

# 25 years of invasive alien species management in the islands of French Polynesia (South Pacific): successes and challenges

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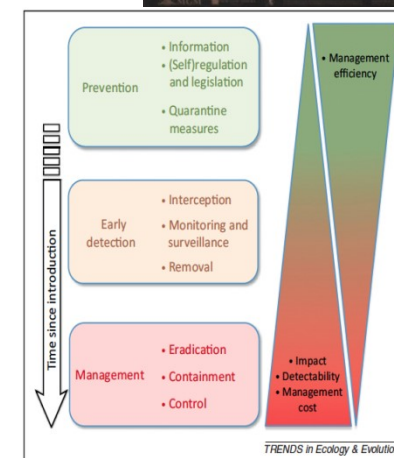
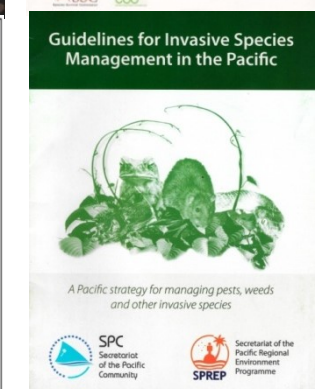
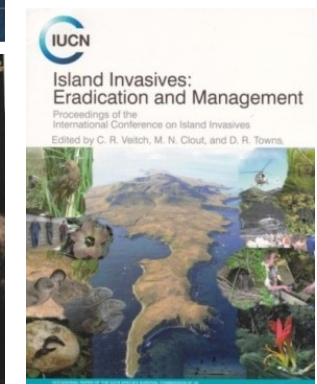
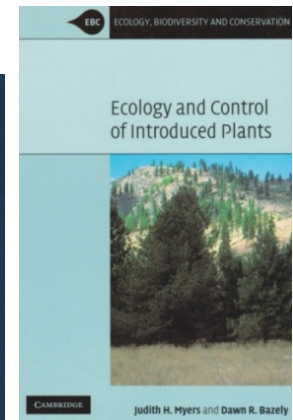
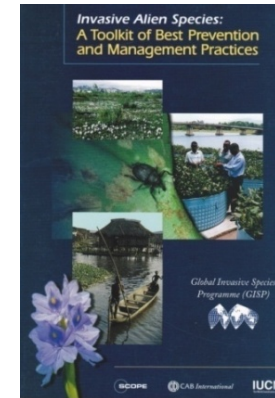


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# What is IAS management?

- Control strategies (from eradication to containment and long-term control)
- Control methods (manual, mechanical, chemical, biological, IPM, genetic...)
- Prevention, early detection & surveillance (biosecurity/quarantine measures, pathways of entry, species monitoring...)
- Legislation (« noxious species »/« black list ») & Risk Assessment (« WRA »...)
- Communication & education (public awareness, training, curricula, media...)
- Research (biology, ecology, genetics, social sciences, economy...)



(Simberloff et al. 2013)

# How to assess the success of IAS management?

## Ask ChatGPT!

*“Assessing the success or failure of invasive species management requires a combination of methods and metrics. Here are some key steps to consider”:*

- 1. Define specific management objectives:** It's important to have a clear idea of what you are trying to achieve with your invasive species management efforts. For example, your objective might be to **reduce the abundance or distribution** of the invasive species, or to **minimize its impact** on native ecosystems or human health.
- 2. Develop quantitative metrics:** To assess whether you are meeting your management objectives, you need to develop quantitative metrics that can be measured over time. For example, you might **measure the density of the invasive species in different areas before and after management**, or **track changes in the abundance of native species** that were impacted by the invasive species.
- 3. Collect baseline data:** Before you start your invasive species management efforts, collect baseline data on the **current status of the invasive species and any native species that may be impacted**. This will allow you to track changes over time and assess the effectiveness of your management efforts.

# How to assess the success of IAS management?

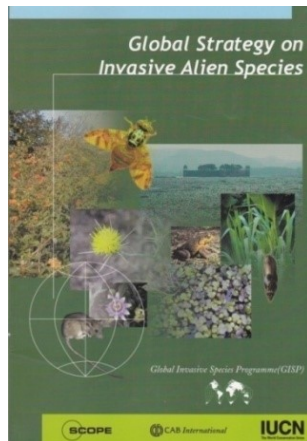
## Ask ChatGPT!

*“Assessing the success or failure of invasive species management requires a combination of methods and metrics. Here are some key steps to consider”:*

- 4. Implement management strategies:** Implement management strategies that are appropriate for the specific invasive species and ecosystem in question. This may include **methods such as chemical control, physical removal, or biological control**.
- 5. Monitor and evaluate results:** Monitor the effectiveness of your management efforts over time **by collecting data on the invasive species and any impacted native species**. Evaluate the results against your management objectives and quantitative metrics to determine whether your efforts were successful or not.
- 6. Adjust management strategies as needed:** Based on the results of your monitoring and evaluation, adjust your management strategies as needed to **improve effectiveness**.
- 7. Communicate results:** Communicate the results of your invasive species management efforts **to stakeholders and the broader community, including any successes or challenges** encountered along the way. This can help to **build support** for ongoing invasive species management efforts and **inform future decision-making**.

# How to assess the success of IAS management?

## Follow the world agenda/global framework!



Convention on  
Biological Diversity



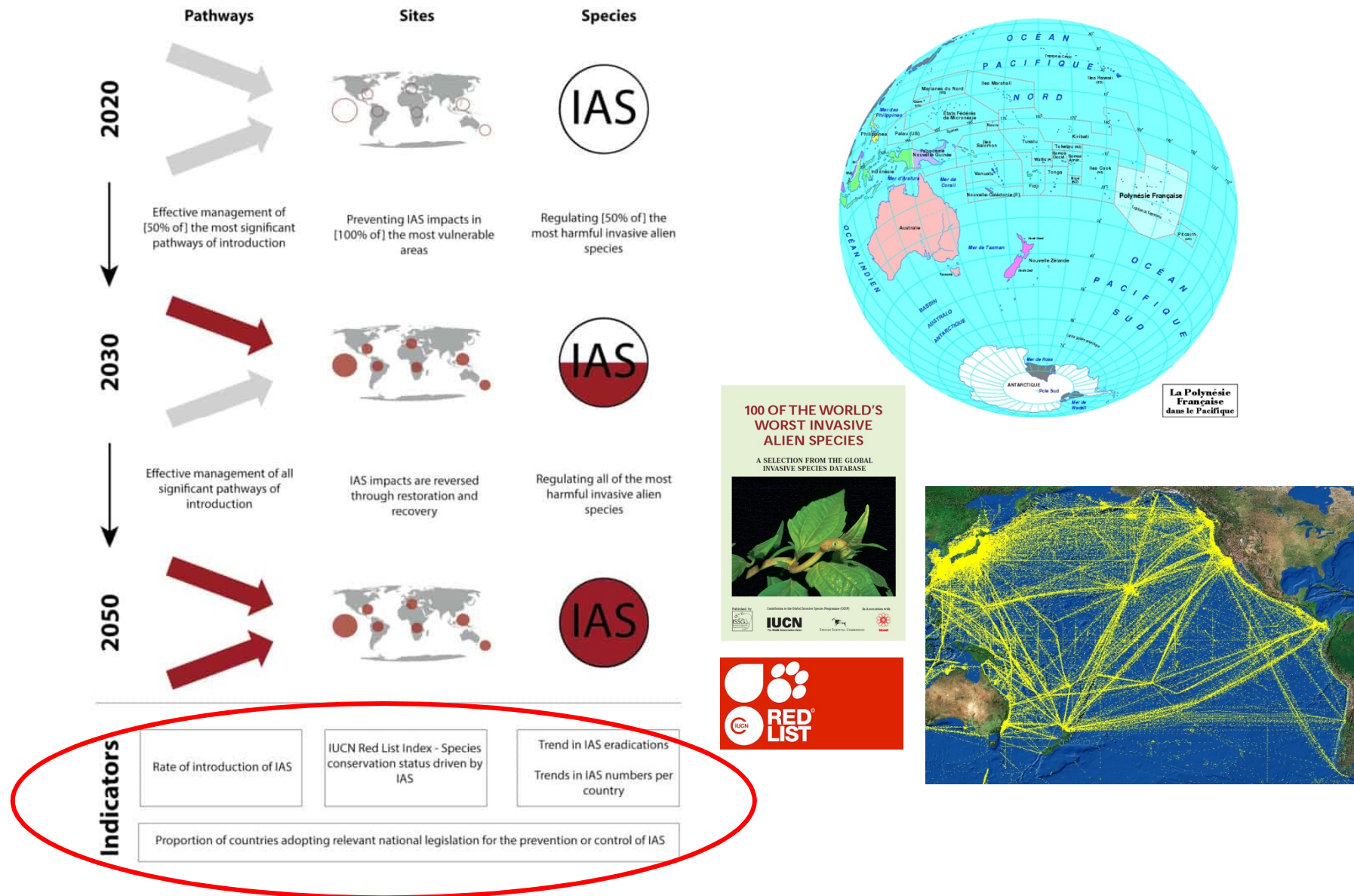
2020 UN BIODIVERSITY CONFERENCE  
COP 15 / CP-MOP 10 / NP-MOP 4  
Ecological Civilization-Building a Shared Future for All Life on Earth  
KUNMING – MONTREAL

### 1. *Reducing threats to biodiversity*

#### TARGET 6

Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent, by 2030, eradicating or controlling invasive alien species especially in priority sites, such as islands .

# “Unpacking Target 6 on managing the impacts of IAS”



# French Polynesia, a pioneer in IAS legislation

1995 !

**DELIBERATION n° 95-257 AT du 14 décembre 1995 relative à la protection de la nature.**

NOR : ENV9501469 DL

## CHAPITRE III - Des espèces menaçant la biodiversité

### Art. 22.— Introduction d'espèces nouvelles

L'introduction, quelle qu'en soit l'origine, sur le territoire de la Polynésie française, l'importation sous tous régimes douaniers, de spécimens vivants d'espèces animales ou végétales n'existant pas sur le territoire à la date de parution de la présente délibération, sont interdites.



### Art. 23.— Contrôle des espèces présentes sur le territoire et menaçant la biodiversité

Le conseil des ministres fixe par arrêté une liste des espèces déjà présentes sur le territoire dont le développement présente une menace actuelle ou potentielle pour la biodiversité. Cette liste est appelée liste des espèces menaçant la biodiversité.

L'introduction nouvelle, quelle qu'en soit l'origine, sur le territoire de la Polynésie française, l'importation nouvelle sous tous régimes douaniers, de spécimens vivants d'espèces menaçant la biodiversité sont interdites.

Des arrêtés pris en conseil des ministres précisent les conditions d'opérations de contrôle, voire d'éradication, des populations d'espèces menaçant la biodiversité qu'il convient de mettre en œuvre.

### Art. 24.— Transfert d'une île à l'autre

Tout transfert d'une île à l'autre de spécimens vivants d'espèces menaçant la biodiversité est interdit.

5 Octobre 2017

JOURNAL OFFICIEL DE

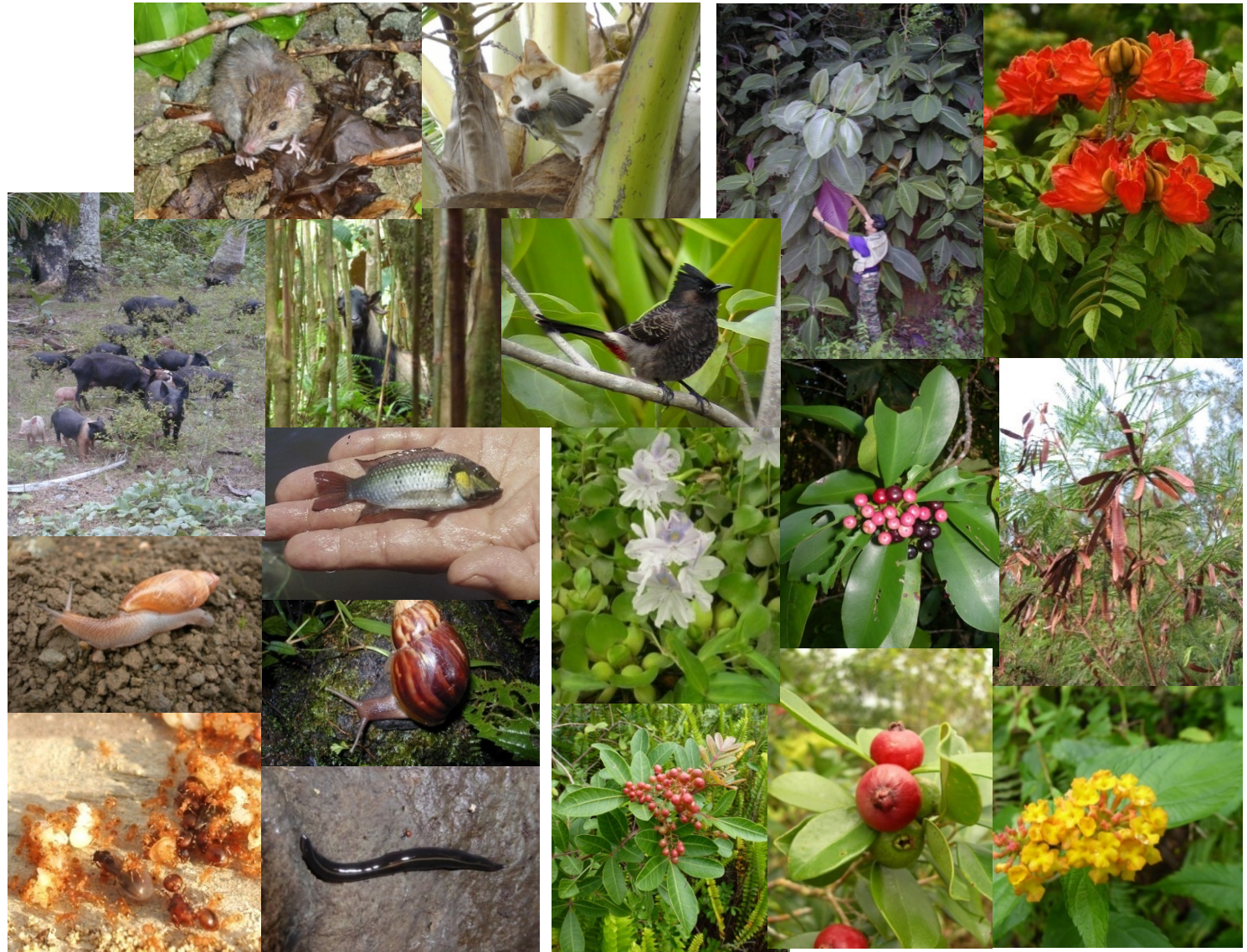
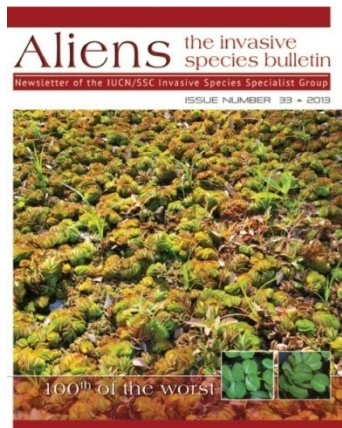
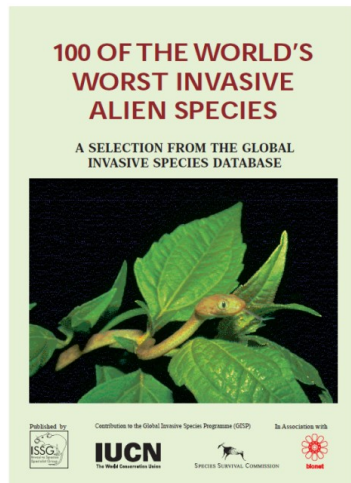
**LOI DU PAYS n° 2017-25 du 5 octobre 2017 relative au code de l'environnement de la Polynésie française.**

NOR : ENV1720587LP

13 species « threatening biodiversity »  
(1998)



52 species (39 plants, 13 animals)



13 of the 36 most invasive aquatic and land plants are found in  
French Polynesia!



## Critical issues and new challenges for research and management of invasive plants in the Pacific Islands

JEAN-YVES MEYER<sup>1</sup>

Table 1. Comparison between native and alien flora (flowering plants and ferns) in selected Pacific tropical islands (by size of terrestrial area) and number of naturalized and invasive alien plants (including dominant or major IAP).

Island or island group	Area (km <sup>2</sup> )	Native flora (number of indigenous species)	Alien flora (number of introduced species)	Naturalized alien plant species	Invasive alien plant species	Dominant IAP
New Caledonia	19 060	3 261 <sup>a</sup>	2 008 <sup>b</sup>	597 <sup>b</sup>	97 <sup>c</sup>	67 <sup>b</sup>
Fiji	18 270	1 622 <sup>d</sup>	977 <sup>d</sup>	461 <sup>d</sup>	107 <sup>e</sup>	30 <sup>f</sup>
Hawai'i	16 880	1 138 <sup>g</sup>	8 134 <sup>h</sup>	1 104 <sup>i</sup>	469 <sup>i</sup>	86 <sup>j</sup>
Galápagos	7 900	550 <sup>k</sup>	870 <sup>l</sup>	229 <sup>l</sup>	109 <sup>l</sup>	22 <sup>l</sup>
French Polynesia	3 519	885 <sup>m</sup>	> 1 700 <sup>n</sup>	593 <sup>n</sup>	-	57 <sup>n</sup>
Cook Is.	238	296 <sup>o</sup>	997 <sup>o</sup>	333 <sup>o</sup>	76 <sup>p</sup>	12 <sup>q</sup>
Rapa Nui (Easter Island)	166	48 <sup>r</sup>	370 <sup>s</sup>	180 <sup>s</sup>	-	36 <sup>s</sup>
Wallis et Futuna	142	351 <sup>t</sup>	338 <sup>u</sup>	151 <sup>u</sup>	-	18 <sup>u</sup>

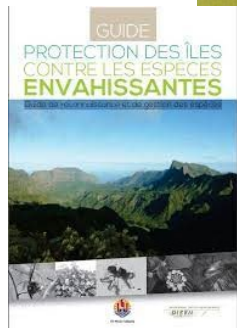
<sup>a</sup>Jaffré *et al.* 2004, <sup>b</sup>Meyer *et al.* 2010, <sup>c</sup>Hequet *et al.* 2009, <sup>d</sup>Brownlie 1977 and Smith 1996, <sup>e</sup>GISD, <sup>f</sup>Meyer 2000, <sup>g</sup>Wagner *et al.* 1999, <sup>h</sup>Staples and Herbst 2005, <sup>i</sup>Staples and Cowie 2001, <sup>j</sup>Smith 1985, <sup>k</sup>Mauchamp 1997, <sup>l</sup>Trueman *et al.* 2010, <sup>m</sup>Florence *et al.* 2007, <sup>n</sup>Fourdrigniez and Meyer 2008, <sup>o</sup>McCormack 2007, <sup>p</sup>Space and Flynn 2002, <sup>q</sup>Meyer 2004, <sup>r</sup>Dubois *et al.* 2013, <sup>s</sup>Meyer 2008, <sup>t</sup>Morat *et al.*, <sup>u</sup>Meyer *et al.* 2010

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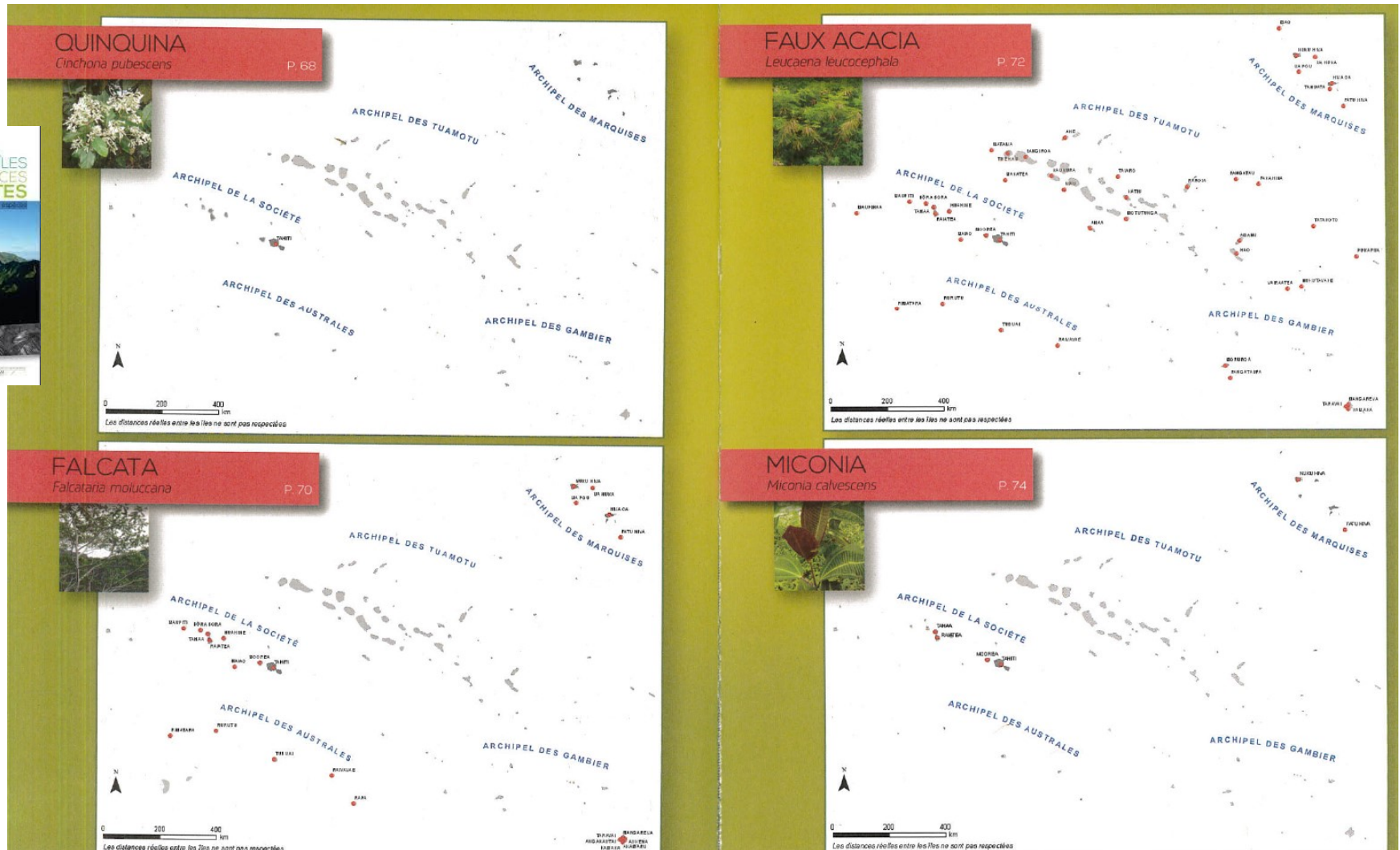
PACIFIC CONSERVATION BIOLOGY Vol. 20(2): 146–164. Surrey Beatty & Sons, Sydney. 2014.

# The challenges in island ecosystems

## ➤ Presence/Absence of IAS in the 120 islands of French Polynesia

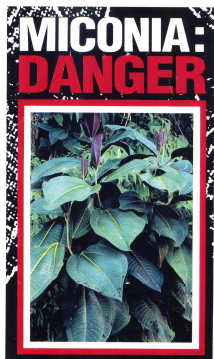


(2014)



## Case study 1. *Miconia calvescens*

- Active monitoring, manual and biological control programs → containment
- Two more invaded islands in 20 years (Nuku Hiva and Fatu Iva in the Marquesas)



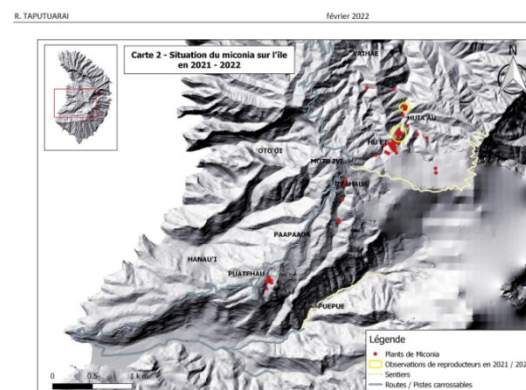
(Nuku Hiva, 2005)



(Fatu Iva, 2003)



(Fatu Iva, 2022)



(Nuku Hiva, 2018)

## Case study 2. Little Fire Ant *Wasmannia auropunctata*

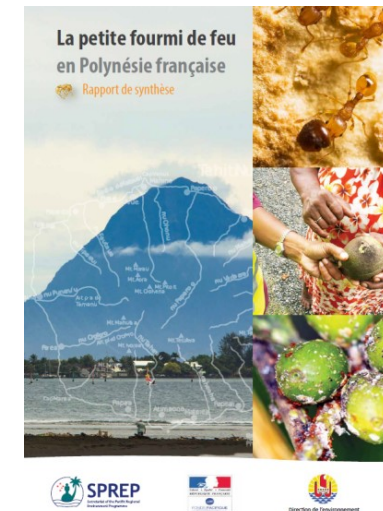
- Chemical control programs (until 2010) and biosecurity measures
- Five more invaded islands in 20 years (Bora Bora, Moorea, Raiatea, Tahaa - Society, Rurutu - Austral)!



(2014)



(Hervé JOURDAN - Tahiti, 2004)



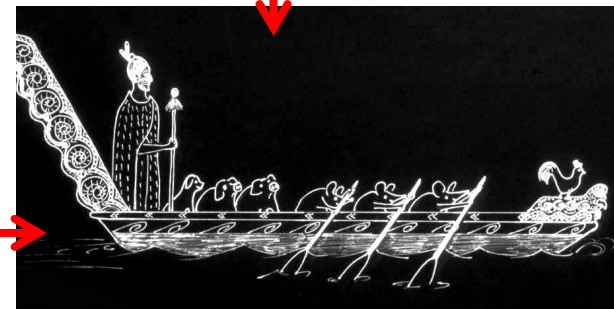
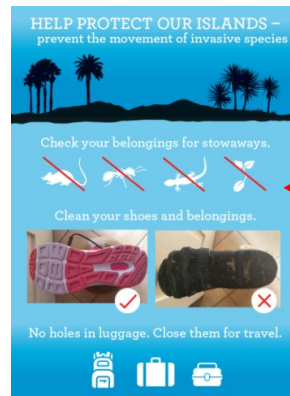
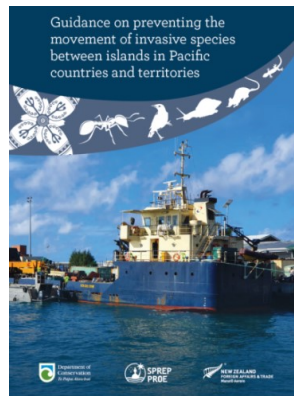
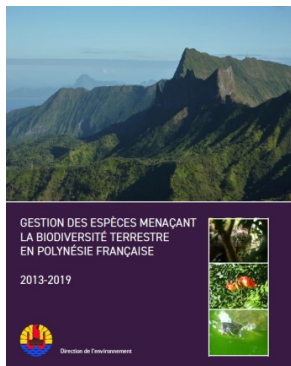
(VANDERWOUDE et al., 2013)



(Tahiti, 2022)

# Lessons learned

- Legislation, communication, prevention are necessary but not sufficient – a better explanation of the pathways of introduction?
- The importance of social perception and « human behavior »



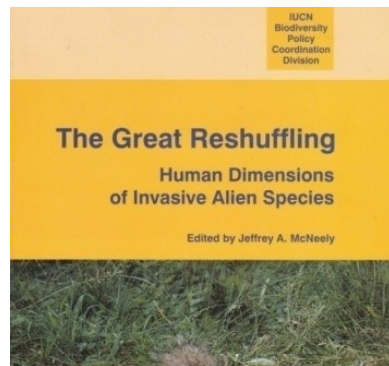
(« Transported landscape »)



(« Heiva i Tahiti » Traditional danse festival, 2014)

# The Human Factor

➤ More sociological studies are needed... according to different cultures !



(2000)



(2001)



**Considering the social dimension of invasive species: the case of buffel grass**

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<http://neobiota.pensoft.net>

RESEARCH ARTICLE



**Beasts or beauties? Laypersons' perception of invasive alien plant species in Switzerland and attitudes towards their management**

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**Social perceptions of the impacts and benefits of invasive alien species: Implications for management**

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(2007–2017)

**Clarifying values, risk perceptions, and attitudes to resolve or avoid social conflicts in invasive species management**

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**Public attitudes to the management of invasive non-native species in Scotland**

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