

Project River Recovery Annual Report

1 JULY 2009—30 JUNE 2010

Project River Recovery Report 2010/01
Chris Woolmore, Susan Anderson, Rhys Garside
Department of Conservation, Private Bag, Twizel
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S U M M A R Y

- This report summarises Project River Recovery's progress towards its six key objectives as identified in its strategic plan for the period 1 July 2009 — 30 June 2010.
- 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.
- Over four thousand nine hundred hours of targeted, ground-based spot spraying of weeds was carried out in eight riverbeds and wetlands.
- Project River Recovery spent \$479,340 in the 2009/2010 financial year.
- Observations of black-fronted tern nest outcomes were completed at three known nesting sites in the Ohau River, Tekapo River and Ruataniwha wetlands. Of 190 monitored nests 91 % hatched chicks and 36 chicks were fledged at the Ohau River site. No birds attempted to breed at the Ruataniwha wetland or Tekapo River sites.
- Walk through riverbed bird surveys were completed in the Ohau and Tekapo rivers in the second of three consecutive annual counts. A total of 309 (13 species) wetland birds were recorded in the lower Ohau River and 1753 (17 species) wetland birds were recorded in the Tekapo River.
- This is the sixth complete year of trapping and monitoring results from the Tasman River predator-control project. This is a joint programme between PRR and the kaki/black stilt recovery group using a range of predator control and monitoring techniques. This season completes the final year of data collection prior to analysis of the dataset in 2011. Results for the year include:
 - Traps caught 658 hedgehogs, 419 stoats, 61 ferrets, 232 cats, 33 possums, 3 weasels and 2 rats over the year
 - Hatching success in the Tasman River for banded dotterels was 89%, 58% for black-fronted terns and 73% for wrybills. Fledging success of wrybills was 35-46%, and black-fronted terns fledged no chicks.

- Hatching success in the Cass River where no predator control was undertaken was 60% for banded dotterels, 56% for black-fronted terns and 79% for wrybills. Fledging success of wrybills was 15-20%, and black-fronted terns 3%
- Predator control to protect a black-fronted tern colony in the Ohau River commenced in July 2009. A total of 448 kill traps were placed in a circular grid extending in a one kilometre radius around the colony. Of these, 169 DOC150 and 165 DOC250 traps were placed at 100 metre spacings with a further 60 modified Steve Allen Conibear (in double sets), 27 Timms and 27 Belisle Super-X traps placed at 200m spacings. During the four month period traps have been open from March to June 2010, a total of 76 feral cats, 81 ferrets, 95 hedgehogs, 16 stoats, 2 rats and 5 weasels were caught. In addition to predator control:
 - Rabbits are being monitored and controlled to low numbers using night shooting and patch poisoning
 - Feral cat movements are being monitored using collar mounted GPS receivers
 - Rat numbers are being monitored using systematically placed wax tags.
- This year Project River Recovery substantially revised and updated the braided river teacher resource kit, producing a new colour information booklet for students and a curriculum assessment guide for teachers which aligns with the Year 6 NZCEA curriculum. The resource has been offered to secondary schools throughout the country with many requesting copies for classroom use.
- PRR updated and reprinted several educational resources and continues to undertake a range of community relations activities, including giving talks to schools and universities.
- PRR staff consulted with stakeholders as required by ongoing operations.
- The braided river multi-species poster and braided river field guide continue to prove popular, and have been distributed free to many schools and visitors.

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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 by Meridian Energy Limited (MEL) under a Compensatory Funding Agreement signed in September 2006. PRR commenced operations in 1991 and its funding is linked to Meridian's resource consents for the Waitaki, which expire in 2025.

PRR is currently operating to a 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 2009 to 30 June 2010.

STAFF

Chris Woolmore continues to manage Project River Recovery assisted by Sue Anderson. Danny Kimber has transferred to a new position in Otago and Rhys Garside has taken on the summer weed control work focusing on the annual yellow tree-lupin eradication programme and other high priority weed control sites. Larger scale weed control is mostly undertaken by contractors OK Vegetation Control. Sue continues to focus her efforts on managing our surveys and monitoring of natural heritage in braided rivers.

PRR partially funds Twizel Area Office's Community Relations Officer who spends up to 100 hrs each year specifically on PRR work. PRR also jointly funds a large-scale predator-control project with the kakī/black stilt recovery team in the Tasman River. Shaun Aitcheson, Glen Currall and Carol Burke continue to run the network of predator traps and Simone Cleland monitors breeding success and population trends of selected fauna.

PROGRESS TOWARD OBJECTIVES OF THE STRATEGIC PLAN

PRR's progress towards achieving the objectives of the strategic plan is summarised below:

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

Ongoing 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 those sites still relatively 'clean' in terms of the number of weed species and the extent of their distribution.

One of the successes of PRR has been maintaining the excellent condition of the rivers above Lakes Tekapo, Pukaki, 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 Godley and Macaulay rivers are almost entirely free of gorse and broom as a result of the combined efforts of PRR, DOC, Land Information New Zealand (LINZ), Environment Canterbury (ECan), and landholders. 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.

This season good progress continues to be made with reductions in weed infestations in the Tasman, Godley, Ohau, Ahuriri and Tekapo rivers, including Fork Stream and Mistake River. Finding a new location for Russell lupin on the Godley River delta this season was disappointing, indicating that members of the public continue to spread these plants into riverbeds. This small patch was removed and will be checked each season for seedling regrowth.

PRR, Environment Canterbury and Land Information New Zealand have implemented an integrated weed control programme in the Tekapo River for the third year, with Environment Canterbury contracting to complete the weed control work. Excellent results were again achieved in this programme.

In areas where control was undertaken, contractors applied herbicides from the ground using a backpack or vehicle-mounted spray unit. 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.

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

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 2009 - JUNE 2010. CONTRACT SPRAYING WAS DONE BY OK VEGETATION CONTROL USING KNAPSACK SPRAYERS AND IN THE TEKAPO RIVER BY ENVIRONMENT CANTERBURY USING VEHICLE MOUNTED SPRAY UNITS.

SITE	TOTAL HOURS	SPRAY UNIT HOURS	GLYPHOSATE (LITRES)	PENETRANT (LITRES)	DYE (LITRES)	TRICLOPYR (LITRES)	TORDON (LITRES)
Tekapo	267	267		27.6		185.5	
Ahuriri	1250		63.4	18.4	47.4		
Forks	800.5			8.7	43.6	52.4	
Tasman	1877			16.4	80.3	94.6	
Twizel							
Jollie							
Ohau	447.5		56.3	12.0	31.1	2.5	
Mistake Stream	100			0.5	2.3	2.7	
Godley							
Ruataniwha wetland	20			0.3	1.5	1.8	
YTL/ buddleia	119.5			0.5	0.4	1.2	
Waterwheel wetland	85			1.1	5.3	6.4	
Total	4966.5	267	119.7	85.5	211.9	347.1	

Yellow tree lupin

Progress continues to be made with the zero-density target for yellow tree lupin in the upper Waitaki basin. Not all sites were able to be checked due to a delay in refilling our weed control position. The number of known sites with yellow tree lupins present has remained at around 70. Encouragingly, the average number of lupins being found at these sites continues to decline compared with previous seasons. Twenty-six sites have remained tree-lupin-free since 2005, and ongoing follow-up control at other sites has continued to see good progress being made. The lupin-free sites will remain on the data base to be checked each year to ensure any germinating seed is removed. The GPS- and GIS-based 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 davidii

Good progress continues to be made maintaining zero density of buddleia at known riverbed sites. Numbers of seedlings recorded and controlled in the lower Twizel River site has declined and few mature plants were seen. Scattered plants were also removed from the lower Ohau River.

PRR does not actively remove buddleia from the Twizel and Tekapo townships where they are common ornamental plants. We do explain the problems they can cause in river systems and encourage residents to replace buddleia with other less invasive plants.

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, controlling weeds, and maintaining fences. No further wetland construction is planned; future wetland conservation efforts will concentrate on protecting existing wetlands.

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

Black-fronted terns

Low levels of breeding success in black-fronted tern colonies have been of concern for some time. This year PRR again used regular casual observations to monitor nest outcomes at black-fronted tern colonies on islands in the upper Ohau and lower Tekapo rivers and at Ruataniwha wetlands.

More than 360 adults were present in the Ohau island colony at its peak. At least three different sub-adults were seen. Nest success was very high, with at least 91% of the 198 monitored nests successfully hatching chicks or reaching full incubation term and less than 6% of the nests confirmed as failing prior to hatching. At least 36 chicks fledged, a clear improvement on the previous two breeding seasons.

The Tekapo island site disappeared after the river channel moved following spills from Lake Pukaki the previous winter. Black-fronted terns were not observed this year at what has become a mainland site.

A maximum of six adults was observed at the Ruataniwha wetlands. The terns did not attempt to breed at the wetlands this year (Anderson & Woolmore 2011a).

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 to enable population trends of threatened as well as more common species to be monitored on a long-term basis.

Project River Recovery 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 1990's counts. The second year of counts continued this season in the Tekapo and Ohau rivers.

Wetland birds were counted along the lower Ohau River between Lake Ruataniwha and Lake Benmore and in the Tekapo River between the Tekapo control gates and Lake Benmore in November 2009. Survey of the upper Ohau River between Lake Ohau and Lake Ruataniwha was not completed this year as the surveyor was injured at the beginning of the count. In total, 309 wetland birds (13 species) were recorded in the lower Ohau River and 1753 wetland birds (17 species) were recorded in the Tekapo River (see Table 2). Comparisons with bird counts from the same river sections in 1991-1994 will be formally analysed

once all three years of observations are completed (2008-2010). Initial indications for this year are that bird numbers are generally similar to last year with more banded dotterels, wrybills, pied stilts, spur-winged plover and Canada geese recorded in the Tekapo River, and more Canada geese in the Lower Ohau. More details are available in the report on this season's surveys (Anderson & Woolmore 2011b).

TABLE 2. NUMBERS OF BIRDS OBSERVED IN WALK-THROUGH RIVERBED SURVEYS OF THE TEKAPO AND LOWER OHAU RIVERS IN NOVEMBER 2008 AND NOVEMBER 2009.

SPECIES	TEKAPO		LOWER OHAU	
	2008	2009	2008	2009
Banded dotterel	146	360	51	64
Wrybill	0	14	0	0
Kaki/ black stilt (node J)	0	1	0	0
Hybrid stilt (nodes I-F)	4	3	0	0
Pied stilt or \leq node E stilt	43	120	11	11
South Island pied oystercatcher	40	67	9	11
Spur-winged plover	6	32	1	4
Black-fronted tern	597	514	40	53
Caspian tern	2	4	5	0
Black-billed gull	1	0	3	0
Southern black-backed gull	231	269	11	32
Black shag	15	12	3	3
Little shag	10	0	8	1
Canada goose	129	178	46	86
Black swan	2	0	2	0
White-faced heron	19	13	11	5
Swamp harrier	12	12	3	5
White heron	1	0	0	0
Other waterfowl	240	154	35	34
TOTALS	1498	1753	239	309

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

Tasman River

As a step toward developing effective predator control, PRR and the Kaki/Black stilt Recovery Project are jointly undertaking 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 sixth season of operation. A total of 253 Fenn, 342 DOC250, 52 DOC150, 263 Conibear traps, 26 cages and 425 Victor leg-hold traps are in place. Over the year these traps caught 658 hedgehogs, 419 stoats, 61 ferrets, 232 feral cats, 33 possums, 3 weasels and 2 rats.

Hatching and fledging success of wading birds was monitored in the Tasman and Cass rivers. The Cass River has no predator control in place and monitoring was established to provide a direct comparison with Tasman River results. Hatching and fledging success was generally similar to previous years in the Tasman river with slightly lower hatching success for wrybill and banded dotterel and higher hatching success for black-fronted tern, although none of the 30 black-fronted tern chicks fledged. In comparisons between the Tasman and Cass rivers, banded dotterel hatching success and wrybill fledging success were lower in the Cass River. All other measures were similar. No black-fronted tern chicks fledged from the Tasman river and only one of 35 chicks fledged from the Cass River.

A walk-through survey of riverbed birds was again completed in the Tasman riverbed during November. The number of wrybills, kaki/black stilts and black-fronted terns recorded was slightly higher than in previous years, and the number of pied and hybrid stilts continues to decline. Other birds generally maintained similar levels to previous years.

This season completes the final year of data collection prior to analysis of the dataset. Evaluation of the success or otherwise of the operation will be completed in 2011. Annual results are summarized in Tables 3 and 4 (Cleland *et al*, 2010).

TABLE 3. HATCHING AND FLEDGING SUCCESS OF BANDED DOTTEREL, BLACK-FRONTED TERN AND WRYBILL FROM 2004 - 2009 IN THE TASMAN RIVER.

	HATCHING SUCCESS %			FLEDGING SUCCESS %		
	BANDED DOTTEREL	BLACK-FRONTED TERN	WRYBILL	BANDED DOTTEREL	BLACK-FRONTED TERN	WRYBILL
2004/05	95	4	100	15-41	0	14
2005/06	71	71	100	NA	27	56-67
2006/07	97	24	89	NA	0	31-53
2007/08	91	39	85	NA	23	33-45
2008/09	94	30	86	NA	25	15-39
2009/10	89	58	73	NA	0	35-46

TABLE 4. HATCHING AND FLEDGING SUCCESS OF BANDED DOTTEREL, BLACK-FRONTED TERN AND WRYBILL FROM 2008 - 2009 IN THE CASS RIVER.

	HATCHING SUCCESS %			FLEDGING SUCCESS %		
	BANDED DOTTEREL	BLACK-FRONTED TERN	WRYBILL	BANDED DOTTEREL	BLACK-FRONTED TERN	WRYBILL
2008/09	44	27	80	NA	13	14-50
2009/10	60	56	79	NA	3	15-20

Obau River

Early indications from the catchment scale trapping in the Tasman River are that while some wading birds may be benefiting, black-fronted tern breeding success remains poor. Previous attempts at localised trapping to protect black-fronted tern breeding colonies in other rivers have also been unconvincing. PRR has designed a “best effort” proposal for intensive predator control to protect a black-fronted tern colony. The aim of this proposal is to combine all current best practice for control of predators and apply the full range of techniques at the greatest practicable scale. A proposal for this work was written and peer reviewed last year (Anderson & Woolmore 2009) and the field work commenced in July 2009. Success of the project will be assessed on consistency of black-fronted tern fledging success over at least a three-year time frame.

A total of 448 kill traps were placed in a circular grid extending in a one kilometre radius from the colony. 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 200m spacings. Traps were positioned in November and left in situ to weather prior to opening in March 2010. During the four month period traps have been open from March to June 2010, a total of 76 feral cats, 81 ferrets, 95 hedgehogs, 16 stoats, 2 rats and 5 weasels were caught.

In addition to predator control, rabbits are being monitored and controlled to low numbers using night shooting and patch poisoning within the one 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 are being monitored using wax tags 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.

Feral cat movements are also being monitored using collar mounted GPS receivers on cats within or near the management area. This work will provide more information on feral cat territory use and behaviour around nesting terns and our predator trapping grid.

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

There are no new initiatives to report against this objective.

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

Project River Recovery's work on braided-river conservation continues to be adopted by many South Canterbury and North Otago schools as part of their Year 6 NZCEA curriculum. This year the braided river teacher resource kit was substantially revised and updated with a colour information booklet for students and a curriculum assessment guide for teachers. The resource has been offered to secondary schools throughout the country with many of them requesting copies for classroom use. PRR and DOC community relations staff continue to deliver a PowerPoint presentation to schools in support of the new braided river teacher resource.

In addition to talks to the public, PRR 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.

This year a number of information sources were updated and reprinted, including the Braided River Care Code, and Conservation of Braided River Birds brochure. These resources continue to be 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.

PROJECT RIVER RECOVERY'S FINANCIAL STATEMENTS 1 JULY 2009 -
30 JUNE 2010

2009/2010 Financial Year

Project River Recovery spent \$479,342 in the 2009/2010 financial year (\$555,000 — 2008/2009). PRR's revenue and expenditure for the 2009/10 financial year are itemised below. PRR Trust Account had a balance of \$90,072.37 at the end of the 2009/10 Financial Year.

	2010	2009	2008	2007	2006	2005	2004	2003
	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)
REVENUE								
ECNZ Transfer from revenue in advance	472	555	425	437	428	556	416	545
Other revenue	0	0	0	0	0	12	1	1
TOTAL REVENUE	472	555	425	437	428	568	417	546
EXPENDITURE								
Personnel costs								
Salaries	119	118	172	108	109	68	98	106
Wages	12	13	4	1	4	1	9	23
Other Personnel	6	3	1	1	0	7	2	1
Total personnel costs	137	134	177	110	113	76	109	130
Administration costs								
Communications/EDP	0	1	1	0	2	1	0	5
Accommodation	26	25	25	25	25	25	25	18
Office costs	0	1	2	0	0	0	1	1
Total administration costs	26	27	28	25	27	26	26	24
Operating costs								
Professional fees	2	15	12	23	6	7	152	100

Travel	7	1	5	1	1	2	4	1	3
Vehicle expenses	38	17	37	12	14	13	11	15	15
Field operations	260	190	335	257	261	436	106	266	266
Information and publicity	6	1	5	2	3	2	7	8	8
Grants and miscellaneous	3	2	0	6	2	4	7	1	1
Total operating costs	316	223	397	301	288	466	284	393	393
TOTAL EXPENDITURE	479	428	558	437	428	568	419	547	547
NET SURPLUS (DEFICIT)	-7	-3	-3	0	0	0	-2	-1	-1

NOTE: PROJECT RIVER RECOVERY CAN BE DIVIDED INTO SIX CORE TASKS. EXPENDITURE OVER THE 2009/10 FINANCIAL YEAR ASSOCIATED WITH EACH TASK WAS:

TASK	EXPENDITURE (\$)	(%) OF EXPENDITURE	% - 2008-09
001 Project management	151,862	31.7	26.3
002 Weed control	228,056	47.6	58.1
004 Research and monitoring	31,822	6.6	3.3
003 Wetland enhancement	0	0	0
006 Advocacy	6,093	1.3	1.7
005 Fence maintenance	0	0	0
007 Predator control	61,507	12.8	10.6
TOTAL	479,340	100.0	100.0

PROJECT RIVER RECOVERY STATEMENT OF FINANCIAL POSITION AS AT
30 JUNE 2010

	2009/10	2009/10
Opening balance 1 July 2009	\$ 10,652.73	
Plus invoices to Meridian		476,460.00
Add funds transferred from DOC on account previous years invoices		116,894.00
Total funds transferred to Westpac Trust account during 2009/10		
Less transfer to operating from Trust Account	593,354.00	
Plus interest on Trust Account	-483,270.00	
ACTUAL CLOSING BALANCE IN WESTPAC TRUST A/C - 30 June 2010	884.64	
Revenue treated as advance and retained in the departmental account (Transferred to the Trust account in July 10)	121,621.37	
Funds Available as at 30 June 2010	-31,549.00	90,072.37

MDS TRUST ACCOUNT

Reconciliation of funds transferred from the trust account to the department (operating *) as Revenue during the year	\$ 483,270
Transfers to PRR Operating	-42,522
Revenue Accrued - previous year, funded by the department	440,748
Revenue (Cash basis) relevant to current year	31,549
Revenue in Advance during the current year	472,297
Total revenue recognised during the year as per the Statement of Financial Performance	

REFERENCES

- Anderson S J, Woolmore C.B. 2009. Proposal for predator control to protect a black-fronted tern colony on an island in the upper Ohau River 2009-2013. Project River Recovery Report 2008/01, Department of Conservation, Twizel.
- Anderson S J, Woolmore C.B. 2011a. Black-fronted tern breeding success at the Ohau and Tekapo River islands and Ruataniwha wetlands: 2009-2010 breeding season notes. Project River Recovery Report 2009/03, Department of Conservation, Twizel.
- Anderson, S.J.; Woolmore, C.B. 2011b. Results of bird counts in the Ohau and Tekapo Rivers in 2009. Project River Recovery Report 2009/02, Department of Conservation, Twizel.
- Cleland S, Aitchison S, Barr T, Currall G, Burke C, Guilford P, Fairhall M, Murray D Nelson D & Maloney R, 2010. Predator Control Project Report for Kaki Recovery Programme. Kaki Project Internal Report 09/04. Department of Conservation, Twizel.