Waikato Regional Council Internal Series 2012/27

Wharekawa Catchment Condition Assessment

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Richard Glass provided the technical expertise to set up data capture devises as well as provide data processing through the catchment survey process.

Greg Jenks and Nathan Sutherland (Wild About NZ) conducted the field survey and provided feedback on methodology.

Greg Jenks and Nathan Sutherland provided a concise report of the field process. Much of this report has been reproduced in the results section of this document.

The RCS Coromandel Zone team provided input into the catchment assessment for the entire catchment condition survey process.

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Executive summary

The Wharekawa catchment condition survey outlined in the document below is designed to provide baseline information on agricultural land to support the development of the Wharekawa Harbour component of the Whangamata Harbour and Catchment Management Plan (HCMP).

The field survey was undertaken utilising two Yuma tablet devices in which general basic RCS attributes were recorded. These included riparian conditions such as stock exclusion, vegetation types, erosion and stream blockages. Landscape features were recorded such as: Significant Natural Areas, stock exclusion, other significant natural areas, hill country erosion, and condition of harbour or coastal margins. Biodiversity issues such as significant weed infestations and threatened species were also recorded where found.

Within the Wharekawa catchment 1.26 ha of hill country erosion was recorded; 79% of the riparian areas had successful stock exclusion in place; 32% had native riparian vegetation dominant, and less than 1% of riparian margins revealed recordable riparian erosion.

The extensive coastal component of the Wharekawa catchment was included in this survey as other sources of contemporary information were lacking. Harbour margins exhibit predominantly native vegetation, whereas the sand dunes along the 5.2km extent of Opoutere Beach reveal a varying ability to function naturally. Approximately 3.2km of this dune complex is dominated by exotic pine forest, with attendant and typical negative consequences. The northern area of the dunes is relatively free of exotic vegetation impacts, so the functional indigenous vegetation is recovering slowly (i.e. constrained growth of spinifex and scarce pingao). Control of the prevailing adverse impacts (rabbit damage, remaining marram and wilding pines) would rapidly improve the storm buffer function and habitat values of the dunes on this beach.

The Wharekawa catchment was split into three subcatchment areas for ease of reporting – Rangipo, Wahitapu and Wharekawa subcatchments. All three subcatchments had at least 50% of their riparian margins fenced. Despite being the smallest of the subcatchments, the Rangipo had the poorest stream fencing record, with 42.5% of its riparian areas not stock proof. The Wharekawa subcatchment had the best record of effective stock exclusion, the most native vegetation, no riparian erosion and with just over 90% of stream banks fenced. Riparian erosion of all subcatchments was minimal, with the small amounts observed being below recordable limits. Hill country erosion was similarly minimal, with a total of just over 1.25ha recorded over the entire Wharekawa catchment.

The survey provides a snapshot into the state of the Wharekawa catchment's agricultural land and it can act as a baseline for further surveys. This will provide a reporting tool on changes within the catchment over time. The geographical mapping of this survey provides information to staff and could help with prioritisation of future land management and protection work.

1 Introduction

Waikato Regional Council is committed to managing harbours and catchments using an integrated approach. Harbour and Catchment Management plans are integral to this approach.

The catchment condition survey outlined in this document is designed to link into the Harbour and Catchment Management Plan (HCMP) for the Wharekawa catchment and provide baseline information on agricultural land to support the implementation phase of the Wharekawa HCMP.

A physical assessment of the state of the land and coastal areas is necessary to understand the current health of the catchment assets and the environmental linkages throughout. The catchment survey is an opportunity to gauge temporal changes within the catchment, particularly to ascertain changes both positively and negatively and be able to respond to those changes.

The survey also spatially defines where assets and issues are located within the catchment, allowing staff to identify priority areas for the implementation of catchment management work programmes.

A field survey of the catchment was undertaken to assess stream condition, soil erosion and significant natural area protection. The survey was designed to assess agricultural land within the catchment. However, brief notes were included if any relevant features were noted on neighbouring land with native forest, plantation forestry cover, plus the state of harbour and coastal margins.

2 Methods

2.1 Formation of criteria

The set of criteria measured and recorded in the Wharekawa survey was focussed around RCS priority work and HCMP reporting. This meant that these features were assessed only within private land, predominantly pastoral and horticultural land.

Features selected for the survey had to fall into the following criteria, they had to be: objective, repeatable (by other field operators), measurable, reportable and valuable.

The Wharekawa survey was split into priority one features and priority two features for this assessment. This was designed to help field staff prioritise their time while conducting the survey. Priority one features were classed as “must have” for the whole survey area and priority two features were classes as “nice to have”. Table 1 outlines the features assessed in the survey and the GIS attributes used to map the features. Coastal features were included in this survey, contrary to the Tairua survey where coastal data was covered by resource information of the Tairua harbour survey.

Table 1 Summary of features captured within the Wharekawa survey

Feature	Capture	Comment	Priority
Riparian fence (stock proof/ not stock proof)	line	This was designed to capture fencing that was ineffective or absent	One
Riparian vegetation (exotic / native)	line	5m riparian vegetation from water's edge. Either: Exotic (including grass) or Native	One
Land erosion (e.g. sheet, rill, mass movement, slip, slump)	polygon	Measured as an area. set up as rill/ sheet (land use issue) mass movement (soil conservation works issue)	One
Riparian erosion (stream bank erosion present)	line	Stream bank erosion	One
Significant features (SNA's: stock proof, not stock proof. Other significant areas not recorded in SNA database)	polygon	Difficult to record large SNAs as stock proof. Also captured were natural areas which were not part of the SNA layer but were still worth noting	One
Stream blockage (e.g. Gravel build up, vegetation in channel)	point	Recorded where there is a potential to cause erosion or gather debris	One
Stream structures (e.g. culvert, bridge, fords, riprap)	point	Recorded when seen during riparian assessment. Useful for stock in streams (ie ford or bridge) or perched culvert recording	Two
Farmer comments	n/a	Recorded only if significant to information required in the survey.	Two
Weed Issues	point	Only significant weeds. Weeds that are generally present were ignored eg gorse, woolly nightshade.	Two
Threatened species	point	Only if noticed while conducting the rest of the survey.	Two

For further details of the catchment condition survey process see document #2092684.

2.2 Consultation with landowners

Letters were sent out prior to the survey to landowners within the catchment who own land greater than one hectare (see appendix 1 for letter). This explained the catchment assessment process and that access to private land would be required for the field survey.

Landowners were phoned where possible to request access for the assessment. All attempts were made to confirm permission from landowners beforehand.

2.3 Field survey

2.3.1 Field work

The field survey was undertaken by Greg Jenks and Nathan Sutherland (Wild about NZ) on the 22-25 May 2012. A 4wd car was utilised for transport to and around the catchment and farms. Cell phone communication was maintained and there were no safety incidents while completing this work.

2.3.2 Data capture

Two Trimble Yuma tablets were employed for the field data entry. The data was backed up each day onto a laptop computer. The attribute data was collected by using forms created in ArcPad.

The Riparian portion of the survey concentrated on assessing the streams defined by the Hydro_50k stream dataset, although other streams were entered where they were considered to be significant and floodplain drains were also included. Stream riparian condition and erosion was plotted along the Hydro_50k line, except where drains and streams were aligned differently than the 50k dataset.

The riparian vegetation area was assessed out to 5m from the stream/drain bank. The objective was to capture the extent of native vegetation which was the predominant vegetation type along the stream bank.

2.3.3 Data processing

Data was downloaded from both of the Yuma tablets and amalgamated together to form one table for each of the captured layers. Processes to identify any inaccuracies such as duplication and positioning errors were utilised to verify data integrity.

Data was initially loaded into the ArcPad application and then exported to Geomedia via shape files. Geomedia was used to manipulate, analyse and report on the raw data.

2.3.4 Subcatchment groups

For ease of reporting and to help focus the location of issues, the catchment has been split into three subcatchment areas – Wharekawa, Rangipo and Wahi Tapu (See Figure 1 below).

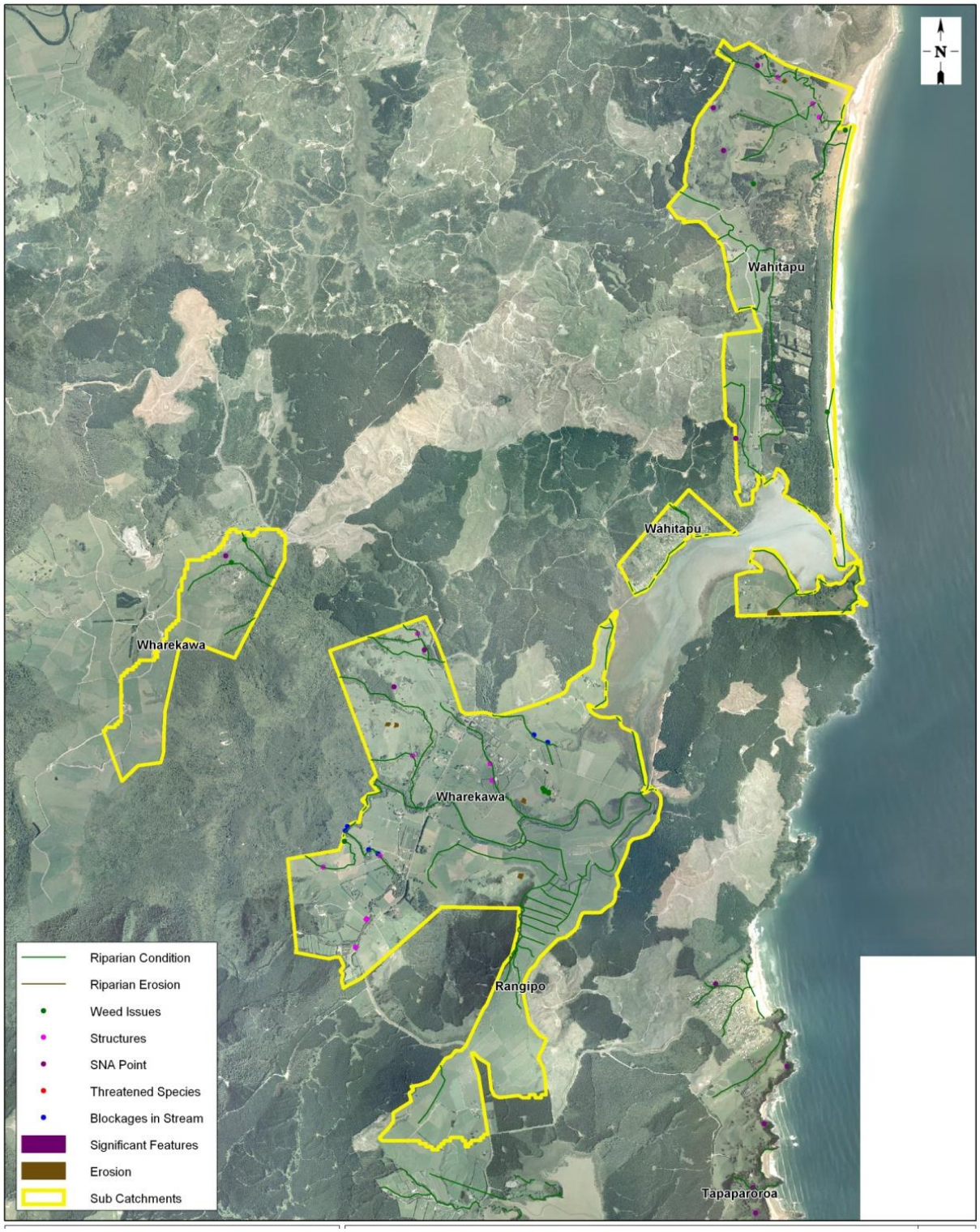

Figure 1 Wharekawa catchment and the-subcatchment areas surveyed

3 Results

3.1 Wharekawa catchment survey summary

3.1.1 Riparian condition

The riparian condition of the entire catchment is summarised in Table 2. Three condition types were recorded, which included:

1. The presence of riparian erosion;
2. The nature of riparian vegetation;
3. Exclusion of stock or not from streams.

Riparian erosion affected a small length of stream within the entire Wharekawa catchment and overall only covered 0.04% of the surveyed watercourses. A small length of stream bank erosion was recorded in the Wharekawa subcatchment, affecting 0.11% of the subcatchments riparian margins.

Stream bank vegetation was dominated by exotic species which occupied nearly 70% of the catchment's riparian margins. This exotic vegetation varied from pasture and weeds through to planted erosion control species such and willow and poplar, and occasionally native riparian plantings or natural occurrences.

The vast majority of streams in the entire Wharekawa catchment were stock proof fenced (nearly 80%), thus making almost all streams in the catchment stock proof through provision of fencing or by other means (e.g. by proximity of roads, impassable rivers etc.).

Table 2 Summary of riparian condition within the Wharekawa catchment

Type	Sum of length (kilometres)	% of streams
Total stream bank	90.79	100%
Riparian erosion	0.039	0.04%
Exotic riparian vegetation	61.6	67.9%
Native riparian vegetation	29.2	32.1%
Stock proof	71.9	79.2%
Not stock proof	18.9	20.8%

Around 79% of riparian margins in the Wharekawa catchment were fenced to exclude stock (Figure 2). Of these fenced areas 47% consisted of exotic vegetation and 32% contained native. The remaining 21% of riparian margins that stock could access only contained exotic flora, leaving no native riparian vegetation unfenced or otherwise unprotected.

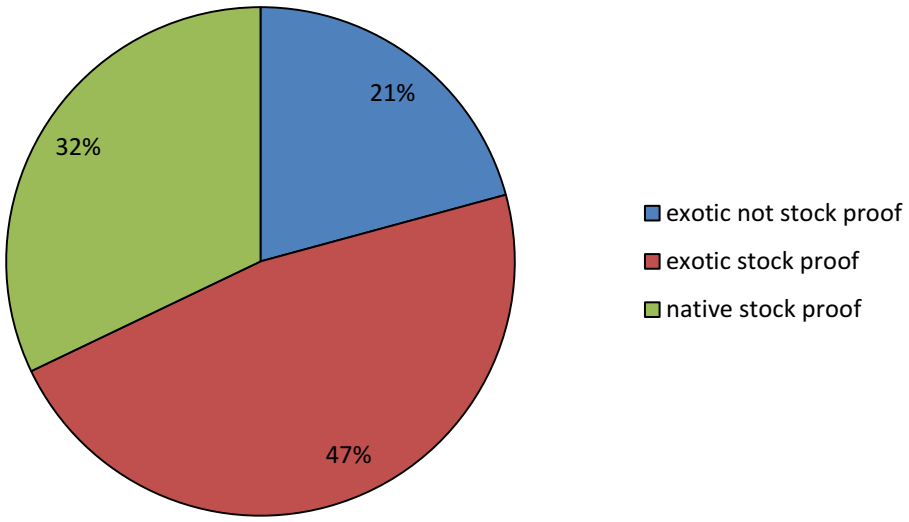

Figure 2 Fencing and vegetation composition within the Wharekawa catchment

3.1.2 Subcatchment groups

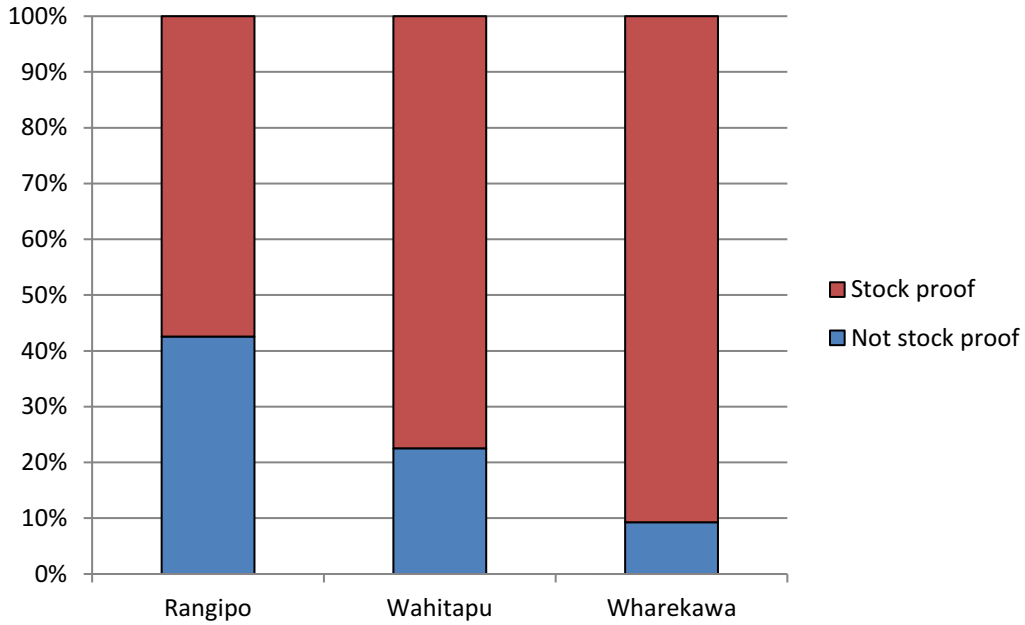

Figure 3 Percentage of stock proof / not stock proof riparian margins within each subcatchment group

All subcatchments had at least 50% of their riparian margins fenced (Figure 3), the Wharekawa subcatchment contained the top score with just over 90% of stream banks fenced. Despite being the smallest subcatchment the Rangipo had the poorest stream fencing record, with 42.5% of its riparian areas not stock proof.

Riparian margins in all three subcatchments are dominated by exotic vegetation, with the Rangipo subcatchment almost entirely so. Stream banks in the Wharekawa subcatchment contained the most native flora, with 42% of surveyed riparian margins home to native species (Figure 4).

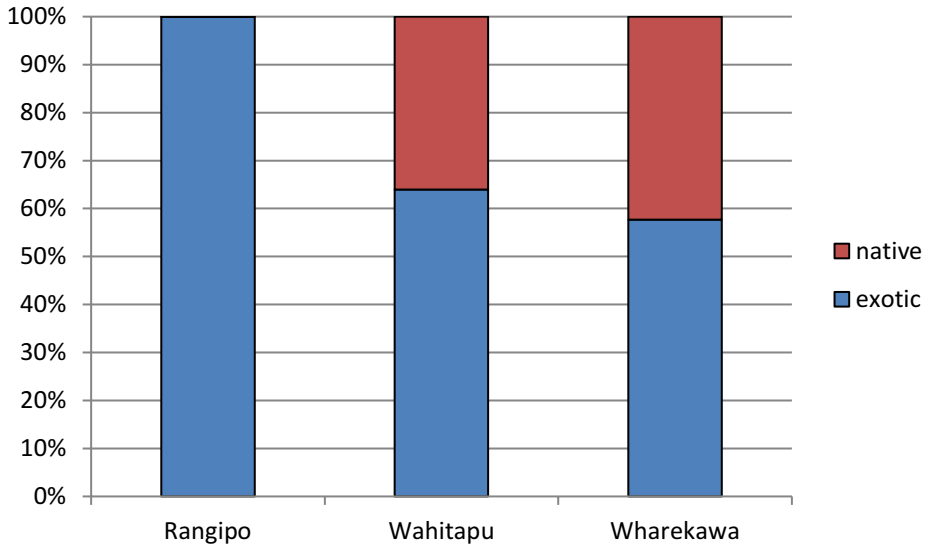

Figure 4 Percentage of exotic and native vegetation within each subcatchment group

3.1.3 Upper catchment condition

Sheet and rill was the most common type of landscape erosion found occurring within the upper Wharekawa catchment (Table 3). The land area affected by such erosion occupied 0.041% of the recorded catchment. Mass movement accounts for a similar sized area, however the occurrence of such erosion was infrequent, with the area recorded emanating from a single event.

Table 3 Summary of erosion within the Wharekawa catchment

Erosion type	Area/distance
Mass movement: slips/slumps/ earthflow	0.5733 ha
Sheet / rill	0.6821 ha
Streambank	39.43 m

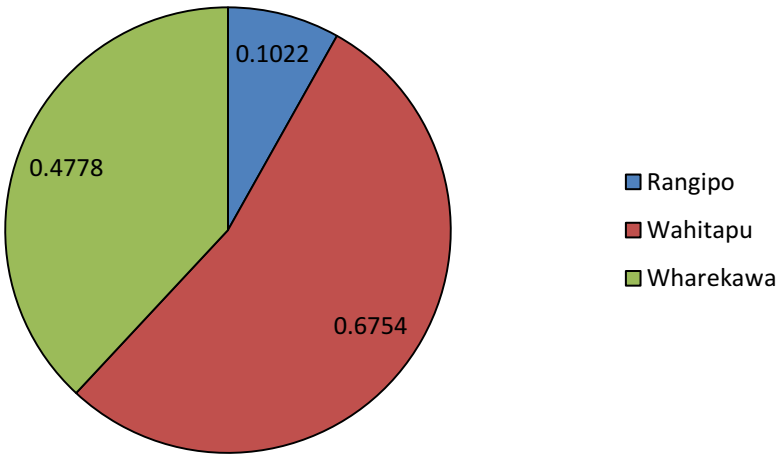

Figure 5 Area of hill country (landscape) erosion (hectares) within each subcatchment group

The Wahitapu subcatchment contained the largest area of landscape erosion (Figure 4), with the majority of its erosion (85%) coming from a single mass movement of soil. Nearly half a hectare of landscape erosion was recorded in Wharekawa subcatchment, all of which was sheet / rill. The Rangipo subcatchment also had a small area of sheet / rill erosion.

3.1.4 Overall catchment ranking

A simple ranking exercise has been completed for each subcatchment group (Table 4). The idea of this is to provide a quick reference to where each subcatchment stacks up against the others. Those with the lowest scores in each category could be seen as the leading catchments. Catchments have then been ranked with the calculated overall average scores for each management feature.

Ranking is based on most intact features: Least erosion, highest percentage of native vegetation, highest percentage of stock exclusion. Ranking from best (1) through to worst (3) has been undertaken. The subcatchments have then been ranked from the lowest average score.

Table 4 Subcatchment ranking for management features

Subcatchment group	Riparian erosion	Landscape erosion	Riparian vegetation	Riparian stock exclusion	Ave	Rank
Rangipo	1equal	1	3	3	2	2=
Wahitapu	1equal	3	2	2	2	2=
Wharekawa	3	2	1	1	1.75	1

3.1.5 Spatial analyses

One of the benefits to this survey is the ability to examine the data in a spatial sense. This allows for on-going analysis or prioritisation, as well as a preparation tool for staff working in the Wharekawa area. This is useful for the examination of attributes that do not necessarily have measurable outcomes. For example: weed and threatened species locations, significant natural areas that have been excluded from stock, stream structures and photo points.

The maps below show the results of the field surveys discussed above overlaid the aerial photography for the area. Some features do not appear on the printed maps as they must be viewed “live” in Geo-Media to observe all features, for example whether a SNA is fenced or not. Most features reveal descriptor notes when clicked on in GeoMedia. See Appendix II for more results maps.

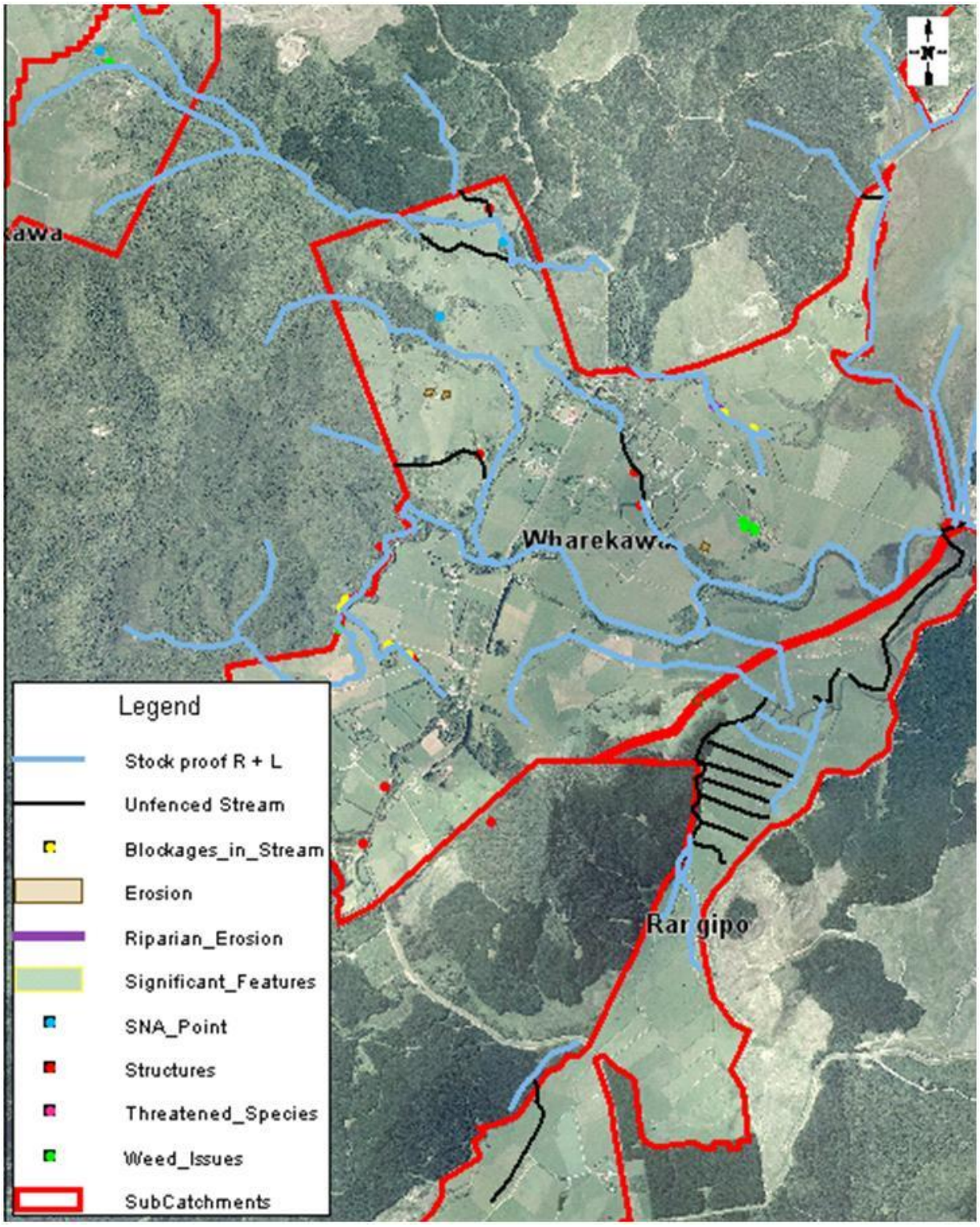

Figure 6 Results map of Wharekawa and Rangipo subcatchments

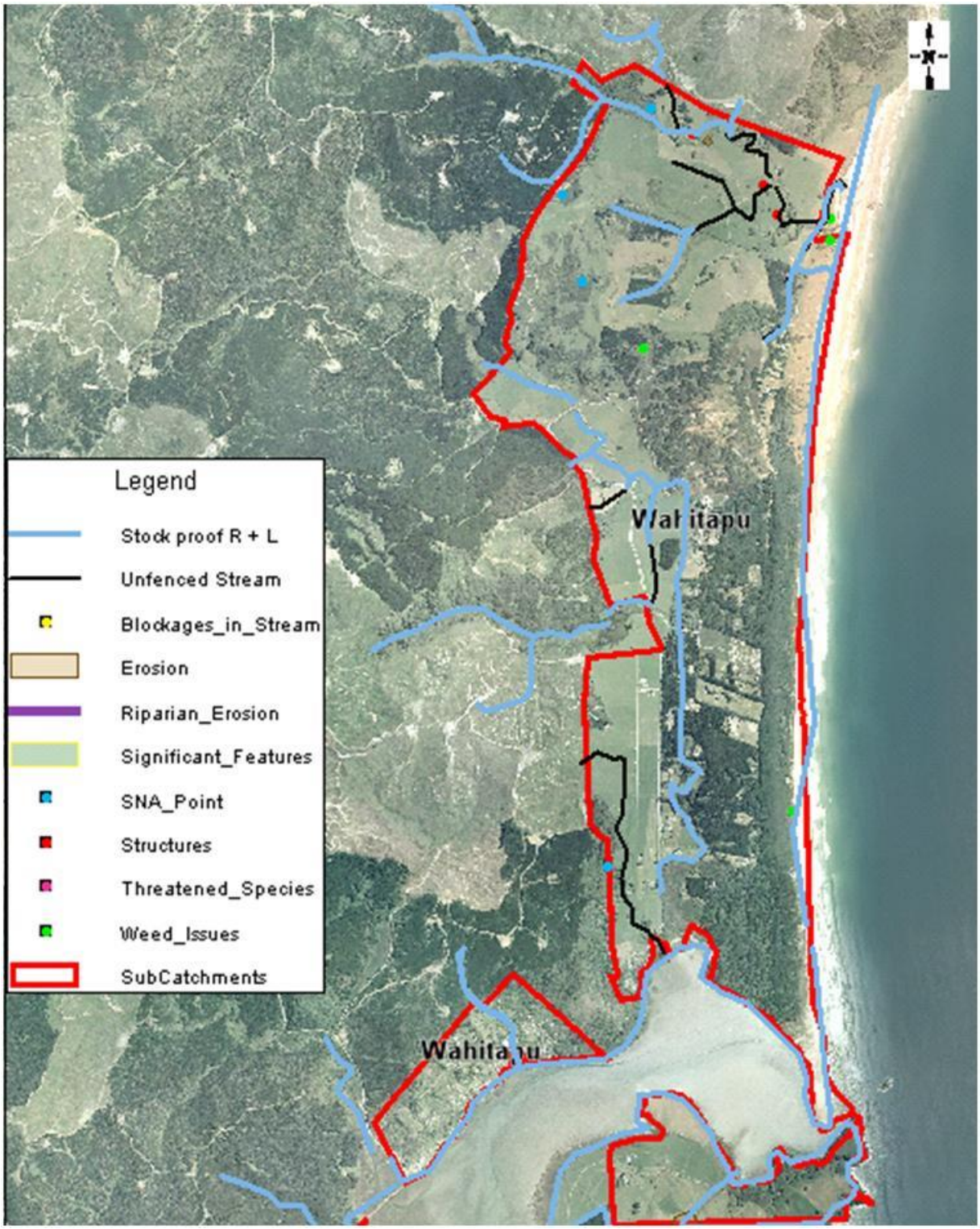

Figure 7 Results map of Wahitapu subcatchment

3.2 Opoutere Beach survey results

The Opoutere Beach coastal component of Wharekawa catchment was included in this survey to assess the natural state of this important erosion buffer zone. Sand dunes along this beach occupy a total length greater than 5.2km and offer protection to about 400ha of mixed use land in the lee of dunes (residential, agricultural and exotic forestry). However, a large extent of Opoutere dunes reveals a poor ability to function naturally.

Greater than 60% (3.2km) of this dune complex is dominated by exotic pine forest, with wilding pines interrupting the natural protection role of affected dunes, along with attendant impacts from rabbit grazing and occasional domination by the exotic and poorly performing marram grass. The affected areas all demonstrate the typical negative consequences of these influences. Functional indigenous vegetation is recovering slowly as the inhibited growth of spinifex and scarcely present pingao is inhibited by the presence of wilding pines and marram grass. Rabbit damage was also prevalent.

Normal expectations of dune improvement are a return of the storm buffer function (increasingly important with predicted climate change impacts), and enhanced opportunities for habitat improvement (e.g. increasingly secure nesting sites for endangered NZ Dotterel) and restoration of back dune areas to improve winter foraging opportunities for native birds.



Photo 1 **Wide, low fore-dune typical of native dune plant domination. Excellent storm buffering ability**



Photo 2 **Narrow, tall fore-dune typical of exotic plant domination. Very poor storm buffering ability**



Photo 3 **Scarce but functional pingao, with damage to leaves caused by rabbit grazing**

4 Discussion

This survey will help to provide baseline information for the catchment for the attributes measured. A similar survey conducted in the future will give an accurate assessment of changes within the catchment.

With only 20% overall of the agricultural land requiring fencing, good progress has been made in the riparian management goals of the Wharekawa catchment. The smallest sub-catchment (Rangipo), with greater than 40% of stream margins that are not fenced presents the greatest challenge. The riparian margins with exotic vegetation stand at approximately 60%, an area that is in need of some concerted work. Again the Rangipo stands out as most in need of native plant conversion, with 100% of exotic vegetation on stream margins.

The catchment riparian condition - for the purposes of this report - can be expressed in terms of “best case” which is native plants along a stock proof stream. Or in the “worst case”, which can be described as exotics along a stream with stock access. Stream margins in the best case group are 41% of riparian margins and 21% in the worst case group with no areas being clad in native plants and open to stock.

Even within a small catchment such as Wharekawa, differences can be observed geographically. The subcatchment group issues were varied. The Wahitapu subcatchment contained the largest area of landscape erosion, however the majority of its erosion (85%) coming from a single mass movement of soil. Nearly half a hectare of landscape erosion was recorded in Wharekawa subcatchment, all of which was sheet/rill. The Rangipo subcatchment also contained a small area of sheet/rill erosion. But taken as a whole, the total area of landscape erosion in this catchment has been managed well, and so is insignificant at 1.26ha.

Other than its use as a reporting tool, the value of this survey is in the spatial mapping of features. Staff are able to access the survey in Geomedia and examine any attributes they want at which ever scale required. This could help guide the type of work required and prioritise which areas to target.

4.1 Future surveys

The Wharekawa survey was completed within timeframes and collated useful information that can measure changes within the catchment and help guide RCS work. Surveys can be as detailed as required, capturing all information within an area. The main balance that was considered, particularly in regards to costs and time was attaining a high enough level of detail without slowing down the process. With this in mind the following improvements on the survey could be made:

4.1.1 Additional information gathering

Land use classification (LUC) mapping could be a useful tool to gauge changes within a catchment. Once LUC classes have been defined an overlay of land cover would pinpoint where land may be inappropriately used. This could guide land management staff to those areas that have a higher likelihood of erosion, and provide a reporting tool on how much of these areas are retired.

Appendix 1 Initial letter to landowners

File No: Z21 H090
Enquiries to: Warren Coffey

23 April 2012

«occup1_initials» «occup1_surname»
«occup1_addr1»
«occup1_addr2»
«occup1_addr3»
«occup1_addr4» «occup1_postal_code»

To Whom It May Concern

Wharekawa Catchment Survey

A catchment survey is being carried out within the Wharekawa catchment and harbour area over the next month. The survey will collect field data to estimate the extent and characteristics of features like vegetation, fencing, streams and erosion within the Wharekawa catchment area.

The aim of the survey is to provide an initial baseline assessment to mark what "state" the catchment is in. This will be functional information which will help guide the harbour and catchment management planning for Wharekawa, assess what issues or key sites exist and help focus our catchment work. It will also help us track future improvements and long term changes that will occur.

The contractors will be able to complete some of the catchment survey from public areas but will also need to access private land in some places to get a good handle on what's within the catchment. This will generally be along stream margins and other natural features. The contractors have been instructed to make contact with the landowner where able, and to be mindful of hazards, privacy, and farm management issues. If there are any site related hazards or issues that we need to know of please let the contractor know when they contact you. For any significant hazards on site please contact Warren Coffey on the freephone number below as soon as practical.

The results of the survey will be applied within a greater catchment focus and will not be published in relation to individual properties. This survey will however help Waikato Regional Council staff identify specific issues within the catchment. Any areas that might need work will be done so in consultation with the landowner. It will also fit into our regular work programmes where potential funding assistance is available to landowners.

Your assistance in allowing access to your property for this survey is appreciated. If you have any concerns regarding access, then please call Warren Coffey on the Waikato Regional Council freephone 0800 800 401.

Yours faithfully



Warren Coffey
Land Management Officer
Waikato Regional Council
13 Opatito Rd, Paeroa 3600

Appendix 2 Maps showing features not entirely visible in results maps above

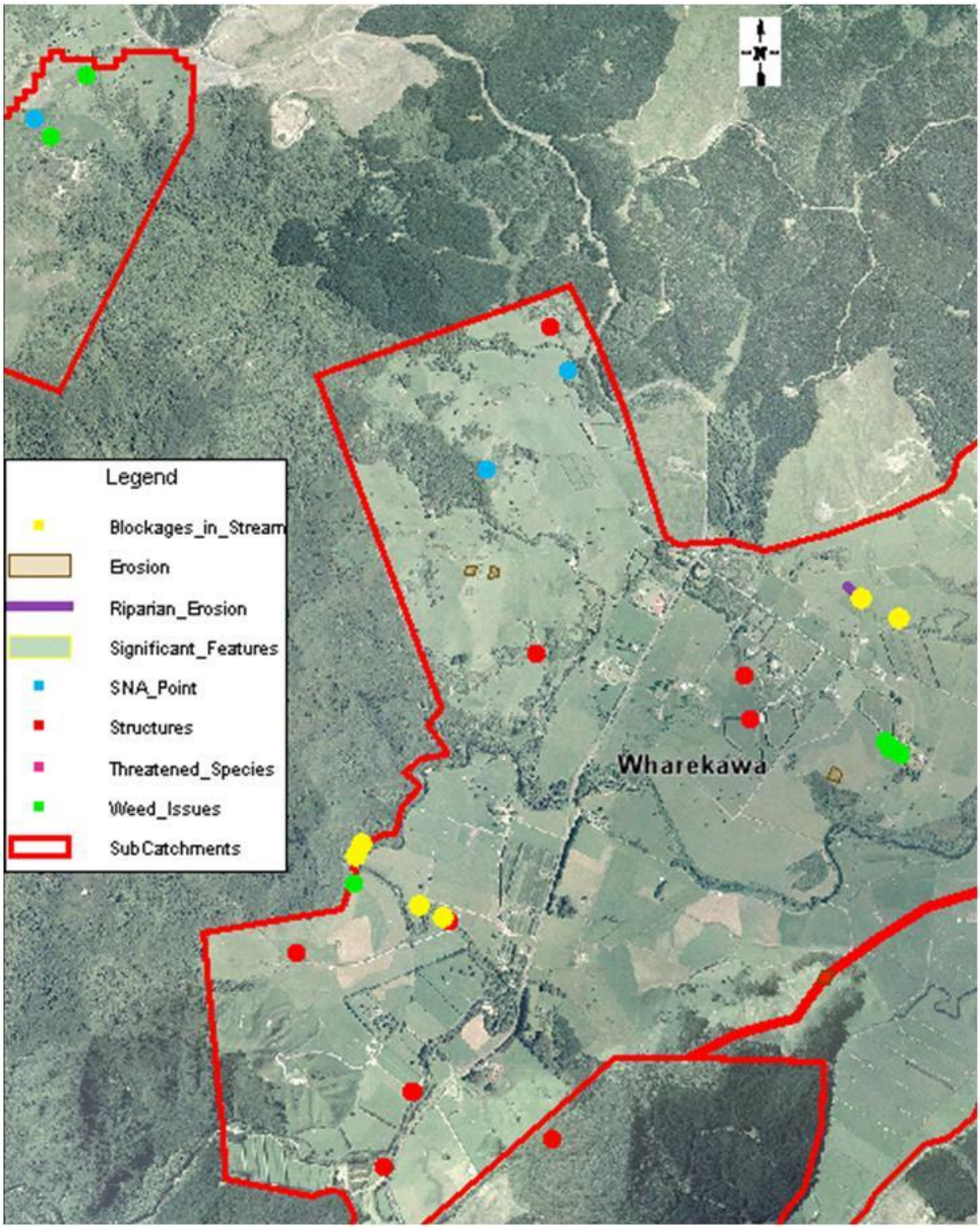

Figure 8 Wharekawa subcatchment

Notes captured: SNA areas are stock proof. Weed issues are mistflower, wild ginger and privet. Blockages range from gravel build up to small gravel and vegetated islands. River bank erosion occurs in main channel but does not appear in this survey map. Landscape erosion is sheet and rill.

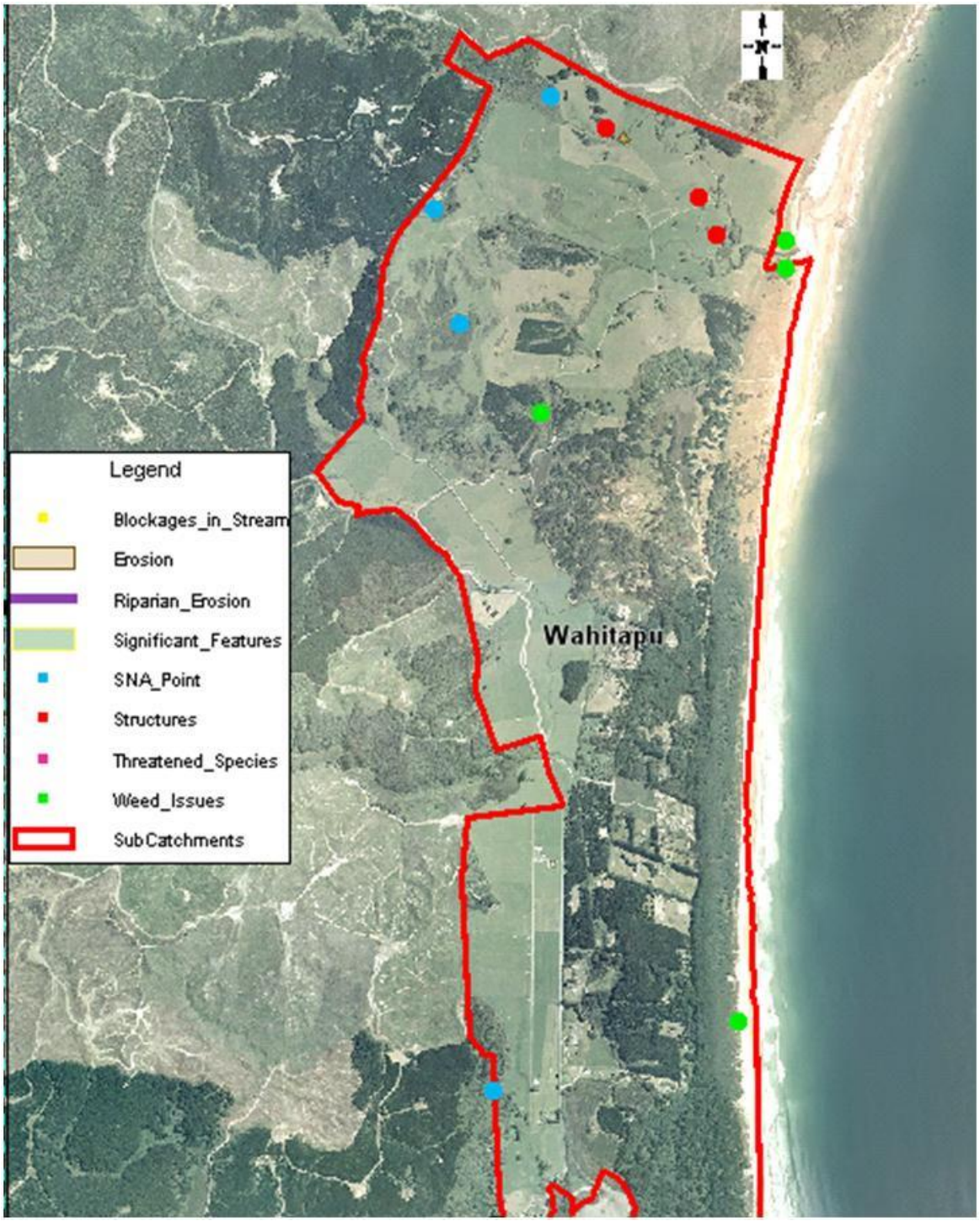

Figure 9 Wahitapu subcatchment

Notes captured: SNA areas are stock proof. Weed issues are mainly wilding pine and saltwater paspalum on the coast, woolly nightshade inland. Two of the structures are culverts and the northernmost one is a gravel ford crossing.