Factors Affecting Human Responses to Exotic and Invasive Species

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Purpose of Talk

- Developing effective strategies for management of invasive species is dependent in part on how the public will respond
- By understanding the type and importance of various factors, managers may be able to choose or fine tune strategies
- Preliminary list with examples based on previous research, case studies, anecdotes

Examples

- Alewives in Great Lakes
- Zebra Mussels in Great Lakes
- Introduced trout and salmon
- Milfoil & other aquatic weeds
- Government (“friendly”) flies
- Gypsy moth NE vs Midwest
- ALB, EAB
- Purple loosestrife in wetlands
- Buckthorn in Chicago prairies
- Black cherry in Chicago prairies
- Feral cats in WI
- Feral pigs in Hawaii, etc.
- Red foxes in SF
- Eucalyptus in SF
- Wild horses & burros in W US
- Grey squirrels in Europe
- Geese in urban areas
- Pigeons in urban areas
- Monk parakeets in Midwest
- Rats everywhere
- Cockroaches everywhere

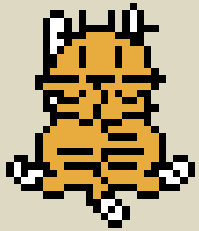
$$R = \sum C_i S_i \left(\frac{V}{T+I} \right) - M$$

(WARNING: a first approximation!)

- R = response to the exotic/invasive species
- V= value of the exotic/invasive
- T= threat
- I= impact or value of the exotic/invasive on the species/ecosystem/object of concern
- M= impact of management control mechanisms
- C= context
- S= stakeholder group factors

Value (of the species of concern)

- Charismatic-aesthetic-recreational
- Utilitarian-economic-cultural
- Alternative ecologies (e.g., non-native trees filter air pollutants and offer shade-cooling)



A cartoon that ran in a Chicago-area paper in November, 1996, indicates the intensity of controversy surrounding restoration programs. *Drawing by Jim Jordan/Press Publications, Elmhurst, IL*

Threat

- Familiarity (length of establishment, degree of exoticness, fear factor)
- Spatial/temporal factors-- Proximity of Threat/Rate of spread and distribution

http://www.fs.fed.us/ne/morgantown/4557/gmoth/atlas/#spread

Impact (value of human and ecological factors affected by species of concern)

- Personal
- Social
- Economic
- Ecological

Table 1
Estimated annual costs associated with some alien species introduction in the United States (see text for details and sources) (×millions of dollars)

Category	Nonindigenous species	Losses and damages	Control costs	Total
Total				
PLANTS	25,000			
Purple loosestrife		–	–	45
Aquatic weeds		10	100	110
Mealeuca tree		NA	3–6	3–6
Crop weeds		24,000	3000	27,000
Weeds in pastures		1000	5000	6000
Weeds in lawns, gardens, golf courses		NA	1500	1500

Pimentel et al., 2004

Management Factors (Costs and Benefits of intervention)

- Impact of control mechanism (personal, social, ecological, ethical)
- Probability of success of control mechanism (limited – complete eradication)
- Duration of control mechanism (short term, cyclic, perpetual)
- $$ cost and who pays for it

Context

- Physical setting—site and adjacent areas
- Remoteness (urban to wilderness)
- Previous site disturbance(s)

Individual and Stakeholder Group Factors

- Social context
- Stakeholder centrality (e.g., income/recreation dependent, NIMBY)
- Education
- Urban-rural residence
- Ideas of nature
- Degree of consensus/divergence in perceptions

Example 1: Feral cats in WI

- High charismatic value to many people
- Threat low; impact acknowledged but disputed
- Shooting as a mgmt strategy highly contentious
- %hunters who favor shooting outweighed by % general public opposition
- Significant urban-rural split

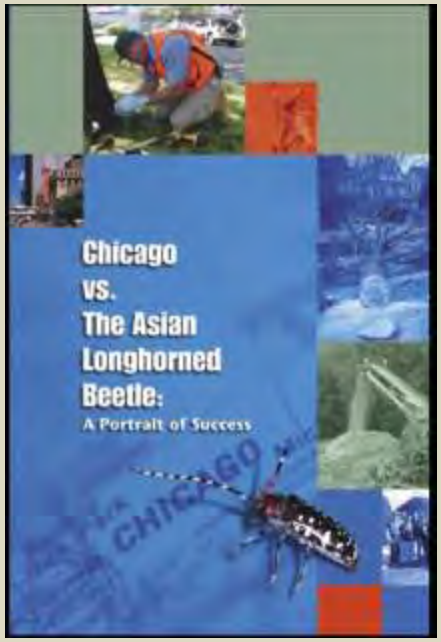
62. Do you favor the DNR take steps to define free roaming feral domestic cats… as an unprotected species?

Voters approve "Kitty-Kitty Bang-Bang" Proposal

NC--People all over the US should boycot Wisconsin. Stop buying cheese and stop supporting the Packers.
TX--Face the reality Wisconsin. Cats are part of a world we all share and deserve a chance to survive. Only cowards and ill-behaved children target the defenseless. For shame!
CA-- Obviously Wisconsin is slipping back into it's 19th century yahoo, redneck history. There are plenty of modern, humane ways to control the population of feral cats. What a laughingstock they are.
WI--I am embarrased and ashamed to admit that I am a Wisconsonite.

Example 2: ALB in Chicago

- ALB low value
- High threat and impact--many trees in neighborhood, city and beyond
- Management impacts of removal severe; injection labor intensive
- Urban context of complete removal is severe; stakeholders homogeneous
- Generalizability to EAB? Other insects and diseases?



It was a cold February morn I had to see it;
I bundled up and went out.
It looked like snow falling down;
it was the limbs of the trees I grew up with,
falling to the ground…

Conclusions

- Public response to invasives based on a complex number of factors and relationships
- Even if a species has little perceived value, management impacts can be contentious
- Use preliminary list of factors to think about approaches, communications
- Please send feedback on factors, esp. the math part (see handout)