PROJECT RIVER RECOVERY REPORT 2012/01

Project River Recovery Annual Report

1 July 2011 – 30 June 2012

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Department of Conservation
Te Papa Atawhai

newzealand.govt.nz

Project River Recovery is a Department of Conservation project that mitigates habitat degradation in braided rivers and wetlands in the upper Waitaki basin. It is funded through a compensatory agreement with Meridian Energy Limited and Genesis Energy in recognition of the adverse effects of hydro-electric power development on these ecosystems.

Project River Recovery Reports are internal reports that provide a record of research or management work carried out or funded by Project River Recovery.

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In the interest of forest conservation, we support paperless electronic information sharing. Limited copies of this report are printed. It is also available from the departmental website in pdf form; refer www.doc.govt.nz/braidedrivers, then *Project River Recovery's Work*, then *Publications*.

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Summary

- This report summarises Project River Recovery's progress towards its six key objectives as identified in its strategic plan for the period 1 July 2011 – 30 June 2012.
- Project River Recovery (PRR) continues to give highest priority to preventing weed invasion of the near-pristine 'upper rivers', above the hydro lakes of the upper Waitaki basin. The success of this work depends on working closely with various stakeholders including Land Information New Zealand, Environment Canterbury, and landholders.
- Nearly 4 000 hours of targeted, ground-based spot spraying of weeds was carried out in eight riverbeds.
- Good progress continues to be made with reduction of mature naturalised yellow tree lupin and buddleia to zero density in the upper Waitaki Basin, although there can be significant fluctuations in the number of seeds germinating from year to year for both species.
- Project River Recovery spent $499,348 in the 2011/2012 financial year.
- This is the eighth year of trapping results from the Tasman River predator-control project. This is a joint programme between PRR and the kakī recovery group, using a range of predator control techniques.
  - Over the year 826 hedgehogs, 259 stoats, 248 feral cats, 128 ferrets, 26 possums, 11 weasels and 3 rats were caught. No monitoring of wading bird breeding success was completed.
  - Analysis and reporting on outcomes from the previous five years of monitoring results is in progress.
- A programme of intensive predator trapping in a 1 kilometre radius around a black-fronted tern colony in the upper Ohau River continued this year.
  - During the twelve month period from 1 March 2011 to 28 February 2012, a total of 198 hedgehogs, 218 ferrets, 76 feral cats, 22 stoats, 11 rats, 3 weasels and 6 possums were caught.
  - Of 246 monitored nests at the island colony site, at least 182 and up to 230 chicks were fledged.
- Programmed walk-through riverbed wetland bird counts in the Ahuriri, Dobson and Hopkins Rivers were not completed this year due to high river levels.
- PRR is supporting a PhD study investigating how flood induced processes affect Russell lupin mortality in the Ahuriri River. The study is expected to help identify the extent of natural recovery of lupin invaded riparian areas following flood events and contribute quantitative information relating river hydraulics to herbaceous vegetation mortality
- Other wetland management has included fence maintenance, weed control and water-level manipulation at Waterwheel and Ruataniwha wetlands.
- PRR staff consulted with stakeholders as required by ongoing operations.
- The braided river multi-species poster, braided river field guide and braided river teacher resource continue to prove popular, and have been distributed for free to many schools and visitors.

1. Introduction

Project River Recovery (PRR) is an ecological management and research programme focused on maintaining habitat and ecological communities in the riverbeds and wetlands of the upper Waitaki basin. PRR is run by the Department of Conservation (DOC) and financed under a compensatory funding agreement with energy providers in the upper Waitaki River. PRR commenced operations in 1991 and its funding is linked to resource consents for hydroelectric power generation in the upper Waitaki, which expire in 2025. Prior to 2011, Meridian Energy Limited and DOC were sole parties to a compensatory funding agreement signed in September 2006, however with the partial sale of generating assets this year to Genesis Power Limited the agreement was amended to include both companies.

PRR is currently operating to a seven year strategic plan for the period 1 July 2005 – 30 June 2012. This annual report summarises progress toward the six key objectives identified in the strategic plan, describes changes in staff, presents financial statements, and lists recent publications and internal reports, for the year from 1 July 2011 to 30 June 2012.

2. Staff

Chris Woolmore continues to manage Project River Recovery assisted by Sue Anderson and Rhys Garside. Rhys has taken on the summer weed control work, focusing on the annual yellow tree lupin eradication programme and other high priority, small scale weed-control operations. Larger scale weed-control is mostly undertaken by contractor OK Vegetation Control. Sue continues to focus her efforts on managing our surveys and monitoring of natural heritage in braided rivers. This work includes a trial programme of intensive predator control in the upper Ohau River to protect nesting black-fronted terns, which is serviced by contractor Ecological Contracting Services Limited.

PRR also jointly funds a large-scale predator-control project with the kakī recovery team in the Tasman River. Shaun Aitcheson, Carol Burke and Glen Currall continue to run the network of predator traps on this programme.

3. Progress toward objectives of the strategic plan

PRR's progress towards achieving the objectives of the strategic plan is summarised below. Detailed reports of seasonal results and outcomes from trials and analysis of data are recorded through PRRs internal report series and are available on request.

3.1 Objective 1: Maintain indigenous vegetation and enhance habitat by removing problem weeds

Ongoing riverbed weed-control programme

Project River Recovery continued its ongoing programme of weed control in the main braided rivers, some of their tributaries, and in various natural and managed wetlands of the upper Waitaki basin. The total area of braided-river habitat in the large rivers of the upper Waitaki basin is approximately 32 000 hectares. PRR gives the highest priority to preventing new incursions of invasive weeds and removing newly established infestations at priority locations. Priority sites are generally still relatively natural in terms of the number of weed species present and the extent of their distribution. The rationale for selection of priority sites and their locations are set out in PRR's weed control plan (Woolmore 2004).

One of the ongoing successes of PRR has been maintaining the excellent condition of the rivers above Lakes Tekapo, Pūkakī, and Ohau, and the Ahuriri River above Longslip Creek. Invasion by several potentially damaging weeds at these sites has been prevented or reversed in its early stages. For example, the Ahuriri River above Longslip Creek is almost entirely free of Russell lupins and broom as a result of the combined efforts of PRR, DOC, landholders and Environment Canterbury (ECan). The rivers below the lakes, and the Ahuriri below Longslip Creek, contain many more species of invasive plants, and infestations are larger in size. Not all invasive weeds can be controlled at these sites, and we continue to work towards achieving sustainable and realistic weed-control programmes at selected priority sites.

This season good progress continues to be made in reducing the impact of invasive weeds in the Tasman, Ahuriri Godley and Mistake rivers. Willow regrowth was controlled over 19km of riverbed from Chain Hills to Killermont Station in the Ahuriri River with only one or two small patches remaining to tidy up next season. There was also a notable reduction in the amount of control effort required in the Tasman River this season as the number and density of weeds to be controlled is reduced. In the Cass River control of pines, willows and broom was completed under a regular programmed schedule, although a new stand of Russell lupins in a small tributary was recorded and added to the control programme.

PRR, ECan and LINZ continue to implement the integrated weed-control programme in the upper Tekapo River targeting gorse, broom, lupins and willows for the fifth consecutive year. LINZ and ECan contractors completed the weed control work.

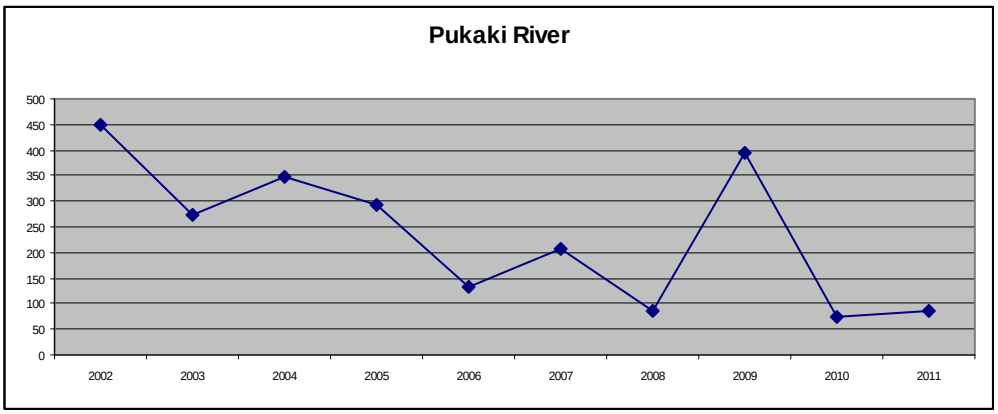
In areas where control was undertaken by PRR, contractors and staff applied herbicides from the ground using knapsack sprayers, except in the Ahuriri River where a vehicle mounted spray unit was used to control thick stands of willow regrowth. Table 1 summarizes the hours and amounts of herbicide PRR used this year. Target weeds include willow, broom, gorse, wilding pines, yellow tree lupin, buddleia, oxeye daisy, Californian poppy and Russell lupin. A summary of the years weed control operations is provided in Appendix 1.

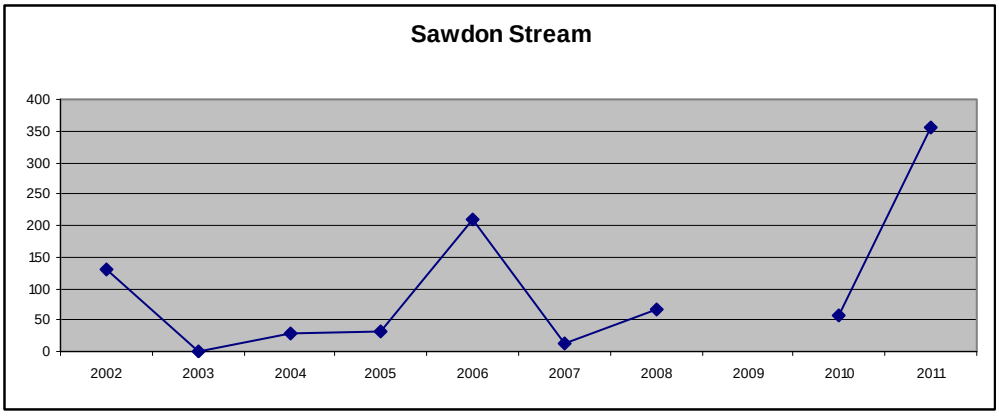
Contractor work practices were monitored by site visits and discussions with contractors. Contractors are committed to, and have maintained, high standards. Effectiveness of weed control was monitored by site inspections, before and after weed control. The level of control achieved was generally excellent.

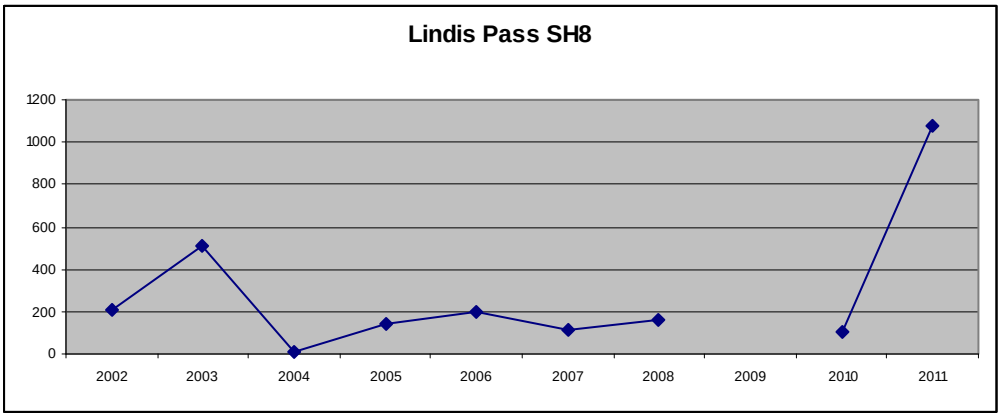
Yellow tree lupin

Good progress continues to be made with the zero-density target for yellow tree lupin in the upper Waitaki basin. All known establishment sites outside town centres were checked for regrowth and controlled where necessary. The number of known sites with yellow tree lupins present has remained relatively constant, and encouragingly, the average number of lupins

being found at these sites continues to decline compared with previous seasons, although there can be significant fluctuations in the number of seeds germinating from year to year. The Pukaki River site is typical with a pattern of general decline with a spike in 2009. These spikes can be attributed to a number of reasons. In Sawdon Stream and at Lindis Pass the 2011 increase in plants followed extensive flood disturbance of streambed sites. The weed database developed in 2002 continues to improve relocation of infestation sites and provide a measure of progress in reducing plant numbers over time.







Buddleia

Buddleia continues to be controlled to zero density at known riverbed sites with good results. The Twizel River holds the largest population with many GPS site records extending from Fraser Stream down to the Ohau River confluence. Control effort in this river continues to make

good progress in containing the spread of buddleia and preventing seedling regrowth from reaching maturity and producing more seed. At other known sites the numbers of seedlings recorded and controlled fluctuates annually but few mature plants were seen and some sites are now free of seedling regrowth.

PRR does not actively remove buddleia from the Twizel and Tekapo townships where they are common ornamental plants. Because of the problems this plant can cause in river systems we would encourage residents to take care when disposing of unwanted trimmings or plant material carrying seed and to replace buddleia with other less invasive plants if possible.

Table 1. Project River Recovery's weed control effort (person hours) and the amount of herbicide, penetrants and dye used by Project River Recovery staff and contractors, July 2011 – June 2012. Contract spraying was done by OK Vegetation Control using knapsack sprayers. Work carried out by Land Information New Zealand and Environment Canterbury in the Tekapo River is excluded from this table.

SITE	TOTAL HOURS	SPRAY UNIT HOURS	GLYPHOSATE (LITRES)	PENETRANT (LITRES)	DYE (LITRES)	TRICLOPYR (LITRES)	TORDON (LITRES)
Tekapo	177.5		8.2	0.0	0.0	0.0	0.0
Mistake Stream	36.5			0.6	1.4	1.7	0.0
Ahuriri Upper	1899.5	70.5	241.0	39.3	106.4	1.0	0.0
Forks	336.0			6.4	16.0	0.0	0.0
Tasman	898.0			10.2	25.6	30.8	0.0
Cass	311.5		10.6	3.8	8.5	0.7	0.0
Ohau tern Island	16		0.1	0.1	0.1	0.0	0.0
Godley	56			1.2	1.1	2.6	0.0
Lower Ohau	24			0.5	0.2	0.5	0.0
Ruataniwha/ Waterwheel wetland	64		3.8	0.0	0.2	00	0.0
YTL/ buddleia	176		0.1	0.2	0.4	1.1	0.0
Total	3995		263.8	62.3	159.9	38.4	0.0

3.2 Objective 2: Explore opportunities to enhance wetland conservation

The constructed Ruataniwha wetlands and Waterwheel wetlands continue to provide habitat for a range of native fauna and flora. PRR continues to manage these wetlands by manipulating water levels, and controlling weeds. No further wetland construction is planned; future wetland conservation efforts will concentrate on protecting existing wetlands.

3.3 Objective 3: Continue to build knowledge of natural heritage in braided-river ecosystems

3.3.1 Riverbed bird surveys

Walk-through counts of riverbed birds have been used for many years in New Zealand to record numbers of birds present in different river systems. A regular cycle of repeated surveys can be useful for long term monitoring of population trends in threatened, as well as more common species.

PRR completed surveys of all the Upper Waitaki Rivers over three consecutive years in the early 1990s. Our intention is to repeat these surveys over three consecutive years for each river system on a rotational basis to make a direct comparison with the 1990s counts. The third year of counts was completed last season in the Tekapo and Ohau rivers and the next rivers programmed for survey are the Ahuriri, Hopkins and Dobson rivers. Unfortunately river levels were too high during November for these surveys to be completed in 2011.

3.4 Objective 4: Test the effectiveness of large-scale predator control

Tasman River

PRR and the Kakī Recovery Project continue to implement a large-scale, extensive predator-control project in the Tasman valley. The project goal is to reduce predation of river birds to a level where depleted populations are recovering and large populations are in a stable state. The project takes a catchment-based approach, using a wide variety of control methods that are applied continuously throughout the year. Success of the project will be assessed on achieving target increases in fledging success and population growth for a range of river birds over a five-year time frame.

This was the eighth season of operation. A total of 194 Fenn, 320 DOC250, 90 DOC150, 202 modified Conibear traps, and 571 Victor leg-hold traps are in place. Over the year these traps caught 826 hedgehogs, 259 stoats, 128 ferrets, 248 cats, 26 possums, 11 weasels and 3 rats (Cleland et al. 2011).

No monitoring of wading bird hatching and fledging success is programmed in the Tasman and Cass rivers until data collected in the previous five years has been analysed. The analysis is currently underway and a report is being prepared by Landcare Research Ltd which is expected to be submitted for publication later in 2012.

Ohau River

PRR commenced an intensive multi-year predator control programme in March 2010, centred on the black-fronted tern colony in the upper Ohau River. Additional observations of black-fronted terns at the Ruataniwha wetlands were continued using the same methods as previous seasons. Observations at the lower Tekapo island colony are no longer made because the island no longer exists.

Briefly, the upper Ohau predator control programme consists of a grid arrangement of predator kill traps in a 1 kilometre radius around the colony nesting site. A variety of trap and bait types were selected to target the range of predators present and provide choices of preferred baits. A total of 169 DOC150 and 165 DOC250 traps were placed at 100 metre spacings with a further 60 modified Steve Allen Conibear (double sets), 27 Timms and 27 Belisle Super-X traps placed at 200 m spacings. During the twelve month period from 1 March 2011 to 28 February 2012, a total of 76 feral cats, 218 ferrets, 198 hedgehogs, 22 stoats, 11 rats, 3 weasels and 6 possums were caught.

Rabbits continue to be monitored with spotlight counts and controlled to low numbers using night shooting and patch poisoning within the 1 kilometre management area. Rabbits are a key prey item for high level predators, so by removing rabbits from the area close to nesting birds, it is anticipated that predators will spend more time hunting in areas with higher prey numbers away from the colony.

Norway rat numbers continue to be monitored using WaxTags® placed systematically along the river margins. Norway rats are known to frequent wetland areas and may benefit from removal of higher order predators during the trapping programme. A low rate of rat chews was again detected during monitoring periods this year.

Monitoring of feral cat movements within or near the management area using collar-mounted GPS receivers was finished this season. This work will provide more information on feral cat territory use and behaviour around nesting terns and our predator trapping grid. Each GPS collar attempts to record a location every 15 minutes and batteries generally last 7–10 days before they must be replaced. Since commencing this work, over 50,000 location points have been collected for collared cats. This data will analysed by Landcare Research Ltd in 2012.

NESTING SUCCESS

Preliminary results indicate a successful breeding season for terns nesting on the island with 246 monitored nests incubating eggs and achieving high hatching rates. At least 182 and up to 230 chicks fledged from these nests. A further 34 nests were established on river terraces adjoining the island colony however none of these successfully fledged any chicks.

3.5 Objective 5: Facilitate research by external agencies to improve our understanding of the ecology of braided-river systems

We have one new initiative to report on this year. PRR is supporting the completion of a PhD study by Luke Javernick from the Canterbury University Civil and Natural Resources Engineering Department in the Ahuriri River. The objective of this research is to investigate how flood-induced processes affect lupin mortality and determine the correlating flood events that drive these processes. Field work will be conducted to identify the processes involved in lupin mortality, as well as to acquire topographic data of a selected study reach. Laboratory experiments will investigate individual processes detrimental to lupins, such as drowning induced by prolonged inundation. The topographic data will be used in a

numerical model of the study reach to simulate a range of flood events and forecast lupin mortality based on the field and laboratory results. Expected outcomes from this study are threefold. Firstly, it will aid in the restoration of the Ahuriri River by identifying riparian areas that can recover naturally from lupin invasion through flood events. Secondly, it can be used to develop a risk analysis to inform managers and the public, and thirdly, it will contribute quantitative information relating river hydraulics to vegetation mortality, a subject seriously overlooked for herbaceous plants like Russell lupin.

3.6 Objective 6: Continue to increase public awareness of braided rivers and wetlands

PRR staff continue to deliver a PowerPoint presentation to schools in support of the braided river education resource, a teacher/student resource addressing values, issues and management in braided river ecosystems. The new colour information booklet and CD of teacher assessment notes has been distributed to secondary schools throughout the South Island and continues to raise interest from teachers.

PRR continues to support the Waterwise Trust programme for selected students from South Island secondary schools who look at water issues in the Waitaki catchment. PRR and other DOC staff at Twizel contributed to another successful pilot programme this year and we anticipate this becoming an annual event.

In addition to talks to secondary schools, PRR has provided similar support to University field trips and met with various stakeholders including the PRR Liaison Group, the Tekapo/Pukaki/Ohau Operational Agreement working group, Fish and Game, ECan, and various private landholders.

PRR's information resources continue to be updated and reprinted as necessary and distributed to schools, businesses and other community groups, with the braided river multi-species poster and braided river field guide still proving to be popular.

4 Project River Recovery's financial statements 1 July 2011 - 30 June 2012

Project River Recovery spent $499,348 in the 2011/2012 financial year ($485,264 in 2010/11). PRR's revenue and expenditure for the 2011/2012 financial year is itemised in tables 2-4. The PRR Trust Account had a balance of $17,424 at the end of the 2011/2012 Financial Year. These funds are invested in an interest bearing call deposit account at Westpac Bank, Government Branch, Wellington.

Table 2. Project River Recovery statement of financial performance for year ending 30 June 2012

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
	($000)	($000)	($000)	($000)	($000)	($000)	($000)	($000)	($000)	($000)	($000)
REVENUE											
ECNZ Transfer from revenue in advance	499	485	472	555	425	437	428	556	416	545	260
Other revenue	0	0	0	0	0	0	0	12	1	1	0
TOTAL REVENUE	499	485	472	555	425	437	428	568	417	546	260
EXPENDITURE											
Personnel costs											
Salaries	140	129	119	118	172	108	109	68	98	106	67
Wages	2	1	12	13	4	1	4	1	9	23	30
Other Personnel	-3	-2	6	3	1	1	0	7	2	1	9
Total personnel costs	139	128	137	134	177	110	113	76	109	130	106
Administration costs											
Communications/EDP	0	0	0	1	1	0	2	1	0	5	0
Accommodation	27	26	26	25	25	25	25	25	25	18	18
Office costs	0	0	0	1	2	0	0	0	1	1	1
Total administration costs	27	26	26	27	28	25	27	26	26	24	19
Operating costs											
Professional fees	1	9	2	15	12	23	6	7	152	100	20
Travel	1	1	7	5	1	1	2	4	1	3	3
Vehicle expenses	41	42	38	37	17	12	14	13	11	15	11
Field operations	278	273	260	335	190	257	261	436	106	266	95
Information and publicity	1	4	6	5	1	2	3	2	7	8	6
Grants and miscellaneous	11	2	3	0	2	6	2	4	7	1	0
Total operating costs	333	331	316	397	223	301	288	466	284	393	135
TOTAL EXPENDITURE	499	485	479	558	428	437	428	568	419	547	260
NET SURPLUS (DEFICIT)	0	0	-7	-3	-3	0	0	0	-2	-1	0

Table 3 Summary of core task expenditure over the 2011/12 financial year

TASK	EXPENDITURE 2011/12 ($)	(%) 2011/12	EXPENDITURE 2010/11 ($)	% 2010/11
001 Project management	167,131	33.5	154,006	31.7
002 Weed control	210,395	42.1	203,243	41.9
004 Research and monitoring	78,087	15.6	80,522	16.6
003 Wetland enhancement	0	0.0	0	0.0
006 Advocacy	357	0.1	2,606	0.5
007 Predator control	43,378	8.7	44,887	9.3
TOTAL	499,348	100.0	485,264	100.0

Table 4 Statement of financial position as at 30 June 2012

	TOTAL	MERIDIAN	GENESIS
	$	$	$
OPENING BALANCE 1 JULY 2010	80,652.75	80,652.75	
Funds transferred to Westpac Trust account during 2011/12	399,464.00	333,834.00	65,630.00
Subtotal	480,116.75	414,486.75	65,630.00
Less transfers (withdrawals) from Trust Account to Operating during 2011/12	464,344.00	404,675.40	59,668.60
Plus interest on Trust Account applied 31st March 2012	1,651.97	1,614.44	37.53
CLOSING BALANCE IN WESTPAC TRUST ACCOUNT 30 JUNE 2012	17,424.72	11,425.79	5,998.93
POST BALANCE DATE TRANSACTION RELATED TO 2012 YEAR			
Amount in advance in Department Balance Sheet transferred to Trust Account after balance date	111,278.00	111,278.00	0.00
FUNDS AVAILABLE AS AT 30 JUNE 2012	128,702.72	122,703.79	5,998.93

5. References

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Cleland, S.; Burke, C.; Aitcheson, S.; Currall, G; Nelson, D.; Maloney, R. 2012: Predator control project report for kakī recovery programme, Tasman Valley. Kakī Project Internal Report 12/04. Department of Conservation, Twizel.

Woolmore, C. (2004). Project River Recovery Weed Control Plan. Project River Recovery Internal Report, Department of Conservation, Twizel.

Appendix 1

Project River Recovery weed control programme summary 2011/12

Location:	Tasman River
Start Date:	20-Oct-11
Finish Date:	24-Jan-12
Target Species:	Russell lupin. Also: broom; crack willow; vipers bugloss; woolly mullein; sweet briar; wilding trees
Control Method:	Handheld - knapsack spot spray. Grazon 90ml per 15L + Aquakynde 30 ml per 15L + Agpro blue marker dye.
Area treated:	4460ha; Total Area 4460ha
Results:	Post control inspection - excellent control achieved
Other:	898 person hours; 30.78 litres Grazon concentrate applied; Annual monitoring of permanent transects completed

Location:	Lower Tekapo River - lake delta
Start Date:	25-Oct-11
Finish Date:	1-Nov-11
Target Species:	Crack willow
Control Method:	Handheld - low volume basal stem treatment. Grazon 3L per 15L + Canola oil.
Area treated:	5ha; Total Area 817ha
Results:	Post control inspection - good control achieved
Other:	177.5 person hours; 8.2 litres Grazon concentrate applied.

Location:	Fork Stream
Start Date:	3-Oct-11
Finish Date:	27-Oct-11
Target Species:	Russell lupin, broom
Control Method:	Handheld - knapsack spot spray. Grazon 90ml per 15L + Aquakynde 30 ml per 15L + Agpro blue marker dye.
Area treated:	93ha; Total Area 93ha
Results:	Good control achieved
Other:	336 person hours; 19.17 litres Grazon concentrate applied.

Location:	Ahuriri River - SH8 to Longslip Ck
Start Date:	25-Jan-12
Finish Date:	26-Mar-12
Target Species:	Willow
Control Method:	Handheld - knapsack spot spray - Glyphosate 360 150ml per 15L + Aquakynde 30 ml per 15L + Agpro blue marker dye; Handheld gun - Glyphosate 360 1L per 100L + Aquakynde 300ml per 100L + Agpro blue marker dye
Area treated:	701 ha; Total Area 925 ha
Results:	Good control achieved
Other:	1851.5 person hours; 70.5 hrs vehicle mounted spray unit, 241.03 litres glyphosate concentrate applied.

Location:	Mistake Creek
Start Date:	17-Dec-11
Finish Date:	17-Dec-11
Target Species:	Lupins
Control Method:	Handheld - knapsack spot spray. Grazon 90ml per 15L + Aquakynde 30 ml per 15L + Agpro blue marker dye.
Area treated:	12.32 ha; Total Area 12.32 ha
Results:	Good control achieved
Other:	28.5 person hours; 1.62 litres Grazon concentrate applied

Location:	Cass River
Start Date:	22-Dec-11
Finish Date:	12-Jan-12
Target Species:	Willow, broom, lupins, pines
Control Method:	Handheld - knapsack spot spray - Glyphosate 360 150ml per 15L + Aquakynde 30 ml per 15L + Agpro blue marker dye
Area treated:	369.9 ha; Total Area 369.9 ha
Results:	Good control achieved
Other:	295.5 person hours. 10.6 litres glyphosate.

Location:	Godley River
Start Date:	16-Nov-11
Finish Date:	16-Feb-12
Target Species:	Broom, gorse, lupins
Control Method:	Handheld - knapsack spot spray. Grazon 90ml per 15L + Herbisafe 90 ml per 15L + Agpro blue marker dye.
Area treated:	Recorded GPS spot locations
Results:	Good control achieved
Other:	64 person hours; 2.7 litres Grazon concentrate applied

Location:	Ahuriri River
Start Date:	24-Nov-11
Finish Date:	8-Feb-12
Target Species:	Lupins, broom, gorse
Control Method:	Handheld - knapsack spot spray. Grazon 90ml per 15L + Herbisafe 90 ml per 15L + Agpro blue marker dye.
Area treated:	Recorded GPS spot locations
Results:	Good control achieved
Other:	48 person hours; 0.96 litres Grazon concentrate applied

Location:	Ohau River (tern island)
Start Date:	4-Jan-12 and 22-Feb-12
Finish Date:	4-Jan-12 and 22-Feb-12
Target Species:	Willow, broom, sweet briar, vipers bugloss, woolly mullein
Control Method:	Handheld - knapsack spot spray. Glyphosate 360 150ml per 15L + Herbisafe 150 ml per 15L + Agpro blue marker dye.
Area treated:	1.2 ha; Total Area 1.2 ha
Results:	Good control achieved
Other:	16 person hours; 0.12 litres glyphosate concentrate and 3 litres X-tree basal applied

Location:	Lower Ohau River
Start Date:	19-Dec-11
Finish Date:	21-Dec-11
Target Species:	Lupins
Control Method:	Handheld - knapsack spot spray. Grazon 90ml per 15L + Herbisafe 90 ml per 15L + Agpro blue marker dye.
Area treated:	Recorded GPS spot locations
Results:	Good control achieved
Other:	24 person hours; 0.48 litres Grazon concentrate applied

Location:	Ruataniwha and Waterwheel wetlands
Start Date:	5-Jan-12
Finish Date:	15-Feb-12
Target Species:	Willows, monkey musk, broom, sweet briar
Control Method:	Handheld - knapsack spot spray. Glyphosate 360 150ml per 15L + Herbisafe 150 ml per 15L + Agpro blue marker dye.
Area treated:	
Results:	Good control achieved, some regrowth of briar from stem bases noted
Other:	64 person hours; 3.75 litres glyphosate concentrate applied.

Location:	YTL Upper Waitaki
Start Date:	5-Sep-11
Finish Date:	28-Jan-12
Target Species:	Yellow tree lupin
Control Method:	Handheld - knapsack spot spray. Glyphosate 360 150ml per 15L + Herbisafe 150 ml per 15L or Aquakynde 30 ml per 15L + Agpro blue marker dye. Grazon 90 ml per 15L + Herbisafe 90 ml per 15L + Agpro blue marker dye.
Area treated:	Recorded GPS spot locations
Results:	Good control achieved.
Other:	144 person hours; 0.12 litres glyphosate concentrate and 1.12 litres Grazon concentrate applied. All plants encountered recorded by size class and GPS location.

Location:	Buddleia Upper Waitaki
Start Date:	7-Nov-11
Finish Date:	23-Dec-11
Target Species:	Buddleia
Control Method:	Handheld - knapsack spot spray. Grazon 90ml per 15L + Herbisafe 90 ml per 15L + Agpro blue marker dye.
Area treated:	Recorded GPS spot locations
Results:	
Other:	32 person hours; 0.45 litres Grazon concentrate applied. All plants encountered recorded by size class and GPS location.