MODELING IN SUPPORT OF REGIONAL LEVEL MPB MANAGEMENT AND THE INFORMATION REQUIRED FOR IMPROVED DECISION MAKING

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Topics

- Analysis
- Model description
- Results and learning
- Closing the planning loop

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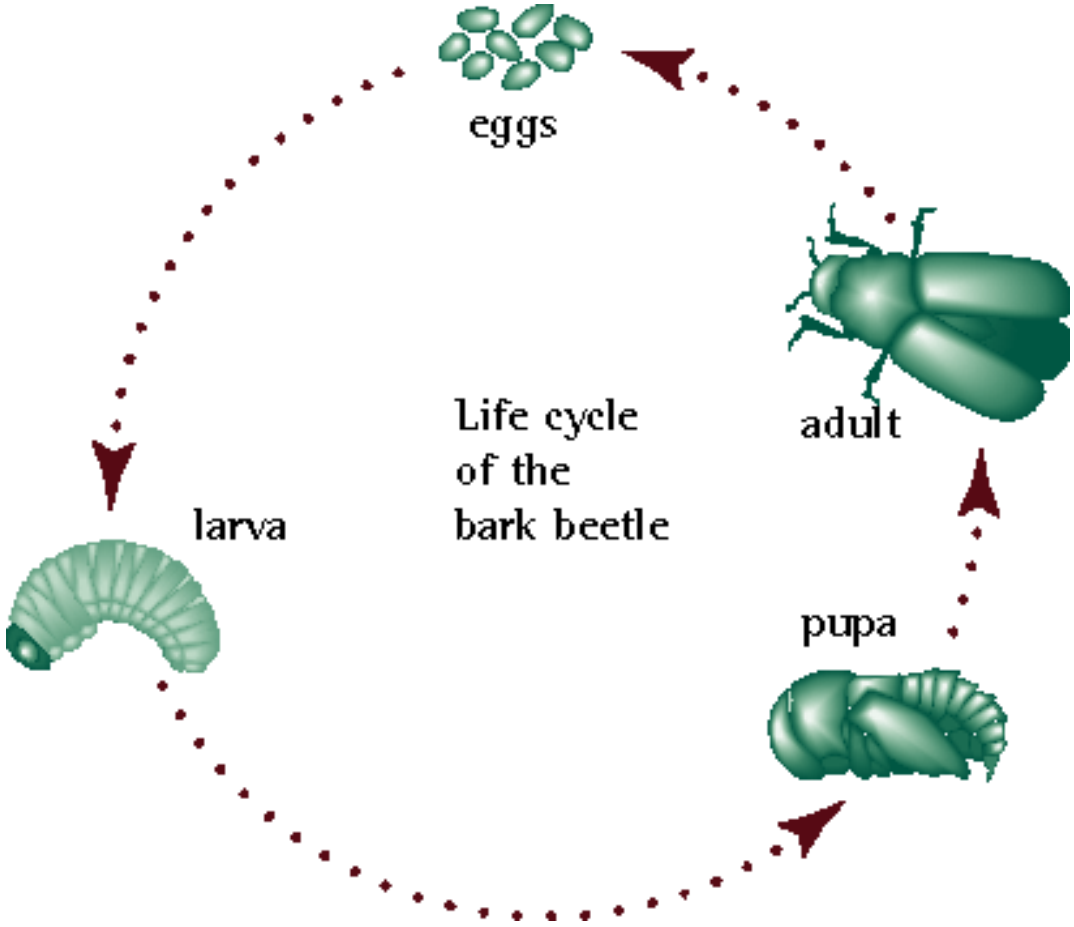
Industry Questions

- How long to we have?
- What will be the impacts of MPB?
- What actions will reduce MPB impacts?
- What are the costs and benefits of potential actions?
- Desire for decision-making to be supported by analysis.

Supporting Analysis

- Conducted under extreme time constraints
- Used existing information and datasets
- Construct a model to support decisions using:
  - MPB expertise – SRD and CFS
  - Harvesting expertise – industry
  - Analysis expertise – The Forestry Corp.
- Multi-discipline solution
- Funded under the FRIAA MPB program

Modeling



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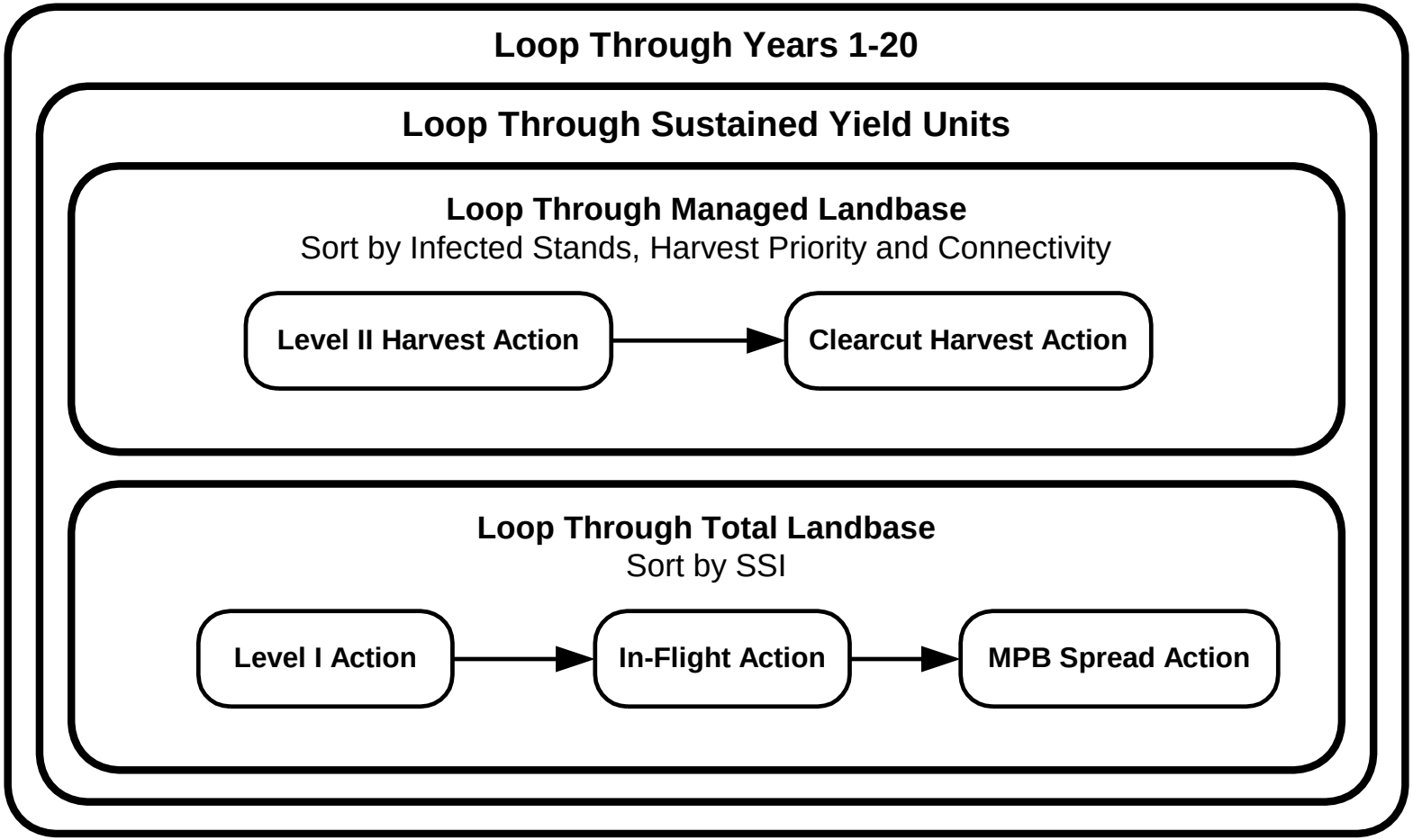
Model Design

- Landscape scale
- Spatial at the stand level
- Annual steps for 20 years
- Track individual pine trees
  - Built upon SRD's work
  - Identify infested trees
  - Predict new infested trees from green:red and SSI
  - Distribute infested trees within a 1 km radius
  - Add optional MPB in-flights

Pine Tree Tracking

- For each polygon:
  - Gray pine trees (non-merch)
  - Gray pine trees (merch)
  - Red attack pine trees (non-merch)
  - Red attack pine trees (merch)
  - Green attack pine trees
  - Non-attacked pine trees
  - Pine tree size
  - Other conifer volume
  - Deciduous volume

Conceptual Flow Diagram



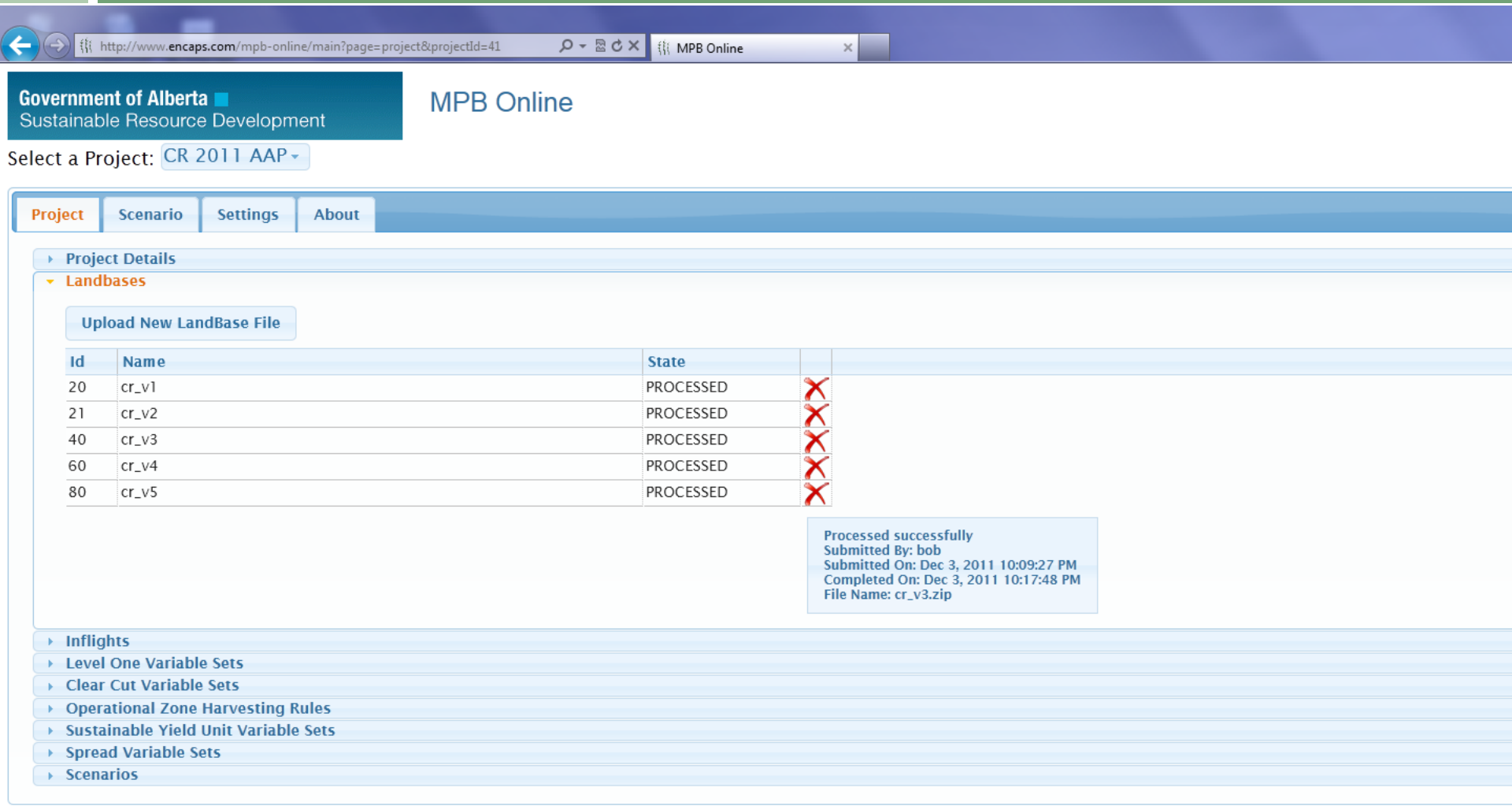
Data Requirements

- Timber supply landbase files or AVI
- Stand and stock tables, yields
- SSI
- Green:red ratios
- SRD's MPB DDS datasets
- Infested tree locations
  - Gray attack
  - Current year's red attack
  - Green attack

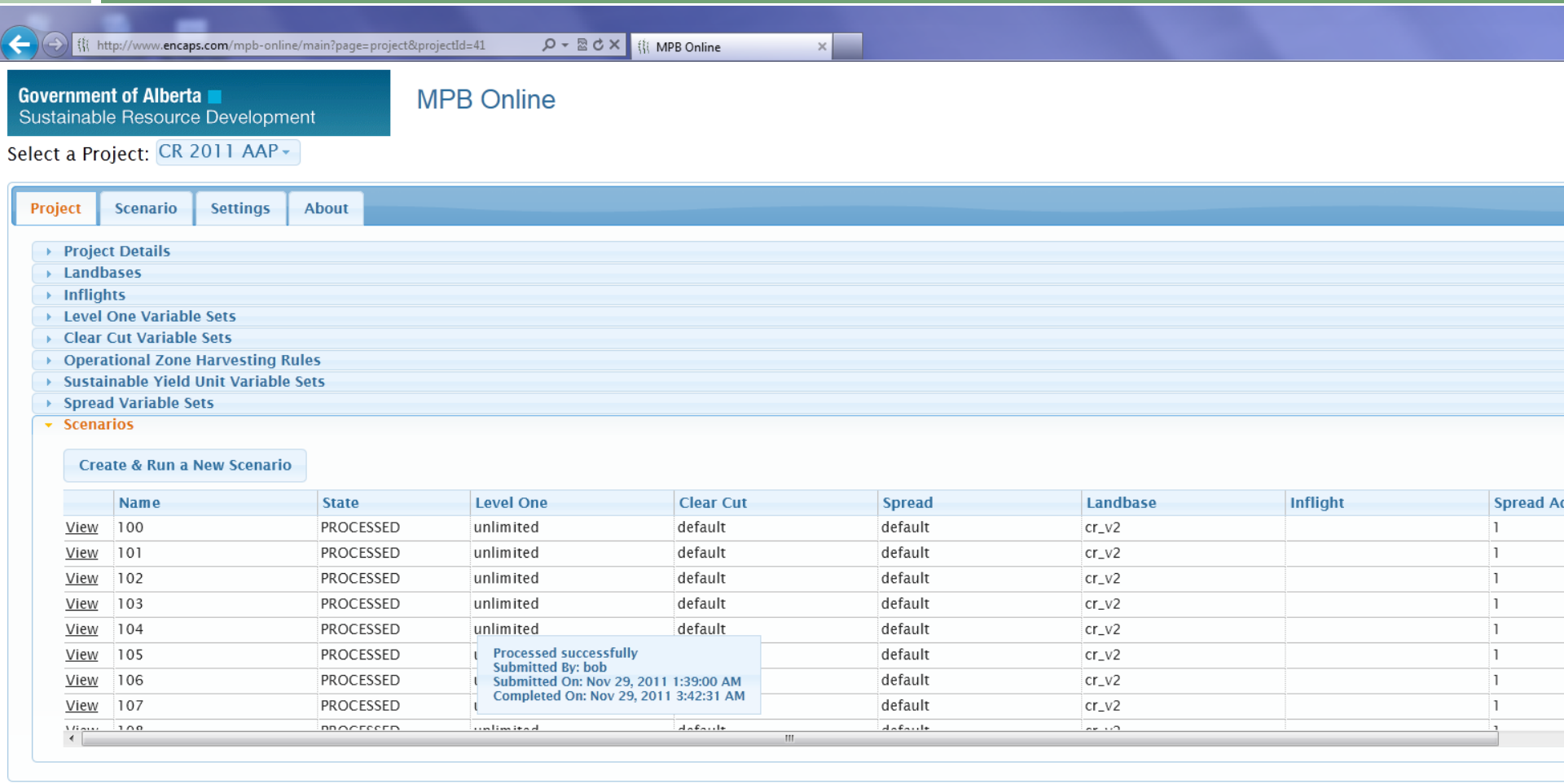
Scenario Assumptions

- MPB growth and distribution rates
- In-flights
- Planned activities
- Conifer AAC levels by FMU
- Percent of harvest from infested stands
- Shelf life
- Sorting rules
- Zones – harvesting and control
- Level 1 rules and budget

MPB Online – Project Tab



MPB Online – Scenario Status



MPB Online – Reports

http://www.encaps.com/mpb-online/rest/project/41/scenario/31/result.pdf

Scenario: 111

Model Inputs

Spread Type: MIXED
Harvesting: NORMAL
Level 1 control: NORMAL
Beetle Flight: None

Spread Variables - set #20

Range (ssi)	Spread
1 - 20	0.75:1
20 - 30	1.0:1
30 - 40	2.0:1
40 - 55	3.0:1
55 +	4.0:1

Distance (m)	Percent (%)
0 - 100	87.0 %
100 - 250	8.0 %
250 - 500	3.5 %
500 - 1000	1.5 %

Cone Direction: 95 °
Cone Width: 20 °
Percent within cone: 65 %

Level 1 Control Variables

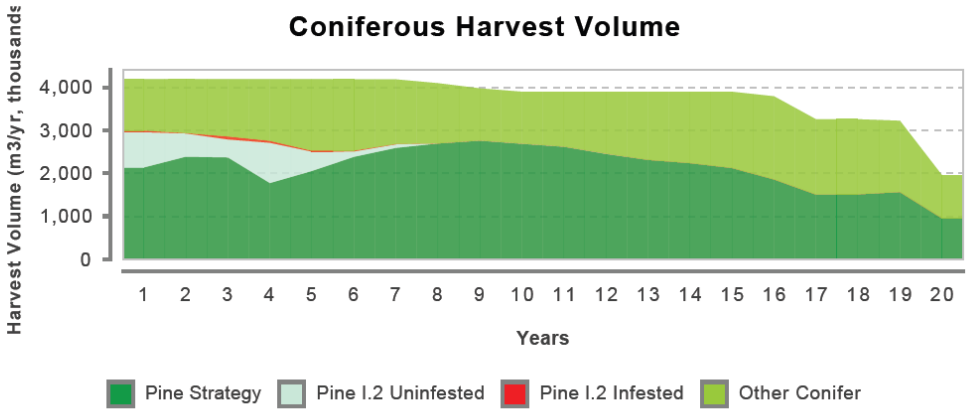
Max tree removed: 60
Cost per tree: $150
Annual Budget: $1,200,000

Harvesting Variables

Shelf Life: 3 Years
Max volume from infected stands: 80 %
Non Pine conifer volume harvested: 100 %
Deciduous volume harvested: 100 %

20 Year Output Summary

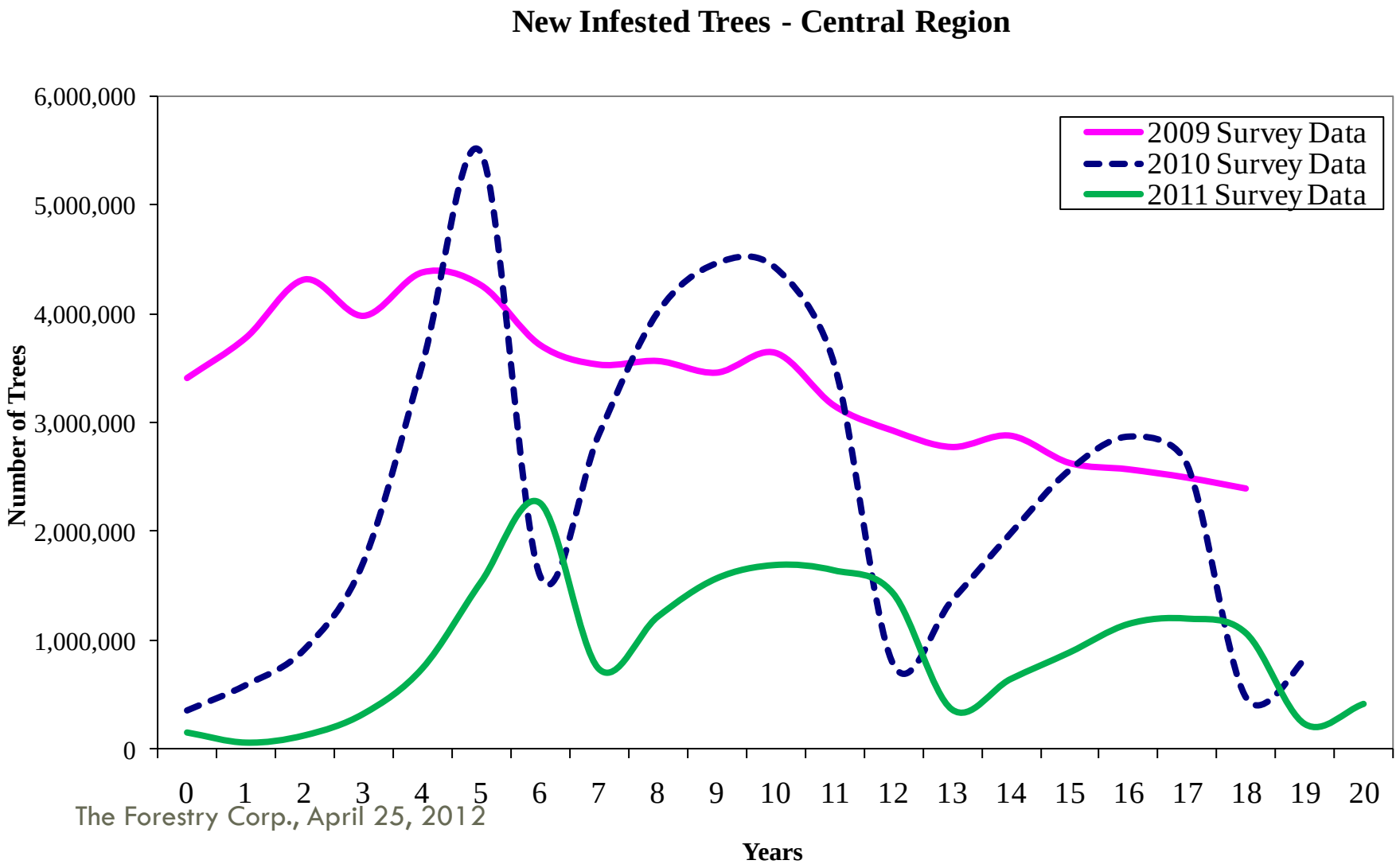
Pine Growing Stock Lost:	671,163	m3/yr
Final Pine Growing Stock (Managed Landbase):	14,381,857	m3/yr
Average Annual Level 1 Cost:	$202,283	
Average Pine Strategy Volume Harvested:	2,147,467	m3/yr
Average Pine Level 2 Uninfested Volume Harvested:	170,303	m3/yr
Average Pine Level 2 Infested Volume Harvested:	10,024	m3/yr
Average Other Conifer Volume Harvested:	1,484,423	m3/yr
	3,812,218	m3/yr



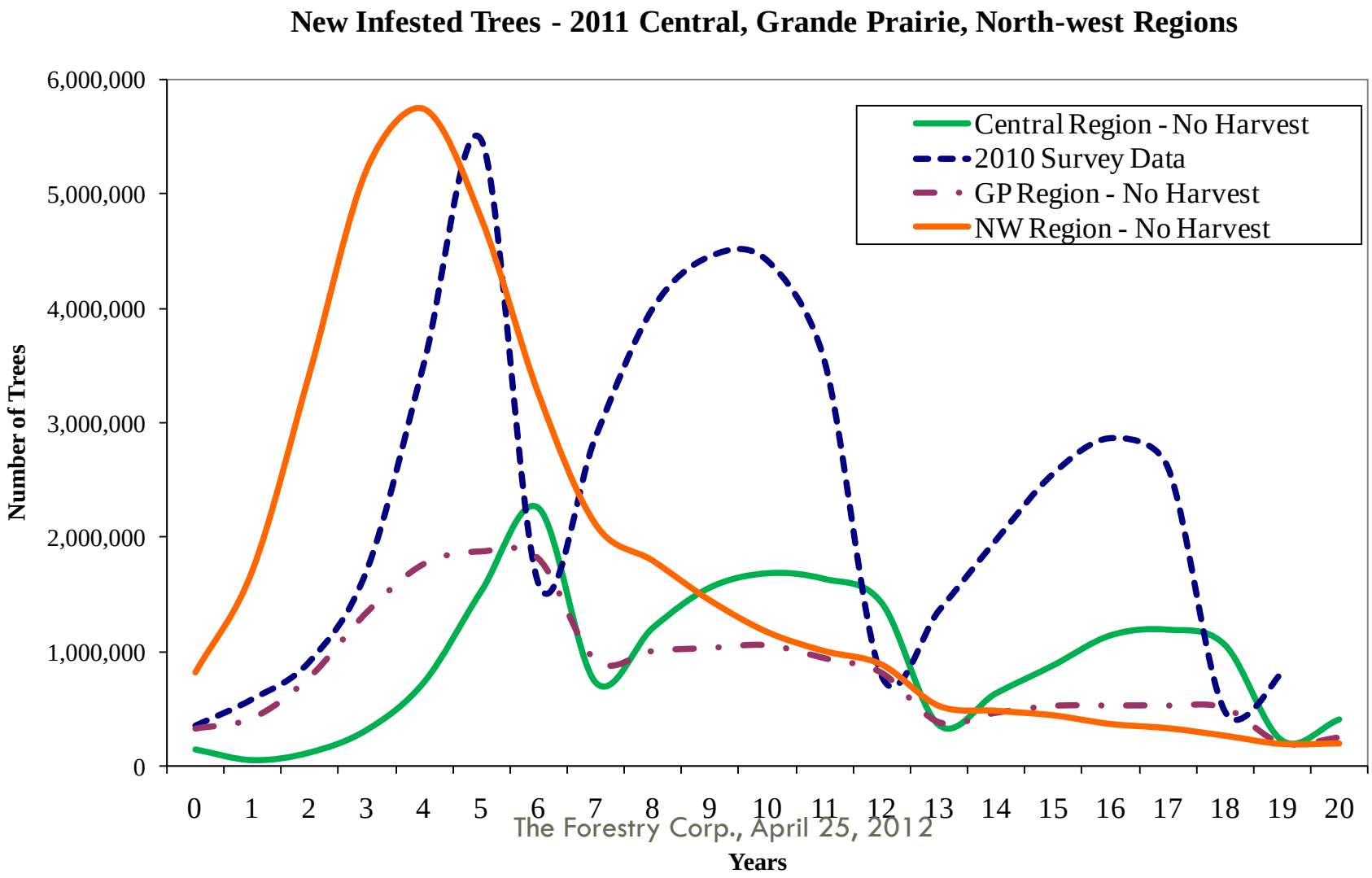
Results

Th

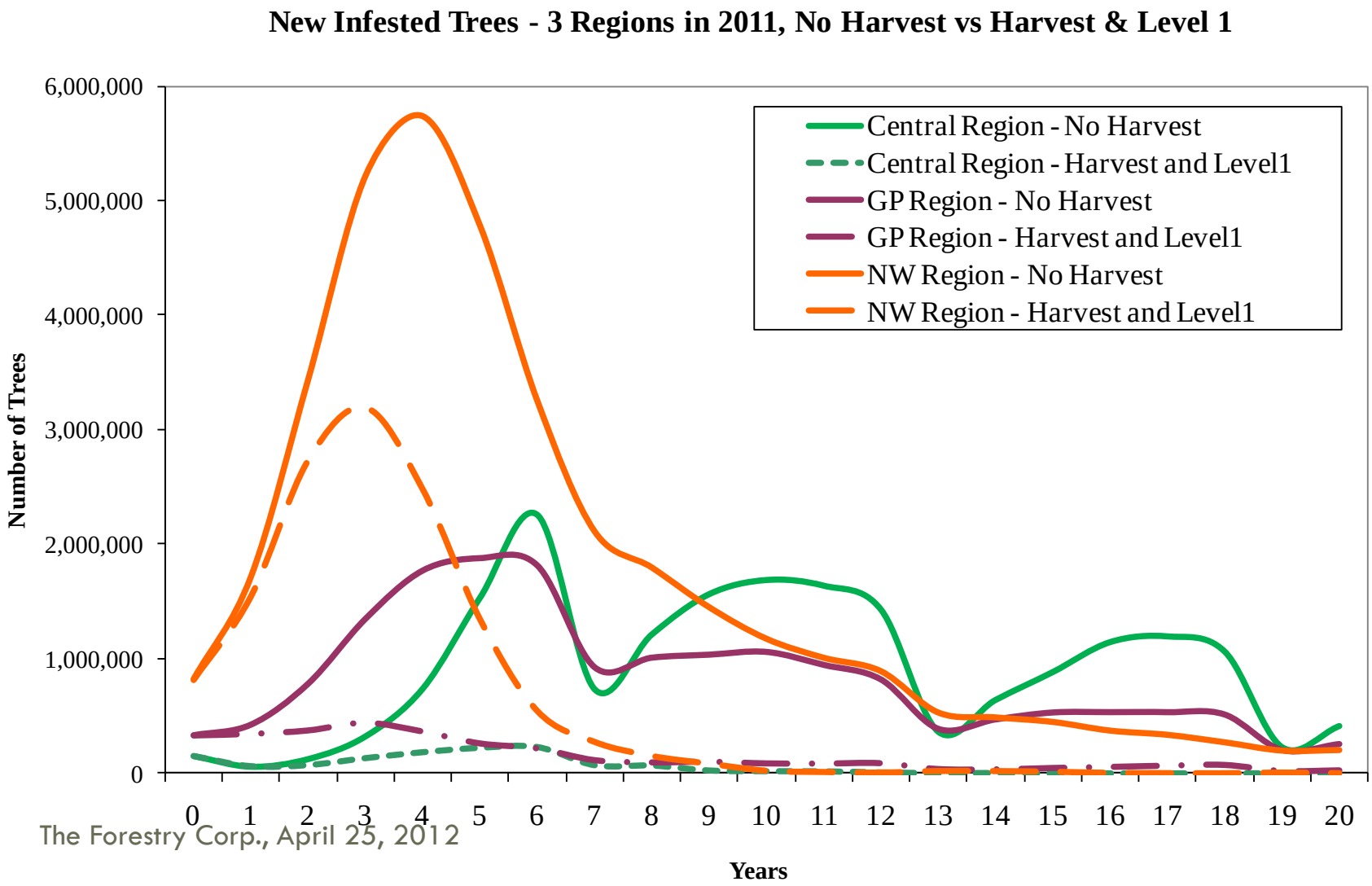
Yearly Comparisons - Central



Compare – Regional No Harvest



Compare – No Harvest & Control



Learning – MPB Dynamics

- Harvesting and single tree control have a similar effect in reducing impact
- Greatest control impact when combined
- Controlling MPB requires a sustained effort
- Greater impacts on small populations
- Difficult to integrate MPB control and harvest planning timelines
- Good survey information is critical

Decisions Supported

- How long do we have and where should we cut?
  - Years to death map
  - Volume killed map
- Should we chase the beetle or consider single tree control?
  - Volume saved
  - Percent of harvest that is gray or green
  - Control costs
  - Harvest dispersal and access costs

Closing the Planning Loop

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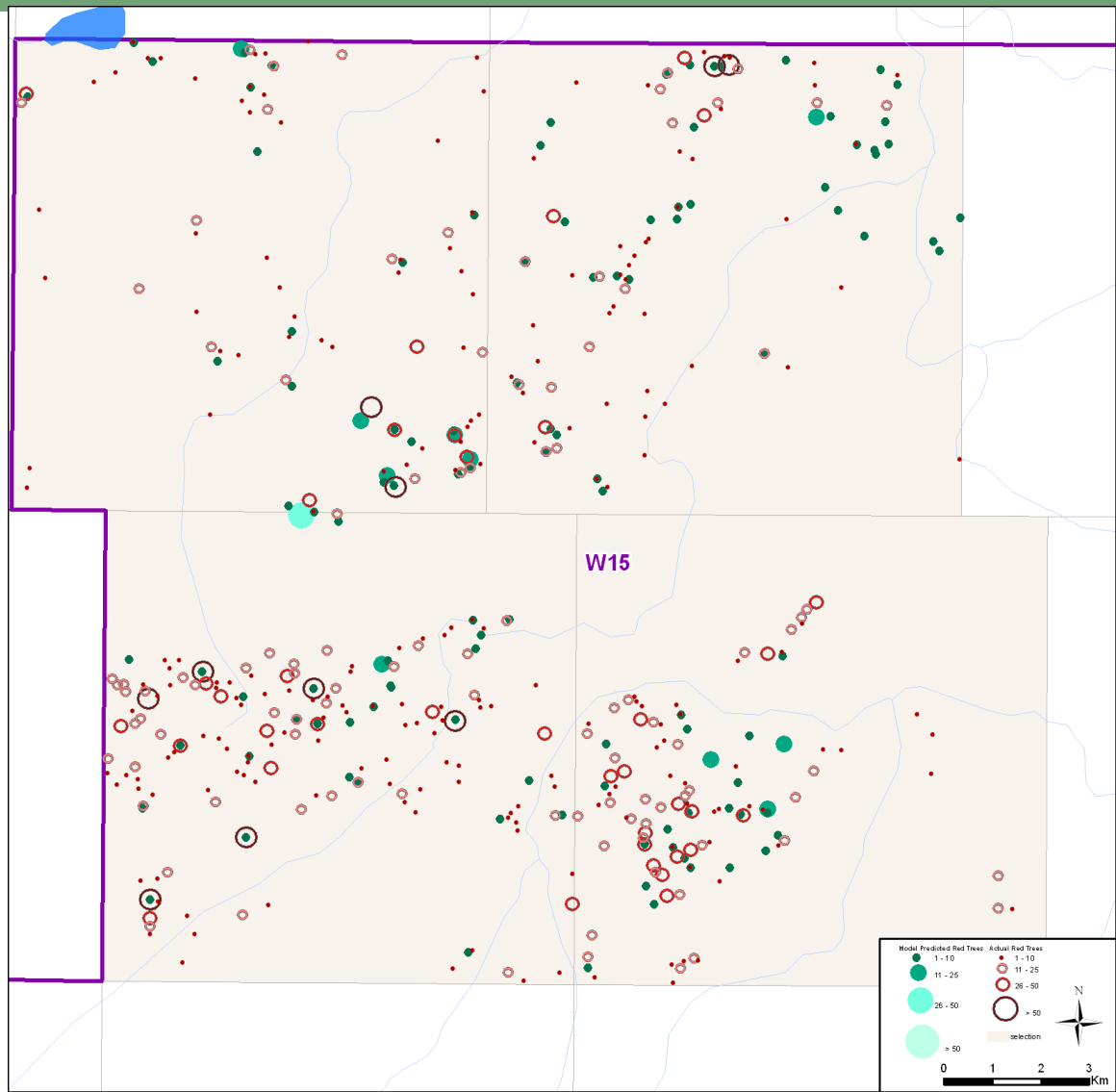
Closing the Planning Loop

- How good are the model predictions?
- Does predicted = observed?
- Initial conditions have a large impact

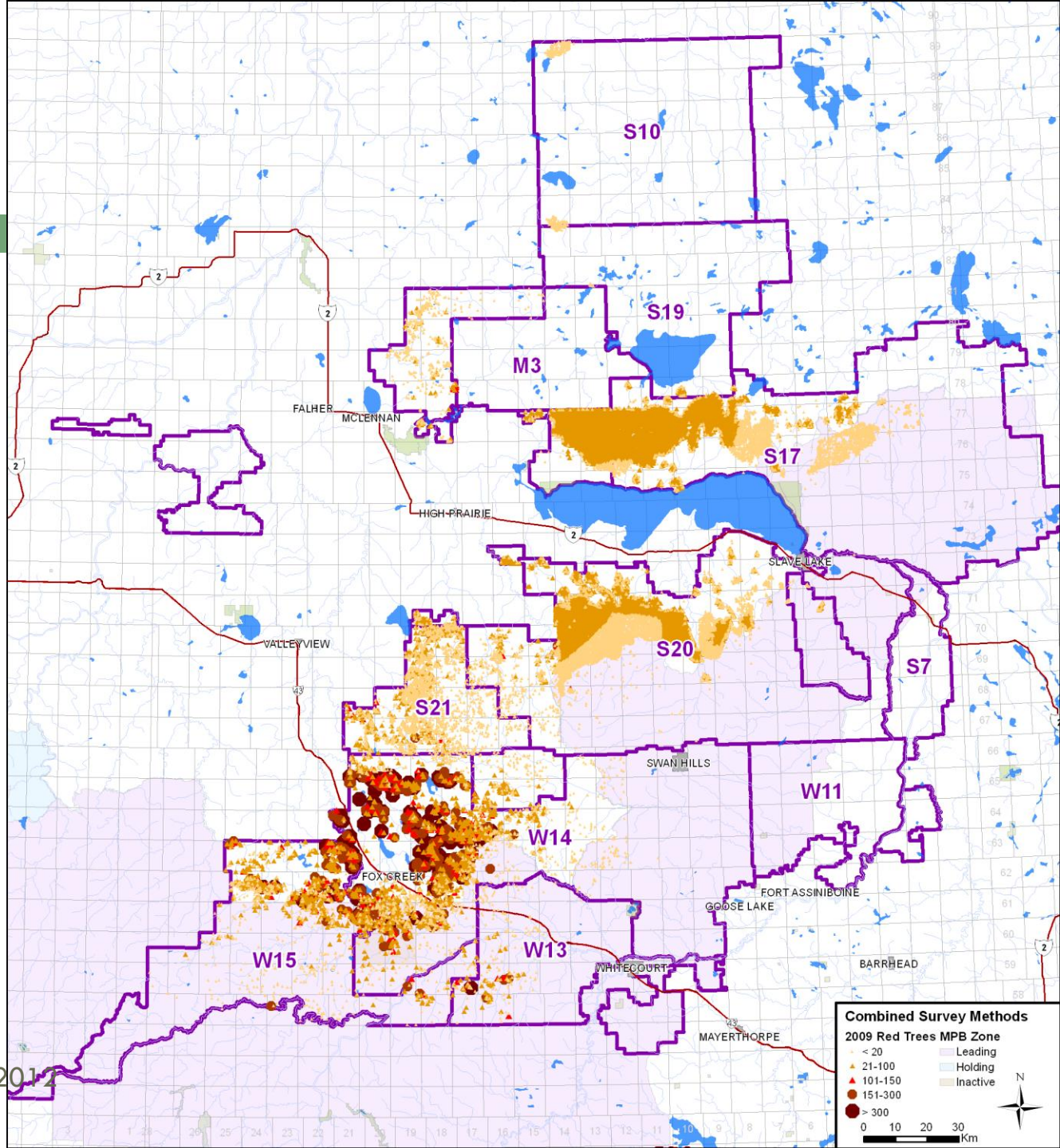
Photo: Manning Diversified Forest Products

Closing the Planning Loop

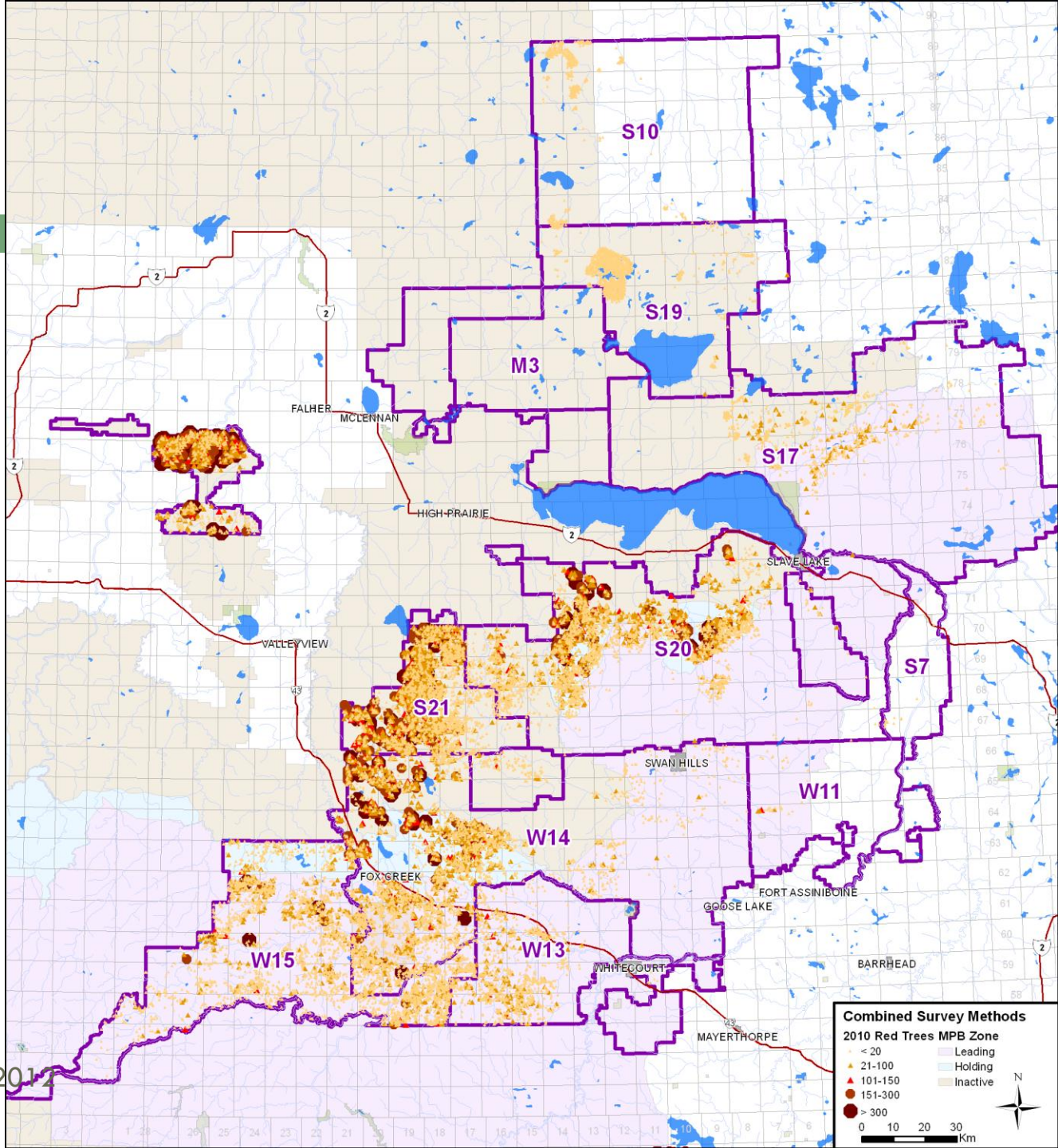
- Compare model predictions to observed
- Green = 2010 predicted
- Red = 2011 observed



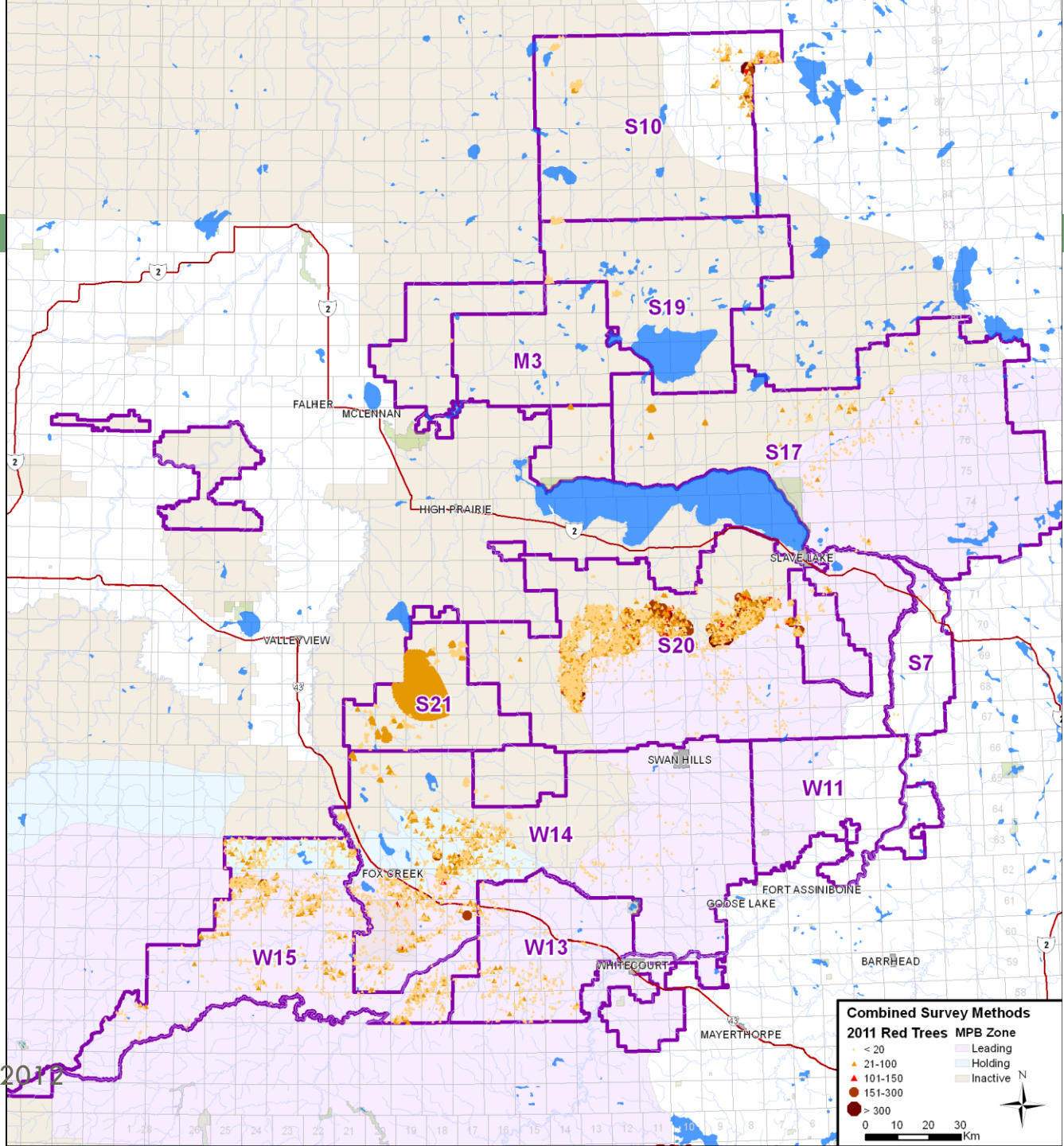
2009 Red Trees



2010 Red Trees



2011 Red Trees



Conclusions

- Model assists with landscape level decisions
- Targeted harvesting and individual tree removal both can slow MPB spread but are most effective when combined
- Generating consistent initial starting conditions will improve forecasting
- Hoping to gain some insight from the other presenters


Questions?
Photo: Ray Hilts