



Hunter Bird Observers Club Inc.

Affiliated with Bird Observation & Conservation Australia

P.O. Box 24, New Lambton, N.S.W. 2305

Telephone: (02) 4951 3872

www.hboc.org.au

ABN: 62 415 889 446

Annual Report 2010 Appendix C Milham Pond Saltmarsh and Shorebird Habitat Restoration Project

2010 Report

Introduction

Milham Pond is located on Ash Island and forms part of the newly gazetted Hunter Wetlands National Park. This particular area consists primarily of coastal saltmarsh and once provided an important feeding site for shorebirds. The continuing encroachment of mangroves into the saltmarsh is regarded as a key threatening process and the reason for declining shorebird numbers.

The project aims to rehabilitate the saltmarsh area of Milham Pond through the removal of the encroaching mangroves and installation of mangrove propagule exclusion devices to restrict the introduction of additional seeds. Site works for this current project commenced in June 2009 and continued throughout 2010.

This report covers the work carried out during 2010 and attempts to chronicle various achievements during that time as well as discuss some of the challenges of the future.

The project continues to be run as a partnership between Hunter Bird Observers Club (HBOC), Kooragang Wetland Rehabilitation Project (KWRP) and National Parks and Wildlife Service (NPWS). HBOC takes responsibility for project design, works planning and implementation, site supervision of contractors and volunteer effort. KWRP is responsible for most of the administration, a community education component and liaison with other government agencies while NPWS are the ultimate land managers.

Bush regenerators from Trees in Newcastle (TIN) are engaged in contractor works funded by two grants; a Caring for Country Community Coastcare 2008 grant and part of money raised in the Birds Australia Twitchathon 2008.

Work Methods

Treating mangroves as weeds requires a variety of strategies and work methods. Many methods have been trialled on HBOC projects with a view of improvement to work efficiencies, care of habitat and worker health. To record this development "Mangrove Removal Techniques for Estuarine and Saltmarsh Restoration" was put together and is available as a guide for others. See Appendix A – Work Methods.

Occupational Health and Safety

In managing site works at Milham Pond we have an obligation to recognise safety hazards and manage the risks. Each person, volunteer or contractor, receives a site induction where they are instructed on various features of the site, hazards associated with working on the site and acceptable behaviours. Additional instruction is given on specific tasks with regards working with machinery. See Appendix B – Site Induction; Appendix C – Risk Assessment; Appendix D – Use Brush-cutter and Appendix E – Use Chainsaw.

Work Areas

In managing the site works in a systematic manner it was necessary to divide the whole Milham Pond area into smaller defined sections of work. This was facilitated by using natural features of the landscape such as creeks and the odd redundant fence line.

The forested section dominated by mature mangrove trees and covering about 1.4ha was split into Area A, B & C. Three main drainage lines (creeks) provide the borders between these areas and an old fence line roughly determines the northern limit. Area A is bound by all three streams and is in effect an island. Area B lies to the south-west of Area A and is bordered by two streams, the old fence line and higher ground (pastureland). Area C lies to the south of its two larger neighbours. Approximate size of each area is A = 0.4ha, B = 0.8ha and C = 0.2ha.

A section dominated by saplings lies upstream of Area A & B and reaches further upstream to another old fence line sometimes referred to as “midway fence”. This is Area D (2ha) which was previously cleared of mangroves in 2005 but due to a lack of resources had suffered from continued recruitment of mangroves and represented a forest of saplings.

Areas A, B, C & D represent the extent of the contractor effort while the remaining 8.5ha of Milham Pond has been the domain of the volunteers. The section that lies between Midway Fence and Milham Road is easily divided into two areas by the stream running down its length. Volunteer Area V1 is about 5.5ha and has been looked after by volunteers since 2005 while Area V2 is about 2.5ha and was successfully cleared of mangroves by volunteers in early 2009. Both Area V1 and Area V2 were thus regarded as requiring secondary follow-up work only at the beginning of 2010.

One final section called Area V3 is that ground downstream from Midway Fence and separated from Area A and D by the main stream in the system. This area was once cleared of mangroves by volunteers in 2005 or 2006 but suffered since from lack of resources and commitment. The challenge for 2010 for volunteers was to get this section cleared of mangroves at a pace that matched the clearing of Area A and D.

2010 Site Works

The volunteer effort commenced with two days in February and another two days in March in order to get a head start on contractors. Follow-up hand remove of mangrove seedlings over Areas V1, V2 and part of V3 were the initial focus. After only three days work all of the follow-up treatment was complete including the Pheonix Flat section.

A further four days was necessary to clear the remainder of Area V3 of its seedlings and saplings. The majority of this work involved the operation of a brush-cutter over the open muddy ground matched with hand remove treatment throughout the grassy margins. With great satisfaction this work was completed 17th May and finally we had cleaned up one complete side of Milham Pond. This hasn't been the case for several years. From the confluence of the two main streams (south

end) right through to Milham Road on the Neville's Nook side and then back down the opposite side as far as Mid-way Fence had been cleared of mangrove seedlings.

The contractor effort commenced in April with two days work in Area A which included follow-up hand removal of new season seedlings and final chainsaw felling of trees. Primary treatment over Area A was now complete after the equivalent of 13.2 days (1 day equals a crew of four people on site for 6 hours) since contractors started in August 2009. A few different work methods had been trialled and modified during this time so that future site works would be tackled with greater efficiency.

Moving right along the focus now turned to Area B with a combined contractor and volunteer effort of under-scrubbing (brush-cutter work) followed by felling (chainsaw) of mangroves. The lessons previously learnt proved invaluable as this section, twice the area of the previous, was completed in the equivalent of 7.3 days. It must be stated also that the structure of the forest in Area B was slightly different to that of Area A. A great majority of the "trees" were basically tall thin saplings, densely packed and easily accounted for with the brush-cutter. This in turn reduced the amount of chainsaw operation necessary and the whole process moved along at a very satisfying pace.



With primary treatment over Area B and C complete we turned our attention then to Area D. This section was different again to those "forested" sections (Areas A, B & C) since it was dominated by saplings to 2m maximum height. Except for one small chainsaw effort towards completion this effort was all about brush-cutting. In August the work had commenced and by October primary treatment over Area D was all but complete after the equivalent of just 5.8 days. Combined contractor and volunteer efforts with efficient brush-cutting machines had ripped through 2ha of mangrove seedlings and saplings.



Scene from early May (left) showing progress of volunteer effort over Area V3 and challenge of Area D in background and (right) job complete in October.



It was a proud moment when the final mangrove fell and the entire Milham Pond site was finally free of all plants capable of producing seeds for next year.

Milham Pond Hours		
Year	Volunteer	Contractor
2009	197.5	216
2010	302.5	264
Total	500	480

This year’s contractor effort was shared by eleven different personnel from TIN so that they could all get experience in this type of work. The volunteer effort continues to be made from a small core group of four dedicated people.

Site Works Forward Planning

Possible low tide days in 2011 for restoration work at Milham Pond	
May	Monday 9 th Monday 23 rd
June	Friday 10 th Friday 24 th
July	Friday 8 th Friday 22 nd
August	Monday 8 th Monday 22 nd
September	Monday 5 th Monday 19 th

Work on Milham Pond does not need to start until at least May to give the place some time to get over the initial primary work. The program scheduled for 2011 has been worked out taking into account the days where best use of low tides will give greatest advantage. All work in 2011 will be secondary follow-up hand removal of seedlings. On at least three of these days the work effort will be augmented by the addition of bush regenerators from TIN.

Measure of Success

The restoration of saltmarsh by removing mangroves is not an entirely proven concept whereas mangrove removal to restore shorebird habitat is. It may be thought of as one and the same but this is not necessarily the case. To allow this project to properly measure its success there needs to be some monitoring additional to any shorebird surveys to aid this process.

Initially a quadrat was set up in Area A in an effort to estimate the number of mangroves likely to be treated. This is a condition of the Fisheries Permit. Since then two additional quadrats have been made; one in Area B and another in Area D. These areas were chosen because they represented slightly different community structures and it was logical then that the plant counts would be different. At each quadrat an initial count of mangrove plants was carried out prior to their removal then an estimate of plants throughout that particular section was made based on the size of the area.

Estimates of mangroves using quadrat counts					
Quadrat	Non-trees	Trees	Area	Non-trees	Trees
A	6183	38	A (0.4ha)	247,320	1,520
			C (0.1ha)	61,830	380
B	7476	32	B (0.8ha)	534,960	2,560
D	1769	0	D (2ha)	353,800	0
			Total	1,197,910	4,460

Each quadrat is 10m x 10m (100 square metres) and simple arithmetic can produce numbers per hectare.

Deliberately omitted from this table are the three so-called volunteer areas for various reasons. Firstly Areas V1 and V2 had primary treatment of mangroves previously and in the case of V3 only part of that section needed primary treatment. Once all areas are regarded as follow-up areas then perhaps calculations can include the entire Milham Pond.

The second aspect of maintaining these quadrats is that they will show the recruitment rate over each year. At the start of each winter a count of the new season seedlings can take place and this will prove the effectiveness of the Mangrove Propagule Exclusion Devices (MPEDs). This was possible for Quadrat A only in 2010.



TIN bush regenerators counting the seedling recruitment within Quadrat A in April 2010 found a total of 1994 seedlings. The initial count in September 2009 was 6124 seedlings.

Further along the road to restoration each of these quadrats will be monitored for regeneration of saltmarsh plants. That will be the exciting part. Both Quadrat A and B have nil saltmarsh plants at this early stage but Quadrat D has an initial 50% cover of *Sporobolus virginicus* (salt couch).

Mangrove Propagule Exclusion Devices

Following last season's failure of MPED No.1 due to the enormous pressure placed on it by the high tides it was decided to look for an alternate location where the stream wasn't so deep. In the end two MPEDs replaced this one and were placed about 30m upstream; one on each side of Area A. It was also suggested that a floppy design may be able to be installed at the original location, the confluence of the streams, and some arrangement at that location that was able to allow for the strong current would still be of benefit.

A third MPED previously installed in 2009 at the extremity of Area B continues to prevent mangrove seeds from entering the area from that "back door" direction via a secondary stream.

It was late July and installation of replacement MPEDs was only just being thought about when it became obvious that mangroves were dropping seeds already. Suddenly MPEDs became an urgent

issue and so in early August new arrangements were in place. By that time thousands of seeds had travelled into the system and of course may thousands more were still being produced within the system. The felling of trees had not quite been completed and tens of thousands of saplings, full of seed, were yet to be treated.



It was with some amusement when upon inspection of the MPEDs during ebb flows, the screens were found to be packed with seeds (left) from upstream and preventing them from escaping! This should not be the case in 2011. On the other hand it was encouraging to see that the piles of mangroves nearest the streams (right) were being effective barriers to seed invasion and this may help reduce the area affected in the short term at least.

Nature of Milham Pond

Lots of casual observations are possible while carrying out this work and every day-sheet has entries describing fauna interacting with the changing landscape. Greatest activity was witnessed from about mid August when insect hunters like Grey Shrike-thrush, Willie Wagtail and Grey Fantail used the area tirelessly. Also attracted to the new structure (piles of dying mangroves) were White-fronted Chat, Little Grassbird and the resident Mangrove Gerygone.

The gerygone were especially persistent in the face of habitat destruction (killing of mangroves) and several birds could still be heard within the remaining mangroves right up to the last day. The program of felling the trees and saplings did span over 15 months and it was supposed that such a time scale would give the gerygone plenty of time to move.

Another species that suffered from the clearing was the Brown Quail. In mid September a bird was flushed from marginal grass only metres away from brush cutting operations and upon inspection a nest was discovered containing 6 eggs. The nest was marked and a decision to work away from the spot was made. Despite this action the nest was found to be abandoned a couple of weeks later and eggs had been predated in early October. Disturbance of this nature will not happen again now that the machinery component of the work is complete.

With regards shorebirds and waterfowl, there is little to report except that a few Eastern Curlew over-wintered and pretty much hung around for the duration while on any day several White Ibis, White-faced Heron and the occasional Great Egret would be present. It is assumed that the great wet of the inland regions has had its part to play here in providing better alternative habitat for these birds. At some point in the future (next couple of seasons) it is hoped that good numbers of shorebirds will return to Milham Pond to prove the benefit of our work.

With each tide there are opportunities to see various forms of aquatic life and over the year lots of Red-fingered Marsh Crab, mullet, catfish and jellyfish were noted. With the installation of MPEDs

it was especially important not to prevent “fish passage” and only 3 mullet and 4 jellyfish were found trapped in the mesh of the MPED standing in the main stream with the greatest flow velocity.

Accounting

Funding for non-volunteer components of the project was ultimately won from two separate sources. Initially an application for a Caring for Country Coastcare grant was made but the final gift fell short of the estimated costs. This short-fall was made up by the generous allowance from Twitchathon 2008.

Finances as at end of 2010		
Funding	Caring for Country (\$20,020)	Twitchathon 2008 (\$10,000 plus interest)
Contractors	\$19,287.66	\$5,623.28
Equipment	\$654.43	\$137.16
Total Spend	\$19,942.09	\$5,760.44
Remainder	\$77.91	\$4,239.66 (plus bank interest)

At the end of June 2010 the majority of the Caring for Country moneys was accounted for with \$19,942.09 spent on contractors and some equipment purchases. The remainder of \$77.91 should be used to cover some of the costs incurred by volunteers.

Since then we have started spending the Twitchathon 2008 money and \$5760.44 has been used for contractors and equipment. The remainder will be spent next year when contractors are asked to help with the 2011 follow-up hand removal of seedlings.

Acknowledgements

Since this project continues to be run as a partnership it is vital that all the organisations mentioned in this report have a solid interest and commitment to the project. It is heartening, therefore, that each organisation continues to have people passionate and willing to get involved, contribute knowledge and lend support.

With particular reference to this project I would like to acknowledge the support of Peggy Svoboda (KWRP) and Jo Erskine (NPWS) whose combined contributions provide the governance required for this project to reach its potential.

With regards the funding arrangements for this project, I need to acknowledge Twitchathon 2008 for the tremendous support it has showed towards the project and the flexibility allowed in the spending of the allocated funds. This has allowed the project to have a contractor component over three winters and reduce the stress to Milham Pond and its inhabitants.

Once again, congratulations to the TIN crew for another year of great interest in the project and for the safe and professional way they have approached their work. It was wonderful to read an article about Milham Pond in an addition of *TINformation* during the year.

Committed volunteers provide the ultimate thrust of a project like this and its success or otherwise will be due completely to their contribution. The tremendous support from Robert McDonald, Ray

McLean and Tom Walters is acknowledged here. The work ethic from these volunteers has been outstanding and their cheerful company on site is very much appreciated.

Tom Clarke
Project Coordinator HBOC
December 2010.



Appendix A – Work Methods

Mangrove Removal Techniques for Estuarine and Saltmarsh Restoration

Mangrove removal has proved to be very beneficial to the restoration of saltmarsh communities in particular and shorebird habitat in general. Removing mangroves is hard work but can be made easier if the situation is adequately assessed. These notes are intended to be a guide for those planning to remove mangroves and are based on the experience of Hunter Bird Observers Club (HBOC) volunteers at shorebird sites within the Hunter River Estuary.

Since 2003 many thousands of mangroves have been removed by HBOC volunteers from Stockton Sand Spit Shorebird Roost, the water bodies of Swan Pond and Wader Pond of Ash Island and the feeding/roosting areas of Pheonix Flats and Milham Pond on Ash Island. All work was carried out under special licences granted by NSW Department of Primary Industries (Fisheries).

The removal of invading mangroves has allowed saltmarsh plants to re-establish (Milham Pond), follow-up restoration of saltmarsh (Milham Pond, Pheonix Flats, Stockton Sand Spit) opened up shorebird feeding areas (Swan Pond, Wader Pond) and eliminate the “blind” that caused shorebirds to abandon a major daytime roost (Stockton Sand Spit).

Different Techniques

Many techniques have been trialled over the years; all have some benefit depending on the circumstances. Factors such as stiffness of substrate, size of mangrove plant, location of the mangrove within the estuary or saltmarsh community and fitness and agility of the individual volunteer all combine to help with selection of technique. Some techniques trialled seemed beneficial at the time but have been dropped for more efficient methods. The abandoned methods included the use of short-handled chipper, long-handled loppers, whipper snipper and even machete.

The following table lists the most efficient techniques trialled and proven at the above sites.

	Seedlings	Saplings	Trees
Soft mud	Submerge under foot or hand remove	Crown using hand saw	Not applicable
Mud	Hand remove or long-handled chipper	Brush-cutter fitted with circular saw blade	Chainsaw
Stiff mud/sand	Long-handled chipper	Brush-cutter fitted with circular saw blade	Chainsaw
Amongst couch	Secateurs	Short-handled loppers or hand saw	Not applicable
Amongst glasswort	Secateurs	Short-handled	Not applicable

		loppers or hand saw	
--	--	---------------------	--

Three Growth Stages

- **Seedlings** are considered to be all mangrove plants easily hand removed or within the range of secateurs when cutting stems. Depending on strength of operator and sharpness of secateurs then seedlings range to about 12mm stem diameter.
- **Saplings** are considered to be those mangrove plants with stems too large to be cut with secateurs but easily cut with loppers or brush-cutter. Stem diameter on single stem saplings up to 70mm can be cut with a heavy duty brush cutter fitted with a circular saw blade.
- **Trees** are considered to be those mangrove plants with stems too large to be easily cut with loppers or brush-cutter.

Technique Descriptions

(in order of appearance in the table above)

- **Submerge underfoot** is used when the volunteer is dealing with seedlings in mud soft enough for the volunteer to sink shin height or more. In these conditions it is most efficient to simply tread on the seedling and bury it within the substrate than to bend over and hand remove. Working in areas of soft mud is very tiring on the legs and should be interspersed with other work.
- **Hand remove** is used when dealing with seedlings in any muddy situation where the substrate allows. The most efficient method of hand removal is to grasp the seedling stem as close to the base as possible and pull in a sideways action towards you or just to the side. The arrangement of the mangrove roots places greater strain on the volunteer when seedlings are pulled in a vertical lift. This may be within the capability of the volunteer but with the prospect of dealing with hundreds of seedlings then the less back strain the better.
- **Long-handled chipper** is used when dealing with seedlings standing in stiff substrate. This occurs mostly on sandy mud flats or just at the edges of saltmarsh and should be carried out during a low tide. Use of the long-handled tool allows the volunteer to effectively deal with mangrove seedlings while maintaining an upright posture. Neat swings of the tool can, with just a little practice, sever the stems of seedlings just above the substrate. This is enough to kill the plant when the next flood tide arrives.
- **Secateurs** are used whenever the seedlings are growing within the couch (*sporobolus virginicus*) margins or the glasswort (*sarcocornia quinqueflora*) heart of the saltmarsh and can be carried out at any stage of the tide. Other techniques (use of chippers, machetes, whipper snippers etc) tend to create more disturbances to the saltmarsh community than desirable. When using secateurs it is very important that the volunteer cut the stems as close to the substrate as possible to avoid re-sprouting; when the next flood tide covers the stumps the plants will die.
- **Crowning** with a hand saw is a very efficient way to remove saplings standing in mud too soft to safely use machinery such as brush cutters and chainsaws. The arrangement of the mangrove root system allows crowning and the practiced use of a hand saw angled in to

subscribe a conical cut will sever each of the main roots. The sapling is then easily lifted and thrown onto a pile.

- **Brush-cutter** fitted with circular saw blade has proved to be amazingly efficient in dealing with all sized plants up to 50mm (70mm for single stemmed saplings) in stem diameter and standing clear of other saltmarsh vegetation. Best use of the brush-cutter is over open muddy areas or as a means of under-scrubbing trees in preparation for felling. To prevent excessive corrosion of the machine and greater access for the volunteer this work needs to be carried out during low tides.
- **Short-handled loppers (or hand saws)** must be used when dealing with saplings standing amongst other saltmarsh vegetation. This method minimises disturbance to the saltmarsh and the loppers are easily carried as part of a “bush regeneration” tool belt. When using loppers it is again very important that the volunteer cut the stems as close to the substrate as possible to avoid re-sprouting; when the next flood tide covers the stumps the plants will die.
- **Chainsaw** is the most efficient means of felling mangrove trees. Chainsaws must be used by experienced operators only and each operator needs to have a buddy. It is also advised to spend some time under-scrubbing the trees to allow for safer access for the operator.

Dealing with Removed Mangroves

Once a mangrove plant has been treated (hand removed, lopped, chain sawed) they can be simply placed back on the substrate. There is no good reason to completely remove treated mangroves from the site. The practice of not removing biomass from a vegetative community is a well regarded axiom with restoration practitioners. Woody plants should be left to break down and feed the soil from where they grew.

As a matter of neatness to help in the systematic treatment of mangroves it is always a good idea to develop tidy but small piles as you go. This allows the volunteer to be confident that an area has been properly cleared (no messiness to hide the odd plant missed) as well as creating the greatest amount of open area for the reinstatement of saltmarsh plants. Piles of plant material also serve as habitat immediately after treatment as well as during decomposition.

When felling trees it will be necessary to cut up sections into manageable lengths so that the chain saw operator’s buddy can handle those sections into piles.

Follow-up Treatment

In planning mangrove removal it must be understood by all involved that follow-up treatment is as significant as the primary treatment. The invading processes that prevailed and destroyed or altered the precious habitat will continue to prevail. Follow-up will be necessary each year to remove those seedlings sprouted from the fresh influx of seeds. It is in some cases possible to place devices in streams to trap the majority of the new season seeds but as fish passage needs to be maintained then a certain percentage will surely make it into the site.

Mangrove removal works very well but the essential follow-up is the continuing cost of this form of restoration.

Occupational Health and Safety

As mentioned earlier mangrove removal is hard work. The tasks have many inherent risks but these can be managed with a little common sense. Those planning this type of work should take time to assess risks such as generally being exposed to the elements and working outdoors, lots of manual handling issues that consider back injuries, repetitive movements and use of hand tools, the topography and environment and the use of machines in difficult conditions.

With volunteers it should always be made clear that the work is hard but no one is expected to perform outside their comfort zone. Confidently suggest to people to warm up prior to physical work and to vary the tasks from time to time (some standing work, some kneeling work etc) to avoid repetitive injuries. Keep volunteers engaged by allowing, even promoting the proper use of work breaks for shorebird observations – an important component of site-monitoring.

Tom Clarke
Projects Co-ordinator
HBOC

Appendix B – Site Induction

SITE INDUCTION REGISTER

Activity: SHOREBIRD HABITAT (SALT MARSH) REHABILITATION

Location: ASH ISLAND

(MILHAM POND, PHEONIX FLATS, SWAN POND, WADER POND)

Date: 2009

Supervisor: TOM CLARKE

Special Instructions:

Permission to work – work can only be undertaken with approval of KWRP. Notify office at start of shift and declare your proposed work for the day. Fill out time sheet at end of shift.

Permission to remove mangroves – all work teams must carry a copy of the Fisheries Permit when on site.

Ground nesting birds – do not work within 30m of ground nesting bird nests. Report nests and nesting bird behaviour to supervisor.

Plant identification – identification of weeds and native plants is extremely important. Take instruction from supervisor and if in doubt, ask.

Saltmarsh community – saltmarsh is recognised as an endangered community. Keep off saltmarsh areas as much as possible and tread carefully when working in saltmarsh. Do not drive vehicles over saltmarsh areas.

Hazards:

As per OH&S risks assessment.

BIRDWATCHERS CODE OF ETHICS

1. The welfare of birds must come first.
2. Habitat must be protected.
3. Nests, eggs and the immediate vicinity must not be disturbed.
4. Keep disturbance of birds and their habitat to a minimum.
5. Abide by the bird protection laws at all times.
6. Keep your pets at home.
7. When you find a rare bird, think carefully about whom you should tell.
8. Make your records available to the local bird recorder.
9. Respect the rights of land owners.
10. Respect the rights of other people in the countryside
11. Be an ambassador for birdwatchers generally. We do not want to be unwelcomed in the future.

The following people have received basic instruction to carry out shorebird habitat restoration work, safely and with sensitivity, at Ash Island.

Print Name	Sign	Date	HBOC	

Appendix C – Risk Assessment

**OH&S
RISK ANALYSIS**

Activity: SHOREBIRD HABITAT (SALT MARSH) REHABILITATION

Location: ASH ISLAND (MILHAM POND, PHEONIX FLATS, SWAN POND, WADER POND)

Date: 2009

Supervisor: TOM CLARKE

Risk assessment to be read in conjunction with Special Instructions and Birdwatchers Code Of Ethics

ACTIVITY	HAZARD	RISK	CONTROL MEASURES	RISK
Working outdoors	Over exposure to the sun	20	Stay sunsafe – hat, clothes, sunscreen etc	4
	Dehydration	14	Regular water intake	4
	Exposure to cold wind	9	Wear additional clothing – coat, beanie etc	2
	Sharps and rubbish	9	Wear gloves and sturdy covered-in shoes Collect and bag rubbish if possible. Alert supervisor to sharps.	2
Manual handling (hoeing, weeding, raking, stacking, etc)	Remove mangrove seedlings	17	Hold stem low to ground and drag sideways.	7
	Lifting	17	Use strength of legs, not back. Get help from workmates for heavy lifts. Work within personal limits.	7
	Repetitive movements	14	Take regular short breaks, vary tasks, avoid twisting & bending.	4
	Use of hand tools	9	Check handles and blades before use. Choose correct tool for the task. Wear appropriate gloves and sturdy covered-in shoes	2

Topography & environment	Uneven ground	14	Be alert for obstacles (old fence posts) hidden amongst low vegetation or below water levels.	3
	Juncus acutus spikes	13	Take care walking amongst J. acutus – clothes, gloves.	7
	Stings, bites etc	10	Wear long sleeved shirts, gloves etc. Use insect repellent against mosquito bites.	2
	Boggy ground (mud flats)	9	Wear gum boots or be prepared to wash and change after work	1
General	First Aid	10	Report all injuries to supervisor (Senior First Aid). First Aid kit is provided on site.	3
	Hygiene	10	Wash up after work. Clean hands before eating. Wash up water is provided on site.	1

Appendix D – Use Brush-cutter

OH&S RISK ANALYSIS

Activity: SHOREBIRD HABITAT (SALT MARSH) REHABILITATION – SPECIAL TASK
Operate brush-cutter to clear mangrove seedlings and saplings.

Location: ASH ISLAND (MILHAM POND, PHEONIX FLATS, SWAN POND, WADER POND)

Date: 12th October 2009

Supervisor: TOM CLARKE

Risk assessment to be read in conjunction with
 Standard Risk Assessment, Special Instructions **and** Birdwatchers Code Of Ethics

ACTIVITY	HAZARD	RISK	CONTROL MEASURES	RISK
Pre-operational checks	Faulty or unsafe equipment	E	Carry out pre-operational equipment checks as per log book. Ensure all guards are sound and secure.	L
	Unfamiliar operating procedure	H	Each operator to familiarise themselves with operation of all controls and kill switches. Read all labels and instructions.	L
Fuelling up	Handling and storage of fuel	E	Use only approved fuel containers. Keep fuel containers in a clear and obvious place away from work area.	L
	Unfamiliar operating procedure	H	Fuel and refuel as per label instructions. Use only approved fuel suitable for the machine.	L
Check work area	Hidden obstacles	H	Walk over work area checking for obstacles. Remove obstacles or “flag” areas not to be worked.	L
	Hit objects flying up	E	Keep work area clear of other people not involved in operation. Workmate to redirect others as required.	L

Operation of brush-cutter	Machine driven cutting blade	H	Ensure that all guards are secure. Stay alert. Do not become distracted (people, birds etc) and keep watch of the cutting operation. Only use machine for its intended purpose.	L
	Tiredness and loss of concentration	H	Do not operate machine beyond your ability. Take regular breaks from continuous operation or work in tandem with workmate.	L
	Hit objects flying up.	E	Wear appropriate PPE including eye protection and sturdy footwear.	L
	Noise	H	Wear earmuffs.	L

Risk ratings E = Extreme
 H = High
 M = Moderate
 L = Low

Appendix E – Use Chainsaw

**OH&S
RISK ANALYSIS**

Activity: SHOREBIRD HABITAT (SALT MARSH) REHABILITATION – SPECIAL TASK
Operate chain saw to clear mature mangrove trees and saplings.

Location: ASH ISLAND (MILHAM POND, PHEONIX FLATS, SWAN POND, WADER POND)

Date: 14th September 2009

Supervisor: TOM CLARKE

Risk assessment to be read in conjunction with
 Standard Risk Assessment, Special Instructions **and** Birdwatchers Code Of Ethics

ACTIVITY	HAZARD	RISK	CONTROL MEASURES	RISK
Pre-operational checks	Faulty or unsafe equipment	E	Carry out pre-operational equipment checks as per log book. Ensure all guards are sound and secure.	L
	Unfamiliar operating procedure	H	Each operator to familiarise themselves with operation of all controls and kill switches. Read all labels and instructions.	L
	Unqualified operator	M	Operators shall hold appropriate chain saw licences or be under supervision of a qualified operator.	L
Fuelling up	Handling and storage of fuel	E	Use only approved fuel containers. Keep fuel containers in a clear and obvious place away from work area.	L
	Unfamiliar operating procedure	H	Fuel and refuel as per label instructions. Use only approved fuel suitable for the machine.	L

Check work area	Hidden obstacles	H	Walk over work area checking for obstacles. Remove obstacles or “flag” areas not to be worked.	L
	Hit objects flying up	E	Keep work area clear of other people not involved in operation. Workmate to redirect others as required.	L
Operation of chain saw	Machine driven cutting blade	H	Ensure that all guards are secure. Stay alert. Do not become distracted (people, birds etc) and keep watch of the cutting operation. Wear appropriate PPE including eye protection, chaps and sturdy footwear. Only use machine for its intended purpose.	L
	Tiredness and loss of concentration	H	Do not operate machine beyond your ability. Take regular breaks from continuous operation or work in tandem with workmate.	L
	Falling trees.	E	Check direction of fall allowing for prevailing breeze. Communicate to mate your intentions. Wear hard hat.	L
	Noise	H	Wear earmuffs. Mate to communicate danger to operator by first grabbing his shoulder, followed by operator killing the motor.	L

Risk ratings E = Extreme
 H = High
 M = Moderate
 L = Low