Forest Surveillance Review

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supported by forestgrowers commodity levy

Introduction

- Review forest surveillance
- Current system
- Drivers for change
- Approach
- Progress

Forest surveillance in New Zealand

- 1956 – Forest surveillance started, prompted by sirex and defoliating insect outbreaks (*observation and collection*)
- 1962 – Dothistroma arrived (*research and monitoring*)
- 1972 – Port surveys (*pest detection on non-forest sites*)
- 1975 – Forest surveys (*pest detection in forests*)
- 1981 – Aerial forest surveys

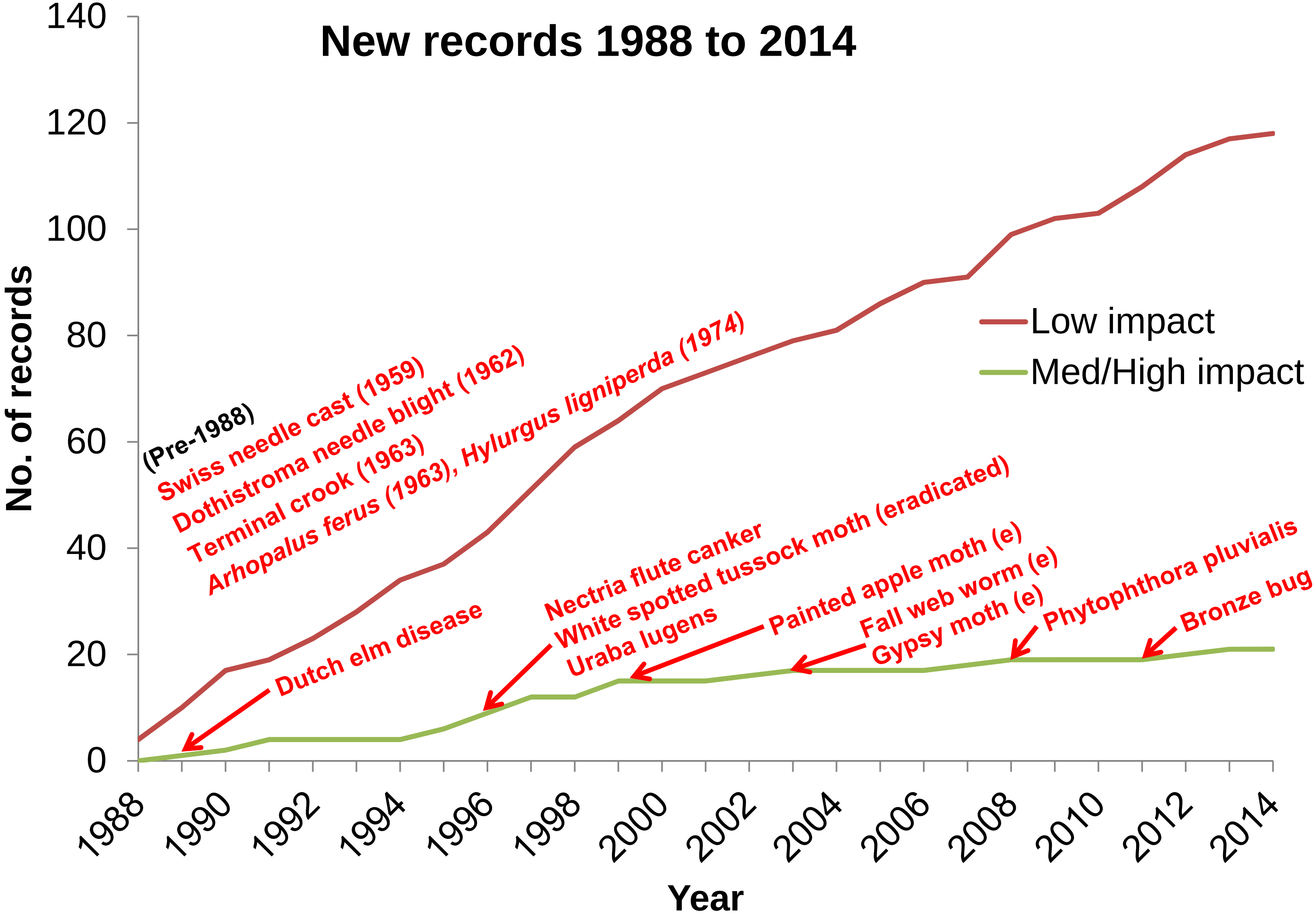
- 1989 to 1996 – Research on forest surveillance benefits and efficacy (*targeted surveillance intensity*)

Forest surveillance in New Zealand

- 1999 – Port environs surveillance reviewed
- 2005 – High risk site surveillance started, 7500 transitional facilities inspected, funding increased, temporary health plots, permanent viewpoint plots, high risk forest plots (*targeted forest surveillance intensity abandoned*)

- 2007 – Forest surveys reviewed by overseas experts
- 2009 – Forest surveys revised (*viewpoint plots abandoned*)
- 2014 – Forest and HRSS surveillance under review

Forest surveillance in New Zealand



Forest surveillance – successes and benefits

- Eradications
  - White spotted tussock moth, painted apple moth, fall web worm, Asian gypsy moth, Dothistroma needle blight (in local region)
- Trade negotiations
  - Pest risk analyses for logs to USA
  - *P. kernoviae* to Australia
  - Set baseline data

Drivers for change

- Commercial
  - Protect trade (declaration of low pest prevalence, pest freedom – regional and national)
  - Rapid new pest detection (to increase eradication probability)
  - Protect the asset – reliance on exotic pines
  - Enhanced investor confidence
- Political
  - New forest growers’ levy in place – everyone pays
  - Expectations that everyone is covered
  - A system for inspecting every plantation in NZ not affordable, nor possible or sensible

Drivers for change

- Science
  - Improvement!
  - New methods and technologies – traps, baits, remote sensing, sentinel plants, UAVs, radio waves, GIS
  - New approaches – Bayesian Networks, optimisation models, discrete event analysis

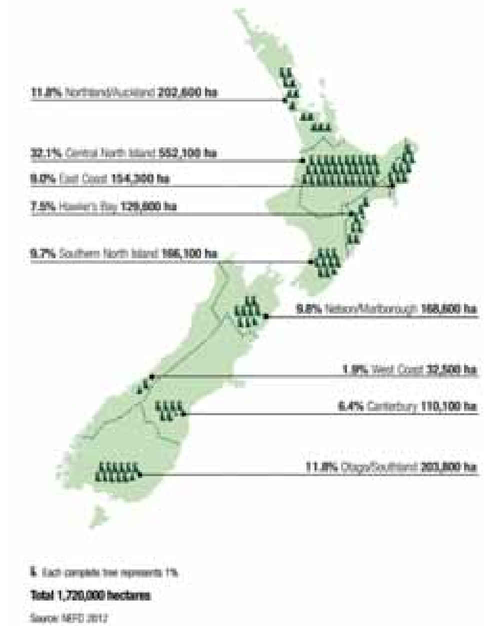
Current system

- Biosecurity system – MPI expenditure (animal and plant)
    1. Pre-border ($? million)
    2. Border ($190 million)
    3. Surveillance ($26 million)
    4. Response ($35 million)
- Total spend $251 million
- Surveillance ~10% of MPI's biosecurity spend
- Is the 10% effort on surveillance about right?
- Compared with the asset and contribution to GDP biosecurity spend is small

Current system

- High risk site surveillance
  - MPI funded
  - Non plantation forest high risk areas
  - Transects on foot

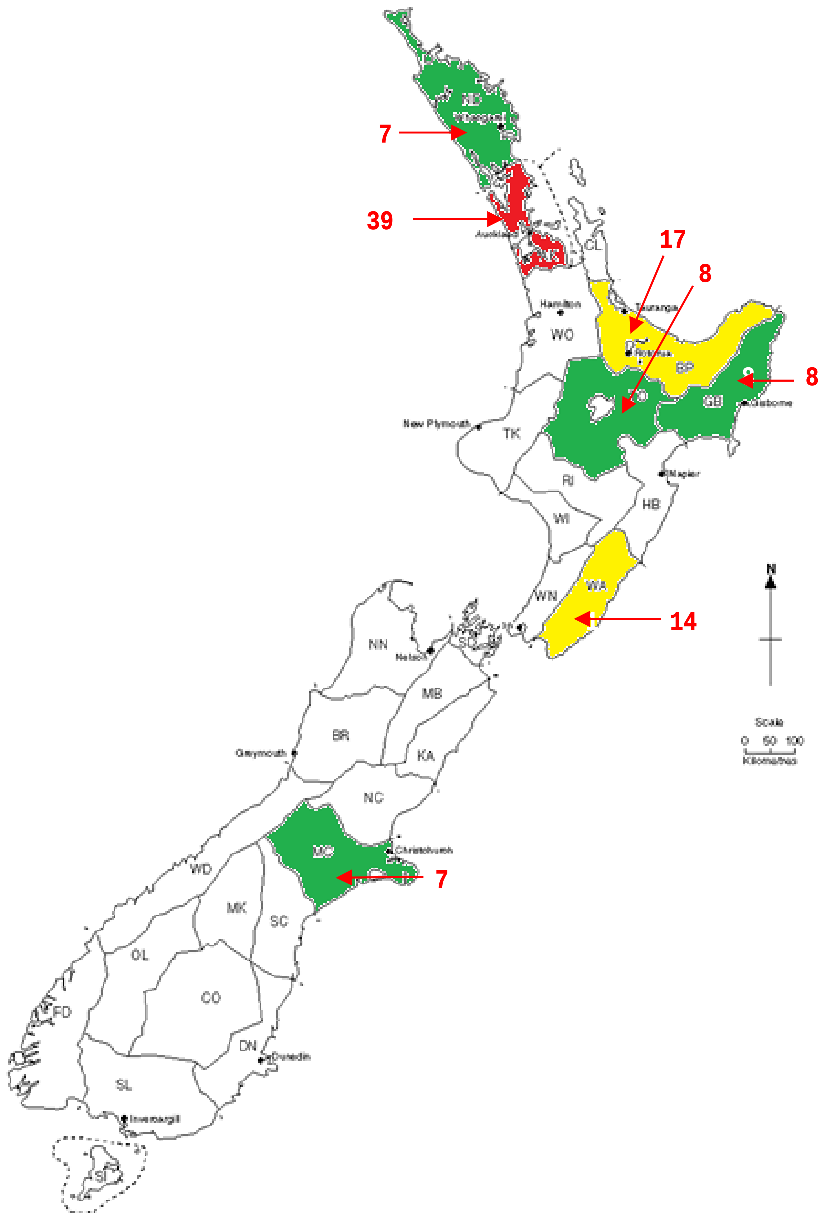
- Forest surveillance
  - Forest grower funded
  - Commercial plantation forests
  - Aerial survey
  - Drive-through survey
  - Transects on foot
  - High risk forest site plots



Approach - problems

- New records very frequent in Auckland, Wellington, BoP
- Reflects arrivals or effort?
- Does first record equate to first establishment
- How do we overcome those problems?

New pest records from 1988 to present



Approach - effort

- First investment = biggest gain

Carter — Risk assessment and pest detection surveys 361

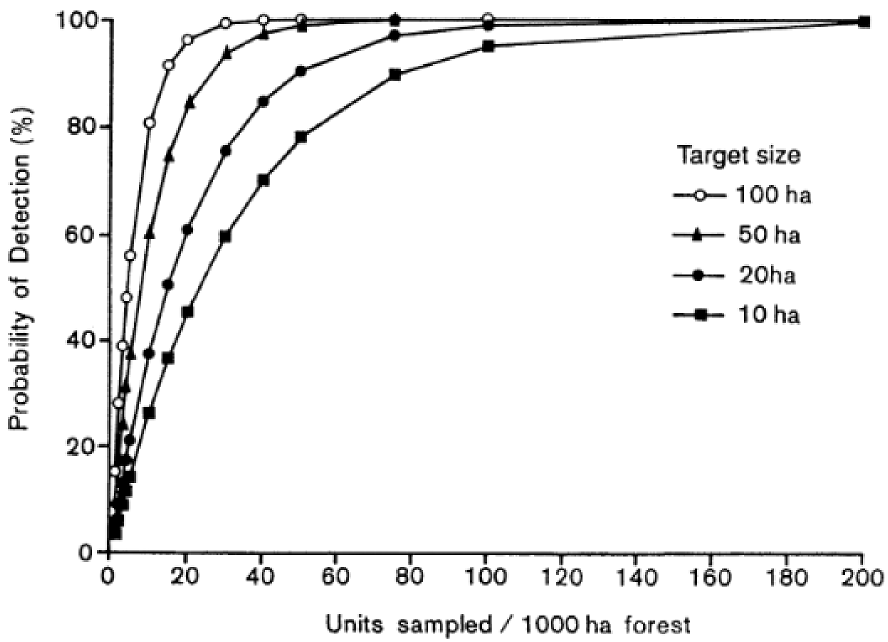
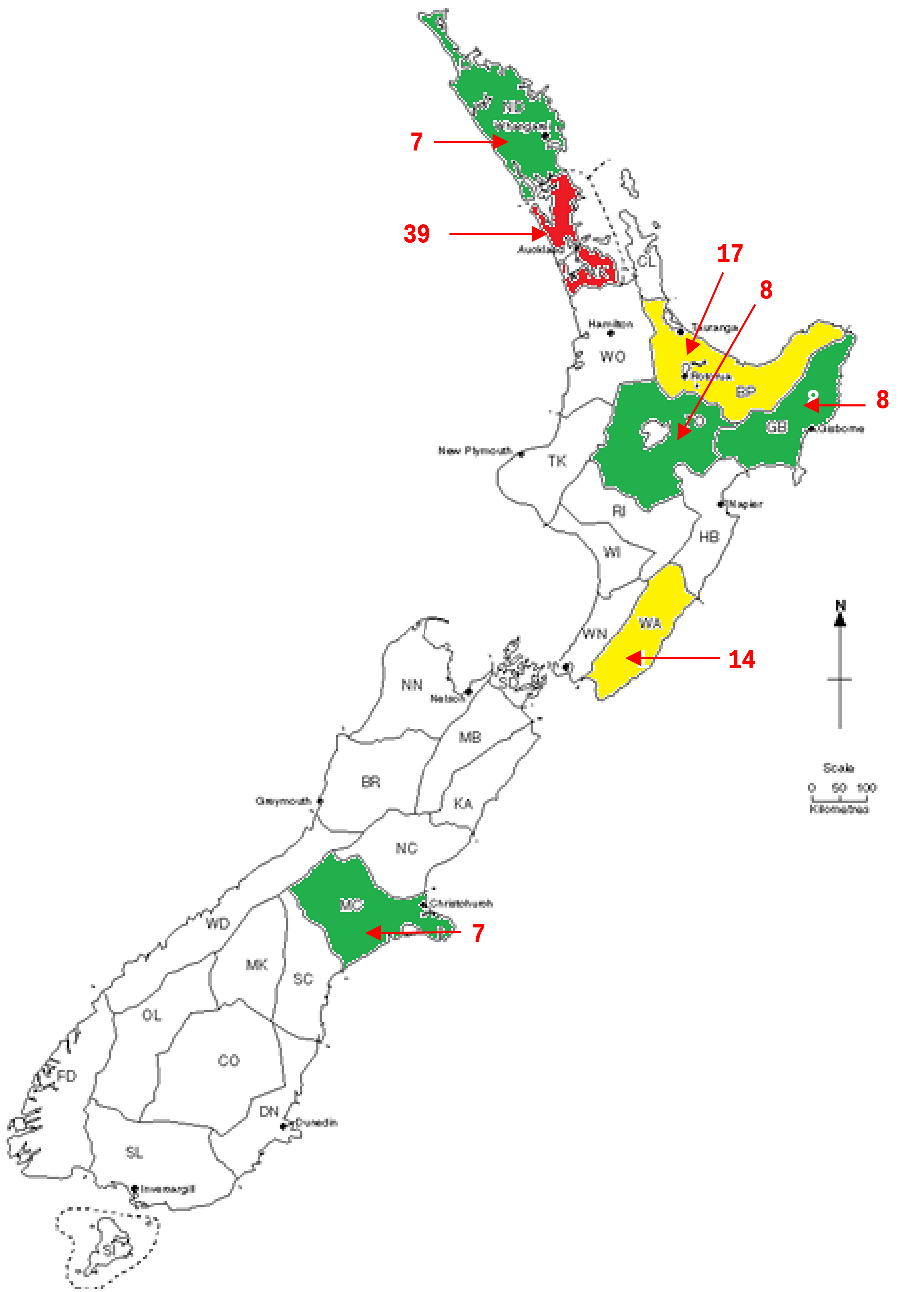


FIG. 2 — Probability of detection of target using random point sampling

Approach - method

- What pests may arrive?
- How do they arrive?
- Where do they arrive?
- Will they establish?
- Answers will tell us:
  - Where to look
  - How to look

New pest records from 1988 to present

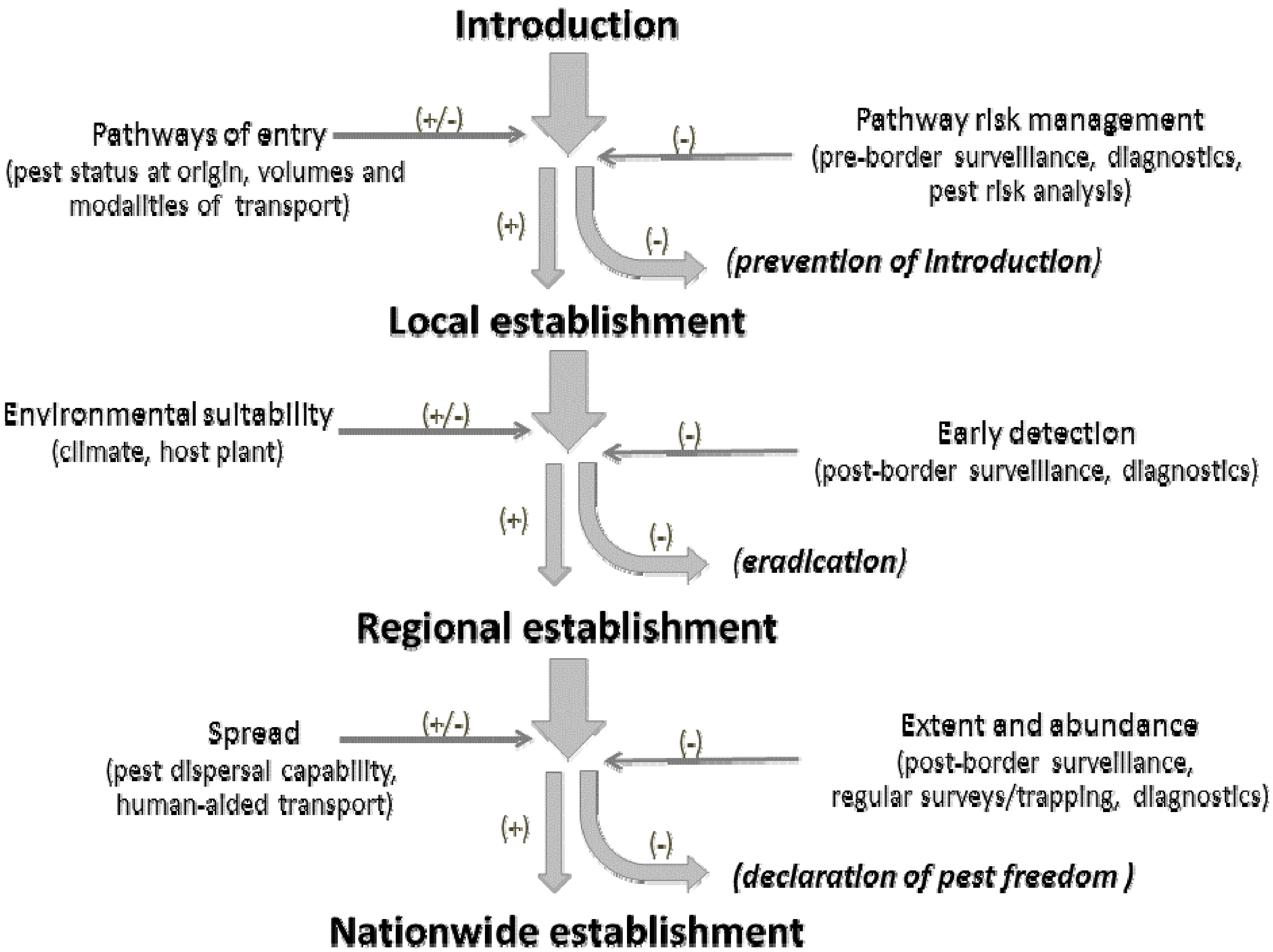


Approach

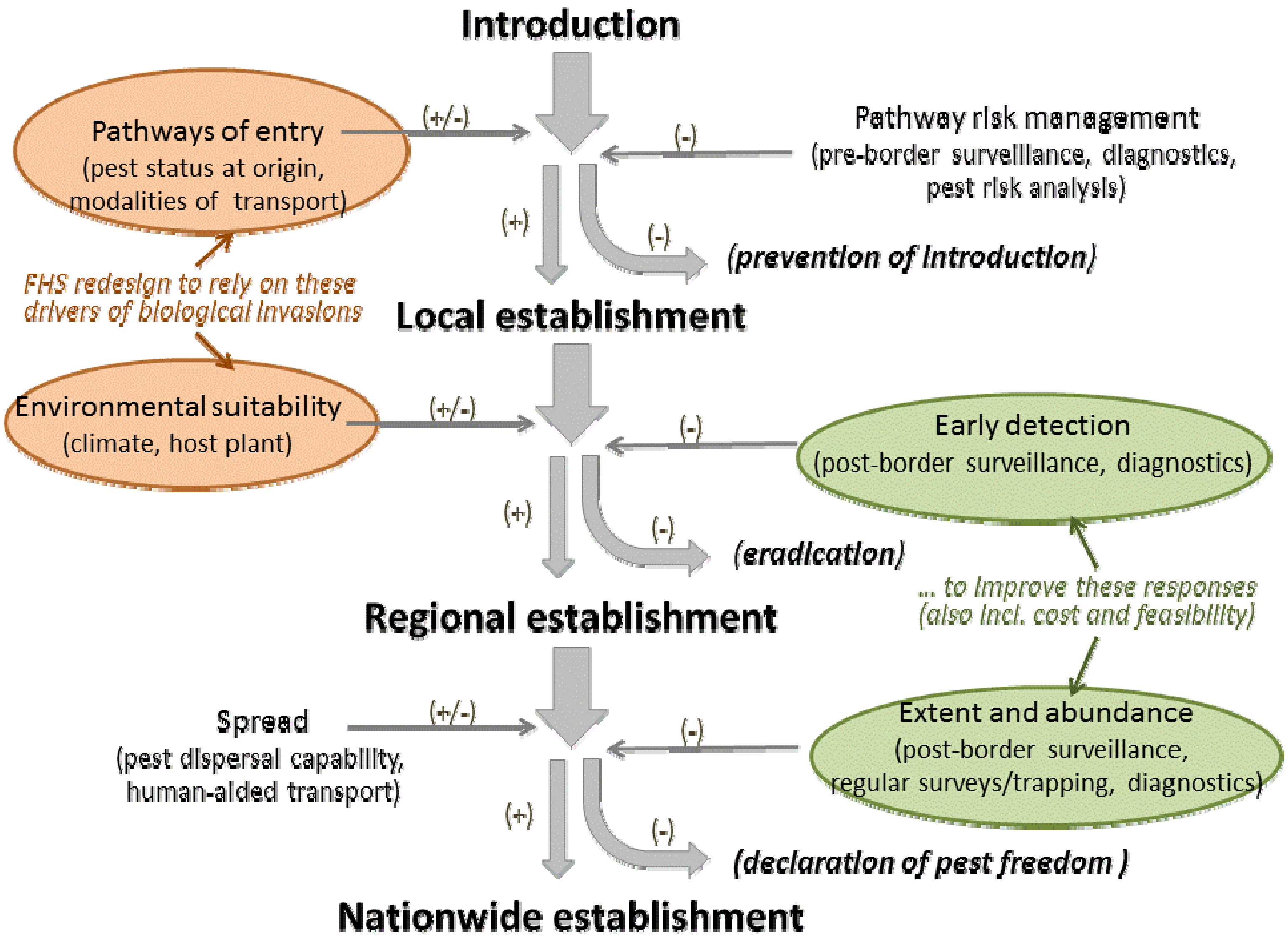
- Design a new forest surveillance system with allocation of effort based on risk and benefit
- Scope includes both HRSS and Forest surveillance
- Brought together a project team – researchers and industry
  - MPI
  - FOA
  - B3 (Scion, AgR)

- Co-opted international experts
  - Bayesian Intelligence, USDA CEBRA

Introduction-spread theory

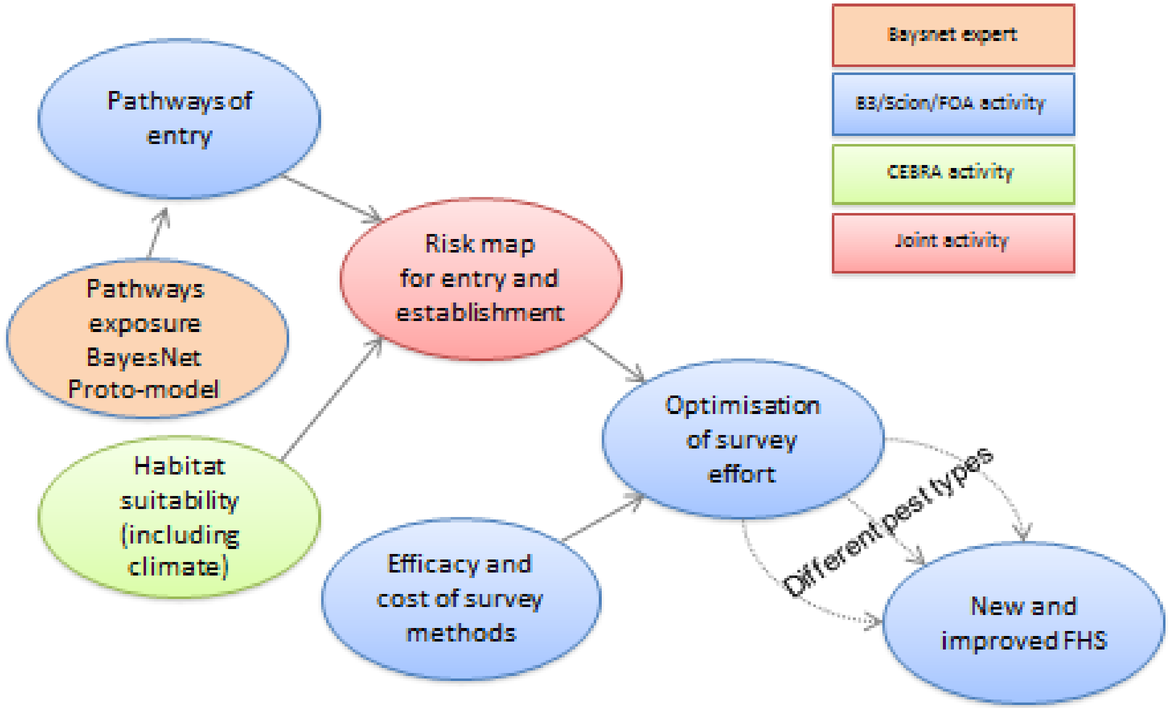


Introduction-spread theory



Approach

- Use expert knowledge, statistical methods and modelling to determine:
  - Where pests are most likely to arrive and establish
  - Best methods to detect new pests quickly
  - The optimal effort



The plan

- Pathway analysis to establish likelihood of arrival at all locations
- Climate and host suitability to estimate likelihood of establishment
- Use three pests (gypsy moth, Asian longhorn beetle, *Phytophthora ramorum*) as case studies
- Use new and historical 'new pest' record data to validate prototype
- Cost benefit analysis for each survey type
- Bring everything together in an optimisation model
- Adopt new system after operational use and further refinement

FHS redesign timeline

Before June 2014
- Continue surveillance as is

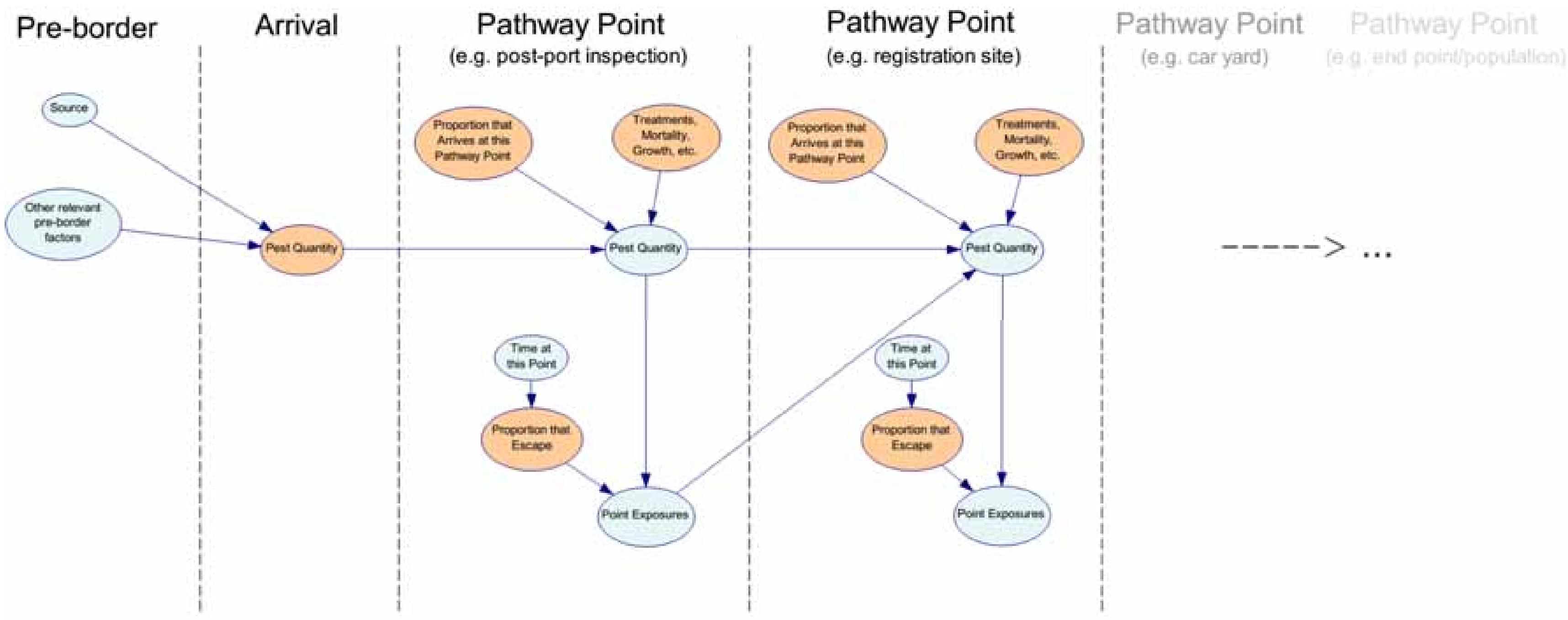
July 2014
- Initiate FHS redesign project
- Collect more data as needed

June 2015
- Deliver prototype of improved FHS platform

July 2016
- New FHS implemented

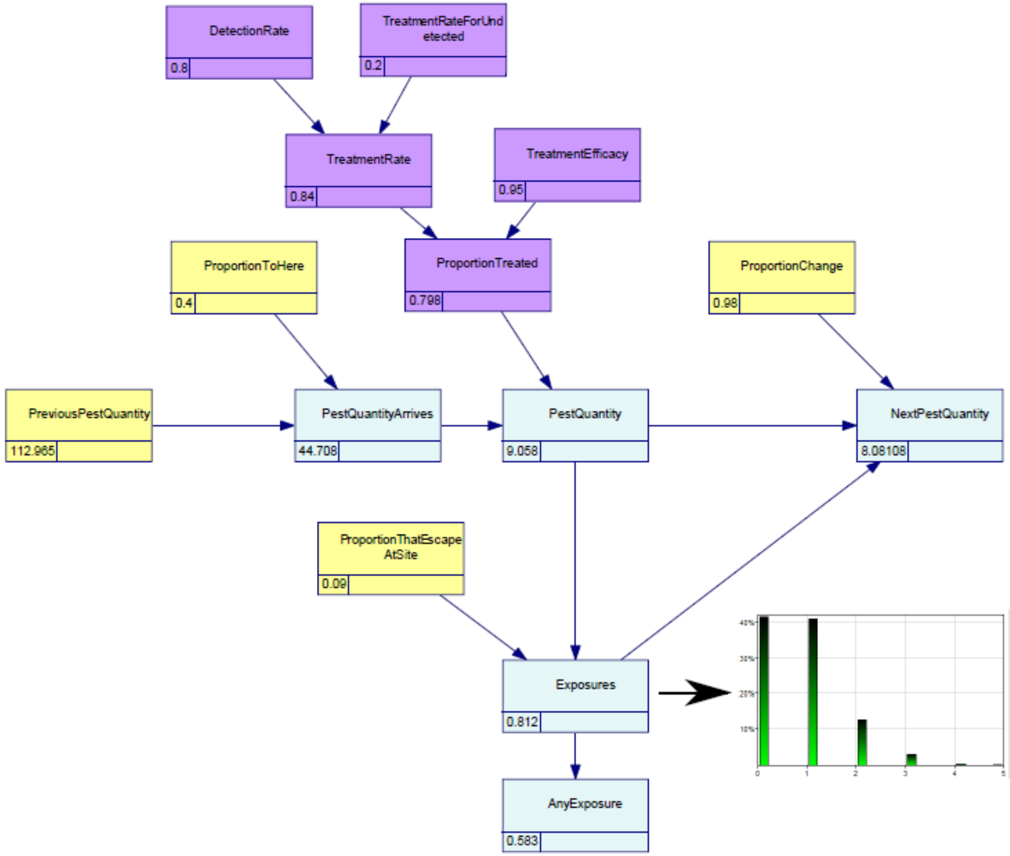
Recent progress

- Pathways data collected (i.e. vessel, cargo, container, passenger arrivals by entry point, used vehicles)
- Protocols for developing a habitat suitability model developed
- Generic pest pathway model outlined



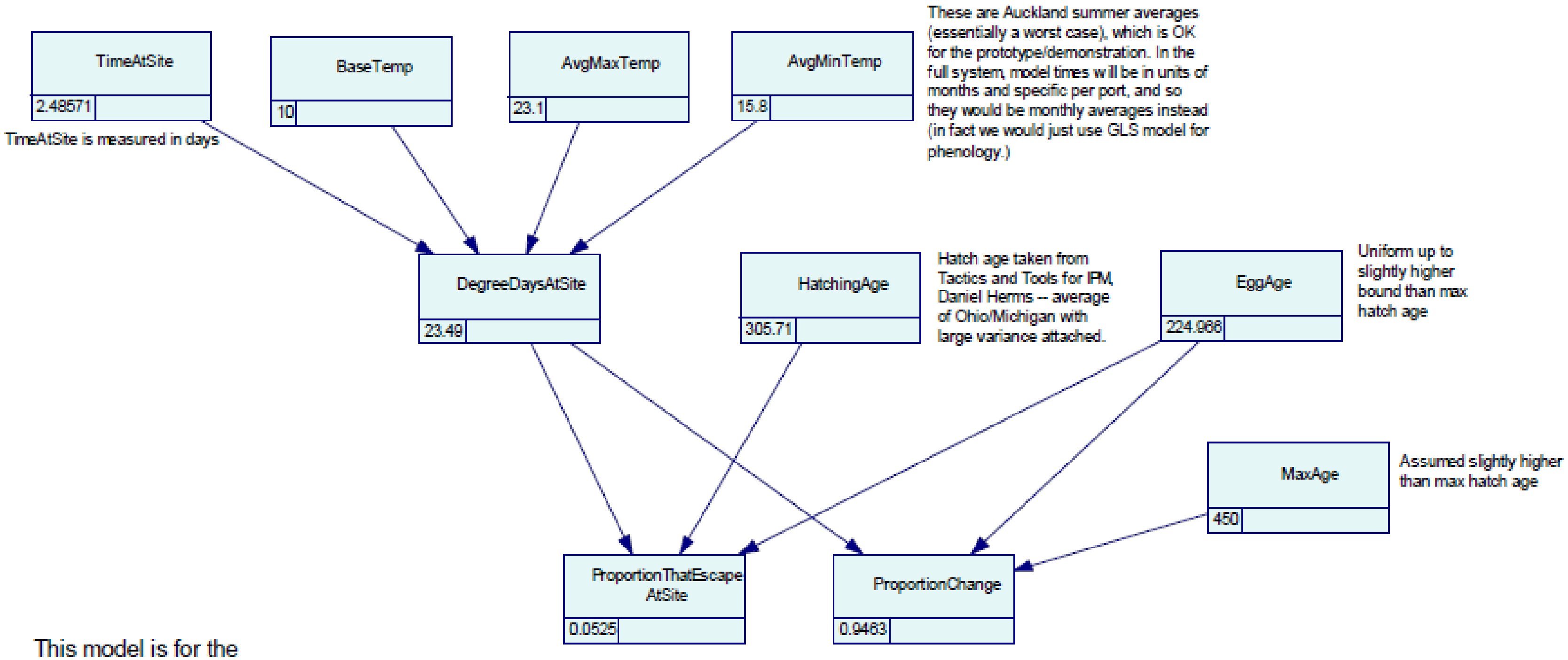
Pathway Point Detail model

- Models number of pests arriving from previous pathway point, how many are moved and how many escape



Escape at Site Model

- Key input is time spent on site



This model is for the prototype only, and is expected to be dramatically changed or replaced for a full system.

Exposure map

- Ports, car yards, and exposure end points

Summary

- It is not logistically possible to inspect all New Zealand’s plantation forests
- All forests can be protected by a robust risk-based system
- Early pest detection will improve eradication outcomes
- Surveillance will facilitate progress on trade talks
- We have taken a ‘build the best team’ approach
- Our approach is robust, the work is on track and will deliver

Acknowledgments

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FOREST OWNERS ASSOCIATION