The LAndscape Management Policy Simulator (LAMPS)

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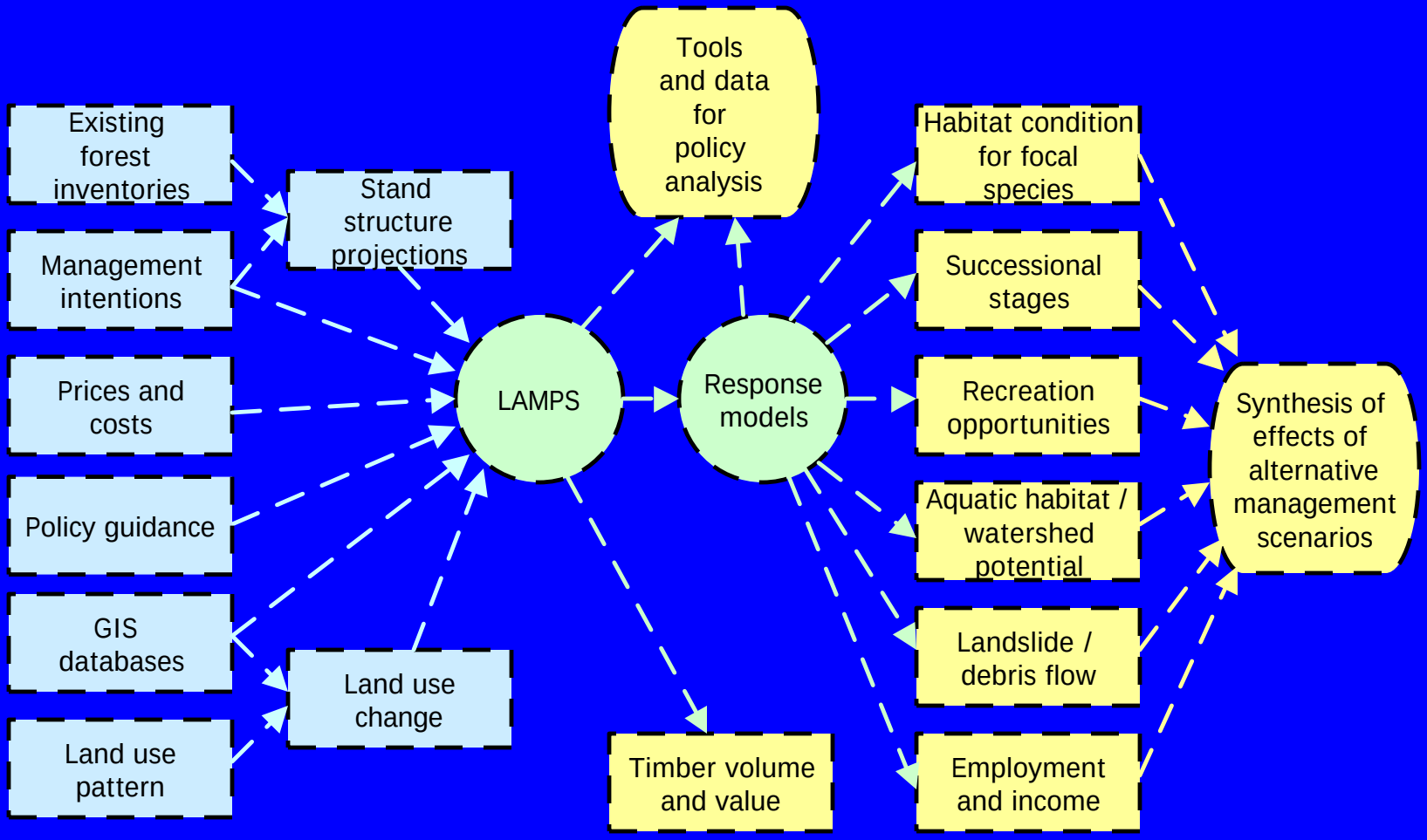
CLAMS

Landscape Planning and Analysis Process



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Forest policies influencing land management

Ownership	Policy	Goals	Strategies
Forest Service / Bureau of Land Management	Northwest Forest Plan; Individual Forest Plans	Late-successional / old-growth forest conditions; T&E species; aquatic systems; commodity production	Reserves; Matrix; Green tree retention; Adaptive management areas
State	State Forest Plans	Healthy forests; Commodity production; T&E species	Structure-based management; Habitat Conservation Plan
Industry / Non-Industrial Private	Organizational Policies; State Forest Practices Act	Commodity production; Protect environment and fish / wildlife habitat	Retain trees in clearcuts; Streamside protection rules

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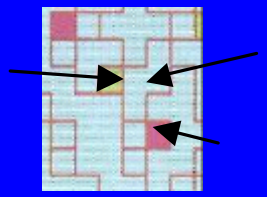
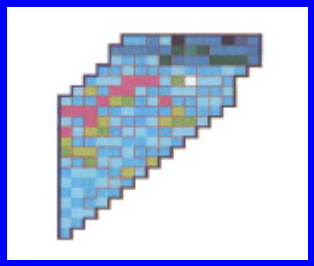
Spatial units recognized

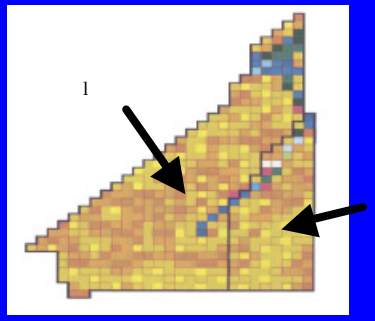
BSUs



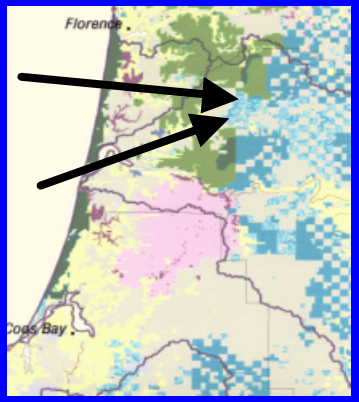
Parcels



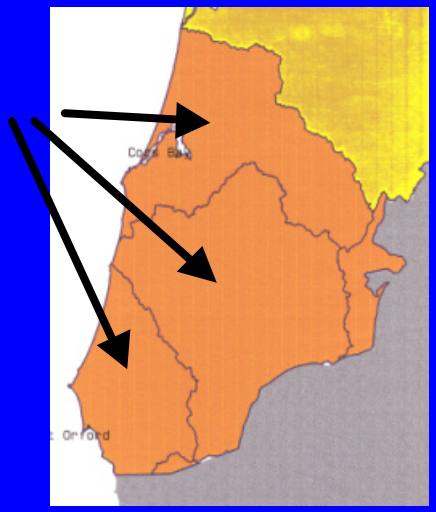
Harvest Blocks



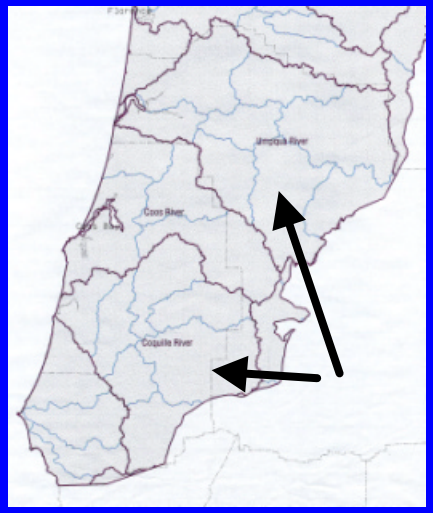
Land Allocations



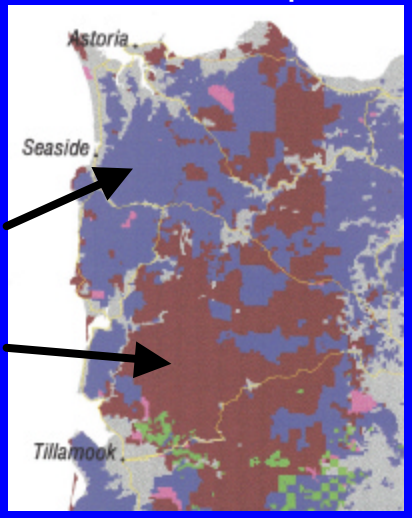
4th Field Watersheds



5th Field Watersheds



Land Ownerships



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Management intentions (what landowners intend to do)

Need to make assumptions for each landowner group:

Federal, State, Forest Industry, Non-Industrial Private

Key assumptions:

- Timing and intensity of treatments
- Minimum clearcut harvest ages
- Spatial considerations:
  - green-up
  - blocking of management units for treatment
- Regeneration stand management intensity

How do we arrive at the assumptions?

- Landowner surveys conducted by the Oregon Department of Forestry
- Numerous meetings with landowners and land managers
- Research

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Policy guidance (what landowners have to do)

Need to make assumptions for each landowner group:

Federal, State, Forest Industry, Non-Industrial Private

Key policies:

- Riparian management
- Leave trees (clumps)
- Owl reserves
- Interior habitat areas
- Structure-based management

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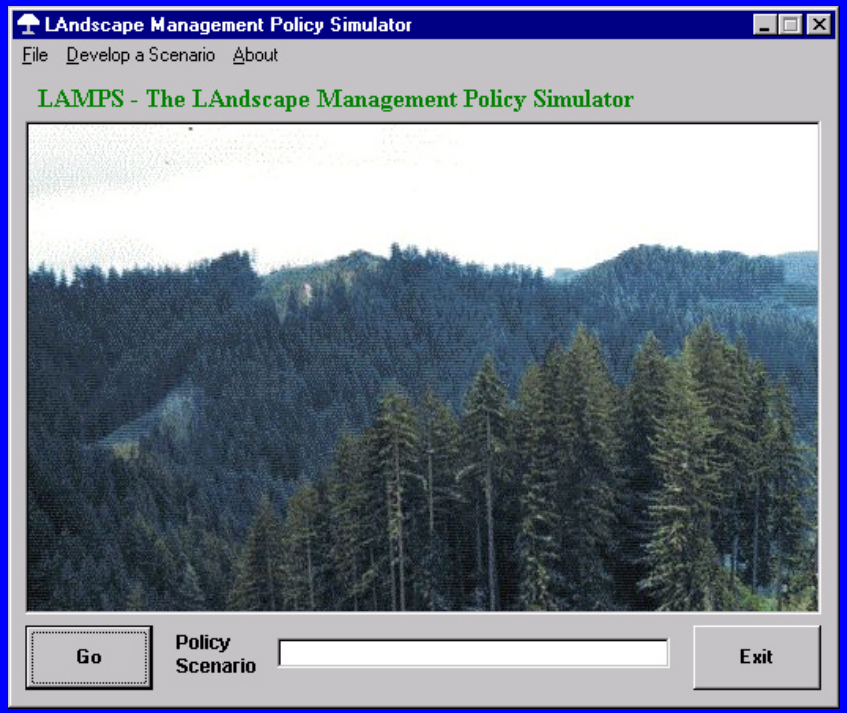
LAndscape Management Policy Simulator

- What is it?
- Principal Developers
- Simulation Notes
- Software
- Management Options
- Spatial Considerations
- Riparian Management Choices
- Leave Tree Strategies
- Transition Probabilities
- Stochastic Events
- Simulation Results



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What is it ?

A simulation model that seeks to emulate management behavior of four landowner groups: federal, state, forest industry, non-industrial private.

A model that allows an evaluation of forest policies across a large area, and over a long time frame.

A model that merges strategic and tactical planning considerations so that processes at a variety of spatial and temporal scales can be represented, and to facilitate an analysis of biological effects at a scale appropriate for the species / function being considered.

A Model I formulation of forest management behavior that seeks to represent some “aspiration” of a group of landowners.

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Principal Developers

Pacific NW Research Station

Thomas Spies

Oregon State University

Pete Bettinger

K. Norman Johnson

Marie Lennette

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Simulation Notes

Projections are for 100 years, with 5-year time steps.

All ownerships must be classified as either federal, state, forest industry, or non-industrial private.

Classification of owners and owner policies is flexible.

Maximum area simulated: Depends on computer's RAM

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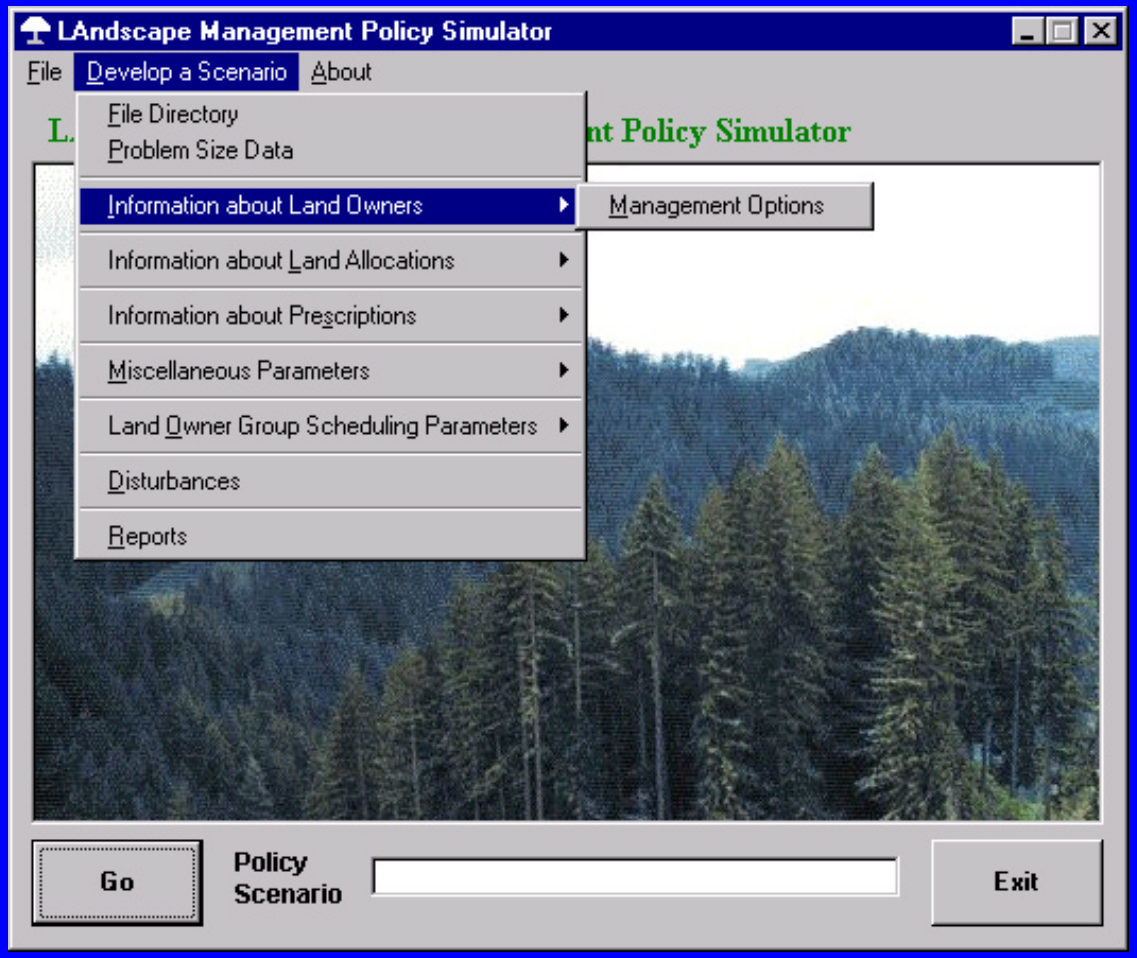
Software

User Interface: Visual Basic



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Management Options

"Federal" scheduling process

Monte Carlo approach to scheduling clearcuts.

Constraints:

A maximum percentage of "matrix" land area can be clearcut in any one 5-year time period.

A minimum amount of "older forest" within a watershed must be present before any clearcuts can be scheduled in that watershed.

Can set a target (upper bound) number of acres to be clearcut or thinned in each time period.

Can set a target (upper bound) amount of volume to be harvested in each time period.

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Management Options

"State" scheduling process

Monte Carlo approach to scheduling clearcuts.

Objective is measured by the achievement of maximum even-flow of timber harvest volume, using binary search.

Constraints:

Achievement of structural conditions by State management District.

Maintain a distribution of sizes of Interior Habitat Area (IHA) patches (essentially older forest conditions spatially connected).

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Management Options

"Forest Industry" scheduling process

Value maximization approach to scheduling clearcuts.

Objective can be measured by the achievement of maximum even-flow of timber harvest volume, using binary search. Alternatively, target harvest levels can be set by the user as goals to achieve.

Constraints:

Attempt to emulate a historical clearcut size distribution by "blocking" management units together for harvest using a dynamic process (block patterns are not fixed).

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Management Options

"Non-Industrial Private" scheduling process

Harvest probability approach to scheduling clearcuts.

No clear objective function to maximize, although target harvest levels can be set by the user as goals to achieve.

Constraints:

Attempt to emulate a historical clearcut size distribution.

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Spatial Considerations

- Adjacency relationships among clearcut harvests
- Clearcut size distributions
- Owl habitat areas
- Interior Habitat Areas
- Federal watershed conditions
- State District forest structure conditions

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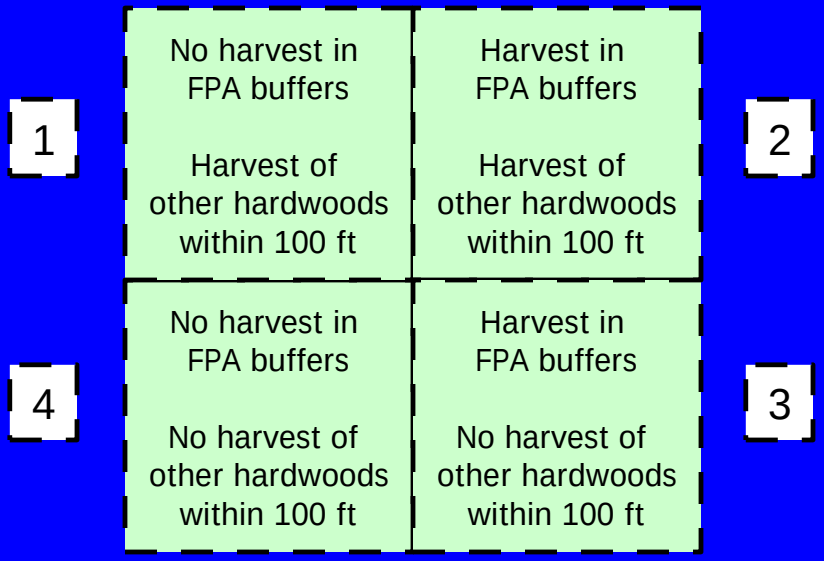
Riparian Management Choices

1) No harvest within Oregon Forest Practices Act buffers.
2) Allow partial cutting within Oregon Forest Practices Act buffers, to the extent allowed by the Act.
3) Choice #2, yet no harvest of hardwoods within 100 feet of a stream.
4) Choice #1, and no harvest of hardwoods within 100 feet of a stream.



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Leave Tree Strategies

1) Leave Oregon Forest Practices Act minimums (2 small TPA).
2) Leave 2 large TPA.
3) Leave 5 TPA, according to State Forest Plan guidelines.
4) Leave 14 TPA according to State Forest Plan guidelines.
5) Leave clumps of trees (BSUs, as a percentage of land area) uncut.

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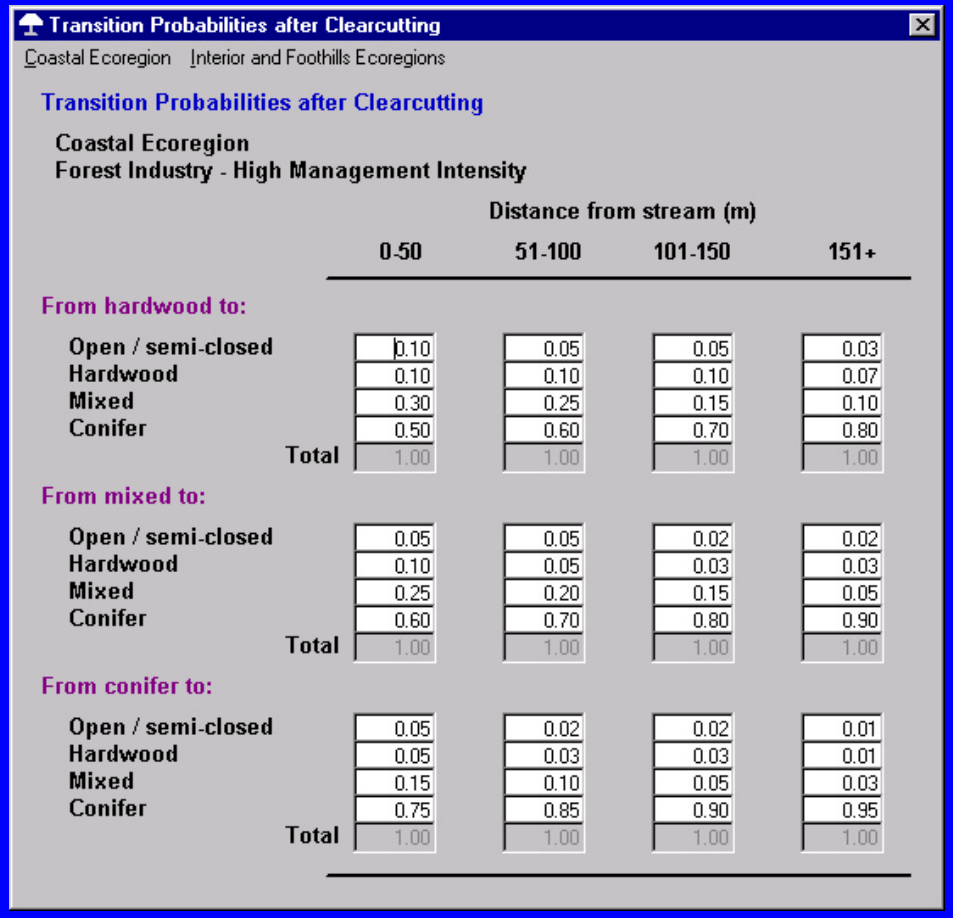
Transition Probabilities

After clearcutting, each BSU within a clearcut unit has a probability of being regenerated as one of four types: open, hardwood, mixed, or conifer.

Probability = *f* (previous forest type, owner, ecoregion, distance from stream)



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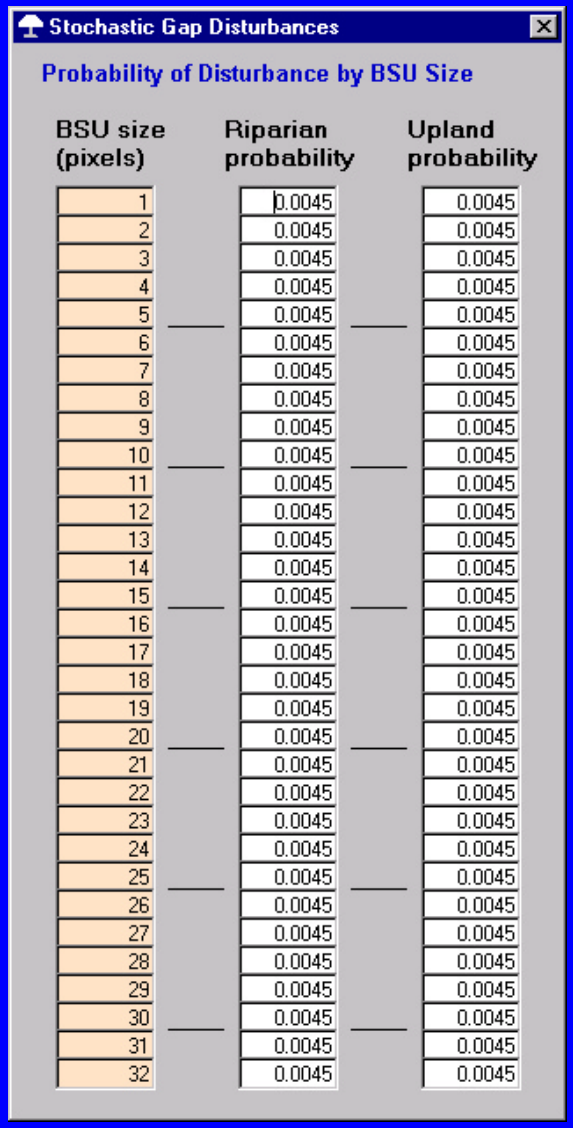
Stochastic Events

During the scheduling process, we model small gap disturbances by examining each BSU and determining whether or not to "regenerate" it (and not "harvesting" the volume).

Disturbance = *f* (BSU size, distance from stream)



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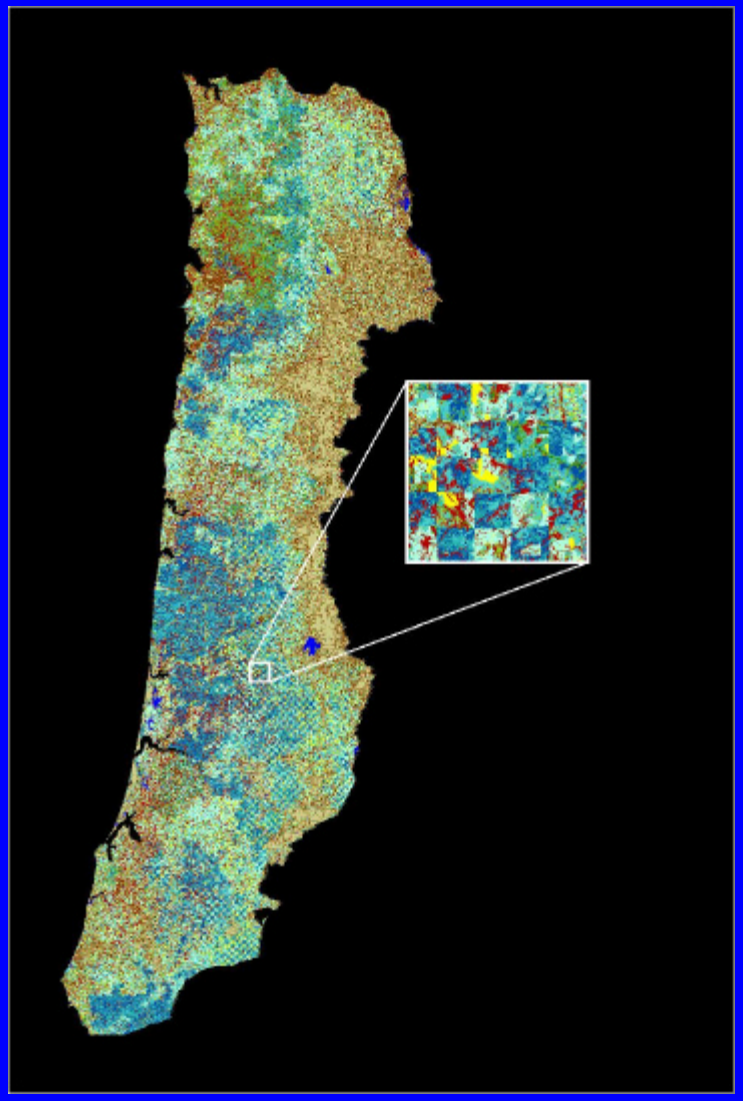
Simulation Results,
projection year 2045

- Non-forest
- Woodland
- Water
- Regeneration
- Broadleaf
- Small mixed
- Medium mixed
- Large mixed
- Very large mixed
- Small conifer
- Medium conifer
- Large conifer
- Very large conifer



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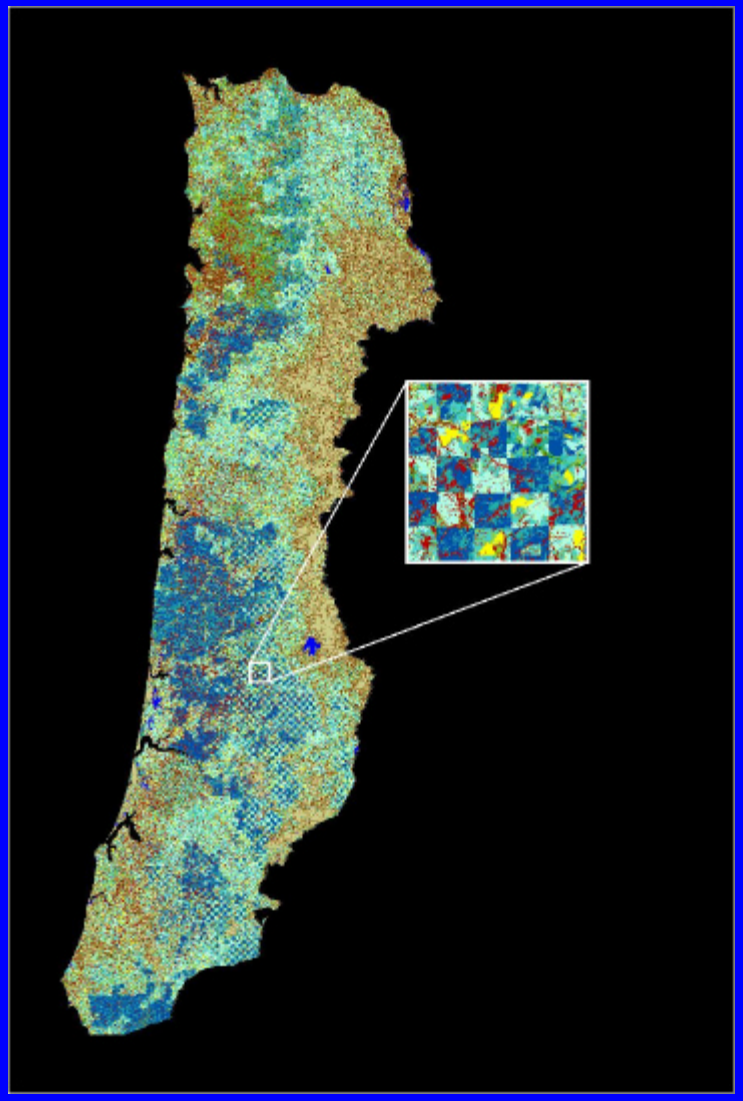
Simulation Results,
projection year 2070

- Non-forest
- Woodland
- Water
- Regeneration
- Broadleaf
- Small mixed
- Medium mixed
- Large mixed
- Very large mixed
- Small conifer
- Medium conifer
- Large conifer
- Very large conifer



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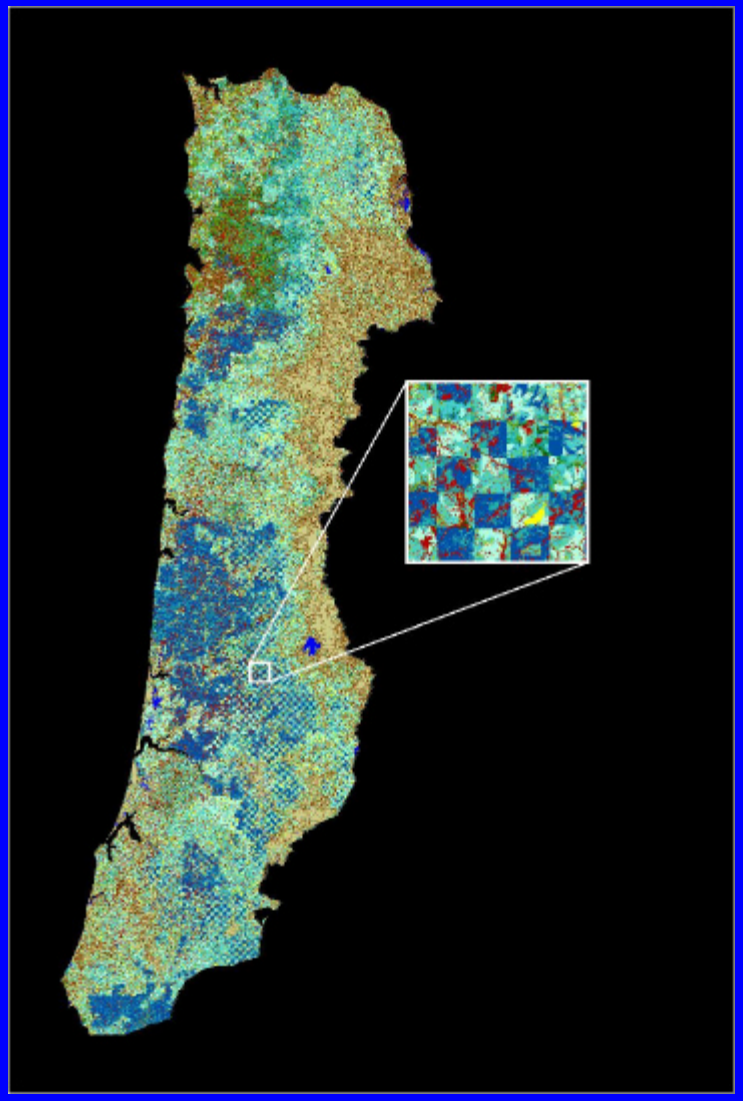
Simulation Results,
projection year 2095

- Non-forest
- Woodland
- Water
- Regeneration
- Broadleaf
- Small mixed
- Medium mixed
- Large mixed
- Very large mixed
- Small conifer
- Medium conifer
- Large conifer
- Very large conifer



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Summary

The LAMPS simulation model is a spatial simulation model of landowner management behavior, and is associated with a quantitative projection of stand structures.

It was designed to help policy makers and land managers “think through” forest policies before implementing them.

It facilitates spatial analysis of biological effects of policies (using wildlife habitat suitability models).

Questions