

# Integrating Invasive Alien Species Management into Marine and Coastal Ecosystem-based Adaptation

Stas Burgiel, PhD  
Global Invasive Species Programme  
CBD COP10 (18-29 October 2010, Nagoya, Japan)

# Climate Change, Invasive Species & Marine/Coastal Biodiversity

---



## Three main points:

- Climate change will have ***direct and second order impacts*** that facilitate the introduction, establishment and/or spread of invasive species.
- Invasive species can ***increase the vulnerability of ecosystems*** to other climate-related stressors and ***reduce their potential to sequester greenhouse gasses.***
- Management of invasive species (prevention, eradication and control) is a critical component of ***ecosystem-based adaptation*** by offsetting pressures on ecosystems and their essential services.





# Direct and Indirect Impacts/Interactions

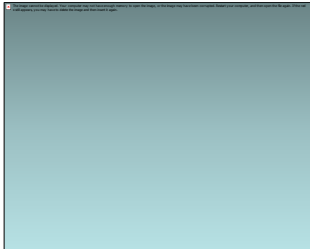
---

## Direct Impacts:

- **Range Shift:** changing climatic variables (temperature, precipitation, water salinity, CO<sub>2</sub> concentrations) can expand the range of invasive species or trigger previously benign alien species to become invasive.
- **Facilitated Movement:** severe weather events, such as storms and floods, can introduce and spread invasive species.
- **Natives vs. Alien Invasive Species:** ecosystem and climatic changes may weaken the natural controls on some native species, resulting in more severe impacts that destabilize ecosystem functioning.
- **Sequestration Ability:** invasive species can degrade the ability of ecosystems to sequester carbon or lead to release of greenhouse gasses through forest dieback, changing fire cycles and broader ecosystem change.

## Indirect and Second-Order Impacts:

- **Disturbance Events:** severe weather events may increase disturbance in ecosystems, making them more vulnerable to biological invasion.
- **Changes in Species Composition/Ecosystem Function:** broader changes in relations between species and ecosystem functions due to climate variability may provide advantages or new niches for invasive species.
- **Human Responses:** mitigation and adaptation measures can increase the risk of invasive species (e.g., infrastructure development; use of non-natives for biofuels; changes in global shipping and trade).



# Examples

## Coastal Protection

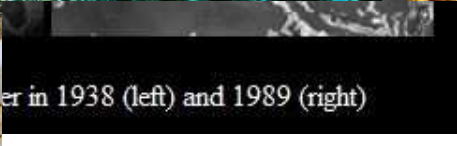
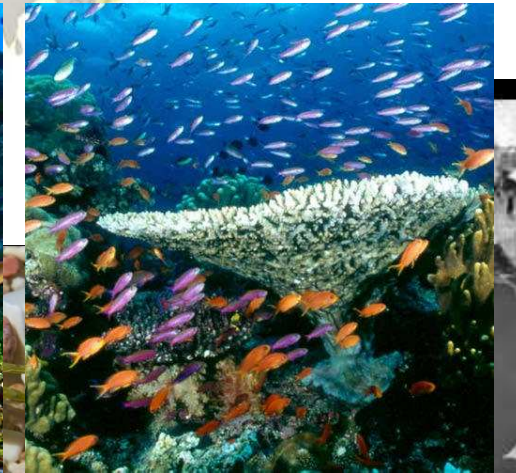
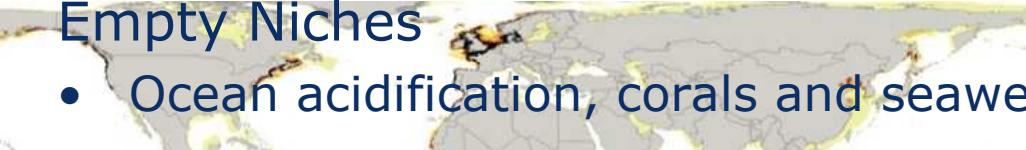
- Nutria/Coypu (*M. Coypus*)
- Beach Vitex (*V. rotundifolia*)

## Range Expansion

- Lionfish (*P. volitans*)
- European Green Crab (*C. maenas*)

## Empty Niches

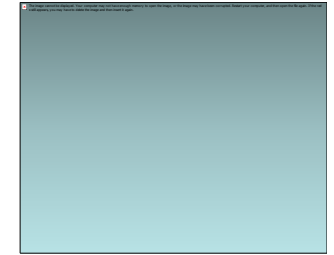
- Ocean acidification, corals and seaweeds/algae



er in 1938 (left) and 1989 (right)



Report available at <http://www.gisp.org>



www.gisp.org



## Invasive Species, **Climate Change** and Ecosystem-Based Adaptation: Addressing Multiple Drivers of Global Change

Global Invasive Species Programme  
September 2010

by Stanley W. Burgiel and Adrianna A. Muir

GISP's mission is to conserve biodiversity and sustain human livelihoods by minimising the spread and impact of invasive species



Within a framework considering climatic changes and human responses:

- Assess the potential for biological invasions
- Prevent the introduction of new alien species
- Develop early detection and rapid response mechanisms
- Eradicate or control priority existing invasive species

