



*Planning, Monitoring and Reporting*

*September 2018*

## Introduction

**\*\* Ollie to add context here \*\***

Regional councils are required to report on the State of the Environment (SOE) for the area that is under their management.

1. Why would Regional Councils monitor biodiversity? They are required to. They need to know for management purposes.

The Department of Conservation has developed a National Biodiversity Monitoring Programme which monitors terrestrial biodiversity on an 8-km grid at over 1,400 sites on Public Conservation Land (PCL). Regional Councils are responsible for a significant amount of biodiversity management contiguous with PCL. For this reason, any monitoring that the Councils implement should compliment the existing DOC programme to make inference at the scale of the Regional Council and not off of PCL. Furthermore, as a general principle, monitoring should be well designed and follow standard protocols in order to be successful.

In order to integrate monitoring between the Regional Councils and DOC we recommend implementing the New Zealand Master Sample (van Dam-Bates et al., 2018). This document compares and contrasts the advantages of the Master Sample over adopting the 8-km grid for Regional Councils who manage diverse ecosystems mixed with protected habitats, industry and urban areas. We describe the two designs in the context of the sampling requirements

- Stratification (Bush, Urban, Pasture)
- Multiple Spatial Scales
- Adaptability (inaccessible sites, changing resources etc.)
- Incorporate legacy monitoring
- Coordination between MfE and DOC.

## Monitoring Design Definition

\*\* Define Master Sample \*\*

\*\* Define 8-km grid \*\*

## Stratification

Regional Councils are specifically interested in monitoring all non-PCL in their area, which is made up of a very diverse number of ecosystems. Biodiversity and ecological integrity is likely to be low and reasonably constant through time on pasture, while high and dynamic in bush. Urban areas would also be very heterogeneous with parks and greenspaces host to many different species while disturbed city areas very low and constant. Any monitoring programme developed would need to stratify over different ecosystem types to efficiently account for this and truly capture the heterogeneity of ecological integrity off of the PCL.

## Adaptability

Heterogeneity in ecosystems also means that there are many sites which may be rejected due to lack of access to private land or the randomly selected site lands directly on top of a building. Objective, statistically robust methods must be set up to allow for establishing sites in feasible areas when the original sample has to be rejected.

## Legacy Monitoring

Often, there are existing monitoring networks that have historical information and/or are currently monitored. Incorporating these sites into new monitoring programmes improves estimation of trends and can reduce costs if the sites are already resourced. We will cover how to incorporate these types of legacy monitoring sites in both the 8-km grid and Master Sample. We

## Adaptability

- Site rejection etc
- Sampling rotation flexibility (temporal sampling flexibility).

## Spatial Scales

- Scale to difference spatial levels (can do local monitoring for South Auckland/Wairapa and contribute to the region/national scale).

## Coordination

## Conclusions

## References

van Dam-Bates, P., Gansell, O., Robertson, B., 2018. Using balanced acceptance sampling as a master sample for environmental surveys. *Methods in Ecology and Evolution*.