

From Models to User Tools

In Forest Landscape Management

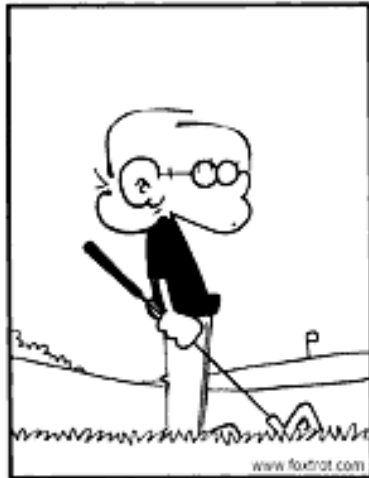
Ajith H. Perera
Ontario Forest Research Institute

Challenges for Adopting New Knowledge and Models in Forest Management

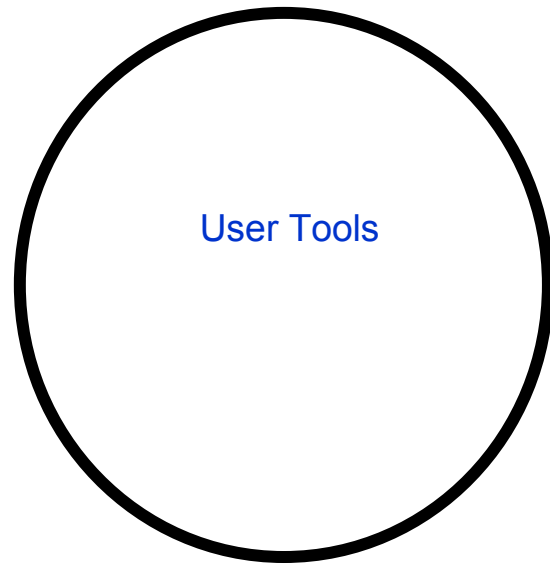
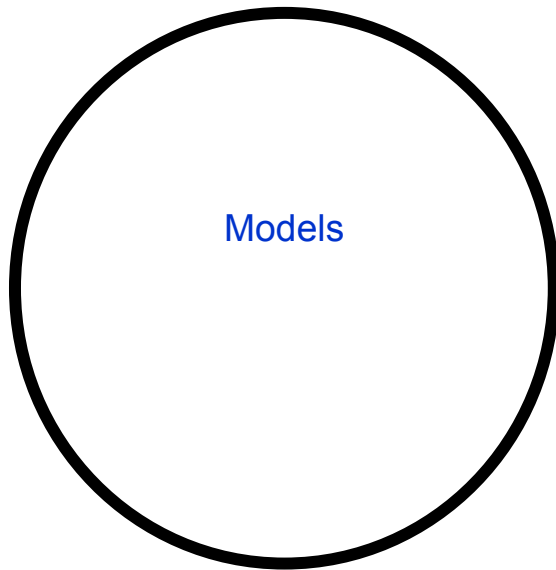
May 12, 2004

Workshop Goal

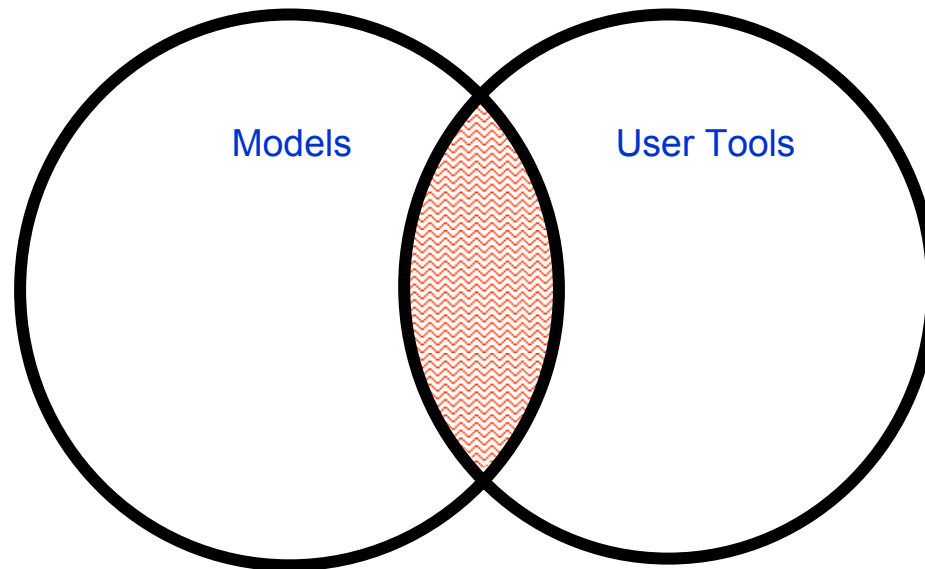
- *To discuss the challenges of adopting new modeling tools in forest management planning...*



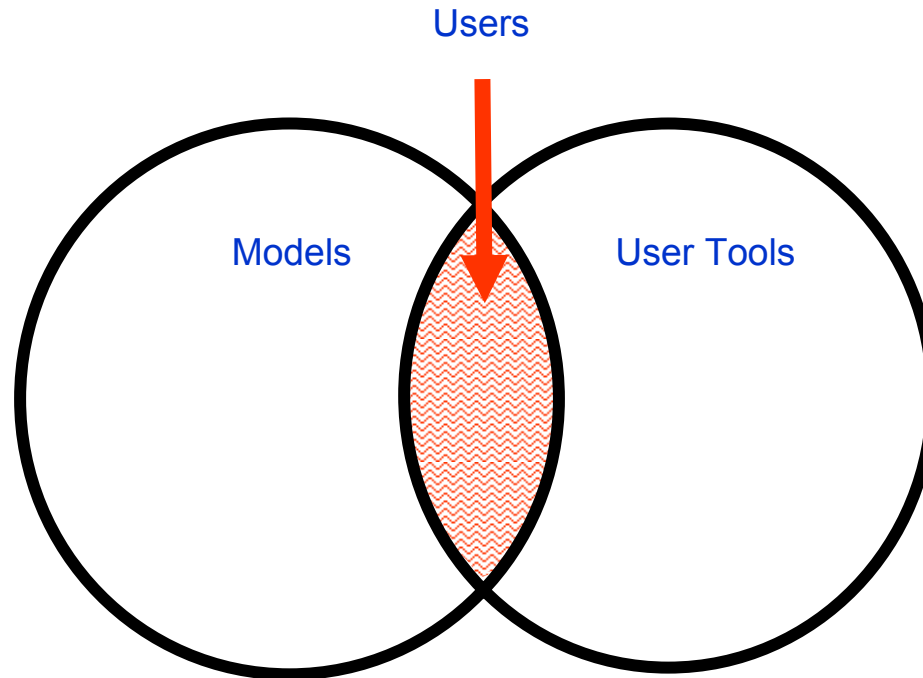
- What are models, and what are user tools ?

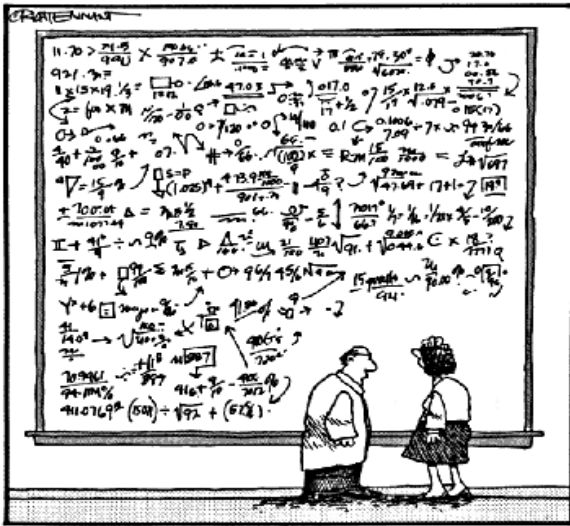


- What are models, and what are user tools ?
- When do models become user tools?



- What are models, and what are user tools ?
- When does a model becomes a user tool?
- What challenges await users?





"WHAT EXACTLY ARE WE SAYING HERE?"

Anatomy of a model

$$Y = f(x) + \xi$$

What cannot be directly measured

- Hypothesis/forecast
- Observation/population
- Deterministic/stochastic
- Spatial/aspatial
- ...

Estimated Relationship

- Simple/complex
- Empirical/process
- Deterministic/stochastic
- Linear/non-linear
- Spatial/aspatial
- ...

Variability

- Random/measured
- Observation/experimental
- Spatial/temporal
- Simple/propagation
- ...

What can be directly measured

- Single/multiple
- Deterministic/stochastic
- Linear/non-linear
- Spatial/aspatial
- ...

What are models, and what are user tools ?



Models

- Abstraction of reality
- Reduce complexity to few dimensions
- Conceptual and exploratory
- Emphasis is on Why ?
- Logic and methods are the primary focus
- Increasingly becoming stochastic
- Increasingly becoming spatial
- Many, many, many different types
- ...

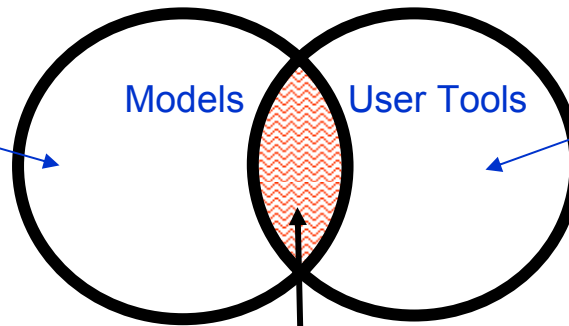


User Tools

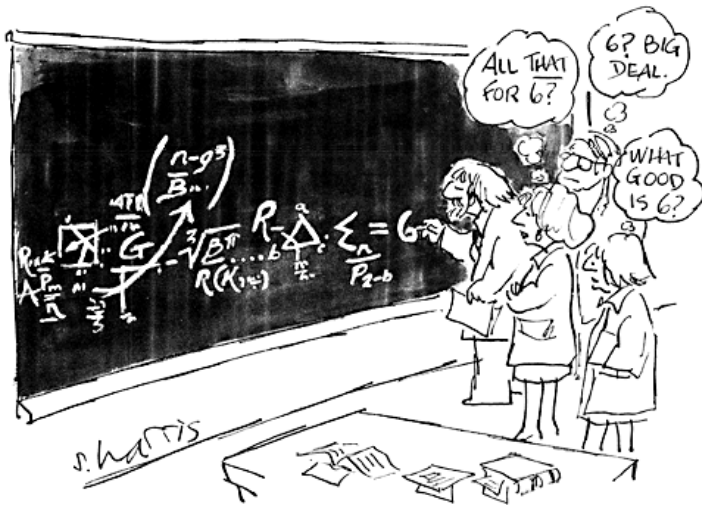
- Address real situations
- Increased complexity desired
- Goal oriented and predictive or analytical
- Emphasis is on What ?
- Results are the primary focus
- Mostly deterministic
- Increasingly becoming spatial
- Many, many, many different types
- ...

When do models become user tools?

All models are not user tools



All user tools are not models



A model that is...

- Directly related to a mgt goal
- Able to assess alternate scenarios
- Simple, easy to use
- Clear with its assumptions and logic
- Feasible to use, with inexpensive input
- Readily understood (output)

A check list for users

1. Select the appropriate user tool

- Do the model assumptions match mgt. goals?
- Does the model scale match mgt. scale ?
- Is it the proper level of complexity ?
- Is it affordable – data, time, alternatives ?
- Is it easy to use ?
- ...

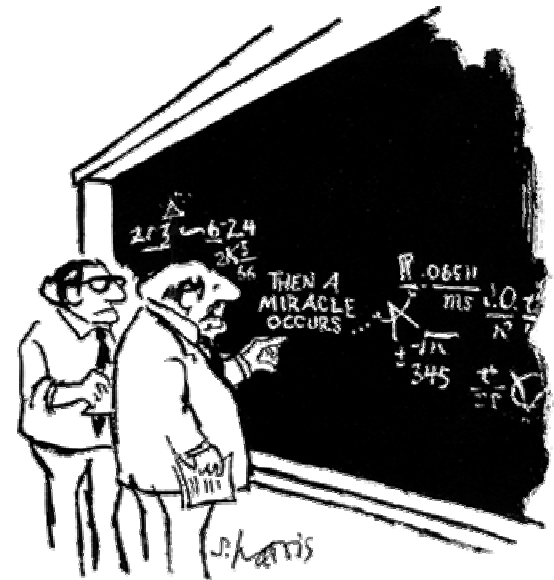


Usually it is obvious

A check list for users

2. Ask modellers the hard questions

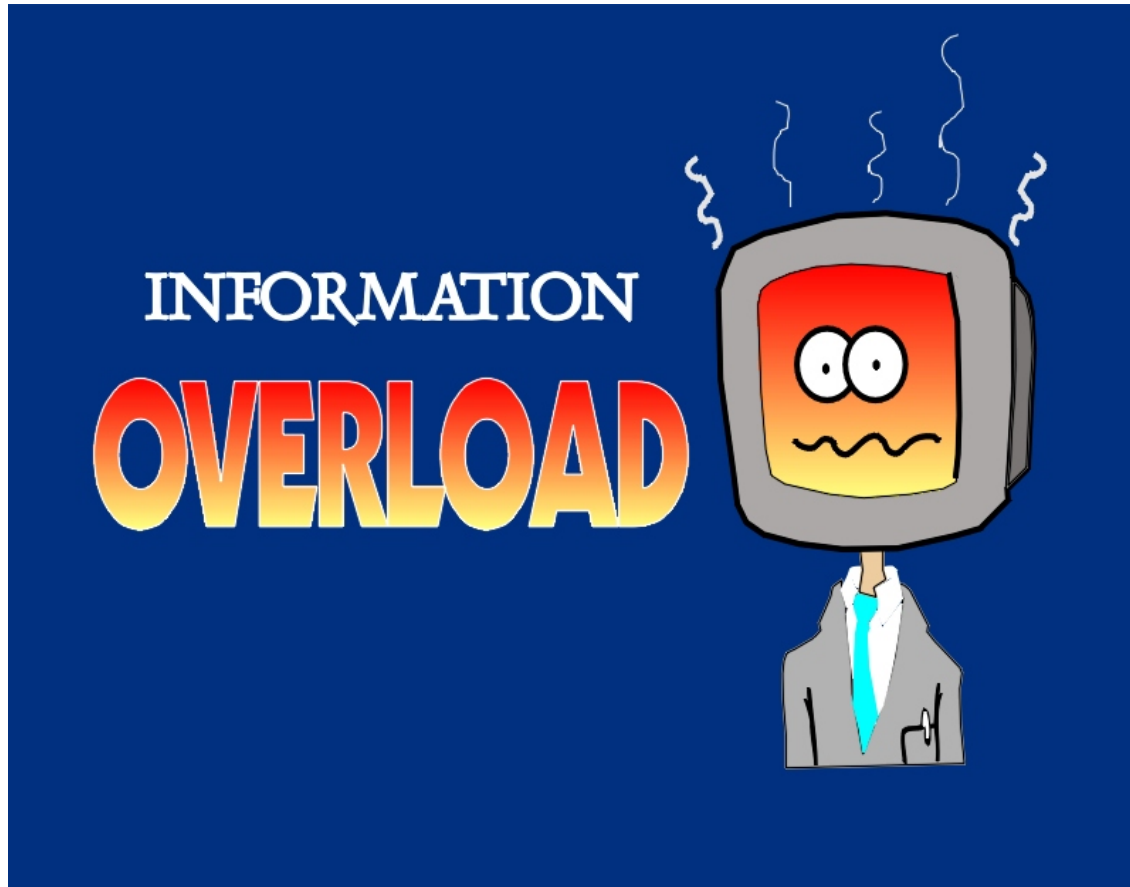
- Does it make sense ?
- Is the logic/concept sound ?
- Is its precision real ?
- How does it handle unknowns ?
- How does it handle variability ?
- Does it propagate error ?
- ...



"I think you should be more explicit here in step two."

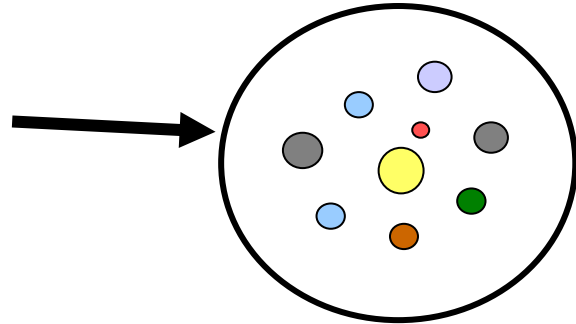
Check the logic !

What challenges await users?

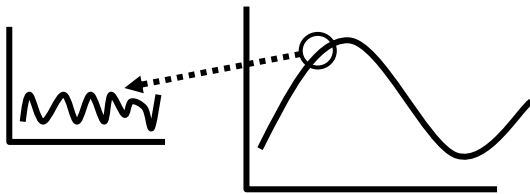


What challenges await users?

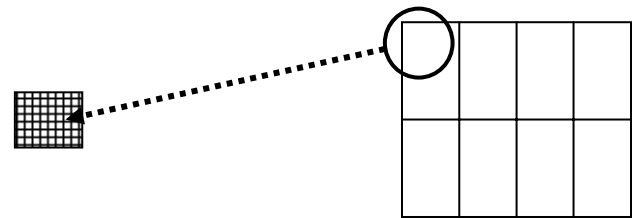
Learn to deal with the bigger picture and forget details



Temporal



Spatial



What challenges await users?

- Learn to deal with probability, and history is not the best guide to what could happen



- What did happen is one realization of many possible series of events

- ‘Validation’ or ‘proof’ is not necessarily in empirical observations; it is mostly in the model logic and assumptions



What challenges await users?



Questions ??