Cost-effective Management of Aquatic Invasive Species in the Pacific Northwest: The Case of New Zealand Mudsnaills

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Introduction

Invasive Species (IS) Are
- Introduced species that cause or may cause economic, environmental, or human health damages
- e.g., New Zealand mudsnails (NZMS): high-speed dispersal, potential impacts on other invertebrates and nutrient levels in water, probable influence on primary producers, and effects on prey and predator relationship (USGS)
- Risk of Invasive Species Introduction: unintentional transportation by humans is a key IS vector
- Risk of Invasive Species Establishment: IS may successfully establish in a recipient region, or may fail to establish based on environmental and biological factors
- Maximum entropy method (habitat suitability)
- The Relative Risk of Biological Invasion

Spatial Bioinvasion Risk
- The normalized bats movement from the habitat model
- The normalized bats movement from the marine environment model
- The normalized bats movement from the maximum entropy method

Invasive Species Damages
- Potential damages include recreational utility loss due to biodiversity loss, boat maintenance, and loss of hydroelectricity power generation and drinking water treatment

Total Cost Minimization
- Trade-off between Damages & Management Costs
- IS Total cost = IS Damages + IS Management Costs
- The Representative Resource Manager’s Objective fn. T

Ultimate Goal: Minimize Total Cost

Cost-Efficient Management in Oregon
- Angler Decontamination
- Hatchery Prevention
- Hydroelectricity/Prevention
- Angler Decontamination

Assumptions about Management
- Effectiveness
  - Prevention => EDRR + other management
  - Boater decontamination => Hatchery prevention + angler prevention

References

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- Oregon State University