Expert witness statement of Brett Alexander Lane
Expert of Gunns Limited

In the matter of the Bell Bay Pulp Mill Project: A project of State Significance Resource Planning and Development Commission inquiry

Proponent: Gunns Limited

1 Name and address

Brett Alexander Lane

Director

Brett Lane & Assocaites Pty Ltd

605 Nicholson Street

Carlton North, Vic. 3054

2 Area of expertise

My area of expertise is ecosystem assessment and management, and development impact assessment.

My qualifications and experience are detailed in Attachment 1.

I am sufficiently expert to make this statement because I have extensive experience over 27 years in assessing fauna habitats and populations and the impacts of development projects. I am particularly experienced in fauna field survey methods and with listed migratory and marine species.

3 Scope

Development of a new pulp mill is proposed by Gunns Limited, to be situated at Bell Bay, on the shores of the Tamar Estuary in northern Tasmania. The proposal consists of three main components, a water supply pipeline from Trevallyn near Launceston, the pulp mill and associated infrastructure, and an effluent pipeline and outfall 3 km offshore in Bass Strait.

3.1 Instructions

My company was engaged through Freehills Lawyers, on behalf of Gunns Limited to undertake two tasks:

- Undertake an independent peer review of the fauna assessment work of GHD and others in the IIS for the pulp mill (Volume 13, Appendix 30); and
- Prepare a report assessing the impacts of the project on listed marine and migratory birds

We have had extensive experience in peer reviewing zoological assessment reports and in preparing impact assessment for projects that affect native fauna. I am particularly familiar with listed migratory and marine birds.

3.2 Process, methodology and reports reviewed

At all stages I worked with Brett Lane & Associates Pty Ltd

For the peer review, we undertook a detailed review of the GHD fauna report in the IIS for the pulp mill (Volume 13, Appendix 30). In this review, particular attention was paid to two aspects:

- Whether the information gathered to inform the response to an implementation of the policy and legislative requirements was valid and collected in an appropriate fashion; and
- Whether that information has been used appropriately to guide the design, and proposed construction and operation of the pulp mill.

For this review, a site inspection was conducted from 25th to 27th September 2006. This involved checking each part of the pulp mill site and the associated water supply and effluent pipeline corridors for their land use and the occurrence of remnant ecosystems, as well as ground-truthing information in the reports. The timing of the site inspection in early spring was not seasonally ideal for all species such as reptiles and frogs and some of these species may have been difficult to detect at that time. However, the inspection did not aim to duplicate the work of the original surveys, rather it aimed to to gain an appreciation of the key ecological issues for the purposed of reviewing the existing studies. In this respect, the inspection was considered adequate in scope and comprehensive in geographic coverage.

The peer review is documented in the attached report (Attachment 2):

Brett Lane & Associates Pty Ltd (2006) 'Bell Bay Pulp Mill, Peer Review of Fauna Studies.' Report to Freehills Lawyers and Gunns Limited.

The migratory and marine bird impact assessment was undertaken in parallel with the peer review. It relied upon the following sources of information, as well as the field inspection undertaken for the peer review:

- Draft Bell Bay Pulp Mill IIS terrestrial fauna report (Volume 13, Appendix 30)(this covers some shorebirds);
- EPBC Act Protected Matters Search Tool (DEH 2006);
- Action Plan for Australian Birds (Garnett and Crowley 2000);
- Seabird Atlas of South-Eastern Australia (Reid et al. 2002);
- Birdata (Birds Australia Atlas of Australian Birds online database);
- Tasmania's Offshore Islands: Seabirds and other Natural Features (Brothers, N. et al. 2001: Hobart: Tasmanian Museum and Art Gallery);
- DPIWE Threatened Fauna Manual (Bryant and Jackson 1999);
- Shorebirds in Australia (Lane 1987)
- A National Plan for Shorebird Conservation in Australia (Watkins 1993);
- The Stilt (journal of the Australasian Wader Studies Group); and
- Corella Seabird Islands Series.

Full details of the references are provided in the report that presents the results of the assessment, which is attached, namely Attachment 3:

Brett Lane & Associates Pty Ltd (2006) 'Bell Bay Pulp Mill Project – Marine and Migratory Avifauna Effects Statement.' Report to Freehills Lawyers and Gunns Limited.

3.3 Assumptions

The peer review and the migratory and marine bird assessment have assumed that the project will be executed in the manner described in the IIS. We have also assumed that the conclusions of Toxikos in relation to the bioaccumulation of dioxins are correct.

3.4 Limitations and exclusions

These limitations and exclusions apply to the migratory and marine bird effects statement.

This assessment was a desktop study involving limited fieldwork. The coastal fieldwork involved inspections of habitat and limited bird observations of marine habitat near the proposed outfall from 25th to 27th September 2006. Ground truthing of some desktop data was undertaken. Bird species recorded during the field surveys and in the GHD IIS fauna surveys have been collated into a source list (Table 2 in main report). Collation and review was undertaken using data and resources available at the time of the study, and every effort was made to base the assessment on the most recent and accurate information available.

The impact assessment carried out here is necessarily general due to incomplete knowledge of seabird and shorebird distribution and use of the study area, and poor understanding of their diet in the study area. The limitations of this assessment are described below.

The available data on marine birds provides limited information on their use of the study area. The best data (Reid et al. 2002) provides little more than occurrence data of each species in an area extending approximately from Devonport to Bridport and gives an indication of relative abundance. Precise feeding locations or foraging patterns for most species of shorebirds within the study area are undocumented and the available information comes from early 1980's data in Lane (1987) and Watkins (1993) for species occurring in significant numbers, and more recent (post-1998) Birdata (Birds Australia, Atlas of Australian Birds online maps) for other species of shorebirds and terns.

Literature review and calculations on estimated levels of bioaccumulation of dioxins in marine seabirds and intertidal zone shorebirds is available for only two species - Little Penguin and White-bellied Sea-Eagle, and it is recognised that available data relating to some prey of these two species is deficient (Toxikos Pty Ltd 2006). In the context of a wider environmental monitoring program for the project, consideration should be given to the dioxin monitoring.

References can be found in the migratory and marine bird assessment report.

4 Findings

4.1 Summary of opinions

4.1.1 Peer review report

This review has regard to the extent to which the following legislation and policy requirements have been addressed:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Tasmanian Threatened Species Protection Act 1995* (TSPA);
- Other fauna of conservation significance listed by DPIWE (2004).

The scope of this review was mainly a desktop review of the fauna reports in the Draft IIS, supplemented by brief field visit to check fauna habitats along the corridor of the proposed development over three days in September 2006.

Aspects particularly focused upon were:

- whether the sources of information were comprehensive and field methods for collecting data were appropriate; and,
- whether this information was used to inform the regulatory processes, i.e. to recommend appropriate mitigation measures for threatened species potentially affected by the development, bearing in mind the legislative and policy context.

Desktop review by GHD in the Draft IIS gave a reasonably comprehensive description of the terrestrial fauna and ecological attributes of the study region including almost all key threatened species that are likely to occur there. The main deficiency of the GHD report is its presentation rather than content, which made it difficult to extract the key information required by the respective regulators. Separation of those species listed as threatened at national level (EPBC Act) from those threatened only at state level (TSP Act) would have presented this information more clearly, and this approach is adopted in this report.

Some minor omissions were evident, such as treating a few species as significant at state level rather than at nationally level (e.g. Tasmanian Devil and Little Tern) and omitting to mention some listed species such as Giant Freshwater Crayfish and some migratory bird species listed under the EPBC Act. Invertebrates could have been dealt with in more detail although it is recognized that many are poorly known.

Field methodology was in most cases appropriate to adequately survey the presence or absence of key species. This is true of mammal trapping, invertebrates at the pulp mill site itself (but not the water supply pipeline or most of the effluent pipeline), bird observation (except marine and migratory species covered elsewhere) and nest searches for Wedge-tailed Eagle and White-bellied Sea-Eagle.

Some targeted searches were considered inadequate: Green and Gold Frog (the September survey was conducted too early and in conditions too cold to expect to find this species), and probably the Masked Owl search (methodology good, except that more time was probably required to be sure the species was absent from the pulp mill area). Reptile trapping was limited by rocky terrain, however there are unlikely to be any threatened reptiles affected by the development.

Some marine and migratory birds are covered in the report, however it is accepted that GHD's brief was coverage of terrestrial and freshwater species, and that marine and migratory species are covered elsewhere.

Fauna habitats are described adequately, although perhaps some of the exotic habitats described could have been combined, since these generally offer lower value to native wildlife. Specific reference to TasVeg communities in some cases could have assisted in identifying sites of potential importance to threatened species such as Swift Parrot.

Recommended mitigation measures are described under each of the key species and consist of avoiding or minimizing clearance of known habitat and further study into the local distribution and ecology of some invertebrates and key threatened mammal species.

The Green and Gold Frog search was inadequate to detect the species, however, the mitigation measure of avoiding or minimizing destruction of its habitat of vegetated wetlands and watercourses, is appropriate.

The reports on the eagle nest searches and the Masked Owl searches are covered in separate sections. One Wedge-tailed Eagle nest was found within 1 km, but not within line of sight of the project footprint and therefore no mitigation is required. No Sea-Eagle nests were discovered.

The Masked Owl call playback searches were probably too brief to detect the species, however sufficient effort was expended to detect potential nest sites. Given the area of habitat to be cleared relative to the owl's average estimated territory size of 180 hectares, the species is unlikely to be placed at significant risk by the project.

4.1.2 Marine and Migratory Avifauna report

The listed migratory and marine birds investigation supplements those documented in the Draft Integrated Impact Statement (Draft IIS).

The output of effluent in Bass Strait waters 3 km offshore from the coast near Five Mile Bluff may affect organisms that form part of the food web in which marine and migratory

bird depend. The extent of this impact is not fully understood and has been subject to an exhaustive literature review by Toxikos Pty Ltd (2006). This review has focussed specifically on the risk of bioaccumulation of persistent dioxins in the effluent. Among other impacts, the current report assesses the risk to migratory and marine birds from this potential impact.

The Tamar Estuary is an area of high ecological value. Some shorebirds occur here in nationally significant numbers (Watkins 1993). Tenth Island and the north coast of Tasmania near Low Head have breeding populations of listed marine species (e.g. Little Penguin and Black-faced Cormorant).

This report identifies marine and migratory seabirds and shorebirds that inhabit the areas potentially affected by the proposal. Key species assessed include Little Penguin, Black-faced Cormorant, Australasian Gannet, albatrosses, giant-petrels, shearwaters, Fairy Prion, Common Diving-Petrel, White-bellied Sea-Eagle and a variety of gulls, terns and migratory and resident shorebirds.

Potential risks to these species arising from the project include bioaccumulation in the food web adjacent to the effluent outfall (assessed as minimal in the two species examined in detail by Toxikos Pty Ltd 2006: Little Penguin and White-bellied Sea-Eagle), increased noise and lights on the shores of the Tamar Estuary, disturbance during construction (Tamar Estuary and Bass Strait coast) and physical alteration of beach habitats on the Bass Strait coast.

4.2 Management recommendations

4.2.1 Peer review report

- The GHD and other fauna reports in the Draft IIS adequately identified most of the key listed threatened terrestrial fauna that may be affected by the pulp mill project, with some shortcomings relating to targeted surveys on owls and frogs, and information on invertebrates, as indicated above. Appropriate mitigation measures were presented.

4.2.2 Marine and Migratory Avifauna report

Mitigation and monitoring measures suggested include:

- Collection of baseline information on dioxin levels in key locally breeding fish-eating species such as Little Penguin, Black-faced Cormorant and White-bellied Sea-Eagle, and for comparative purposes, Silver Gull, using non-destructive sampling methods;
- Carry out a survey in the early stages of the breeding season of the Hooded Plover (August to October) to determine whether this species is nesting within the construction zone at Five Mile Beach;
- Avoid, as far as possible, disturbance by outfall pipe construction works to Hooded Plover nest sites during the breeding season (late August to March);
- Replace beach sands (if significantly altered in form), after the outfall pipe is installed.

4.3 Conclusion

The GHD and other fauna reports covered in our peer review considered almost all of the key fauna species that might be affected by the pulp mill project. Although the presentation of the tabulated information could be confusing, the key information was provided. The fauna reports used appropriate methodology and covered the available existing literature adequately. However, the Masked owl survey did not involve sufficient effort to detect the species with certainty.

The proposed pulp mill will not have a significant impact on migratory and marine birds, provided that the mitigation of impacts on the coast can be managed in the manner described above.

5 Provisional opinion

The opinions that I have expressed in this report are based on my experience and the experience and advice provided to me by Gunns Limited and the consultants engaged to carry out specialist studies for the Bell Bay Pulp Mill Project. Subject to any limitations and exclusions identified in this statement, my opinions are complete and accurate in every respect.

I am satisfied through my inquiries that the opinions I have expressed are reasonable in regard to migratory and marine bird impacts.

6 Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have, to my knowledge, been withheld from the Commission.

Signed

Brett Lane
Principal Consultant
Brett Lane & Associates Pty Ltd

Attachment 1

Qualifications

1 Qualifications

Bachelor of Arts (Zoology and Physical Geography, Monash University, 1982)

2 Awards

Awards:

Special Commendation, Royal Australian Planning Institute 1991 for Point Cook Residential Development Environmental Planning – now Sanctuary Lakes.

Banksia Award 1990 (Secondary School Environmental Education Category) for Ashwood College Concept Plan and Design of Urban Forest and Wetland.

3 Employment history, achievements and projects worked on

EMPLOYMENT HISTORY

1979:	Kinhill Planners Pty Ltd., Research Assistant (Melbourne)
1980 – 1986:	Wader Studies Co-ordinator, Royal Australasian Ornithologists' Union (Melbourne)
1987 – 1991:	Director, Brett A Lane Pty Ltd (Melbourne)
1991 – 1993:	Assistant Director (East Asia), Asian Wetland Bureau (Kuala Lumpur, Malaysia)
1993 – 1996:	Principal Terrestrial Ecologist, WBM Oceanics Australia (Brisbane, Qld.)
1996 – 1998:	Senior Ecologist, Ecology Australia Pty Ltd (Melbourne)
1999 – 2000:	Natural Resource Specialist, PPK Environment & Infrastructure Pty Ltd (Melbourne)
2001 – present:	Director, Brett Lane & Associates Pty Ltd (Melbourne)

SELECTED PROJECT EXPERIENCE

The projects on the following pages represent a selection of work undertaken. Information of additional projects can be provided on request.

Environmental Impact Studies

Port Phillip Bay Channel Deepening Project EES, Vic. Port of Melbourne Corporation, 2003 – 2005: Undertook impact assessment for a major channel dredging project in Port Phillip Bay, focussing on coastal ecosystems (vegetation and fauna), and marine and intertidal avifauna.

Murray Valley Drain 11, Vic., Goulburn Murray Water, 2000-2001: Undertook site investigations and literature review for referral and preliminary documentation as part of an assessment under the Environment Protection and Biodiversity Conservation Act 1999

Western Treatment Plant, Vic. Melbourne Water Corporation, 2001: Assisted Melbourne Water to develop an approach to meeting the requirements of the Environment Protection and Biodiversity Conservation Act 1999 for its 5-year major capital works program at the Western Treatment Plant. This included discussions with Commonwealth Government officials, preliminary impact assessment of all elements of the program and analysis of options for meeting requirements.

Toora Wind Farm Development, Vic. Stanwell Corporation Ltd., 2000-2001: Undertook an assessment of the ecological and land management issues associated with a proposed 12-tower wind farm in South Gippsland, including an assessment of the bird strike risk. Designed and implemented on-going bird and bat risk and mortality assessment program.

Tweed Sand By-pass Environmental Impact Statement, Tweed River, New South Wales, Public Works Department, 1996: Undertook comprehensive ecological monitoring and assessment of the impact of the Tweed River Sand By-pass project. This included examining the effects of dredging, dredge spoil disposal, works and hydrodynamic changes in the Tweed estuary on wetland and estuarine ecosystems. Mitigation measures, including the provision of compensatory habitats were formulated. A long-term monitoring program to determine waterbird impacts of changed tidal regimes was also developed and implemented.

Terranora Country Club and Residential Development, Tweed Valley, New South Wales, 1995: Undertook an assessment of the impacts of recreational and residential development on terrestrial and wetland ecosystems on and near the Tweed River. Developed measures for minimising impacts and restoring degraded ecosystems.

Cooloola Region Water Supply Investigation, South East Queensland, Cooloola Shire Council, 1994-95: Reviewed and evaluated the ecological values of the Cooloola region of South-east Queensland and assessed the potential ecological impacts of six water supply options for the towns of Tin Can Bay, Cooloola Village and Rainbow Beach. This work included extensive review of groundwater impacts and their effect on freshwater wetland ecosystems of international significance.

Lake Cowal Gold Mine Environmental Impact Statement, West Wyalong, New South Wales, North Group Ltd, 1989-91: Undertook detailed investigations of waterbird usage of a large ephemeral lake and developed environmental management and mitigation measures for an open cut gold mine.

Narracoopa Sand Mine, King Island, Tasmania, Australian Titanium Minerals Ltd.1997: Undertook detailed flora and fauna investigation of a coastal sand mining area and studied the behaviour of the endangered Orange-bellied Parrot in the area. Assessed the potential impacts of the mine on flora, fauna and wetlands in the area and developed guidelines for managing impacts for inclusion in the Development Plan and Environmental Management Plan for the development.

Ecological Studies

Waterbird Monitoring Program, Western Treatment Plant, Melbourne Water, Vic. 2000: Designed a statistically sound waterbird monitoring program for the effluent lagoons and coastal wetlands of the plant to inform management decisions on future land use and wastewater treatment strategies.

Little River to Beacon Point Shorebird Study, Western Treatment Plant, Melbourne Water, Vic. 1999-00: Project managed a technical team to investigate the relationship between effluent nutrient levels and shorebird abundance on the west coast of Port Phillip Bay. The study was used to develop Melbourne Water's adaptive management framework for responding to the impacts of reduced nutrient levels in wastewater effluent required by a new EPA discharge licence.

Road Traffic Impact on the Orange-bellied Parrot, Point Wilson, Victoria, Department of Defence, Vic. 1998. Designed and undertook a detailed experiment on the response of the endangered Orange-bellied Parrot to a range of truck traffic scenarios near their habitat. The work determined that proposed truck volumes would have minimal impact, saving over $2 million in construction costs for screening embankments.

Construction disturbance related impacts on coastal waterbirds, Point Wilson, Victoria, Department of Defence, Vic., 1998: Designed and undertook an investigation of the impact of construction activities on feeding and roosting coastal ducks and swans. The results were used to identify appropriate buffer distances between sensitive habitats and works areas.

Guidelines for Managing Visitation to Seabird Breeding Islands, Great Barrier Reef Marine Park Authority, Qld. 1994: Prepared national guidelines for managing the potentially detrimental effects of human access and activities on offshore islands used by seabirds for colonial breeding. The guidelines were extensively field-tested in the Great Barrier Reef Marine Park and framed to enable island mangers to develop their own site-specific management.

Threatened Species Management

Norfolk Island Green Parrot Recovery Plan, Norfolk Island, Environment Australia Biodiversity Group, 1998: Prepared a recovery plan under the Commonwealth Endangered Species Protection Act 1992 for the management and recovery of the critically endangered Norfolk Island Green Parrot.

Little Tern Recovery Plan, Australia, Environment Australia Biodiversity Group, Canberra, 1998: Prepared a recovery plan under the Commonwealth Endangered Species Protection Act 1992 for the management and recover of Australia's endangered Little Tern population.

Beach Stone-curlew Recovery Plan, New South Wales, National Parks and Wildlife Service, NSW, 1998-99: Prepared a recovery plan under the New South Wales Threatened Species Conservation Act 1995 for the management of the New South Wales population of the Beach Stone-curlew.

Lord Howe Woodhen Recovery Plan, Lord Howe Island, New South Wales, National Parks and Wildlife Service, 1998 –99: Prepared a recovery plan under the New South Wales Threatened Species Conservation Act 1995 for the recovery and management of the Lord Howe Woodhen population.

Black-eared Miner habitat assessment, South Australia, Department of Environment, Heritage and Aboriginal Affairs, S.A., 1998-99: Reviewed the habitat requirements of the endangered Black-eared Miner in South Australia and designed a field investigation to define key habitat variables associated with the species.

Alpine Tree Frog Monitoring Program, Mount Hotham Airport, Victoria, Mount Hotham Ski Company, 1998: Designed and undertook baseline survey of impact and control sites for the vulnerable Alpine Tree Frog at the site for a proposed airport development.

Orange-bellied Parrot Survey, Point Wilson Petrochemical Development, Point Wilson, Victoria, ICI Australia Ltd, 1979: Undertook a detailed investigation of habitat usage by the endangered Orange-bellied Parrot on and near the site of a proposed petrochemical complex. Assessed the likely impact of the development on the species and other birds in the area, and developed impact mitigation measures.

Natural Resource Management

Stormwater Management Plans (Casey and Moreland City Councils), Vic., 2000: Provided workshop facilitation and environmental values assessment input to municipal stormwater management plans.

Swan Hill Stormwater Management Plan (Rural City of Swan Hill), Vic. 2000-2001: Developed stormwater management plan for Swan Hill, Robinvale and Nyah, including values and risk assessment, application of the Best Practice Management Guidelines for Urban Stormwater and the formulation of strategies and activities to protect the Murary River from urban stormwater.

Rutherford Inlet Environmental Planning Study, Casey City Council, Vic. 2000: Assessed environmental risks to the marine environment of Rutherford Inlet, Western Port and provided environmental planning and management directions to Council.

Western Port Perspective, Parks Victoria & Central Coastal Board, Vic. 2000: Determined coastal and marine environmental values of Western Port, developed environmental value rating system, assessed risks to values and developed management directions for each coastal and marine segment. Developed a GIS database to support preparation of a coastal planning framework for Western Port.

Strategic Management Plans for Coastal Ramsar Sites, Parks Victoria, Vic.1999-00:Prepared management plans for Victoria's four sites listed on the Convention on Wetlands (Ramsar Convention), including documentation of environmental values, assessment of key risks and development of management strategies and priorities.

Apollo Bay Coastal Action Plan, Colac-Otway Shire Council, Vic. 1999: Prepared a Coastal Action Plan for the Marengo – Skene's Creek coastline under the Coastal Management Act 1995 that identified key coastal attributes and risks, and provided strategic management recommendations for all relevant government agencies.

Biodiversity Conservation in Urban Areas, Department of Environment, Sport and Territories, Canberra, 1995: Reviewed and evaluated approaches to protecting biodiversity throughout Australia. This included detailed case studies from local government areas in three states, as well as an evaluation of strategic planning and development control approaches, and of the land management approaches of government agencies, community groups and private land holders. The research enabled the best combination of the approaches to be determined.

International Projects

Se San 3 Hydropower Project, Asian Development Bank, Central Highlands, Vietnam, 2000: Undertook an assessment of the potential impacts of a proposed hydropower project on biodiversity in and adjacent to the project area and on downstream wetland and riparian environments in Vietnam and Cambodia.

Uong Bi Coastal Land Reclamation Project Environmental Impact Assessment, Vietnam, British Overseas Aid (NGO), 1993: Undertook an assessment of the impacts of coastal wetland reclamation for agricultural development on the natural resources (water quality, hydrology, sedimentation, fisheries, material resources, vegetation and fauna) and livelihoods of local people.

Red River Delta Waterbird Hunting Assessment, Vietnam, Australian International Development Assistance Bureau, 1991-93: Worked with University of Hanoi Department of Biology to assess the extent of waterbird hunting on the Red River delta. Determined the numbers of birds involved as a proportion of total populations and assessed the economic value to hunters of the resource.

Southern Thailand Community Livelihood Project, Pattani Bay, Thailand, Australian International Development Assistance Bureau, 1991 – 1993: Worked with the Prince of Songkhla University Department of Biology to develop alternative livelihoods for waterbird hunters based on cottage industry value-adding to natural resources sustainably harvested from coastal wetlands.

National Wetland Action Plan, Philippines, Asian Wetland Bureau, 1992: Worked with officials of the Department of Environment and Natural Resources in the Philippines to develop a national strategy for wetland protection and sustainable use. Shortly afterwards, the Philippines joined the Ramsar Convention and nominated its first site.

East Asian Shorebird Status Overview, Asian Wetland Bureau, Australian Nature Conservation Agency, 1993: This project involved the collation and synthesis of data from

shorebird counts throughout East Asia and the compilation of a report summarising the most significant sites for shorebirds in the East Asian region.

Cambodian National Wetland Workshop, Phnom Penh, Cambodia, Asian Wetland Bureau, 1993: Worked closely with officials from the Cambodian Ministry of the Environment to organise and national workshop for regional government and non-government officials. The workshop raised awareness of the values and management approaches to protect the natural resources of wetlands and developed a series of national wetland management objectives. A national wetlands program was later implemented based on the outcomes of the workshop.