



# Achieving Aichi Biodiversity Target 9

Guidance on devising and implementing measures to address the risks associated with the introduction of alien species as pets, aquarium and terrarium species, and as live bait and live food

Annex to decision XII/16  
of the Conference of the  
Parties to the Convention  
on Biological Diversity



Convention on  
Biological Diversity





## **Aichi Biodiversity Target 9**

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment

## **Sustainable Development Goal Target 15.8**

By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species





# Background

Invasive alien species are a direct driver of biodiversity loss, and considered a cross-cutting issue of the CBD, a key matter of relevance to all major biomes. In addition, invasive alien species have been estimated to cost our economies hundreds of billions of dollars each year, due to the economic implications of present invasions to both agriculture and ecosystem services, as well as the high cost of eradication efforts. At the same time, the pets and ornamental species trade has the potential to generate significant socio-economic benefits, including benefits for developing States.

The movement of live animals and plants around the world, facilitated by increased global trade and the accessibility of online marketing tools, poses a risk of spreading invasive species and their associated problems around the globe more widely and more rapidly. The existing international regulatory framework did not take into account the risk of biological invasions posed by broad range of live species as pets, aquarium and terrarium species, and as live bait and live food, which impacted on ecosystems, habitats or native species.

In response to the above, decision XII/16 of the Conference of the Parties adopted the voluntary “Guidance on devising and implementing measures to address the risks associated with the introduction of alien species as pets, aquarium and terrarium species, and as live bait and live food” at the twelfth meeting of the Conference of the Parties in Pyeongchang, Republic of Korea, in October 2014.

This guidance is intended to assist countries and relevant organizations to address the risks associated with the introduction of alien species as pets, aquarium and terrarium species, and as live bait and live food at a national, regional and sub-regional level.





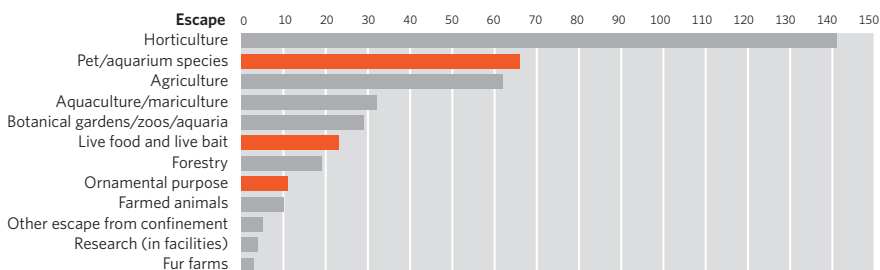
*Annex to decision XII/16 of the Conference of the Parties  
to the Convention on Biological Diversity*

**GUIDANCE ON DEVISING AND IMPLEMENTING  
MEASURES TO ADDRESS THE RISKS ASSOCIATED  
WITH THE INTRODUCTION OF ALIEN SPECIES AS  
PETS, AQUARIUM AND TERRARIUM SPECIES, AND  
AS LIVE BAIT AND LIVE FOOD**

*Objectives and nature of this guidance*

1. This guidance is intended to assist countries and relevant organizations in devising and implementing measures, at national, regional, subregional and other levels, to address the risks associated with the introduction of alien species as pets, aquarium and terrarium species, and as live bait and live food. It provides elements that relevant authorities may use for the development of regulations or codes of conduct, or that international organizations, industry and civil society organizations may use in voluntary codes of conduct and other guidance.

2. The introduction of invasive alien species as pets, aquarium and terrarium species, and as live bait and live food, is a subcategory of “escape” as a pathway. Escape is the movement of organisms from captivity or confined conditions into the natural environment. Through this pathway the organisms are initially intentionally imported or transported into the confined conditions, then escape. This may include intentional, accidental or careless release of live organisms into the environment, including cases such as the disposal of live food into the environment or the use of live bait in non-confined water systems.



Frequencies of escapes known cases of introduction of over 500 invasive alien species profiled in the Global Invasive Species Database (GISD). Source: *Global Biodiversity Outlook 4th edition*

3. For the purpose of this guidance, pets, aquarium and terrarium species, live bait and live food are understood to include lower taxa and hybrids (including hybrids between native organisms and organisms that are alien in the region to which they are intended to be imported or transported).
4. This guidance is intended to apply to the import or transport to a country or distinct biogeographical area within the country, of pets, aquarium and terrarium species, live bait and live food, including trade via the Internet. This guidance is relevant to States, relevant organizations, the industry and consumers, including all actors along the value chain (such as importers, breeders, wholesalers, retailers and customers). For the case of live food, this also includes restaurants and markets.
5. This guidance is voluntary and is not intended to affect any existing national and international obligations. It is intended to be used in conjunction and mutually supportive with other relevant guidance, for example the Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats and Species; standards, guidelines and recommendations developed under the International Plant Protection Convention or under the World Organisation for Animal Health and Codex Alimentarius Commission and other relevant organizations; and relevant voluntary codes.

#### *Prevention and responsible conduct*

6. Industry and all actors should be aware of the risk of alien organisms becoming invasive and their potential negative impacts on biodiversity at ecosystem, habitat, species and gene levels, and related impacts on human health, livelihoods and economies. States, industry and relevant organizations should undertake public awareness campaigns to this effect.

## CASE STUDY 1

### Burmese python *Python molurus* subsp. *bivittatus*

■ Introduced in Florida through pet trade, Burmese pythons are known to prey on federally endangered native species such as Wood storks and Key Largo woodrats. From 1999 to 2009, the recovery of these two species has cost federal and state agencies \$101.2 million and \$1.4 million, respectively. As competitors due to the overlap in diet, Burmese pythons affect the survival of the state and federally threatened indigo snake (*Drymarchon couperi*). The growing concern is highlighted by their ability to rapidly reproduce and spread.



Source 1: US Fish and Wild Service: <https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEWjOgcbC9PzKAhWDIB4KHbihDP4QFggcMAA&url=https%3A%2F%2Fwww.fws.gov%2Fverobeach%2FPythonPDF%2FCostofInvasivesFactSheet.pwdf&usg=AFQjCNE7bKcycqRGS64axsE4Z00oWITPw>

Source 2: "Burmese Pythons in South Florida: Scientific Support for Invasive Species Management" — Harvey et al. 2010. Institute of Food and Agricultural Sciences (IFAS). Accessed from US Department of Agriculture: [www.invasivespeciesinfo.gov/animals/python.shtml](http://www.invasivespeciesinfo.gov/animals/python.shtml)



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7. Generally, and as a priority, States, relevant organizations and the industry should promote the use of species that have been shown to be non-invasive in the case of species used as pets and aquarium and terrarium species.
8. States, relevant organizations and the industry should discourage or prohibit the use of live bait that may pose a risk of invasion and/or spread of pathogens or parasites.
9. States, relevant organizations and the industry should raise awareness of buyers, potential buyers, suppliers, sellers consumers, and potential consumers on the importance of safe handling of, and appropriate care for, live organisms as pets, aquarium and terrarium species and of the safe handling and disposal of invasive species used as live bait or live food.
10. States, relevant organizations, the industry and consumers should handle any potentially invasive pet, aquarium and terrarium species, or species used as live bait and live food, responsibly and with utmost care. They should undertake, where possible and appropriate, the measures listed in paragraph 18 below.

### Risk assessment and management

11. When planning to import or transport pets, aquarium and terrarium species, live bait and live food to a country, or distinct biogeographical area within a country, where they are non-native, States, relevant organizations or the industry, should undertake a risk assessment. The risk assessment may draw on previously conducted assessments and other available information. The risk assessment should consider, *inter alia*:
  - (a) The probability of escape of organisms, at any stage of their life cycle, from confined conditions (including through accidental or careless release);
  - (b) The probability of establishment and spread of the species;
  - (c) The impacts of establishment and spread of the species on biodiversity, including hybridization with native species leading to loss of genetic diversity, and related impacts on productive activities and human health and the significance of these impacts;
  - (d) Risk regarding spread of pathogens and parasites.
12. The assessment of the probability of escape should take into account the specific characteristics of the species as well as existing measures in place to retain it within confined conditions.
13. Where the risk assessment indicates that the risk associated with the pet, aquarium and terrarium species, live bait or live food is acceptable, the species may be imported or transported to a country or distinct biogeographical area within a country. States, relevant organizations and the industry may need to repeat the risk assessment if new information becomes available that may change the outcome of the assessment.



## CASE STUDY 2

## Water hyacinth *Eichhornia crassipes*

■ Despite being widely favored as a beautiful ornamental plant for ponds, water hyacinth has been labelled as the world’s worst water weed. Experts suspect that water hyacinth was first imported to Africa by botanists and gardeners as an ornamental plant in 1980’s. This invasive species is efficient in utilizing aquatic nutrients and solar energy, which altered ecosystem services and processes threatening the survival of native species. The economic loss caused by its invasion was above US\$ 700 million, estimated in South Africa. Due to its exceptional reproductive output, water hyacinth has rapidly colonized important water bodies in Africa including Lake Victoria, the second largest freshwater lake in the world supporting approximately 30 million people and over 350 endemic species of East African cichlids.

Source 1: FAO (<http://www.fao.org/News/2000/000705-e.htm>)

Source 2: UNEP ([http://na.unep.net/geas/getUNEPPageWithArticleIDScript.php?article\\_id=98](http://na.unep.net/geas/getUNEPPageWithArticleIDScript.php?article_id=98))

14. Where the risk assessment indicates that the risk associated with the pet, aquarium and terrarium species, live bait or live food is not acceptable, measures to manage the risk should be taken. They could include the requirement to undertake one or more of the actions listed in paragraph 18 below.
15. Where the risk assessment indicates that the risk associated with the pet, aquarium and terrarium species, live bait or live food is not acceptable and risk management measures are not sufficient to lower the risk, the import or transport of the species as pets, aquarium and terrarium species, live bait or live food should not be permitted.
16. Alien species of pet, aquarium and terrarium species, live bait or live food that have not been subjected to a risk assessment should be treated as having the potential to become invasive.
17. The standards, guidelines and recommendations developed by the standard-setting organizations recognized by the Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization may be relevant in the conduct of risk assessments.

*Measures*

18. A number of measures are available to address the risks associated with alien species introduced as pets, aquarium and terrarium species, live bait and live food. Examples of such measures include, inter alia:

- (a) To ensure that efficient measures to prevent escape (for example, methods of secure confinement, handling, and transport) are in place;
- (b) To raise awareness and develop capacity among all persons involved in transporting, handling, selling, using or keeping a species of its risk and appropriate measures to prevent escape (for example, methods of secure confinement, handling, and transport);
- (c) To discourage or prohibit users, consumers, owners, traders, and keepers of live organisms from releasing the organisms into the natural environment and, in the event of an escape, to urge or require them to take immediate measures to recapture the organisms and, if appropriate, report the escape to the relevant authorities in order to facilitate a rapid response;
- (d) To provide secure and humane services for the return, resale, rehoming or disposal of undesired species;

**CASE  
STUDY 3****Rainbow smelt**  
*Osmerus mordax*

■ The introduction of rainbow smelt from the Arctic, and its consequent rapid expansion in the Great Lakes, are primarily attributed to human transfer as a bait fish for recreational and commercial fisheries.

Because of their broad dietary and habitat tolerances, rainbow smelts engage with various trophic levels including zooplankton, planktivores, benthivores, and piscivores through

a combination of predation and competition. Their interaction with such indigenous species has raised concerns for trophic cascades leading to the acceleration of eutrophication, increase in biomagnification of contaminants, and detrimental shifts in marine community composition. Along with these ecological costs, the economic loss due to invasive fish in the Great Lakes Basin such as rainbow smelt is an estimated \$4.5 billion USD. The multilevel interaction of rainbow smelt with the indigenous species and their potential to harm marine diversity call for a multilevel approach to examine and control the impact of their invasion.

Source: Fisheries and Oceans Canada (<http://www.dfo-mpo.gc.ca/Library/338381.pdf>)





## CASE STUDY 4

## Chinese mitten crab *Eriocheir sinensis*



■ Nominated as among 100 of the “World’s Worst” invaders, Chinese mitten crabs inflict substantial economic and ecological harm in European and American freshwaters. As an opportunistic omnivore, Chinese mitten crabs consume a wide range of native species resulting in a significant decline in their competitors including rare or endangered crayfish species that share similar diet and habitat preferences. The economic loss caused by this species in German waters is approximately 80 million euros since 1912. The main pathways of its introduction and spread include live food trade, aquarium trade and ships’ ballast water.

Source: IUCN-Invasive Species Specialist Group (<http://www.issg.org/database/species/ecology.asp?si=38>)

- (e) To ensure that appropriate response measures, including eradication and control, are in place to address potential introduction, establishment and spread;
- (f) To ensure that appropriate and safe methods of disposal for live bait and live food are used by buyers and sellers;
- (g) To ensure that appropriate control measures are taken to prevent illegal import, transit and export or re-export;
- (h) To encourage the use, where appropriate, of sterile organisms as pets, aquarium and terrarium species, as live bait and live food;

19. All consignments of pet, aquarium and terrarium species, live bait or live food should clearly indicate the taxon (at the lowest known taxonomic rank and if available, the genotype, using the scientific name and the Taxonomic Serial Number or alternatives to such numbers), as well as any relevant requirements on confinement, handling and transport.

20. Consignments may be labelled as a potential hazard to biodiversity unless the species has been shown to be safe for import to the particular country or biogeographical region within the country in question.

### *Information sharing*

21. The results of risk assessments should be made publicly available and shared among Parties through the clearing-house mechanism or other appropriate means.

22. States could maintain lists of species shown to be safe for import into their territory or into particular biogeographical regions within their territory, and for specific sectors, including detailed information on their native range and a clear definition of the countries or biogeographical regions for which they are shown to be safe.



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23. States should maintain lists of species with the assessed potential to become invasive and associated with unacceptable risks for biodiversity and make it available through the clearing-house mechanism or other appropriate means.

### *Consistency with other international obligations*

24. Measures under this guidance should be undertaken in a manner that is consistent with applicable international obligations, for example, the Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization, and the standard-setting organizations recognized by this agreement, as well as the Convention on International Trade in Endangered Species of Wild Fauna and Flora.



### CASE STUDY 5

#### Lion Fish

*Pterois volitans* (red lionfish) and *Pterois miles* (devil firefish)

■ Through the saltwater aquarium trade, the Indo-Pacific lionfish was introduced to U.S. waters and has widely been established from Caribbean Sea to offshore of New York in less than a decade. Recent studies have estimated that the population of lionfish has outnumbered that of some indigenous marine fish. In fact, lion fish have already reduced native reef fish recruitment by 79 percent. With their voracious food habits and venomous spines, they pose a threat to important fisheries, tourism and coral reef conservation.

Source : US Fish and Wild Service <https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjOgcbC9PzKAhWDIB4KHbihDP4QFggcMAA&url=https%3A%2F%2Fwww.fws.gov%2Fverobeach%2FpythonPDF%2FCostofInvasivesFactSheet.pdf&usq=AFQJCNE7bKcycqRGS64axsE4Z0oWITPw>

# Actions to enhance progress towards the Aichi Biodiversity target 9

- Raising awareness among policy makers, the general public and potential importers of alien species, of the impacts of invasive alien species, including the possible socio-economic costs and the benefits of taking action to prevent their introduction or to mitigate their impacts, such as by publicizing nationally relevant case studies
- Increasing efforts to identify and control the main pathways responsible for the introduction of alien species, including through the development of border control or quarantine measures to reduce the likelihood of potentially invasive alien species being introduced and making full use of risk analysis and existing relevant international standards
- Putting in place measures for the early detection and rapid response to species invasions
- Identifying and prioritizing those invasive alien species with the greatest potential to cause negative impact on biodiversity that are established in the country, and developing and implementing plans for their eradication or control, prioritizing protected areas and other areas of high biodiversity value for eradication or control measures
- Developing lists of alien species known to be invasive (or assessing existing lists for their completeness and accuracy) and making them widely available (Target 19), such as through the Global Invasive Alien Species Information Partnership







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