Collaboratively Managing SOD using Tangible Geospatial Modeling

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Center for Geospatial Analytics
6th Sudden Oak Death Science Symposium
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More Data & Better Models than Ever!

LiDAR data

WebGIS & Citizen Science

Dynamic spatiotemporal modeling

How do we use this information to make a difference?

Center for Geospatial Analytics
Obstacles to Management

Detection & control...

& uniting stakeholders on a strategy...
Obstacles to Management

Complexity arises from multiple stakeholder attitudes on calls to action (or not!)
Time to Action Counts...

Modeling when, where, and how to manage a forest epidemic, motivated by sudden oak death in California

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Sudden oak death, caused by Phytophthora ramorum, has killed millions of oak and tanoak in California since its first detection in 2000. Eradicating the disease is now impossible, and the question of how to best manage the disease is no

Eradication of disease is no longer possible...
Participatory Modeling

An approach that can involve all stakeholders in finding solutions
Geospatial Participatory Modeling

Using dynamic, adaptive models: stakeholders can visualize and explore the geographical dimensions of PLACE, SPATIAL INTERACTION, and SCALE through all steps of the research process.
The Vision

**Tangible exploration** of management scenarios and tradeoffs with place- and time-dependent feedbacks
The Vision

Tangible exploration of management scenarios and tradeoffs with place- and time-dependent feedbacks
Tangible Landscape

Bridging the digital and physical worlds
Then, stakeholders can interact with the dynamic model to know when, where, and how to collectively manage spread...

Modeling SOD transmission in a real landscape, accounting for:
- host density & susceptibility
- weather
- dispersal of the pathogen
- time and space

(Meentemeyer et al. 2011. Ecosphere)
Tangible Landscape

Sonoma County

Information Layers

3D Physical Model

1 m = 10 km

NC STATE UNIVERSITY

Center for Geospatial Analytics
# Tangible Landscape: a serious game

## Players

<table>
<thead>
<tr>
<th>Role</th>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAND OWNER</td>
<td>• Concern = personal property</td>
</tr>
<tr>
<td>STATE PARK MANAGER</td>
<td>• Concern = forest health and public safety in state parks</td>
</tr>
<tr>
<td>CONSERVATIONIST</td>
<td>• Concern = saving old growth oaks, regardless of location</td>
</tr>
</tbody>
</table>

## Rules

- Intervention = culling bay laurel
- Cull up to 62 hectares
- 10-year outlooks
- Decide where culling should happen individually, then work together!

## Objectives

- Maximize # of oaks saved
- Minimize cost (total & cost/oak saved)
Tangible Landscape: a serious game

https://www.youtube.com/watch?v=dnOhOFHakEU
Tangible Landscape: a serious game

Did it work?

• Collaboration produced collective outcomes exceeding individual performances

• Players made trade-offs to maximize oaks and money saved

A shared, interactive environment for visualizing disease spread… with realistic

PLACE | SPATIAL INTERACTION | SCALE
Tangible Landscape Makes It REAL

• Connects stakeholders to a place they know and care about
  Making it spatial...makes it personal

• Enables quick envisioning of “what-if” scenarios in a shared environment

What happens here...affects there

Sparks co-learning and co-management among stakeholders
Future Directions

From building models to building consensus

SOD at the Oregon – California border

- develop models for new spatial extent
- conduct workshops with local stakeholders, using **Tangible Landscape** as a collaborative tool
Thank You!

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