

# Using a rubric to design and evaluate a passive surveillance system

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## Abstract

Pest and disease surveillance is essential for the early detection of unwanted organisms and demonstration of area freedom. Passive surveillance in New Zealand is enabled by the Exotic Pest and Disease hotline, and while this operates effectively, there is room for improvement. The Ministry for Primary Industries (MPI) has initiated a project to improve the engagement of stakeholders in passive surveillance and enhance notification channels. The first step in this project was to determine how to evaluate passive surveillance. While there are limitations with measuring the effectiveness of various dimensions of passive surveillance, rubrics are an easily applicable form of comprehensive assessment. Developing rubrics can help clarify the expectations that people have for different aspects of task or behaviour performance by providing detailed descriptions of collectively agreed upon expectations. A rubric for passive surveillance was developed during two workshops attended by members of MPI's Surveillance and Incursion Investigation team and social scientists. During the first workshop both social and technical components important to the functioning of passive surveillance were recognised and evaluated. At a second workshop the rubric was tested and refined by evaluating two industries. It was found that determining where passive surveillance was "emerging" or unknown allowed for easy identification and prioritisation of activities.

**Keywords:** *passive surveillance; system evaluation; system design; rubric*

## Introduction

Passive surveillance is an essential programme within New Zealand's surveillance systems for the early detection of unwanted organisms and demonstration of freedom from pests and diseases. While New Zealand's targeted surveillance programmes are highly sensitive and specific, they are limited to high risk sites, time periods or organisms (1). Passive surveillance however allows surveillance to be broadened to unexpected or emerging organisms at any time or place where humans visit (2,3,4). Timely detection in this system however is solely dependent on the participation of citizens. All New Zealanders have an obligation under the Biosecurity Act to report suspected exotic organisms. Reporting is enabled by a free Exotic Pest and Disease hotline provided by the Ministry for Primary Industries (MPI). While this system has enabled the detection of many exotic organisms, MPI believes that there is room for improvement in ensuring the participation of New

Zealanders. MPI has therefore initiated a project to improve the engagement of stakeholders in passive surveillance and enhance notification channels.

The first step in this project was to determine how to evaluate passive surveillance, followed by an assessment of New Zealand's current system. The literature on evaluating passive surveillance is currently limited. While it is clear that an effective surveillance system is one that enables early detection, this is most commonly only assessed after an incursion has occurred. Passive surveillance has been assessed in outbreak situations by comparing notifications to positive findings from active surveillance within certain areas (2), or to the output of a model of the likely distribution of the organism (3). Measuring passive surveillance during "peace time" is more difficult and is often done by measuring the quantity of notifications. However this depends on the level of pest and diseases in the population as well as human activities. Accuracy of notifications is also important to avoid unnecessary strain on resources. Quantity of notifications is therefore an inappropriate measure of passive surveillance, as the ideal number of calls is impossible to define. Similarly, number of notifications does not provide a useful indication of vigilance across key stakeholder groups. Additionally the capacity of the responsible agency to respond to and process notifications is also an important consideration. An evaluation framework which encompasses the multiple aspects of passive surveillance was therefore required.

## Methods

Individual discussions and focused workshops around the development of simple rubrics provided an entry point for thinking about how engagement across the disciplinary spectrum supported integration.

A rubric is an easily applicable form of assessment. They are most commonly used in education, and offer a process for defining and describing the important components of work being assessed (5). They are particularly useful in helping us assess complex tasks or behaviours. Although the format of a rubric can vary, they all have two key components:

- A list of criteria—or key elements that count in an activity or task
- Graduations of quality—to provide an evaluative range or scale.

Developing rubrics helps clarify the expectations that people have for different aspects of task or behaviour performance

by providing detailed descriptions of collectively agreed upon expectations. They not only formulate standards for key areas of accomplishment, but they can be used to make these areas clear and explicit to all those with an interest in improving performance. It is different than a simple checklist since it also describes the gradations of quality (levels) for each dimension of the performance to be evaluated. It is important to involve program participants in developing rubrics and helping define and agree on the criteria and assessment. This broad involvement increases the likelihood that different evaluation efforts can provide comparable ratings.

## Application

The rubric for passive surveillance was developed during two workshops. Attendees consisted of two technical leads for the ‘animal’ and ‘plant and environment’ sectors and their managers, the project manager, the project executive and two independent engagement specialists. Prior to the workshop all participants were invited to write down and share two or three elements they considered essential to a well-functioning passive surveillance system. In the

workshop these were discussed and collated into nine key elements. It was noticed that different people emphasised different elements, depending on their area and experience. For example some of the participants focused on the quality of inputs and how to get greater consistency of reporting records while others were concerned with the reporting experience of citizen observers and how to tailor reporting channels to suit their needs and enable feedback on reporting. This highlighted that both social and technical components are important to the functioning of passive surveillance. The rubric enables both to be recognised and evaluated.

The attendees were then asked to describe how excellent would be defined for each of these elements, which enabled descriptions to also be developed for “good” and “emerging” systems. An abbreviated summary of the final rubric for a generic passive surveillance system is shown in Table 1.

**Table 1** The final rubric developed by workshop participants to evaluate New Zealand’s passive surveillance programme (has been abbreviated for this article)

Passive surveillance system			
Elements	Excellent	Good	Emerging
<b>Awareness and motivation</b>	High awareness and motivation throughout the audience, perception that MPI and partners handles biosecurity issues effectively	Awareness and some established biosecurity activities, mostly good perception of how MPI and partners handle biosecurity	Low awareness and lack of biosecurity within the audience, poor perception of how MPI and partners handle biosecurity
<b>Appropriate and well-functioning networks</b>	Network clearly identified and each level engaged, good trust and communication between the levels of the network	Network mostly identified, some groups engaged, may be inconsistent communication	The network is not well identified, with few groups engaged and/or some distrust between the levels of the network
<b>Target at-risk locations, industries and stakeholder groups</b>	Strategies targeted to groups and locations likely to first incur new organisms. Wide participation by industry.	Strategies are somewhat targeted, good level of participation from most areas, and key groups within the industry	Strategies are ad hoc and generalised. Participation is limited to certain individuals, groups or areas.
<b>Timely and accurate notifications</b>	Notifications consistently timely and accurate, samples frequently available for diagnostics	Notifications are usually timely, and accurate, with samples usually available for diagnostics	Delayed/lack of reporting of incursions, low accuracy, samples often not available for diagnostics
<b>Notifying channels</b>	Users report high satisfaction with the range of available notifying channels and all notifying channels provide good notifications	Users mostly report satisfaction in channels, but prefer an alternative option and/or a notifying channel provides low quality notifications	Participants are reluctant to use the available reporting channel(s). $\geq 1$ notifying channel does not provide useful notifications
<b>Notification data storage, retrieval and management</b>	All core data is recorded and stored sufficiently and consistently, data is accessible and allows for meaningful interpretation.	Data is usually recorded consistently with sufficient information yet may be difficulties in interpretation	Core data is stored inconsistently, not easily accessible, difficulties in interpreting the data meaningfully
<b>Resourcing</b>	Qualified, trained, motivated personnel, financial and other resources available for surveillance activities. Ongoing training provided	Trained and motivated personnel. Usually sufficient resources available but stretched during peak times. Limited opportunities for ongoing training.	Untrained/unmotivated personnel. Resources constantly stretched limiting ability to perform surveillance activities. No or little ongoing training
<b>MPI constructive system connections</b>	Good relationships with other relevant teams in MPI and available resourcing for necessary activities. High awareness of the aims and functioning of passive surveillance within MPI	Mostly good relationships with other relevant teams yet can be a lack of resources available. Passive surveillance valued yet may be poorly understood	Low prioritising of MPI resources for passive surveillance, relationships with other teams need developing. Low awareness and/or poor perception of passive surveillance
<b>Monitoring, evaluation and reflection</b>	Performance of passive surveillance is monitored and assessed annually. Action taken to address areas of weakness.	Performance is measured annually and action is taken to address the most important areas of weakness	Passive surveillance system is not regularly or incompletely evaluated, lack of action to address areas of weakness

The first three elements “Awareness and motivation”, “Appropriate and well-functioning networks” and “Target at-risk locations, industries and stakeholder groups” assesses stakeholder awareness and motivation as well as efforts to enhance accuracy. It is assumed that early detection will occur if all relevant stakeholders are vigilant and willing to notify. However, the group identified that within each sector there naturally exists a network of stakeholders with varying levels of expertise who already exchange information about pests and diseases. The element “Appropriate and well-functioning networks” therefore aims to enhance this network to help enable accurate notifications. The element “Timely and accurate notifications” is a technical assessment of notifications made to MPI. The communication channel between the notifier and MPI is assessed under “Notifying channels”. To be effective channels must be user-friendly, acceptable by the audience of potential observers and permit easy transfer of photos, videos and samples. The ability of MPI to respond effectively to notifications is captured by three elements: “Notification data storage, retrieval and management”, “Resourcing” and “MPI constructive system connections”. Finally, the element “Monitoring, evaluation and reflection” assesses the regular and meaningful evaluation of the passive surveillance system.

At a second workshop the rubric was tested and refined by evaluating two industries, one believed to be performing well and the other believed to require much improvement. It was found that determining which elements showed signs where passive surveillance was “emerging” or unknown allowed for easy identification and prioritisation of activities.

### Final comments

Through this process a number of benefits of using rubrics to help design, evaluate and improve passive surveillance systems began to emerge. Although rubrics are a comprehensive performance measure for use with complex systems and behaviours, they are fairly easy to use and explain. They make sense of how a range of different elements fit together in one system from different perspectives. This helps experts in different areas appreciate the importance of technical, social and organizational aspects. As performance frameworks rubrics provide more informative feedback about strengths and areas in need of improvement than traditional forms of assessment do. A well-written rubric describes short-comings in a concrete way – and provides guides to look for improvement, as well as ways in which elements are well managed. System staff can learn from developing and using a performance framework in a way they cannot learn from just measuring outputs or other narrow performance measures. A well-written rubric supports staff learning and the advancement of new skills. Developing the rubric helps people understand the bigger picture, and the way in which assessments are conducted invites people to explain what is actually happening in visible terms, or in an outcome-oriented way.

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### Acknowledgements

The authors thank the workshop participants Brendan Gould, Paul Bingham, Mark Bullians, Rory MacLellan and John O’Connell; and the support of MPI’s Surveillance and Incursion Investigation team and members of Protecting New Zealand’s primary sector from plant pests: a toolkit for the urban battlefield research programme.