



Annual Reserve Report

Five Rivers Reserve 2015-16



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INTRODUCTION

The Tasmanian Land Conservancy (TLC) protects important natural areas as permanent reserves and aims to demonstrate excellence in reserve management for biodiversity conservation. To achieve this aim, the TLC has adopted an adaptive management framework – the Open Standards for the Practice of Conservation. The framework comprises 5 key steps – planning, implementing, monitoring, reporting, review/adaptation and communication.

Five Rivers Reserve was acquired by the TLC in 2010 and protects over 11,000 hectares of highland forests and marshlands on Tasmania’s Central Plateau. The management of the Reserve is guided by the Five Rivers Reserve Management Plan. The plan is implemented by TLC staff through an annual Reserve Work Plan and Monitoring Plan. Details of ecological monitoring methods can be found in TLC’s Ecological Monitoring Procedures Manual.

This report describes progress made towards delivery of the management plan in 2015-16, and is divided into three sections:

1. Reserve Scorecard – a table summarising the results of management effectiveness and ecological monitoring to date;
2. Management Effectiveness Summary – providing details of the implementation of key management strategies and making recommendations for plan improvement;
3. Ecological Monitoring Summary – providing details of the status of conservation targets and trends of key ecological indicators

The recommendations made in this report are used to adapt and improve management of the Reserve, update the management plan, and revise work and monitoring plans for the coming year. Key findings of this report are communicated to TLC Board, supporters and other stakeholders.


Cover image: Alpine cushion moorland at Skullbone Plains, Five Rivers Reserve. Photo: Andy Townsend.


FIVE RIVERS RESERVE SCORECARD 2015-16


Monitoring				
Target	Indicator	Status 2015-16	Trend	
Highland Marshes	Floristic diversity	10 species/site	Stable	
	Structural complexity	2.8 strata/site	Stable	
	Miena cider gum recruitment	> 3 age cohorts present	Stable	
	Sphagnum peatland extent	100.8 hectares	Stable	
	Vertebrate fauna diversity	9.4 species per site	Stable	
Streams and wetlands	Aquatic biota diversity	Data collected, awaiting results of analysis from UTAS	Baseline data	
	Floristic diversity	9.4 species/site	No change	
	Structural complexity	2.9 strata/site	No change	
	Vertebrate fauna diversity	8.9 species/site	No change	
	Drooping pine population size	Present but not fully mapped	Not assessed	
	Clarence galaxid populations	Present at 4 sites	No change	
Highland forest and woodland	Floristic diversity	10.4 species/site	No change	
	Structural complexity	10.3 strata/site	No change	
	Canopy recruitment	2.9 cohorts/site	No change	
	Vertebrate fauna diversity	9.3 species/site	No change	
	Eagle nest productivity	0 active nests	Decline	
	Forest cover change in reserve	No data for report period	No change 2000-2010	
	Forest cover change - 20km	No data for report period	Significant decline 2000-2010	
Carnivorous marsupials	Spotted-tailed quoll Occupancy Relative abundance	Recorded at 5/43 sites (12% sites) 6 observations (2550 trap nights)	Decline Decline (25%)	
	Eastern quoll Occupancy Relative abundance	Recorded at 21/43 sites (49% sites) 58 observations (2550 trap nights)	Stable Decline (38%)	
	Tasmanian devil Occupancy Relative abundance Disease status	Recorded 37/43 sites (86% sites) 286 observations (2550 trap nights) DFTD suspected at 1/37 (3% sites)	Decline (11%) Decline (21%) Improved	
	Community connection with landscape	# volunteer days on the reserve	195 volunteer/days	Flat
		# visitors to the Reserve	121 visitors	Flat
	Cultural heritage	Intactness of indigeneous heritage sites	Not documented	Flat
Understanding and interpretation of indigenous knowledge		Not documented	Flat	
Intactness of cultural heritage sites		Not documented	Flat	
Preservation of cultural history sites and knowledge		Being documented	Flat	
Regional capacity	Income generated from carbon	Yes	Stable	
	Income generated from other ecosystem services	Yes	Stable	
	Income and benefits flowing to the Bronte community	No indices as yet	Unknown	
Management Effectiveness				
Strategy	Indicator	Status 2015-16	Trend	
Build resilience to climate change	Resilience of at-risk conservation targets is improved	No data	Unknown	
Access management	Reportings / evidence of illegal entry	Measures to be reviewed	Slight increase	
Fire management	Number of unplanned fires	0	Decrease	
Clarence galaxias protection	Presence of brown trout	Present through most of the Nive Catchment including Kenneth Creek	Stable	
	Presence of Clarence galaxias	Present at 4 sites	Stable	
Threatened species protection	Knowledge is improved about distribution, status and ecology of threatened species	Small improvement	Increasing	
Carnivorous marsupial management	Extension and location surveys completed	Completed	Ongoing	
Feral and domestic animal management	Cat abundance	44% of sites 49 observations	Decline (29%) Decline (6%)	
	Rabbit abundance	12% of sites 21 observations	Decline (46%) Increase (5%)	
	Deer abundance	23% of sites 34 observations	Decline (28%) Decline (28%)	
	Stock access	Some stock incursions	No change	
Weed management	Weed extent	Weeds present in most areas of	Flat	

		reserve	
	Weed density	Very low	Improving
	Treatment extent	100% of weeds (other than thistles)	Improving
Neighbour relations	Regular communication with neighbours occurred	Yes	Flat
Enhanced regional capacity and ecosystem services	Income generated from Reserve	Yes	Flat
	TLC expenditure in local community	No data	Unknown
Visitor management	Procedures in place to ensure visitors are aware of and comply with policies	Processes partially in place	Ongoing
Protecting cultural heritage sites	European heritage sites are documented and mapped by B. Hay	European sites being documented	Flat
Community engagement	# events at the Reserve	1 event	Flat
	# of volunteer activities at the Reserve	9 activities	Slight increase
	# of research and education projects	2 projects	Slight decrease

MONITORING SUMMARY


Highland Marshes		Status: Very Good
Goal Maintain or improve the floristic diversity of Highland Marshes Maintain or improve the structural complexity of Highland Marshes Maintain recruitment of Miena cider gum Maintain the extent of Sphagnum Peatland Maintain or improve the vertebrate fauna diversity of Highland Marshes		Outcome: On Track
Description Highland marshes typically occur in valleys where impeded drainage and severe frosts restrict the growth of most tree species. Highland marshes include all forms of poorly drained vegetation communities, including peatland, heathland, <i>Eucalyptus rodwayi</i> and <i>E. gunnii</i> woodland, and <i>Poa</i> grassland. Highland marshes are floristically diverse, and perform important ecological functions, including filtering water runoff, and reducing erosion from, and the severity of, flooding events. The diverse shrubs flower for an extended period over summer and provide an important food resource for native insectivorous bird species in particular.	 <p>Sphagnum bog at Skullbone Plains. Photo: M. Taylor.</p>	
Ecological indicator	Status - 2014	Trend
Floristic diversity	10 species/site	Stable
Vertebrate fauna diversity	9.4 species per site	Stable
Structural complexity	2.8 strata/site	Stable
Miena cider gum recruitment	> 3 age cohorts present	Stable
Sphagnum peatland extent	100.8 hectares	Stable
Key findings <ul style="list-style-type: none"> The population of Miena Cider Gum on Mackenzie's Tier was re-assessed and found to be in good condition with clear evidence of recruitment. The area occupied by Sphagnum peatland is stable. An area of Sphagnum bog on Roscarborough that was harvested in the 1990s was assessed by Dr. J Whinam and a rehabilitation plan has been prepared. The condition of vegetation remains very good. 		
Recommendations <ul style="list-style-type: none"> Continue to implement Fire Management Strategy, including the development of an operational fire management plan for the Reserve that identifies sensitive vegetation. Continue to implement the Threatened Species Protection Strategy, including: applying for grant funding to support rehabilitation of harvested Sphagnum bog and undertake rehabilitation works as per rehabilitation plan; and conducting ptunarra brown butterfly extension surveys in <i>Poa</i> grasslands. Repeat long-term ecological monitoring in 2020. 		


Streams and Wetlands		Status: Good
Goals Maintain the diversity of aquatic biota Maintain or improve floristic diversity of streams and wetlands Maintain or improve structural complexity of streams and wetlands Maintain or improve vertebrate fauna diversity in streams and wetlands Maintain populations of drooping pine <i>Pterosphaera hookeriana</i> Maintain or increase populations of Clarence galaxias		Outcome: On Track
Description The Five Rivers Reserve is nestled between the Nive, Serpentine, Pine, Little and Little Pine rivers and surrounded by Lake Ina, Clarence Lagoon, Kenneth Lagoon and Pine Tier Lagoon and their associated tributaries and creek systems. These water systems are invaluable ecosystems and corridors for a range of aquatic dependent and associated plants and animal species. The riparian vegetation is intact and is dominated by diverse native vegetation with no or few weeds occurring in this area.		 <p>Wetlands provide habitat for Clarence galaxias. Photo: TLC</p>
Ecological indicator	Current status	Trend
Aquatic macro-invertebrate abundance	Data collected, awaiting results of analysis from UTAS	Baseline
Floristic diversity (species/site)	9.4	No change
Vertebrate fauna diversity	8.9 species per site	No change
Structural complexity (strata/site)	2.9	No change
Drooping pine population size	Present but not fully mapped	Not assessed
Clarence galaxid presence	4 sites	No change
Key findings <ul style="list-style-type: none"> • The condition of riparian vegetation is excellent • A project to increase the occupancy of Clarence galaxias is in the advanced stages of planning • Aquatic biota was assessed for the first time 		
Recommendations <ul style="list-style-type: none"> • Continue to implement the Threatened Species Protection Strategy, including: conduct extension surveys for drooping pine in riparian vegetation along the Nive River on the Viormy section of the Reserve. • Continue to progress the Clarence Galaxias Protection Strategy. • Repeat long-term ecological monitoring in 2020. • Consider adjusting target goals to better reflect TLCs capacity to measure changes: <ul style="list-style-type: none"> ○ The condition of riparian vegetation is maintained or improved ○ The area of the Reserve occupied by Clarence galaxias is increased by 50% by 2025 ○ The diversity of aquatic biota is improved 		


Highland Forest and Woodland		Status: Good
Goals <ul style="list-style-type: none"> - Maintain or improve overall floristic diversity and structural complexity, and recruitment of canopy species, of Highland Forests and Woodlands - Maintain Highland Forests and Woodlands forest cover within 2% of 2010 baseline - Maintain or improve vertebrate fauna diversity of Highland Forests and Woodlands - Maintain or improve reproductive success of the wedge-tailed eagle 		Outcome: On Track
Description The highland forests and woodlands of the Five Rivers Reserve are a significant conservation feature of the landscape. Diverse eucalypt species occur as a mosaic, where dominance is determined by minor changes in topography, aspect, drainage and geology. The forests are floristically diverse and are structurally complex despite decades of forestry activities.	 <p>Highland forest typical on the Five Rivers Reserve. Photo: TLC</p>	
Ecological indicator	Current status	Trend
Floristic diversity (species/site)	9.4	Stable
Structural complexity (strata/site)	4.1	Stable
Canopy recruitment (cohorts /site)	2.9	Stable
Wedge-tailed eagle productivity		
- # successful nests	0 of 5 nests	Decrease
- # fledged young	0	Decrease
Forest cover change in reserve (hectares)	9463	Stable
Forest cover change - 20km (landsat data)	2014, 7,384 ha	Average 9,827 ha/yr 2001 – 2010 Average 2,475 ha/yr 2011 – 2013
Key findings <ul style="list-style-type: none"> • There are 5 wedge-tailed eagle nests recorded on the Reserve, which are likely occupied by 2 breeding pairs of wedge-tailed eagles. One new nest was discovered on nearby Forestry Tasmania land in Aug 2015. No nests on TLC land were active during the 2015-16 season, however at least one pair of eagles nested on adjacent Forestry Tasmania land. • The condition of vegetation is stable. Vegetation structure is likely to take many years to recover from logging impacts. Vigorous recruitment continues in productive lowland areas and remains less advanced in sub-alpine areas. • Regeneration in an area affected by a fire in 2014 has been slow, probably due to extremely dry weather conditions. • Forest loss was not measured in the reporting period. • Illegal felling of dead standing trees for firewood collection occurred intensively across 5-7 ha (0.0007% of the Highland Forest and Woodland target) on Pine Tier, within the 2014 fire boundary. Actions were taken to stop further activity. 		


Recommendations

- Repeat long-term ecological monitoring in 2020.
 - Continue to implement and improve the Access Management Strategy, including monitoring for illegal timber harvesting and taking action to prevent illegal access when detected.
 - Consider removing the indicator “Forest cover change – 20 km buffer” as it doesn’t reflect TLC management, and can’t be influenced by TLCs actions.
 - Continue to implement the Threatened Species Protection Strategy, including annual eagle nest checks and review eagle breeding status in 2016-17 to ensure protection.
 - Consider amalgamating the first three goals to be “The condition of Highland Forests and Marshes is improved”, maintaining the same indicators.
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Carnivorous Marsupials		Status: Minor issues
Goals Maintain wild, free ranging populations of carnivorous marsupials		Outcome: On Track, continue monitoring
Description The Bronte region is one of the few areas in Tasmania that retains an intact guild of large carnivorous marsupials, the Tasmanian devil, spotted-tail quoll and eastern quoll. All three species are listed as threatened under state and/or federal environmental legislation. The mosaic of open areas, woodland and forest supports high population densities of prey species such as wallaby and possum and large fallen trees and rocky areas provide den sites.	 <p>Tasmanian devil captured by remote camera. Photo: TLC</p>	
Ecological indicator	Current status 2015-16	Trend
Spotted-tailed quoll	Detected at 5/43 sites (12%) 6 observations (2550 trap nights)	Decline Decline 25%
Eastern quoll	Detected at 21/43 sites (49%) 58 observations (2550 trap nights)	Stable Decline 38%
Tasmanian devil	Detected 37/43 sites (86%) 286 observations (2550 trap nights) DFTD suspected at 1/37 (3% sites)	Decline 11% Decline 21% Improved
Key findings		
<ul style="list-style-type: none"> • 30 species of fauna were identified, new species include brown bandicoot and spotted-quail thrush • Three carnivorous marsupials and feral cats were routinely detected • The Tasmanian devil was the most commonly detected carnivorous species • Devil facial tumour disease was suspected at 1/37 sites FIRI142 and is the lowest in 3 years • Eastern quoll and spotted-tailed quoll were relatively rarely detected at Five Rivers • Decline in detection accords with the STDT survey findings are may be related to drought 		
Recommendations		
<ul style="list-style-type: none"> • Review monitoring data in 2016-17 post-drought to determine whether trends have changed • Continue carnivore monitoring on an annual basis and standardise camera placement, settings and duration of trap nights • Investigate other options to improve detectability of spotted-tail quoll • Consider expanding target to include all native terrestrial vertebrate species, recognising that most of these species occur across different vegetation-based targets, and allow reporting on data being collected through the long-term ecological monitoring. 		

Community Connection with the Landscape		Status: Good
Goal <ul style="list-style-type: none"> • Provide ways for people to achieve and enjoy the benefits of conservation • Harness knowledge of the Bronte landscape to enhance management and support healthy communities. 		Outcome: On Track
Description There is a high degree of public interest in the Five Rivers Reserve, and the TLC continues to encourage community connection with the landscape. People visit the reserve for a variety of cultural, artistic, recreational and educational reasons. Volunteers assist in a variety of reserve management activities. TLC staff support local businesses through purchase of food, fuel and accommodation and hire of local contractors.	Visitors experiencing Skullbone Plains. Photo: Denna Kingdom 	
Indicator	Current status	Trend
# volunteer days on the reserve	195 volunteer/days	Flat
# visitors to the Reserve	>121 visitors	Flat
Key findings <ul style="list-style-type: none"> • 24 visitor trips were recorded, with >121 visitors exploring Five Rivers for walking, fishing, undertaking personal research or artistic endeavours. • TLC continued its relationship with RiverFly 1864, which operates fly fishing trips from a standing camp at Skullbone Plains. (Visitor numbers from RiverFly 1864 were not included in the above visitation figure, as they had not been received before publication.) 		
Recommendations <ul style="list-style-type: none"> • Continue to implement the Community Engagement Strategy, including: encouraging visitation to the Reserve by people in diverse and exciting ways; and improving opportunities for locals to engage in low-impact recreational uses such as fishing, camping and bushwalking. • Consider removing this target from individual reserve management plans and reporting all relevant TLC activities across Tasmania in a separate report. This approach will be easier to report, more reflective of TLCs effort and change over time, and is a goal of TLC's Strategic Plan. 		

Cultural Heritage	Status: Very Good	
Goal Protect, enhance and rediscover the cultural heritage values of the reserve	Outcome: On Track	
<p>Description</p> <p>The Five Rivers Reserve in the wider central highland landscape contains a number of important cultural sites for Aboriginal people and also areas where there remains evidence of early European settlement, such as fences, chimneys and ruins. Although a detailed Aboriginal cultural survey has yet to be undertaken, many artefact scatters and traditional campsites are known to occur across the reserve. The remoteness of most sites means that they remain in a relatively undisturbed condition. A range of shepherd huts, boundary fences, cairns and oral histories of the early pioneering days are in various stages of being documented.</p>	 <p>Remains of a shepherd hut on Roscarborough. Photo: TLC</p>	
Indicator	Current status	Trend
Intactness of indigeneous heritage sites	Not documented	Unknown
Understanding and interpretation of indigenous knowledge	Not documented	Unknown
Intactness of cultural heritage sites	State of decay	Unknown
Preservation of cultural history sites and knowledge	Being documented	Unknown
<p>Key findings</p> <ul style="list-style-type: none"> Retired TLC staff member Bruce Hay has an excellent knowledge of the European cultural heritage sites. Bruce mapped and documented these sites in 2016. 		
<p>Recommendations</p> <ul style="list-style-type: none"> Commission an Aboriginal cultural survey of the reserve. Continue to systematically map and document European heritage sites. Support the collection of an oral history of the reserve especially in relation to past use and changes of the landscape. 		

Regional capacity	Status: Unknown	
Goal <ul style="list-style-type: none"> Find ways to generate revenue and to enhance regional capacity Reserve derived income supplements reserve costs by 5% annually 	Outcome: Not known	
Description Through our conservation activities TLC strives to provide economic benefits to the local community. A robust Central Highlands community will enhance the TLCs long term vision to support healthy communities to underpin healthy landscapes. An ecosystem services framework has been used by TLC as a way to structure thinking around income generation from reserves. By annually recording expenditure by TLC and related on-reserve activities and revenue generated in the local area, we can identify our financial contribution from conservation activities to the local community.	Tent platforms at Skullbone Plains. Photo: TLC 	
Indicator	Current status	Trend
Income generated from carbon	Yes	Stable
Income generated from other ecosystem services	Yes	Stable
Income and benefits flowing to the Bronte community	No indices as yet	Unknown
Key findings <ul style="list-style-type: none"> Income was derived from Five Rivers Reserve endowment, interest on investments, the sale of carbon credits, provision of hunting licenses, a commercial use license (RiverFly) and sale of gravel from a pre-existing quarry. TLC activities such as monitoring, Bushblitz, the PALRC course, supporter trips and reserve management trips generated a significant economic activity in the Central Highlands community. Work was undertaken to develop a method for measuring the impact that TLC have on the local community. This work indicated that a large effort is required to quantitatively measure how TLC contributes to the Bronte community economy. 		
Recommendations <ul style="list-style-type: none"> Consider removing this target from individual reserve management plans and reporting all relevant TLC activities across Tasmania in a separate report. This approach will be easier to report, more reflective of TLCs effort and changes over time, and is a goal of TLC’s Strategic Plan. 		

MANAGEMENT EFFECTIVENESS SUMMARY

Build Resilience to Climate Change		
Key objective(s) <ul style="list-style-type: none"> Climate change impacts on all conservation targets are being addressed 	Status 2015-16 On-track	
Strategy description Climate change is recognised as a key threat to many conservation values. Changes in climate will affect most conservation targets in the reserve, but particularly sphagnum peatlands, wetlands and moorlands. Sphagnum peatlands and Miena cider gum are under direct threat from climate change due to their narrow environmental niche. Other species, like <i>Pherosphaera hookeriana</i> and other dwarf conifers, are also particularly sensitive to changes due to fire. Improving the resilience of the conservation targets will help to limit the impacts of other stressors and actively help recruitment and population replacement where appropriate.	Climate change will impact peatland. Photo: TLC 	
Indicator	Current status	Trend
Resilience of at-risk conservation targets is improved	No data	Unknown
Progress in 2015-16 <ul style="list-style-type: none"> The highland marshes conservation target, including nested targets such as Miena cider gum, sphagnum peatland and alpine vegetation communities, along with riparian species such as drooping pine, are the most susceptible to climate change. A student research project has been developed to identify those areas most at risk from wildfire (a key issue relating to climate change). 		
Key recommendations for future management <ul style="list-style-type: none"> Consider incorporating this strategy as a point of focus within the Highland Marshes and Streams and Wetlands conservation targets, rather than being a separate strategy, as all actions required fall into other strategies (e.g. fire management, weed management, threatened species protection) and monitoring occurs as part of the long-term ecological monitoring. 		

Access Management

Key objective(s)

- Unauthorised access is reduced by 80% by 2020

Status 2015-16

On-track

Strategy description

Management of access points across the Reserve is required so that visitation causes minimal impact to Reserve natural values. Unauthorised and illegal access can have a significant negative impact on values, through activities such as hunting, wood-hooking, campfires, dumping of rubbish and off-road driving. A variety of mechanisms are used to regulate access including infrastructure such as fences and gates, information provided in signs, and direct communication with the local community and potential visitors. Infrastructure needs to be maintained to ensure it is safe to use, is effective and does not impact on the values of the Reserve (e.g. erosion).

Access management at Skullbone Plains. Photo: TLC



Indicator	Current status	Trend
Reportings / evidence of illegal entry	Difficult to measure – see recommendations below	

Progress in 2015-16


- In 2015-16 illegal access was observed and reported numerous times, mostly in late summer and autumn. Illegal access was primarily linked to felling of trees and theft of firewood in and around the area of the 2014 fire at Pine Tier / Roscarborough. Illegal access was gained from the Marlborough Rd and Pine Tier Road, with tree felling located in areas that were not visible from the road. Trenching of these illegal access points was initiated in May 2016 and will be completed in 2016-17. New TLC “Private land” signs were installed at these points. Remote cameras were deployed to identify vehicles involved in the theft of firewood, however number plates were not distinguishable from the photos.
- Hunters reported illegal access points into Roscarborough (likely used by 4WDs for access to Circle Marsh).
- Roads were assessed by TLC’s Bruce Hay to develop a road maintenance/closure schedule.
- There has been ongoing road maintenance, predominantly drainage management of roads that were identified as needing to stay open. 5km of roadside vegetation (predominantly eucalypts) was cleared by staff, contractors and volunteers by cut and paint. No roadside spraying was undertaken. Tree falls were cleared from roads as necessary.
- Several locks on gates went missing or were broken, these were replaced as necessary.
- Forestry Tasmania began using the main Serpentine road for movement of logging trucks between Lake Echo and the Marlborough Rd. A formal Right Of Way is being developed.


Key recommendations for future management


- Finalise the mapping for road maintenance/closure schedule.
- Continue the program of road, gate and trench maintenance. Further work is required on main Viormy road to address drainage issues. Roadside spraying will be required in 2016-17 through Viormy. Top dressing of roads across Pine Tier, Viormy and Skullbone Plains will be required in 2018-19.
- Finalise a formal Right Of Way with Forestry Tasmania over the main Serpentine Road, and

manage Right Of Way to ensure that usage/maintenance requirements are adhered to.

- Consider fencing or other physical means to both sides of Pine Tier Road to prevent illegal access and activities (wood cutting/rubbish dumping/etc).
 - Ensure that information from individual hunters about access issues is passed onto TLC staff via the hunting group leaders.
 - Revise objective – individual instances of illegal access are difficult to detect and measure. Qualitative measurements as reported by reserve management staff would be more indicative, as would the efficacy of barriers, gates and other access control methods.
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Fire management		
Key objective(s) <ul style="list-style-type: none"> No unauthorised fires start on the reserve by 2020. All reasonable measures are taken to prevent the spread of any fires originating on the reserve (ongoing) 		Status 2015-16 On-track
Strategy description The aim of this strategy is to reduce the impact of unplanned fire, on the people and values of the Five Rivers region. Bronte Park is the largest community in the region and wildfire poses a significant risk to the community. While most of the natural values of the Reserve are relatively resilient to the impacts of fire, there are some significant features, such as sphagnum peatlands and populations of drooping pine that should be protected from fire wherever possible.		Sphagnum bogs are fire sensitive. Photo: J. Hattam 
Indicator	Current status	Trend
No. of unplanned fires	0 unplanned fires	Flat
Progress in 2015-16 <ul style="list-style-type: none"> Water holes and vehicle tracks were maintained for use during fire suppression activities. There were no unauthorised fires on the Reserve in 2015-16. A fire risk assessment was completed for all TLC reserves. A fire management policy for all TLC Reserves is being implemented. A fuel stove only policy is also being implemented. 		
Key recommendations for future management <ul style="list-style-type: none"> Map fire sensitive and fire dependent vegetation on the Reserve and develop strategies to maintain the values of these vegetation types, and develop an Operational Fire Management Plan that identifies locations of fire sensitive values and ways to protect these during firefighting operations. Continue to implement a fuel stove only policy for the Reserve. Continue to implement TLC's fire policy and procedures, including conducting an annual fire risk assessment across all TLC properties Continue to maintain key roads and firefighting infrastructure such as dams An ecological burn plan needs to be developed for marshes and grassy woodlands Consider revising first objective – the current objective is easy to measure but doesn't reflect the effectiveness of TLC's management. 		

Threatened species protection		
Key objective(s) <ul style="list-style-type: none"> Improved conservation outcomes for threatened species by 2016 		Status 2015-16 On-track
Strategy description <p>There are a number of threatened species on the Five Rivers Reserve that are either poorly known or for which more information is required. Extension surveys are required to better understand the distribution and status of fauna species such as the Ptunarra brown butterfly, Miena jewel beetle, Masked owl and Grey goshawk, etc and threatened plant species such as the grassland cupflower, claspleaf heath and small alpine leek orchid. Knowledge of the ecological requirements of other threatened species should be investigated. Ongoing survey and assessment of eagles will ensure this shy nesting species is not disturbed during the breeding season and that breeding success and productivity is being maintained.</p>		<p><i>Ozothamnus hookeri</i> habitat for Miena jewel beetle on Skullbone Plains. Photo: TLC</p> 
Indicator	Current status	Trend
Knowledge is improved about distribution, status and ecology of threatened species	Small improvement	Increasing
Progress in 2015-16 <ul style="list-style-type: none"> Extension surveys for the nationally endangered ptunarra brown butterfly were planned for Mar 2016 but were hampered by poor weather. Progress extension surveys for Miena jewel beetle, masked owl and swift parrot. Miena jewel beetle surveys not progressed due to poor flowering season 		
Key recommendations for future management <ul style="list-style-type: none"> Continue to progress extension surveys on poorly recorded threatened species. Target Miena jewel beetle surveys during peak <i>O. hookeri</i> flowering periods in Nov / Dec. Improve knowledge on swift parrot distribution on the reserve. Continue to conduct extension surveys for ptunarra brown butterflies in Poa grasslands. Conduct extension surveys for drooping pine in riparian vegetation along the Nive River on the Viormy section of the Reserve Review eagle breeding in 2016-17 to monitor productivity and ensure protection Consider revising strategy to emphasise the improvement of knowledge about data deficient threatened species Update threatened species mapping to incorporate new data collected from on and near Five Rivers 		

Clarence Galaxias Protection		
Key objective(s) <ul style="list-style-type: none"> No introductions or expansion of brown trout on the reserve 		Status 2015-16 On-track
Strategy description <p>The aim of this strategy is to prevent the establishment of Brown Trout in areas where Clarence galaxias occurs. Brown trout have the potential to cause extinction of native fish species. Anglers are the most likely vector for introduction. Access control and the encouragement of responsible fishing practices are some of the ways that the risk can be reduced.</p> <p>A secondary aim is to work with partners to investigate the potential to eradicate trout from other small water bodies to expand area of occupancy of Clarence galaxias as specified in the species recovery plan.</p>		 <p>Likely habitat for Clarence galaxias. Photo: D. Sprod</p>
Indicator	Current status	Trend
Presence of brown trout	Present through most of the Nive Catchment including Kenneth Creek	Stable
Presence of Clarence galaxias	Present at 4 sites	Stable
Progress in 2015-16 <ul style="list-style-type: none"> Preliminary Clarence galaxias restoration plan has been approved by the TLC's Science Council and TLCs Board. Application to purchase Kenneth Lagoon from the Crown is progressing. Two site inspections with Inland Fisheries staff to assess weir options. Stage 2 of Feasibility Plan investigating water movement across Skullbone Plains is progressing. Additional hydrological modelling of the Kenneth Creek catchment has been identified as a priority. Some preliminary discussions on funding options have been made. 		
Key recommendations for future management <ul style="list-style-type: none"> Continue implementing the Clarence Galaxias project plan Investigate funding options for the project Contact geotechnical engineer regarding hydrological modelling costs and timeframe 		

Feral and Domestic Animal Management

Key objective(s)

- By 2016 distributions of key feral species have been mapped and management strategies identified.

Status 2015-16
Minor issues

Strategy description

The aim of this strategy is to better understand the impact of feral fauna species on the natural values of the Reserve and to develop appropriate strategies to minimise their impact on conservation targets. Targeted monitoring using remote cameras and other methods will identify a baseline measure of population that will be used to measure the effectiveness of control measures. A Feral Animal Management Plan will be prepared to reduce populations of both predators such as cats and European wasps, and herbivores such as deer and rabbits. This may require input and advice from key organisations including DPIPW, PWS, IFS and others.

Five Rivers Reserve is bordered on several sides by pastoral properties that run stock (predominantly cattle). Stock can have negative impacts on wetlands and other sensitive vegetation if unmanaged.

Stock fence at Viormy Island block. Photo: TLC



Indicator	Current status in 2015-16	Trend
Feral Cat abundance	Abundance 49 cats Occupancy 44 cats Recorded at 19 / 43 sites (44.1%)	Declined
Rabbit abundance	Abundance 21 rabbits Occupancy 12 rabbits Recorded at 5 / 43 sites (11.6%)	Declined
Fallow Deer abundance	Abundance 34 deer Occupancy 23 deer Recorded at 10 / 43 sites (23.2%)	Declined
Stock access	Some stock incursions	No change

Progress in 2015-16

- Deer control has continued in partnership with the Bronte Deer Stalkers – a local community group. Additional cull tags were secured and filled by the deer hunters.
- Feral cat monitoring has continued, low numbers match trends observed for marsupials
- The Bronte Deer stalkers have provided an annual report on the number of deer shot. The hunters reported fewer deer on the properties in 2016 than previous years, and that many deer shot had a lower than usual body weight, possibly due to dry conditions over summer. TLC issued the Bronte Deer Stalkers with 3 additional deer culling tags to increase the number of deer shot. In total, five doe and four stags were shot.
- TLC is continuing to collaborate with the University of Tasmania and Bush Heritage Australia on a deer management research project, which will inform feral animal management at Five Rivers Reserve
- TLC provided a response to a Tasmanian Legislative Council inquiry into the wild fallow deer population in Tasmania, with a view to reducing or eliminating the species from Tasmania.
- TLC has registered Five Rivers Reserve as a potential Tasmanian release site for a new strain of rabbit calicivirus, through the Invasive Species CRC.
- TLC volunteer Claudia Carpenter completed a project mapping hotspots of feral animal

activity and identifying opportunities for effective control on the TLC reserve estate.

- Several incursions by livestock have been detected on Reserve, including onto TLC's Pine Tier property. The impact of livestock on the Reserve is minimal.

Key recommendations for future management

- Continue to obtain additional deer tags for Five Rivers Reserve for the next deer season to increase the intensity of shooting effort.
 - Gather more information on feral cat ecology and develop a feral cat management strategy.
 - If Five Rivers is selected as a Tasmanian release site for the new strain of rabbit calicivirus, implement methodology and monitoring requirements.
 - Inspect and repair fences in the vicinity of Pine Tier Lagoon and around Howards Way gate/cattle grid, because cows have been accessing the property occasionally.
 - Inspect the fences and close gates on the northern and southern boundary of the Viormy Island Block.
 - Consider separating this strategy into "Feral Animal Management" and "Stock Exclusion", as the two are very different points of focus for management.
-

Weed management

Key objective(s)

- Existing infestations of weeds are eradicated from the Reserve by 2017

Status 2015-16

On-track

Strategy description

The aim of this strategy is to control existing infestations of priority weeds on the Five Rivers Reserve. Weed mapping and control has been ongoing since 2010 and is continuing. A weed management strategy has been prepared for TLC's Central Highlands properties to ensure that weed management is effective. Monitoring and follow-up control are a key part of the weed management strategy, along with co-operating with neighbours to encourage management of weeds at a regional scale. Hygiene procedures are also critical to ensuring that new weed species are not introduced to the Reserve.

Ragwort rosette. Photo: TLC



Indicator	Current status	Trend
Weed extent	Weeds present in most areas of reserve	Stable
Weed density	Very low	Improving
Treatment extent	100% of weeds (other than thistles)	Improving

Progress in 2015-16

- Overall decrease in quantity of weeds found, using herbicide volume as a proxy.
- Machinery used for road maintenance was cleaned prior to bringing on to the Reserve, ensuring no new weeds were brought into the Reserve.
- The TLC's Central Highlands weed management strategy was completed in 2010 and has been implemented annually since. This plan encompasses all of the TLC's properties in the Central Highlands, including the Five Rivers Reserve.
- TLC staff and volunteers have completed a sixth consecutive year of weed control across the Five Rivers Reserve. Work was supported by an Australian Government grant.
- Funding has been secured from NRM South for weed control works at Five Rivers Reserve in 2016-17.

Key recommendations for future management

- Annually update weed mapping to include the previous season of weed control.
- Continue with annual weed control.
- Consider revising goal - current goal is overly ambitious and does not prioritise weed species – some weed species do not pose a particular threat to conservation targets or are so established in the region that eradication is not viable or feasible. The TLC's Central Highlands Weed Management Strategy prioritises weed species and sets out goals for management.
- Consider revising indicators – they are hard to measure at present. Update and revise according to the weeding plan.

Neighbour Relations

Key objective(s)

- Regular communications are maintained with all neighbours.

Status 2015-16
On-track

Strategy description

The TLC recognises the importance of maintaining good relationships with neighbouring landowners and regularly communicates with neighbours about shared management issues. Regular communication between TLC Reserve Managers and neighbouring landowners facilitates cooperative approaches to regional land management issues such as feral animals, weeds and fire management.

Indicator	Current status	Trend
Regular communication with neighbours occurred	Yes	Stable

Progress in 2015-16

- Reserves staff liaised with neighbours regarding weed control, access management and stock exclusion.

Key recommendations for future management

- Consider removing this as a strategy, and incorporate as an action in relevant management issues, e.g. weed control, stock exclusion, etc.

Enhanced Regional Capacity and Ecosystem Services

Key objective(s)

- Ecosystem service derived income supplements reserve costs by 10% annually and contributing to the local Bronte community

Status 2015-16

Unknown

Strategy description

Financial stability and security is critical in ensuring management of special conservation areas can be maintained in perpetuity. A range of products and programs that align with TLC's mission and values can generate revenue, which will help to manage the costs of conservation management of protected areas, without compromising natural values. They can also enable wider benefits and services to be available to the community, which can improve the community's connection with the land.

TLC has implemented a carbon project over logged forests on the Five Rivers Reserve and has successfully sold several years' worth of credits. A three year licence to Riverfly 1864 has been granted to establish huts and operate their World Heritage Area tours. Other potential products and programs are considered as they arise.


Indicator	Current status	Trend
Income generated from Reserve	Yes	Stable
TLC expenditure in local community	No data	Unknown

Key findings

- Income was derived from Five Rivers Reserve through the sale of carbon credits, provision of hunting licenses, a commercial use license (RiverFly) and sale of gravel from a pre-existing quarry.
- TLC activities such as monitoring, Bushblitz, the PALRC course, supporter trips and reserve management trips generated a significant economic activity in the Central Highlands community.
- Work was undertaken to develop a method for measuring the impact that TLC have on the local community. This work indicated that a large effort is required to quantitatively measure how TLC contributes to the Bronte community economy.

Key recommendations for future management

- Maintain carbon stocks and reporting requirements to maintain carbon credits
- Continue to develop and secure ecosystem service programs that physically or financially support conservation of the reserve and provide wider community benefits.
- Consider removing this strategy from individual reserve management plans and reporting all relevant TLC activities across Tasmania in a separate report, with the aim of securing 10% of all of TLC's reserve management costs from reserve income. This approach will be easier to report, more reflective of changes over time, and is a goal of TLC's Strategic Plan.

Visitor management		
Key objective(s) <ul style="list-style-type: none"> • People visit the reserve every year and are complying with TLC policies 		Status 2015-16 On-track
Strategy description <p>The aim of this strategy is to ensure that visitation is undertaken safely with minimal impact on the values of the reserve. Five Rivers Reserve provides excellent opportunities for the community to engage with TLC and conservation through recreation, education and scientific research, where this has minimal impacts on values. Visitor infrastructure at Five Rivers includes roads, gates and camping platforms at Skullbone Plains. Activities that pose a threat to the natural values are controlled or prohibited.</p>		
Accessing camp structures on Skullbone Plains. Photo: Matthew Newton		
Indicator	Current status	Trend
Procedures in place to ensure visitors are aware of and comply with policies	Processes partially in place	Ongoing
Progress in 2015-16 <ul style="list-style-type: none"> • A large number of people continue to visit the Five Rivers Reserve, with World Heritage listed Skullbone Plains a major drawcard. • Visitation infrastructure, including roads, bridges, tent platforms, fire pit, water tank and firewood storage shed, was maintained and visitors were supported to visit the Reserve. • A draft visitor guide has been prepared and will be finalised in 2016-17. 		
Key recommendations for future management <ul style="list-style-type: none"> • Consider the need for additional visitor infrastructure, seek funding and construct, e.g. composting toilet at camping platforms, hut, walking tracks. • Maintain visitor infrastructure including tent platforms, rinse water tank, fire pit and supply firewood • Finalise the reserve visitor guide, including information about values, management issues and a map. • Consider changing the objective to “Visitation and visitor infrastructure is managed to protect the natural values of the Reserve,” to reflect the work required to support visitation to the Reserve. 		

Protecting Cultural Heritage

Key objective(s)

- By 2016, cultural heritage sites are documented and a protection strategy planned.

Status 2015-16
On-track

Strategy description

Cultural heritage values are recognised by TLC as an important feature of the landscapes we manage, and TLC management objectives for cultural heritage values are consistent with the Burra Charter.

Sites of indigenous cultural significance, and sites and structures from early European settlement are widespread on the Five Rivers Reserve. Features of cultural significance include Aboriginal stone tool scatters, the remnants of trapper’s and shepherd’s huts, and the remains of old fences. Landscape surveys by cultural heritage officers will increase our knowledge of cultural heritage values on the Reserve.

Remains of a hut. Photo: James Hattam.



Indicator

Current status

Trend

Cultural heritage sites are documented and mapped

European cultural heritage sites have been documented. Indigenous heritage sites have not been documented yet.

Improving

Progress in 2015-16

- TLC Staff member Bruce Hay documented his extensive knowledge of European history and heritage sites at the Reserve. Mapping is to be completed.
- TLC Staff have a good working relationship with the Aboriginal Land Council of Tasmania and the Tasmanian Aboriginal Centre and hope to improve our understanding and protection of aboriginal sites

Key recommendations for future management

- Continue to systematically map and document European heritage sites, including finalising mapping of European heritage values, as per Bruce Hay's documents.
- Work with indigenous groups to document and/or protect indigenous heritage values.
- Establish a process to preserve knowledge of the landscape.

Community engagement

Key objective(s)

- Increasing number of people accessing the Reserve are engaged in TLC activities.

Status 2015-16
On-track

Strategy description

The aim of this strategy is to engage with the Central Highlands community and with the wider Tasmanian community.

Five Rivers Reserve provides excellent opportunities for the community to engage with TLC and conservation through recreation, education and scientific research, where this has minimal impacts on values. Visitor infrastructure at Five Rivers includes camping platforms at Skullbone Plains. Activities that pose a threat to the natural values are controlled or prohibited. All visitors to TLC Reserves are asked to take measures to ensure that weeds and diseases are not introduced to the Reserve.



A gathering of artists at Skullbone Plains. Photo Matthew Newton

Indicator	Current status	Trend
# events at the Reserve	1 event	Slight decrease
# of volunteer activities at the Reserve	9 volunteer activities	Slight increase
# of research and education projects	2 projects	Slight decrease

Progress in 2015-16

- A large number of people continue to visit the Five Rivers Reserve, with World Heritage listed Skullbone Plains a major drawcard.
- TLC hosted one field trip for supporters.
- UTAS ran the “Protected Areas Planning” field-based course at Five Rivers Reserve in Jan 2016 for the second consecutive year.
- Riverfly Tasmania continues to take people to the Reserve to access trout fishing areas in the WHA

Key recommendations for future management

- Continue to identify opportunities for volunteers to assist with reserve management and monitoring activities and ensure this information is included in the volunteer policy
- Continue to work with a diverse range of stakeholders to create opportunities for community access and engagement with Five Rivers Reserve
- Continue to identify opportunities for volunteers to assist with reserve management and monitoring activities and ensure this information is included in the volunteer policy
- Continue to work with TAC on developing a guided walk through trawtha makuminya and Skullbone Plains.
- Consider removing this strategy from individual reserve management plans and reporting all relevant TLC activities across Tasmania in a separate report. This approach will be easier to report, more reflective of changes over time, and is a goal of TLC’s Strategic Plan.