

Carp Captures at a Glance

Lake Sorell

October – December 2014 (Total)	Adult*/Juvenile	Total 1995 to present
618	3/618	40,637

*Adult fish refers to carp from pre-2009 cohorts

Lake Crescent

October – December 2014 (Total)	Adult/Juvenile	Total 1995 to present
0	0 - 0	7797

Overview

Lake Sorell

Carp removal has been difficult this season. However the increased effort has seen more carp this year (618) compared with the same time last year (556). Catch rates in the early part of the spring have dropped from the last season and remain low compared with previous seasons. Fishing effort has increased substantially to make up for the drop in catch rates. It has required hard work to catch each carp, this can be taken as an encouraging sign that carp from the 2009 cohort are being fished down.

Table 1. Gill net fishing effort in Lake Sorell

Fishing Effort	October	November	December	Grand Total
Gill Nets Sets	161	149	267	577
100m Gill Net Hours	8176	9299	15546	33022

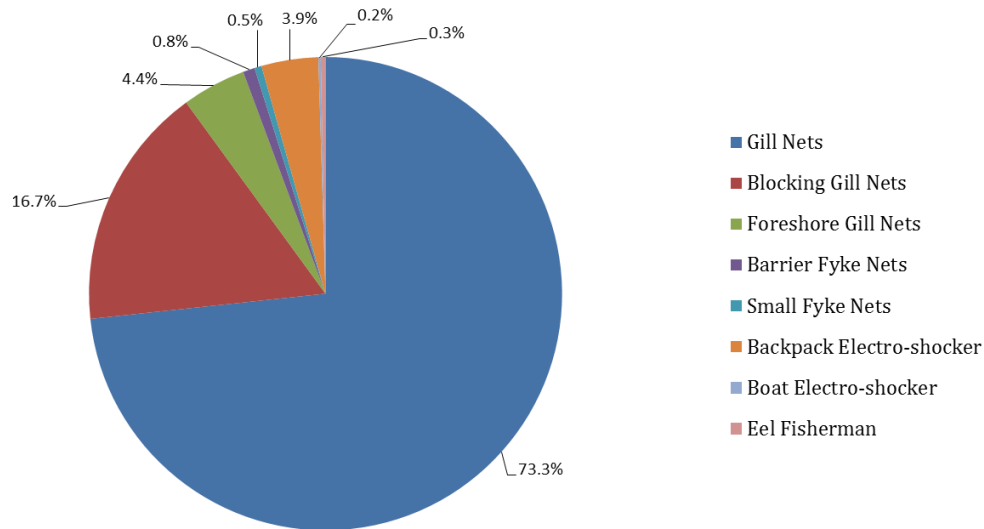


Figure 1. Proportion of carp captures during the October to December 2014 period by fishing method

This year there has been an absence of aggregations of carp in shallow water. These aggregations have boosted catch rates in previous years and contributed greatly to the fish-down of carp in the lake. The largest catch of carp from a single location over three consecutive days this season was 28 fish. These fish were caught following a number of days of light winds and warm weather during late November. Carp were caught using backpack electrofishing and gill nets. Apart from this event, fishing effort has focused on areas frequently visited by tracker carp and habitats that have consistently produced low numbers of carp. The absence of significant rainfall events, an important trigger for aggregations in spring, highlights the degree to which weather plays a part in the success of fishing each season. Carp numbers relative to fishing effort have been low. Gill nets have again accounted for the majority of carp captures this season. Fishing catch from gill nets is standardized to carp per 100m net hour, to make meaningful comparisons between different nets and between months and years. This helps when making changes to fishing practices.



Figure 2. The work vessel IFS10 with the modified net chutes specifically designed for servicing long stretches of gill net

Each year the population of carp within the lake change and respond differently to environmental cues, as fish grow and mature, and more fish are removed. The Program continues to monitor the carp population fitting gears and techniques to efficiently harvest as many as possible. After capture each fish is measured and processed, providing information about the growth and reproductive development of each fish. This information is then linked to information about the gear and catch location. Trends are used to refine fishing techniques throughout the season. Each year new gear and techniques are trialed. The introduction this year of nets blocking bays in front of barrier nets has further reduced the likelihood of fish spawning in marshes. Gill nets were also set along foreshores to prevent carp penetrating flooded areas of the lake that are not protected by barrier nets. Both of these methods are new techniques that have provided valuable catches this season.

Table 2: Carp captures by various fishing methods over the Oct-Dec 2014 quarter

Gear Type	October	November	December	Grand Total
Gill Nets	91	119	243	453
Blocking Gill Nets	4	35	64	103
Foreshore Gill Nets	9	6	12	27
Barrier Fyke Nets	3	2		5
Small Fyke Nets		2	1	3
Backpack Electro-shocker		15	9	24
Boat Electro-shocker			1	1
Eel Fisherman		1	1	2
Grand Total	107	180	331	618



Figure 3. Carp caught in gill nets in early November during a cold snap

Lake Crescent

The capture of a lone female carp in an aggregation with a number of “Judas” transmitter fish in December 2007 proved significant. Despite extensive fishing effort and monitoring over the past seven years no carp have been captured and no evidence of recruitment has been found in the lake. Lake Crescent is carp free.

The native golden galaxias is now once again abundant and despite proving difficult to catch, large trout have also been seen in recent surveys. Timely rains over the winter period have returned the lake to full supply level, allowing the extensive marshlands to fully recover the macrophytes, invertebrates, and amphibians lost during the drought.

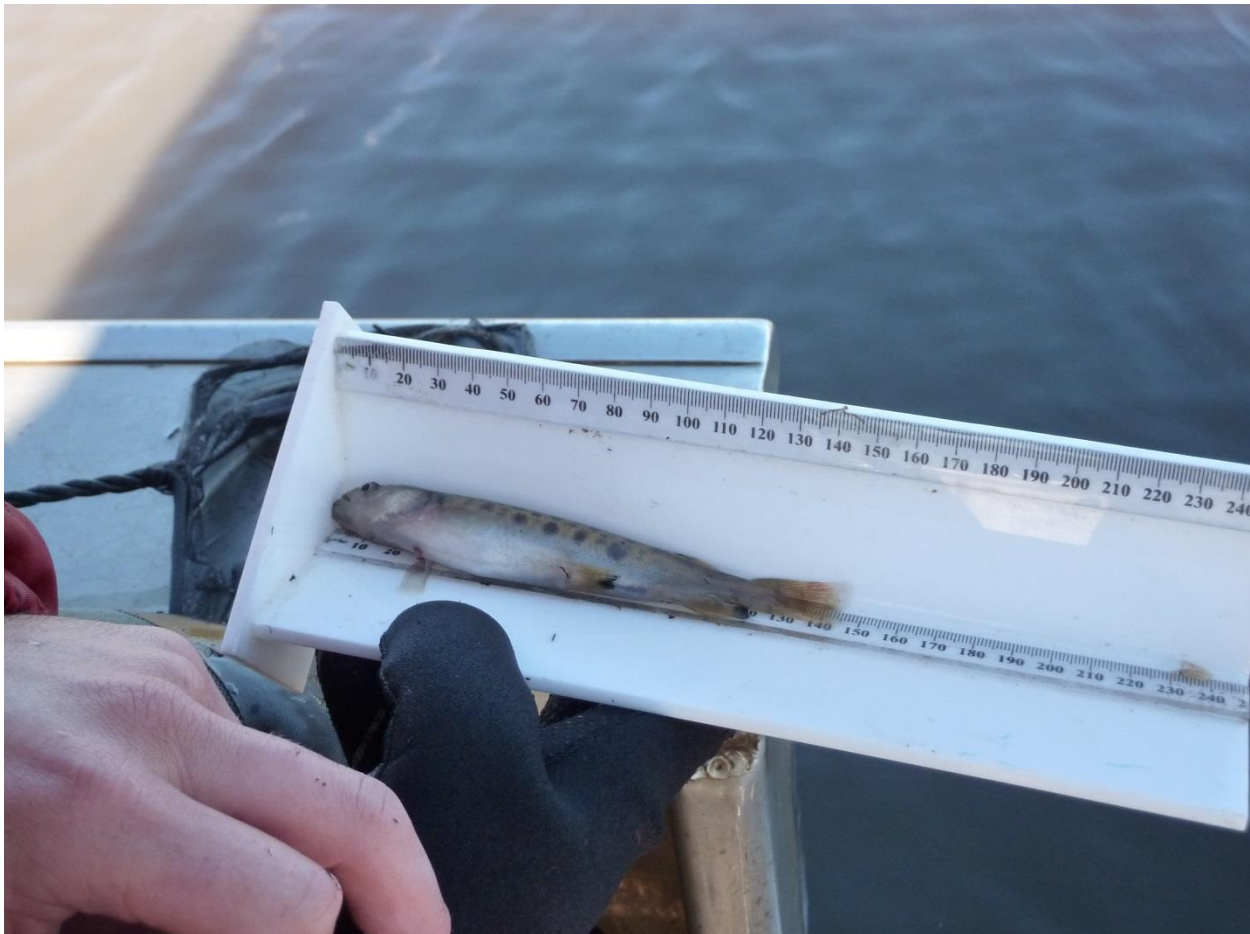


Figure 4. A large golden galaxias from Lake Crescent is measured

Commercial eel fishing in lakes Sorell and Crescent

The commercial eel fishers provide a valuable carp monitoring service with their extensive distribution of fyke nets set in marsh areas, which are checked on a daily basis. Brad Finlayson commenced fishing in Lake Crescent on the 25th of November with 54 nets set, which later increased to 104 nets on the 13th of December. Fyke nets were moved around to different sections of the lake depending on catch rates and weather events, but the majority of nets were set in Tea Tree and Clyde marshes. There was little by-catch with an average of 1 to 3 trout caught each day, which were all released unharmed. 284 eels were caught in November, while December resulted in 2361 eels. Tasmanian Eel Exporters reported that catch rates were down from last year, which could be a result of less favourable weather conditions. The average size of eels caught was 800gm, with some of the larger specimens reaching 2kg. No presence of carp was detected in Lake Crescent.

Shaun Finlayson commenced fishing in Lake Sorell on the 9th of November with 65 fyke nets installed around the lakes, which later increased to 126 nets in December. Nets were set in a range of locations around the Lake, including Point of Chillon Bay, Kermodes Bay, Duck Bay, Boathouse Bay, Silver Plains Shore, Robertson's Marsh, and St Georges Island. These nets were set both on the inside of the barrier net, as well as the main body of the lake, which was especially important as a sampling method for determining whether there were carp trapped in the wetlands behind the barrier nets. Fyke nets were constantly moved around these locations depending on catch rates and weather events. 3570 eels were caught in November, while December accounted for 5506 eels. Similarly to Lake Crescent, catch rates were down compared to previous seasons. In a bid to improve catches, fykes were moved to "harder to fish" locations such as rocky shores, to determine whether eels were exploiting different habitat. This resulted in a slight improvement in catches. The average size of the eels caught in Lake Sorell was approximately 500gm in weight. 6 carp were caught in the fyke nets including one transmitter fish.



Figure 5. A short finned eel caught from Lake Sorell

Work experience

The Inland Fisheries Service (IFS) receives regular requests from schools, universities, and interested graduates looking for work experience in the freshwater fisheries field. The Carp Management Program (CMP) is especially sought after, as the work the students are involved in is very diverse. These activities include repairing barrier nets on Lake Sorell, tracking tagged transmitter carp, observing the surgical implantation of radio transmitters into carp, setting gill nets/fyke nets, and staging the gonads of carp.

Josh Hore is studying a Bachelor of Environmental Science and Management at Charles Sturt University Albury/Wodonga campus (NSW). Joshua approached the Inland Fisheries Service in June 2014, seeking work experience to help him decide which field he would like pursue after completion of his degree. Joshua thoroughly enjoyed his time at the IFS and after the university studying year was completed, he was offered casual work on the CMP. Thanks to the employment of IFS Joshua has found his passion and

has developed new skills which are specifically required in fisheries management, including obtaining hours required on IFS works vessels to help gain his AMSA Coxswains Grade 2.

Josh Hore



Figure 6. Josh Hore with carp caught in sub-zero conditions

Student Projects

Chemo-attraction- The latest in tactic in carp capture

Common Carp (*Cyprinus carpio*) are the most damaging introduced species in Australia. After being found in Tasmania in the 90's, the Inland Fisheries Service have confined carp to only a small area. After a breakthrough in 2007, with the eradication of Carp from Lake Crescent, progress has been steady on the removal from Lake Sorell. However, more efficient methods of capture are under investigation, which has led to the investigation of chemo-attraction to enhance capture.

Chemo-attraction is the process of hijacking pheromone communication pathways between carp, and using them to attract fish towards the fishing gear. This method has been proven in other species, however has not been examined with carp. 2015 marks the beginning of a research project run by Mr Brendan Adair from the University of Tasmania/Australian Maritime College and Dr. Jawahar Patil from the Inland Fisheries Service, who aims to quantify the strength of the attraction forces in carp, and whether they can be used commercially to aid in removal. Brendan is working with male fish and synthetic hormone implants which trigger the fish to release the attracting hormone into the water. He has a number of traps set up around the lake and aims to find significant differences between catch rates between treated and normal fish. Brendan is doing a number of dissections to examine the brain and olfactory nervous system. He aims to describe the olfactory bundle in detail and look at any specific gene expression in fish caught via chemo-attraction, something that has not been completed on common carp before.

Brendan's results are promising; but with more experiments still in the pipeline, final results are yet to be published.



Figure 7. Brendan Adair and Raihan Mahmud preparing to deploy a running male carp into the trap

Environmental DNA trials in Lake Sorell

Scientists from the University of Canberra collaborated with the Inland Fisheries Service in developing a framework for estimating the sensitivity of environmental DNA detection to inform sampling regimes. Dr. Elise Furlan, the project leader/Postdoctoral fellow in Molecular Ecology was accompanied by her supervisors Professor Richard Duncan and Dr. Dianne Gleeson on a visit to Lake Sorell. Water samples were taken daily at various sites around Lake Sorell, which were then filtered to trap DNA on the filter paper. Her work will highlight how many water samples must be taken before a conclusion is made that carp are present/absent in a waterway, particularly when carp are at low densities in comparatively large water bodies. Lake Sorell is considered an ideal location due to its large size and isolated situation. The trials are supported by the extensive data and knowledge that is held by the widely recognised

Tasmanian Carp Management Program. The Carp Team were able to provide an ideal testing regime by leading the visiting scientist to known carp locations, allowing samples to be collected at varying distances from these sites. If successful, this technique would be useful for confirming the presence of carp and other species in suspected waters while populations are small, as well as being a complementary technique for confirming the eradication of species from particular waters.



Figure 8. Dr. Elise Furlan overseeing the filtration of water samples for collection of carp DNA

Employment and funding

Thirteen casual workers were employed at the start of October to assist with the onset of the carp spawning season. The majority of staff were either Australian Maritime College graduates or students, with a few individuals from other schools and universities.

Table 3. Volunteer positions (October – December 2014)

Name	Background	Timeline
Storm Eastley	Rosny College	13 th Oct – 28 th Oct
Danielle Zanetto	University of Tasmania	13 th Oct – 31 st Dec

Table 4. Casual positions (October – December 2014)

Name	Background	Timeline
Nick Boucher	AMC student	18 th Oct – 31 st Dec
Andrew Taylor	AMC graduate	9 th Oct – 30 th Nov
Bryan Van Wyk	AMC student	3 rd Oct – 31 st Dec
Brendan Adair	AMC student	20 th Oct – 21 st Dec
Raihan Mahmud	Shah Jalal University of Science & Technology	6 th Oct – 29 th Dec
Joe Grey	AMC student	15 th Oct – 3 rd Dec
Bernard Creed	Local shack owner/angler	23 rd Oct – 8 th Dec
Ben Grossmith	AMC graduate	11 th Oct – 23 rd Dec
Josh Hore	Charles Sturt University	1 st Oct – 12 th Nov
Jack Rolf	Rosny College	13 th Oct – 19 th Nov
Storm Eastley	Rosny College	29 th Oct – 31 st Dec
Chris Boon	AMC student	13 th Dec – 31 st Dec
Joe Mangan	Charles Sturt University	16 th Dec – 21 st Dec

Water Management

Table 3. Water Release data (October – December 2014)

Month	Lake Sorell release (ML)	Lake Crescent release (ML)
October	-	653.8
November	-	752.2
December	-	1425.1
TOTAL	-	2830.1

* Note: There is no continuous flow monitoring on the Lake Sorell release. Only spot checks are done.

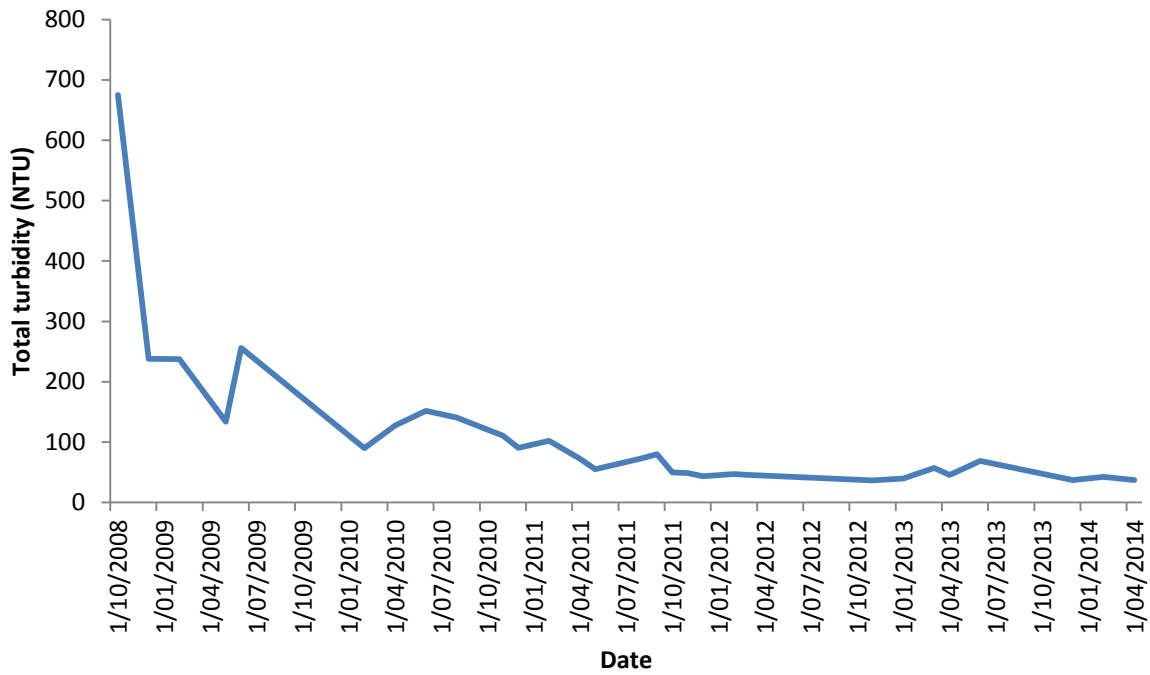


Figure 9. Decreasing turbidity levels in Lake Crescent from 2008 to 2014

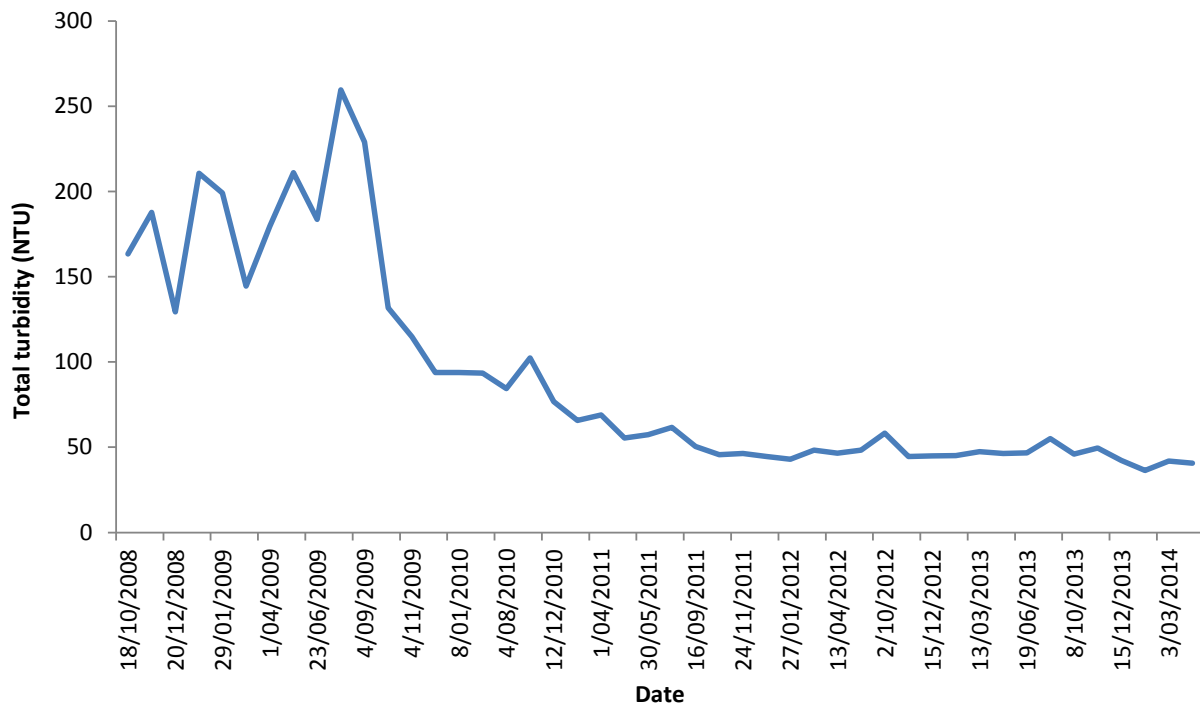


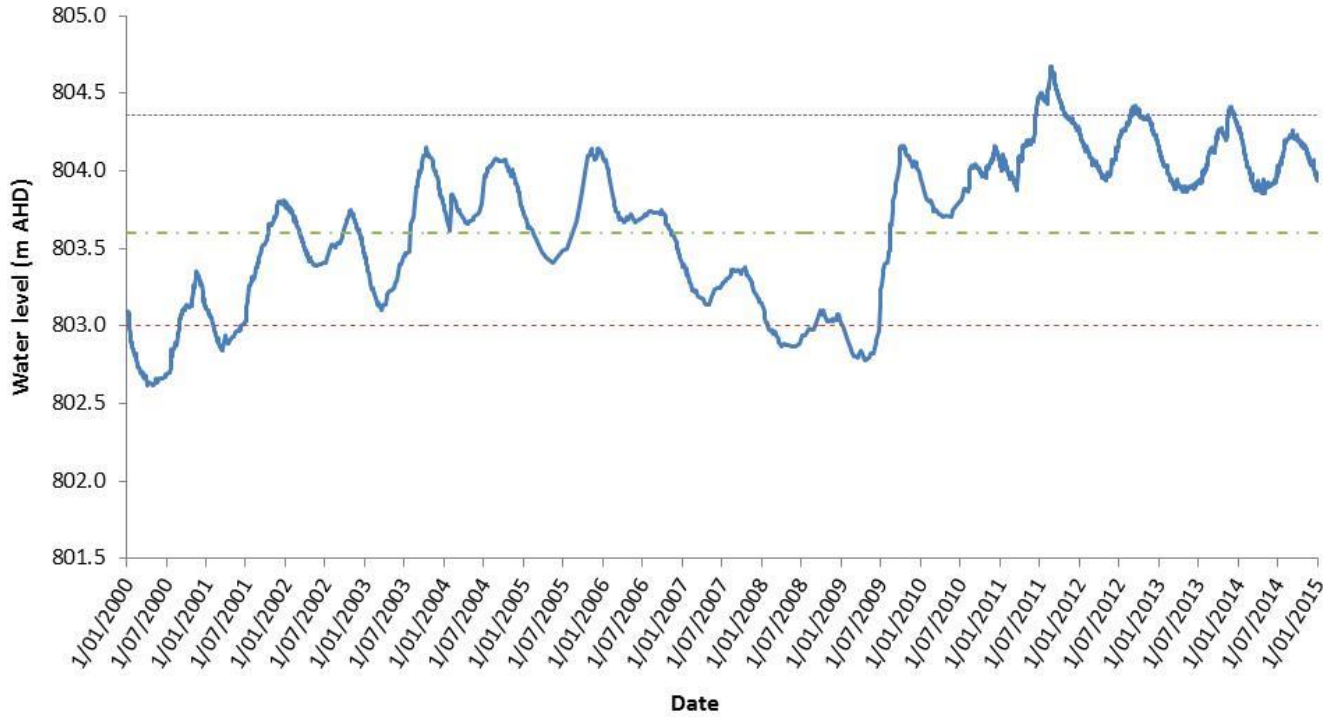
Figure 10. Decreasing turbidity levels in Lake Sorell from 2008 to 2014



Figure 11. Field officer Terry Byard processing the water samples from lakes Crescent and Sorell



Lake Sorell



Lake Crescent

