



**Landcare Research**  
**Manaaki Whenua**

## **Outcome focussed** regional council pest management programmes

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# Background and Context



- NZ Biosecurity Strategy Expectations
  - transparent and effective performance measures
  - ongoing assessment and review of both individual programmes and the overall system
- BCR Forum’s “Strategic Priorities for Pest Management”
  - Priority 4. “Indicators and Monitoring”
- MAF Future of Pest Management initiative
  - Performance Measurement Framework for pest management in NZ
  - Measurement and Review work stream

# FOPM - National Pest Management Outcomes



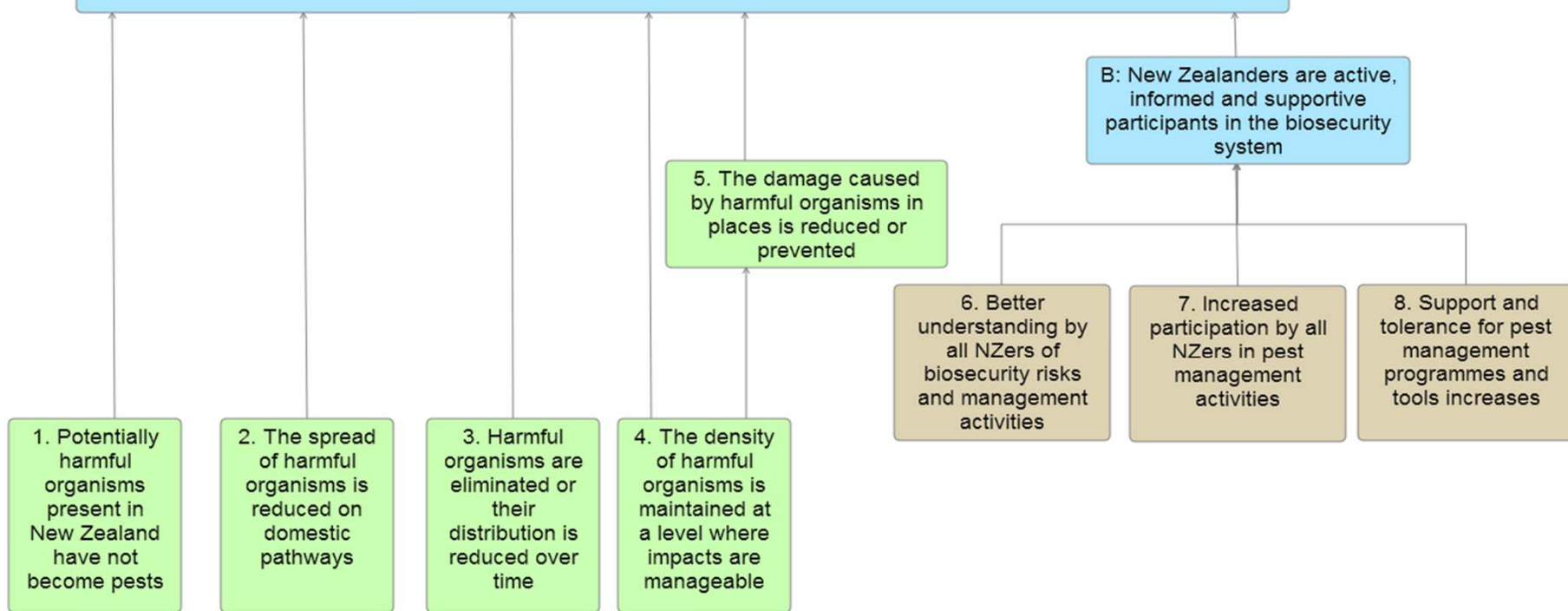
Outcomes that biosecurity contributes to



Overall Pest management Outcomes

A: Unwanted damage caused by harmful organisms that have established in New Zealand is prevented or reduced

Pest management intermediate outcomes



# Issues - performance measurement in RC biosecurity programmes



- Often no clear, explicit links between activities and objectives/outcomes ..... *Why do you control pests?*
- Measures and indicators often not appropriate for identifying success
- Difficulties in measuring performance in site-led programmes

# Issues - performance measurement in RC biosecurity programmes



- Current resources and capabilities limit councils' ability to measure outcomes
- Organisational inertia – programmes carried out because “*that’s the way we’ve always done it*”
- Reporting = activity and output-based “*How we keep busy*”

# Linked projects facilitating RC outcome monitoring and reporting



How to define outcomes?

## **1. Defining pest management outcomes**

(Generic processes; includes biodiversity)

*THIS PROJECT*

Which biodiversity indicators?

## **2. Regional Council terrestrial biodiversity monitoring framework**

(Common, aligned biodiversity indicators)

How to measure?

## **3. Terrestrial biodiversity monitoring system**

(Measurement methods and data management)

# 1. Measuring pest management outcomes



- Envirolink Tools/MAFBNZ- funded project
- Run by Landcare Research (Jones/Cowan)
- Sept. 2010 to March 2012
- Workshops with council biosecurity/planning staff
- Development of resource package (“how to do it”)
- Encourages use of common approach (intervention logic modelling) with national performance measures and DOC/AHB processes

How to define outcomes?

Which indicators?

How to measure?



## 2. Regional Council terrestrial biodiversity monitoring framework



How to define outcomes?

Which indicators?

How to measure?

- Landcare Research (Bill Lee) with RC Biodiversity Forum (TFBIS/LCR- funded)
- Key output = set of common biodiversity outcome indicators
- Performance indicators will be compatible with DOC's NHMS indicators

### 3. Terrestrial biodiversity monitoring system



How to define outcomes?

Which indicators?

How to measure?

- Envirolink Tools from July 2011 (P. Bellingham LCR)
- Development of standard methodologies and protocols for data capture (field methods, data management and analysis)
- Long-term maintenance of the system
- Optimal hosting and maintenance of data collected

# Envirolink Tools – Regional Council



## Outcomes Monitoring

- Workshops in performance measurement best practice for biosecurity staff
- Best practice outcomes monitoring advice incl. identification of outcome indicators
- Development of training resource
- Identifying opportunities for alignment between National Pest PMF and RPMSs
- ID. research gaps and opportunities for RC collaboration



# Why measure performance?

It's not about you

It's about the programme

# Why measure performance?



- To measure the progress of a programme towards achieving its goals

**“Are we there yet?”**

- To inform “stopping rules”

**“If we’re not, should we keep spending money on this programme?”**

- Programme improvement

**M.E.R.I** (Monitoring, Evaluation, Reporting, Improvement)

# Why measure performance?



- Demonstrate that resources applied to pest management deliver the maximum possible value to tax- and ratepayers

## **Most bangs per buck**

- Communicate value to communities and key stakeholders more effectively

## **Clear, simple reporting**



**The basic concept**

**Logic Models**

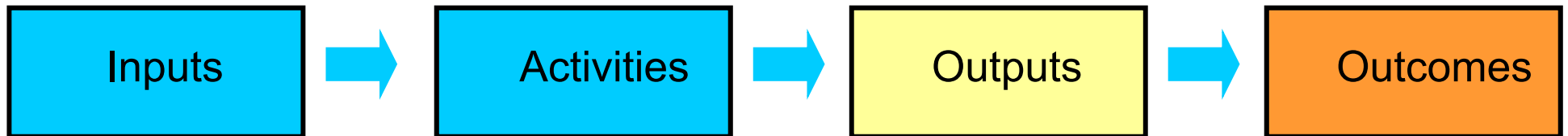


# The basic concept: logic models

- A simple illustration of the logic behind a policy, programme, or initiative
- Demonstrates links between :
  - (i) the theoretical assumptions/principles of a programme
  - (ii) programme activities/processes
  - (iii) the desired outcomes (short and long-term).
- Highlights how results will be monitored and evaluated.



# A simple logic model



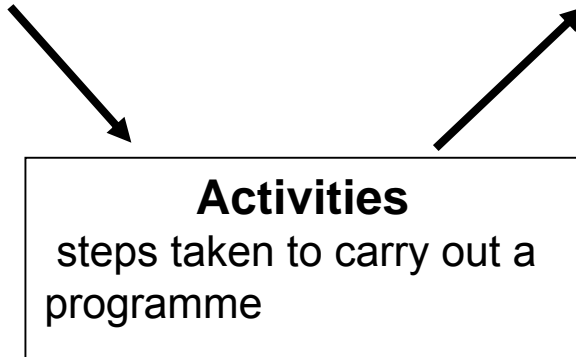
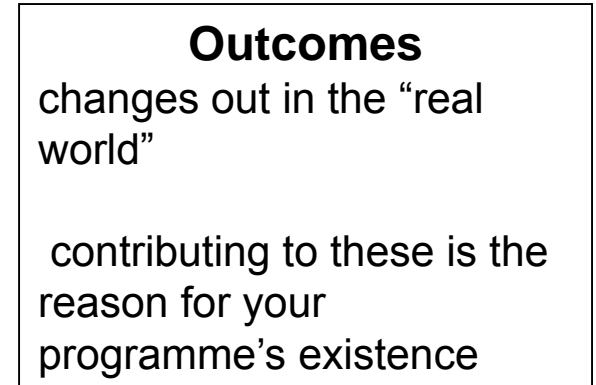
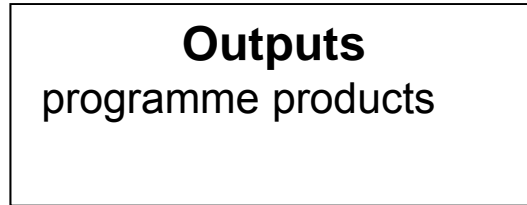
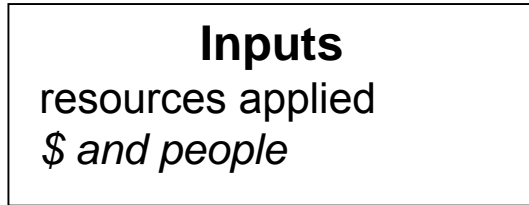
- A picture of how you believe your programme is going to work
- Demonstrates the order of activities and how these activities connect to the expected programme results
- What is invested, what is done, and what results

# “Keeping busy” vs. “making a difference”



*What we use*

*What gets delivered*



*How we keep busy*

*What difference we make*

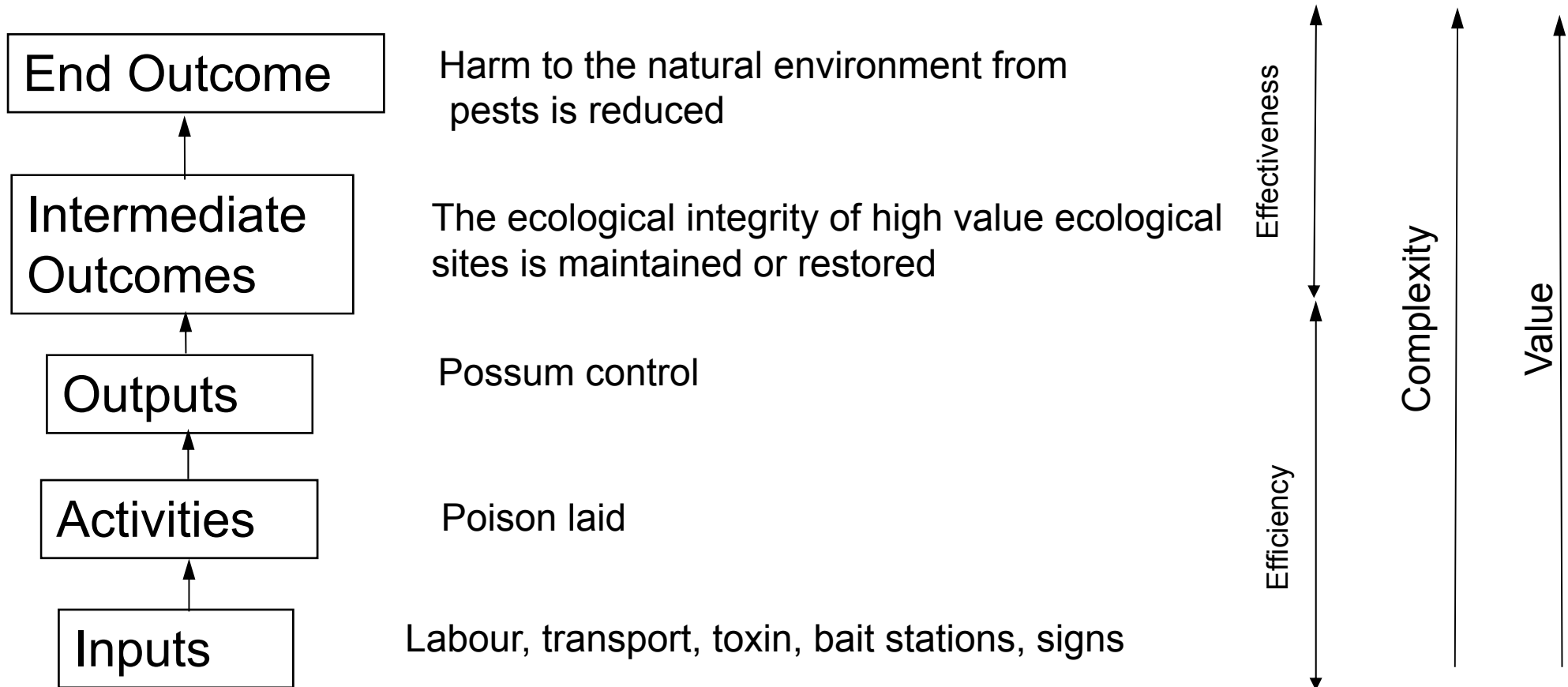
*What happens as a result*

**EFFICIENCY**

**EFFECTIVENESS**

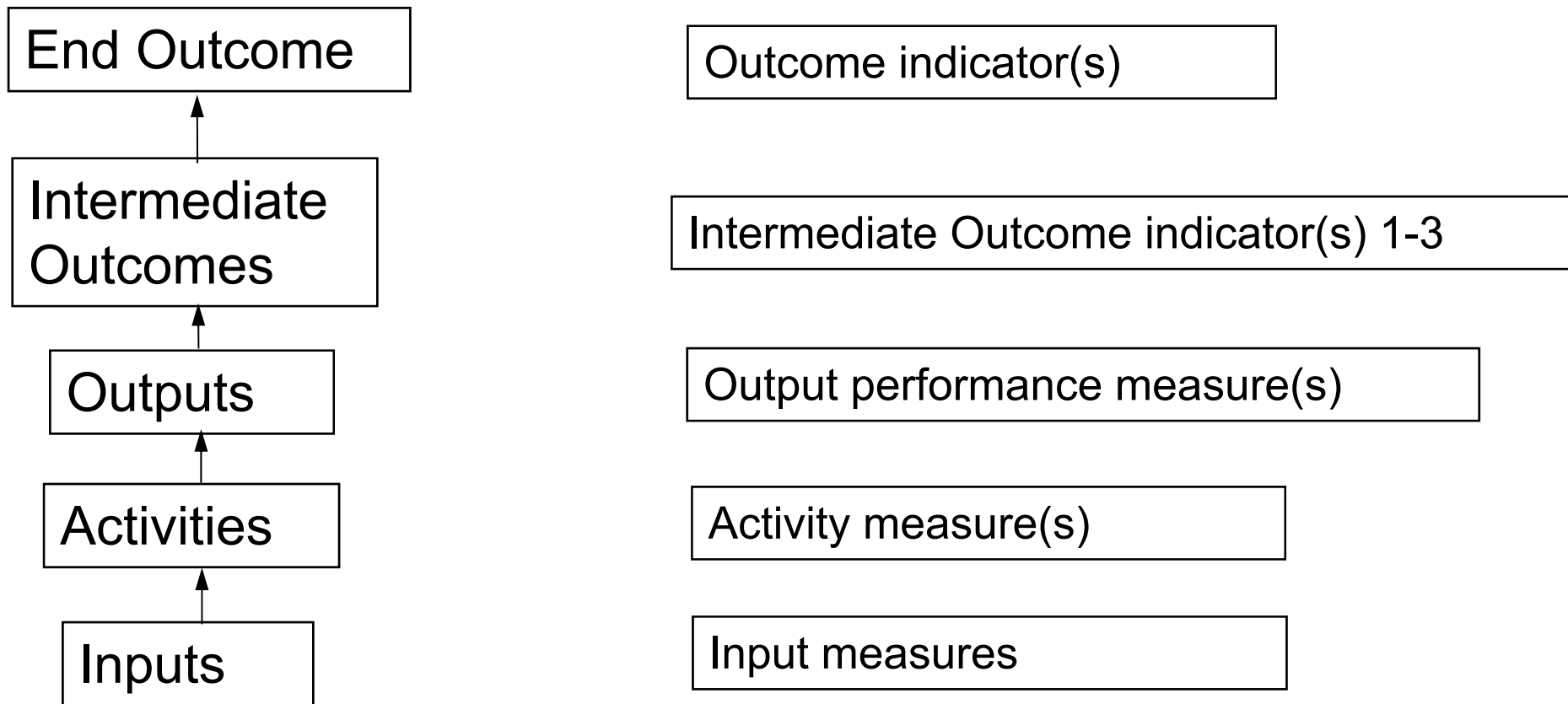


# Intervention logic pest example



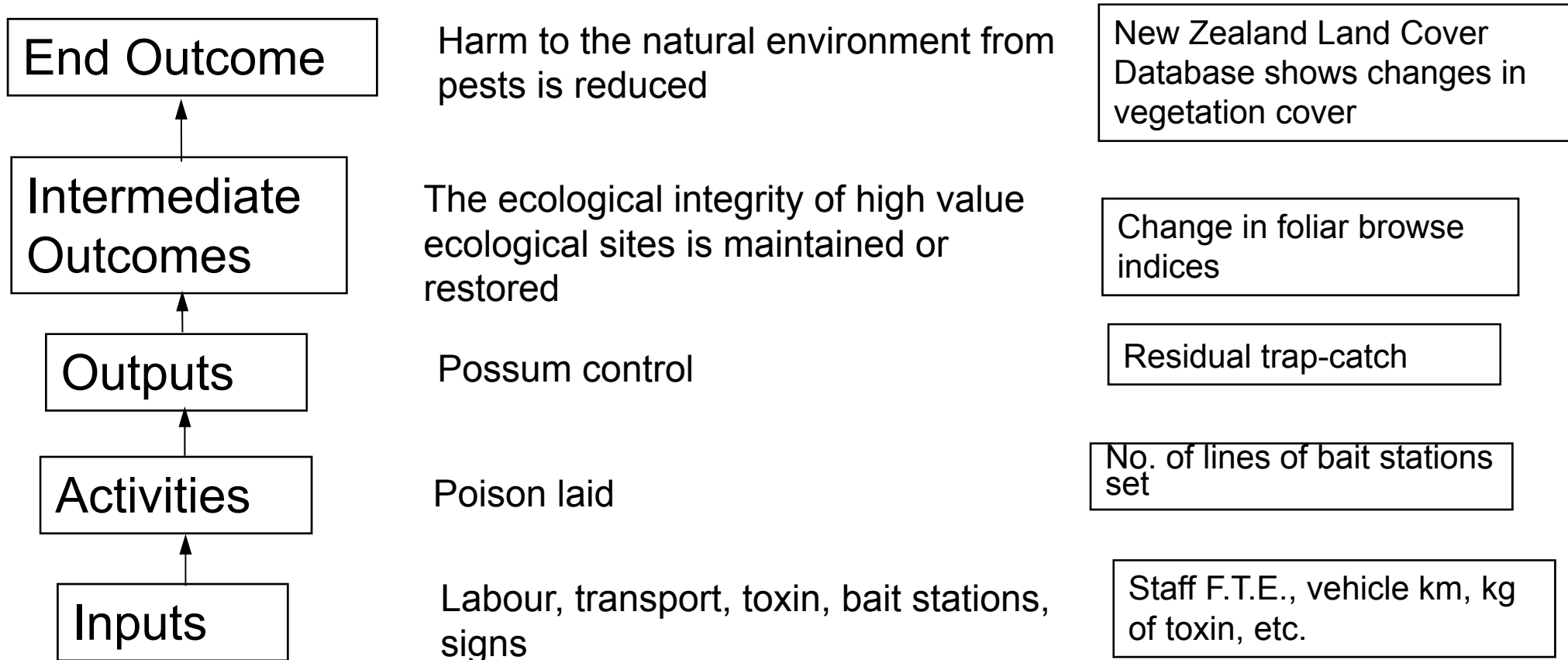


# Indicators and measures





# Pest indicators example



# Key steps in developing an ILM:



- Scoping: define the programme boundaries
- Develop an outcomes hierarchy: aims and expectations (**S.M.A.R.T.**)
- List risks, assumptions and influential factors
- Evaluation: indicators, measures and targets



# Scoping

- Is the programme's end outcome achievable in the timeframe?
- Who are the key end-users and stakeholders?
- Are there robust cause-and-effect links to justify interventions?
- What outputs are likely to be required?
- What are the costs likely to be?
- Are sufficient resources available?

# Writing outcome statements 1



- Describe the desired change in the resource
- Be succinct (max. 10 words)
- Say ‘what’ not ‘how’. The ‘how’ is a later step
- Define the key terms used in the statements
- Use plain English words in the statement—no ambiguity



# Writing outcome statements 2



**SMART objectives:** Specific, Measurable, Achievable, Relevant, Time-limited

<b>Who/what</b>	<b>Change/desired effect</b>	<b>In what</b>	<b>By when</b>
Residents in the crime control area	decrease	Their loss of property	within one year of the project start
Police	increase	Crimes investigated	by Dec 2010
People on release from prison	increase	In long-term employment	Over five years

# Writing outcome statements 3



<b>Who/what/where? (the target subject)</b>	<b>Change/Desired effect</b>	<b>In what (expected results)</b>	<b>By when</b>

# Writing outcome statements 3



<b>Who/what/where? (the target subject)</b>	<b>Change/Desired effect</b>	<b>In what (expected results)</b>	<b>By when</b>
Seabird-dominated coastal ecosystems on Stewart Island	Increase	Extent	2035

# Outputs and outcomes



Programme	Outputs	Outcomes
Crime control	Scheduled patrols Responses to calls Crimes investigated Arrests made	Reduction in crimes committed Reduction in deaths and injuries resulting from crime Less property damaged or lost due to crime
Highway construction	Project designs Highway miles constructed Highway miles reconstructed	Capacity increases Improved traffic flow Reduced travel times Reduction in accidents and injuries



# Outcomes and Intermediate Outcomes

## Outcomes

- The state or change in state of a condition of significance to the community or ecosystem resulting from intervention
- Medium- to long-term time frame

## Intermediate Outcomes

- One or more steps or stages that are necessary to achieve the Outcome
- Short to medium term time frame
- May have differing durations

For example, the Outcome of “Healthy Native Forests” may require Intermediate Outcomes about native animal and plant species restoration, formal protection of sites, etc...



# Performance indicators

For **activities** and their **outputs**, indicators are direct counts of how:

- Much
- Many
- Good
- Quickly

This type of information is already collected and reported in most programmes

# Identifying outcome indicators



Clear, well-written outcome statements *should* mean that the appropriate performance indicator is pretty obvious

Try to assign at least one for each outcome

**No, you can't measure them all!**

# Criteria for performance indicators



- **Robust**
- **Comparable**
- **Capable of aggregation**
- **Use readily available data**
- **Utility**
- **Simple and understandable**
- **Sensitive and specific**
- **Consistent and repeatable**
- **Valid**





# Indicators: a process

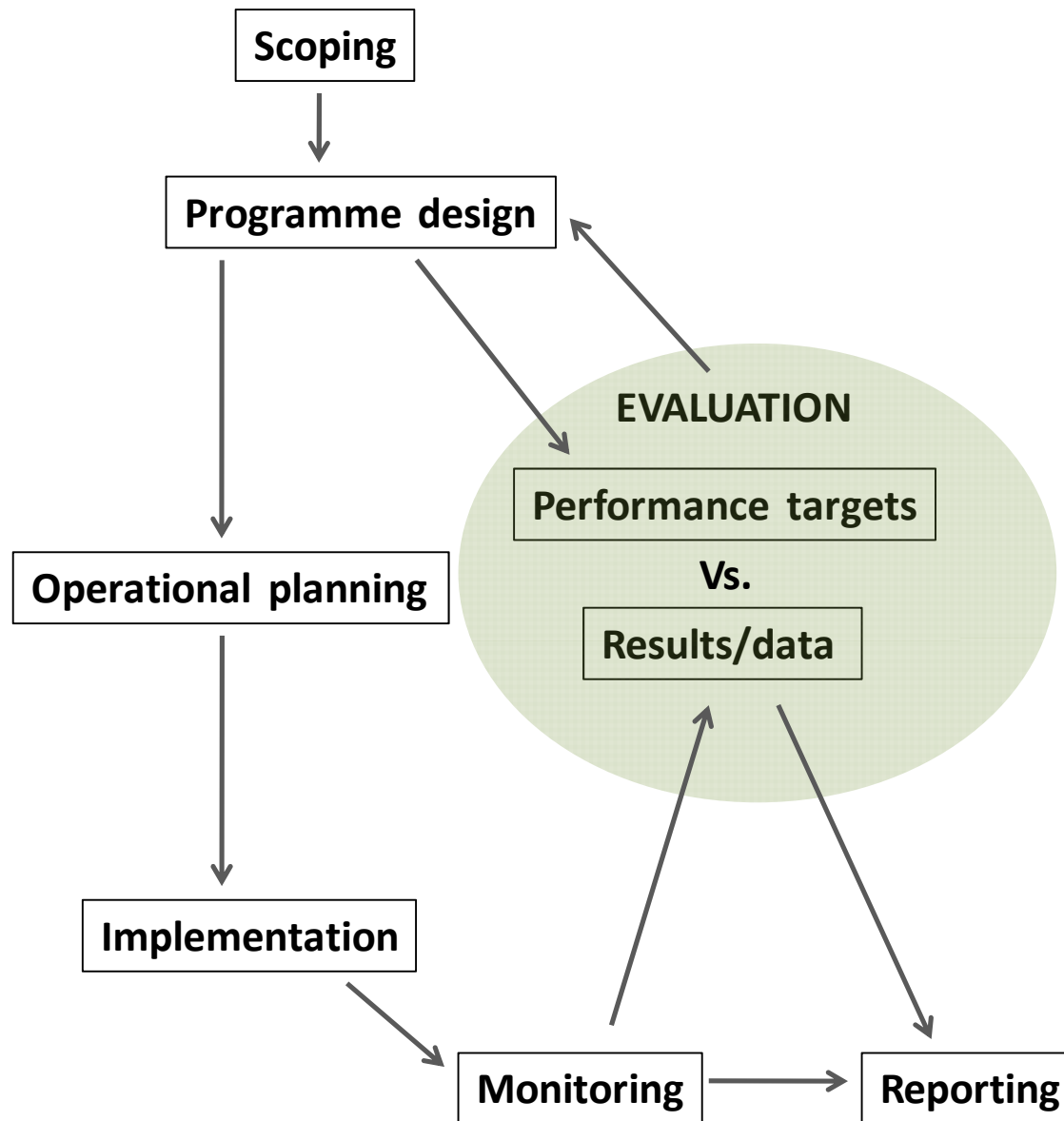
1. Collate a “candidate set” of potential indicators (Use existing SOE indicators?)
2. Assess vs. pre-determined criteria
3. Identify a sub-set of the **vital few** indicators that best reflect overall performance of the programme
4. Take reporting needs into account

# Evaluation: are we there yet?



- **Comparing** the actual outcome indicators to forecasts
- **Interpreting** the reasons underlying any differences
- **Amending** the programme in the light of this information

# Evaluation: review to improve



# Reporting: targeted readerships



National Outcome from pest management	MAF Biosecurity; Minister
Regional (LTCCP) outcome	C.E, council, community
Programme intermediate outcome	C.E, council, community
Outputs	Managers, council biosecurity committee, community
Activities	Managers, council biosecurity committee, community
Inputs	Managers, council biosecurity committee, accountants



# Common Headaches

**Attribution:** so many things can affect outcomes in natural systems, how can we be sure that what we do leads to an outcome?

**Time-lag:** outcomes might take 20 years to achieve, how can this be made to fit with our reporting requirements?



# Dealing with attribution and time-lag

- Robust, justifiable and transparent links in a programme's logic hierarchy (i.e. can an effect be reasonably assumed based on prior evidence?)
- Focus on INTERMEDIATE OUTCOMES that can be attributed directly to programme activities at a measurable timescale
- Use PROXY INDICATORS
- Use a formal experimental design or a statistical analysis of attribution
- Use qualitative measures of progress

# Example: clearer attribution via more intermediate outcome levels



<b>Outcome</b>	Harm to economic activity from pests and diseases is prevented or reduced	<b>Outcome indicator</b>	Trend in aggregated economic measures for primary production sector
<b>Intermediate outcome I</b>	Increased stock productivity over 5 years	<b>Intermediate outcome I indicator</b>	Kgs of product per hectare (e.g., milk solids, meat)
<b>Intermediate outcome II</b>	Increased pasture growth over 2 years	<b>Intermediate outcome II indicator</b>	Pasture dry matter yield per hectare.
<b>Output</b>	Weed control	<b>Output performance measure</b>	Weed species distribution and density
<b>Activity</b>	Spraying/grubbing	<b>Activity measure</b>	No. of plants removed/area sprayed
<b>Input</b>	Labour, herbicide	<b>Input measure</b>	Costs; staff FTE

# Proxy Indicators



An indirect measure of progress when:

- time lag significant
- impractical to measure directly (cost or other reasons)
- **Use must be justified by robust, defensible logic**

For **Containment Pests**, changes in density and distribution are proxy indicators of changes in pest **impacts**

## **Example:**

- Privet is controlled because of its supposed impacts on human health: asthma; poisonous berries
- No information available to measure changes in the human health impacts of privet
- Assumption: less privet in the environment → less impact on human health
- On that assumption, changes in privet density and distribution may be adequate indicators of progress toward an outcome of “people living well in healthy communities”



# Examples 1. Saffron thistle (with indicators)



Regional Community Outcome

A strong, prosperous and thriving economy

Programme Outcomes

By 2025, relative on-farm saffron thistle control costs on at-risk farms are reduced by 50% compared to 2012 baseline costs

By 2050, at-risk farms suffer no pasture productivity losses due to saffron thistle

- Total annual expenditure on contractors to control saffron thistle

Total annual expenditure by council on on-farm saffron thistle control

- Total known area of saffron thistle infestation [note: this is a proxy indicator]

Intermediate Outcomes

By 2022, the density of saffron thistle infestations on affected properties has declined by 15% compared to 2012 baseline

- Proportion of affected properties requiring plant-counts [only used for low-density infestations]

Plant-count data from infested properties

By 2027, the number of properties requiring aerial control of saffron thistle has declined by 50% compared to 2012 baseline

- Number of properties requiring aerial control of saffron thistle per year

By 2022, 90% of occupiers of infested properties use best-practice saffron thistle control methods

- Proportion of occupiers receiving > 2 visits by council staff to ensure compliance

By 2017, a cost-effective adaptive management programme for saffron thistle is in place and reviewed annually

- Programme operates within budget

Proportion of biosecurity budget required for saffron thistle programme

Evidence that monitoring data are used to modify/improve saffron thistle control programme

Outputs

Plants killed/removed

Maps, database – distribution and plant-count data

New control tools; reports

Farm visits, field-days; educational media

RPMS; reports, contracts; regulations; enforcement notices

Activities

Control operations: aerial and ground spraying; grubbing

Surveillance and monitoring

Research: novel control methods; dispersal modelling

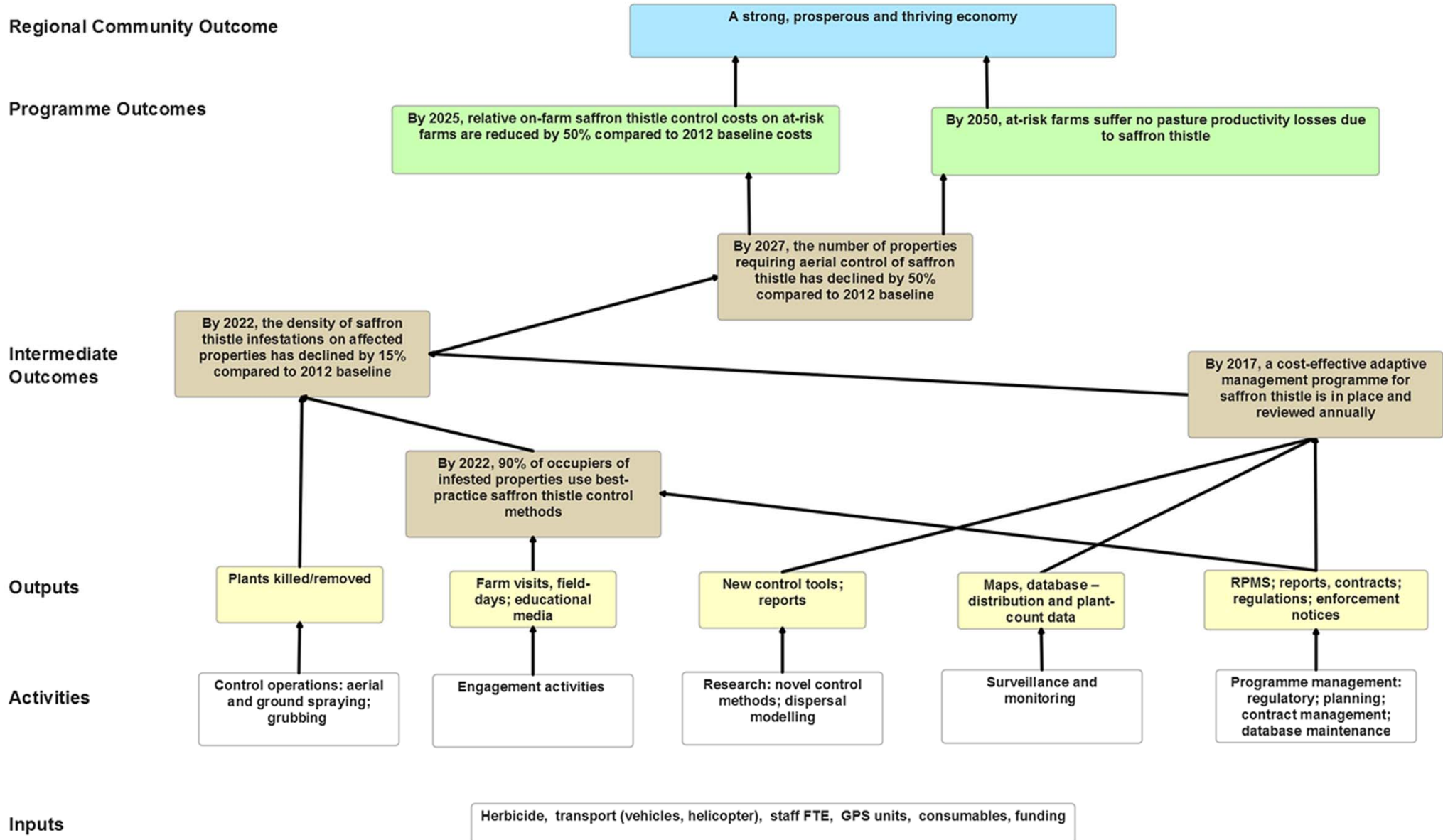
Engagement activities

Programme management: regulatory; planning; contract management; database maintenance

Inputs

Herbicide, transport (vehicles, helicopter), staff FTE, GPS units, consumables, funding

# Examples 2. Saffron thistle (with links)



# Examples 3. Regional possums (with indicators)



Regional Community Outcome

A strong, prosperous and thriving economy

Programme Outcomes

By 2025, relative on-farm saffron thistle control costs on at-risk farms are reduced by 50% compared to 2012 baseline costs

By 2050, at-risk farms suffer no pasture productivity losses due to saffron thistle

- Total annual expenditure on contractors to control saffron thistle
- Total annual expenditure by council on on-farm saffron thistle control

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By 2022, the density of saffron thistle infestations on affected properties has declined by 15% compared to 2012 baseline

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By 2017, a cost-effective adaptive management programme for saffron thistle is in place and reviewed annually

- Proportion of affected properties requiring plant-counts [only used for low-density infestations]
- Plant-count data from infested properties

- Number of properties requiring aerial control of saffron thistle per year

- Proportion of occupiers receiving > 2 visits by council staff to ensure compliance

- Programme operates within budget
- Proportion of biosecurity budget required for saffron thistle programme
- Evidence that monitoring data are used to modify/improve saffron thistle control programme

Outputs

Plants killed/removed

Maps, database – distribution and plant-count data

New control tools; reports

Farm visits, field-days; educational media

RPMS; reports, contracts; regulations; enforcement notices

Activities

Control operations: aerial and ground spraying; grubbing

Surveillance and monitoring

Research: novel control methods; dispersal modelling

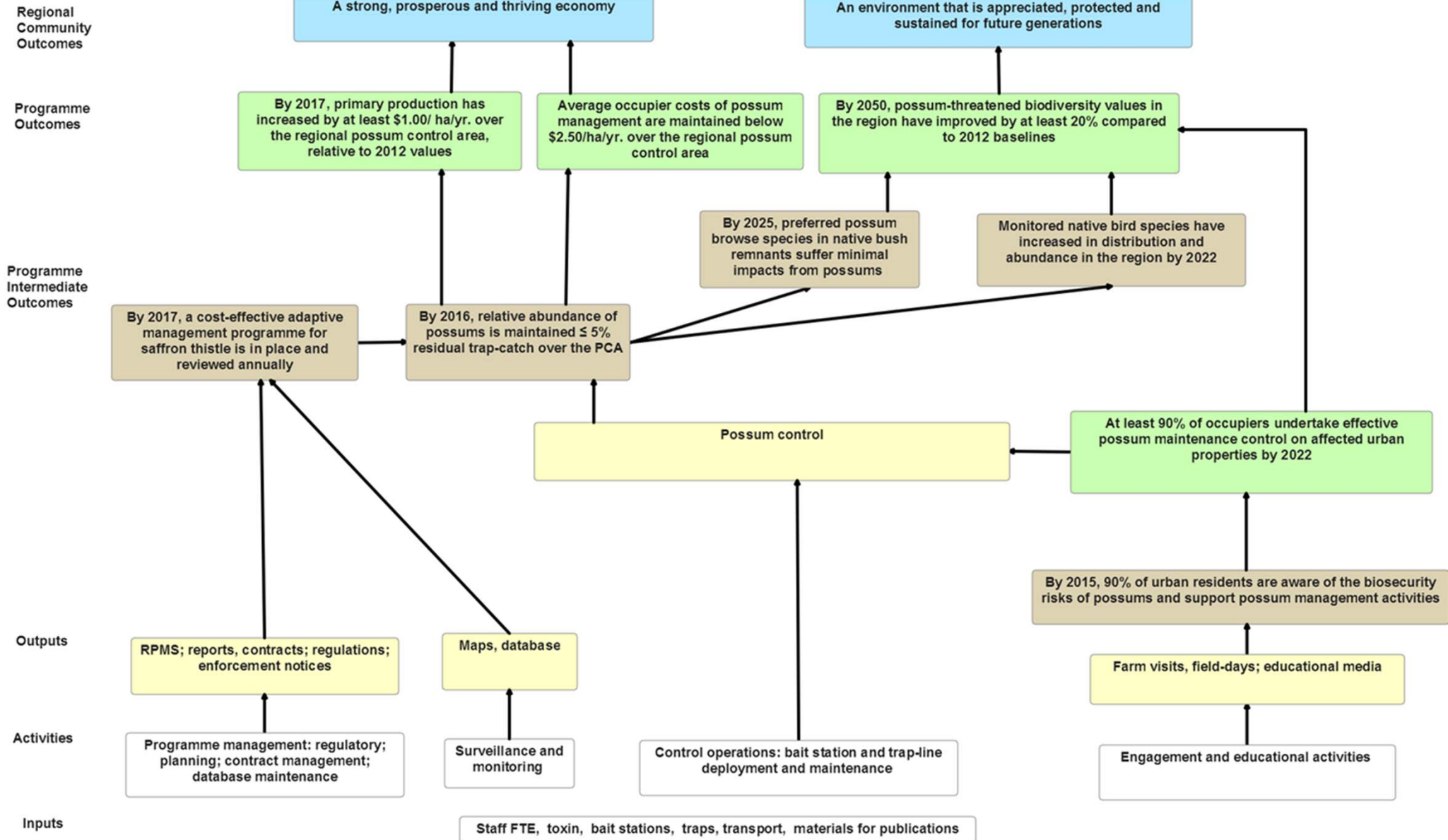
Engagement activities

Programme management: regulatory; planning; contract management; database maintenance

Inputs

Herbicide, transport (vehicles, helicopter), staff FTE, GPS units, consumables, funding

# Examples 4. Regional possums (with links)





# Examples 5. Multi-pest site (with indicators)



Regional Community Outcome

An environment that is appreciated, protected and sustained for future generations

Regional Outcome (possum control programme)

By 2050, possum-threatened biodiversity values in the region have improved by at least 20% compared to 2012 baselines

- Vegetation structure and composition

Contribution of indigenous palatable plant species and birds in representative ecosystems

Programme Outcome/ Regional intermediate outcomes

Healthy, functioning native bush remnants on Napier Hill are free of the impacts of introduced pests and weeds by 2030

By 2025, preferred possum browse species in native bush remnants suffer minimal impacts from possums

Monitored native bird species have increased in distribution and abundance in the region by 2022

- Density/basal area/canopy cover of indicator species at monitored sites

- Presence:absence data and 5-minute bird counts

Programme Intermediate Outcomes

Native bird populations on Napier Hill show a positive growth trend by 2015

Native plant species susceptible to damage by introduced pests increase in density and distribution in Napier Hill bush remnants by 2020

- Presence:absence data and 5-minute bird counts

- Density/basal area/canopy cover of indicator species at monitored sites

Control of possum and rat populations

- Residual trap-catch and tracking indices

Pest ecology and interactions are better understood

- Publication of peer-reviewed scientific papers

New best practice methodologies

By 2017, 90% of Napier Hill residents are engaged in and support pest management activities

- No. participating in garden bird survey

No. negative responses to management interventions

By 2015, 90% of Napier Hill Residents are informed and included in decision-making

- Environmental awareness survey

Outputs

Reports, contracts; enforcement notices

Maps, database, reports

Data, reports

Visits to properties, phonecalls to landowners/occupiers

Leaflets, web page, guidelines

Activities

Operational pest control: trapping, poisoning

Programme management

Surveillance and monitoring

Research activities

Engagement activities

Educational and informative materials produced and distributed

Inputs

Staff FTE, transport, contractor costs, toxins, traps, consumables for educational materials