



UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT

The UAE National Invasive Species Strategy & Action Plan

2022 - 2026

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Strategy and Action Plan**

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Scientific name: *Felis catus*
Common name: Feral Cat





Scientific name: *Corvus splendens*
Common name: House crow

DEFINITIONS OF KEY TERMS

Biodiversity	The variety among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems
Biosecurity	Protecting the human community, and their economy, and environment from the negative impacts of diseases that can be generated by pests, weeds and harmful microorganism, either directly or through their produced substances
Eradication	The removal of all individuals of the species population from the range of their invasive distribution
Introduced species	Species that are living outside its native distributional range without causing any harm to the native species
Invasive species	Any plants, animals, and other organisms that are non-native to an ecosystem and may cause economic or environmental harm or adversely affect human health
Native species	A species within its natural range (past and present)
Pathways	The passage by which invasive species move e.g. air, surface water, groundwater, plants, animals and by human agents
Pest	Any species, strain or biotype of plant, animal or pathogenic agent injurious to humans, animals, plants, other organisms, native biodiversity, habitats, ecosystems, or materials, including vectors of parasites or pathogenic agents



Scientific name: *Acridotheres tristis*
 Common name: Common myna

ABBREVIATIONS

CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
IAS	Invasive Alien Species
IUCN	International Union the Conservation of Nature
MOCCA	Ministry of Climate Change and Environment
NGO	Non-Governmental Organisation
UAE	United Arab Emirates
CMS	Convention on the Conservation of Migratory Species of Wild Animals
MOU	Memorandum of Understanding
IOSEA	Indian Ocean and South-East Asia
IPPC	International Plant Protection Convention
OIE	World Organization for Animal Health
IMO	International Maritime Organization
BWM	Convention on Ballast Water Management
FAO	Food and Agriculture Organization of the United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WHC	Convention Concerning the Protection of the World Cultural and Natural Heritage

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Scientific name: *Iridomyrmex anceps*
Common name: Flat-backed tyrant ant

1. Introduction

1.1. The Invasive Alien Species in the United Arab Emirates

Invasive Alien Species (IAS) are defined as alien or non-native species of plant, animal, and microorganism whose introduction and/or spread threaten local biological diversity. The establishment and spread of IAS is a leading threat to natural ecosystems through biodiversity loss and environmental degradation worldwide, as these affect the environment, economy, and society, including human health. The need for the United Arab Emirates (UAE) to take measures to address IAS and conserve the country's natural resources is due to the threats posed by existing and potential invasive alien species that lead to biodiversity loss and severe environmental impacts if they are not managed.

Invasive alien species can originate from other continents and neighbouring countries. The ways in which invasive alien species are introduced or spread are called pathways. Introductions are either intentional, unintentional or through dispersal. The component which enables movement that pathway is called the invasion "vector" (IUCN Invasive Species Specialist Group ISSG, 2016). Examples of vectors in a marine or aquatic context include ships, and recreational craft that can unintentionally transport alien organisms in cargo containers, packaging materials, fishing gear, ballast water, or attached to the hull. The UAE's strategic approach to address invasive alien species, as discussed in more detail later in this document, will focus on the identification of priority pathways of current introduced species as well as species that are likely to enter the country in the future.

IAS can potentially cause a range of problems, as they become predators, competitors, parasites, hybridizers, and diseases of the native and domesticated flora and fauna. IAS threatens the survival of native flora and fauna by competing for resources, thus upsetting the ecological balance. They are costly to control if not managed properly and could endanger human health. In addition, IAS could result in negative genetic impacts if they interact with native species.

1.2. United Arab Emirates' biodiversity values that are at risk from IAS

Exponential increases in the global trade of goods and services by land, air and sea have simultaneously accelerated the spread of IAS. The fifth Global Environment Outlook Report shows that the global number of exotic invasive species has increased by 76% since 1970. Furthermore, IAS introductions from global trade were responsible for endangering 20% of native species, while economic losses were estimated at about USD 1.4 trillion a year. This environmental threat exists in addition to other significant global challenges like climate change, unsustainable use of natural resources, habitat fragmentation and pollution.

The UAE contains important areas of coral reefs, seagrass, mangroves, salt marshes, sand dunes, gravel plains and dry sand. It provides a native habitat to more than 598 species of wild vascular plants, 58 species of native mammals, 459 species of birds, 66 species of corals and more than 80 species of sharks and rays. The UAE has 49 protected areas that account for more than 15% of the total area of the country. It is divided into 33 terrestrials and 16 marine protected areas. 10 of these protected areas are recognized as Wetlands of International Importance and 2 are certified as UNESCO- Man and Biosphere Reserve (MAB).

Introduction of alien species that are accidentally or deliberately, often compete with native species, and can cause significant damage. However, the effects are normally only realised many years later, making it too late to introduce any preventive measures. For example, the black rat and brown rat have caused or contributed to the extinction or range reduction of native mammals, birds, reptiles and invertebrates through predation and competition in their introduced range across the world. They restrict the regeneration of many plant species by eating seeds and seedlings. They eat food crops and spoil human food stores by urinating and defecating in them. They carry pathogens that spread and transmit diseases. Additional economic damage includes chewing of power cables.

1.3. IAS currently present in the United Arab Emirates

The baseline checklist of alien and invasive species in the United Arab Emirates was compiled in 2017 and published through the Integrated Publishing Tool of the Global Biodiversity Information Facility (GBIF). This 2017 baseline dataset included 250 alien and 24 known invasive species records (Appendix 1 &2).

A breakdown of the number of alien species records, as well as the changes in numbers, per taxon group of the 2017 baseline and the revised 2019 dataset is provided in Table 1. There were no changes in the numbers of amphibians, birds, dinoflagellates, Insects and mammals recorded.

Kingdom/ Taxon group	Species records (2017 baseline)	Species records (2019 updates)	Change
Amphibians	1	1	0
Birds	123	123	0
Dinoflagellates	6	6	0
Fish and other aquatic animals	17	16	-1
Insects	53	53	0
Mammals	11	11	0
Molluscs (terrestrial)	5	8	+ 3
Reptiles	2	6	+ 4
Vascular Plants	29	48	+ 19
TOTAL	247	272	

Table 1. Taxon breakdown of United Arab Emirates checklist and comparison between the 2017 baseline version and the updated 2019 version

1.3.1 Vascular Plants

Five vascular plant species have been identified as invasive in the United Arab Emirates: fountain grass (*Cenchrus setaceus*), milkweed (*Calotropis procera*), lantana (*Lantana camara*), parthenium (*Parthenium hysterophorus*), and mesquite (*Prosopis juliflora*). These species are known to have well-established populations in the country and

actions are on-going to contain and manage them.

The number of vascular plant species listed increased from 29 to 52 (including two seaweeds, *Caulerpa racemosa* var. *lamourouxii* and *Ulva ohnoi*). The increase in the numbers of plant species is not due to the detection of new species since the previous inventory was compiled, but rather due to gaining access to reference literature that was previously unavailable and that was now obtained through contacts with experts within the region. This literature reports on the presence of further alien plant species in the country.

1.3.2 Birds

As for birds, 29 species have been identified for priority action, focused on monitoring bird populations and spread. Eight of the 29 birds listed are known invaders in their introduced range including the common myna (*Acridotheres tristis*), canada goose (*Branta canadensis*), rock pigeon (*Columba livia*), house crow (*Corvus splendens*), monk parakeet (*Myiopsitta monachus*), rose-ringed parakeet (*Psittacula kramera*), and the red-vented bulbul (*Pycnonotus cafer*). Introduced intentionally or unintentionally to novel locations, they have established breeding populations and spread, causing impacts on native biodiversity, the general environment and even human health. Impact mechanisms include competition for nesting places and food resources, predation, disruption of ecosystem function, disease transmission and physical nuisance (degrading and damaging spaces in which they nest) and disturbance including destruction of electric wiring and systems due to nest building (Invasive Species Specialist Group, 2018).

Bank myna, common myna, rock pigeon, house crow, alexandrine parakeet and rose-ringed parakeet are listed as 'invasive' in the United Arab Emirates, indicating priority status in their management.

The other bird species are known to have established small breeding populations with potential to spread, requiring monitoring of their populations and, in cases where population numbers are high, an assessment of their impacts.

1.3.3 Mammals

1.3.3.1 Predators:

According to the results of the identification of priority species in phase 1 of IAS project, five mammal predators were identified, including the black rat (*Rattus rattus*), brown rat (*Rattus norvegicus*), house mouse (*Mus musculus*), feral cat (*Felis catus*), and feral dog (*Canis lupus familiaris*).

1.3.3.2 Herbivores/grazers:

Feral goats are generalist herbivores and browse a wide variety of plant species, but often concentrate most of the feeding on a small number of favoured species. Grasslands, scrub lands, rocky outcrops and semi-open or open forests are all used extensively by goats as habitat (Invasive Species Specialist Group, 2018).

1.3.4 Reptiles

Four additional reptiles have been listed. They do not refer to new species detections, but had simply missed being listed in the 2017 version.

1.3.5 Amphibians

The United Arab Emirates is home to two species of native amphibians, the arabian toad (*Duttaphrynus arabicus*) and dhofar toad (*Duttaphrynus dhufarensis*), both of which are regional endemics (Soorae, 2010). The asian common toad (*Duttaphrynus melanostictus*) is the only alien amphibian recorded in the United Arab Emirates. It is a potential carrier of the deadly chytrid fungus *Batrachochytrium dendrobatidis* (Bd), the causal agent of chytridiomycosis, a notifiable disease that has caused a decline in amphibian populations across the globe.

1.3.6 Molluscs

Four new records of species of land molluscs have been added to the list of alien mollusca. They include the freshwater red-rimmed melania (*Melanoides tuberculata*), whose provenance is Uncert, the giant African snail (*Lissachatina fulica*), the air-breathing land snail (*Macrochlamys indica*), and *Zootecus insularis* (Saji & Soorae, 2019). There is no information on the dates of introduction or discovery of these species. One genu level record (*Calcisuccinea*) from the 2017 version was removed due to uncertainty about its presence.

1.3.7 Insects

As for insects, five tramp ants (Flat-backed tyrant ant (*Iridomyrmex anceps*), argentine ant (*Linepithema humile*), singapore ant (*Monomorium destructor*), tropical fire ant (*Solenopsis geminata*), ghost ant (*Tapinoma melanocephalum*)), and the red palm weevil (*Rhynchophorus ferrugineus*) are identified for priority action.

Tramp ants are a diverse group of invasive ant species that are highly mobile and have established across the world. These ants cause negative impacts on biodiversity (predation, competition and habitat modification), physical disturbance to humans and damage electrical installations etc. (Invasive Species Specialist Group, 2018). Collingwood et al. (1997) observe that alien tramp ant species form a very high percentage of ant fauna in the United Arab Emirates. They mostly occur in man-made environments (Soorae, 2010).

1.3.8 Fish

Alien fish have potentially posed a direct threat to the three native and two regionally endemic fish that occur in the freshwater wadi systems of the United Arab Emirates. According to the results of the identification of priority species in phase 1 of this project, 14 alien fish species have been listed for priority management focused on the prevention of further introductions to sensitive areas and studying the feasibility of eradications of alien fish in specific waterbodies where they are competing with native species.

1.3.9 Other Aquatic Animals

For fish and other aquatic animals, the only crustacean present in the 2017 list, the Indo-Pacific swimming crab (*Charybdis hellerii*), was excluded from the list, as no occurrences have been reported since carapaces were found at the time of the first report. The species was also listed as Cryptic.



Scientific name: *Lantana camara* L.

Common name: Wild-sage

1.4 Identification of priority species for eradication and control actions

Studies show that to define the prioritization process of ranking species, pathways, or sites for the purposes of:

1. Determining their relative environmental (and socio-economic) impacts, and for
2. Deciding on the relative priority of actions to effectively and efficiently prevent, control or eradicate the invasive alien species,

the actions can be undertaken at different stages of the invasion process, before introduction (pre-border), or after introduction (post-border), with relevance to management and control (McGeoch, et al., 2016).

1.4.1 Method used to prioritize IAS in the UAE

The identification of priority alien and known invasive species for potential eradication or management actions was based on information available on the known severity and magnitude of their negative impacts upon native species, ecosystems and their socioeconomic impacts in invaded areas around the world, and more specifically in the United Arab Emirates. This knowledge was gathered from data and information on impacts and potential management options that was compiled during the 'Validation and Prioritization' Workshop held in 2016,

and the list was reviewed and validated again in the national workshop held in 2019.

Prioritization of species for management was undertaken by experts on the draft United Arab Emirates species inventory, including detailed discussions by groups of taxon experts. 'Listing approaches' are used globally for invasive alien species, regulatory and voluntary approaches to invasive alien species prevention and management, organizational framework for surveillance, and prioritization of species and sites for management using different approaches (including prevention, early warning and rapid response, eradication and management).

1.4.2 Invasive Alien Species for priority actions in the UAE:

In collaboration with the International Union for Conservation of Nature (IUCN), and the IUCN Species Survival Commission (SSC) Invasive Species Specialist Group (ISSG), a national workshop has been conducted to identify the IAS in the UAE. A list of IAS had been identified by workshop participants consists of 24 species (appendix 1) that was further reduced to have a priority list of IAS that provides information on detection, eradication and control measures of the 20 priority species.



Scientific name: *Acridotheres ginginianus*
Common name: Bank myna



Scientific name: *Acridotheres tristis*
Common name: Common myna



Scientific name: *Corvus splendens*
Common name: House crow



Scientific name: *Columba livia*
Common name: Rock dove



Scientific name: *Psittacula eupatria*
Common name: Alexandrine parakeet



Scientific name: *Psittacula krameri*
Common name: Rose-ringed parakeet



Scientific name: *Capra hircus*
Common name: Goat



Scientific name: *Felis catus*
Common name: Feral Cat

Figure 1. Priority IAS in the UAE

Figure 1. Priority IAS in the UAE



Scientific name: *Mus musculus*
Common name: House mouse



Scientific name: *Rattus norvegicus*
Common name: Brown rat



Scientific name: *Rattus rattus*
Common name: House rat



Scientific name: *Iridomyrmex anceps*
Common name: Flat-backed tyrant ant



Scientific name: *Linepithema humile*
Common name: Argentine ant



Scientific name: *Monomorium destructor*
Common name: Singapore ant



Scientific name: *Rhynchophorus ferrugineus*
Common name: Red palm weevil



Scientific name: *Solenopsis geminata*
Common name: Fire ant



Scientific name: *Tapinoma melanocephalum*
Common name: Ghost ant



Scientific name: *Lantana camara L.*
Common name: Wild-sage



Scientific name: *Pennisetum setaceum*
Common name: Fountain grass



Scientific name: *Prosopis juliflora*
Common name: Mesquite

Figure 1. Priority IAS in the UAE

Figure 1. Priority IAS in the UAE

1.5 Invasion pathways into the United Arab Emirates

The most critical information in the practical approach to prevention and management of biological invasions is the identification of their pathways of the introduction and details of the vectors by which they are transported. These are necessary for planning the prevention of the introduction of potentially invasive species and for the containment of the spread of established invasions.

Invasion pathways are the actual or theoretical routes along which introduced species move during their early stages of invasion (which includes introduction, establishment or naturalization, spread and then damage to biodiversity or human development). The component which enables movement along that pathway is called the invasion vector (IUCN Invasive Species Specialist Group ISSG, 2016). Examples of vectors in a marine or aquatic context include ships and recreational craft that can unintentionally transport alien organisms in cargo containers, packaging

material, fishing gear, ballast water or attached to the hull.

A standardized pathway classification endorsed by the Conference of the Parties to the Convention on Biological Diversity (Convention on Biological Diversity (CBD), 2014) was used to categorize the pathways of introduction (realized and potential) of alien and invasive species. This tool aids in identification of priority pathways.

According to the CBD (2014) classification scheme, introductions are either Intentional, Unintentional or through Dispersal (see table 2). The mechanism of introduction is also classified as either through the movement of a commodity, arrival on a transport vector, or through human facilitated spread. These mechanisms are further categorized into Release, Escape, Transport-contaminant, Transport-stowaway, Corridors and Unaided dispersal, each with additional sub-categories. A guidance document has been published to support the interpretation and application of the CBD categories on invasive pathways (IUCN, 2017).

	Category	Sub-category	
Movement of commodity	Release in nature	Biological control Erosion control / dune stabilization (windbreaks, hedges,) Fishery in the wild (including game fishing) Hunting Landscape / flora / fauna "improvement" in the wild Introducing for conservation purposes or wildlife management Release in nature for use (other than above, e.g., fur, transport, medical use) Other intentional release	Intentional
	Escape from confinement	Agriculture (including Biofuel feedstocks) Aquaculture / mariculture Botanical garden / zoo / aquaria (excluding domestic aquaria) Pet / aquarium / terrarium species (including live food for such species) Farmed animals (including animals left under limited control) Forestry (including reforestation) Fur farms Horticulture Ornamental purpose other than horticulture Research and ex-situ breeding (in facilities) Live food and live bait Other escape from confinement	
	Transport contaminant	Contaminant nursery material Contaminated bait Food contaminant (including of live food) Contaminant on animals (except parasites, species transported by host / vector) Parasites on animals (including species transported by host and vector) Contaminant on plants (except parasites, species transported by host / vector) Parasites on animals (including species transported by host and vector) Seed contaminant Timber trade Transportation of habitat material (soil, vegetation, ...)	Unintentional

Table 2. Pathways of Introduction- Convention on Biological Diversity CBD

Vector	Transport stowaway	Angling / fishing equipment Container / bulk Hitchhikers in or on airplane Hitchhikers on ship / boat (excluding ballast water and hull fouling) Machinery / equipment People and their luggage / equipment (in particular tourism) Organic packing material, in particular wood packaging Ship / boat ballast water Ship / boat hull fouling Vehicles (car, train, ...) Other means of transport	Unintentional
Spread	Corridor	Interconnected waterways / basins / seas Tunnels and land bridges	Dispersal
	Unaided	Natural dispersal across borders of invasive alien species that have been introduced through pathways 1 to 5	

Pathway categories and sub-categories were assigned to each alien or known invasive species in the UAE according to the CBD's classification. The results of the ranking of pathways of introduction are shown in Table 3. Selected highest-ranking pathway categories and sub-categories are 'Escape from confinement' (Pets and aquarium species (74 species), Aquaculture/mariculture facilities (11 species), Ornamental purposes (10 species), Botanical gardens and Zoos (4 species)) and 'Release in Nature' (Landscape improvement (49 species), Biological control (3 species); Transport-contaminant (Contaminant on plants (6 species) Transport-stowaway (Container-bulk (6 species), Hitchhiker on ship or boat, Ballast water (4 species); Unaided -natural dispersal (4 species).

1.5.1 Pathways that most likely facilitate the introduction of alien species during the importation of commodities into the UAE.

Neighboring countries with land and sea borders and main trading partners (based on volumes of trade and a minimal degree of climatic matching) comprise the source areas for the identification of priority pathways of introduction. The pathway categories and sub-categories assigned were based on the types of commodities being imported and their most likely transportation pathway (vectors).

Imports in almost all cases enter through the sea and airports. The primary pathway class applicable in this case is 'Transport- stowaway' and pathway sub-classes are indicated based on the main type of importation commodity imported into the country (mostly machinery, vehicles, and electronic materials). 'Corridors' and 'Unaided' pathway classes are also listed to address the movement of species that can spread across land and water borders (see Table 4).

Introduction Type	Pathway categories	Pathway sub-categories	Number of species
Intentional	Escape from confinement	Pet/aquarium/terrarium species (including live food)	74
		Aquaculture / mariculture	11
	Release in nature	Ornamental purpose other than horticulture	10
		Botanical garden/zoo/aquaria (excluding domestic aquaria)	4
		Landscape/flora/fauna "improvement" in the wild	49
	Biological control	3	
Unintentional	Transport-contaminant	Contaminant on plants	6
	Transport-stowaway	Hitchhiker on ship or boats,	6
	Transport-stowaway	Ballast water	4
	Unaided	Natural dispersal	4

Table 3. Priority Pathway categories, sub-categories based on alien and invasive species already introduced to the United Arab Emirates

Introduction Type	Pathway categories	Pathway sub-categories
Unintentional	Transport-stowaway	Container/bulk
		Hitchhikers in or on airplane
		Hitchhikers on ship/boat (excluding ballast water and hull fouling)
		Machinery/equipment
		People and their luggage/equipment (in particular tourism)
		Organic packing material, in particular wood packaging
	Corridor	Ship/boat ballast water
		Ship/boat hull fouling
	Unaided	Other means of transport
		Interconnected waterways/basins/seas
		Natural dispersal across borders of invasive alien species that have been introduced by the other pathways

Table 4. Priority Pathway categories and sub-categories based on the type and movement of goods from neighbor countries and trading partners

1.6 Management of IAS

1.6.1 Management of IAS in the UAE

The UAE has implemented regulations and techniques to remove or control the invasive alien species. Some of the tools were defined as best global practices and followed the UAE ethical rules on animal welfare, this is cited in the below tables.

1.6.1.1 Rodents – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Inspecting ships in ports Examining of footprint, feeding marks and traps Monitoring plan of active areas with rodents Integrated pest management program Biosecurity plan
Eradication	<ul style="list-style-type: none"> Using Internet of Pest (IOP) (A smart remote sensor and control system for mice and public pests that aims to know their species and prevalence rates) Using local friendly chemical control such as, anticoagulants in the form of baits and poisons to reduce populations Using physical control such as trapping Using smart traps (The traps are equipped with sensors and a data bundle that sends text messages when the mouse is captured including the location and the time of mouse capturing. The Specialists visit the trap site, dispose of the species, and prepare it to work again. There are two types of traps: <ul style="list-style-type: none"> Single traps: The trap capture only one mouse. Multiple traps: The trap capture number of mice and is equipped with a waste basket, which then disposes it (it can hunt and get rid of 7 mice at a time)
Control	<ul style="list-style-type: none"> Carrying out scientific research and studies in the field of rodent and rat control Health awareness and educational programs

1.6.1.2 Cats – management measures

Measures	Tools
Eradication	<ul style="list-style-type: none"> Trap – Neuter- Return (TNR) <ul style="list-style-type: none"> This procedure is used in order to create a balance environment by dealing with loose cats. The cats are being caught and transferred to the Municipality. After that, they assign a vet to sterilized and vaccinate the cats and return it to the same place it was found Cats are checked through their chips to recognised their owners, registered cats are contacted with their owners to receive them within 3 working days of their seizure. Registered cats that are not recognized by their owners, or whose owners have not attended to receive them during the specified period, it will become as the municipality property, and then subjected them for adoption through Alif application Diseased cats are eliminated by euthanasia (mercy killing)
Control	<ul style="list-style-type: none"> Shelters

1.6.1.3 Feral dogs – management measures

Measures	Tools
Eradication	<ul style="list-style-type: none"> Castration or sterilization of feral dogs, then placing a microchip and put for adoption through Alif application or through website Frenzied dogs are eliminated by euthanasia (mercy killing)
Control	<ul style="list-style-type: none"> Shelters

1.6.1.4 Birds – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Monitoring by collecting data over time to detect changes Pet shop survey
Eradication	<ul style="list-style-type: none"> Managing waste and food availability to limit localized crow gatherings Trapping nets
Control	<ul style="list-style-type: none"> Awareness programs

1.6.1.5 Insects – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Phytosanitary measures on borders
Eradication	<ul style="list-style-type: none"> Pest control Management campaigns are carried out using chemical pesticides
Control	<ul style="list-style-type: none"> Use of poisons

1.6.1.6 Vascular plants – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Monitoring of the area surrounding over a period of time Field observation
Eradication	<ul style="list-style-type: none"> Removal of random plants and trees that appear in streets, farms and household
Control	<ul style="list-style-type: none"> Using of machines to remove, cut and grind mesquite trees

Another tool that has been adopted is the generation and upkeep of national checklists of introduced and invasive species. These provide the simplest form of useful information on the distribution of alien species; essentially, they represent a record for each species listed at the scale of the country (or other geopolitical or land management units, such as islands or protected areas). Also using the Global Register of Introduced and Invasive Species (GRIIS), which is designed to provide such a harmonised, open source, multi-taxon database that includes verified information on the presence of introduced and invasive species for most of the world's countries. GRIIS provides significant support for countries to identify and prioritise invasive alien species, and establishes national and global baselines. This global system helps monitor of trends in biological invasions that affect the environment.

1.6.2 Management of IAS in the world

There are many global tools used in combating invasive alien species. Some of these global best practice of management measures for each of the different groups are reviewed and elaborated upon priority species, were its clusterd into the following taxonomically similar groups that entail a broadly similar management response:

1. Mammals (predators)
2. Mammals (herbivores and grazers)
3. Birds
4. Fish
5. Insects (Tramp ants)
6. Amphibians
7. Vascular plants

Prevention is the first and most cost-effective line of defence in the management of invasive alien species. Early detection determines if eradication is feasible and a rapid management response is required (Figure 2). Where alien and potentially invasive species have breached these lines of defence and established widespread populations, containment and management are the options to follow (Wittenberg & Cock, 2001). This section mainly focuses on management measures for detection, eradication and control of the identified priority taxon groups worldwide.

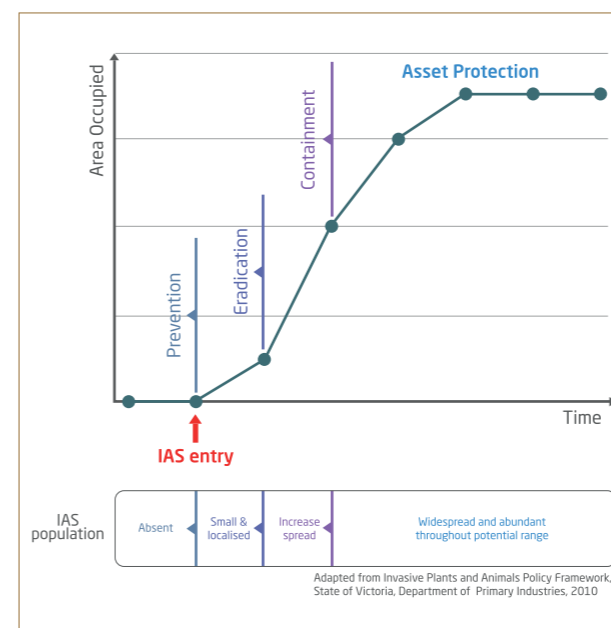


Figure 2. Species invasion curve with appropriate measures

1.6.2.1 Rodents and cats – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Examining left nests, running tracks, droppings, footprint, feeding marks, tracking tunnels and traps Visual sightings by the use of cameras and examination of nests Chewcards are also used to detect predators
Eradication	<ul style="list-style-type: none"> Combinations of traps, biodegradable and eco-friendly poisons and baits are used, including deploying aerial applications and trapping on the ground Biosecurity plan, Monitoring and evaluation plan
Control	<ul style="list-style-type: none"> Trapping and the use of poisons to reduce populations

1.6.2.2 Feral dogs – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Bait stations, scat counts, DNA sampling, trapping and telemetry, incidental observations and remote photography
Control	<ul style="list-style-type: none"> Baiting, trapping, shooting, fencing, and adaptive management

1.6.2.3 Herbivores/grazers – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Judas technique <ul style="list-style-type: none"> It has been used to detect populations of feral goats; this technique can be used to detect low density herds that are fragmented across an area. The principle behind the technique is that goats, which do not like to be isolated, seek out other goats when isolated. The 'Judas' goat is desexed, fitted with a radio-collar, and released in an area where there are known to be feral goat populations. The numbers of 'Judas' goats released depends on the extent of the site and estimated numbers of feral goats. The fitted radio-collars allow the marked animals to be tracked, and through them track the location of feral goat populations which are then physically removed or shot
Eradication	<ul style="list-style-type: none"> Shooting (either aerial or ground) and physically removing then from the site
Control	<ul style="list-style-type: none"> Raising awareness among civil society The use of rules or codes of practice to exclude goats from certain sensitive areas

1.6.2.4 Birds – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Citizen science networks, including birding enthusiasts and bird watching clubs Surveillance and monitoring techniques can include one-off surveys to build an inventory of species Monitoring by collecting data at two or more points over time to detect changes
Eradication	<ul style="list-style-type: none"> Trapping and shooting
Control	<ul style="list-style-type: none"> Non-lethal methods include the use of scaring devices, chemical repellents, decoy food sources, manipulating the habitat so it is rendered unsuitable for colonizing, the use of deterrents, and exclusion netting. Lethal methods include shooting, trapping and the use of poisons

1.6.2.5 Fishes – management measures

Measures	Tools
Prevention	<ul style="list-style-type: none"> Raising awareness among the general public is key to prevention of release of pet species into waterbodies. Promote knowledge of native species, their status and their potential loss
Detection	<ul style="list-style-type: none"> Citizen science including observations from fishing communities and inspection of fish catches for any new species detections
Eradication	<ul style="list-style-type: none"> Electrofishing and passive removal (e.g. nets and traps)
Control	<ul style="list-style-type: none"> Barriers, harvesting, traps and water level manipulation Electric barriers, bubble curtains and sonic barriers Biological control, immunocontraception and genetic manipulation

1.6.2.6 Insects – management measures

Measures	Tools
Prevention	<ul style="list-style-type: none"> Risk assessments, knowledge and facilities for identification of ant species, Enabling phytosanitary measures
Detection	<ul style="list-style-type: none"> Monitoring and surveillance of high-risk areas such as airport and seaport cargo areas Resources such as AntWeb can provide guidance on species identification to relevant authorities Baseline surveys and distribution maps of native biodiversity
Eradication	<ul style="list-style-type: none"> Chemical control (active compounds in bait), by destroying the nest detected using chemicals and treating the area immediately around the nest Monitoring and surveillance of the area surrounding over a period of time to ensure no ants remained from the detected population
Control	<ul style="list-style-type: none"> Non-toxic method (such as the use of saltwater dousing, boiling water treatment and the use of Boric acid) Toxic methods (such as the use of poisons and baits)

1.6.2.7 Amphibians – management measures

Management measures, (Prevention, Detection and management and control) is focused on the Chytrid fungus.

Measures	Tools
Prevention	<ul style="list-style-type: none"> Regulations regarding quarantine, testing, treatment and movement of amphibians
Detection	<ul style="list-style-type: none"> Diagnostics test and histological examination
Control	<ul style="list-style-type: none"> Disinfection of water and fomites through the use of chemical disinfectants (bleach, quaternary ammonium compounds, ethanol, Virkon, Trigen, F10) Physical methods (heat, drying)

1.6.2.8 Vascular plants – management measures

Measures	Tools
Detection	<ul style="list-style-type: none"> Satellite populations and remote sensing techniques Developing Early Detection and Distribution Mapping System (EDDMapS) Field observation
Eradication	<ul style="list-style-type: none"> Eradication of established plant species is difficult to achieve due to the persistence of seed banks
Control	<ul style="list-style-type: none"> Mechanical control methods Refer to the use of machines to cut, dig out, remove and shred infestations of plant species. Machines used can vary from tractors, tillers, earth moving equipment for terrestrial plants to the use of boats and shredders for aquatic plants. The timing of the cutting of plants is critical, plants need to be removed before they set seed, while secondary control methods such as chemical application to cut stumps may be required to eliminate the plants Manual control methods Refer to the hand pulling, or physical digging out of plants. This is best suited for small infestations or single plants, or if the plants are growing on soft soil and easy to pull out. Care must be taken for plants that produce rhizomes, corms etc., as every bit of the root of the plant needs to be removed Cultural control Refers to the 'revegetation' of invaded areas with native plant species that may compete with the alien species to restrict their establishment. This method is also used in revegetation of areas where alien and invasive plants have been removed resulting in bare areas, to prevent re-invasion Chemical control Refers to the use of herbicides for the control or elimination of particularly persistent species of plants. The type of chemical or formulations, quantity of chemical and application methods vary depending on the target species, environmental conditions, size and state of the infestation. Issues related to the use of chemicals include toxicity of the chemicals used, spray-drift and related unintended consequences Biological control Refers to the use of living organisms to reduce the vigor of a plant and seed production, resulting in the decline and elimination of populations of the target plant species. Natural predators of the target species are used



Scientific name: *Solenopsis geminata*
Common name: Fire ant

2. International and National obligations relating to IAS

The commitment of national governments to Multilateral Environmental Agreements (MEAs) that address aspects of alien and invasive species issues guides national policy, legislation and action. The United Arab Emirates is signatory to a number of relevant MEAs (Table 5).

Multilateral Environmental Agreements
Convention on Biological Diversity (CBD)
Cartagena Protocol on Biosafety
Convention on the Conservation of Migratory Species of Wild Animals (CMS)
Memorandum of Understanding on the Conservation and Management of Dugongs and their Habitats throughout their Range (Dugong MoU)
Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA Marine Turtle MOU);
CMS Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia (Raptors MOU)
Convention on Wetlands of International Importance (Ramsar)
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their utilization (Nagoya Protocol)
International Plant Protection Convention (IPPC)
World Organization for Animal Health (OIE)
International Maritime Organization (IMO)
Convention on Ballast Water Management (BWM)
Food and Agriculture Organization of the United Nations (FAO)
United Nations Framework Convention on Climate Change (UNFCCC)
Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC)

Table 5. Global Multilateral Environmental Agreements

Furthermore, the United Arab Emirates has developed legislations to manage invasive species (Table 6)

UAE Legislation
Federal Law No. 6 of 1979 concerning Veterinary quarantine and its amendments
Federal Law No. 5 of 1979 concerning Agriculture quarantine and its amendments
Federal Law No. 24 of 1999 on the Protection and Development of the Environment, its amendments and Executive Regulations
Federal Law No. 11 of 2002 on Regulating and Controlling International Trade in Endangered Species of Wild Fauna and Flora and its Executive Regulations
Federal Law No. 16 of 2007 on Animal Welfare State, its amendments and executive regulations
Federal Law No. 8 of 2013 on the Prevention and Control of Contagious and Epidemic Animal Diseases
Federal Law No. 22 of 2016 on Regulating the possession of dangerous Animals

Table 6. UAE Legislation

3. The process for preparing the NISSAP

A national committee was established to include competent authorities across the UAE and several meetings were held to discuss all aspects related to the UAE National Invasive Species Strategy and Action Plan (NISSAP). A two day national workshop was held in cooperation with IUCN and with the participation of the committee experts from competent authorities, academic entities, NGOs and the private sector to prepare and discuss the NISSAP in order to regulate and combat invasive species by developing response plans to its impact. A draft of NISSAP was outlined and reviewed by all experts and specialists. The draft was approved by the MOCCA and the biodiversity executive committee.

4. The strategy

4.1 Vision

Natural resources, the environment, and communities are protected from the impact of invasive alien species

4.2 Goals

1. Improve public awareness of invasive alien species
2. Enhance capacity for managing invasive alien species
3. Prevent the introduction and spread of alien and invasive alien species
4. Manage established priority invasive alien species
5. Enhance and strengthen cooperation and coordination at the national, regional and international level

4.3 Scope

The plan of action is intended to have an initial five years' duration from 2021 until 2026. A subsequent review will enable an adaptive management approach to ensure the attainment of the vision and strategic goals. Identified goals, objectives and actions must be specific to the situation in the UAE, and address the gaps and challenges identified through the strategy.

The implementation will be coordinated by the Ministry of Climate Change and Environment - MOCCA in close collaboration with relevant stakeholders, progress will be assessed and reported annually at the Emirates Climate Change and Environment Council.

4.4 Criteria to prioritize the Action

Immediate priority action

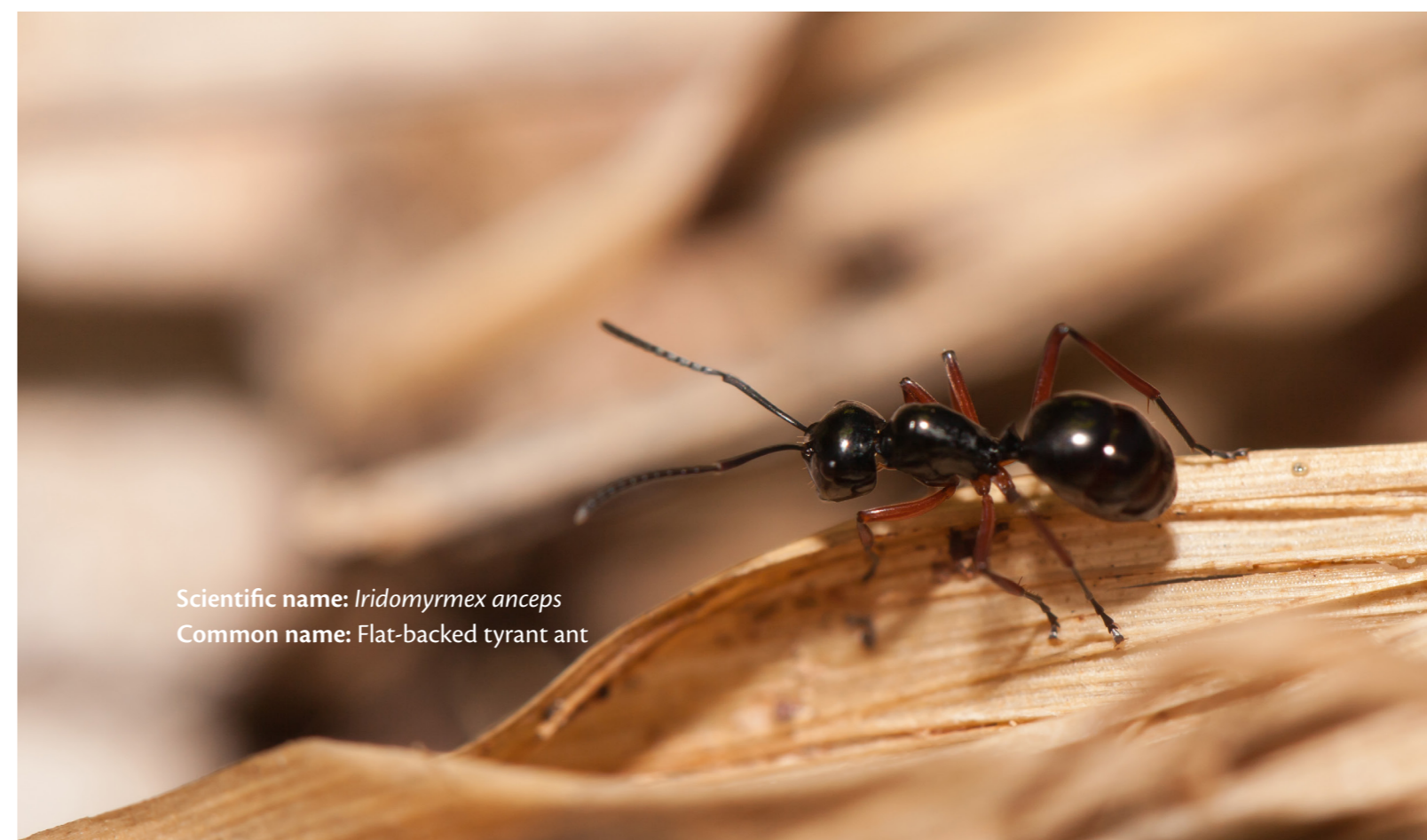
Actions that are essential to prevent the extinction or extirpation of endemic and native threatened species and required to be implemented within 1 - 3 years.

Medium term priority action:

Actions that are essential to avoid a significant decline in endemic and native species population and required to be implemented within 3 - 5 years.

Long term priority action:

Actions that are recommended for the recovery of species and restoration of the ecosystem. These are non-critical measures and may require more than 5 years to be implemented.



Scientific name: *Iridomyrmex anceps*
Common name: Flat-backed tyrant ant

5. The UAE National Invasive Species Strategy and Action Plan

Goal 1: Improve public awareness of invasive alien species				
Objective 1.1: Enhance awareness of invasive alien species, their impacts and management				
Actions	Indicators	Lead agency	Partners	Priority
1.1.1. Assess public understanding of invasive alien species, their impacts and management	Assessment report	MOCCA	Competent authority	Immediate
1.1.2. Develop and implement mass media awareness campaigns on invasive alien species, their impacts and management	Number of implemented programs	MOCCA	Competent authority	Medium term
1.1.3. Develop and disseminate education programs on invasive alien species, their impacts and management, including the use of multimedia platforms	Number of awareness program and educational material distributed per year	MOCCA	• Competent authority • Academic sector • Private Sectors • NGOs	Medium term
1.1.4. Assess the outcomes of awareness campaigns and education programmes	• Assessment report • Awareness campaigns and education programmes revised based on assessment findings	MOCCA	Competent authority	Medium term
Goal 2: Enhance capacity for managing invasive alien species				
Objective 2.1: Mobilize and maintain knowledge on alien and invasive alien species				
Actions	Indicators	Lead agency	Partners	Priority
2.1.1. Develop a web-based information resource for invasive species to share information on species ecology, distribution, pathways of introduction and spread, management, impacts on native species, ecosystems and services	• Web based information • Resources are publically available	MOCCA	• Competent authority • Academic sector • Private Sectors • NGOs	Medium term
2.1.2. Conduct research studies on invasive alien species' ecology, environmental impacts and their management including development of innovative techniques	Number of research studies conducted	• MOCCA • Competent authority • Universities	• Private Sectors • NGOs	Medium term
2.1.3. Promote the use of traditional knowledge in invasive alien species research and management	• Number of programs with community • Local knowledge interviews carried out and techniques/lessons documented	• MOCCA • Competent authority • Universities	• Private Sectors • NGOs	Immediate
Objective 2.2: Enhance skills and techniques to manage invasive alien species				
Actions	Indicators	Lead agency	Partners	Priority
2.2.1. Identify gaps for capacity building	Report on the gaps and needs of capacity building	MOCCA	• Competent authority • Private Sectors • NGOs	Immediate
2.2.2. Provide and coordinate training workshop/programs to increase capacity building	Number of workshops/ programs	• MOCCA • Competent authority	• Private Sectors • NGOs	Medium term
2.2.3. Promote partnerships with universities, research institutions and other organizations that can provide support on capacity building	Number of partners and outcomes	• MOCCA • Competent authority	• Academic sector • Private Sectors • NGOs • Research institutes	Medium term
Goal 3: Prevent the introduction and spread of alien and invasive alien species				
Objective 3.1: Strengthen biosecurity to prevent the introduction of species across the border				
Actions	Indicators	Lead agency	Partners	Priority
3.1.1. Review current border controls, quarantine systems to identify gaps and address them	• Review report completed • Gaps identified and recommendations	MOCCA	Competent authority	Immediate
3.1.2. Establish risk assessment procedures to screen all proposed intentional species introductions	Risk assessment procedures operationalized	MOCCA	Competent authority	Immediate
3.1.3. Identify priority pathways using pathway analysis (for current pathways) and horizon scanning (for emerging pathways)	List of priority pathways (current and emerging)	MOCCA	• Competent authority • Government sectors • Private Sectors	Immediate
3.1.4. Develop and implement pathway management plans for priority pathways	Pathway management plans operationalized	MOCCA	NGOs	Medium term

Objective 3.2: Establish and maintain an early detection and rapid response mechanism				
Actions	Indicators	Lead agency	Partners	Priority
3.2.1. Carry out surveys with standardized methodologies (SOP) to update the national checklist of alien and invasive species (terrestrial, freshwater and marine biomes)	Updated national checklist	MOCCA	• Competent authority • Academic Sector • Government sectors • Private Sectors • NGOs	Immediate
3.2.2. Carry out monitoring for high-risk taxa (e.g. tramp ants, birds), high-risk species (e.g. Chytrid fungus), at high-risk areas (e.g. pet shops, nurseries, ports, container facilities, airports etc.) to detect new incursions	Monitoring programs established	MOCCA	• Competent authority • Academic Sector • Government sectors • Private Sectors • NGOs	Medium term
3.2.3. Carry out monitoring for alien and invasive species using best practice in sites of importance for biodiversity to detect new incursions	All-important sites monitored	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Medium term
3.2.4. Increase monitoring capacity through citizen science programs	Citizen science programs established in each Emirate	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Medium term
3.2.5. Develop a detailed generic emergency response plan for new incursions (should include process for confirming species identification, decision making, resourcing (e.g. skilled staff, equipment and financial means)	Emergency response plan	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Immediate
3.2.6. Develop emergency response plans for incursions of high-risk species (e.g. tramp ants, Chytrid fungus)	Completion of emergency response plans for at least two high-risk taxa	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Immediate
3.2.7. Undertake emergency response simulations exercises to enhance preparedness for rapid response	One emergency response simulation per year	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Immediate
3.2.8. Ensure adequate resources as, identified in the plans (e.g. legislation, skilled staff, equipment, finances) are available to respond to a new incursion.	Adequate incursion response resources in place and ready for deployment in the event of a new incursion.	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Immediate
Goal 4: Management of established priority invasive alien species				
Objective 4.1: Identify priority invasive alien species for management				
Actions	Indicators	Lead agency	Partners	Priority
4.1.1. Develop and establish a prioritization process to identify priority species for management based on magnitude of impacts, (including potential impacts) and feasibility of management	Prioritisation process established	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Immediate
4.1.2. Develop the list of priority species including management goals (i.e. eradication, control)	List of priority species completed	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Immediate
Objective 4.2: Management of priority invasive alien species				
Actions	Indicators	Lead agency	Partners	Priority
4.2.1. Develop and implement management plans for priority species	Management plans developed and implemented for at least the top five priority species	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Medium term
4.2.2. Develop and implement invasive species management plans for priority sites	Management plans developed and implemented for at least two sites	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Medium term
4.2.3. Develop standard operational procedures to eradicate or control priority invasive alien species	Number of developed standard operational procedures by taxa	MOCCA	• Competent authority • Government sectors • Private Sectors • NGOs	Medium term

Objective 4.3: Recover native species populations and restore ecosystems following invasive alien species management				
Actions	Indicators	Lead agency	Partners	Priority
4.3.1. Design and implement outcome monitoring following management of invasive alien species	Ecosystem restoration action identified Species recovery action identified	MOCCAЕ	<ul style="list-style-type: none"> Competent authority Academic Sector Government sectors Private Sectors NGOs 	Immediate
4.3.2. Design and implement ecosystem restoration plans following invasive alien species management action	Area restored (km2)	MOCCAЕ	<ul style="list-style-type: none"> Competent authority Government sectors Private Sectors NGOs 	long term
Objective 4.4: Strengthen national legislation, policy and regulations				
Actions	Indicators	Lead agency	Partners	Priority
4.4.1. Review the current national legislation, policies, and regulations to identify any gaps relating to the management of invasive alien species (prevention/biosecurity, early detection, rapid response, eradication or control)	Report of gaps within legislation	MOCCAЕ	Competent authority	High term
4.4.2. Develop and enact new legislation, policies and regulations to address gaps relating to the management of invasive alien species (prevention/biosecurity, early detection, rapid response, eradication or control)	New legislation, policies, and regulations are enacted	MOCCAЕ	Competent authority	Medium term

Goal 5: Enhance and strengthen cooperation and coordination at the national, regional and international level				
Objective 5.1: Enhance and build mechanisms for national, regional and international cooperation and coordination				
Actions	Indicators	Lead agency	Partners	Priority
5.1.1. Identify and strengthen existing mechanisms for cooperation at national level	Number of collaborative initiatives implemented nationally	MOCCAЕ	Competent authority	High term
5.1.2. Identify and strengthen existing mechanisms for cooperation at the sub-regional level	Number of collaborative Initiatives implemented regionally	MOCCAЕ	Competent authority	Medium term
5.1.3. Identify and strengthen existing mechanisms for cooperation at the international level	Number of collaborative Initiatives implemented internationally	MOCCAЕ	Competent authority	Medium term
Objective 5.2: Strengthen legislation, policy framework and enforcement				
Actions	Indicators	Lead agency	Partners	Priority
5.2.1. Review regional, and international policies and legislation to address these gaps, as applicable.	Number of benchmarking and gaps	MOCCAЕ	Competent authority	Medium term
5.2.2. Identify efficient mechanisms to enhance enforcement of policies, and collaborate with enforcement agencies to eradicate and control invasive alien species	Number of mechanisms	MOCCAЕ	Competent authority	Medium term

6. Implementation of the NISSAP

This NISSAP covers a period of 5 years commencing in 2022 until 2026. The implementation of the NISSAP will be coordinated by MOCCAЕ in close collaboration with key stakeholders working to combat invasive alien species in the UAE. Progress will be assessed and reported annually at the Emirates Climate Change and Environment Council.

A number of priority activities will be initiated during the initial phase of implementation. These priority activities will allow effective implementation of the plan, periodic evaluation of progress and effective participation of key stakeholders. As they play an important role in supporting various components of this NISSAP. In addition, since this NISSAP is aiming to manage IAS, dissemination of information and collaboration at a regional level is required.

The implementation plan serves to guide the management and control of IAS within the UAE over time. Furthermore, the implementation plan is articulated through a series of recommended actions, building off the unique issues and opportunities facing each high priority invasive species. Each action within the implementation plan has been assigned a time-frame for implementation, within an immediate, medium, or long term based on their priority level.

An annual review of the implementation plan and priority actions will be undertaken to address emerging needs and issues, and to measure progress toward achieving the plan’s outcomes. As information and management guidance on invasive species is constantly evolving, recommended management strategies and priority actions may also change over time—particularly as new information and research becomes available, or new high risk invasive species emerge.



Scientific name: *Psittacula krameri*
Common name: Rose-ringed parakeet

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8. Appendix 1: Invasive species in the UAE

Species Scientific Name	Class	Habitat
Acridotheres ginginianus (Latham, 1790)	Aves	Terrestrial
Acridotheres tristis (Linnaeus, 1766)	Aves	Terrestrial
Alhagi maurorum Medik.	Magnoliopsida	Terrestrial
Capra hircus (Linnaeus, 1758)	Mammalia	Terrestrial
Corvus splendens (Vieillot, 1817)	Aves	Terrestrial
Columba livia (Gmelin, 1789)	Aves	Terrestrial
Dactyloctenium aegyptium (L.) Willd.	Liliopsida	Terrestrial
Equus africanus (Heuglin and Fitzinger, 1866)	Mammalia	Terrestrial
Felis catus (Linnaeus, 1758)	Mammalia	Terrestrial
Iridomyrmex anceps (Roger, 1863)	Insecta	Terrestrial
Lantana camara L.	Magnoliopsida	Terrestrial
Linepithema humile (Mayr, 1868)	Insect	Terrestrial
Monomorium destructor (Jerdon, 1851)	Insecta	Terrestrial
Mus musculus (Linnaeus, 1758)	Mammalia	Terrestrial
Psittacula eupatria (Linnaeus, 1766)	Aves	Terrestrial
Psittacula krameri (Scopoli, 1769)	Aves	Terrestrial
Pycnonotus leucotis (Gould, 1836)	Aves	Terrestrial
Pennisetum setaceum (Forssk.) Chiov.	Liliopsida	Terrestrial
Prosopis juliflora (Sw.) DC.	Magnoliopsida	Terrestrial
Rattus norvegicus (Berkenhout, 1769)	Mammalia	Terrestrial
Rattus rattus (Linnaeus, 1758)	Mammalia	Terrestrial
Rhynchophorus ferrugineus (Oliver, 1790)	Insecta	Terrestrial
Solenopsis geminata (Fabricius, 1804)	Insecta	Terrestrial
Tapinoma melanocephalum (Fabricius, 1793)	Insecta	Terrestrial

9. Appendix 2: alien species in the ua

Species Scientific Name	Class	Habitat
Acridotheres cristatellus (Linnaeus, 1758)	Aves	Terrestrial
Acridotheres fuscus (Wagler, 1827)	Aves	Terrestrial
Acridotheres javanicus Cabanis, 1851	Aves	Terrestrial
Acryllium vulturinum (Hardwicke, 1834)	Aves	Terrestrial
Actophilornis africanus (Gmelin, 1789)	Aves	Terrestrial Freshwater Marine
Agapornis fischeri Reichenow, 1887	Aves	Terrestrial
Agapornis lilianae Shelley, 1894	Aves	Terrestrial
Agapornis roseicollis (Vieillot, 1818)	Aves	Terrestrial
Aix galericulata (Linnaeus, 1758)	Aves	Terrestrial Freshwater Marine
Aix sponsa Linnaeus, 1758	Aves	Terrestrial Freshwater Marine
Albizia julibrissin Durazz.	Magnoliopsida	Terrestrial
Alectoris melanocephala (Rüppell, 1835)	Aves	Terrestrial
Aleurocanthus woglumi Ashby, 1915	Insecta	Terrestrial
Alisterus scapularis (Lichtenstein, 1816)	Aves	Terrestrial
Allopeas gracile (Hutton, 1834)	Gastropoda	Terrestrial
Alopothen aegyptiaca (Linnaeus, 1766)	Aves	Terrestrial Freshwater Marine
Alternanthera sessilis (L.) DC.	Magnoliopsida	Terrestrial
Amadina fasciata (Gmelin, 1789)	Aves	Terrestrial
Amandava amandava (Linnaeus, 1758)	Aves	Terrestrial
Amandava formosa (Latham, 1790)	Aves	Terrestrial
Amandava subflava (Vieillot, 1819)	Aves	Terrestrial Freshwater Marine
Amaranthus lividus L.	Magnoliopsida	Terrestrial
Ammoperdix griseogularis (Brandt, 1843)	Aves	Terrestrial
Anagallis arvensis L.	Magnoliopsida	Terrestrial
Aphis gossypii Glover, 1877	Insecta	Host
Ara chloropterus G.R.Gray, 1859	Aves	Terrestrial
Ardea goliath Cretzschmar, 1829	Aves	Terrestrial Freshwater Marine
Ardeotis arabs (Linnaeus, 1758)	Aves	Terrestrial
Bactrocera cucurbitae (Coquillett, 1899)	Insecta	Terrestrial
Bactrocera dorsalis (Hendel, 1912)	Insecta	Terrestrial
Bactrocera zonata (Saunders, 1842)	Insecta	Terrestrial
Balearica regulorum (E.T.Bennett, 1834)	Aves	Terrestrial Freshwater Marine
Bemisia tabaci (Gennadius, 1889)	Insecta	Terrestrial
Bidens pilosa L.	Magnoliopsida	Terrestrial
Blattella germanica (Linnaeus, 1767)	Insecta	Terrestrial
Branta canadensis (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Branta sandvicensis (Vigors, 1834)	Aves	Terrestrial Freshwater
Bregmatothrips dimorphus (Priesner, 1919)	Insecta	Terrestrial
Bromus diandrus Roth	Liliopsida	Terrestrial
Bucorvus leadbeateri (Vigors, 1825)	Aves	Terrestrial Freshwater
Cacatua galerita (Latham, 1790)	Aves	Terrestrial

Species Scientific Name	Class	Habitat
Cadra cautella (Walker, 1863)	Insecta	Terrestrial
Cairina moschata (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Callipepla californica (Shaw, 1798)	Aves	Terrestrial
Callonetta leucophrys (Vieillot, 1816)	Aves	Terrestrial Freshwater
Calotropis procera (Aiton) W.T.Aiton	Magnoliopsida	Terrestrial
Camponotus compressus (Fabricius, 1787)	Insecta	Terrestrial
Canis lupus familiaris Linnaeus, 1758	Mammalia	Terrestrial
Cardinalis cardinalis Linnaeus, 1758	Aves	Terrestrial
Cardiocondyla emeryi Forel, 1881	Insecta	Terrestrial
Carpomya incompleta (Becker, 1903)	Insecta	Terrestrial
Chenopodium murale (L.) S.Fuentes, Uotila & Borsch	Magnoliopsida	Terrestrial
Chenopodium album L.	Magnoliopsida	Terrestrial
Chenopodium carinatum R.Br.	Magnoliopsida	Terrestrial
Clarias gariepinus (Burchell, 1822)	Actinopterygii	Freshwater
Cochlodinium polykrikoides Margalef	Dinophyceae	Marine
Colius striatus Gmelin, 1789	Aves	Terrestrial Freshwater
Columba guinea Linnaeus, 1758	Aves	Terrestrial Freshwater
Commelina benghalensis L.	Liliopsida	Terrestrial
Convolvulus arvensis L.	Magnoliopsida	Terrestrial
Conyza bonariensis (L.) Cronq.	Magnoliopsida	Terrestrial
Corvus macrorhynchos Wagler, 1827	Aves	Terrestrial
Ctenopharyngodon idella (Valenciennes, 1844)	Actinopterygii	Freshwater
Culex quinquefasciatus Say, 1823	Insecta	Terrestrial Freshwater
Culicoides kingi (Austen, 1912)	Insecta	Terrestrial
Cuscuta campestris Yunck.	Magnoliopsida	Host
Cygnus atratus (Latham, 1790)	Aves	Terrestrial Freshwater Marine
Cygnus buccinator Richardson, 1831	Aves	Terrestrial Freshwater Marine
Cygnus melancoryphus (Molina, 1782)	Aves	Terrestrial Freshwater Marine
Cygnus olor (Gmelin, 1789)	Aves	Terrestrial Freshwater
Cylas formicarius (Fabricius, 1798)	Insecta	Terrestrial
Cynodon dactylon (L.) Pers.	Liliopsida	Terrestrial
Cyperus eremicus Kukkonen	Liliopsida	Terrestrial
Cyprinus carpio Linnaeus, 1758	Actinopterygii	Freshwater Brackish
Datura ferox L.	Magnoliopsida	Terrestrial
Dendrocitta vagabunda (Latham, 1790)	Aves	Terrestrial
Dendrocygna autumnalis Linnaeus, 1758	Aves	Terrestrial Freshwater
Dendrocygna bicolor (Vieillot, 1816)	Aves	Terrestrial Freshwater
Dendrocygna javanica (Horsfield, 1821)	Aves	Terrestrial Freshwater Marine
Dicentrarchus labrax (Linnaeus, 1758)	Actinopterygii	Freshwater Brackish Marine
Dinophysis caudata Saville-Kent	Dinophyceae	Marine
Diplotaxis eruroides DC.	Magnoliopsida	Terrestrial
Duttaphrynus melanostictus (Schneider, 1799)	Amphibia	Terrestrial Freshwater
Cadra cautella (Walker, 1863)	Insecta	Terrestrial

Species Scientific Name	Class	Habitat
Cairina moschata (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Callipepla californica (Shaw, 1798)	Aves	Terrestrial
Callonetta leucophrys (Vieillot, 1816)	Aves	Terrestrial Freshwater
Calotropis procera (Aiton) W.T.Aiton	Magnoliopsida	Terrestrial
Camponotus compressus (Fabricius, 1787)	Insecta	Terrestrial
Canis lupus familiaris Linnaeus, 1758	Mammalia	Terrestrial
Cardinalis cardinalis Linnaeus, 1758	Aves	Terrestrial
Cardiocondyla emeryi Forel, 1881	Insecta	Terrestrial
Carpomya incompleta (Becker, 1903)	Insecta	Terrestrial
Chenopodium murale (L.) S.Fuentes, Uotila & Borsch	Magnoliopsida	Terrestrial
Chenopodium album L.	Magnoliopsida	Terrestrial
Chenopodium carinatum R.Br.	Magnoliopsida	Terrestrial
Clarias gariepinus (Burchell, 1822)	Actinopterygii	Freshwater
Cochlodinium polykrikoides Margalef	Dinophyceae	Marine
Colius striatus Gmelin, 1789	Aves	Terrestrial Freshwater
Columba guinea Linnaeus, 1758	Aves	Terrestrial Freshwater
Commelina benghalensis L.	Liliopsida	Terrestrial
Convolvulus arvensis L.	Magnoliopsida	Terrestrial
Conyza bonariensis (L.) Cronq.	Magnoliopsida	Terrestrial
Corvus macrorhynchos Wagler, 1827	Aves	Terrestrial
Ctenopharyngodon idella (Valenciennes, 1844)	Actinopterygii	Freshwater
Culex quinquefasciatus Say, 1823	Insecta	Terrestrial Freshwater
Culicoides kingi (Austen, 1912)	Insecta	Terrestrial
Cuscuta campestris Yunck.	Magnoliopsida	Host
Cygnus atratus (Latham, 1790)	Aves	Terrestrial Freshwater Marine
Cygnus buccinator Richardson, 1831	Aves	Terrestrial Freshwater Marine
Cygnus melancoryphus (Molina, 1782)	Aves	Terrestrial Freshwater Marine
Cygnus olor (Gmelin, 1789)	Aves	Terrestrial Freshwater
Cylas formicarius (Fabricius, 1798)	Insecta	Terrestrial
Cynodon dactylon (L.) Pers.	Liliopsida	Terrestrial
Cyperus eremicus Kukkonen	Liliopsida	Terrestrial
Cyprinus carpio Linnaeus, 1758	Actinopterygii	Freshwater Brackish
Datura ferox L.	Magnoliopsida	Terrestrial
Dendrocitta vagabunda (Latham, 1790)	Aves	Terrestrial
Dendrocygna autumnalis Linnaeus, 1758	Aves	Terrestrial Freshwater
Dendrocygna bicolor (Vieillot, 1816)	Aves	Terrestrial Freshwater
Dendrocygna javanica (Horsfield, 1821)	Aves	Terrestrial Freshwater Marine
Dicentrarchus labrax (Linnaeus, 1758)	Actinopterygii	Freshwater Brackish Marine
Dinophysis caudata Saville-Kent	Dinophyceae	Marine
Diplotaxis eruroides DC.	Magnoliopsida	Terrestrial
Duttaphrynus melanostictus (Schneider, 1799)	Amphibia	Terrestrial Freshwater
Earias insulana (Boisduval, 1833)	Insecta	Terrestrial
Eolophus roseicapilla (Vieillot, 1817)	Aves	Terrestrial

Species Scientific Name	Class	Habitat
Eos bornea (Linnaeus, 1758)	Aves	Terrestrial
Erigeron primulifolius (Lam.) Greuter	Magnoliopsida	Terrestrial
Estrilda astrild (Linnaeus, 1758)	Aves	Terrestrial
Estrilda caerulescens (Vieillot, 1817)	Aves	Terrestrial
Estrilda rufibarba (Cabanis, 1851)	Aves	Terrestrial
Euphorbia hirta L.	Magnoliopsida	Terrestrial
Euplectes afer (Gmelin, 1789)	Aves	Terrestrial
Euplectes albonotatus (Cassin, 1848)	Aves	Terrestrial Freshwater
Euplectes ardens (Boddaert, 1783)	Aves	Terrestrial Freshwater
Euplectes hordeaceus (Linnaeus, 1758)	Aves	Terrestrial
Euplectes nigroventris Cassin, 1848	Aves	Terrestrial
Euplectes orix (Linnaeus, 1758)	Aves	Terrestrial
Eupodotis senegalensis canicollis (Reichenow, 1881)	Aves	Terrestrial Freshwater
Fiorinia phoenicis Balachowsky, 1967	Insecta	Terrestrial
Francolinus francolinus (Linnaeus, 1766)	Aves	Terrestrial
Francolinus leucoscepus G.R.Gray, 1867	Aves	Terrestrial
Funambulus pennantii Wroughton, 1905	Mammalia	Terrestrial
Gambusia affinis (Baird & Girard, 1853)	Actinopterygii	Freshwater Brackish
Gambusia holbrooki Girard, 1859	Actinopterygii	Freshwater Brackish
Geochelone sulcata Pritchard, 1967	Reptilia	Terrestrial Freshwater
Geopelia cuneata (Latham, 1802)	Aves	Terrestrial Freshwater
Geopelia striata (Linnaeus, 1766)	Aves	Terrestrial
Gerrhosaurus nigrolineatus Hallowell, 1857	Reptilia	Terrestrial
Gnaphalium pensylvanicum Willd.	Magnoliopsida	Terrestrial
Gracula religiosa Linnaeus, 1758	Aves	Terrestrial
Gracupica contra (Linnaeus, 1758)	Aves	Terrestrial
Grus grus (Linnaeus, 1758)	Aves	Terrestrial Freshwater Marine
Gymnodinium catenatum Graham, 1943	Dinophyceae	Marine
Helicoverpa armigera (Hubner, 1808)	Insecta	Terrestrial
Herpestes edwardsi (É.Geoffroy Saint-Hilaire, 1818)	Mammalia	Terrestrial
Iguana iguana (Linnaeus, 1758)	Reptilia	Terrestrial
Ipomoea pes-caprae Schumach. & Thonn.	Magnoliopsida	Terrestrial
Karenia mikimotoi (Miyake & Kominami ex Oda) G.Hansen & Moestrup	Dinophyceae	Marine
Kickxia elatine (L.) Dumort.	Magnoliopsida	Terrestrial
Laevicaulis alte (Ferussac, 1822)	Gastropoda	Terrestrial
Lagonosticta rhodopareia (Heuglin, 1868)	Aves	Terrestrial
Laguncularia racemosa C.F.Gaertn.	Magnoliopsida	Terrestrial Brackish
Lamprotornis regius (Reichenow, 1879)	Aves	Terrestrial
Lamprotornis superbus RÄppell, 1845	Aves	Terrestrial
Lasioderma serricorne (Fabricius, 1792)	Insecta	Terrestrial
Launaea intybacea Beauverd	Magnoliopsida	Terrestrial
Leiothrix lutea (Scopoli, 1786)	Aves	Terrestrial
Leptoptilos crumeniferus (Lesson, 1831)	Aves	Terrestrial Freshwater

Species Scientific Name	Class	Habitat
Leucopsar rothschildi Stresemann, 1912	Aves	Terrestrial
Lissachatina fulica (Férussac, 1821)	Gastropoda	Terrestrial
Lolium multiflorum Lam.	Liliopsida	Terrestrial
Lonchura atricapilla (Vieillot, 1807)	Aves	Terrestrial Freshwater
Lonchura maja (Linnaeus, 1766)	Aves	Terrestrial
Lonchura malacca (Linnaeus, 1766)	Aves	Terrestrial Freshwater
Lonchura punctulata (Linnaeus, 1758)	Aves	Terrestrial
Maconellicoccus hirsutus (Green, 1908)	Insecta	Host
Macrochlamys indica (Godwin-Austen, 1883)	Gastropoda	Terrestrial
Maladera insanabilis (Brenske, 1894)	Insecta	Terrestrial
Mauremys caspica (Gmelin, 1774)	Reptilia	Terrestrial Freshwater
Melierax metabates Heuglin, 1861	Aves	Terrestrial
Melopsittacus undulatus (Shaw, 1805)	Aves	Terrestrial
Monomorium indicum Forel, 1902	Insecta	Terrestrial
Musca domestica domestica	Insecta	Terrestrial
Mycteria ibis (Linnaeus, 1766)	Aves	Terrestrial Freshwater Marine
Mycteria leucocephala (Pennant, 1769)	Aves	Terrestrial Freshwater Marine
Myiopsitta monachus (Boddaert, 1783)	Aves	Terrestrial
Myzus persicae (Sulzer, 1776)	Insecta	Terrestrial
Nandayus nenday (Vieillot, 1823)	Aves	Terrestrial
Nezara viridula (Linnaeus, 1758)	Insecta	Terrestrial
Nicotiana plumbaginifolia Viv.	Magnoliopsida	Terrestrial
Numida meleagris (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Nymphicus hollandicus (Kerr, 1792)	Aves	Terrestrial
Oldenlandia lactea DC.	Magnoliopsida	Terrestrial
Opuntia ficus-indica Mill.	Magnoliopsida	Terrestrial
Oreochromis aureus (Steindachner, 1864)	Actinopterygii	Freshwater Brackish
Oreochromis mossambicus (Peters, 1852)	Actinopterygii	Freshwater Brackish
Oreochromis niloticus (Linnaeus, 1758)	Actinopterygii	Freshwater Brackish
Oreochromis spilurus (GÄnther, 1894)	Actinopterygii	Freshwater Brackish
Orobancha aegyptiaca Pers.	Magnoliopsida	Terrestrial
Oryctes rhinoceros (Linnaeus, 1758)	Insecta	Terrestrial
Oryzaephilus mercator (Fauvel, 1889)	Insecta	Terrestrial
Pachycondyla sennaarensis (Mayr, 1862)	Insecta	Terrestrial
Padda oryzivora (Linnaeus, 1758)	Aves	Terrestrial
Pangasianodon hypophthalmus (Sauvage, 1878)	Actinopterygii	Freshwater
Panicum maximum Jacq.	Liliopsida	Terrestrial
Papilio demoleus Linnaeus, 1758	Insecta	Terrestrial
Paratrechina flavipes (Smith, 1874)	Insecta	Terrestrial
Paratrechina jaegerskioeldi (Mayr, 1904)	Insecta	Terrestrial
Paratrechina longicornis (Latreille, 1802)	Insecta	Terrestrial
Parembia persica (McLachlan, 1877)	Insecta	Terrestrial
Paroaria coronata (J.F.Miller, 1776)	Aves	Terrestrial

Species Scientific Name	Class	Habitat
Parthenium hysterophorus L.	Magnoliopsida	Terrestrial
Passer luteus (Lichtenstein, 1823)	Aves	Terrestrial
Pavo cristatus Linnaeus, 1758	Aves	Terrestrial
Pavo muticus Linnaeus, 1766	Aves	Terrestrial
Pelecanus rufescens Gmelin, 1789	Aves	Terrestrial Freshwater Marine
Periplaneta americana (Linnaeus, 1758)	Insecta	Terrestrial
Phasianus colchicus Linnaeus, 1758	Aves	Terrestrial
Phasianus colchicus versicolor	Aves	Terrestrial
Pheidole teneriffana Forel, 1893	Insecta	Terrestrial
Pithecellobium dulce (Roxb.) Benth.	Magnoliopsida	Terrestrial
Planococcus citri (Risso, 1813)	Insecta	Host
Platycercus eximius (Shaw, 1792)	Aves	Terrestrial
Plecostomus sp.	Actinopterygii	Freshwater
Plectropterus gambensis (Linnaeus, 1766)	Aves	Terrestrial Freshwater
Ploceus benghalensis (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Ploceus cucullatus (Statius Muller, 1776)	Aves	Terrestrial Freshwater
Ploceus galbula Röppell, 1840	Aves	Terrestrial Freshwater
Ploceus intermedius Röppell, 1845	Aves	Terrestrial Freshwater
Ploceus jacksoni Shelley, 1888	Aves	Terrestrial Freshwater
Ploceus manyar (Horsfield, 1821)	Aves	Terrestrial Freshwater
Ploceus philippinus (Linnaeus, 1766)	Aves	Terrestrial Freshwater
Ploceus rubiginosus Röppell, 1840	Aves	Terrestrial Freshwater
Ploceus vitellinus (Lichtenstein, 1823)	Aves	Terrestrial Freshwater
Plodia interpunctella (Hubner, 1813)	Insecta	Terrestrial
Plutella xylostella (Linnaeus, 1758)	Insecta	Terrestrial
Poecilia reticulata Peters, 1859	Actinopterygii	Freshwater Brackish
Polygyra cereolus (Megerle von Mühlfeld, 1818)	Gastropoda	Terrestrial
Procapra capensis (Pallas, 1766)	Mammalia	Terrestrial
Prorocentrum micans Ehrenberg, 1833	Dinophyceae	Marine
Prosopis glandulosa Torr.	Magnoliopsida	Terrestrial
Pseudonapaeus jousseaumei (E.A.Smith 1894)	Gastropoda	Terrestrial
Psittacula cyanocephala (Linnaeus, 1766)	Aves	Terrestrial
Psittacula roseata Biswas, 1951	Aves	Terrestrial
Psittacus erithacus Linnaeus, 1758	Aves	Terrestrial
Pterocles alchata (Linnaeus, 1766)	Aves	Terrestrial
Pycnonotus cafer (Linnaeus, 1766)	Aves	Terrestrial
Pycnonotus jocosus (Linnaeus, 1758)	Aves	Terrestrial
Pycnonotus leucotis (Gould, 1836)	Aves	Terrestrial
Pyrodinium bahamense Plate, 1906	Dinophyceae	Marine
Quelea erythropus (Hartlaub, 1848)	Aves	Terrestrial
Quelea quelea (Linnaeus, 1758)	Aves	Terrestrial
Ramphotyphlops braminus Daudin, 1803	Reptilia	Terrestrial
Rhizophora mucronata Lam.	Magnoliopsida	Terrestrial Brackish Marine

Species Scientific Name	Class	Habitat
Schismus arabicus Nees	Liliopsida	Terrestrial
Sciaenops ocellatus (Linnaeus, 1766)	Actinopterygii	Brackish Marine
Sciurus anomalus Gmelin, 1778	Mammalia	Terrestrial
Senecio vulgaris L.	Magnoliopsida	Terrestrial
Senna occidentalis (L.) Link	Magnoliopsida	Terrestrial
Serinus alario alario	Aves	Terrestrial
Sesuvium portulacastrum (L.) L.	Magnoliopsida	Terrestrial
Sida spinosa L.	Magnoliopsida	Terrestrial
Sitophilus granarius (Linnaeus & C., 1758)	Insecta	Terrestrial
Sparus aurata Linnaeus, 1758	Actinopterygii	Brackish Marine
Sphaeralcea bonariensis Griseb.	Magnoliopsida	Terrestrial
Stegobium paniceum (Linnaeus, 1758)	Insecta	Terrestrial
Stomoxys calcitrans (Linnaeus, 1758)	Insecta	Terrestrial
Struthio camelus Linnaeus, 1758	Aves	Terrestrial
Sturnia pagodarum (Gmelin, 1789)	Aves	Terrestrial
Supella longipalpa (Fabricius, 1798)	Insecta	Terrestrial
Tadorna radjah (Lesson, 1828)	Aves	Terrestrial Freshwater Marine
Tapinoma simrothi Krausse, 1911	Insecta	Terrestrial
Tetramorium bicarinatum (Nylander, 1846)	Insecta	Terrestrial
Threskiornis aethiopicus (Latham, 1790)	Aves	Terrestrial Freshwater
Trachemys scripta elegans (Wied, 1838)	Reptilia	Terrestrial Freshwater
Treron bicinctus (Jerdon, 1840)	Aves	Terrestrial Freshwater
Tribulus terrestris L.	Magnoliopsida	Terrestrial
Trichoplusia ni (Hubner, 1803)	Insecta	Terrestrial
Trogoderma granarium Everts, 1898	Insecta	Terrestrial
Tuta absoluta (Meyrick, 1917)	Insecta	Terrestrial
Ulva ohnoi M.Hiraoka & S.Shimada	Ulvophyceae	Marine
Uraeginthus cyanocephalus (Richmond, 1897)	Aves	Terrestrial
Vanellus armatus (Burchell, 1822)	Aves	Terrestrial Freshwater Marine
Verbesina encelioides (Cav.) A.Gray	Magnoliopsida	Terrestrial
Vidua macroura (Pallas, 1764)	Aves	Terrestrial
Xiphophorus maculatus (Günther, 1866)	Actinopterygii	Freshwater
Zeuxine strateumatia (L.) Schltr.	Liliopsida	Terrestrial
Ziziphus mauritiana Lam.	Magnoliopsida	Terrestrial
Zootecus insularis (Ehrenberg, 1831)	Gastropoda	Terrestrial
scientificName	class	habitat
Acridotheres cristatellus (Linnaeus, 1758)	Aves	Terrestrial
Acridotheres fuscus (Wagler, 1827)	Aves	Terrestrial
Acridotheres javanicus Cabanis, 1851	Aves	Terrestrial
Acryllium vulturinum (Hardwicke, 1834)	Aves	Terrestrial
Actophilornis africanus (Gmelin, 1789)	Aves	Terrestrial Freshwater Marine
Agapornis fischeri Reichenow, 1887	Aves	Terrestrial
Agapornis lilianae Shelley, 1894	Aves	Terrestrial
Agapornis roseicollis (Vieillot, 1818)	Aves	Terrestrial

Species Scientific Name	Class	Habitat
Aix galericulata (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Aix sponsa Linnaeus, 1758	Aves	Terrestrial Freshwater
Albizia julibrissin Durazz.	Magnoliopsida	Terrestrial
Alectoris melanocephala (R&A;ppell, 1835)	Aves	Terrestrial
Aleurocanthus woglumi Ashby, 1915	Insecta	Terrestrial
Alisterus scapularis (Lichtenstein, 1816)	Aves	Terrestrial
Allopeas gracile (Hutton, 1834)	Gastropoda	Terrestrial
Alopochen aegyptiaca (Linnaeus, 1766)	Aves	Terrestrial Freshwater
Alternanthera sessilis (L.) DC.	Magnoliopsida	Terrestrial
Amadina fasciata (Gmelin, 1789)	Aves	Terrestrial
Amandava amandava (Linnaeus, 1758)	Aves	Terrestrial
Amandava formosa (Latham, 1790)	Aves	Terrestrial
Amandava subflava (Vieillot, 1819)	Aves	Terrestrial Freshwater
Amaranthus lividus L.	Magnoliopsida	Terrestrial
Ammoperdix griseogularis (Brandt, 1843)	Aves	Terrestrial
Anagallis arvensis L.	Magnoliopsida	Terrestrial
Aphis gossypii Glover, 1877	Insecta	Host
Ara chloropterus G.R.Gray, 1859	Aves	Terrestrial
Ardea goliath Cretzschmar, 1829	Aves	Terrestrial Freshwater Marine
Ardeotis arabs (Linnaeus, 1758)	Aves	Terrestrial
Bactrocera cucurbitae (Coquillett, 1899)	Insecta	Terrestrial
Bactrocera dorsalis (Hendel, 1912)	Insecta	Terrestrial
Bactrocera zonata (Saunders, 1842)	Insecta	Terrestrial
Balearica regulorum (E.T.Bennett, 1834)	Aves	Terrestrial Freshwater
Bemisia tabaci (Gennadius, 1889)	Insecta	Terrestrial
Bidens pilosa L.	Magnoliopsida	Terrestrial
Blattella germanica (Linnaeus, 1767)	Insecta	Terrestrial
Branta canadensis (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Branta sandvicensis (Vigors, 1834)	Aves	Terrestrial Freshwater
Bregmatothrips dimorphus (Priesner, 1919)	Insecta	Terrestrial
Bromus diandrus Roth	Liliopsida	Terrestrial
Bucorvus leadbeateri (Vigors, 1825)	Aves	Terrestrial Freshwater
Cacatua galerita (Latham, 1790)	Aves	Terrestrial
Cadra cautella (Walker, 1863)	Insecta	Terrestrial
Cairina moschata (Linnaeus, 1758)	Aves	Terrestrial Freshwater
Callipepla californica (Shaw, 1798)	Aves	Terrestrial
Callonetta leucophrys (Vieillot, 1816)	Aves	Terrestrial Freshwater
Calotropis procera (Aiton) W.T.Aiton	Magnoliopsida	Terrestrial
Camponotus compressus (Fabricius, 1787)	Insecta	Terrestrial
Canis lupus familiaris Linnaeus, 1758	Mammalia	Terrestrial

10. Appendix 3: List of stakeholder's participated in developing the nissap

Government

- Ministry of Climate Change and Environment
- Environment Agency - Abu Dhabi
- Dubai Municipality
- Sharjah Environment and Protected Areas Authority
- Sharjah Municipality
- Ajman Municipality & Planning Department
- Umm Al Quwain Municipality
- Fujairah Municipality
- Dibba Fujairah Municipality
- Ras Al Khaimah Environment Protection and Development Authority
- Chambers of Commerce
- Critical Infrastructure and Coastal Protection Authority
- Sharjah Seed Bank & Herbarium

Non-Governmental groups and organizations

- The Academic Sector in the UAE
- Gulf Cooperation Council
- Regional Organization for the Protection of the Marine Environment (ROPME)

Private Sectors

- AlBarari
- Nakheel properties
- Central Veterinary Research Laboratory



Scientific name: *Acridotheres ginginianus*
Common name: Bank myna

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