control involves applying a chemical agent (herbicide) to the target plant. There are multiple application methods that are each suitable for different types of plants. These include **foliar** (spray herbicide on leaves, flowers and stems), **basal bark** (spray herbicide on stem base only), **injection** (inject herbicide into stem or rootstock), and **hack and squirt** (apply herbicide into shallow cuts in stem).

Sometimes, it may be best to combine chemical control with some form of physical control, producing hybrid methods like **ring-bark and spray** (spray herbicide onto ring carved around the stem), **paint stump** (fell tree and apply herbicide on stump), and **regrowth** (cut shrubs, vines or trees, wait for

new growth then spray with herbicide). The effectiveness of these methods varies—see summarized in Table 1; the recommended methods are explained in greater detail next.

Foliar spray

This method involves spraying the aboveground parts of the target plant with correctly diluted herbicide, using either a hand-held or backpack sprayer. It is difficult to minimize damage to non-target plants as the spray may drift onto plants around the area; however, this method is ideal in areas where there are few non-target plants or where the intermingled vegetation is not ecologically or economically important. Do not use foliar spray on tall vegetation (no "spraying up") or in windy conditions, as it increases the risk to non-target plants and operators. Overall, this is less labour intensive than manual control, but the lower labour costs are offset by higher costs for equipment and herbicide purchase.
In Anguilla, use for: false puncture vine, tropical bull nettle, rubbervines, coral vine, burr weed, burr grass, fountain grass, wild moses, neem, castor bean, Brazilian jasmine, yerba porosa, Chinese violet, snake plants, periwinkle, barleria

Basal bark

This method involves spraying the base of large stems (especially shrubs and trees) with moderately diluted herbicide, using a hand-held or backpack sprayer. The herbicide is applied more precisely than foliar spray, reducing the quantities used, risk to non-target vegetation, and risk to operators. Because most herbicides will not penetrate bark, a special bark-penetrating herbicide such as triclopyr ester is needed (see Table 3 for more details on herbicide options); these tend to be more expensive but smaller amounts are used so it is still a cost-effective method.
In Anguilla, use for: wild moses, tropical bull nettle, castor bean, rubbervines, Brazilian jasmine, giant milkweed, beach cabbage, snake plants, neem

Hack and squirt

This method has two steps: first make a ring of shallow cuts around the stem of the target plant ("hack") and then "squirt" a small quantity of undiluted herbicide into the cuts. The herbicide needs to be applied immediately after (within 1–2 minutes), before the wood vessels contract. Equipment is relatively cheap, as you only need a machete or similar blade, and a pressure can or a squeeze bottle with a long nozzle. The risk to operators and non-target plants is low, and overall the method is cost-

and labour-effective. It is suitable for medium-to-large woody plants with a main stem, and even large trees, but can be tricky for multi-stemmed species, when basal bark is often faster and more effective.
In Anguilla, use for: wild moses, rubbervines, Brazilian jasmine, neem

Paint stump

This method also has two steps, namely to cut through the tree trunk or vine stems, and then paint or spray the cut surface of the stump(s) with undiluted herbicide. It can be labour-intensive as the plant has to be cut before treatment, and there are risks associated with felling trees. For large stumps, the herbicide can be applied precisely with a paintbrush, but this must be done quickly, before the wood vessels contract. Herbicide can be sprayed onto multiple smaller cut stems, but this creates some risk to non-target plants. Overall, stump painting can work for many woody plants, including trees, but simple cutting may suffice in many cases, or basal bark may work better and be cheaper.
In Anguilla, use for: wild moses, rubbervines, Brazilian jasmine, giant milkweed, beach cabbage, snake plants, castor bean, neem

Regrowth

This method involves treating new growth after initially removing target plants by physical methods. The new shoots are sprayed with herbicide diluted as for foliar application, and this reduces the amount of herbicide used because the bulk of the target plant has already been removed. There remains a risk to operators using tools and machinery in the first step, and the method is labour-intensive, with moderate equipment and herbicide costs. This method can be used on most woody plants, but is especially suitable for plants in dense patches, and for target plant species that mostly die after cutting and produce minimal regrowth that needs to be sprayed.

Table 1: Comparison of the effectiveness, safety, and cost of each control method

√ = meets the given criteria and is recommended, ± = situation-dependent, × = does not meet the criteria and is not recommended.

	Effectiveness	Safety	Cost	Overall	Best for
Biological	±	√	√	√	Widespread target plant with ongoing seed dispersal; cheapest when biological control agent is already known and tested
Physical					
Manual	±	±	×	±	Plants that do not regrow after manual treatment; small sites where labour costs not excessive; sites with important non-target plants
Mechanical or Grazing	×	√	√	±	Site-focused management where non-target plant damage is acceptable and seed dispersal to other sites can be prevented
Fire	×	×	√	×	Site-focused management where non-target plant damage acceptable
Chemical					
Foliar	√	±	±	±	Areas with dense low vegetation and where risk of spray drift is minimal (no important non-target plants)
Basal bark	√	√	√	√	Trees, multi-stemmed shrubs, woody vines
Injection	±	√	±	×	Some vines and other plants with large storage roots
Hack and squirt	√	√	√	√	Medium to large woody plants > 3 cm diameter
Hybrid (physical and chemical)					
Ring-bark and spray	×	√	±	×	Woody plants with stems > 10 cm in diameter. Only worth using if target plant cannot be controlled by physical or chemical means alone.
Paint stump	±	±	±	±	Trees, multi-stemmed shrubs, and woody vines, but only for species that regrow if cut stump not treated with herbicide.
Regrowth	√	±	±	√	Areas with tall plants or dense impenetrable patches

Recommended treatments for common invasive plants in Anguilla

Table 2: Applicable control methods for common invasive plants in Anguilla

The following information has been compiled from various sources[2,4,5], based on successful treatments of the same or similar species; inclusion in this table does not mean that the methods have been tested locally nor does it signify endorsement by the DNaR.

Invasive plant species	Applicable control method
Tropical bull nettle (*Cnidoscolus urens*)[6] **DANGEROUS TO TOUCH**  	Foliar spray with glyphosate (small plants) Basal bark with triclopyr (large plants) *Manual not recommended due to abundant spikes that cause irritation and rash*
Wild moses / river tamarind (*Leucaena leucocephala*) 	Biocontrol (leaf beetle *Acanthoscelides macrophthalmus*) Manual (uprooting, cutting) Foliar spray with glyphosate (small plants) Basal bark, hack and squirt, or paint stump with triclopyr (larger plants) *Difficult to control; for better results on large trees, use paint stump method.*

[4] Kline, W.N., and Duquesnel, J. G. 1996. Management of invasive exotic plants with herbicides in Florida. Down to Earth, 51(2), 22–28.

[5] Enloe, S.F., Langeland, K., Ferrell, J., Sellers, B., and MacDonald, G. 2022. Integrated Management of Invasive Plants in Natural Areas of Florida.

[6] More details on treatment options for this species can be found in "Plan for the eradication of Tropical Bull nettle *Cnidoscolus urens* from Anguilla" produced by DNaR. Contact us for a copy if interested.

Invasive plant species	Applicable control method
Neem (*Azadirachta indica*)  	Manual (cutting, felling) Foliar spray with triclopyr and/or picloram Basal bark, hack and squirt with triclopyr Paint stump with glyphosate or triclopyr
Castor bean / castor oil tree (*Ricinus communis*) **TOXIC**  	Manual (uprooting) Foliar spray or paint stump with glyphosate Basal bark or paint stump with triclopyr
Brazilian jasmine / river jasmine (*Jasminum fluminense*)  	Manual (uprooting) Foliar spray with glyphosate Basal bark or paint stump with triclopyr

Invasive plant species	Applicable control method
Rubbervines (*Cryptostegia madagascariensis, C. grandiflora*) **TOXIC** 	Biocontrol (moth *Euclasta whalleyi,* fungus *Maravalia cryptostegiae*) Manual (uprooting, cutting) Foliar spray with picloram Basal bark, hack and squirt, paint stump with triclopyr and/or picloram *Likely to resprout or propagate from cuttings; proper disposal after manual control is critical to prevent regrowth*
Coral vine / coralita (*Antigonon leptopus*) 	Manual (uprooting) Foliar spray with glyphosate, triclopyr, or picloram *May need follow-up treatment if it resprouts from tuberous roots*
False puncture vine / Jamaican feverplant (*Tribulus cistoides*) 	Biocontrol (beetle *Microlarinus lypriformis / layeynii*) Manual (uprooting; beware the spiny seeds) Foliar spray with glyphosate

Invasive plant species	Applicable control method
Yerba porosa / shine bush (*Porophyllum ruderale*) 	Manual (uprooting before it flowers) Foliar spray with glyphosate
Chinese violet / creeping foxglove (*Asystasia gangetica*) 	Manual (uprooting) Foliar spray with dicamba
Burr grass (*Tragus racemosus, T. berteronianus*) 	Foliar spray with glyphosate

Invasive plant species	Applicable control method
Burr weed / rough cocklebur (*Xanthium strumarium*) 	Biocontrol (multiple agents available) Foliar spray with picloram
Fountain grass (*Cenchrus setaceus, C. alopecuroides*) 	Manual (uprooting, cutting, mowing) Foliar spray with glyphosate
Snake plant (*Dracaena / Sansevieria* spp.) 	Manual (uprooting, cutting) Foliar spray or paint stump with glyphosate Basal bark or paint stump with triclopyr *Plants may take 6-12 months to die, often requiring follow-up application.* *"Regrowth" method recommended with initial manual removal followed by chemical treatment of remaining plants.* *Likely to resprout or propagate from cuttings; proper disposal after manual control is critical to prevent rooting.*

Invasive plant species	Applicable control method
Beach cabbage (*Scaevola taccada*)  	Manual (uprooting, cutting) Basal bark or paint stump with triclopyr
Periwinkle / old maid (*Catharanthus roseus*) **TOXIC** 	Manual (uprooting) Foliar spray with picloram
Hop-headed barleria (*Barleria lupulina*) 	Manual (uprooting) Foliar spray with glyphosate or dicamba

Invasive plant species	Applicable control method
Giant milkweed / headache bush (*Calotropis procera)* **TOXIC** 	Manual (cutting) Paint stump with glyphosate Basal bark with triclopyr
Christmas plant, chandelier plant, mother-of-millions (*Kalanchoe / Bryophyllum* spp.) **TOXIC**  	Manual (uprooting) Foliar spray with glyphosate, triclopyr, or picloram

Tips for Disposal[7]

Before disposal, or as a means of disposal, plant material resulting from physical control can be:

- Dried in the sun – applicable to all weeds but only if no seeds are present on the material
- Burnt after drying in an oil drum incinerator (avoid open bonfires) – for grasses and woody weeds
- Sealed in black plastic bags to bake and rot in the sun – for weeds already seeding and those with vegetative bulbs and tubers

[7]Tips adapted from: Great Britain Nonnative Species Secretariat. 2020. Invasive Species Management Plan: Eradication of Brazilian jasmine *Jasminum fluminense* from Anguilla.

- Composted after removing fruits/seeds and bulbs/tubers – for small weeds and leafy parts of larger weeds
- Chipped up and used as mulch, which has the additional benefits of providing nutrients for plants and ground cover to prevent new weed growth – for woody weeds without seeds

Plant material treated as above can then be either:

- Left on site, either where it fell or piled up as needed – especially for any weeds already seeding or which would spread their seeds when transported
- Transported to the landfill, taking care to cover trailers and truck beds to prevent material from falling off. Any plants with seeds must be bagged up before moving them to avoid spreading seeds on the way and at the landfill – for all weeds

For plants treated with herbicide, ensure the plant has died completely before removing and disposing of it. Depending on which herbicide and treatment method you used, some seeds may remain viable after the plant is dead, meaning there is always a risk of spread if the plant is transported off-site.

Everything you need to know about Herbicides

Pesticides policy and recommendations for safe use

The DNaR and the Anguilla National Trust have drafted a Pesticides Policy to guide the safe and effective use of pesticides, including herbicides, in Anguilla. The document details how the policy is implemented and enforced, regulations for the importation and sale of pesticides, prohibited application methods and treatment areas, equipment specifications, and recommendations for integrated pest management. Certain pesticides are prohibited from importation or use in Anguilla, in order to reduce their impact on human health and the environment. The Policy document is not yet finalized or available to the public, so for guidance, please contact the Horticulturist at the Agriculture Unit.

In the meantime, here are some common best practice guidelines to ensure the safe and effective treatment of invasive plants. Take care to:

- Read the manufacturer instructions carefully before use
- Take note of whether the product is “ready-to-use” (already diluted) or requires dilution; some products need to be diluted in water while others need an oil like diesel
- Always dilute herbicide to the recommended specifications

- Wear your personal protective gear (PPE) and avoid contact with your skin
- Never spray into the wind or up into the air
- Check the forecast as some herbicides will not work if applied before rain (12 hours minimum)
- Dispose of unused herbicide safely (follow manufacturer instructions)

There are two main types of herbicides: **contact herbicides** and **systemic herbicides**.

As the name suggests, contact herbicides kill only the part of the plant that they touch, which are usually the aboveground parts like leaves and stems. They do not spread through the plant to other parts that they do not contact, such as the roots, which often allows the target plant to recover after treatment. Contact herbicides are generally only good for annual species.

In comparison, systemic herbicides are absorbed into the plant wherever applied and move up to the foliage and down to the roots, effectively killing the entire plant. They are further divided into either **broad-spectrum** or **selective** herbicides.

- Broad-spectrum systemic herbicides can kill a wide variety of plants, and are useful when there is not a more specific option available for your target plant. To minimize non-target damage, you must carefully choose the application technique so that the herbicide is applied only to the target plants you intend to kill. These herbicides, such as glyphosate, are usually cheaper than selective systemic herbicides.
- Selective systemic herbicides are designed to kill a particular kind of plant via its specific metabolism. Because the chemical is selective, it can be applied less precisely as it may not affect non-target vegetation; however, it is still good practice to apply as precisely as possible and not spray carelessly. There are many selective herbicides available that will kill broad-leaved plants but not grasses, including dicamba and triclopyr, but they tend to be more expensive than broad-spectrum formulations.

Generally, try to avoid commercial weedkillers with more than one active herbicide ingredient—simple is best. Instead, choose a formulation that has only one active ingredient that will work for your target species. There are a few exceptions to this rule of thumb, particularly multi-ingredient weedkillers for use on lawns, which will not kill the grass.

Table 3: Herbicides (and where to find them)

"Class" describes the type of herbicide as explained above, and "Good for" details the types of plants the herbicides works well against. Recommended PPE[8] is the minimum personal protective equipment applicators should use, but please read the product label carefully and use what is required in each case. More information on the different herbicides can be found here[5].

Triclopyr	
Class: selective systemic Good for: woody (penetrates bark) and broadleaf plants (does not affect most grasses) Recommended PPE: long sleeved shirt, long pants, closed shoes and socks, chemical resistant gloves Brand name examples: Garlon 4 Ultra, Ortho Weed B Gon Available at: Lake's Do It Best	
Glufosinate ammonium	
Class: broad-spectrum contact Good for: broadleaf weeds and grasses, including some species resistant to glyphosate Recommended PPE: long sleeved shirt, long pants, closed shoes and socks, chemical resistant gloves, protective eyewear Brand name examples: Eliminator 20% SL, Bonide KleenUp Available at: ABC Supplies, Anguilla Garden Center	

[8] Neal, J., and Senesac, A. 2018. "Table 1. Signal words, PPE and OMRI certifications for glyphosate and chemical alternatives for use in managed landscapes". https://content.ces.ncsu.edu/are-there-alternatives-to-glyphosate-for-weed-control-in-landscapes.

Glyphosate	
Class: broad-spectrum systemic Good for: broadleaf weeds and grasses Recommended PPE: long sleeved shirt, long pants, closed shoes and socks Brand name examples: RoundUp, Martin's Eraser, Bonide KleenUp Available at: ABC Supplies, Anguilla Garden Center, Top Shop Hardware	   **NB: HEALTH RISK. Exposure (through unprotected skin and eyes) may cause health issues in applicators, so follow all usage guidance carefully**
Paraquat dichloride	
Class: broad-spectrum contact Good for: annual broadleaf weeds and grasses but will not kill roots of perennial plants. Recommended PPE: long sleeved shirt, long pants, closed shoes and socks, chemical resistant gloves, protective eyewear, respirator Brand name examples: Herbaxon, Gramaxone Available at: Agriculture Unit - DNaR	 **NB: RESTRICTED USE. Paraquat is toxic to people and animals and may only be applied by licensed applicators**

Some herbicide formulations to avoid:

- Plainview – contains imazapyr, aminocyclopyrachlor, and indaziflam
- Spectracide – contains 2,4-D, sulfentrazone, diquat, dicamba, and more
- Some formulations of Roundup containing more than 1 active ingredient, e.g., glyphosate and triclopyr or glyphosate and diquat
- Combination herbicide and fertilizer, e.g., Spectracide Weed & Feed, which make it difficult to know or control the amount of herbicide used

Further reading

If you want to learn more about invasive plants and tools for their management, the following resources may be helpful.

General guides to management:

Witt, A. 2024. Guide to the Naturalized and Invasive Plants of the Caribbean. CABI. www.cabidigitallibrary.org/doi/book/10.1079/9781800623453.0000.

Enloe, S.F., Langeland, K., Ferrell, J., Sellers, B., and MacDonald, G. 2022. Integrated Management of Invasive Plants in Natural Areas of Florida. University of Florida, Institute of Food and Agricultural Sciences. www.edis.ifas.ufl.edu/publication/WG209.

Tu, M., Hurd, C., and Randall, J.M. 2003. Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas. The Nature Conservancy - Wildland Invasive Species Team. www.invasive.org/gist/products/handbook/methods-handbook.pdf.

Kline, W.N., and Duquesnel, J.G. 1996. Management of invasive exotic plants with herbicides in Florida. Down to Earth 51(2), 22–28. www.silo.tips/download/anagement-of-invasive-exotic-plants-with-herbicides-in-florida.

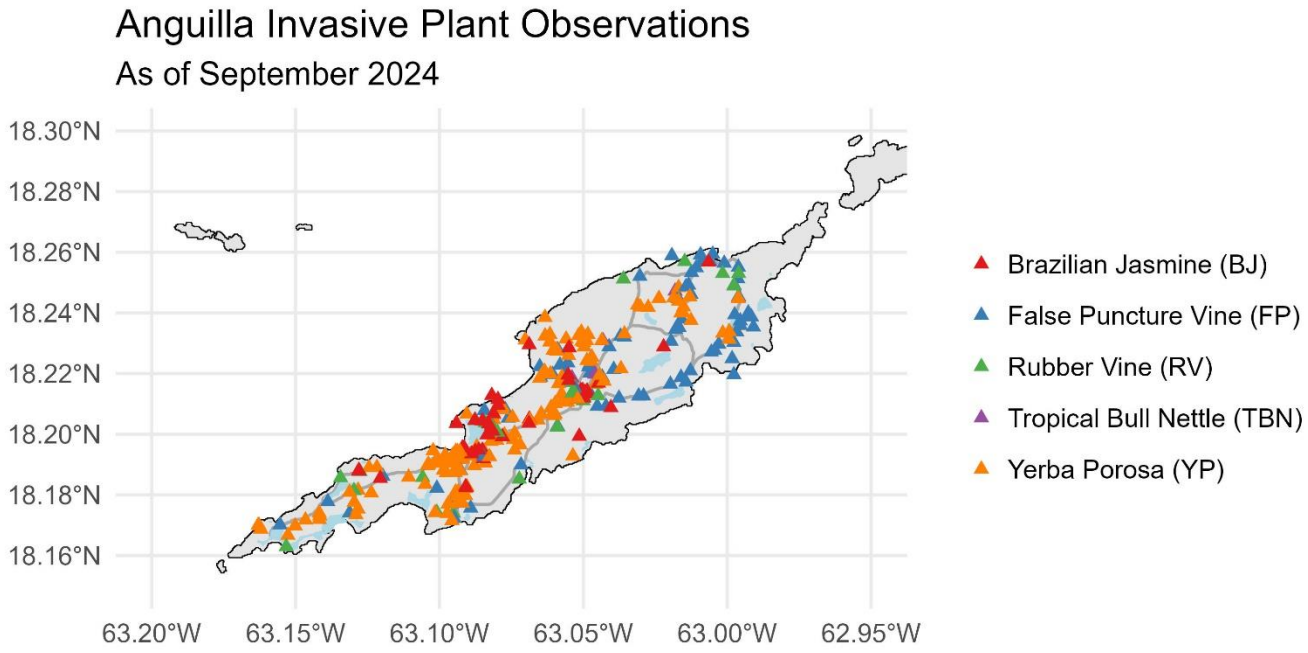
Species-specific management plans:

Buckmire, Z., and Tye, A. 2024. Plan for the eradication of Tropical Bull nettle *Cnidoscolus urens* from Anguilla, version 2.0. Department of Natural Resources, Government of Anguilla.

Great Britain Non-native Species Secretariat. 2020. Invasive Species Management Plan: Eradication of the false puncture vine *Tribulus cistoides* from Anguilla. www.nonnativespecies.org/overseas-territories/prioritising-containment-and-eradication-action/.

Great Britain Non-native Species Secretariat. 2020. Invasive Species Management Plan: Eradication of Brazilian jasmine *Jasminum fluminense* from Anguilla. www.nonnativespecies.org/overseas-territories/prioritising-containment-and-eradication-action/.

Appendix 1



Under the DPLUS125 invasive plant project, the team has conducted regular field surveys across Anguilla and the larger offshore islands to identify and map five focal invasive plant species. These five species are distributed across all of mainland Anguilla, in all communities and across a range of ecosystems. Yerba porosa was the most frequently found species, with over 150 detections so far, while the tropical bull nettle is the least common with 4 known locations. Thankfully, none of these species has been detected on any of the offshore islands or cays.