Invasive/Nuisance Pest & Pathogen Removal

A DOI Nature-Based Solutions Roadmap Fact Sheet

Invasive or nuisance pests are species that cause harm to humans or the environment.[1] Invasive species are non-native; nuisance species may be native or non-native. This fact sheet focuses on invasive and nuisance insects and pathogens (bacteria, fungi, and viruses). Invasive pathogens are a significant cause of death for trees in the U.S., while invasive insect incursions are low-probability but high-consequence events that can cause ecological, economic, and aesthetic destruction.[2-3] Management starts with prevention and early detection; complete eradication is rare, so long-term treatment and monitoring are often required.[4]

TECHNICAL APPROACH

Integrated pest management, the primary approach to pest management using environmentally sound methods[5], focuses on nonchemical treatments first but uses chemical control as a last resort:

- Prevent spread into new areas by blocking access or limiting food, water, or shelter sources.[5]
- Monitor so early invasions can be detected and responded to rapidly. Newly invaded areas are frequently quarantined to prevent further spread.[6]
- Eradicate pests from an area via mechanical removal[5] (including removing infected host trees)[7], biological control (using native predators), or chemical controls (pesticide use is only recommended when absolutely necessary).[5]
- Continue to monitor affected areas and apply follow-up treatment as needed.

BENEFITS

Climate Threat Reduction

- Carbon storage and sequestration

Social and Economic

- Agriculture and timber yields
- Cultural values
- Food security
- Jobs

Ecological

- Enhanced biodiversity

Hanging a spruce budworm trap in Alaska. Photo credit: Garret Dubois / USDA Forest Service.

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SITE SUITABILITY FACTORS

- ✓ Terrestrial habitats, especially in crop- or timber-producing areas
- ✓ Sites with newly established invasive or nuisance pests or pathogens
- ✓ Sites particularly vulnerable to invasive species, such as protected areas
- ✓ High likelihood of invasion
- ✓ Sites affected by especially destructive invasive species
- ✘ Lack of resources for long-term management

EXAMPLE PROJECT

The City of Chicago, working with the Illinois Department of Agriculture, successfully eradicated the Asian longhorned beetle in the early 2000s. This effort involved chemical and mechanical treatments, removing affected trees, quarantines, and public outreach to reduce spread.[8] Chicago learned from New York City's earlier efforts to address this pest.

Asian longhorned beetle exit holes on an infested tree. Photo credit: Julie Twardowski / USDA.

KEY RESOURCES

Title and Link	Site Suitability	Design and Construction	Monitoring Guidance	Example Projects
Safeguarding America's Lands and Waters from Invasive Species (DOI)	✓	✓	✓	✓
A Land Manager's Guide to BMPs to Prevent the Introduction and Spread of Invasive Species (University of Georgia)	✓	✓	✓	✓

LEARN MORE

Visit the DOI Nature-Based Solutions Roadmap for more information on invasive and nuisance pest and pathogen removal, other nature-based solutions, and principles and considerations broadly relevant for nature-based solutions projects. The pest and pathogen removal summary includes additional details on each section included in this fact sheet, plus information on operations and maintenance, common barriers, and more resources and example projects.

Explore the Roadmap

Full Roadmap Document

Invasive and Nuisance Pest and Pathogen Removal Section

www.nicholasinstitute.duke.edu/roadmap

REFERENCES

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