# Economic Costs of Invasive Plant Management in Florida's Natural Areas

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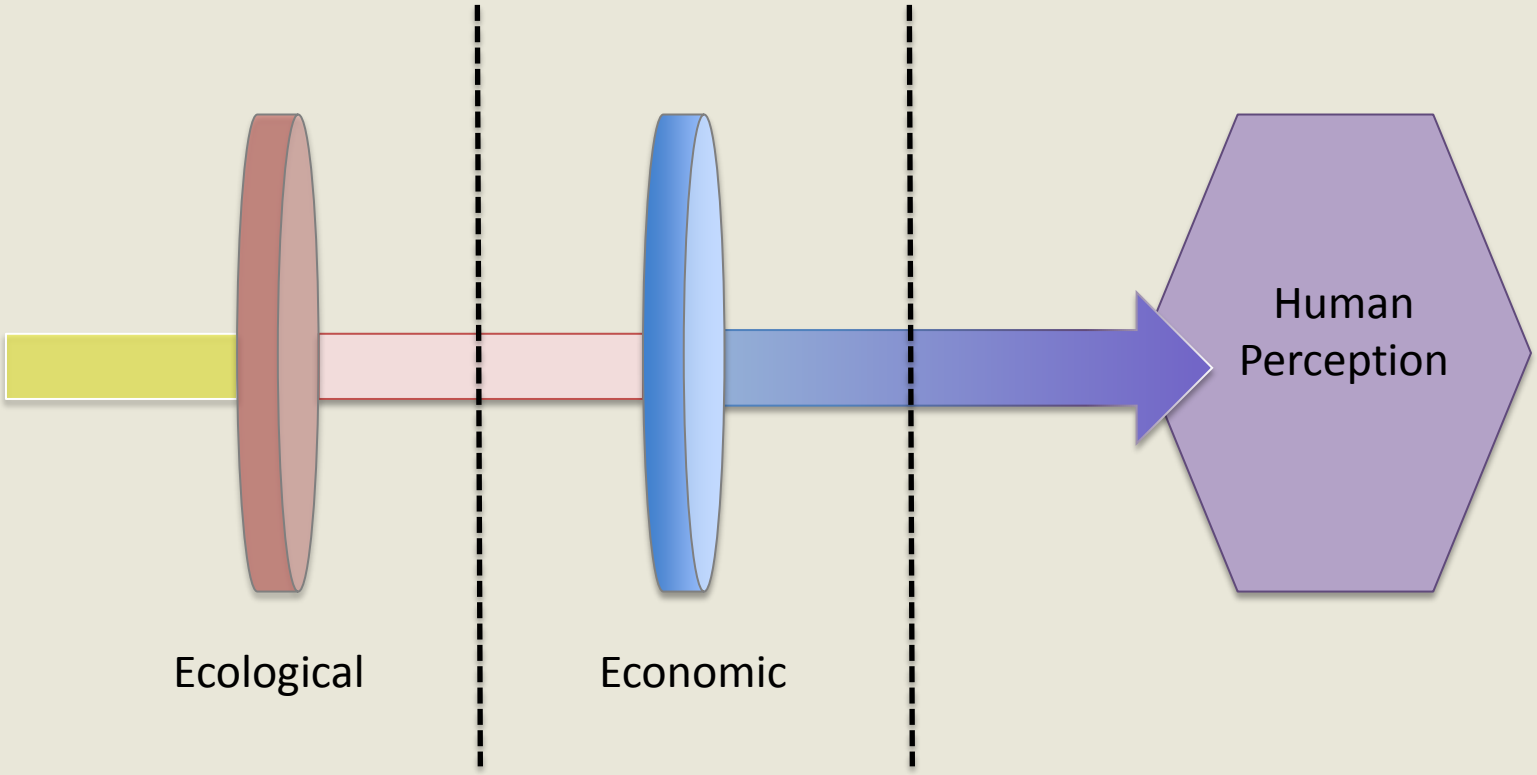
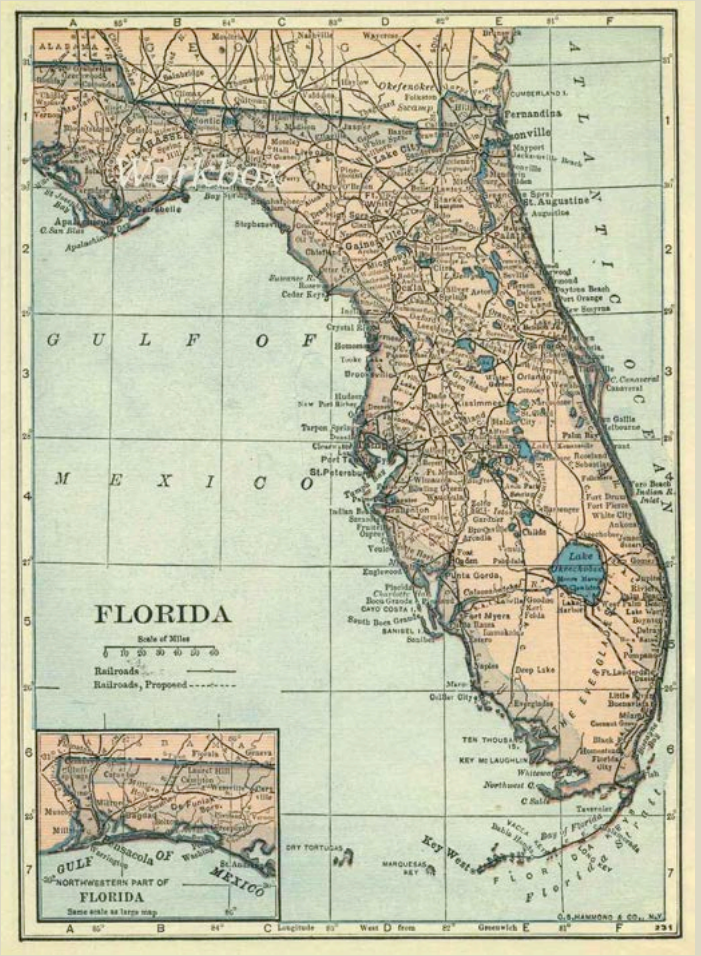
Picture: http://www.eosnap.com

# Impacts of Invasive Plants

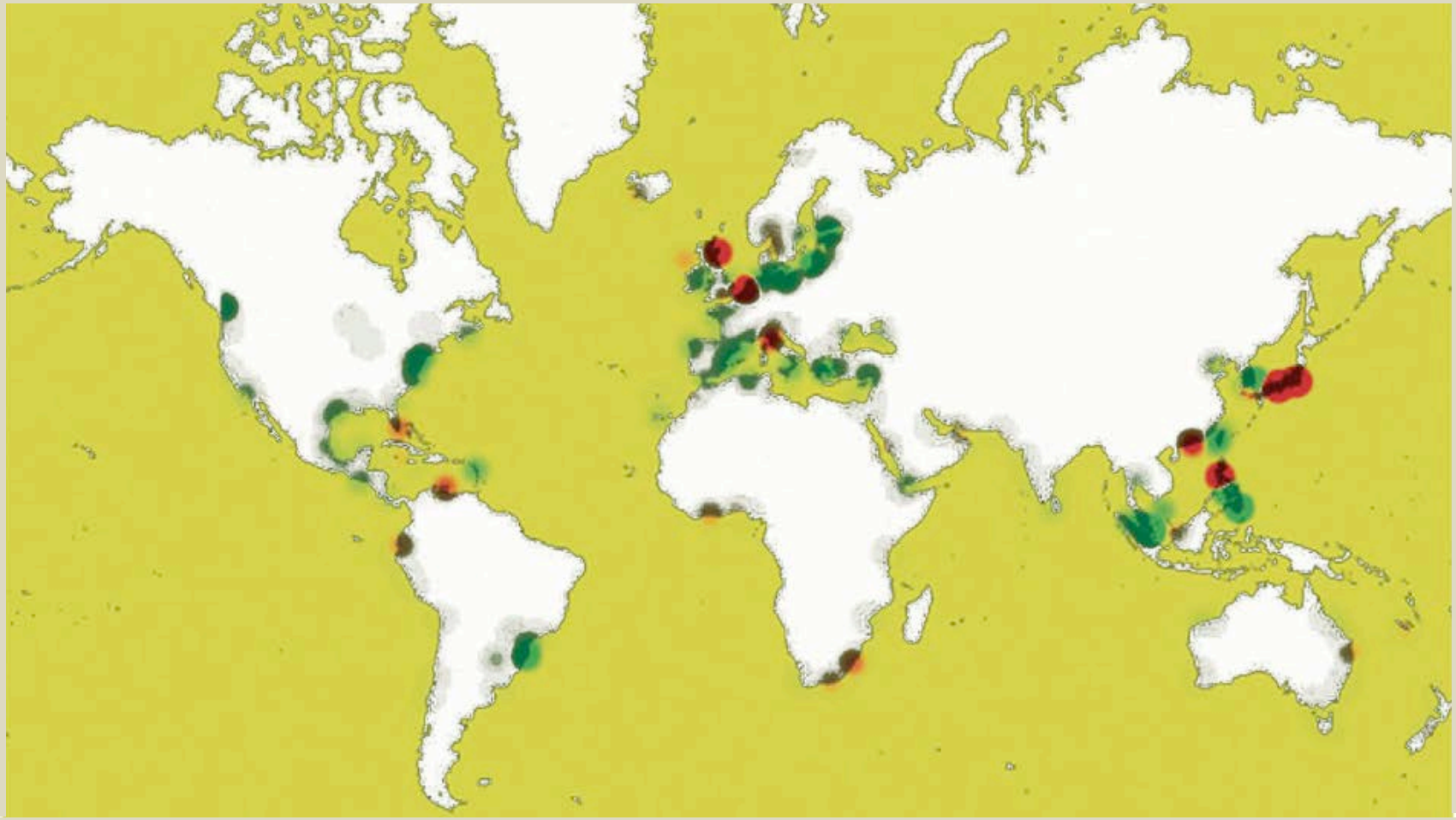


# Why is Florida particularly vulnerable to plant invasions?

- Areas prone to invasion
  - Islands
    - Island like characteristics
  - Habitats created / disturbed by humans
    - (Dasmann 1971; Elton 1958; Simberloff 1986)
- International Trade
  - Port of Miami
    - Of all shipments of nonindigenous plants into the US, 85% enter through the port of Miami (US Congress 1993)
  - Port Tampa Bay
- Climactic similarity with many diverse global regions.



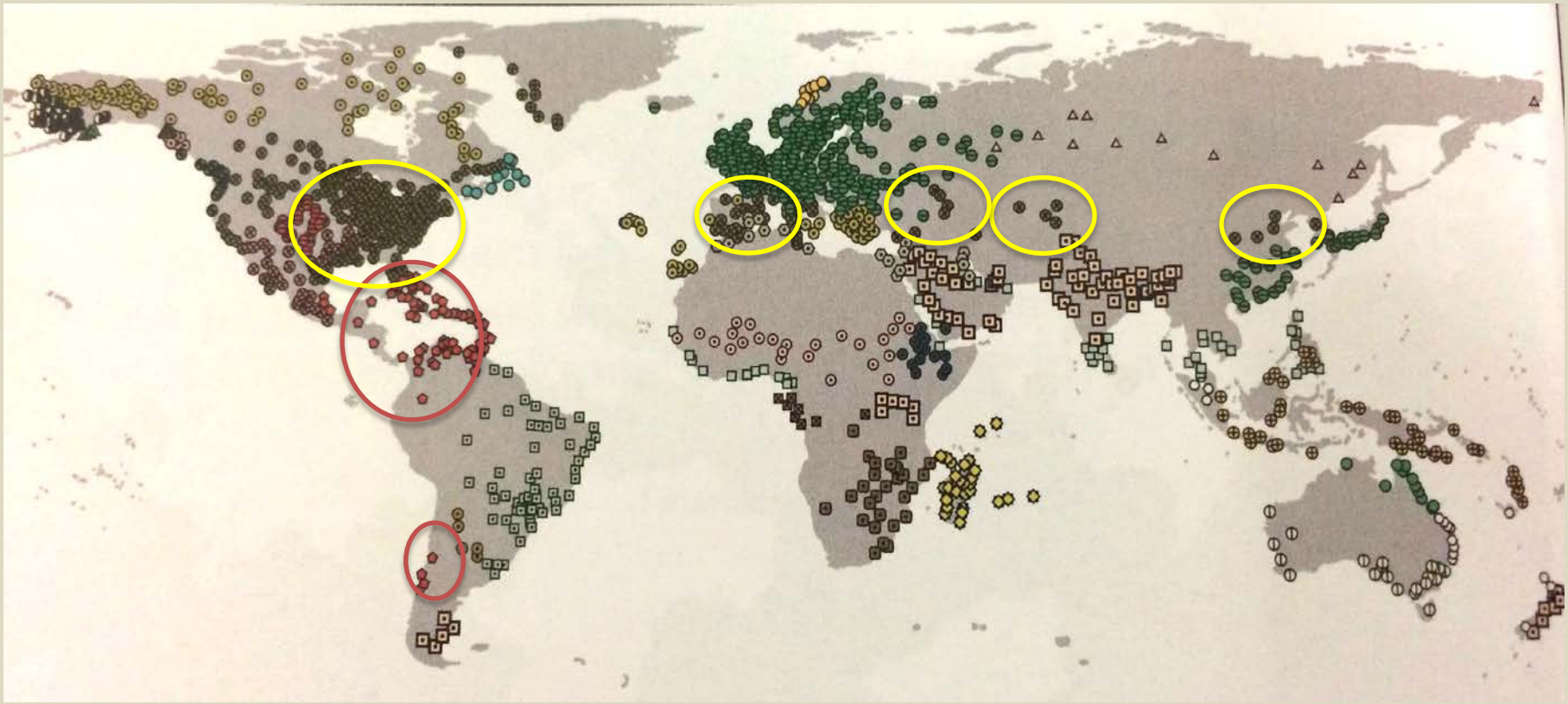
# International Trade



Density of ship visits and expected rate of invasion 1996-2000

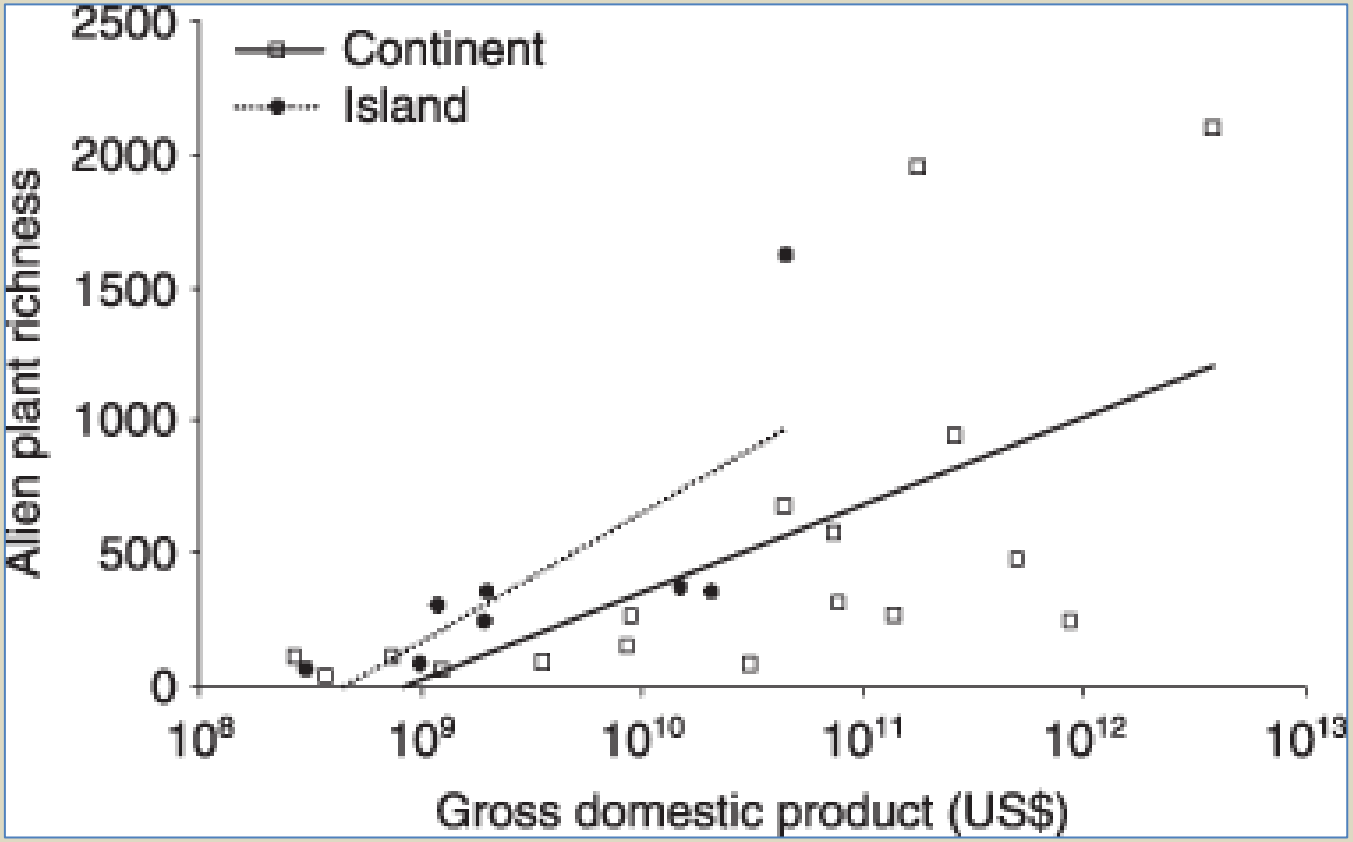
Drake, J.M. and Lodge, D.M. (2004) Global hot spots of biological invasions: evaluating options for ballast-water management.

# Airports with high climactic similarity



Tatem, A.J. and Hay, S.I. (2007) Climactic similarity and biological exchange in the worldwide airline transportation network. Proceedings of the Royal Society of London Series B: Biological Sciences 274, 1489-1496.

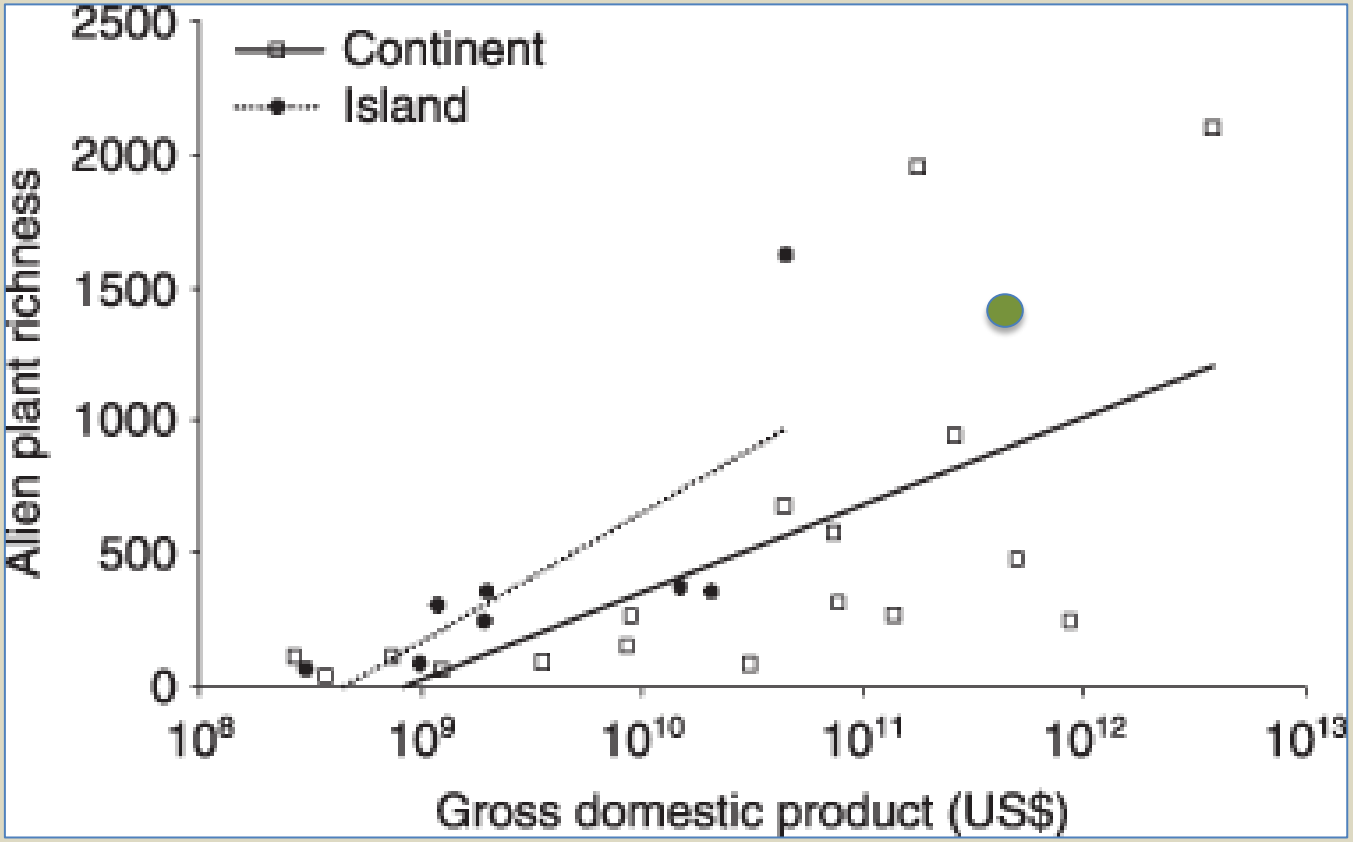
# Economic growth and plant invasions




Hulme et al (2009)

# Economic growth and plant invasions

- Florida's 2013 GDP in $US : $800 Billion (bea.gov)
- 1300 non-native established species in Florida (FDEP 2007).




Hulme et al (2009)

# Contributions to Florida's Economy

Agriculture

$100 Billion / Year[1]

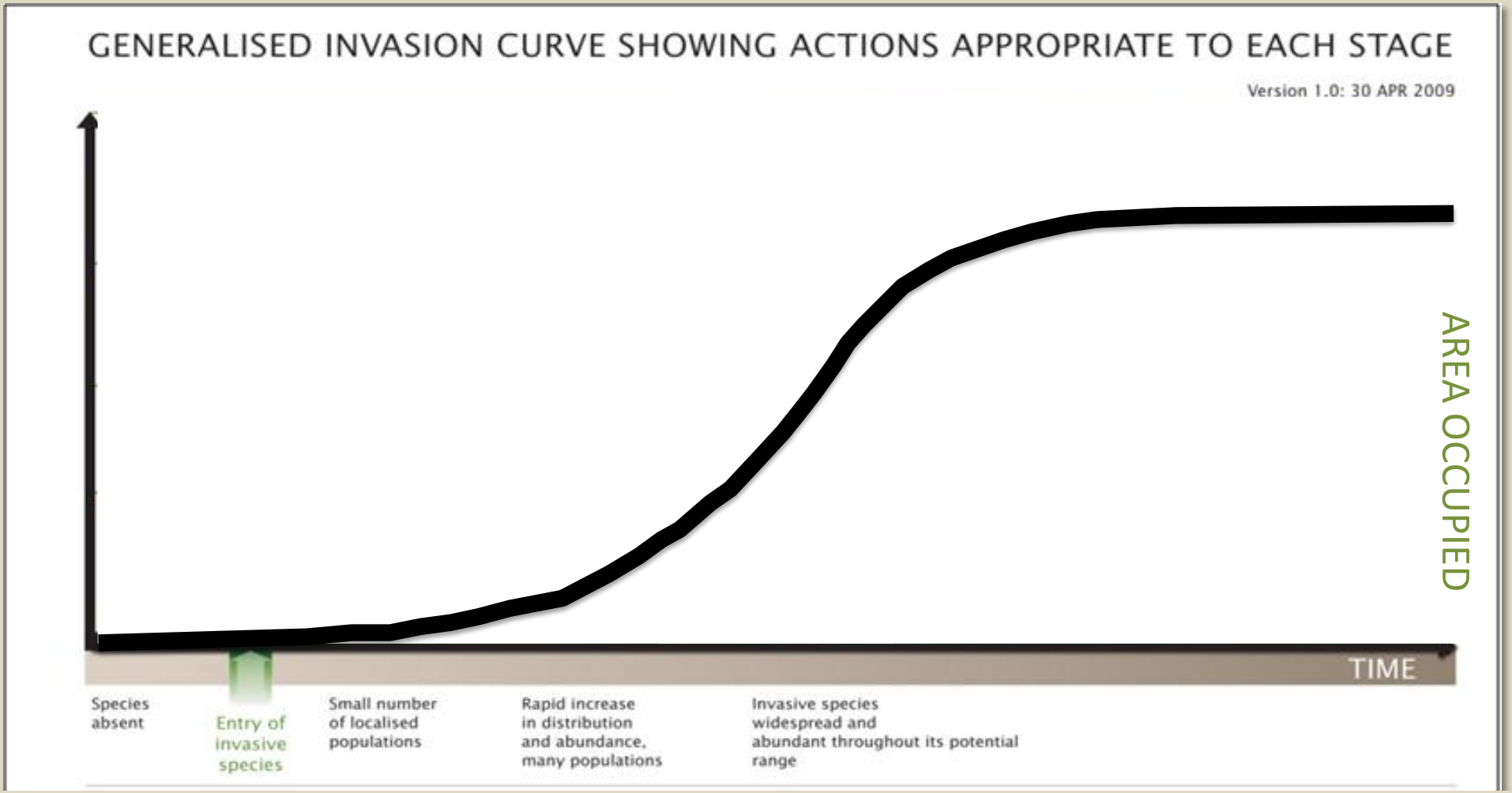
Ecotourism

$8.3 Billion / Year[2]

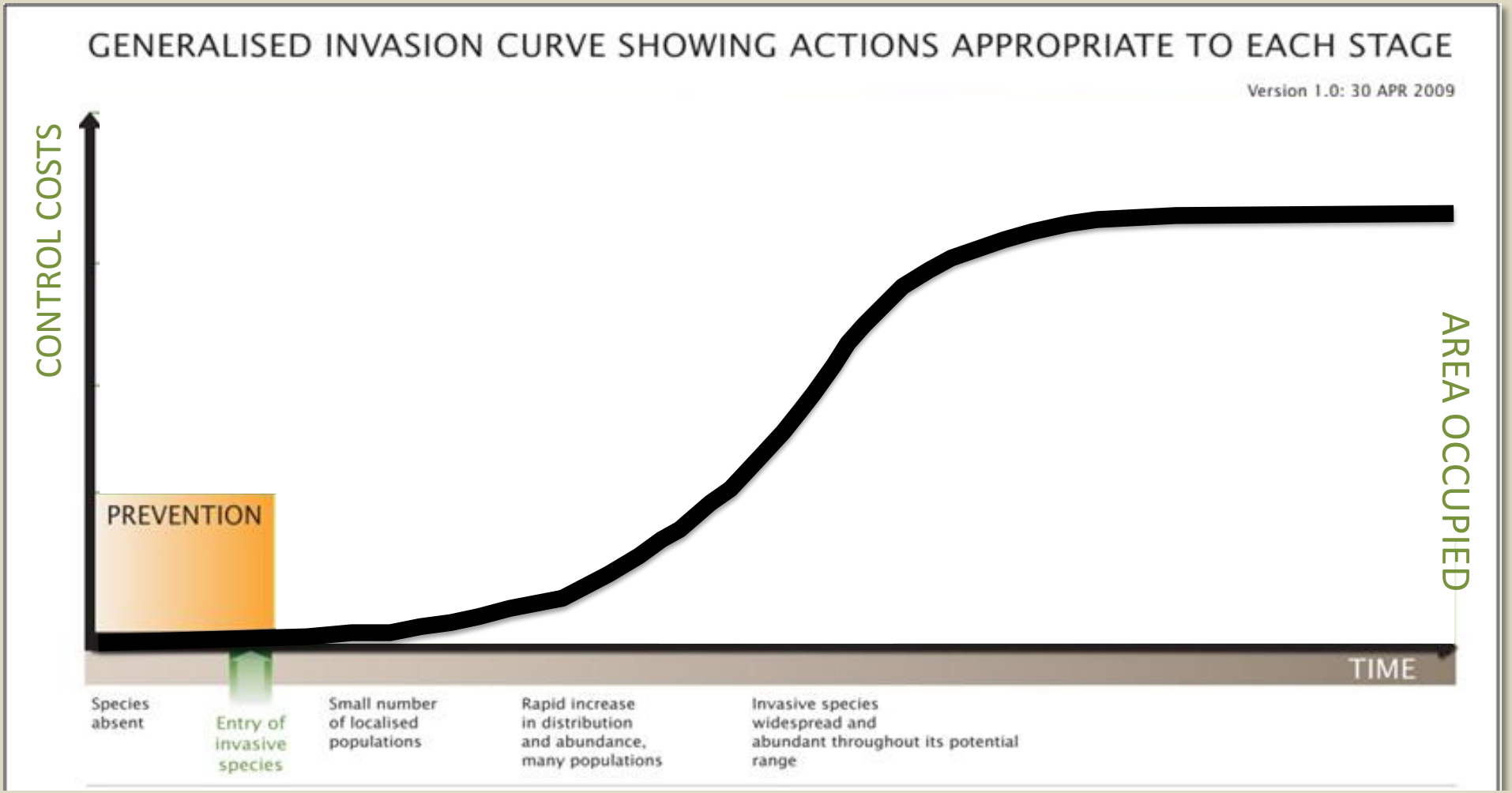
National / State Parks

$970 Million / Year[2]

[1]2013 FDACS Annual Review
[2]FDEP 2011




Source: Victoria Dept. of Primary Industries (Australia)

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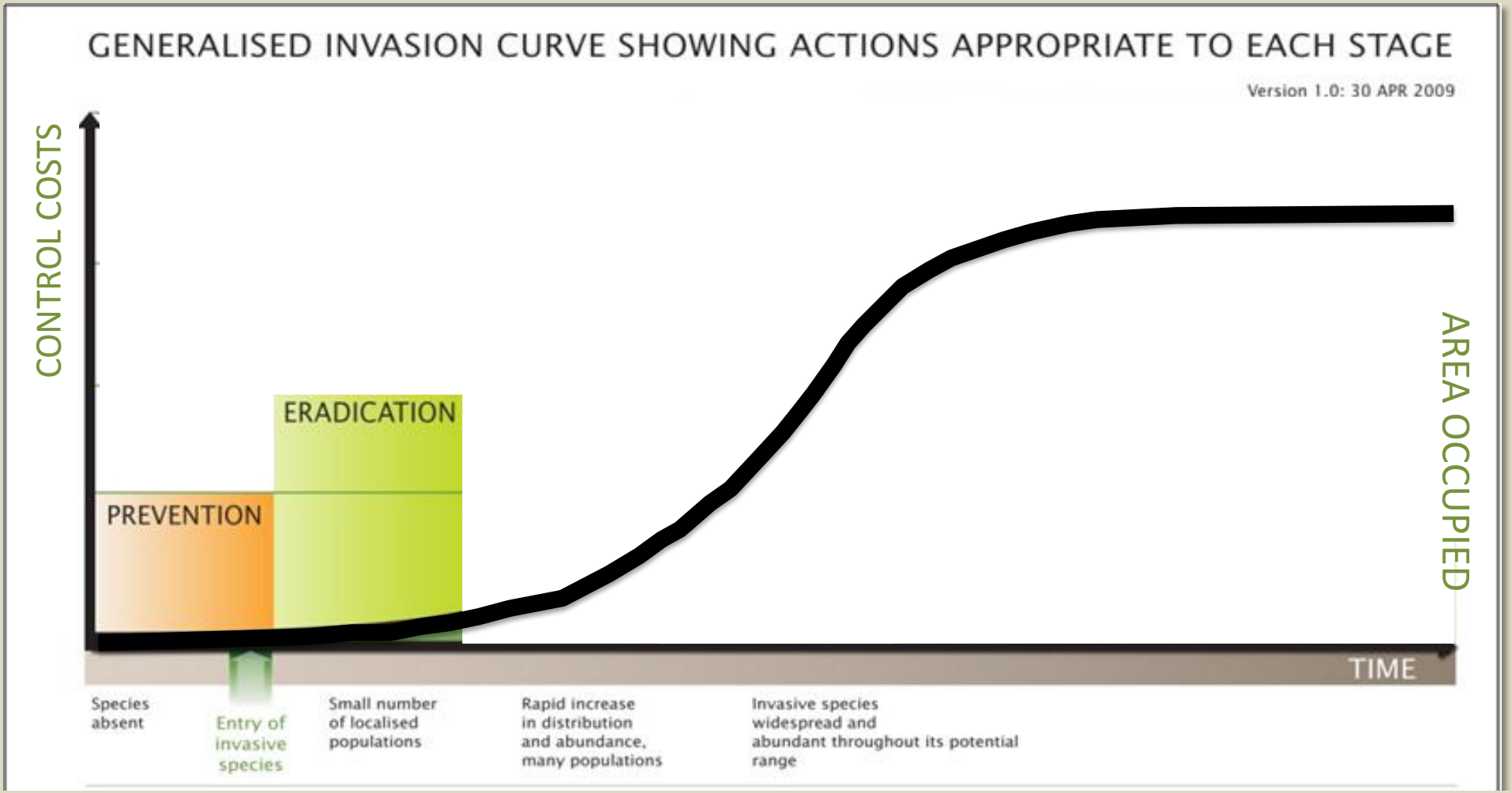


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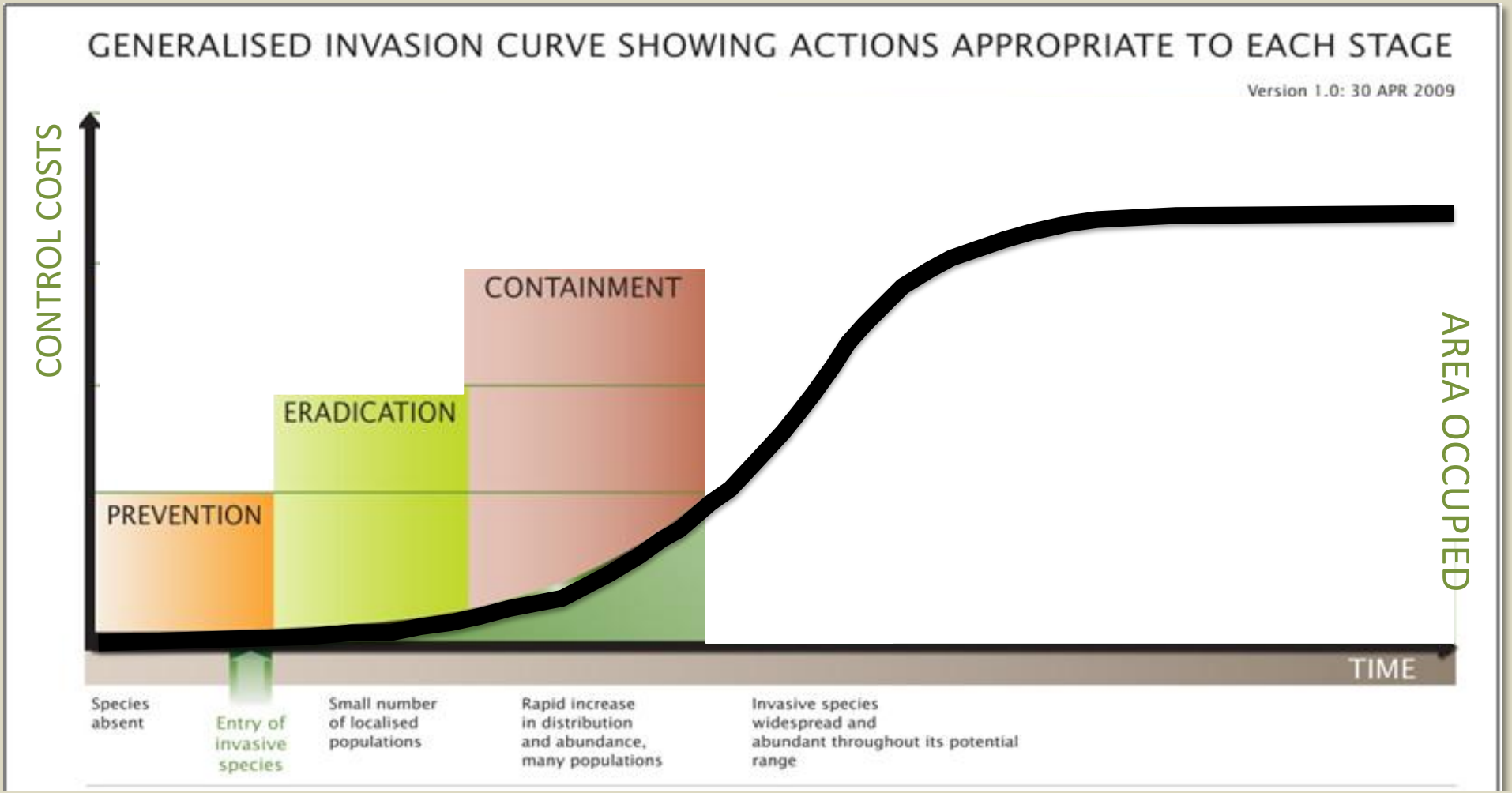


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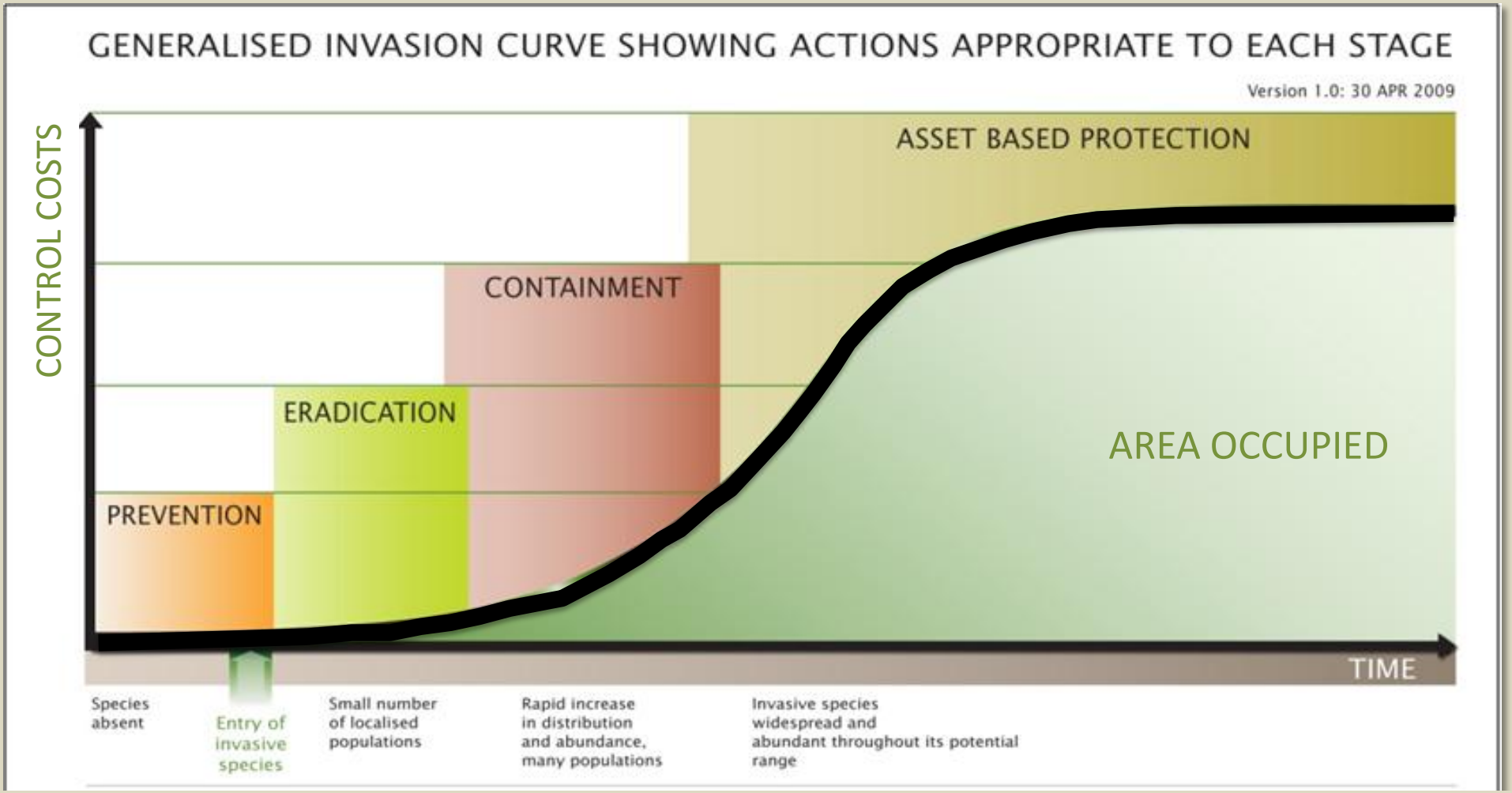


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# Project Objectives

1. Quantify the costs of managing upland and aquatic plant invasions in Florida's natural areas for:
   - State agencies
   - Federal agencies
   - Local (County, City) government
   - Non-profit organizations
   - Private landowners

2. Determine how patterns in spending have changed over time (min 5 years) by:
   - Region
   - Species

3. Evaluate the differences in roles of public and private entities in managing invasions.

# Data collection

Florida Natural Areas Inventory (FNAI) database

- Agencies that manage 25,000+ acres

| | Total Conservation Acres | Total Agencies |
|---|---|---|
| **State** | 5,930,363 | 22 |
| **Federal** | 5,544,456 | 12 |
| **Local** | 496,552 | 148 |
| **Private** | 342,201 | 75 |
| **Total** | **12,313,572** | **257** |

# Data requested

1. Year of funding
2. Source of funding (internal, FWC, etc.)
3. Total expenditures
4. Location of treatment
5. Acres treated
6. Habitat treated (upland or aquatic)
7. Species targeted
8. Type of treatment (herbicide, mowing, discing, etc.)
9. Cost of personnel vs. cost of materials/product
10. EDRR costs
11. Was this a re-treated area? If so what is the history?

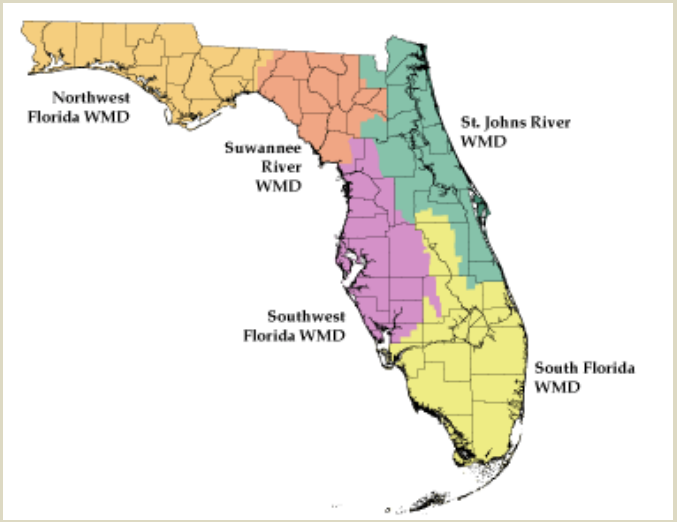
# Data Collected to Date

| | Total Agencies | Agencies that manage 25,000+ acres | Agencies with reported data | Total Acres | Acres Represented w/ cut-off | Total Acres for Data already acquired | Proportion of Data already acquired |
|---|---|---|---|---|---|---|---|
| **State** | 22 | 11 | 7 | 5,930,363 | 5,880,115 | 5,017,425 | 85.33% |
| **Federal** | 12 | 6 | 3 | 5,544,456 | 5,537,131 | 4,806,926 | 86.81% |
| **Local** | 148 | 7 | 1 | 496,552 | 272,077 | 48,134 | 17.69% |
| **Private** | 75 | 4 | 1 | 342,201 | 231,093 | 67,167 | 29.06% |
| **Total** | **257** | **28** | **12** | **12,313,572** | **11,920,416** | **9,939,653** | **83.38%** |

Development of Processwire Database

- Ongoing data storage for future records and analysis

# Example: St. John's River Water Management District



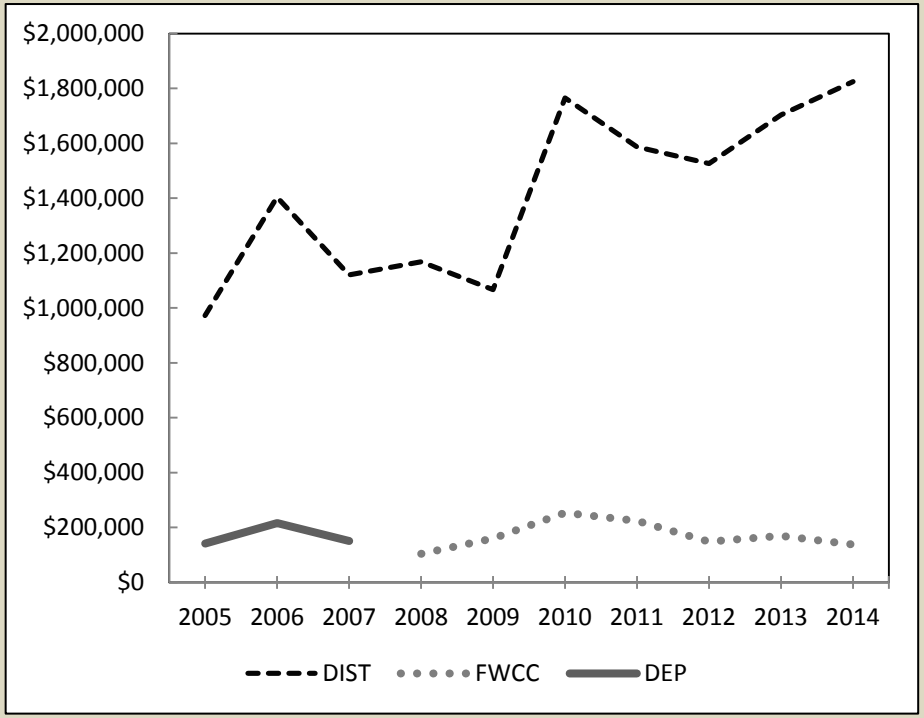




**Fig-1: St. John's River W.M.D. Invasive Total Plant Management Expenses by Funding Source (2005-2014)**

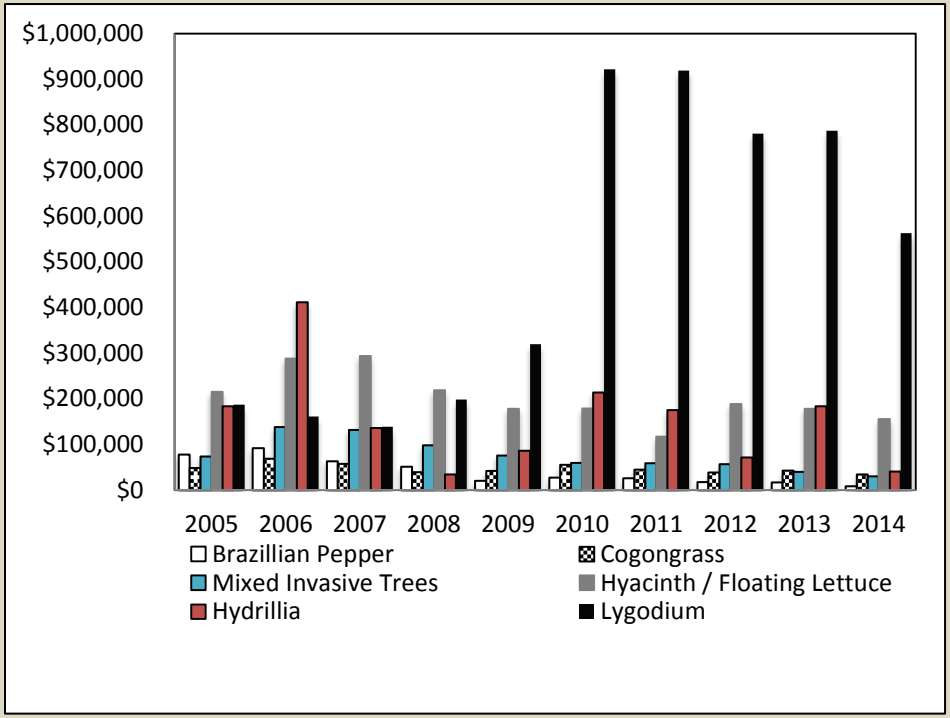



**Fig-2: St. John's River W.M.D. Invasive Plant Management Trends for the Most Problematic Species (2005-2014)**

# Example: City of Fernandina Beach

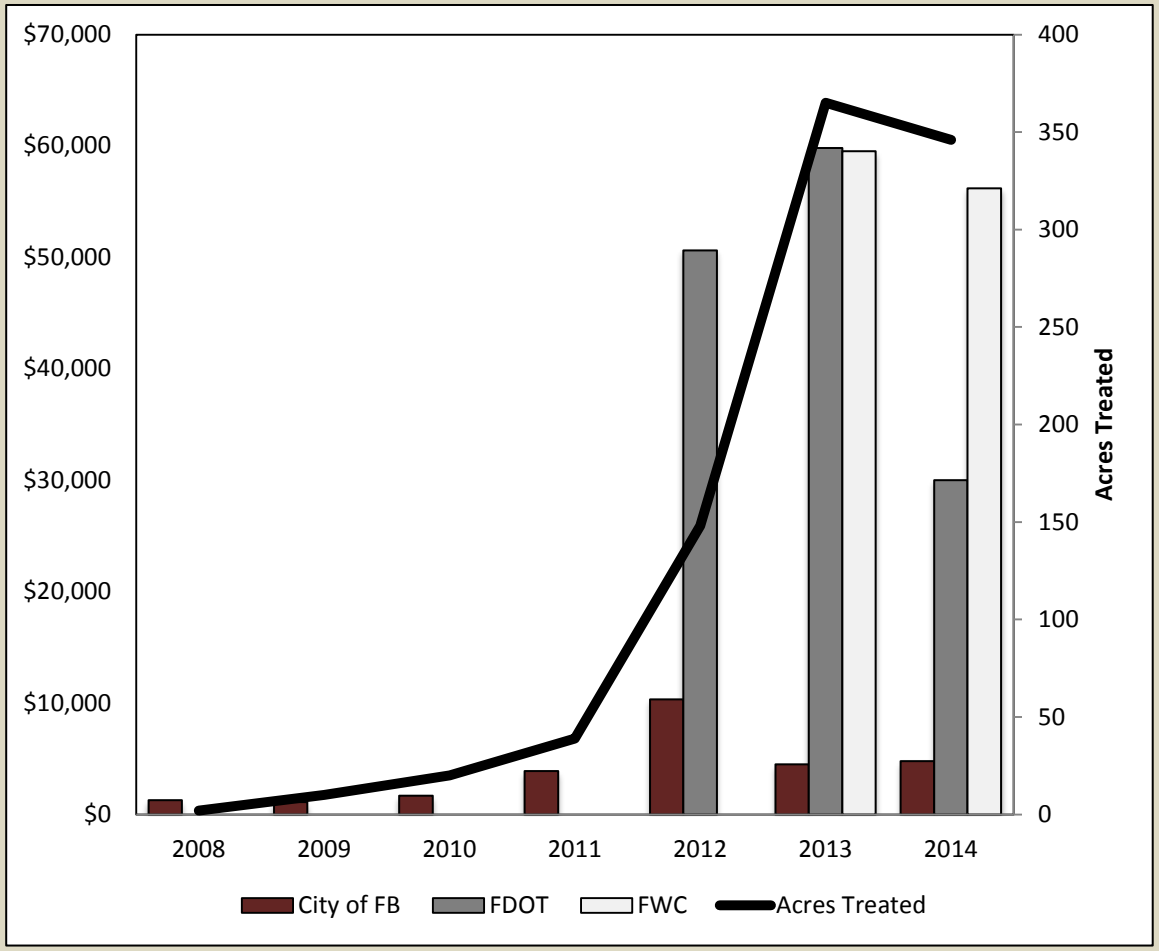
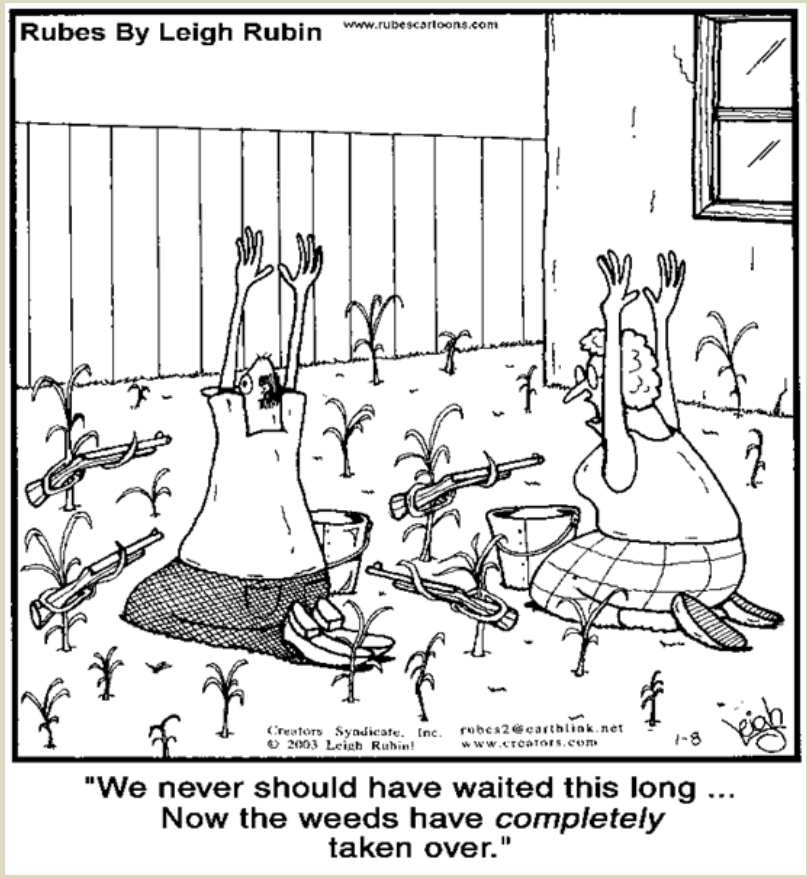



**Fig- 3: Invasive Plant Management Expenses by Funding Source for the City of Fernandina Beach**

# Ongoing work

- Agencies for which we need data:
  - Federal:
    - US Dept. of Defense (Air Force): 631,168 acres
    - US Dept. of Defense (Navy): 37,051 acres
  - State:
    - DEP Coastal and Aquatic Managed Areas (CAMA): 442,125 acres
  - Local:
    - Hillsborough County (65,385 acres)
    - Volusia County (42,505 acres)
    - Palm Beach County (34,970 acres)
    - Pinellas County (30,145 acres)
    - Manatee County (25,901 acres)
    - Lee County (25,036 acres)
  - Private:
    - Babcock Ranch Management, LLC (73,239 acres)
    - Tall Timbers Research, Inc. (48,942 acres)
    - National Audubon Society, Inc. (41,745 acres)
- 3 main types of data we need:
  1. Year of funding
  2. Source of funding (internal, FWC, etc.)
  3. Total expenditures

# Thank You

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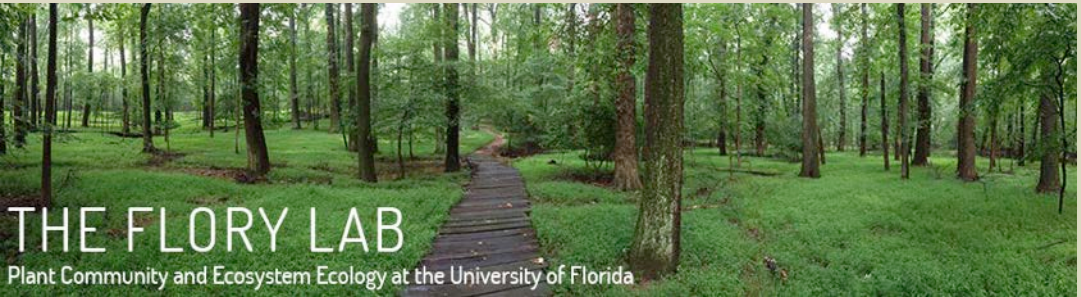


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