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Committee **Rural Services and Wairarapa**
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Soil Intactness Monitoring

1. Purpose

To inform the Committee of completion of the baseline soil intactness monitoring programme and report key findings.

2. Background

Regional Councils have a statutory responsibility to collect information about the state of the environment for their regions. Primarily this is for state of the environment reporting. However the data is also useful for many other purposes such as assessing the extent of vegetative soil conservation measures, determining extent of disturbed soil, providing detail about the regions land, assisting with policy development, and as a source for facts and figures for Council publications.

3. Survey Design

The design mirrored similar methods used by the authors in Waikato, Gisborne, Auckland, and Manawatu-Wanganui regions. It followed the completion of a pilot study in the Wairarapa in 2002.

Specific design features are:

- Photo-interpretation of ortho-rectified photos by on-screen point analysis.
- Point analysis density of one point per 4 km² (a 2km by 2km grid).
- Total points are approximately 2,000, providing statistically robust regional information.
- Details to include land use, secondary vegetation, soil stability, erosion type and landform.
- Field validation of photo-interpretation for quality assurance.

4. Summary of Findings

A summary of the key findings contained in the report is listed in the tables below.

<i>Land Use Category</i>	<i>% of Region</i>
Drystock farming	46.4
Native forest & scrub	33.7
Exotic forest & scrub	10.2
Lakes, rivers, roads, urban areas	5.6
Dairy	1.7
Sub-alpine & coastal scrub	1.4
Intensive cropping	1.0

Notes:

- Exotic forest is 80% of the exotic vegetation cover, the balance is predominantly gorse.
- Native forest is 55% of the native vegetation cover.

<i>Soil Stability</i>	<i>% of Region</i>
Stable intact soil, well vegetated	65.5
Stable soil, disturbed by land use	10.6
Unstable soil, recently disturbed by natural processes	9.2
Unstable soil, freshly disturbed by natural processes	9.1
Lakes, rivers, roads, urban areas	5.6

Notes:

- 18.3% of the regions soils are either recently, or freshly disturbed by natural processes.
- *Disturbed by land use* includes drains, earthworks, tracking, cultivation and livestock grazing pressure.

- *Recently disturbed by natural processes*, generally mass movement erosion that is revegetating.
- *Freshly disturbed by natural processes*, mass movement erosion that is bare, and generally occurred within the last two years.

<i>Land Use Category</i>	<i>% Unstable (Recent or fresh disturbance)</i>	<i>% of All Instability (Recent or fresh disturbance)</i>
Drystock pasture	23.0	58.5
Native forest	20.0	20.6
Native scrub	17.0	13.9
Exotic forest	8.6	3.8
Other	*	3.2

Notes:

- Drystock pasture and native vegetation has similar percentages of unstable soils.
- Drystock pasture soils account for 58.5% of the regions unstable soils because of the prevalence of this land use within the region.

5. Extent of Soil Conservation Measures

The point sample methodology records secondary vegetation. For each land use this can indicate the presence of other vegetation over and above the dominant vegetation. For example, on drystock pasture the existence of secondary exotic trees or native vegetation is recorded. Exotic trees on pasture are an indication of the establishment of plantings for soil erosion control.

<i>Drystock Pasture containing unstable soils</i>	<i>% of Land Use</i>	<i>Area (hectares)</i>
Open pasture	43.7	38,000
Pasture with Soil Conservation plantings	13.8	12,000
Pasture with native tree & scrub cover	42.5	37,000

Notes:

- 87,000 hectares of drystock pasture is erosion prone i.e. 10.7% of the Wellington region.

- 56.3% is protected with secondary vegetation.
- 43.7% or 38,000 hectares requires treatment.

6. Future Monitoring and Representativeness

The methodology and associated data analysis enables repeat monitoring to be carried out in a very efficient and cost effective manner. Repeat analysis is proposed every five years. Sample point locations are stored in an Arcview map layer, which is cross-referenced to an Arcview database, which contains the raw data for all 2,039 points.

The data enables statistically robust conclusions about soil intactness and soil disturbance region-wide, and for land uses within the region. It is also sufficiently representative to draw conclusions about the extent of secondary vegetation and soil conservation cover.

Regional sub-sets can be safely extracted from the data as long as the sample size exceeds 100 points. This is equivalent to 400 km² (40,000 hectares) and could be applied to the Ruamahanga, Taueru, Pahaoa, Hutt and Whareama catchments.

7. Communications

The information gained from monitoring soil intactness will be used as part of the upcoming State of the Environment report. Findings from the report should also be communicated to staff in other departments where land based activities are undertaken.

Regional data, and sub-sets of qualifying size, will provide a snapshot of soil intactness suitable for publications such as Elements and the Rural Services newsletter.

8. Recommendation

That the report be received and its contents noted.

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