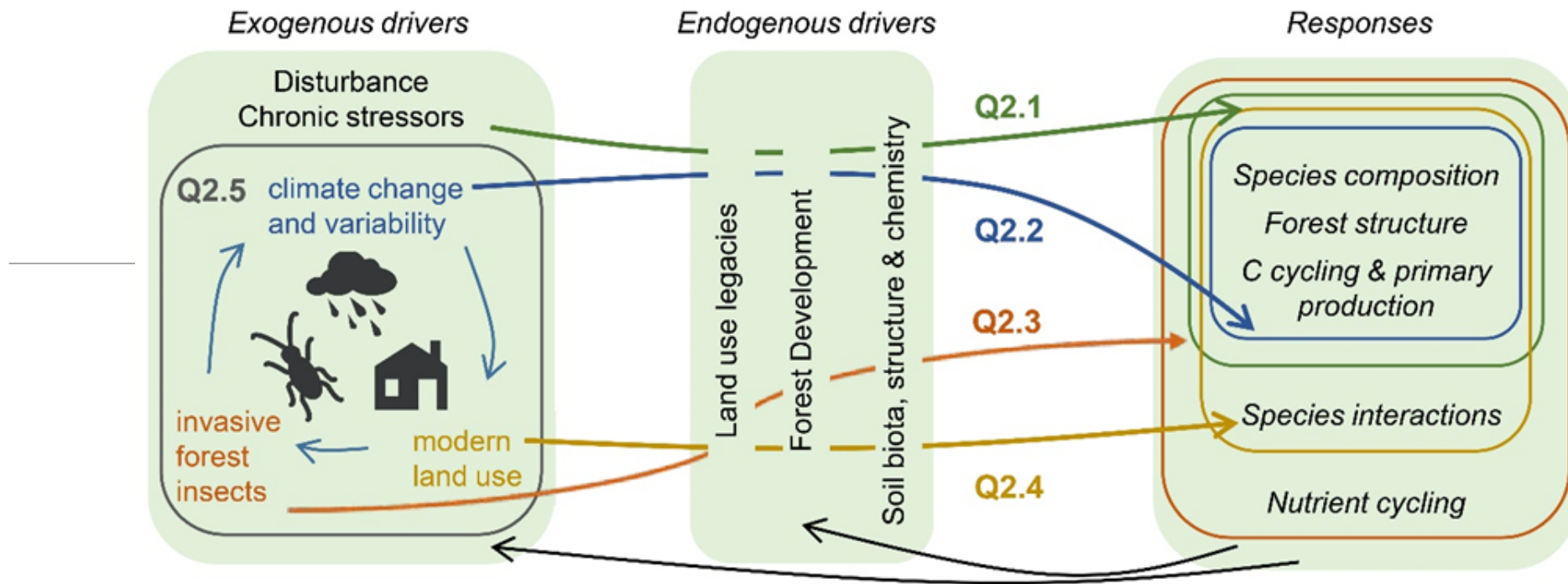


FROM MICROBES TO MACROSYSTEMS: UNDERSTANDING THE RESPONSE OF ECOLOGICAL SYSTEMS TO GLOBAL CHANGE DRIVERS AND THEIR INTERACTIONS

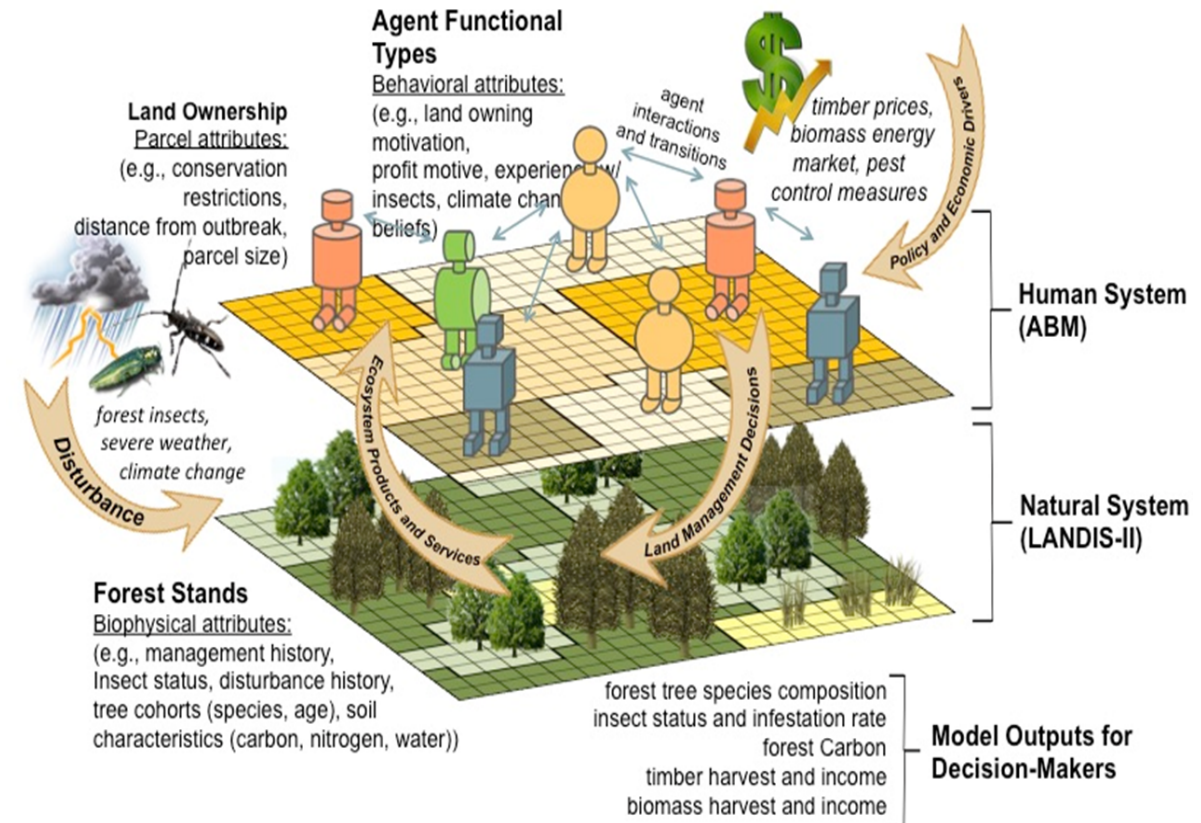
HARVARD FOREST LTER VI 2019 – 2024

Jonathan Thompson



Hypothesis: Forest land-use change *in response to* invasive insects will have greater ecological consequences than the insects by themselves

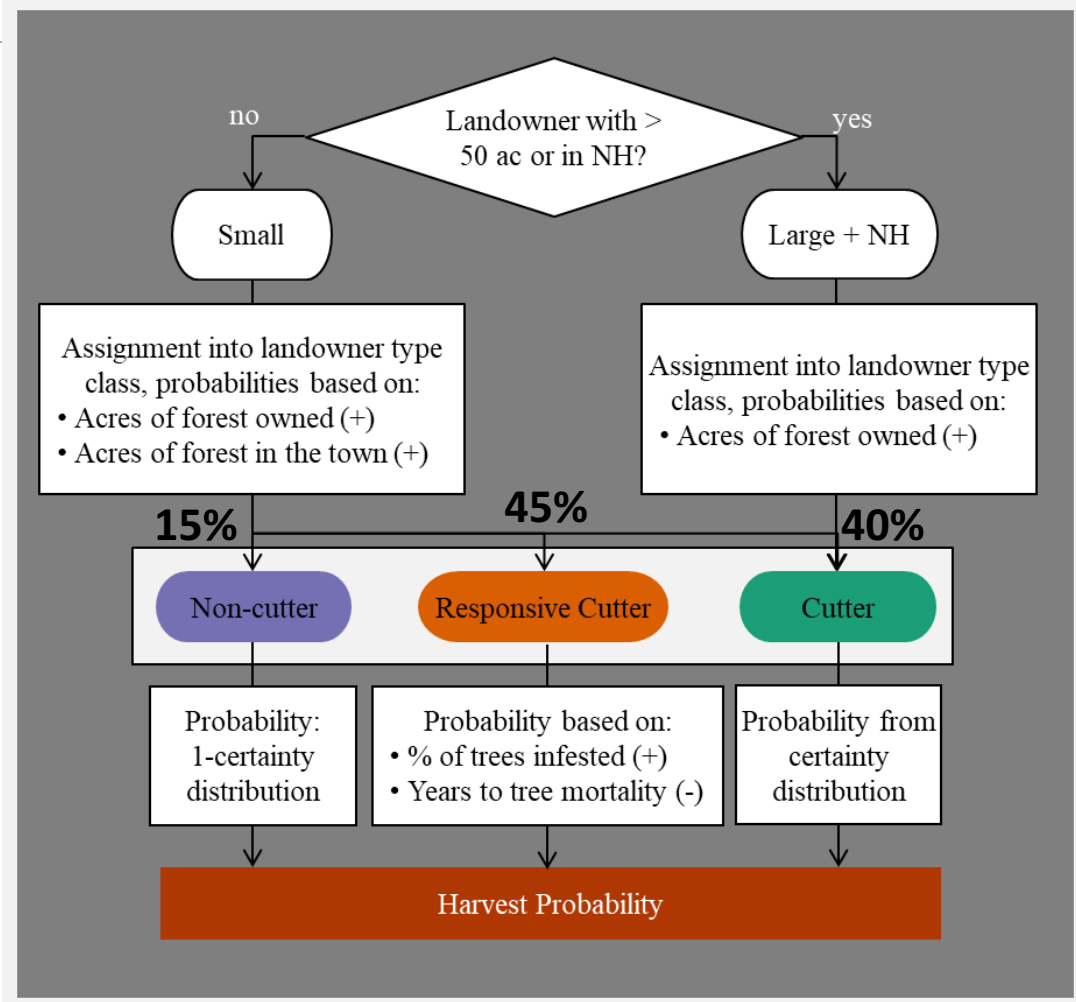
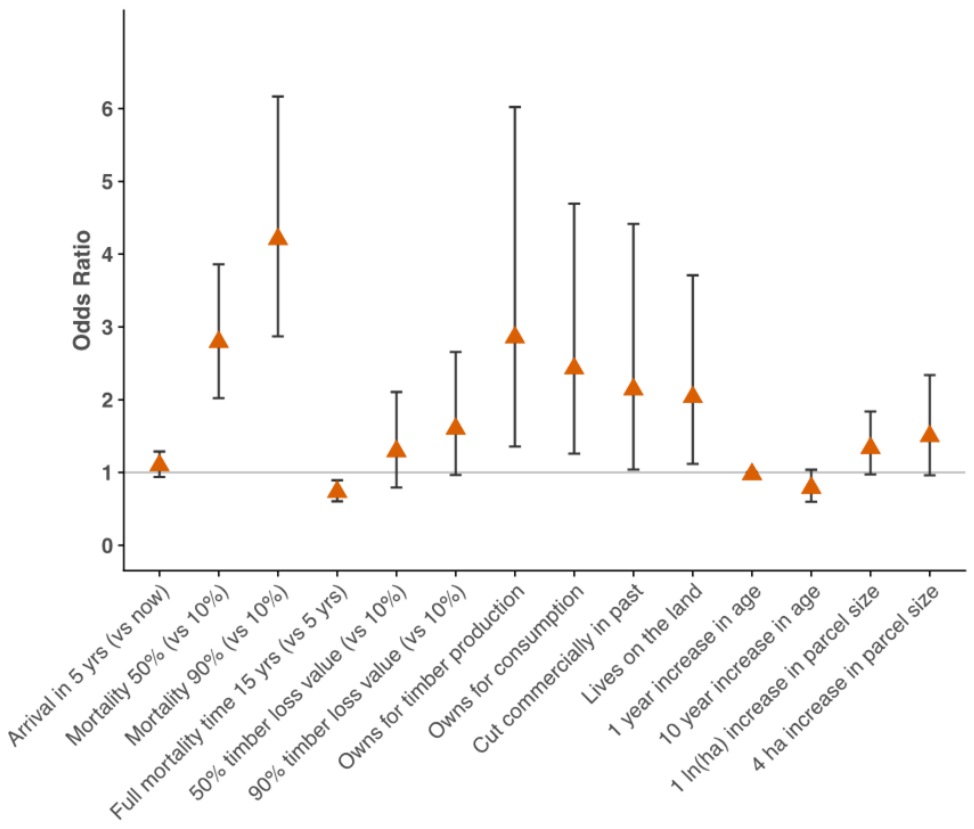
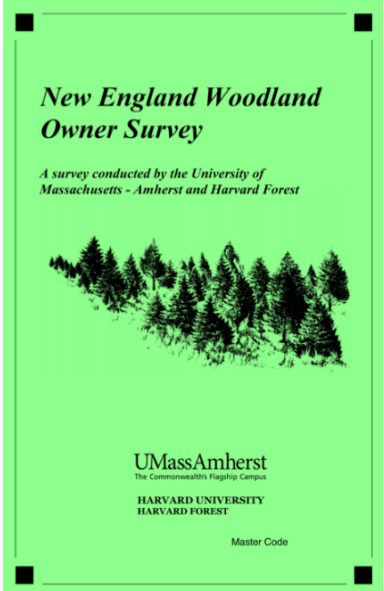
- >600,000 forest landowners in New England and the “Tyranny of Small Decisions”
- Low intensity harvest is the dominant forest disturbance
- Highest number of invasive forest insects in North America



Surveyed
2000
landowners

>80 % would harvest
under at least one insect
scenario

Assigned Agent Functional Type
to every parcel based on social
and biophysical attributes



The Model: LANDIS-II / PnET-II / AFT



Modeling framework applied to **emerald ash borer**, preliminary findings:

- 80% increase in harvesting rates
- Most harvest is “by catch”
- Harvests are synchronized
- Insect/land-use interactions have distinct ecological consequences

Models underpinned by long term data:

- Forest processes calibrated & validated from towers and plots
- PnET developed & tested for 30yrs at LTER
- 20 years of HFR research on insect spread and effects
- 30 years of landowner outreach & demonstration

