

Anguilla Invasive Species Strategy 2008 (DRAFT)



Giant African snail



Corn snake



Burr grass



Cuban Tree frog



Black rat



Acacia

Prepared by Rhon A. Connor (2008)
Co-ordinator, Environment and Sustainable development
Department of Environment
Anguilla, WI

Important Note

Please note that this document is an attempt at creating an Invasive Species Strategy for Anguilla. It is hope that this document will be constructively assessed, and that it will set the framework for a National Invasive Species strategy and policy for the island of Anguilla.

* The document was drafted / patterned based on the Palau and Bahamas Invasive species Strategy;

Table of Content

1.0	Introduction: An Overview of Invasive Species
2.0	Pathways of Entry
3.0	Potential Impact of Invasive Species
4.0	Mechanisms to Manage and Control Invasive Species
	1: Prevention
	2: Early Detection and Rapid Response
	3. Control and Management
	4. Rehabilitation and Restoration
5.0	Recommendations on Invasive Species
	1. Ports of Entry
	2. New invasive species
	3. Management of established Invasive Species
	4. Involvement of the Community
	5. Invasive species Committee
	6. Assessment of the Marine Environment
6.0	Glossary of Terms
7.0	Appendices
8.0	References

Appendices

- I. The Public and Implementation of the Strategy
- II. Plant and Animal Species Recommended for Eradication
- III. Plant and Animal Species Recommended for Control
- IV. Draft Policy on Invasive Species
- V. Code of Conduct for Government
- VI. Voluntary Code of Conduct for Botanical Gardens
- VII. Voluntary Code of Conduct for Landscape Architects
- VIII. Voluntary Code of Conduct for the Gardening Public
- IX. Voluntary Code of Conduct for Nursery Professionals
- X. Voluntary Code of Conduct for Zoos and Aquaria
- XI. Voluntary Code of Conduct for Farms (Agricultural and Aquacultural)
- XII. Voluntary Code of Conduct for Pet Stores, Breeders and Dealers
- XIII. Voluntary Code of Conduct for Pet Owners
- XIV. Voluntary Code of Conduct for Veterinarians
- XV. Stakeholder Participant List
- XVI. List of Known Invasive Alien Species in The Anguillian Territory

1.0 Introduction: An Overview of Invasive Species

The island of Anguilla is currently undergoing major economic development. As a result of this, there is a demand for the importation of labour and material to meet the infrastructural needs on the island. Certainly, this is one method in which various types of organisms have entered territories and established their niche within/throughout different countries. Therefore, it is imperative for the authorities in Anguilla to become aware of the potential risk of various elements of invasive species that may be introduced to the island via the importation of materials and people. It is important to note that not all species of plants, animals and other organisms that gain entry into a country are considered to be invasive species.

A species is known to be invasive if it meets two of the following criteria:

1. It is non-native to the ecosystem under consideration
2. Its introduction causes or is likely to cause economic or environmental harm or harm to human health

Invasive Species (IS), which are ranked next to habitat degradation, are considered to be one of the most destructive elements to biodiversity. These organisms can take the form such as plants, insects, molluscs, fish, pathogens, etc. As a result, IS have the potential to pose major challenges to environmental managers.

2.0 Pathways of Entry

The term pathway simply refers to the method of entry by which the invasive species are transported from one country to another.

IS have the potential to enter into a country by several different modes. Some of these include, but are not limited to, the invasive being attached to or embedded in the transshipment of containers; The possibility also exists that the invasive can be transported in plants' soil, branches or containers. The invasive can also enter Anguilla as propagule, seedlings, eggs, or in its earliest stages of development.

Other forms of entry into a host country include deliberate attempts by individuals to introduce the organism for specific purposes. For example, the invasive might be introduced as a source of food, as a pet, etc. Entry can also be gained through the marine environment-whereby the invasive was attached to vessels, logs of wood or other floating objects. In many instances, ports are considered to be the exclusive gateway to the introduction of Invasive Species.

3.0 Potential Impact of Invasive Species

Invasive Alien Species has the potential to severely alter a country's ecosystem, and can also affect it from an economic perspective. Some invasive species goes through a period of lag time or dormancy, and eventually experiences a major exponential growth, before dominating / spreading throughout its new territory. Once established outside of their native country, IS has the potential to spread rapidly (since they lack their natural predators from their country of origin), compete with native species in their new territory, and completely change ecosystems. As a result, the native or local species are sometimes restricted, suffocated, or overcrowded in its natural environment. This is an indication that the native or endemic species have been out-competed by its invasive counterpart.

Invasive Species has also been associated with high economic costs with regards to their management. The management and subsequent eradication of the Giant African Snail in Florida cost the state approximately \$1,000,000 from 1969-1979. The Canadian Authorities have reported that Manitoba has loss roughly \$30 million due to the Dutch Elm disease. From a local perspective, statistics from the Agriculture Department in Anguilla has indicated that the authorities have spent over \$100,000 (2005/2006) in an effort to control and eradicate the Giant African Snail.

Apart from negatively impacting flora and fauna life, invasive species have the potential to affect human health. Several species of invasive organisms are carriers of pathogens that are capable of spreading diseases to humans. These diseases can be spread by direct or indirect contact with the invasive organism. For example, some species of the Giant

Africa Snails are carriers of a disease known as the rat lung worm. If infested snails are consumed by humans, it is likely that the persons will become infected. On the other hand, the snails have the potential of contaminating water systems, and may therefore pose a threat to human health.

4.0 Mechanisms to Manage and Control Invasive Species

The management, control and eradication of Alien Invasive Species is extremely critical, and for decades they have posed major challenges to environmental managers. However, in an effort to effectively manage and control the introduction and subsequent spread of invasive species in Anguilla, various mitigation measures and other techniques are to be implemented. The established protocol for managing Alien Invasive Species is outlined as follows:

- 1: Prevention
- 2: Early Detection and Rapid Response
3. Control and Management
4. Rehabilitation and Restoration

1. Prevention of Invasive Species

Prevention is the best method from keeping Invasive Species from entering Anguilla. Certainly it's a difficult task to detect and avoid all the potential invasive species that are hidden in various elements of products entering Anguilla on a daily basis. However, the relevant authorities in Anguilla must continue to play their part and exercise caution in preventing new IS from entering the territory. Prevention initiatives must be initiated at all ports. Customs, Department of Agriculture and the relevant government agencies should ensure that containers entering Anguilla are pre-checked and given a clean bill of health before being unloaded. At the local level, the authorities should ensure that there are adequate trained personnel to thoroughly investigate containers, luggage, and other

products for the purposes of intercepting any foreign or invasive species which may pose a threat to native biodiversity or human health.

2. Early Detection and Rapid Response

The most effective method of addressing the issue of Invasive Species in Anguilla is to detect them at an early stage, and formulate a strategy for their immediate removal or control. Residents should be encouraged to be continuously on the look out for specimens of various plants and animals that are unknown to the territory. Once such species are identified and reported to the relevant authorities, they must immediately initiate a strategy to manage and curtail the spread of the invasive.

3. Control and Management of Invasive Species

Environmental managers and other technocrats must establish and implement practical strategies to control and manage Invasive Species in Anguilla. The relevant environmental agencies must try to restrict the newly invasive to a particular locale. Established invasive species must be prioritised and ranked according to the level of risk / threat they pose to the environment or human health. Coordinated programmes and strategies must be initiated to eradicate (if possible), or control and manage the most serious IS. The control and management of IS usually utilizes the following methodology:

Mechanical: The method of controlling or eradicating the invasive utilizing human resources / people to physically remove the invasive by hand or with the use of machinery.

Chemical: The method of controlling or eradicating the invasive by utilizing chemicals.

Biological: The method of controlling or eradicating the invasive by introducing another non-native natural predator from its country of origin or another territory.

4. Rehabilitation and Restoration of the Area

Invasive Species have the ability to completely alter or destroy various types of flora and fauna throughout Anguilla's ecosystems. If indeed an invasive has devastated an ecosystem to such an extent, then the resource managers can reconstruct or rehabilitate the said site with the same native plant or animal species which were affected. This can be done by ex-situ conservation, whereby the plant is harvested in a safe area and then replanting or reintroducing the depleted organism into the said area. This is a particularly important mechanism to undertake when a rare or endemic species is involved. However, this process is only recommended under the conditions that the infested and surrounding areas have been deemed free of the pest that caused the demise of the native/endemic plant.

5.0 Recommendations on Invasive Species

The interception, control and management of Invasive Alien Species is a major challenge. This challenge can be overcome by taking proactive measures to prevent, reduce and control invasive pest from entering our shores. Therefore, some of the following recommendations will be useful in mitigating the entry and subsequent spread / establishment of invasive species throughout Anguilla.

1. Ports of Entry

The potential for invasive species to enter a country usually begins here. The Customs agents should ensure that all luggage, parcels, and hand bags are thoroughly checked for signs of invasive species before leaving the check points. In the case of the transshipment of plants and animals via containers, the Department of Agriculture must be involved in assessing these organisms to ensure they are free of invasive pests. The authorities should ensure that there is a central area on the island that is set aside for the monitoring of containers, otherwise known as a quarantine area. Containers should remain at the said

site for a couple of days (2/3) and thoroughly fumigated/examined for foreign pest. During this process, any invasive organism should be contained and dealt with accordingly. However, as a preliminary to the aforementioned, if possible, the Department of Agriculture or Custom's agents should request the shipping agent to get clearance from the relevant Food and Drug agencies, stating that the container has been checked and approved by their standards.

2. New Invasive Species

There is always a possibility that a few invasive pest will manage to escape interception and inadvertently be introduced into the territory. One way of tackling such organisms is to continuously educate the public to report any new plants or animals to the environmental agencies in Anguilla. Once a report is made, the infested and surrounding areas should be monitored in an effort to capture the invasive, and prevent further infestation. In the case of vectors, it is known that they are much more difficult to detect. However, once detected, the health and environmental agencies must act immediately. Quarantine measures must be considered depending on the nature and potential impact of the invasive.

3. Management of Established Invasive Species

Anguilla is known to have approximately 212 invasive animals and plants (K. Varnham). However, although most of these organisms are fully established, they might not be negatively affecting the island. Therefore, the relevant agencies should establish a criterion for targeting AIS. The following areas should be addressed in the plan of action:

- Identify all of the Alien Invasive Species on the island
- Evaluate those that are causing major impacts
- Rank them according to their level of impact
- Select the top five (5) for priority action
- Develop an action plan to control or eradicate target species

- Educate the public of targeted species
- Inform stakeholders of proposed actions
- Seek external funding/advice if necessary
- Implement strategic plans
- Assess results of strategic plans
- Implement continued surveillance

4. Involvement of the Community

Invasive Species have no borders with regards to their manifestation. They have a tendency to proliferate rapidly, and have the ability to spread throughout various types of ecosystems. For these reasons, it is important to involve the citizenry of the island. Efforts should be taken to ensure that stakeholders are properly informed of the intended plans, as personnel conducting the control measures will need access to their property. Members from the Anguilla Community should be recruited on a voluntary basis to assist with the control of the invasive. Residents should also be educated about the nature of the targeted species, and have a general awareness as to what measures they can take to reduce the impact and spread of the invasive.

5. Invasive Species Committee

The authorities should seek to establish an invasive species committee for Anguilla. This committee should be charged with the responsibility of reviewing, developing, and implementing strategies for invasive species in Anguilla. The committee should also be focusing on developing the human capacity, especially at the ports, to mitigate the introduction of invasive species into the island. It is also important for this task force to keep a database of all known invasive species on the island, consult with the islands in the region to learn of newly invasive species, and encourage the local agents to be vigilant for such species.

6. Assessment of the Marine Environment

Most of the terrestrial invasive species (flora and fauna) in Anguilla are well documented. However, there is little or no information on marine invasives. Therefore, the authorities in Anguilla should seek to ascertain information about the status of marine invasives and their impact on aquatic life. Efforts should be made to seek the technical support and funding for assessing invasive species throughout Anguilla's marine environment. This will not only provide the island with vital information for creating its database, but will also assist it in developing strategies for invasives that poses a threat to the marine environment.

6.0 Glossary of Terms

Organism: an individual living system (such as animal, plant, fungus or micro-organism)

Niche: a term describing the relational position of a species or population in an ecosystem

Invasive Species: non-indigenous species (e.g. plants or animals) that adversely affect the habitats they invade economically, environmentally or ecologically

Species: a group of organisms capable of interbreeding and producing fertile offspring

Non-native: This term, along with the terms *introduced species* and *non indigenous species*, is one of the most commonly used terms to describe a plant or animal *species* that is not originally from the area in which it occurs.

Ecosystem: a natural unit consisting of all plants, animals and micro-organisms in an area functioning together with all the non-living physical factors of the environment

Biodiversity: the variation of life forms within a given ecosystem, biome or the entire Earth

Pathogens: a biological agent that causes disease or illness to its host

Propagule: A structure with the capacity to give rise to a new plant, for example a seed, a spore, or a part of the vegetative body capable of independent growth if detached from the parent.

Endemic: belonging or native to, characteristic of, or prevalent in a particular geography, area or environment

Flora: all plant life occurring in an area or time period, especially the naturally occurring or indigenous plant life

Fauna: all of the animal life of any particular region or time

Specimen: an individual animal, plant or microorganism used as a representative to study the properties of the whole population of that species

Ex-situ Conservation: the process of protecting an endangered plant or animal by removing part of the population from a threatened habitat and placing it in a new location, which may be a wild area or within the care of humans

Quarantine: the voluntary or compulsory isolation on an item, typically to contain the spread of something considered dangerous, such as a disease

7.0 Appendices

I. The Public and Implementation of the Strategy

Public education and awareness is vital and it must occur at all levels. The public should include the following:

- Cabinet Ministers
- Judiciary
- Policy makers
- Government Ministries and officials
- Local Government
- Technical Officers
- Enforcement agencies
- Churches
- Media
- Youth
- NGOs
- Farmers
- Fishermen
- Tourism sector (including hotels and tourists)
- Contractors (i.e. landscapers, architects and construction industry)
- Schools and colleges
- Importers and exporters
- Airline companies
- Shipping companies
- Horticulturists
- Plant nurseries
- Botanical gardens
- Homeowners
- Gardeners/gardening enthusiasts
- Gardening clubs
- Pet stores
- Pet breeders and dealers
- Pet owners

**Public education should involve utilization of the media in the promotion of information on invasive species and their management.

II. Plants and Animals Species Recommended for Eradication

**** To be determined by committee but may include...

<i>Achatina fulica</i>	Giant African Snail
<i>Osteopilus septentrionalis</i>	Cuban Tree Frog
<i>Macronellicoccus hirsutus</i>	Pink Mealybug

III. Plants and Animal Species Recommended for Control

<i>Felis cactus</i>	Cats (stray)
<i>Canis familiaris</i>	Dog (stray)
<i>Rattus rattus</i>	Black Rat
<i>Rattus norvegicus</i>	Brown Rat
<i>Capra hircus</i>	Goat
<i>Acacia farnesiana</i>	Queen Casha
<i>Cuscuta</i> spp	Yellow (Dad) Dodder

IV. Code of Conduct for Government

Ensure that quarantine areas are designated for examining imports to Anguilla and its territories

Require risk assessment for Government-led or financed plant and animal introductions to ensure that no new harmful species are introduced, intentionally or unintentionally.

Do not distribute existing holdings of invasive plant and animal species to areas where they can potentially do harm.

Coordinate and facilitate collaboration in databases, early warning systems, monitoring and other means of preventing invasive plant species problems.

Lead and fund the development of environmentally sound methods to control harmful invasive plant **and animal** species, seek control of such species on Crown and other public lands and promote their control on adjacent private lands.

Develop and promote the use of non-invasive plant species within all Government agencies and to the public.

Facilitate, lead, coordinate and evaluate public outreach and education on harmful invasive species.

Encourage public servants and managers, **especially those in environmental agencies and the customs division** to participate in ongoing training programmes on invasive species.

Foster international and regional cooperation to minimize the risk of import and export of potentially invasive species.

Develop partnerships and incentive programmes to lessen the impact of invasive species and provide non-invasive restoration materials.

Provide a forum for regular evaluation of the effectiveness of these voluntary codes of conduct towards preventing the invasive species problem.

Enforce existing invasive species legislation at all levels, and enact new legislation where deficiencies occur in existing legislation.

V. Voluntary Code of Conduct for Botanical Gardens

Conduct an internal review examining all activities that provide an opportunity to prevent the spread of invasive species and to inform visitors on this issue.

Avoid introducing invasive plants by establishing an invasive plant assessment procedure. This procedure should involve responsible and regular monitoring of the garden site.

Remove invasive species from plant collections. If for any reason the decision is made to retain an invasive species, ensure its control and provide strong interpretation to the public explaining the risk of the species and its function in the garden. **Efforts should be made to liaise / register it/them with the Agriculture Department**

Seek to control harmful invasive species in natural areas managed by the garden and assist others in controlling them on their property, whenever possible.

Promote non-invasive alternative plants or help develop non-invasive alternatives through plant selection or breeding.

If your institution participates in seed or plant distribution, do not distribute known invasive plants except for bona fide research purposes and consider the consequences of distribution outside your bio-geographic region. Consider attaching a statement of caution to species that appear to be potentially invasive but have not been fully evaluated.

Increase public awareness about invasive plants. Provide information on why they are a problem, their origin, mechanisms of harm and need for prevention and control. Work with local nurseries and seed industries to assist the public in environmentally safe gardening and sales.

Participate in developing, implementing or supporting regional, national or local early warning systems for immediate reporting and control.

Participate in the creation of regional lists of concern.

Become informed about the invasiveness of species within your institution in other bio-geographic regions. Compile and share this information in a manner accessible to all.

Become partners with **government agencies and** other organizations in the management of harmful invasive species.

Follow all laws on importation, exportation, quarantine and distribution of plant materials across political boundaries. Be sensitive to conventions and treaties that deal with this issue and encourage affiliated organizations (plant societies, garden clubs, etc.) to do the same.

VI. Voluntary Code of Conduct for Landscape Architects

Work with local plant ecologists, horticulturists, nurseries, botanic gardens, conservation organizations and others to determine what species in your region either are currently highly invasive or show aggressive potential.

Increase interaction with other professionals and non-professionals to identify alternative plant material and other solutions to problems caused by harmful invasive plants.

Take advantage of continuing education opportunities to learn more about the invasive species issue.

Identify and specify/**recommend** non-invasive species that are aesthetically and horticulturally suitable alternatives to invasive species in your region.

Eliminate specification of species that are invasive in your region.

Be aware of potential environmental impacts beyond the designed and managed area of the landscape plan (for example, plants may spread to adjacent natural areas or cropland).

Encourage nurseries and other suppliers to provide landscape contractors and the public with non-invasive plants.

Collaborate with other local experts and agencies in the development and revision of local landscape ordinances. Promote inclusion of invasive species issues in these ordinances.

VII. Voluntary Code of Conduct for the Gardening Public

Utilize native/indigenous plants as much as possible for landscaping your property

Ask for only non-invasive species when you purchase plants. Plant only environmentally safe species in your gardens. Work towards and promote new landscape design that is friendly to local ecosystems.

Seek the best information on which species are invasive in your area. Sources could include botanical gardens, nurseries, horticulturists, conservationists and Government agencies.

Remove invasive species from your property and replace them with non-invasive species suited to your site and needs.

Do not trade plants with other gardeners if you know they are species with invasive characteristics.

Request that botanical gardens and nurseries promote, display and sell only non-invasive species.

Help educate your community and other gardeners in your area through personal contact and in such settings as garden clubs and other civic groups.

Ask garden writers and other media to emphasize the problem of invasive species and provide information. Request that garden writers promote only non-invasive species.

Invite speakers knowledgeable on the invasive species issue to speak to garden clubs, schools and other community groups.

Seek the best information on control of invasive plant species and organize neighbourhood workgroups to remove **most serious/threatening** invasive plant species under the guidance of knowledgeable professionals.

Volunteer at botanical gardens and natural areas to assist ongoing efforts to diminish the threat of invasive plants.

Participate in early warning systems by reporting invasive species you observe in your area to the relevant authority, i.e. the Department of Environment, Department of Agriculture, Environmental Health Unit or the Department of Fisheries.

Assist garden clubs to create policies regarding the use of invasive species not only in horticulture, but in activities such as flower shows.

Urge florists and others to eliminate the use of invasive plant material.

Reserve/preserve natural/indigenous population of vegetation where possible

VIII. Voluntary Code of Conduct for Nursery Professionals

Ensure that the invasive potential of plants is assessed prior to introducing and marketing a plant species new to The Anguillian Territory. Invasive potential should be assessed by the introducer or qualified experts using risk assessment methods that consider plant characteristics and prior observations or experience with the plant elsewhere in the world.

Additional insights may be gained through extensive monitoring on the nursery site prior to distribution.

Work with the **Department of Agriculture, conservationists**, local experts and stakeholders to determine which species are either currently invasive or will become invasive. Identify plants that could be suitable alternatives in your area.

Identify plants that are hosts to already existing invasive insects or pest

Develop and promote alternative plant material through plant selection and breeding.

Where agreement has been reached among nursery associations, Government, academia and ecology and conservation organizations, phase out existing stocks of invasive species in areas where they are considered to be a threat.

Follow all laws on importation and quarantine of plant materials across political boundaries.

Encourage customers (**especially those in the tourism industry**) as much as possible, to utilize non-invasive plants for landscaping purposes

IX. Voluntary Code of Conduct for Zoos and Aquaria

Conduct an internal review examining all activities that provide an opportunity to prevent the spread of invasive species and to inform visitors on the issue.

Avoid introducing invasive animals by establishing an invasive animal assessment procedure. This procedure should involve responsible and regular monitoring of the facility.

Take due care to prevent the release or escape of animals that are known to cause damage as invasives or may be potential invasives.

Remove invasive species from exhibits or displays. If the decision is made to retain an invasive species, ensure its control and containment and provide strong interpretation to the public explaining the risk associated with the species and its function in the facility.

If your institution participates in breed stock exchange, do not distribute known invasive animals except for bona fide research purposes and consider the consequence of distribution outside your bio-geographic region. Consider attaching a statement of caution to species that appear to be potentially invasive but have not been fully evaluated.

Increase public awareness about invasive animals. Provide information on why they are a problem, their origin, mechanisms of harm and need for prevention and control.

Participate in developing, implementing or supporting regional, national or local early warning systems for immediate reporting and control.

Participate in the creation of regional lists of concern.

Become informed about the invasiveness of species within your facility in other bio-geographic regions. Compile and share this information in a manner accessible to all.

Become partners with other organizations in the management of harmful invasive species.

Follow all laws on importation, exportation, quarantine and distribution of animals across political boundaries. Be sensitive to conventions and treaties that deal with this issue and encourage affiliated organizations to do the same.

X. Voluntary Code of Conduct for Farms (Agricultural and Aqua cultural)

Ask for only non-invasive species when you purchase livestock or fish stock. If for any reason, the decision is taken to farm invasive species, ensure that they are controlled and contained through appropriate mechanisms, e.g. fencing to prevent escape or breeding with native species.

Take due care to prevent the release or escape of domestic animals that are known to cause damage as feral animals, e.g. pigs and goats.

Take due care to prevent the release or escape of livestock or fish stock that are known to cause damage due to their invasive characteristics or potential.

Seek information on which species are invasive in your area. Sources could include breeders, veterinarians, conservationists and Government agencies.

Do not trade stock with other farmers if you know that they are species with invasive characteristics.

Request that breeders and dealers promote and sell non-invasive species.

Help educate your community and other farmers in your area through personal contact and in such settings as farmers' association meetings.

Ask writers and other media to emphasize the problem of invasive species and be willing to provide information.

Invite speakers knowledgeable on the invasive species issue to speak to farmers' association meetings, schools and other community groups.

Seek the best information on control of invasive animal species.

Participate in early warning systems by reporting invasive species you observe in your area to the relevant authority, i.e. the Department of Environment, Department of Fisheries, Department of Agriculture or Environmental Health Unit.

Assist farmers' associations to create policies regarding the use of invasive species in agriculture and aquaculture.

XI. Voluntary Code of Conduct for Pet Stores, Breeders and Dealers

Ensure that the invasive potential of animals is assessed prior to introducing and marketing an animal species new to The Anguillian Territory. Invasive potential should be assessed by the introducer or qualified experts using risk assessment methods that consider animal characteristics and prior observations or experience with the animal elsewhere in the world.

Additional insights may be gained through extensive monitoring at your facility prior to distribution.

Work with local experts and stakeholders to determine which species are either currently invasive or will become invasive. Identify animals that could be suitable alternatives in your area.

Where agreement has been reached among associations, Government, academia and ecology and conservation organizations, phase out existing stocks of invasive species in areas where they are considered to be a threat.

Follow all laws on importation and quarantine of animals across political boundaries.

Encourage customers to purchase non-invasive pets or livestock.

XII. Voluntary Code of Conduct for Pet Owners

Ask for non-invasive species when you purchase pets. If the decision is taken to own an invasive species, ensure that it is contained and controlled through confinement to your property and **ensure that measures are taken to initiate** reproductive control (e.g. spaying and neutering).

Seek information on which species are invasive in your country. Sources could include zoos, aquaria, pet stores, ecologists, conservationists and Government agencies.

Do not trade pets with other pet owners if you know they are species with invasive characteristics.

Request that pet stores and breeders promote, display and sell non-invasive species.

Help educate your community and other pet owners in your area through personal contact and in such settings as pet shows, training sessions, visits to the vet and other gatherings involving activities with pets.

Ask writers and other media to emphasize the problem of invasive species and provide information.

Invite speakers knowledgeable on the invasive species issue to speak to associations, clubs, schools and other community groups.

Seek the best information on control of invasive animal species and work with other like-minded individuals to remove these species from your area in an ethical and humane manner under the guidance of knowledgeable professionals.

Volunteer at zoos, aquaria, national parks and other natural areas to assist ongoing efforts to diminish the threat of invasive animals.

Participate in early warning systems by reporting invasive species you observe in your area to the relevant authority, i.e. the Department of Environment, Department of Agriculture or the Environmental Health Unit .

XIII. Voluntary Code of Conduct for Veterinarians

Work with local ecologists, breeders, pet stores, conservation organizations and others to determine what species in your region either are currently highly invasive or show aggressive potential.

Increase interaction with other professionals and non-professionals to identify non-invasive animals and other solutions to problems caused by harmful invasive animals.

Take advantage of continuing education opportunities to learn more about the invasive species issue.

Identify and specify non-invasive species that are aesthetically and ecologically suitable alternatives to invasive species in your region.

Eliminate specification of species that are invasive in your region.

Encourage breeders and pet stores to provide farmers, private firms and the public with non-invasive animals.

Promote knowledge about the threats of invasive species to schools, community groups and other organizations.

XIV. Stakeholder Participant List

The following is a list of stakeholders who should be involved in a workshop to further discuss this draft invasive species strategy;

Department of Environment

Rhon Connor
Keith David
Karim Hodge

Environmental Health Unit

Oliver Hodge
Leroy Richardson
Ambrell Richardson
Alex Fleming
Candacie David

Department of Fisheries and Marine Resources

Kenroy Rawlins
James Gumbs

Water Lab

Jaine Rogers

Anguilla Tourist Board

Gina Brooks-Hodge

Department of Agriculture Staff

William Vanterpool
Patrick Vanterpool (PhD)
Antonio Christopher
Andre Samuel

Anguilla National Trust

Farah Muhkida

Other stakeholders

Trevor Gumbs

Everett Clark

Hyacinth Hughes

Icilma Morton

Winston Carter

Glenford Hodge

Marino Hodge

Jarmain Rochester

Kenrick Richardson

Kenneth Hodge

Foster Rogers

Rev. John A. Gumbs

Josephine Gumbs-Connor

Olive Hodge

Kennedy Hodge

Bernice Lake QC

Joyce Kentish

Michelle Carty

Jocelyn Theophile

Mary Smith

Albert R. Lake

Remington Lake

Keithley Benjamin

Patrick Webster

Walton Fleming

Illidge Richardson

Junior Fleming

Alan Gumbs

Eric Carty

Garfield Richardson

XV. Invasive Species in Anguilla

The following list provides an overview of the known invasive species that are found throughout Anguilla: * List taken from JNCC- K. Varnham (2006)

Taxon	Scientific name	Common name(s)
Invertebrate – Homoptera	<i>Macronellicoccus hirsutus</i>	hibiscus mealybug; pink mealybug
-----	-----	-----
Vertebrate		
	<i>Oryctolagus cuniculus</i>	Rabbit
Plant - Acanthaceae	<i>Asystasia gangetica</i>	Christmas bells; Demerara primrose
Plant - Acanthaceae	<i>Pseuderanthemum carruthersii</i> var. <i>reticulatum</i>	Jacob's coat
Plant - Acanthaceae	<i>Thunbergia alata</i>	golden bells; black-eyed susan vine
Plant - Acanthaceae	<i>Thunbergia erecta</i>	king's mantle; bush clock vine
Plant - Acanthaceae	<i>Thunbergia fragrans</i>	white lady; sweet clock vine
Plant - Agavaceae	<i>Agave sisalina</i>	sisal; fibre pole; pita

Plant - Agavaceae	<i>Sansevieria hyacinthoides</i>	snake plant; mother-in- law's tongue
Plant - Agavaceae	<i>Sansevieria trifasciata</i>	
Plant - Agavaceae	<i>Yucca guatemalensis</i>	Spanish needle
Plant - Amaranthaceae	<i>Achyranthes aspera</i>	man-better man; hug- me-close
Plant - Amaranthaceae	<i>Alternanthera brasiliana</i>	
Plant - Amaranthaceae	<i>Celosia argentia</i>	cockscomb
Plant - Amaryllidaceae	<i>Zephyranthes candida</i>	crocus; snowdrop
Plant - Anacardiaceae	<i>Anacardium occidentale</i>	cashew
Plant - Anacardiaceae	<i>Mangifera indica</i>	mango
Plant - Anacardiaceae	<i>Spondias mombin</i>	golden apple; plum
Plant - Anacardiaceae	<i>Spondias purpurea</i>	hog plum; fig
Plant - Annonaceae	<i>Annona muricata</i>	soursop; guanábana
Plant - Annonaceae	<i>Annona squamosa</i>	sugar apple; sweetsop; custard apple
Plant - Apiaceae	<i>Anethum graveolens</i>	dill; anise; fennel

Plant - Apiaceae	<i>Foeniculum vulgare</i>	fennel; dill
Plant - Apocynaceae	<i>Allamanda blanchetii</i>	purple allamanda
Plant - Apocynaceae	<i>Allamanda cathartica</i>	allamanda
Plant - Apocynaceae	<i>Carissa macrocarpa</i>	Natal plum
Plant - Apocynaceae	<i>Catharanthus roseus</i>	old maid; Madagascar periwinkle
Plant - Apocynaceae	<i>Nerium oleander</i>	oleander
Plant - Apocynaceae	<i>Plumieria rubra</i>	red frangipani
Plant - Apocynaceae	<i>Tabernaemontana divaricata</i>	gardenia
Plant - Apocynaceae	<i>Thevetia peruviana</i>	lucky nut; yellow oleander
Plant - Araceae	<i>Rhaphidophora aurea</i>	pothos
Plant - Araliaceae	<i>Polyscias fruticosa</i>	ming aralia
Plant - Araliaceae	<i>Polyscias guilfoylei</i>	roseleaf aralia
Plant - Araliaceae	<i>Schefflera macrostachya</i>	octopus tree
Plant - Araucariaceae	<i>Araucaria heterophylla</i>	christmas plant; Norfolk Island pine

Plant - Arecaceae	<i>Cocos nucifera</i>	coconut palm
Plant - Arecaceae	<i>Neodypsis decaryi</i>	triangular palm
Plant - Arecaceae	<i>Phoenix dactylifera</i>	date palm
Plant - Arecaceae	<i>Veitchia merrillii</i>	Manilla palm; Christmas palm
Plant - Arecaceae	<i>Washingtonia</i> sp.	fan palm
Plant - Asclepiadaceae	<i>Calotropis procera</i>	headache bush; milky - milky bush; French cotton
Plant - Asclepiadaceae	<i>Cryptostegia madagascariensis</i>	Indian rubber vine
Plant - Asparagaceae	<i>Asparagus densiflorus</i>	sprengeri
Plant - Asparagaceae	<i>Asparagus setaceus</i> .	fern, asparagus fern
Plant - Asteraceae	<i>Ambrosia hispida</i>	bay geranium; tapis
Plant - Asteraceae	<i>Cosmos sulphureus</i>	cosmos
Plant - Asteraceae	<i>Emilia fosbergii</i>	tassel flower; rabbit meat
Plant - Asteraceae	<i>Flaveria bidentis</i>	

Plant - Asteraceae	<i>Helianthus debilis</i>	dune sunflower
Plant – Asteraceae	<i>Leucophyllum frutescens</i>	texas sage
Plant – Asteraceae	<i>Parthenium hysterophorus</i>	White top - weed
Plant - Asteraceae	<i>Senecio confusus</i>	Mexican flame vine
Plant - Asteraceae	<i>Solidago microglossa</i>	
Plant - Asteraceae	<i>Sonchus oleraceus</i>	dandelion; sow thistle
Plant - Asteraceae	<i>Thymophylla tenuiloba</i>	
Plant - Asteraceae	<i>Xanthium strumarium</i>	burrweed
Plant - Bignoniaceae	<i>Crescentia cujete</i>	calabash tree; cup tree
Plant - Bignoniaceae	<i>Podranea ricasoliana</i>	pink trumpet vine
Plant - Bignoniaceae	<i>Tabebuia heterophylla</i>	white cedar; trumpet tree; pink Tecoma
Plant - Bignoniaceae	<i>Tecoma capensis</i>	cape honeysuckle
Plant - Boraginaceae	<i>Cordia obliqua</i>	clamen cherry
Plant - Boraginaceae	<i>Cordia sebestana</i>	geiger tree
Plant - Boraginaceae	<i>Heliotropium angiospermum</i>	eyebright; scorpion tail

Plant - Boraginaceae	<i>Heliotropium curassavicum</i>	small lavender; seaside heliotrope
Plant - Brassicaceae	<i>Lepidium virginicum</i>	pepper grass; vomiting bush
Plant - Cactaceae	<i>Epiphyllum oxypetalum</i>	orchid cactus
Plant - Cactaceae	<i>Hylocereus undatus</i>	night blooming cereus
Plant - Cactaceae	<i>Opuntia cochenillifera</i>	French prickle; cochineal cactus
Plant - Caesalpinaceae	<i>Bauhinia</i> sp.	orchid tree
Plant - Caesalpinaceae	<i>Caesalpinia pulcherrima</i>	pride of Barbados; flower fence
Plant - Caesalpinaceae	<i>Cassia fistula</i>	golden shower tree; cassia stick tree
Plant - Caesalpinaceae	<i>Delonix regia</i>	flamboyant tree; royal poinciana
Plant - Caesalpinaceae	<i>Senna italica</i>	
Plant - Caesalpinaceae	<i>Senna siamea</i>	kas; Siamese cassia
Plant - Caesalpinaceae	<i>Tamarindus indica</i>	tamarind
Plant - Capparaceae	<i>Cleome gynandra</i>	small spider flower; stinking miss

Plant - Capparaceae	<i>Cleome viscosa</i>	caia
Plant - Caricaceae	<i>Carica papaya</i>	papaya; pawpaw
Plant - Casuarinaceae	<i>Casuarina equisetifolia</i>	Casuarina; lumber tree; beefwood
Plant - Chenopodiaceae	<i>Atriplex pentandra</i>	
Plant - Chenopodiaceae	<i>Chenopodium ambrosioides</i>	wormweed
Plant - Combretaceae	<i>Bucida buceras</i>	candlewood tree; black olive tree
Plant - Combretaceae	<i>Terminalia catappa</i>	almond; Indian almond
Plant - Crassulaceae	<i>Bryophyllum pinnatum</i>	love bush; Christmas plant
Plant - Crassulaceae	<i>Kalenchoe blossfeldiana</i>	kalenchoe
Plant - Crassulaceae	<i>Kalenchoe tubiflora</i>	kalenchoe
Plant - Cucurbitaceae	<i>Cucumis anguria</i>	wild cucumber
Plant - Cucurbitaceae	<i>Momordica charantia</i>	maiden apple; wild balsam apple
Plant - Euphorbiaceae	<i>Acalypha poiretii</i>	
Plant - Euphorbiaceae	<i>Breynia disticha</i>	snow bush

Plant - Euphorbiaceae	<i>Codiaeum variegatum</i>	croton
Plant - Euphorbiaceae	<i>Euphorbia lactea</i>	candelerero; mottled spurge
Plant - Euphorbiaceae	<i>Euphorbia leucocephala</i>	christmas bush
Plant - Euphorbiaceae	<i>Euphorbia pulcherrima</i>	poinsettia; lobster plant; Christmas plant
Plant - Euphorbiaceae	<i>Euphorbia tirucalli</i>	pencil bush; milk bush
Plant - Euphorbiaceae	<i>Hura crepitans</i>	sandbox tree
Plant - Euphorbiaceae	<i>Jatropha curcas</i>	barricata bush
Plant - Euphorbiaceae	<i>Jatropha integerrima</i>	peregrina
Plant - Euphorbiaceae	<i>Jatropha multifida</i>	coral plant
Plant - Euphorbiaceae	<i>Ricinus communis</i>	castor oil plant; castor nut
Plant - Euphorbiaceae	<i>Euphorbia milli</i> var. <i>splendens</i>	crown of thorns
Plant - Fabaceae	<i>Cajanus cajan</i>	pigeon pea
Plant - Fabaceae	<i>Crotolaria incana</i>	shack-shack; rattle bush

Plant - Fabaceae	<i>Crotolaria retusa</i>	yellow shack-shack; rattleweed
Plant - Fabaceae	<i>Crotolaria verrucosa</i>	blue sweet pea; blue rattlesnake
Plant - Fabaceae	<i>Erythrina variegata</i>	immortel; crab claw
Plant - Fabaceae	<i>Gliricidia sepium</i>	glory cida; quick stick
Plant - Fabaceae	<i>Indigofera suffruticosa</i>	indigo
Plant - Fabaceae	<i>Indigofera tinctoria</i>	indigo
Plant - Fabaceae	<i>Lablab purpureus</i>	bonavist
Plant - Fabaceae	<i>Leucaena leucocephala</i>	Leucaena
Plant - Fabaceae	<i>Macroptilium atropurpureum</i>	kudzu
Plant - Fabaceae	<i>Sesbania grandiflora</i>	agati; hummingbird tree
Plant - Fabaceae	<i>Sophora tomentosa</i>	bead tree
Plant - Goodeniaceae	<i>Scaevola taccada</i>	
Plant - Lamiaceae	<i>Leonotis nepetifolia</i>	rabbit brush; ball of thread; hollow stalk; shandilay

Plant - Lamiaceae	<i>Ocimum basilicum</i>	basil
Plant - Lamiaceae	<i>Plectranthus amboinicus</i>	stingy time
Plant - Lauraceae	<i>Persea americana</i>	avocado; pear tree
Plant - Liliaceae	<i>Aloe vera</i>	aloe; sempervive
Plant - Lythraceae	<i>Lawsonia inermis</i>	mignonette; henna
Plant - Malpighiaceae	<i>Galphimia gracilis</i>	shower of gold
Plant - Malvaceae	<i>Abelmoschus esculentus</i>	okra
Plant - Malvaceae	<i>Abutilon indicum</i>	monkey bush
Plant - Malvaceae	<i>Hibiscus rosa- sinensis</i> var. <i>rosa- sinensis</i>	hibiscus
Plant - Malvaceae	<i>Hibiscus rosa- sinensis</i> var. <i>schizopetalus</i>	fringed hibiscus
Plant - Malvaceae	<i>Malvaviscus penduliflorus</i>	Turk's cap hibiscus; sleeping hibiscus
Plant - Meliaceae	<i>Azadrachta indica</i>	neem

Plant - Meliaceae	<i>Melia azedarach</i>	china berry tree; pride of India; Barbados lilac
Plant - Meliaceae	<i>Swietenia macrophylla</i>	Honduras mahogany
Plant - Meliaceae	<i>Swietenia mahagoni</i>	mahogany; West Indian mahogany
Plant - Mimosaceae	<i>Acacia farnesiana</i>	queen casha; sweet acacia
Plant - Mimosaceae	<i>Acacia macracantha</i>	kushar; long spine acacia
Plant - Mimosaceae	<i>Acacia nilotica</i>	cashu; gum arabic tree
Plant - Mimosaceae	<i>Albizia lebbek</i>	woman's tongue; sand tree
Plant - Moraceae	<i>Artocarpus altilis</i>	breadfruit
Plant - Moraceae	<i>Ficus benjamina</i>	benjamin fig
Plant - Moraceae	<i>Ficus elastica</i>	rubber tree
Plant - Moraceae	<i>Ficus microcarpa</i>	laurel fig
Plant - Moringaceae	<i>Moringa oleifera</i>	horseradish tree
Plant - Musaceae	<i>Musa sapientum</i>	banana; fig
Plant - Myrtaceae	<i>Psidium guajava</i>	guava

Plant - Nyctaginaceae	<i>Mirabilis jalapa</i>	four-o'clock
Plant - Oleaceae	<i>Jasminum fluminense</i>	wild jasmine; ink vine
Plant - Oleaceae	<i>Jasminum grandiflorum</i>	jasmine
Plant - Oleaceae	<i>Jasminum multiflorum</i>	jasmine
Plant - Oxalidaceae	<i>Oxalis corniculata</i>	sour grass
Plant - Pandanaeae	<i>Pandanus utilis</i>	screw pine
Plant - Papaveraceae	<i>Argemone mexicana</i>	Mexican poppy; yellow thistle
Plant - Passifloraceae	<i>Passiflora edulis</i>	passion fruit
Plant - Plumbaginaceae	<i>Plumbago auriculata</i>	lead vine
Plant - Poaceae	<i>Bothriochloa pertusa</i>	Antigua hay; Barbados sour grass
Plant - Poaceae	<i>Bothriochloa ischaemum</i>	bluestem
Plant - Poaceae	<i>Chloris gayana</i>	Rhodes grass
Plant - Poaceae	<i>Cymbopogon citratus</i>	lemon grass; fever grass

Plant - Poaceae	<i>Dactyloctenium aegyptium</i>	crowfoot grass
Plant - Poaceae	<i>Digitaria decumbens</i>	pangola grass
Plant - Poaceae	<i>Digitaria sanguinalis</i>	crab grass
Plant - Poaceae	<i>Eleusine indica</i>	cheddah; Dutch grass; goose grass; fowlfoot grass
Plant - Poaceae	<i>Eragrostis ciliaris</i>	love grass
Plant - Poaceae	<i>Eragrostis tenella</i>	Japanese lovegrass
Plant - Poaceae	<i>Panicum maximum</i>	Guinea grass
Plant - Poaceae	<i>Panicum molle</i>	
Plant - Poaceae	<i>Pennisetum purpureum</i>	elephant grass; napier grass
Plant - Poaceae	<i>Rhynchelytrum repens</i>	red-headed grass; natal grass
Plant - Poaceae	<i>Sorghum bicolor</i>	Guinea corn
Plant - Poaceae	<i>Sorghum halepense</i>	sorghum; johnson grass
Plant - Poaceae	<i>Tragus berteronianus</i>	spike burgrass
Plant - Poaceae	<i>Vetiveria zizanioides</i>	khus-khus; cockroach grass
Plant - Poaceae	<i>Zea mays</i>	corn; maize

Plant - Polygonaceae	<i>Antigonon leptopus</i>	coral vine; coralita
Plant - Polypodiaceae	<i>Nephrolepis biserata</i>	fern
Plant - Portulacaceae	<i>Portulaca oleracea</i>	pussley; purslane
Plant - Punicaceae	<i>Punica granatum</i>	pomegranate
Plant - Rhamnaceae	<i>Ziziphus mauritiana</i>	pomme- surette; jujube
Plant - Rosaceae	<i>Rosa indica</i>	rose
Plant - Rubiaceae	<i>Ixora casei</i>	ixora
Plant - Rubiaceae	<i>Ixora coccinea</i>	ixora
Plant - Rubiaceae	<i>Pentas lanceolata</i>	star clusters
Plant - Rutaceae	<i>Citrus aurantifolia</i>	lime
Plant - Rutaceae	<i>Citrus aurantium</i>	sour orange; Seville orange
Plant - Rutaceae	<i>Citrus sinensis</i>	sweet orange
Plant - Rutaceae	<i>Citrus x paradisi</i>	grapefruit
Plant - Rutaceae	<i>Murraya exotica</i>	orange jessamine
Plant - Salicaceae	<i>Salix humboldtiana</i>	willow
Plant - Sapindaceae	<i>Melicoccus bijugatus</i>	genip; tiirnep
Plant - Sapotaceae	<i>Manilkara zapota</i>	sapodilla

Plant - Scrophulariaceae	<i>Russelia equisetiformis</i>	fountain plant; firecracker bush
Plant - Solanaceae	<i>Capsicum frutescens</i>	pepper (red)
Plant - Solanaceae	<i>Datura stramonium</i>	wildfire; david bush; jimson weed
Plant - Solanaceae	<i>Lycopersicon lycopersicum</i>	tomato
Plant - Solanaceae	<i>Solandra guttata</i>	cup of gold
Plant - Solanaceae	<i>Solanum melongena</i>	eggplant
Plant - Tamaricaceae	<i>Tamarix</i> sp. <i>chinensis</i>	tamarisk
Plant - Verbenaceae	<i>Holmskioldia sanguinea</i>	parasol flower; Chinese hat plant
Plant - Verbenaceae	<i>Petrea volubilis</i>	sandpaper vine; wreath vine
Plant - Verbenaceae	<i>Vitex agnus-castus</i>	chaste tree
Plant - Zingiberaceae	<i>Alpinia zerumbet</i>	shell ginger
Vertebrate - Amphibian	<i>Bufo marinus</i>	cane toad; marine toad

Vertebrate - Amphibian	<i>Eleutherodactylus johnstonei</i>	Johnstone's whistling frog
Vertebrate - Amphibian	<i>Osteopilus septentrionalis</i>	Cuban tree frog
Vertebrate - Bird	<i>Gallus varius</i>	chicken
Vertebrate - Mammal	<i>Canis familiaris</i>	dog
Vertebrate - Mammal	<i>Capra hircus</i>	goat
Vertebrate - Mammal	<i>Felis catus</i>	cat
Vertebrate - Mammal	<i>Mus musculus</i>	house mouse
Vertebrate - Mammal	<i>Rattus norvegicus</i>	brown rat
Vertebrate - Mammal	<i>Rattus rattus</i>	black rat
Vertebrate - Reptile	<i>Anolis carolinensis</i>	
Vertebrate - Reptile	<i>Elaphe guttata</i>	corn snake
Vertebrate - Reptile	<i>Hemidactylus mabouia</i>	common woodslave
Vertebrate - Reptile	<i>Iguana iguana</i>	common iguana
Vertebrate - Reptile	<i>Rhamphotyphlops braminus</i>	worm snake
Mollusca <i>Achatinidae</i>	<i>Achatina fulica</i>	Giant African Snail

Invertebrates

Insects (Ant species) * List supplied by Dr. James Wetterer (Wilkes Honor College, FL)

Probable exotics

Cardiocondylia emeryi

Monomorium floricola

Paratrechina bourbonica

Paratrechina longicornis

Paratrechina pubens

Pheidole megacephala

Solenopsis invicta

Strumigenys emmae

Tapinoma melanocephalum

Not yet identified

1-2 other Cardiocondyla sp

1-3 other Hypoponera sp

8.0 References

BEST Commission (2003), *The National Invasive Species Strategy for The Bahamas*. BEST, Nassau, The Bahamas, 34 pp.

Morse, L.E., J.M. Randall, N. Benton, R. Hiebert, and S. Lu. (2004), *An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for Their Impact on Biodiversity*. Version 1. NatureServe, Arlington, Virginia.

Palau National Invasive Species Strategy (2004);
(<http://www.cbd.int/doc/submissions/ias/ias-pw-strategy-2007-en.pdf>)

Varnham, K. (2006), *Non-native species in the UK Overseas Territories: a review (with database of non-native species occurring in the UK Overseas Territories)* JNCC Report 372; Joint Nature Conservation Committee;

Wetterer J. (PhD), (Wilkes Honor College, FL) ; Per communication (2008)