



Birds Australia
CONSERVATION THROUGH KNOWLEDGE

Final Report

Shorebirds 2020 *Migratory Shorebird Population Monitoring Project*

25 July 2008

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Kearney

Funding Provided By:

**The Australian Government's Natural Heritage Trust
and WWF-Australia**



Australian Government

Department of the Environment, Water, Heritage and the Arts



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Recommended citation:

Oldland, J. M., Clemens, R. S., Haslem, A., Shelley, L. D. & Kearney, B. D. 2008. Final Report: Shorebirds 2020: Migratory Shorebird Population Monitoring Project. Birds Australia report. The Australian Government's Department of Environment, Water, Heritage and the Arts.

Report prepared for the Australian Government's Department of Natural Environment, Water, Heritage and the Arts (DEWHA) by Birds Australia, Melbourne.

This report was prepared by Birds Australia under contract to DEWHA.

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Published by Birds Australia, 60 Leicester Street, Suite 2-05, Carlton VIC 3053, Australia.

This report was prepared by Joanne Oldland, Robert Clemens, Angie Haslem, Luke Shelley & Brian Kearney.

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1. Acknowledgements

We would like to thank the many people and organisations who gave their time, energy, and shared information to assist with this project. Without their help this project would not have been possible.

First we would like to thank The National Heritage Trust and WWF-Australia for providing funding for this project.

We would like to thank the following shorebird experts who gave their time (again and again) to provide us answers to questions, valuable feedback, and access to data: Linda Cross (QWSG), Phil Straw (NSW WSG), Doug Watkins (Wetlands International), Roger Jaensch (Wetlands International), Clive Minton (VWSG).

We would also like to thank Brian Kearney, Shakya Jayalatharachchi, Suleeqa Hussein, Hayley Glover, Thomas Hagen, Heather Maginn, Oscar Flores, Steve Camilleri, Kate Stevens and Lili Wang for all their volunteer efforts entering and cleaning data in order for these analyses to be conducted.

We would also like to thank Andrew Geering, Anne Lindsey, Bianca Priest, Bill Rutherford, Denis Charlesworth, Eric Woehler, Gayle Stewart, Heather Gibbs, Jenny Skewes, Laurie Living, Lisa Collins, Mark Barter, Maureen Christie, Mike Carter, Mike Craig, Ricki Coughlan, Roz Jessop, Tammie Matson, and Warren Lee Long for their hard work on the project.

We thank the Australasian Wader Study Group (AWSG) for providing the bulk of the data and doing most of the field work related to this project. We would also like to thank the members of associated groups including the Queensland Wader Study Group, New South Wales Wader Study Group, Western Australia Wader Study Group, Hunter Bird Observers Club, Birds Tasmania, the Bird Observers Club, the Victoria Wader Study Group, and the Albany bird club for their major contributions in on ground counting, local knowledge, and expertise that they shared with us.

We would especially like to thank the many people who donated their time to provide local expertise and data on shorebird areas throughout Australia (apologies if we have missed anyone):

From New South Wales: Alan Stuart, Ann Lindsey, Chris Brandis, David Adams, David Rohweder, Gary Whale, Hans Lutter, Joy Pegler, Judy Harrington, Liz Crawford, Chris Herbert, Phil Craven and Phil Straw.

From the Northern Territory; Arthur and Sheryl Keates, Ian Hance, and Tony Hertog.

In Queensland; Andrew Geering, David Niland, Dawn Beck, Gay Deacon, George Baker, Linda Cross, Matt Bloor, Peter Driscoll, Sandra Harding, and Tim Murphy.

From South Australia; Bryan and Toni Haywood, Chris Baxter, David Close, Dave Donato, Deane Morgan, Derek Carter, Graham Carpenter, Iain Stewart, Jack & Pat Bourne, Jane Cooper, Jeff Campbell, John Eckert, John Mullins, Kent Treloar, Len Underwood, Lynn Pedler, Maureen Christie, Paul Wainwright, Peter Langdon, Richard Owen, Rick Hawthorne, Rob Tanner, Travis Hague, Vicki Natt, and Wally Klau.

From Tasmania; Chris Coleborn, Eric Woehler, Peter and Hazel Britton, Peter Duckworth, Priscilla Park, Ralph Cooper, and Richard Ashby.

From Victoria; Barbara Garrett, Bernie McCarrick, Bill Wright, Bob Cook, Bob Semmens, Chris Coleborn, Dale Tonkinson, Dave Ryan, Dave Warne, David McCarthy, Donna Smithyman, Doris Graham, Doug Phillips, Duncan Fraser, George Appleby, Hugo Phillipps, Jim and Anthea Whitelaw, Iva Graney, Jane Hayes, Jeff Davies, Jim Reside, John Newman, Jonathon Stevenson, Kelvin Williams, Ken Harris, Kieth Davis, Marilyn Hewish, Penny Johns, Peter Anton, Peter Dann, Peter Menkhorst, Phil Du Guesclin, Ren Millsom, Richard Loyn, Richard and Margaret Alcorn, Rick Resson, Richard and Margaret Alcorn, Rob Farnes, Rod Bird, Rohan Clarke, Simon Starr, Stephen Johnson, Toni Ryan, Tim Allen, Tom McRaet, Wendy Davies, Will Steele, and Xenia Dennett.

From Western Australia; Anne Bondin, Bill Rutherford, Chris Hassel, Chris James, Eric Sedgwick, John Lauri, Rob Breeden and Sue Mather.

Lastly, we would like to thank Dr Michael McCarthy and Dr Kirsten Parris from Melbourne University for early advice on various aspects of the statistical analyses and content.

2. Scope of Report

As part of the monitoring, evaluation and reporting requirements of the agreement between Birds Australia and the Department of Environment, Water, Heritage and the Arts (DEWHA), Birds Australia are required to provide a Final Report to the Commonwealth by July 25 for the Shorebirds 2020: Migratory Shorebird Population Monitoring Project.

This Final Report includes:

- The scope of the project i.e. Objectives, Outcomes, Outputs, Activities, Milestones, relation to the Wildlife Conservation Plan for Migratory Shorebirds.
- Executive summary
- A summary list of achievements to date and table of Project Activities and Outputs against Outcomes.
- Report on Key activity areas
 1. Fundraising
 2. Development of methods and a toolkit
 - Development of a tractable, improved method for counting shorebirds
 - Production of a shorebird counters toolkit
 3. Site identification
 4. Volunteer recruitment and training
 5. Database modification and web-based data entry
 6. Coordinate monitoring nationally
- Future Plans

3. Scope of Project

The *Shorebirds 2020* project seeks to address the shortcomings of existing shorebird population monitoring programmes by implementing a nationally coordinated monitoring programme that produces robust, long-term population data able to support the conservation and effective management of migratory shorebirds and their habitat.

Objectives

The Objective of the Project is to collect data on numbers of shorebirds in a manner that can be utilised to aid their conservation and management.

With the overall aims of the project being:

- To better understand the relationship between habitat, habitat quality and pressures, and shorebirds;
- To provide information and advice to those charged with conserving and managing shorebirds and the habitats they use, and in doing so;
- To collect and disseminate information on wetlands habitats

Objectives and Actions of the Wildlife Conservation Plan for Migratory Shorebirds that the project contributes to:

Objective 1. Increase international cooperation for migratory shorebirds and ensure that countries of the East Asian - Australasian Flyway work together to conserve migratory shorebirds and their habitat.

Action 1.5. Develop and support training programs in population monitoring and habitat management for site managers in Australia and throughout the Flyway.

Objective 2. Identify, protect and sustainably manage a network of important habitat for migratory shorebirds across Australia to ensure that healthy populations remain viable into the future.

Action 2.9. Develop and support training programs in population monitoring and habitat management for site managers in Australia.

Objective 3. *Increase biological and ecological knowledge of migratory shorebirds, their populations, habitats and threats in Australia to better inform management and support the long term survival of these species*

Action 3.5. *Develop and implement a consistent national method to monitor migratory shorebird populations*

Action 3.6. *Encourage ongoing population monitoring programs for species covered by this plan.*

Activities

Birds Australia was required to provide the services described in the proposal prepared by the organisation dated May 2007, entitled 'Shorebirds 2020: a proposal to monitor migratory shorebirds in Australia'. Key Activities:

1. Fundraising
2. Development of methods and a toolkit
 - Development of a tractable, improved method for counting shorebirds
 - Production of a shorebird counters toolkit

3. Site identification
4. Volunteer recruitment and training
5. Database modification and web-based data entry
6. Coordinate monitoring nationally

Milestones

In addition, Birds Australia was also required to achieve the Milestones in Table 1. As reported in the Yearly Performance Report (April 30, 2008), Recruitment of a Program Manager, Technical Manager and Project Officer had taken place as required. All other Milestones will be reported under the relevant Activity.

Table 1: Project Milestones

Milestone	Date
Stage 1: - Recruit and induct project manager - Commence recruitment of project assistant and develop training for volunteer counters - Commence database modification and maintenance	December 2007
Stage 2: - Recruit and induct project assistant - Complete training materials and undertake volunteer training - Finalise database alterations - Commence first phase of monitoring, Nov 2007 – May 2008	May 2008

Performance measures

It is a requirement that the performance of the Activity be monitored in relation to:

(a) The Objectives:

Collect data on numbers of shorebirds in a manner that can be utilised to aid their conservation and management.

(b) The Outcomes, both Principal National Investment Stream Priority Outcomes and other National Investment Stream Priority outcomes:

Principal NIS Outcome	Protecting and restoring the habitat of threatened species, threatened ecological communities and migratory birds
Other NIS Outcomes	Protecting and restoring significant freshwater, marine and estuarine ecosystems

Both the Principal and Other NIS Outcomes are quite broad, and are encompassed by the first Key Project Outcome: *Improved conservation and management of shorebirds, their habitats and sites*. Therefore performance will also be measured against the Key Project Outcomes.

Key Project Outcomes:

- Improved conservation and management of shorebirds, their habitats and sites
- Improved understanding of the impact of changes in habitat and management and their influence on the suitability of conditions for shorebirds
- A practical model for community-based shorebird monitoring suitable for use by communities throughout East Asia
- An increase in the number of skilled shorebird counters active in Australia and an established network of shorebird counters

- An increase in the number of regularly monitored shorebird sites
- An improved knowledge of trends in shorebird populations

Timeline

The proposed timeline of the project is five years project, due to the fact that it will build momentum over time.

Table 2: Key Activities in relation to proposed timeline.

Phase	Year1	Year 2	Year 3	Year 4	Year 5
Fundraising	*				
Development of methods and a toolkit	*				
Site identification	*	*			
Recruitment and training	*	*	*	*	*
Monitoring		*	*	*	*
Reporting and transition strategy			*	*	*

Table 3. Performance measures in relation to timeline.

Deliverable or performance measure	Year 1	Year 2	Year 3	Year 4	Year 5
Number of mentors	0	4	6	8	10
Number of counters	0	30	40	40	40
Number of sites monitored	20	30	40	40	40
Number of applications of the data				10	10
Toolkit	completed				
Web-interface		completed			
Report on the way forward					completed
Glossy brochure					completed

Additionally there will be annual reports and feedback to all volunteers.

4. Executive Summary

Migratory shorebirds are listed matters of national environmental significance under the EPBC Act. Shorebirds are excellent indicators of environmental health, are important values of coastal sites and are highly visible natural icons that have the capacity to engage the Australian community in international biodiversity conservation. Yet, migratory shorebird populations throughout the world are declining, and threats to their survival (habitat destruction, human disturbance, climate change) are increasing rapidly. To effectively conserve shorebirds and their habitats, we need to know how, where and why they are in trouble, which requires a monitoring program. Whilst volunteer groups, have been monitoring shorebird populations at a number of sites for 27 years, there are many limitations that need to be overcome to provide robust, reliable long-term data capable of detecting shorebird population trends.

The Shorebirds 2020 program was initiated in 2007 to address these shortcomings by implementing a nationally coordinated program. The program is designed to reinvigorate, enable, and facilitate the exceptional community effort at monitoring Australia's migratory shorebirds, and collect robust data on numbers of shorebirds in a manner that can be utilised to aid their conservation and management.

This report outlines progress made during its first year, and successful achievement of the following Output Measures:

- Development of a tractable, improved method for counting shorebirds (Haslem et al. 2008)
- Production of a shorebird counters toolkit, available at www.shorebirds.org.au
- Identification and GIS mapping of important shorebird sites in Australia (Clemens et al. 2008), and selection of sites to include in the national monitoring program (Haslem et al. 2008)
- Volunteer recruitment and training through media promotion of the project, and the development and delivery of training resources and workshops
- Database modification and cleaning
- Coordination of summer 2008 national shorebird counts. *Around 500 volunteers conducted shorebird counts at over 70 sites around the country this summer, totalling over 5000 hours of volunteer effort.*

Analysis undertaken in the development of the monitoring protocol revealed that, in order to be able to identify statistically significant declines in shorebird species populations (50% over 5 years for some species), the number of regularly monitored sites around the country would need to increase to around 150. To achieve this will require a significant expansion of the current monitoring scheme, and the recruitment, training and coordination of significantly more volunteer shorebird counters. Therefore, the next phase (Year 2) of this project will need to focus on delivering the roll-out and facilitation of the uptake of the new, 'best practice' shorebird counting methodology and counter 'toolkit'; expand the delivery of workshops to improve communities skills, knowledge and engagement in shorebird monitoring and conservation at a number of key sites; and increase the level of support for regional count coordinators/mentors.

5. Summary of Achievements

Shorebirds 2020 has successfully achieved its Milestones and Output Measures for Year 1:

- Development of a tractable, improved method for counting shorebirds, to enable the identification of statistically significant declines in shorebird species numbers in Australia, and the collection of information on disturbance, threats and habitat condition to help explain trends at sites (Haslem et al. 2008)
- Production of a shorebird counters toolkit including how to count and identify shorebirds resources, instructions, datasheets, customised site maps etc, available at www.shorebirds.org.au
- Identification and GIS mapping of important shorebird sites in Australia (Clemens et al. 2008), and selection of a network of (fixed and random) sites to include in the national monitoring program (Haslem et al. 2008)
- Volunteer recruitment and training through media promotion of the project, and the development and commencement of delivery of training resources and workshops on how to identify and count shorebirds
- Database modification and cleaning to incorporate new methods and enable reliable analysis of population trend data
- Coordination of summer 2008 national shorebird counts. *During summer 2008 around 500 volunteers (and more than 56 organisations and groups) conducted shorebird counts at over 70 sites around the country this summer, totalling over 5000 hours of volunteer effort, and far exceeding our Output Measures of 20 new sites and 0 new counters in Year 1.*

And in addition:

- Secured base funds from WWF-Australia philanthropic donors and the Australian Government's Natural Heritage Trust for the first two years of the project, and submitted a Caring for Our Country Community Coastcare application (\$250,000), "Shorebirds 2020: Community-based Monitoring and Conservation of Migratory Shorebirds in Australia" to secure further funds for Years 2-3.
- Published a paper that: 1) reviewed existing and historic shorebird population monitoring in Australia; 2) made recommendations regarding the development of a national population monitoring program for shorebirds, and; 3) conducted preliminary population trend analyses.

Gosbell, K. and R. Clemens. 2006. Population monitoring in Australia: some insights after 25 years and future directions. Stilt 50: 162-175.

- Reviewed existing background material/scientific literature, and consulted with shorebird experts, to develop a preliminary list of project objectives and an initial protocol outline.

Table 4. Summary of Project Activities and Outputs against Outcomes for Year 1.

Key Activities	Outputs
Outcome: Improved conservation and management of shorebirds, their habitats and sites (encompasses both NIS outcomes)	
Development of a tractable, improved method for counting shorebirds	<ul style="list-style-type: none"> • Shorebird population trends identified (Power analysis on historic data) • Data collected on disturbance, threats and habitat condition to help explain trends at sites • Revision of shorebird area boundaries makes counts spatially explicit
Site identification	<ul style="list-style-type: none"> • <i>Number of sites monitored: 70 (target 20)</i> • <i>A GIS with maps of all sites completed (Clemens et al. 2008)</i>
Coordinate monitoring nationally	<ul style="list-style-type: none"> • <i>Number of sites monitored: 70 (target 20)</i> • <i>Summary report of summer 2008 counts produced for circulating to counters and stakeholders</i>
Outcome: Improved understanding of the impact of changes in habitat and management and their influence on the suitability of conditions for shorebirds	
Development of a tractable, improved method for counting shorebirds	<ul style="list-style-type: none"> • Data collected on disturbance, threats and habitat condition to help explain trends at sites
Outcome: A practical model for community-based shorebird monitoring suitable for use by communities throughout East Asia	
Fundraising	Secured funding for Years 1-2 of project
Development of methods and a toolkit	<ul style="list-style-type: none"> • <i>Population Monitoring Program for monitoring Shorebirds in Australia completed (Haslem et al. 2008)</i> • <i>Counters Toolkit completed</i>
Site identification	<ul style="list-style-type: none"> • <i>Number of sites monitored: 70 (target 20)</i> • <i>A GIS with maps of all sites completed (Clemens et al. 2008)</i>
Coordinate monitoring nationally	<ul style="list-style-type: none"> • <i>Number of sites monitored: 70 (target 20)</i> • <i>Summary report of summer 2008 counts produced for circulating to counters and stakeholders</i>
Volunteer recruitment and training	<ul style="list-style-type: none"> • <i>Number of mentors: (target 0)</i> • <i>Number of counters: approx 500, 250 new? (target 0)</i> • <i>Annual (count summary) report and feedback to counters: completed</i>
Outcome: An increase in the number of skilled shorebird counters active in Australia and an established network of shorebird counters	
Volunteer recruitment and training	<ul style="list-style-type: none"> • <i>Number of mentors: approx 32, 8 new? (target 0)</i> • <i>Number of counters: approx 500, 250 new? (target 0)</i> • <i>Training materials developed and workshops delivered</i>
Outcome: An increase in the number of regularly monitored shorebird sites	
Site identification	<ul style="list-style-type: none"> • <i>Number of sites monitored: 70 (target 20)</i>
Coordinate monitoring nationally	<ul style="list-style-type: none"> • <i>A GIS with maps of all sites completed (Clemens et al. 2008)</i> • <i>Number of sites monitored: 70 (target 20)</i>
Outcome: An improved knowledge of trends in shorebird populations	
Development of a tractable, improved method for counting shorebirds	<ul style="list-style-type: none"> • Shorebird population trends identified (Power analysis on historic data) • Data collected on disturbance, threats and habitat condition to help explain trends at sites • Revision of site boundaries makes counts spatially explicit
Coordinate monitoring nationally	<ul style="list-style-type: none"> • <i>A GIS with maps of all sites completed (Clemens et al. 2008)</i> • <i>Number of sites monitored: 70 (target 20)</i>
Database modification and web-based data entry	<ul style="list-style-type: none"> • Database modifications: completed (for now!) • Web-interface: not developed (target: Year 2) • Number of applications of the data: ? (target: 10 in Years 4 and 5)

6. Fundraising

Developing a comprehensive, adequate, and sustainable funding base

The key to this project is accessing enough funds to adequately conduct the required tasks over the time frame of the project. It is anticipated that the funds may take some time to raise from one or a number of sources.

Funds for the initial two years of the Shorebirds 2020 Project were raised by WWF-Australia (\$180,000 from Philanthropic donors), and were matched by the Australian Government's Natural Heritage Trust (a further \$180,000). These funds were also supplemented in Year 1 by remaining funds from the "Programme for Population Monitoring of Shorebirds in Australia" Project, also funded by the Australian Government's Natural Heritage Trust (\$49,500).

Birds Australia continue to work closely with WWF-Australia and the Australian Government to secure further funds for the 08/09 financial year (Year 2), and for Years 3-5 of the project.

Recently, Birds Australia and WWF-Australia submitted a Caring for Our Country Community Coastcare application (\$250,000), "Shorebirds 2020: Community-based Monitoring and Conservation of Migratory Shorebirds in Australia", to fund the delivery of the roll-out and facilitate the uptake of the new, 'best practice' shorebird counting methodology and counter 'toolkit'; expand the delivery of workshops to improve communities skills, knowledge and engagement in shorebird monitoring and conservation at a number of key sites; and increase the level of support for regional count coordinators/mentors. If successful this will provide funds for certain aspects of the project from Jan 2009 – Dec 2010.

However, we still require top-up funds for other activities in the 08/09 financial year (Year 2), as well as base-funding for Years 3-5 of the project.

Future fundraising efforts will also focus on identifying sources of State and local funding in an effort to build a comprehensive and sustainable funding base that will endure beyond the life of the Shorebirds 2020 Project.

7. Development of a tractable, improved method for counting shorebirds

A protocol has been proposed which will establish the procedures and program for shorebird monitoring in Australia. This Activity has been recently completed as part of Birds Australia's "Developing a Programme for Population Monitoring of Shorebirds in Australia" Project. Below is a brief summary of the recommended protocol, see Haslem et al. (2008) for further and more detailed information.

Two hundred and thirty-four sites, termed "shorebird areas", have been identified as areas of important habitat for both resident and migratory shorebirds in Australia (see Clemens et al. 2008). Many of these shorebird areas are associated with coastal tidal flats and beaches; others are located in non-coastal wetlands. It is within these pre-defined shorebird areas that shorebird counts for ongoing population monitoring will primarily be undertaken. By targeting these areas, those known to be regularly used by large numbers of shorebirds, monitoring efforts will have the greatest chance of detecting population changes at a national level.

Each shorebird area has been identified to include all areas of habitat, contiguous and non-contiguous, used regularly by the same group of shorebirds. Non-contiguous habitats have been combined in the same shorebird area when evidence (e.g. local shorebird expertise, patterns in shorebird count data) suggests that birds exhibit regular movements between them. Thus, multiple roosting and feeding areas may be included within the same shorebird area. This approach has been taken with the objective of ensuring that, as far as possible, each shorebird area represents a closed shorebird population.

Depending on how counts are traditionally undertaken in different shorebird areas, each has been broken up into one or more "count areas". In many shorebird areas, count areas represent known high tide roosts. Separate shorebird counts should be undertaken within each of these count areas. Data collected in each individual count area will then be aggregated to give the total number of birds observed in the entire shorebird area.

To reduce the amount of geographic bias in current shorebird sampling, a further 330 count areas located in wetland or coastal habitats have been randomly selected. Selection of these additional count areas has been stratified across 11 biogeographic regions encompassing all of Australia. Thus, these randomly-selected count areas increase the geographic representativeness of survey coverage. They should help reduce any sampling bias introduced by changes in shorebird distributions due to the abundance of ephemeral wetlands in Australia.

At least two shorebird counts should be planned over the summer months and a third count in winter should be planned in areas with historic winter data, or where Double-banded Plover are known to occur. January or early February is the preferred time for undertaking the summer count in most shorebird areas. July is the preferred month in which to undertake winter counts at shorebird areas. For each of these three counts, a national count date will be recommended, but it is understood that local factors (i.e. variations in tides) may prevent all areas being surveyed on the same date. Therefore, it is recommended that counts be undertaken as close to the national count date as possible. In shorebird areas near the coast, counts should generally be conducted in the hours either side of high tide (shorebirds are often more tolerant of observers on a falling tide).

When undertaking population monitoring counts in shorebird areas, counters are encouraged to use the newly-updated datasheet. One datasheet should be completed for each count area. This datasheet prompts counters to record all the important details relating to each visit (such as location, date, weather conditions and observer contacts), as well as the number shorebird individuals/species observed during the count.

Additional information on changes in habitat condition, disturbance and apparent threats to shorebirds, observed at shorebird areas is also requested. Such information will allow more detailed investigations into the cause of population changes at shorebird areas over time. These scores only need be estimated once a year. Finally, recording 'component counts' that identify the size of separate groups / individual birds observed is valuable as it provides a way to estimate the error associated with counting large numbers of birds. This information is particularly useful when collected at shorebird areas where many birds are observed.

8. Production of a shorebird counters toolkit

Stage 2 Milestone: Complete training materials and undertake volunteer training

The toolkit is the set of instructions, proformas and other resources required by counters and mentors to conduct or facilitate counting, including:

- How to count and ID resources
- Instructions
- Datasheets
- Customised site maps
- Submission and reporting protocols
- ‘Help’ documents dealing with FAQ’s and providing avenues through which help can be accessed and
- Explanations of why adherence to the methodology is critical

In late 2007 Birds Australia took over the hosting and maintenance of the *Shorebird Conservation Toolkit* website www.shorebirds.org.au developed as part of the Australian Government and WWF’s *Protecting and enhancing migratory shorebird habitat: a shorebird conservation toolkit to accelerate on ground conservation in NRM regions* Project. The website content has now been moved over to the Birds Australia server and updated to include details of the *Shorebirds 2020* Project.

The *Shorebirds 2020 Toolkit* resources have now all been loaded onto the website and can be accessed under “The Toolkit” <http://www.shorebirds.org.au/content/view/12/26/>.

1. Learning Tools

This webpage contains learning resources for how to count and identify many of the resident and migratory shorebirds which can be found across Australia. Two flash presentations have been developed:

a) Shorebird Identification

This presentation will take you through the basics of identifying all of the commonly encountered migratory (and some resident) shorebirds which can be found on Australian wetlands; covers some of the more challenging to identify species and tests the counters skills. See http://www.shorebirds.org.au/images/stories/learning_tools/id_presentation/shorebirds.swf

a) Counting Shorebirds

This presentation will teach you some of the fundamental skills of counting shorebirds, including: the most commonly used methods for counting shorebirds; when to apply a particular method; how to approach shorebird roosts; tips to contribute to counting success; and tests the counters skills. See http://www.shorebirds.org.au/images/stories/learning_tools/counting_presentation/shorebirds.swf

This page also contains the Shorebird Identification sheets for download. These are the set of identification cards developed as part of the Australian Government and WWF’s *Protecting and enhancing migratory shorebird habitat: a shorebird conservation toolkit to accelerate on ground conservation in NRM regions* Project.

Both the laminated shorebird identification sheets and shorebird identification booklet (developed by DEWHA Migratory and Marine Biodiversity Section in March 2008) are available upon request. The website directs counters to contact the Shorebirds 2020 team to receive copies of these. Both versions have proven extremely popular and useful for shorebird volunteers and it is anticipated that further reprints will be required in the near future.

A PowerPoint presentation, “Shorebird Overview”, developed for the purpose of delivering workshops to shorebird counters and volunteers, is also available to counters. It includes information on shorebirds, about the *Shorebirds 2020* Project, and how to count and ID shorebirds. This presentation is available upon request on a “*Learning Tools CD*”, which includes all learning resources as well as counting resources such as count forms and instructions. It is available on the website upon request to the Shorebirds 2020 team. It is anticipated that that the Learning Tools CD will be used by volunteers who only have dial-up internet (although they can currently access everything from the website, it is just slower), and coordinators or volunteer groups who would like to run their own shorebird workshop.

2. Counting Tools

This webpage contains all of the tools that that counters need to gather and report their shorebird counting data.

a) Shorebirds 2020 Instructions

These instructions provide information on:

- What is Shorebirds 2020?
- How to get involved
- How to do a Shorebird count
 - The difference between a Shorebird Area and a Count Area
 - Why are sites divided up into Shorebird Areas and Count Areas?
- When is the best time to count?
- Choosing an area to count
 - Fixed Count Areas
 - Counting a new site
 - Counting a Random Area
- Recommendations for conducting a count
- Shorebirds 2020 contacts

(See Appendix 1)

b) Count Form Instructions

These instructions explain how to use the shorebird count form, take you through how to fill out each section of the form, and how to submit your count data (see Appendix 2):

- Using the Shorebird Count form
- Observer Details
- Time & Date
- Count Details
- Potential Disturbance

- Threats
- Habitat Change
- Bird Counts
- Comments
- Submitting your form
- Shorebirds 2020 contacts

c) Shorebird Count Forms

The “Shorebird Count Form” or datasheet is the form is designed for shorebird counters to fill out when they do a shorebird count. It is where they enter information about site conditions, counting conditions, species types and their numbers. The Shorebird Count Form comes in both colour and black and white versions (see Appendix 3).

A Microsoft Excel version of the count form will be completed and loaded onto the website in the next few weeks to enable direct entry of count data onto your computer for forwarding to your count coordinator, Shorebirds 2020 team and for keeping your own records.

The instructions, count forms and even count methods themselves were trialled by shorebird counters around the country during the summer 2008 shorebird count season. They have since been refined and redesigned based on extensive feedback received from counters and other key stakeholders.

d) Shorebird Count Schedule

This section of the webpage contains the most recent schedule for the national shorebird counts (currently winter 2008). It contains information on when and where shorebird counts are being conducted, and most importantly contact details for state and regional count coordinators (see Appendix 4).

3. Site Maps

This webpage contains a list, organised by State, containing links to maps of all Shorebirds Areas and Count Areas which are currently part of the Shorebirds 2020 project. All files are in downloadable “pdf” format (see Appendix 5 for an example). Also on this page is a downloadable Google Earth file which contains overlays of all of the Shorebird Areas, Count Areas and Feeding & Roosting Areas for all of Australia. When in Google Earth, pressing the Control key and clicking on the Shorebird Area or Count Area of interest will bring up a table containing detailed site information such as size, location, habitat, species richness, average species abundances, etc.

9. Site identification

The selection of fixed and opportunistic or random sites to be included in the National Shorebird Monitoring Protocol was also recently completed as part of Birds Australia's "Developing a Programme for Population Monitoring of Shorebirds in Australia" Project. Below is a brief summary of site selection, see Haslem et al. (2008) for further and more detailed information.

Fixed Sites

From the full number of shorebird areas ($n = 234$) located across the country, 150 have been identified as being of high priority for shorebird monitoring (see Haslem et al. 2008). Collectively, these 150 shorebird areas form some of the most abundant areas for a range of resident and migrant species. The selection of these shorebird areas has been guided by the results of statistical analyses investigating the influence of a few key factors on the probability of detecting national trends in shorebird populations. Results indicated that 1) the ability to detect changes in shorebird populations is most strongly (and positively) affected by the number of shorebird areas monitored, and 2) sampling shorebird areas with more birds has a stronger positive influence on the ability to detect population trends than reducing the inter-annual variation of count data collected. Findings also suggested that, to adequately identify long-term, national population changes (30% decline over 25 years), around 30 shorebird areas will need to be monitored. Further, to detect short-term population trends (50% decline over 5 years) at the national level, monitoring will need to be undertaken at between 30 and 35 shorebird areas.

Based on these results, the 30 "most abundant" shorebird areas in Australia, for 32 species with sufficient data, were identified. This list was then sorted based on three factors: 1) the feasibility of undertaking regular, ongoing shorebird counts in the area; 2) the number of years of existing data available for the area, and; 3) the number of species for which the shorebird area formed a "most abundant" area. This process led to the identification of 150 priority shorebird areas in which to focus ongoing, population monitoring efforts for shorebirds in Australia. Many of these priority areas have already been regularly monitored for a number of years by organised teams of shorebird counters. For others, more effort will be required in order to facilitate/re-initiate regular shorebird counts. The ability to successfully detect national trends in shorebird populations is dependant on regular monitoring in as many of these areas as possible.

Opportunistic or Random Sites

To reduce the amount of geographic bias in current shorebird sampling, a further 330 count areas located in wetland or coastal habitats have been randomly selected. Selection of these additional count areas has been stratified across 11 biogeographic regions encompassing all of Australia. Thus, these randomly-selected count areas increase the geographic representativeness of survey coverage. They should help reduce any sampling bias introduced by changes in shorebird distributions due to the abundance of ephemeral wetlands in Australia.

Site Mapping

The 150 Shorebird Areas that have been identified as being of high priority for shorebird monitoring, and the individual Count Areas within them have all been mapped in a GIS as part of Birds Australia's "Identifying Sites of National Importance for Shorebirds" Project, also funded by the Australian Government's Natural Heritage Trust. See Clemens et al. (2008) for further detailed information. Additionally, maps of

all Shorebird Areas and Count Areas are available on the website
<http://www.shorebirds.org.au/content/view/87/99/>.

10. Volunteer recruitment and training

Stage 2 Milestone: Complete training materials and undertake volunteer training

Volunteer recruitment

This project aims to recruit, train and retain skilled shorebird counters. This is critical as the pool of volunteers is ageing and is overstretched. Volunteers will be part of a network of shorebird counters facilitated by Shorebirds 2020 staff and regional coordinators/mentors. Each mentor will have an area of responsibility to arrange volunteers and counts.

To date volunteers have been drawn from both within and outside the existing counter network. Around 500 volunteers were involved in shorebird counts this summer, totalling over 5000 hours of volunteer effort. Some were existing counters, some had not been involved in counting for a number of years, and some were new counters. Much of the recruitment came from within the existing counter network and affiliated state, regional and local bird interest groups, such as the Queensland Wader Study Group (QWSG), Victorian Wader Study Group (VWSG), NSW Wader Study Group, Western Australia Wader Study Group, Hunter Bird Observers Club, Birds Tasmania, Hunter Wetlands Centre, other regional BOCAs (Bird Observation & Conservation Australia). However we also engaged with a number of other 'Friends of' Groups, State environmental departments, State Parks & Wildlife services, NRM, CMA and Catchment Council Agencies, EPA etc., and intend to build on these relationships and developing partnerships as a priority of over the next 12 months.

National shorebird surveys have been running for 27 years, and the reinvigorated program, Shorebirds 2020, one year. This means that there is already a well-established network of shorebird related community contacts and partnerships, such as local bird watching clubs, 'friends of' groups, and government and non-government conservation organisations. Over this time, and particularly within the last 12 months, there has been significant consultation with these contacts to gain useful advice from past experiences, identify resource needs, discuss project design, and gauge the capacity of the Australian community to achieve the desired outcomes of the Shorebirds 2020 program.

Below is an indicative list of the audiences engaged by Birds Australia in shorebird monitoring and conservation over the past 12 months. Note that some of these are newly formed and developing relationships fostered as part of Birds Australia's Caring for Our Country Community Coastcare application, "Shorebirds 2020: Community-based Monitoring and Conservation of Migratory Shorebirds in Australia".

Audiences engaged in shorebird monitoring and conservation:

Western Australia

- Birds Australia Western Australia (BWA)
- Western Australian Wader Study Group
- Western Australian Department of Environment and Conservation (DEC)
- Ornithological Technical Services
- Peel-Harvey Catchment Council
- City of Mandurah
- Mandurah Bird Observers
- Canoe Trail Friends of Mandurah Pinjarra Inc
- Albany Bird Group
- Cape Conservation Group (CCG) (Exmouth)
- Friends of Forrestdale Lake

Northern Territory

- Northern Territory Field Naturalists

South Australia

- Adelaide and Mount Lofty Ranges NRM and associated volunteer groups e.g. Our Patch, Coastcare
- Northern and Yorke NRM
- South East (SA) NRM
- Kangaroo Island NRM
- Department of Environment and Heritage, Friends of the Parks
- Group: B.E.S.T. Biodiversity and Endangered Species Team
- Friends of Shorebirds, SE
- Friends of the Coorong
- Shorebird Research Eyre Peninsula
- BirdsSA

Tasmania

- Birds Tasmania
- University of Tasmania
- Tasmanian Parks & Wildlife Service

Victoria

- BOCA (Bird Observation and Conservation Australia)
- VWSG (Victorian Wader Study Group)
- GFNC (Geelong Field Naturalists Club)
- Parks Victoria
- Central Coastal Board
- Melbourne Water
- Corangamite CMA
- Portland Field Naturalists
- Department of Environment and Sustainability
- S.W.I.F.F.T. (South West Integrated Flora and Fauna Team)

New South Wales

- NSW Wader Study Group
- Avifauna Research
- Hunter Wetlands Centre
- HBOC (Hunter Bird Observers Club)
- Department of Environment and Climate Change (DECC) / NWS Parks and Wildlife Service
- Far South Coast Bird Watchers
- Clarence Valley Bird Watchers
- Brunswick Valley Bird Watchers
- Byron Bird Buddies
- Tweed Bird Observers
- Manning Valley Bird Watchers
- Hastings Birdwatching Inc.
- University of New South Wales

Queensland

- QWSG (Queensland Wader Study Group)
- BrisBOCA (Brisbane Bird Observers Club of Australia)
- Port of Brisbane Corporation
- Brisbane City Council
- Queensland EPA/ Queensland parks & Wildlife Service
- Mackay Whitsunday NRM
- MACBOC (Mackay Bird Observers Club)
- Mackay Council
- TRBOC (Townsville Region Bird Observers Club)

- Department of Defence (Shoalwater Bay)

Birds Australia have also carried out a large amount of awareness raising of the *Shorebirds 2020* project and plight of migratory shorebirds in general in the media as well as at meetings and workshops, which has no doubt also helped considerably to recruit new counters.

Media and events utilised:

- Birds Australia: Wingspan magazine, TBN newsletter *Volunteer* and email alerts, information brochure sent out in new members packs, new website, regional group updates
- AWSG: *Stilt* and *Tattler* publications
- WWF-Australia website
- ABC Television news, April 2008
- ABC Radio, Orange, NSW, 14/04/2008
- ABC Radio, North & West Mornings Program, South Australia, 02/06/2008
- SBS Television news, April 2008
- Yorke Peninsula Country Times newspaper (SA), “*Program to conserve Earth’s disappearing shorebirds*”, 08/01/2008, “*Plight of Migratory Shorebirds*” 25/05/2008 (see **Appendix 6**)
- Northern Guardian newspaper (WA), “*Trouble for our shorebirds*”, 23/01/2008
- Bellingen Shire Courier Sun newspaper (NSW) “*Wetlands crucial for visiting migrants*”, 29/01/2008
- The Independent, Frankston (VIC), “*Global Visitors under threat*”, 04/03/2008
- Local Sydney Radio show “*A Question of Balance*”, December 2008, 07/05/2008
- Australasian Ornithological Conference *Shorebirds 2020* Project launch, Perth, 05/12/2007
- Shorebird Network Site Managers Workshop, Brisbane
- Victorian Wader Study Group (VWSG) AGM presentation, Melbourne, August 2007 (will also present at 2008 AGM, 09/08/2008)
- Australasian Wader Studies Group (AWSG) AGM, 26/07/2008
- State CMA Wetland Officers Forum, Geelong, Victoria, 12/03/2008
- South West Integrated Flora and Fauna Team video conference, Vic and SA, 31/01/2008
- Swan Bay Shorebird Protection Group meeting, Geelong, 19/02/2008
- Leadership Victoria Western Treatment Plant tour presentation, 09/04/2008
- The Sunday Age newspaper (Melbourne): World Migratory Birds Day media release, “*Godwits in flight to reveal habitat’s plight*”, 11/05/2008
- NSW National Parks and Wildlife Service: South Coast Shorebirds recovery Newsletter, 2007-08 Season
- Asian Waterbird Census (AWC) Newsletter No. 15, June 2008
- Mornington Peninsula Radio, 3RPP, “*The Green Room*” Program, 26/06/2008
- Victorian Department of Sustainability and Environment, Coastline Newsletter, Edition 43, Autumn Update 2008
- The Western Australian newspaper, “*WA birds tracked on China stopover during long migration*”, 14/07/2008
- BirdLife International media release, “*Resident Waders Disappearing Down-Under*”, June 2008

Volunteer retention

The strategy for retaining shorebird volunteers via enhanced feedback, recognition, participation in training workshops, and the establishment of a coordinated network of state and regional count coordinators/mentors to support and organise counters. Details

of all shorebird contacts are maintained on a database to facilitate communications and help keep track of all volunteers and stakeholders.

Since the commencement of the project, large amounts of time and effort have been devoted to liaising with counters to coordinate the national counts, update count area maps etc, responding to counter enquiries and requests and providing feedback and recognition where possible. However, in this first year of the project it has proven difficult for Shorebirds 2020 staff at Birds Australia to be able to give every counter and other stakeholder the level of attention we would like, as quickly as we would like. This is why the network of coordinators/mentors is and will increasingly become absolutely critical for supporting and retaining volunteers, and maintaining momentum for national shorebird monitoring in the long-term. Such mentors are already in place in some States and regions where shorebirds have been historically counted. However, in other areas there is a need to recruit these “local champions”.

Birds Australia’s Caring for Our Country Community Coastcare application, “Shorebirds 2020: Community-based Monitoring and Conservation of Migratory Shorebirds in Australia”, proposes to address this by providing support to regional coordinators in the form of financial support on expenses, regular feedback and participation in meetings and workshops; as well as expanding the delivery of workshops to improve communities skills, knowledge and engagement in shorebird monitoring and conservation at a number of key sites.

Training workshops

Stage 2 Milestone: Complete training materials and undertake volunteer training

Over the summer 2008 counting season we conducted four well attended shorebird ID, counting and *Shorebirds 2020* Project introduction days, including three at the Western Treatment Plant in Victoria and one in Mandurah, Western Australia. Two of the workshops attracted over 40 participants and we had a reasonable number of new recruits sign up for the national monitoring program.

Training workshops were delivered by Shorebirds 2020 staff in conjunction with local mentors. A workshop usually consisted of a half-day field component at a shorebird site and an indoors presentation (with afternoon tea provided) covering: introduction to shorebirds & their biology; conservation and management issues; threats and impacts (how to undertake a risk assessment); how to identify and count them; the national monitoring program and how to get involved. An example of the presentations used, called “Shorebird Overview” is provided on the “Shorebird Reports” DVD included with this report. Participants were provided with a set of laminated shorebird identification sheets or booklet and registered on the day if interested in becoming involved in shorebird counts or wanting to receive further information about the project.

There has been a high level of interest from volunteers to have shorebird workshops held in their local region. In addition, there is a strong need for further counter recruitment and training and promotion of the Shorebirds 2020 Project around the country. Birds Australia’s Caring for Our Country Community Coastcare application, “Shorebirds 2020: Community-based Monitoring and Conservation of Migratory Shorebirds in Australia”, proposes to expand the delivery of workshops and provision of the counters toolkit to improve community skills, knowledge and engagement in shorebird monitoring and conservation at a number of key sites. Workshops would be

delivered by Shorebirds 2020 staff in some areas, and local coordinators/mentors in other areas.

It has also been highlighted that the training module could be enhanced if it were to incorporate information with a management/conservation focus from www.shorebirds.org.au (developed by WWF-Australia in a previous project) covering:

1. Shorebird habitat requirements (reasonably undisturbed roosting, feeding, breeding areas)
2. Management (e.g. protecting roosting and feeding (and breeding, for resident species) habitat, mapping/info for local government, controlling disturbance via signage, access control, dog management plans etc)
3. Relevant policy/legislation (e.g. EPBC Act, International Bilateral Agreements, Ramsar wetlands, State threatened spp. legislation, etc)
4. Developing a project (steps you would take)

This kind of information could be easily incorporated into the training workshops, which could be tailored to suit specific audiences and main purposes.

11. Database modification and web-based data entry

Stage 2 Milestone: Finalise database alterations

The AWSG's national shorebird database has been used to store count data from the national counts for the last 27 years. Over the years data had been entered and coded in a variety of different ways, by different people, resulting in a situation where it was difficult to obtain accurate and consistent results when extracting data. This variation was encountered by even experienced database users. There were also many errors in the database. Given the long varied history of the database, and the variety of data entry volunteers, it is not surprising that there were many errors in the data. These errors were in the counts themselves, in the dates of survey, and notably in the area surveyed. The database needed to be vetted and redesigned to facilitate new counting methods, and to streamline data entry and retrieval. Ideally a database was required that was able to be accessed by a wide group of users.

Scope of work:

Three staff and one paid consultant each spent over three months working on the database. Volunteers were regularly entering data, and vetting data for on average two days per week over the last year.

Heather Gibbs was contracted to redesign the database in order to accommodate new count methods. She redesigned data entry and editing forms, and successfully redesigned the database in order to accommodate the variety of new data being collected. She further assisted with ways to identify errors in the database, and identify and fix problems associated with easily obtaining consistent extraction results. Given the diversity of ways we were interested in extracting data, this required structural changes to the way data was coded, and a variety of queries to identify inconsistencies.

Shorebird experts throughout Australia were sent all the data from their area. Scatter plots with simple linear regressions were also sent to counters for all the species recorded regularly in their areas. Maps of the areas covered for any count were also included, which helped us clarify the on ground coverage that the data represented. In several cases this allowed counters to inform us directly of mistakes in our database, and in some cases their raw data was provided so that we could identify and correct mistakes.

Outliers were identified using linear regressions through data for each species in most shorebird areas with five or more years of data, and the largest ones have been corrected if needed. Staff and volunteers spent months vetting data using a variety of the techniques mentioned above, editing and entering thousands of records.

Cleaning the data will be ongoing, but the areas with more than 10 years of data are much cleaner, and we are now at a stage where we can pull reasonably reliable data out, and allow volunteers to enter data more easily.

12. Coordinate monitoring nationally

Stage 2 Milestone: Commence first phase of monitoring, Nov 2007 – May 2008
Output Measures, Year 1: 20 new sites counted and 0 new volunteers recruited

This is the first year that the national counts have been coordinated by the *Shorebirds 2020* national shorebird monitoring program. We had an overwhelming response to the project and were contacted by hundreds of people, with widely varying shorebird ID & counting skill levels, interested in getting involved in shorebird counts in their local area. The team have spent substantial amounts of time (much more than anticipated!) responding to these enquiries.

Approximately 500 volunteers were involved in counting at 70 sites around the country this summer, totalling over 5000 hours of volunteer effort, and far exceeding our Output Measures of 20 new sites and 0 new counters in Year 1.

This effort also includes large amounts of time state and regional coordinators contributed to coordination & training at the regional level. We were able to provide some funds key groups (Queensland Wader Study Group, Birds Tasmania, Birds Australia Western Australia, NSW Wader Study Group, Friends of the Limestone Coast and Eyre Peninsula (both South Australia) counters) to support coordination, mentoring and counting logistics.

A few of the highlights from this year's counts include the discovery of an estimated 250,000 Banded Stilts in the Coorong – exceeding the estimated total Australian population! Internationally significant numbers of birds were reported for the first time at some inland lakes like Lake Linlithgow in Victoria where 5,000 Sharp-tailed Sandpipers showed up for a couple weeks, and two summer counts were conducted in some areas which is a first step toward informing us of how confident we can be of the accuracy of numbers recorded at these sites on any one count.

See Appendix 7 for Summary tables of summer 2008 shorebird count data collected (and received to date).

The future

Analysis undertaken in the development of the new counting methodology revealed that, in order to be able to identify statistically significant declines in shorebird species populations (50% over 5 years for some species), the number of regularly monitored sites around the country would need to increase to around 150. To achieve this will require a significant expansion of the current monitoring scheme, and the recruitment, training and coordination of significantly more volunteer shorebird counters.

Birds Australia's Caring for Our Country Community Coastcare application, "Shorebirds 2020: Community-based Monitoring and Conservation of Migratory Shorebirds in Australia" aims to deliver the roll-out and facilitate the uptake of the new, 'best practice' shorebird counting methodology and counter 'toolkit'; expand the delivery of workshops to improve communities skills, knowledge and engagement in shorebird monitoring and conservation at a number of key sites; and increase the level of support for State and regional count coordinators/mentors.

13. Future Plans

Fundraising

- Birds Australia will continue to work closely with WWF-Australia and the Australian Government to secure further funds for the 08/09 financial year (Year 2), and for Years 3-5 of the project.
- Future fundraising efforts will also focus on identifying sources of State and local funding in an effort to build a comprehensive and sustainable funding base that will endure beyond the life of the Shorebirds 2020 Project.

Population monitoring protocol

- Conduct further power analyses/trend analyses after five years to determine if sampling is sufficient to identify temporal change in shorebird populations.
- Identify shorebird areas in which to trial a new method (see Rogers et al. 2007) with the potential to a) calibrate the variation associated with shorebird counts, and b) identify short-term population trends. Ensure counters are trained in this method and that datasheets accommodate the collection of any additional information required.
- Explore other techniques for reporting short-term population changes, and determine appropriate sampling needed to ensure desired sensitivity.

Shorebird Counters Toolkit

- Complete the Microsoft Excel version of the count form and load onto the website to enable direct entry of count data onto volunteer computers
- Survey counters on the final toolkit products and consider revisions or additions (e.g. Count Form - species listed in systematic rather than alphabetical order?)
- Complete the update and redesign of the entire Shorebirds 2020: Shorebird Conservation Toolkit website (if resources allow)
- Commence development of a web-interface for data-entry, integrated into Birds Australia's Atlas website Birdata (if resources allow)

Site identification

- Determine the feasibility of sampling at the priority shorebird areas and the randomly-selected count areas: revise list as needed.
- Select a group of sites that are paired with existing shorebird areas to facilitate detailed analyses of the influence of habitat characteristics on shorebird occurrence.

Volunteer recruitment and training AND Coordination of national shorebird monitoring

- If successful, Birds Australia's Caring for Our Country Community Coastcare application, "Shorebirds 2020: Community-based Monitoring and Conservation of Migratory Shorebirds in Australia" will deliver the roll-out and facilitate the uptake of the new, 'best practice' shorebird counting methodology and counter 'toolkit'; expand the delivery of workshops to improve communities skills, knowledge and engagement in shorebird monitoring and conservation at a number of key sites; and increase the level of support for State and regional count coordinators/mentors.

Database modification and web-based data-entry

- Cleaning of the database will be an ongoing process, *as will entering new count data*
- Commence development of a web-interface for data-entry, integrated into Birds Australia's Atlas website Birdata (if resources allow)

14. References

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