

Economic Impact of Invasive Species in Florida



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My Role

- Work with and support the efforts of the natural scientists to generate economically viable and environmentally friendly production practices, technologies and production systems
- **Assess the economic impacts of pests and diseases and evaluate the various proposed management options in terms of (market and non-market) costs and benefits**
- Conduct both farm and market level economic analyses
- Assist with disseminating the information and creating public awareness

**Epidemiological
Model**

**Economic
Model**

**Probability
Model**

**Epidemiological
Model**

**Economic
Model**

**Probability
Model**

Fig. 2. Probability tree for post-entry

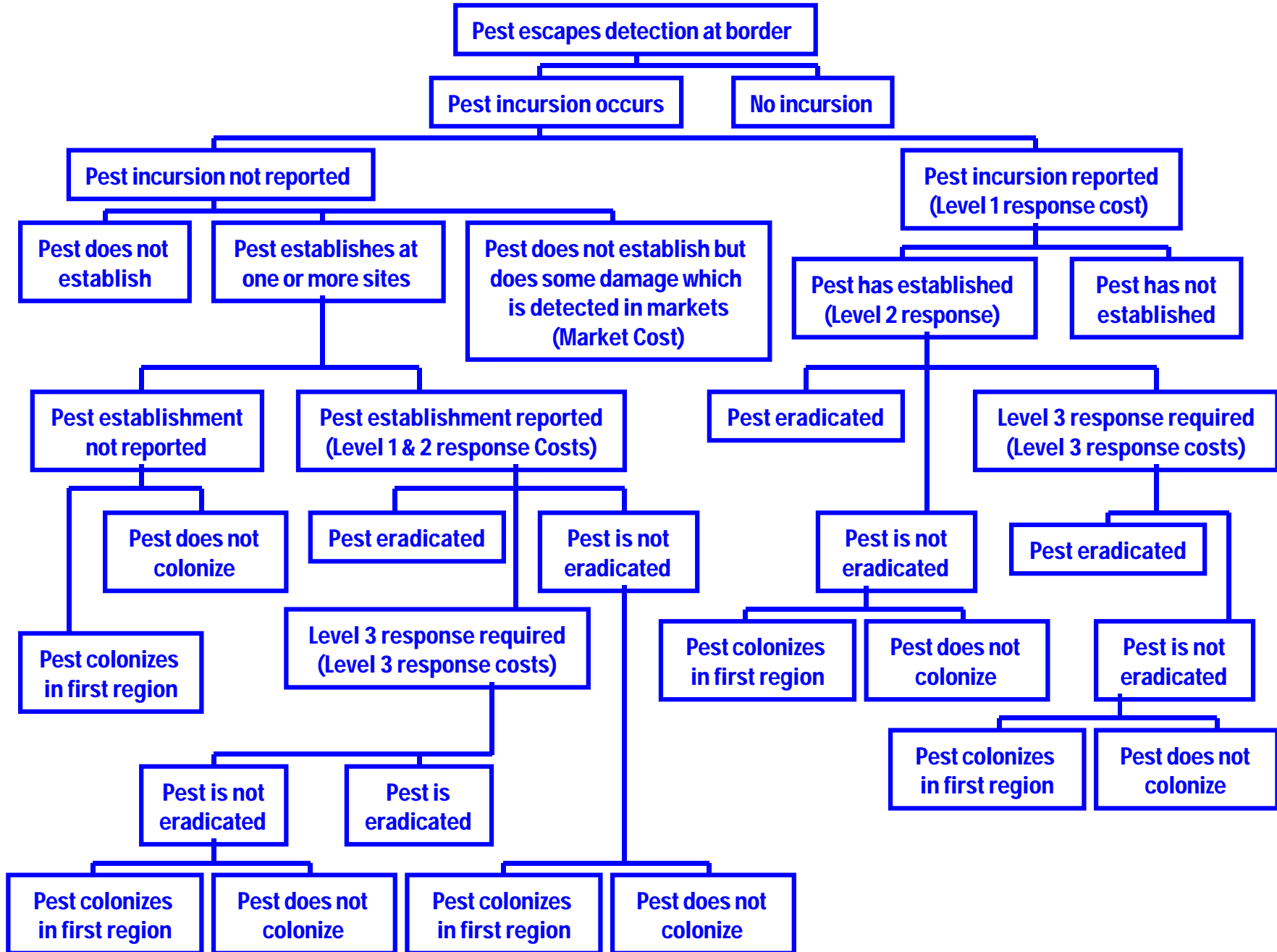
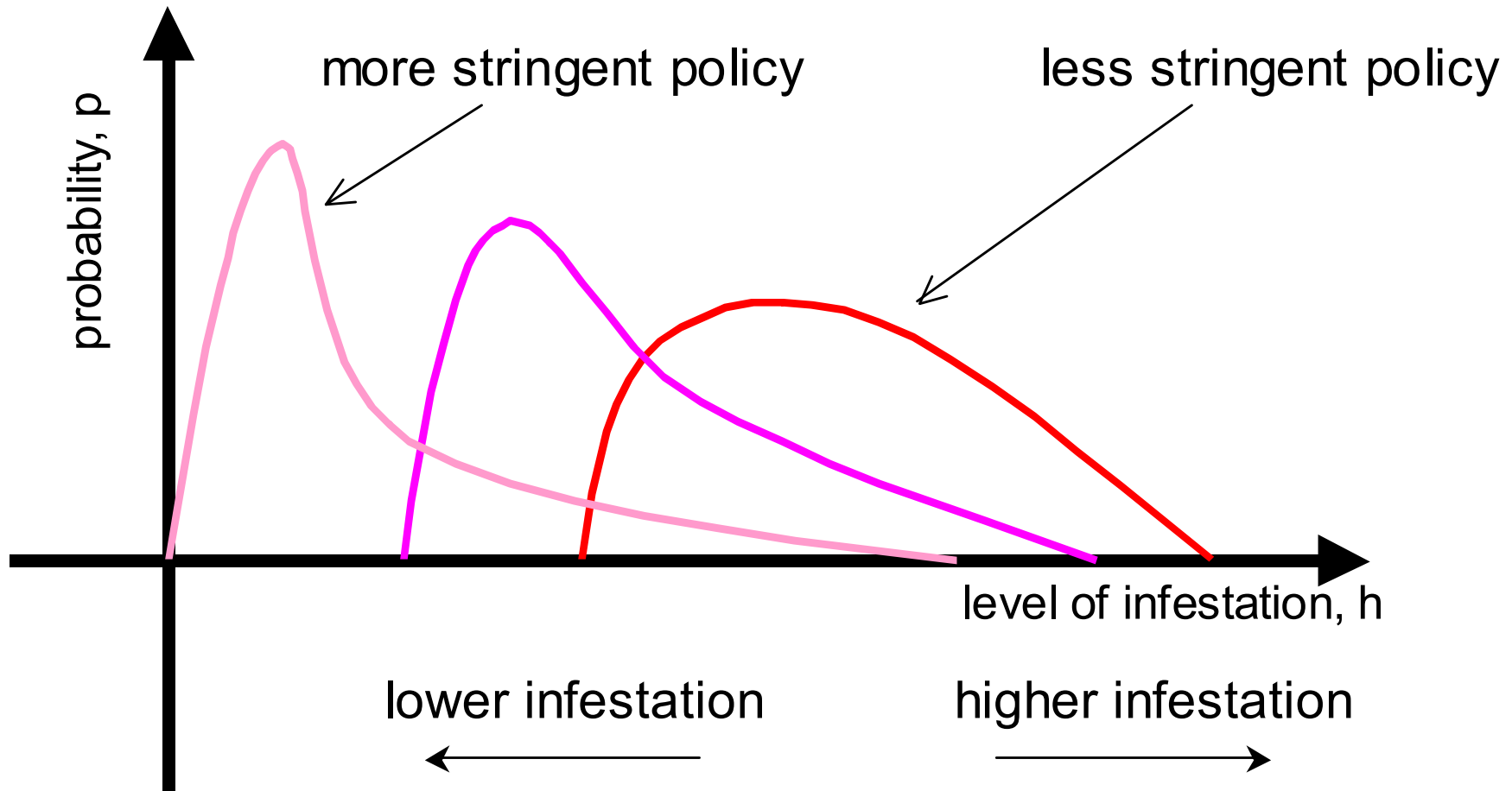
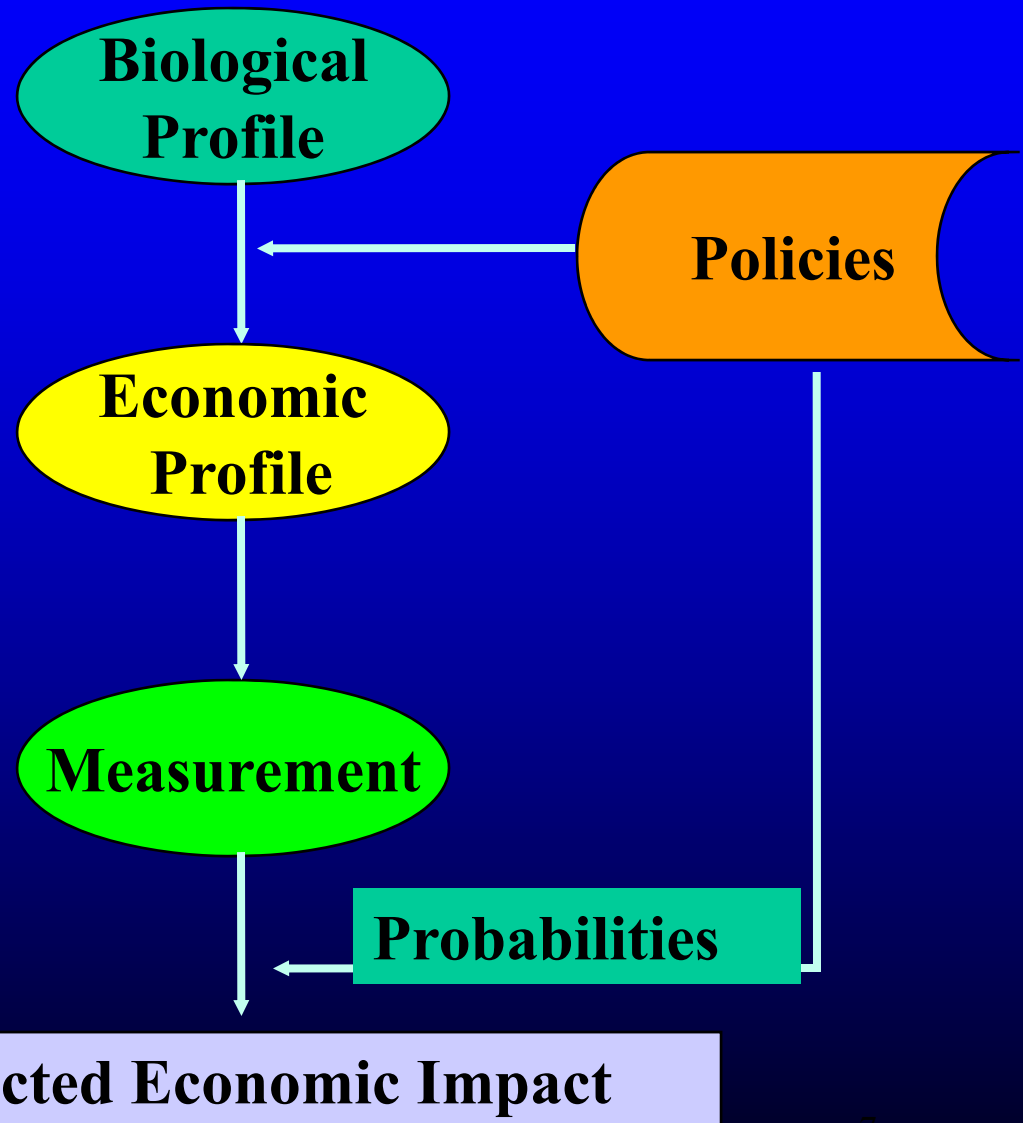


Fig. 3. Pest Infestation from invasive species as a function of policy stringency



Integrating the scientific and economic input



Policies will determine the probability of a particular outcome

Measurement of economic impact combine with probabilities

Assessment of Impacts

Example of Economic Profile

Market Impacts

Non-Market Impacts

Direct Pest Effect

- Yield reduction
- Poor quality
- Control costs

- Urban mango trees affected

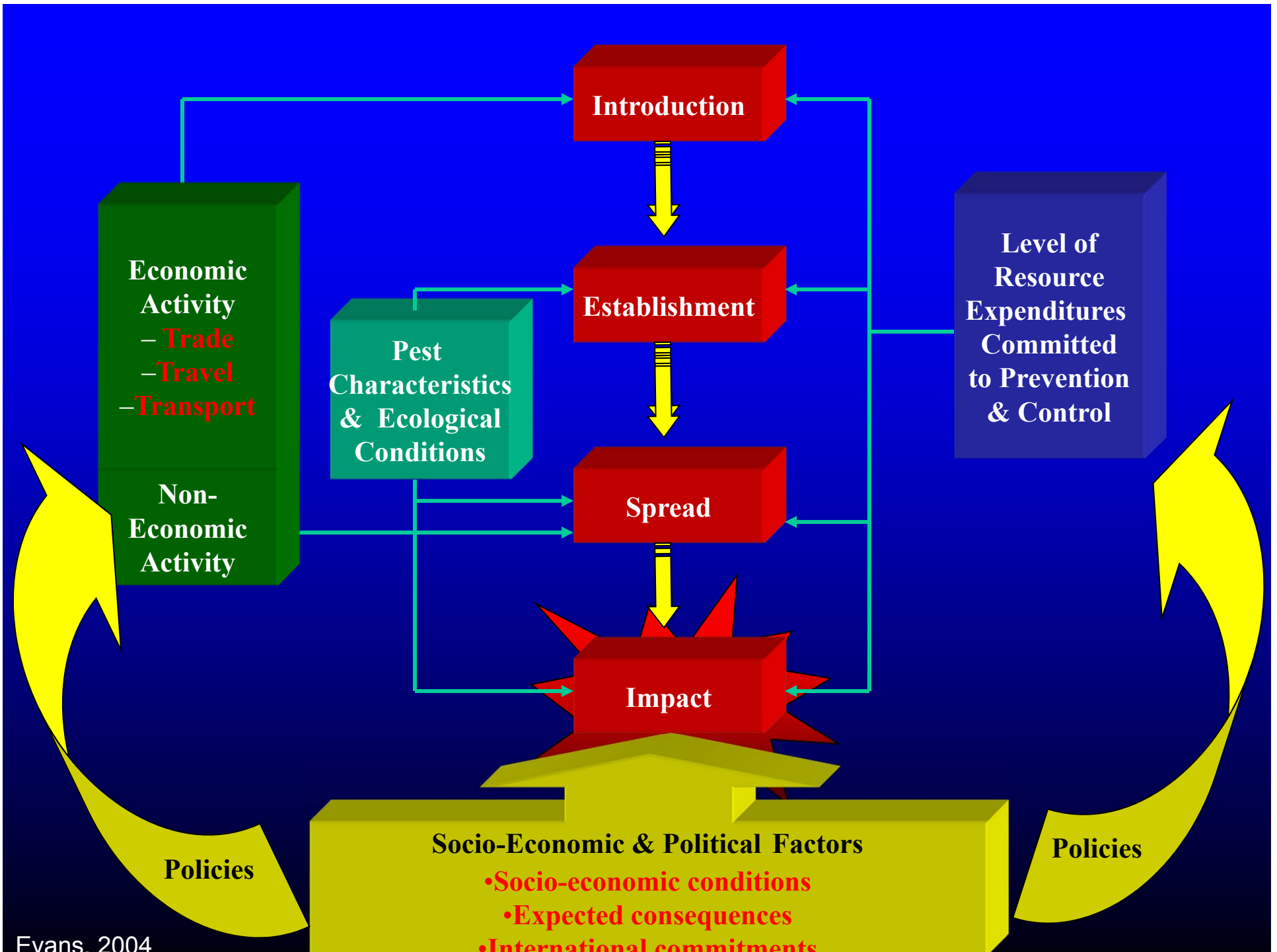
Indirect Pest Effect

- Trade effects
- Unemployment

- Political effects
- Legal battles with homeowners

Economic Dimension of the Invasive Species Problem

*Economic activity is a major
contributor to the problem of
invasive species*



What are the economic impacts of invasive species?



Courtesy C. Franqui

Types of Socio-Economic Impacts of Invasive Pests and Diseases

- Reduction in domestic food

supply or ability to se
and earn foreign exc

- Serious concern for
countries

- Difficult to assess because in most cases
impacts not fully understood

- Reduce productivity; loss of biodiversity;
disruption of environmental and ecological
service

quantities
supplied

ciated
es

ced

extent of c
and supply

- Could lose
in export m
premium as
disease-fre

Price &

- Measures to control, eradicate or
mitigate invasives have budgetary
implications; costs of production

- Include compliance costs, costs of
inspections, monitoring, prevention and
response

- Increased management costs; R& D;
costs associated with loss of efficiency

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Types of Socio-Economic Impacts of Invasive Pests and Diseases

Financial Costs

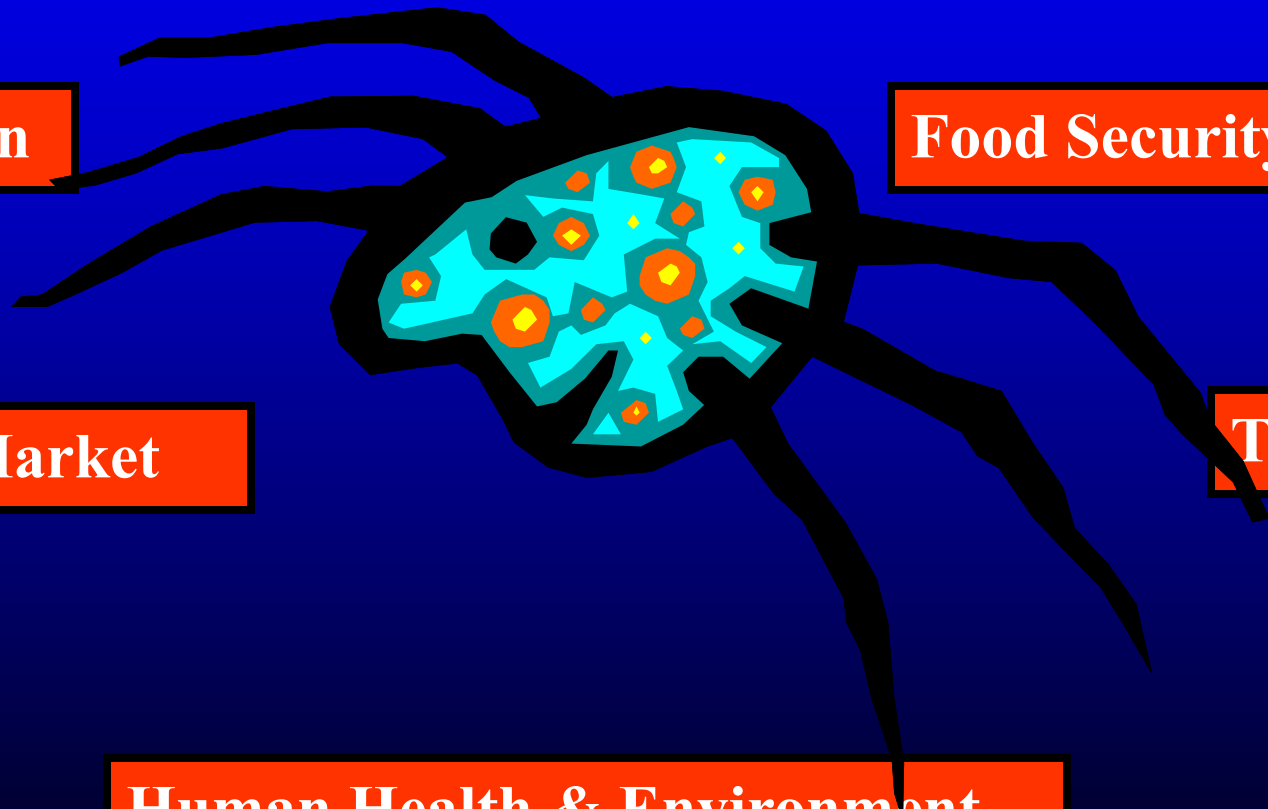
Production

Food Security

Price & Market

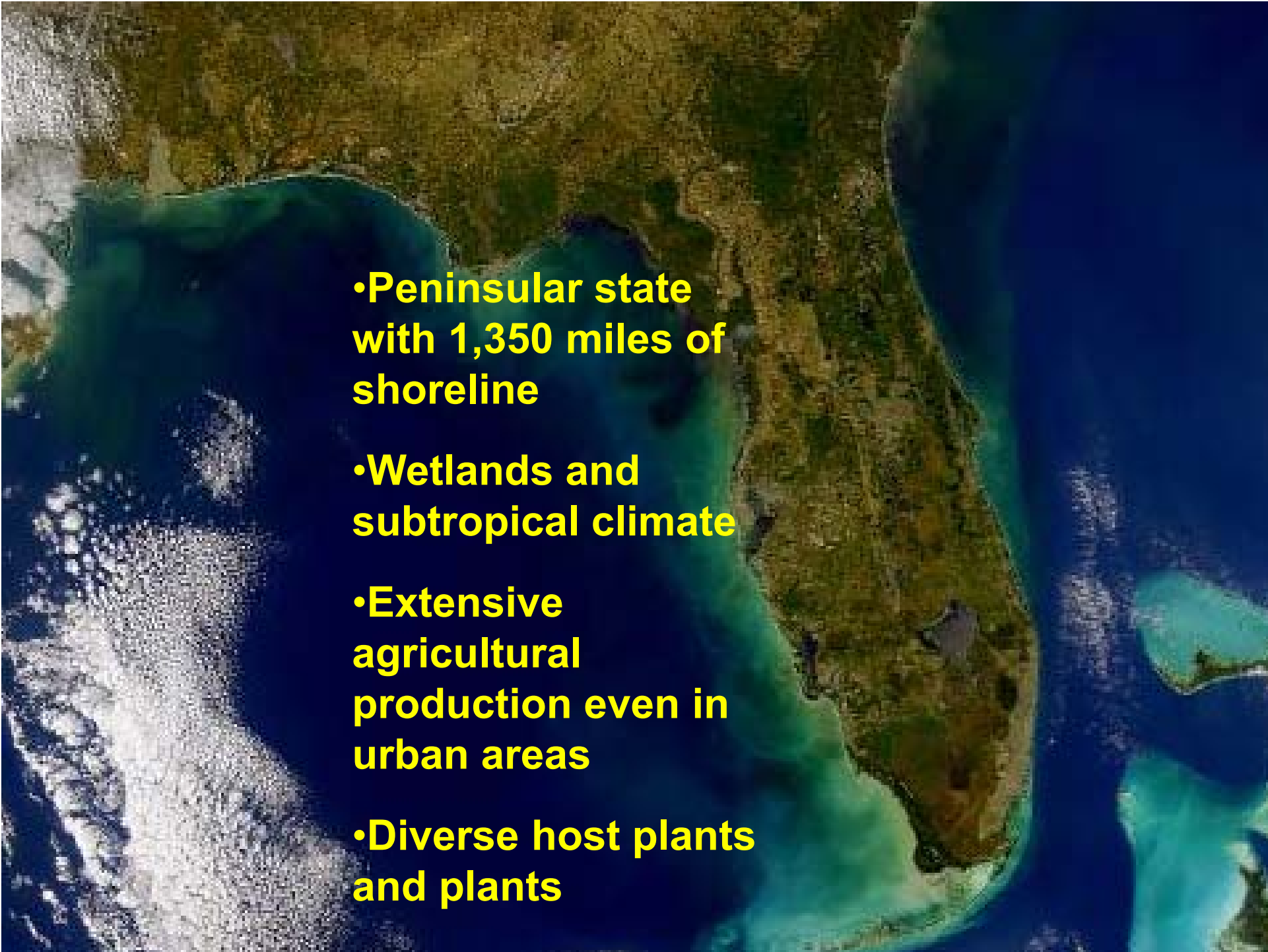
Trade

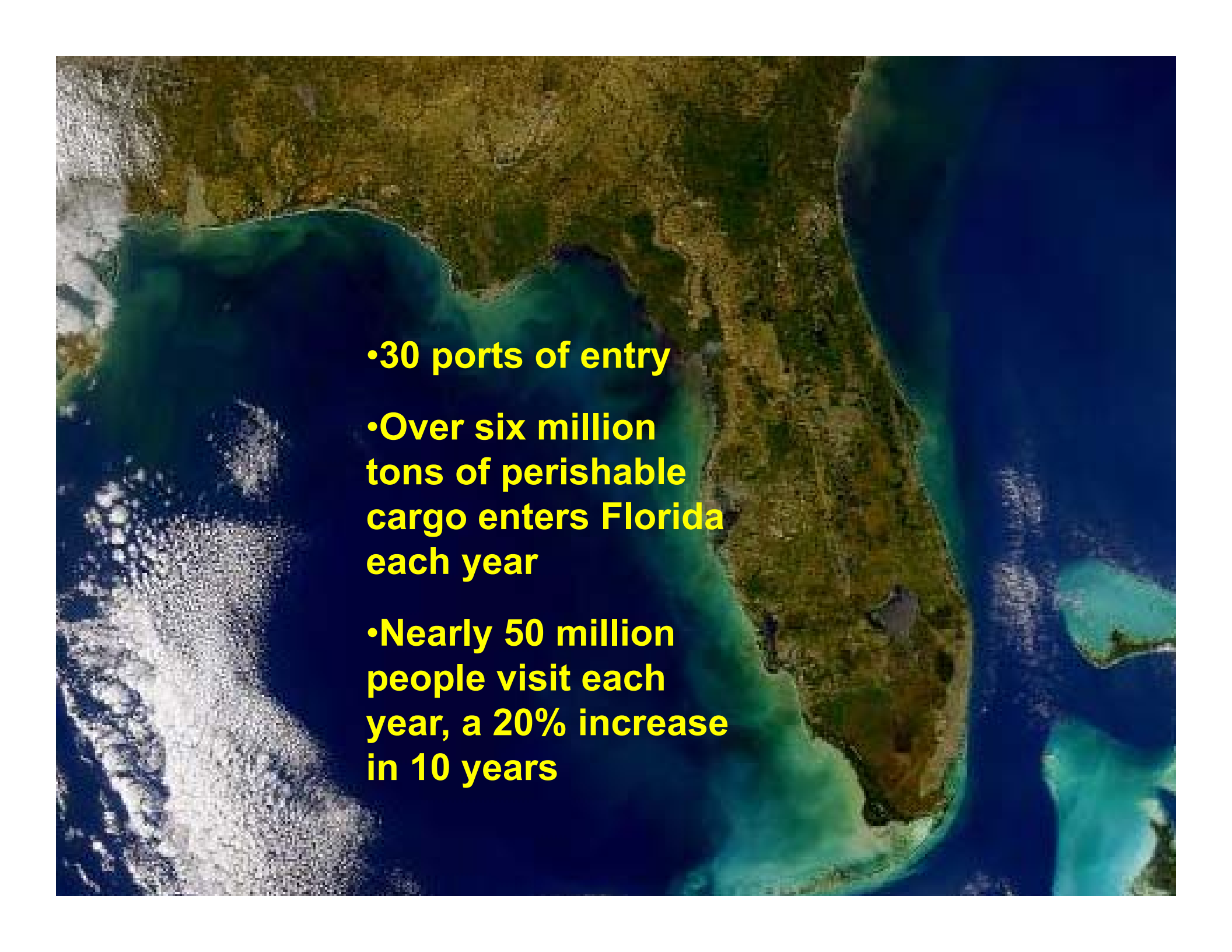
Human Health & Environment



Florida Economy and the Issue of Invasive Species

- Florida is the most vulnerable mainland state in the USA for invasive pest's introduction and establishment.

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- An aerial photograph of a coastal region, likely Florida, showing a large bay and surrounding land. The water is a mix of dark blue and light green, indicating varying depths and possibly mangroves. The land is a mix of green and brown, suggesting a mix of vegetation and urban areas. The text is overlaid on the image in yellow.
- **Peninsular state with 1,350 miles of shoreline**
 - **Wetlands and subtropical climate**
 - **Extensive agricultural production even in urban areas**
 - **Diverse host plants and plants**

- 
- An aerial photograph of the state of Florida, showing its coastline and surrounding waters. The text is overlaid on the central part of the state.
- **30 ports of entry**
 - **Over six million tons of perishable cargo enters Florida each year**
 - **Nearly 50 million people visit each year, a 20% increase in 10 years**

An aerial photograph of the Florida peninsula, showing the state's outline against the surrounding ocean. The water is a deep blue, and the land is a mix of green and brown. The text is overlaid on the left side of the image.

•Over 85% of plants imported to US go through Miami

•88% of US flower imports and

•55% of US Fruits and Vegetables

(Dixon,2008)

Florida Economy and the Issue of Invasive Species

- Florida is the most vulnerable mainland state in the USA for invasive pest's introduction and establishment.
- On average Florida receives one new pest every month
- Agricultural trade & pest interceptions at ports of entry have been doubling every 5-6 years.
- With increased trade liberalization and as east – west trade has increased many invasives now come from Asia.

Florida Agriculture

Invasive species represent a significant economic risk to both the financial viability of Florida's agricultural producers and the sustainability of the sector

Estimates of Control and Damage Costs in Florida Agriculture

Plant/Animal Pest/Disease	Ind. Control Cost/yr (\$'M)	Potential Sales Loss/yr (\$'M)
Citrus Canker & Citrus Greening	29	750
Thrips palmi	20	3.5
Brown Citrus Aphid	30	5.2
Citrus Leaf miner	32	5.5
Leatherleaf Fern Anthracnose	33	20.0
Others	27	727.8
Total	171	1,512

Estimates of Control and Damage Costs in Florida Agriculture*

Invasive Species	Ind. Control Cost/yr (\$'M)	Potential Sales Loss/yr (\$'M)
Weeds	101	558
Vertebrate (Feral Pigs)	100	-
Insects and Mites	126	328
Plant Pathogens	13	533
Microbes and Parasites	n/a	224
Total	340	1,643

* Compiled by author based on information obtained from Pimentel, 2005

Estimated Economic Impacts of Crop and Livestock Losses from Selected Invasive Species

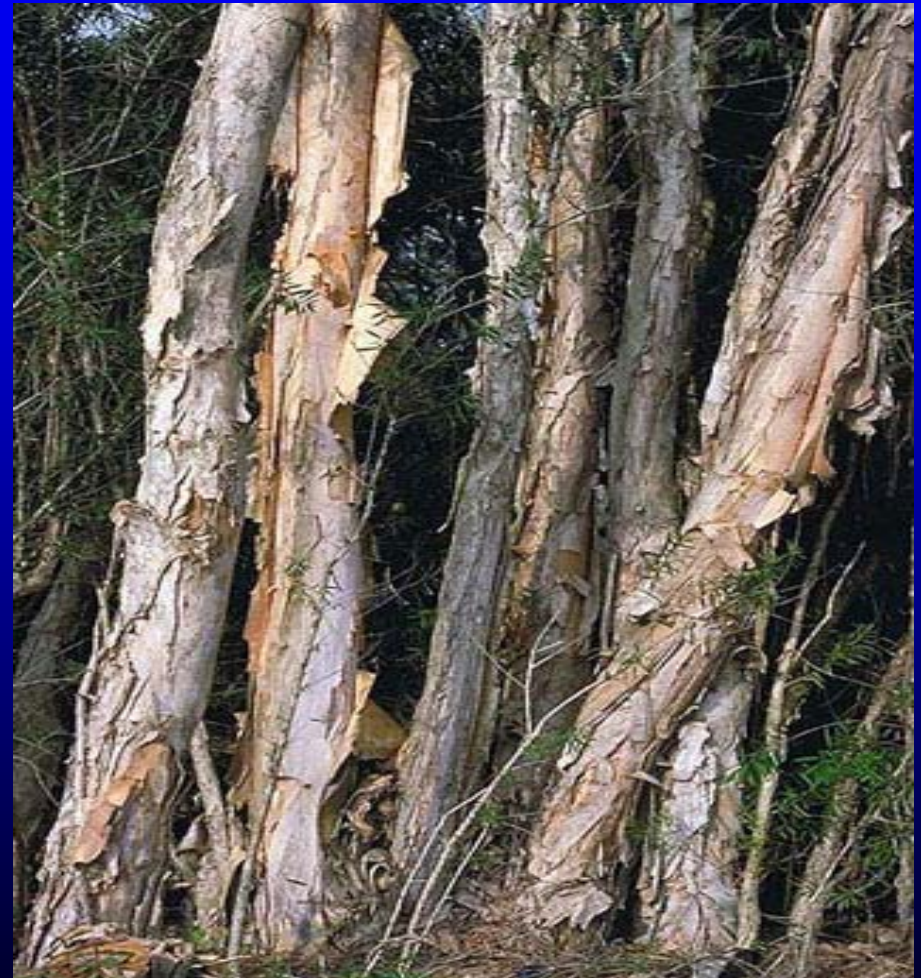
Key Indicator	Unit	Impact			Total
		Direct	Indirect	Induced	
Sales/Output	\$'M	1,643			
Value Added	\$'M				
Labor Income	\$'M				
Indirect Business Tax	\$'M				
Employment	Jobs				

Estimated Economic Impacts of Crop and Livestock Losses from selected Invasive Species

Key Indicator	Unit	Impact			Total
		Direct	Indirect	Induced	
Sales/Output	\$'M	1,643	474	1,840	3,957
Value Added	\$'M	1,061	263	1,130	2,453
Labor Income	\$'M	481	195	778	1,454
Indirect Business Tax	\$'M	59	24	85	168
Employment	Jobs	18,345	9,189	20,925	48,458

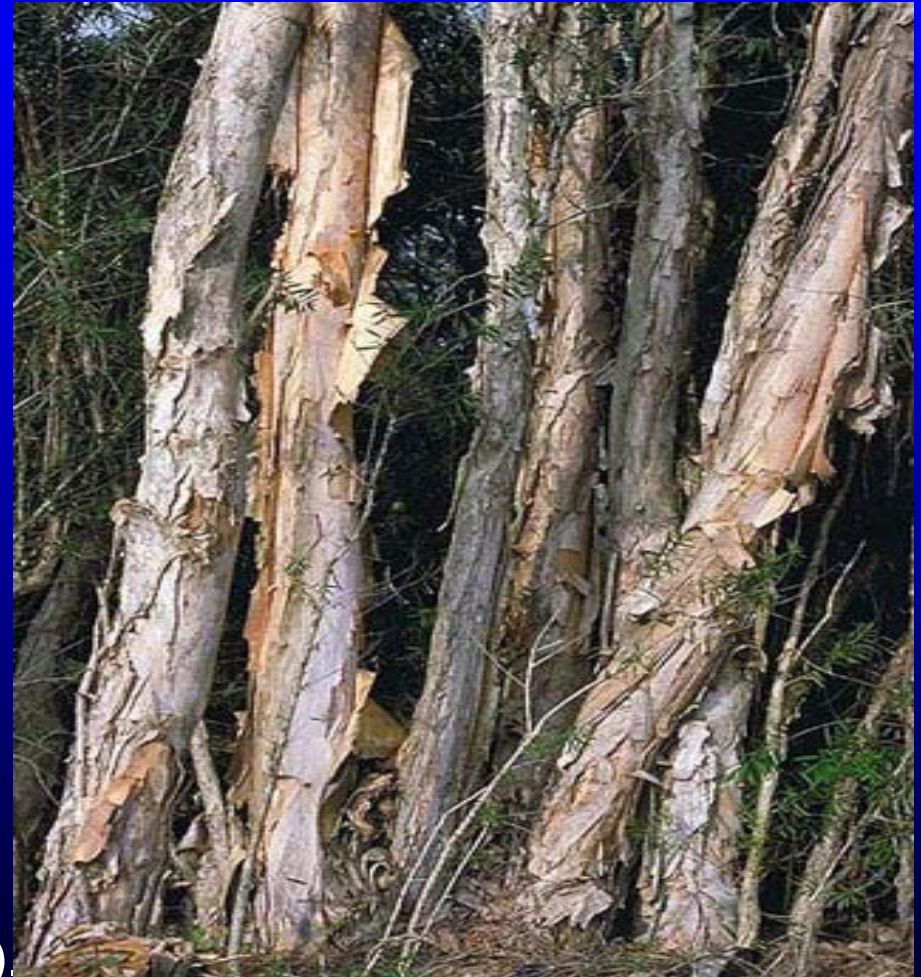
Melaleuca in Florida

- Occupies about 500,000 acres in South Florida.
- Florida agencies have spent an estimated \$25 million on its control during past decade (Pratt and Ferriter, 2001).
- Approximately 100,000 acres of natural area have been cleared of *Melaleuca* (Laroche, 1999).
- Poses a threat to economically viable uplands and ecologically sensitive wetlands.



Melaleuca in Florida

- A benefit-cost analysis of *Melaleuca* control programs in 2003 estimated total social benefits of \$23 million and total costs of \$13 million, indicating a very strong benefit-cost ratio (1.76), which justifies continued public support or expansion of funding for control programs (full report of the *Socioeconomic Impacts of Melaleuca Control in Florida* by Hodges and Evans is available online at <http://www.economicimpact.ifas.ufl.edu/publications/Melaleuca%20socioeconomics%202007.pdf>)

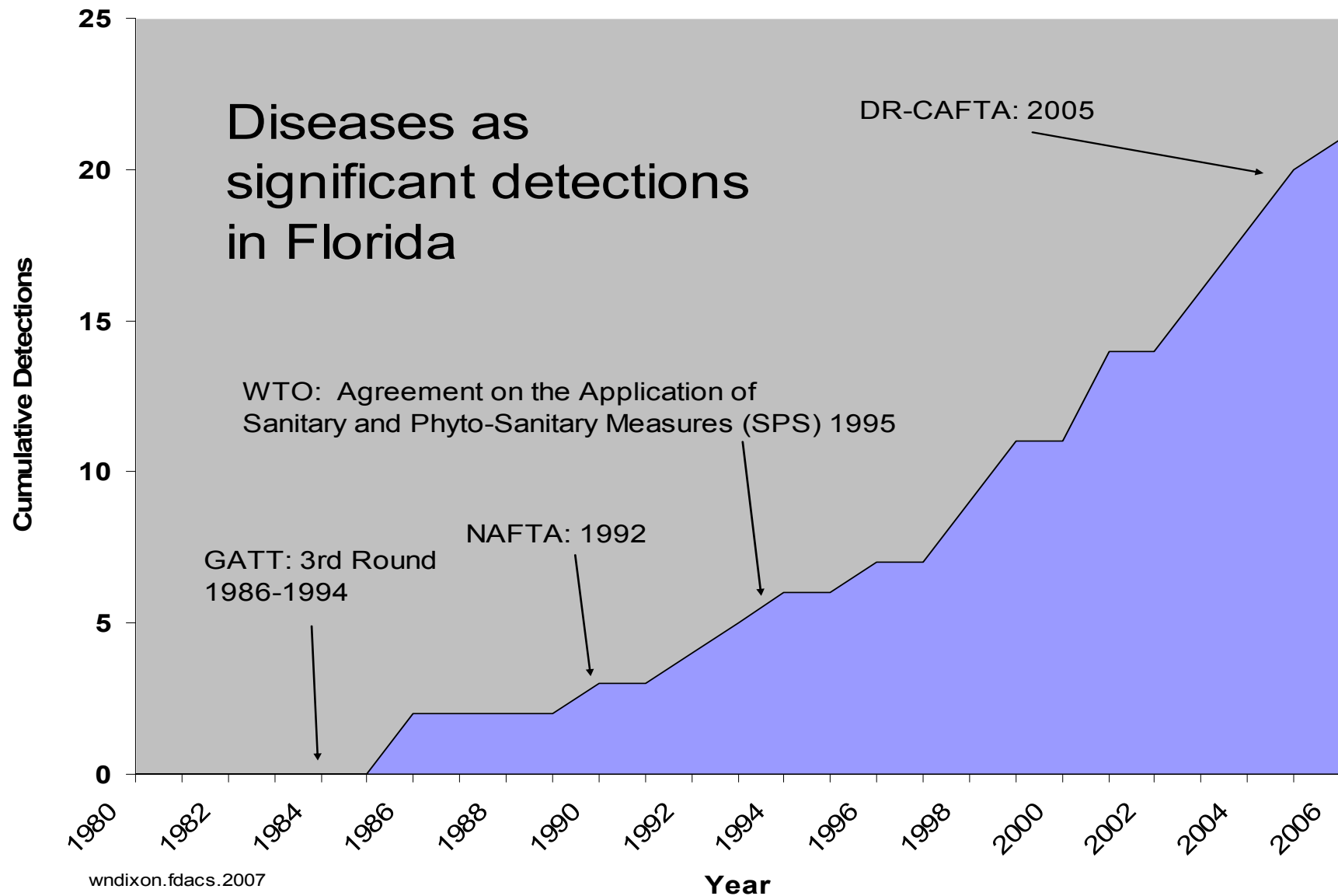


Concluding Remarks

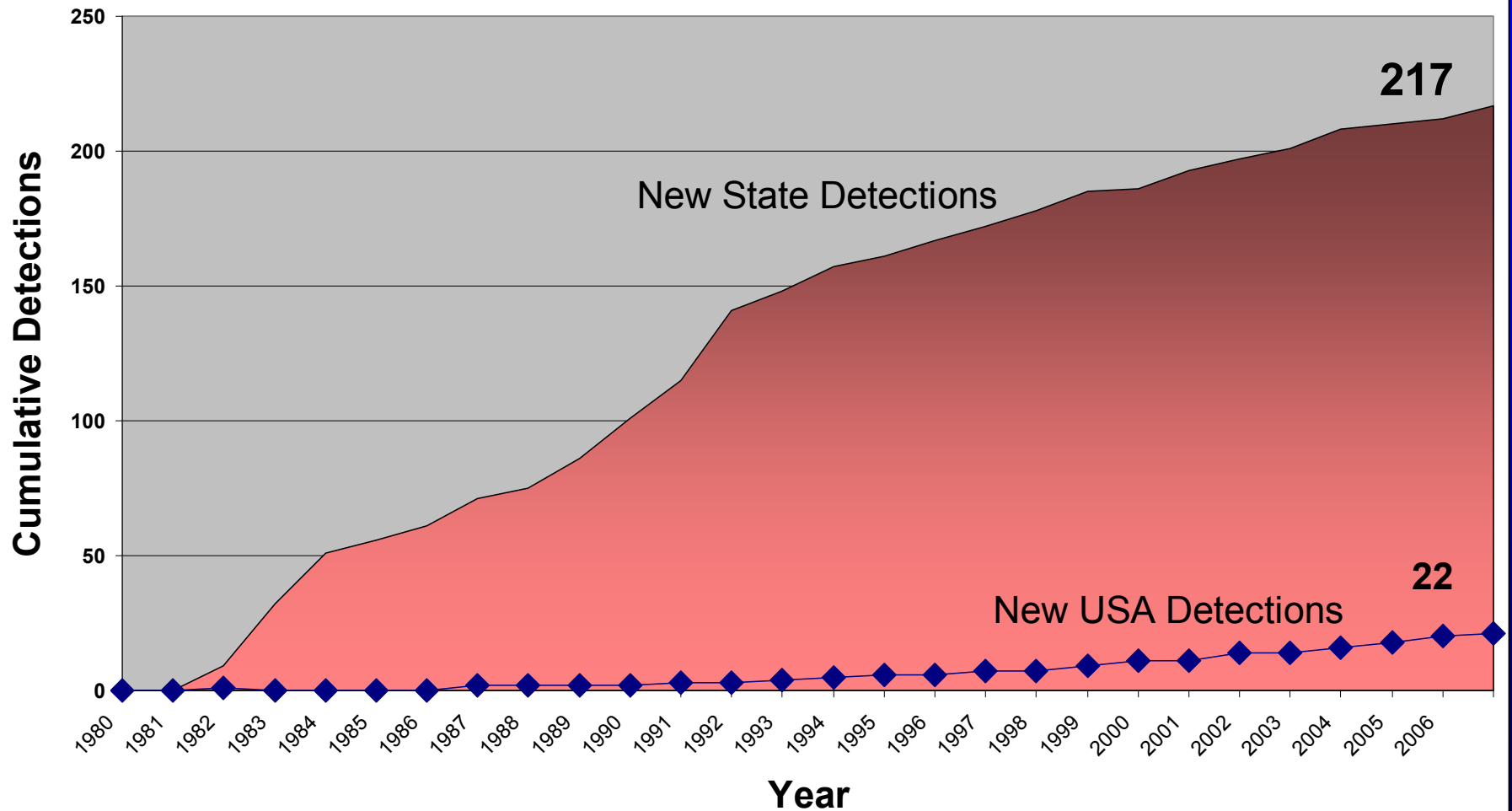
- **Invasive species affect all aspects of our lives;**
- **Florida is being over-run by an army of invasive alien species**
- **Sufficient resources are not available**
- **When the evidence of impacts can be quantified and communicated reliably a wide range of constituencies can be motivated to support an effective response.**

Thanks

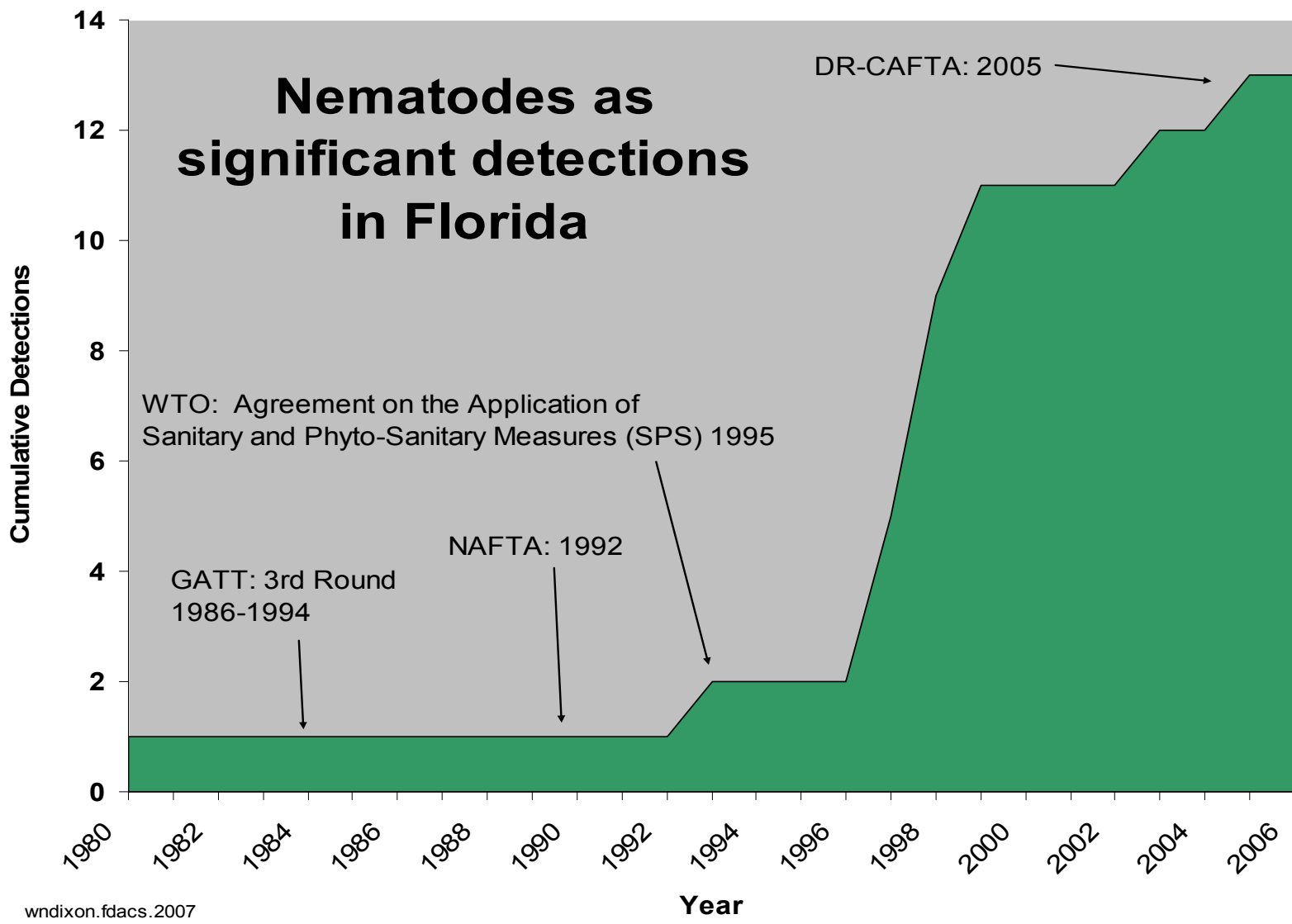
Diseases as significant detections in Florida



Pathogens Diagnosed as New State or USA+ Detections (239)

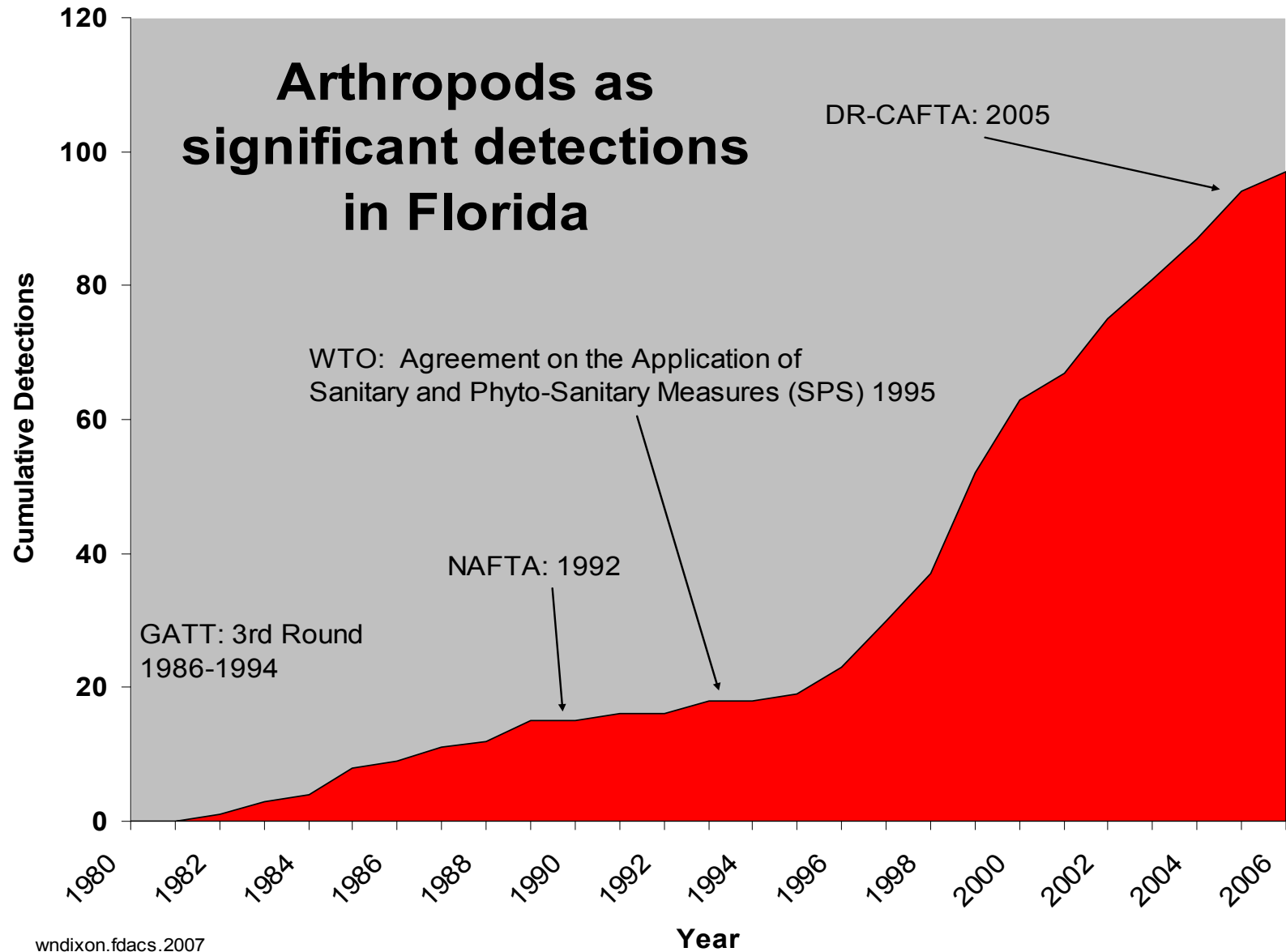


Nematodes as significant detections in Florida



wndixon.fdacs.2007

Arthropods as significant detections in Florida



Arthropods Identified as New State or USA+ Detections (246)

