

No	Download title	Description
001	Project DS.01a: Ground-truthing the Salinity Investment Framework III (SIF3) in the SW NRM region	DRAFT: The aim of the South West Catchments Council.s IP2 project, DS01a: Ground-truthing Salinity Investment Framework (SIF3) is to provide a scoping study to examine the feasibility of using SIF3 (Phase Three of the Salinity Investment Framework) for salinity management and future investment prioritization in the SWCC NRM region.
002	Governance Arrangements for the Fence Road Drainage Scheme	
003	Technical Review of the Implementation of the Fence Road Drainage Scheme	
004	Fence Road Drainage Scheme: As-Constructed Drawings	Drawings for the Fence Road Drainage Scheme
005	Evaluation Report: Resource condition target setting, monitoring & evaluation systems for dryland salinity (L7-G2 & DS.01d projects)	Resource condition target setting
006	Report on an Online Salinity and Vegetation Survey	Resouces condition targets
007	Dumbleyung SWCC Core Area, Western Australia, Airborne Magnetic, Gamma-ray and Elevation Survey for Geoscience Australia Acquisition and Processing Report	Dumbleyung core area airborne magnetic, gamma-ray and elevation survey
008	Project DS.01a: Ground-truthing the Salinity Investment Framework III (SIF3) in the SW NRM region	Study to examine and manage salinity levels
009	SkyTEM Field processed data: Darkan-Wagin (Dardadine Palaeochannel) survey	This report provide SkyTEM processed data for Darkan-Wagin
010	Wagin Townsite Boardfield: Results of drilling and test pumping, production bores 05WAPB4-07WAPB8	This report presents the results of the 2007 bore drilling and testing programme. It also includes limited results of the dewatering trial and, more fully, the results of the unreported exploration drilling and bore construction programmes conducted during 2005 and 2006.
011	Marketing Strategy for the Saltwater Aquaculture Alliance Inc. 2007 to 2010	This report provides a marketing strategy for the Salwater Aquaculture Alliance INC on the saltwater rainbow trout.
012	Inland Saltwater Aquaculture Growth Strategy: Using salined water to grow fish and diversify farm income in the dryland areas of Western Australia	The objective of this project is to facilitate the adoption of aquaculture by landowners managing on-farm salinity in the dryland areas of WA.
013	Keen Interest in Saline Trout Trial by Bowelling Aquaculturalist	Saline trout trials in the Lower Blackwood Basin
014	Saline Aquaculture of Great Interest to Mudiarup farmer	Farmer's interest in saline agriculture to use brackish water on his property
015	Strategic tree farming: Creating social, environmental and economic solutions for Western Australian farmers	This report provides an overview of the Strategic Tree Farming (STF) project managed by the Forest Product Commission (FPC) in four regional natural resource mangement regions of West Australia.
016	Two-legged Predators A Problem for Saline Aquaculture Trial	This document provides a case study on a farmer Saline Aquaculture Trial in the Blackwood basin.
017	Supporting the development of alternative industries for saline land (Project no. DS 03 c)	This document looks at the development of alternative industries for saline land in the SW agricultural region in WA.
018	Saltwater Trout Alliance Business Plan Section 2: Production Plan	This report summarises a study where three Saltwater Trout production systems have been evaluated to determine their profitability (or otherwise) and their suitability a diversification option for existing farm businesses.

019	Operations Manual: Saltwater Rainbow Trout	This document is an operational manual on Saltwater Rainbow trout aimed at providing a clear practical framework to assist producers to manage and record their farm activities
020	Analysis of Monitoring Data from the Fence Road Drainage Scheme	The Sample Analysis Plan for the Fence Road Drainage Scheme provided a network of sample points within the catchment both upstream and downstream of the discharge point (see Plan 1). While there are eighteen sites only three were monitored on a regular basis. The other thirteen sites have only been monitored as snap shots at specific times of the construction period, i.e. upon completion of construction and then again six weeks after completion of construction. These snapshots provide a guide to how the system was performing, but more importantly provide base line data that can be compared against in the event that future snap shots are required due to the distance the discharged groundwater exceeds that identified in the Environmental Impact Assessment
021	SA-02-Trees South West report on the barriers and benefits to the adoption of farm forestry	This report provides a review by Trees South West Report on the Barriers and Benefits to the Adoption of Farm Forestry. The study had the following key objectives: ☐ To measure landholder aspirations for dry land salinity (recovery, containment and/or adaptation), their experience with management actions and estimates of effectiveness and interest in, and possible adoption of management actions in future; ☐ To measure landholder attitudes toward remnant vegetation, management of this vegetation as well as its future management; and ☐ To test the success of an electronic online questionnaire as a survey instrument.
022	Biodiversity Sub-Strategy for the South West Catchments Council.	The Biodiversity Sub-Strategy presents a systematic, logical and strategic approach to the prioritisation of biodiversity assets and processes that threaten them, to enable defensible and transparent conservation investment decisions to be made across the whole of the SWCC region. The SWCC Biodiversity Sub-Strategy aims to: <ul style="list-style-type: none"> <li>• Provide a regional context for long term conservation of biodiversity;</li> <li>• Provide a strategic, systematic and objective approach to identifying and prioritising projects that require funding to protect, enhance or restore biodiversity;</li> <li>• Outline broad management responses at biogeographical and regional scales that conserve biodiversity;</li> <li>• Increase the SWCC community's understanding of biodiversity and its values and threats within the South West NRM region; and</li> <li>• Facilitate the integration of biodiversity conservation objectives within other natural resource themes and issues.</li> </ul>
023	Preliminary scoping document guiding the revision of biodiversity targets (MATs & RCTs).	This aim of this report was to conduct a preliminary review of the current suite of Resource Condition Targets (RCTs) and Management Action Targets (MATs) that exist for the theme of biodiversity, within the South West Catchments Council's (SWCC) Regional Strategy for Natural Resource Management (South West Catchments Council, 2005). The specific task is to prepare a "preliminary scoping document outlining recommendations guiding the Region's revision of MATs and RCTs". In this report, we reviewed the current biodiversity targets for SWCC and a number of other regional organisations from around Australia and internationally. The current academic literature was also reviewed. We outline our logic from established principals and matters outlined by the Commonwealth government, through the draft WA State Biodiversity Strategy and the approved suite of current targets to recommend example targets that should guide SWCC in their revision of their targets. It is our intention that this document is used as the basis for discussion and debate in the formulation of more specific, logical and achievable targets for regional scale biodiversity conservation within the South West.

024	Biodiversity Situation Statement for the South West Catchments Council	The aim of this document is to provide a summary of the current status of rare and threatened flora, fauna and ecological communities, and remnant native vegetation within the South West Catchment Council region of south-western Western Australia. The processes that determine these trends are dynamic and continually under review. This is due to both taxonomic revisions and updated survey and research. The consequence of this is that this document can only serve as an exploration of the available data, at a particular time. Thus this document is a "snap-shot" using data made available by the relevant custodians, as at early 2007.
025	Appendix 5 - The biodiversity of the inland Natural Resource Management (NRM) zone: Towards prioritisation for conservation.	The process of locating potential habitat for the species from DEC's Threatened and Priority Fauna list is determined by 2 factors. One factor is determined by the pre-European vegetation associations the existing records are found in (VSA code), the other factor is dependant on the soil and landforms the existing records are found in. These two factors are overlaid and the result shows areas that have both – a suitable vegetation association as well as a suitable soil type. This document provides the Biodiversity of the Inland NRM Zone: Towards Prioritisation for Conservation including maps and potential habitat for a suits of threatened and priority Fauna.
026	Appendix 4 - The biodiversity of the inland Natural Resource Management Zone: Towards prioritisation for conservation draft.	The process of locating potential habitat for the DEC's DRF species is determined by 2 factors. One factor is determined by the pre-European vegetation associations the existing records are found in (VSA code), the other factor is dependant on the soil type the existing records are found in. These two factors are overlaid and the result shows areas that have both – a suitable vegetation association as well as a suitable soil type. The Biodiversity of the Inland NRM Zone: Towards Prioritisation for Conservation
027	Best Practices in Translocation	The purpose of this document is to summarise the current best practices for a successful bilby translocation using literature review and standard practice and then prescribe the information required to prepare a translocation proposal. It is intended that regular reviews of this document will position the DEC's Great Southern District and SWCC to fund translocations within their boundaries that have the best chance of success. There are opportunities for every translocation to be used as a trial to optimise release strategies. For example: Presence of a dominant food source e.g. Termite (year round presence) vs. Acacia spp. This information can then be fed back into this document to continually improve the likelihood of successfully re-establishing Bilbies through out the South West of Western Australia.
028	Burrowing Bettong (boodie) Translocation to Dryandra Woodland Report.	This document provides a report on Burrowing Bettong (boodie) Translocation to Dryandra Woodland and provides indicators to gauge if the translocation is a success.
029	Replacement of the critically endangered Hairy Marron by the introduced Smooth Marron (Decapoda: Parastacidae) in Margaret River (Western Australia).	This document provides an overview of the available data on spatial and temporal changes in the abundance and distribution of Hairy Marron throughout the Margaret River since the 1980s. We will briefly discuss likely replacement mechanisms that might explain the observed decline of Hairy Marron in the Margaret River and management options that could possibly avoid their extinction.
030	Interim Recovery Plan No. 80 - Annual Report 2007.	This summary report provides information regarding the progress and implementation of recovery actions for <i>Drakea confluens</i> ms within the Wellington District for 2007
031	Field studies into the biology and conservation requirements of Engaewa species in the South West and Warren DEC regions.	This report presents the findings of survey and monitoring of the Engaewa species work undertaken throughout 2006-2007 in the South West and Warren DEC region.
032	Field studies into the biology and conservation requirements of Engaewa species in the South West and Warren DEC regions. Part 2	This report provides field studies result into into the biology and conservation requirements of Engaewa species in the South West and Warren DEC regions
033	Conservation of 2 species of threatened frogs (South West Catchment Council – abstract)	This document provides a brief overview of the conservation status of Two species, the White-bellied Frog ( <i>Geocrinia alba</i> ) and the Orange-bellied Frog ( <i>Geocrinia vitellina</i> ) which occur only in the higher rainfall zones of the SW corner of the SWCC area.

034	Review of Threatened Flora and TEC/PEC's in the eastern Jarrah Zone of Haddleton Gully Catchment in DEC's South West Region.	This document is an extract from " Haddleton Hydrogeology Feasibility Planning Project (BR03c), Final Report, December 2008. Dr Erica Shedley, Department of Environment and Conservation". The document provides a summary and review of Threatened Flora and TEC/PEC's in the eastern Jarrah Zone of Haddleton Gully Catchment in DEC's South West Region.
035	Vegetation and soil survey on the bilby in Dryandra woodland.	Following the release of Bilbies, <i>Macrotis lagotis</i> , into Dryandra woodland it is appropriate to outline and analyse the habitat utilised by those radio-collared bilbies permitting the identification of habitat preference. By identifying habitat preference we can predict other areas likely to be inhabited by bilbies, and also identify sites with suitable habitat for reintroduction, such as that planned for Lake Magenta. It may also assist in release at the micro habitat level whereby after the translocation site has been chosen, the positioning of artificial burrows within the reserve. In total, 100 bilbies have been released, primarily from Return to Dryandra Captive Breeding Colony but also from Kanyana Wildlife Rehabilitation Centre and Arid Zone Research Centre. Twenty two of these individuals did not survive as of the date of this paper. The first release of 27 animals took place in 2000 and the last release took place in 2006. Surveys of diggings along transects through Dryandra woodland have been undertaken in the past and have provided limited information on movements however this survey aims to answer the following questions. In what soil type and vegetation type are bilby burrows found at Dryandra Woodland?
036	Recommendations for on-ground work to benefit Phascogale.	The following pages provide recommendations for on-ground work arising from the 2006-07 trapping season for Red-tailed Phascogale as part of the above SWCC grant. These recommendations are additional to those supplied for the 2005-06 season. They are in no particular order of priority and some sites include multiple recommendations or recommendations that may include many landowners. They are designed to provide a range of opportunities probably far beyond available resources but provide a range of options given the highly variable receptivity of the land owners.
037	BRO4g Report to South West Catchments Council	The aims of the Woylie Conservation Research Project (WCRP) were to: a) determine the causal factors responsible for the recent woylie declines in south-western Australia; b) identify the management required to ameliorate these declines; and, c) develop mammal monitoring protocols that will better inform factors associated with future changes in population abundances.
038	Assessment of potential Threatened Ecological Communities on the Southern Swan Coastal Plain (SWCC Project BR05a).	The objectives of this study are to identify potential new threatened ecological communities or priority ecological communities, or new occurrences of currently recognized TECs/PECs and nominate these as such through the Western Australian Threatened Ecological Community Scientific Committee (WATECSC).
039	Peppermint Decline Treatment Trials Information for Landholders.	The document is a report on a trial which aimed to assess the effectiveness of a range of treatments for improving heath and vigour of native trees showing symptoms of decline. On the basis of results and feedback, the feasibility of stem injection with phosphite and stem implants with nutrients by private landholders will be assessed and the treatment methodology refined if necessary. If the treatments are shown to be successful then the methodology and results will be communicated throughout the community.
040	Peppermint Tree Condition Rating.	This document provides a PPT on Peppermint Tree Condition rating
041	Freshwater fish and crayfish communities of the Caribunup and Buayanyup Rivers: Conservation significance and management considerations.	This study is the first to examine the fish and freshwater crayfish of the Caribunup and Buayanyup Rivers, south-western Australia. It aimed to determine the distribution of the fishes and freshwater crayfishes, their conservation significance and management implications to help ensure the ongoing viability of these communities. Ten sites each in the Caribunup and Buayanyup Rivers were sampled for fish and freshwater crayfish in November 2008.

042	Appendix 1: Fox Control For Woylie Management	<p>The aim of this project was to assist in the protection of what had been an endangered native species- the woylie- which had been re-introduced to the project area some two decades before by the Department of Conservation and Land Management (CALM). The major predator of the woylie is known to be the introduced red fox. This feral species has thrived in the project area for decades, particularly since the land clearing bans imposed in the 1970's and re-forestation of the creek lines and other areas which have provided protective corridors for the movement of the foxes.</p> <p>The project area is land adjoining State Forest in the Batalling area; and that adjacent to the large nature reserves in the Bennelaking region and its adjoining State Forest. These localities are in the western section of the West Arthur Shire.</p> <p>The land tenure is mixed with some farms (sheep and cropping); tree plantations and nature reserves controlled by the Department of Water; and scattered reserves and unallocated crown land controlled by the Department of Environment and Conservation (DEC)- formerly CALM.</p> <p>The farm holdings are generally larger than others in the Shire for economic considerations due to the extensive areas of native bushland still present as a result of earlier clearing bans. There are 12 farmers in the vicinity of the target area.</p> <p>The project was funded by the Commonwealth and State Governments through the South West Catchments Council and administered by the Leschenault Catchment Council who employed a project officer. In kind support was provided by the West Arthur Shire Council with the provision of an office and communication facilities (phone, fax and photocopying) at the local telecentre.</p> <p>The outcomes of the project were generally effective in achieving fox control in the</p>
043	Marine Communities of the South West Capes Region (Brochure).	This brochure provides an overview of the Marine Communities of the South West Capes Region and the associated Biodiversity Marine Management Creating Sanctuary Zones
044	Seagrass Communities of Geographe Bay (Brochure).	This brochure provides an overview of the Seagrass Communities of Geographe Bay as well as the patterns of Diversity, Ecological Importance and Threats to Conservation
045	<p>A Review, gap analysis, and assessment of current information relating to marine and coastal environments in the South-west Region.</p> <p>Part A Of project C1-G1: A Coastal and marine management planning framework for the South West Catchment Council.</p>	<p>The project included: a detailed search for literature and information from relevant libraries; liaison with stakeholders, government departments and researchers; and collation of references into a database. Over 500 articles were located of varying levels of relevance to marine and coastal resource management. The literature was reviewed and this report was compiled detailing: the current knowledge and condition of coastal and marine "assets" (where information was available); and gaps in knowledge. The second phase involved an assessment of knowledge gaps to determine priority actions for SWCC. The main sources of information were scientific journals, government reports, newspapers, brochures and websites and most articles located have been provided to SWCC to be held in a database. Much of the past work was in response to targeted management or development issues. There was some focus on important nearshore habitats such as seagrass and reef communities, and on fishes that are sought by commercial and recreational fishers.</p>
046	An Annotated Bibliography On Reef Communities Of The South-West Of Western Australia.	<p>In 2005, the South West Catchments Council (SWCC) finalised their Regional Strategy for Natural Resource Management (SWCC, 2005) and provided funding, under their investment plan, to Westera et al. (2005) to conduct project C1-03 "Benchmark study on marine communities of the south west for long-term monitoring including the proposed Capes Marine Reserve" (Westera, 2006). A necessary part of that project was to collate, and briefly review, existing literature on marine communities from reefs in the southwest of Western Australia, in particular the Capes region (Geographe Bay to Flinders Bay including Capes Leeuwin and Naturaliste). This document fulfils that purpose: drawing upon literature on the marine environment that bounds the SWCC coastline, from Mandurah at the northern limit to Walpole at the south-eastern limit, termed the 'study region'.</p>

047	Primary Producers, Benthic Invertebrates And Demersal Finfish As Indicators Of Resource Condition: A Review.	The goal of this review is to determine the effectiveness of biological indicators of resource condition that can be or are already being applied to assess the state of the nearshore marine environments in temperate Western Australia. The review is structured to first address the characteristics of primary producers, benthic invertebrates and demersal fish that can be used as indicators of resource composition and condition. It then reviews the use of indicators as surrogates of biodiversity and ecosystem condition and concludes with a series of recommendations specific to the existing marine resource monitoring programs in the South West of Western Australia.
048	Seagrass Mapping Geographe Bay 2004 - 2007.	<p>Seagrasses are common in nearshore, subtidal sand habitats in temperate southern Australia. This study documents an analysis using aerial photography of the distribution of Posidonia and Amphibolis seagrass in nearshore shallow (&lt;10m depth) in Geographe Bay in 2004 and 2007. These studies are part of several ongoing investigations that together will assist assessment of development impacts on the marine environment in Geographe Bay.</p> <p>In 2004, two methods were used to map seagrass distributions, classification accuracies were assessed, and a spatial assessment of classification certainty was also developed. 77% of the study was covered by seagrass, equating to 9699ha. For the area that was spatially coincident with the 2007 imagery equated to 9495ha. Future recommendations at the time included development of nearshore bathymetric data and future field survey data collection (GEM 2007).</p> <p>In 2009, mosaicked aerial photography flown in 2007 was used to assess seagrass cover using the best methodology determined from the 2004 study. Spatial assessment of classification certainty was also analysed again. 71% of the study area (as defined by the coincident coverage for both sets of aerial photos) was covered in seagrass, equating to 8726ha.</p> <p>An assessment made of the change in seagrass cover between the two time frames, as well as an assessment of the accuracy of the change detection. The analysis showed a gain of 1101ha and loss of 1870 ha across the study area covered by both images. 9383 ha remained unchanged. Inspection of the outcome showed that although an overall loss of seagrass cover of 769ha was found, but this was mainly due to (1) spatial displacement errors in the imagery as delivered, (2) distortions in the images as delivered due to sun glare and the mosaicking process, and (3) differences in the predictions between the two classifications (2004, 2007). In particular, improvements in the prediction of deeper water sand in the northeastern part of the study area led to an incorrect prediction of seagrass loss in the change detection analysis. Visual inspection</p>
049	Seagrass Mapping Geographe Bay 2004.	
050	Augusta Microbial Threatened Ecological Community Monitoring Report (2007-2008).	<p>The tufa of the south-west has been categorized as a Threatened Ecological Community (entitled 'Augusta microbial – Rimstone pools and cave structures formed by microbial activity on marine shorelines'). The current status of the community is Endangered. Threats to tufa include physical damage as a result of recreational activities, changes to hydrological regimes (impacts could occur from both changes in water quantity and quality through either natural or anthropogenic-driven factors) and physical collapse of limestone habitat (i.e. cavern collapse).</p> <p>The Department of Environment and Conservation (DEC) is responsible for the protection and monitoring of Threatened Ecological Communities as part of its role in conserving the State's biodiversity. In 2007, the South West Region received state and federal government funding through the South West Catchments Council to implement a tufa monitoring program. This report outlines the program objectives, methods and results for the various components of the tufa monitoring program in 2007-08.</p> <p>REPORT's OBJECTIVES</p> <ol style="list-style-type: none"> <li>1. Determine the Ecological Water Requirements (EWR's) of the tufa.</li> <li>2. Determine the biological composition of the various tufa formations and occurrences seasonally.</li> <li>3. Determine the lithological parameters of the tufa (element and mineral composition).</li> <li>4. Measure the growth of tufa between seasons and over time.</li> <li>5. Identify threats to tufa occurrences.</li> </ol>

051	Capes' Hooded Plover Monitoring Report (2007 - 2009).	<p>The Hooded Plover <i>Thinornis rubricollis</i> is a small wader (19-23cm long) that lives mainly in southern Australia with an estimated population of less than 7000 birds (Raines, 2002). It has been spilt into two subspecies on the basis of morphology and plumage – the eastern subspecies <i>Thinornis rubricollis rubricollis</i> and the western subspecies <i>Thinornis rubricollis tregallasi</i> (Garnett and Crowley, 2000). The western subspecies is a Priority 4 species and is classified as Near Threatened under IUCN criteria. It breeds on the south-west Western Australian coast and on inland lakes. The birds nest on the open beach above the high water line, around dunes where there is little vegetation and on the margins of salt lakes, and have been recorded breeding in every month of the year (Garnett and Crowley, 2000; Raines, 2002).</p> <p>Hooded Plover are most vulnerable in the first nine to ten weeks of their life, as the eggs and flightless young are well-camouflaged. They are often disturbed or destroyed by pedestrians and four-wheel drive vehicles because they are not seen, or are eaten by introduced predators such as foxes, dogs and cats.</p> <p>Hooded Plover have been observed breeding on a number of beaches between Cape Naturaliste and Cape Leeuwin. Most of these beaches are within the Leeuwin-Naturaliste National Park and managed by the Department of Environment and Conservation (DEC), and several are the responsibility of local government. Of all the Western Australian Hooded Plover Management Regions (HPMR's), the Naturaliste-Augusta HPMR has the greatest threats of pedestrian disturbance as these beaches are used extensively for walking, bathing, fishing and surfing (Raines, 2002). Whilst dogs are not permitted in the Leeuwin-Naturaliste National Park, they have been observed and are thought also to be a significant threat to Hooded Plover in the region.</p> <p>Research has been undertaken by Birds Australia and universities in eastern Australia</p>
052	South West Coast Action Grant Summary Report (2007 - 2008).	<p>This report provides a summary of the South West Coast Action Grant which was an initiative developed by the South West Catchments Council (SWCC). The objective of the devolved grant program is to provide funding to coastal managers and community group partnerships to undertake on-ground coastal management activities for the protection and rehabilitation of regionally significant sites along the south west coastline. The first round of the grant program was managed by the SWCC in 2006 and the Department of Environment and Conservation's (DEC) South West Region was responsible for the management of the second round as a component of the CM.02 project in 2007/08. This document outlines the process and key achievements of round two of the South West Coast Action Grant in 2007/08.</p>
053	South West Islands Survey Report (2008).	<p>This document provides a report on a survey and inspection of the South West Offshore islands of the South West NRM Region in 2008. The aims of the surveys were to:</p> <ol style="list-style-type: none"> <li>1) Quantify the number of New Zealand Fur Seals utilizing the islands and rocks;</li> <li>2) Determine the diversity and density of seabirds breeding on and utilizing the islands, particularly monitoring observations of tropical seabirds that have been observed extending their range south (Dunlop, 2008);</li> <li>3) Conduct a general inspection of the nature reserves;</li> <li>4) Determine the flora species diversity of the larger islands (St Alouarn, Seal and Hamelin); and</li> <li>5) Quantify the amount of rubbish on the islands.</li> </ol>
054	Fact sheet 10: A Wrasse In Groper's Clothing.	<p>This brochure provides a factsheet on the Western blue groper</p>
055	Aboriginal Consultation and Engagement in Natural Resource Management.	<p>This document provides guidelines which were set up predominately to help DoW staff and related organisations, such as Catchment Councils, to meet the statutory requirements of the Native Title Act 1993 and Aboriginal Heritage Act 1972.</p>

056	Aboriginal Heritage and Native Title Guidelines for On-Ground Works (Pilot document).	<p>These guidelines have been developed to give effect to the Department of Water (DoW) Policy for Engaging with Aboriginal People, in that they aim to assist staff in assessing and meeting DoW's policies and statutory requirements under the Native Title Act 1993 and the Aboriginal Heritage Act 1972.</p> <p>These guidelines primarily deal with on-ground works that fall under the following statutory functions of DoW:</p> <ul style="list-style-type: none"> <li>• Management and Monitoring</li> </ul> <p>Locating, managing and monitoring ground and surface water resources, with the objective of protecting and restoring rivers, streams and wetlands. These works include the development of management tools such as Ecological Water Requirements (EWR) and River Action Plans (RAPS) and may require the installation of equipment to monitor stream flows and water quality and drilling bores to monitor ground water depth and quality.</p> <ul style="list-style-type: none"> <li>• River Care Planning and implementation of river restoration and protection works generally comprising revegetation, re-contouring of river banks and foreshores and the installation of hard and soft-engineered erosion and waterway or stormwater management solutions. Projects can range from DoW contracted engineering works to assisting local volunteer community groups carry out minor works on a minimal budget.</li> <li>• Emergency Responses Emergency procedures may include flood mitigation and/or monitoring works, pollution clean ups, fish kill responses, etc. These are generally climate and water quality event based situations and can not be predicted nor individually planned for.</li> </ul>
057	South West Catchments Council Communications Toolkit.	This documents provides a generic tool kit on how to work with the media
058	Local Government Guidelines for Bushland Management: In the Perth and Coastal South-West Natural Resource Management Regions, Western Australia.	<p>The aim of this document is to assist local governments in strategic planning of natural area management that reflects the biodiversity values of each natural area and the level of threat to those values.</p> <p>These Guidelines are not intended to take the place of individual reserve management plans or to extinguish existing plans for natural area conservation. They have been developed to assist local government environmental officers to holistically plan management actions by ensuring that reserves are prioritised for management according to their biodiversity values, the threats that may impact upon them and that the finite resources are used to achieve best long-term outcomes.</p>
059	South West Biodiversity Project (SWBP) Natural Area Initial Desktop Assessment (template form).	This document is a South West Biodiversity Project (SWBP) Natural Area Initial Desktop Assessment template form.
060	Final Report to the South West Catchments Council on the implementation of "Consultancy Number 0607-SPS for the provision of Salinity Project Contractor Support Services" to Projects DS01a and DS01c (Purchase Order – SWCC 545).	
061	Presentation to the Salinity Program Group (2008).	PPT summarising five salinity projects under the IP2 investment with SWCC.
062	Presentation to the Salinity Program Group (2007).	

063	Required Data Sets and Models for Salinity Management: A Gap Analysis	<p>A gap analysis has been undertaken to identify, and guide the future acquisition of, data sets and models that will provide maximum benefit for salinity planning, management and project evaluation in the southwest region. The analysis meets part of the requirement of the South West Catchments Council IP2 project DS.01b "Data Collection and Modelling to Support Improved Decision Making for Salinity Management".</p> <p>This document summarizes the principle findings of the gap analysis. Existing data sets and models relevant to and used in the southwest region, together with their applications and benefits/drawbacks, are briefly described. Several key research areas on the fundamental processes of salinization have been identified to help steer thought on future data and modelling needs. Additional, currently not held or available data sets and models that are considered sufficiently accurate, cost-effective and necessary to complete and evaluate the IP2 programs are recommended for acquisition.</p>
064	The WA Salinity Investment Framework: Reflections on its implementation.	This PPT provides a reflection on the implementation of the WA salinity investment framework
065	Governance Arrangements for the Fence Road Drainage Scheme.	<p>Governance Arrangements for the Fence Road Drainage Scheme provides specific details of a range of requirements for effective governance for the project, including responsibilities of the Shire of Dumbleyung, the Local Land Drainage Advisory Committee (LLDAC) and landowners, funding options, land tenure arrangements, maintenance requirements, directions for ancillary works, reporting, Health and Safety, dispute resolution and details on governance agreement particulars.</p> <p>The document aims to:</p> <ul style="list-style-type: none"> <li>- Ensure a uniform approach to ongoing management of the Scheme.</li> <li>- Provide directions to stakeholders regarding the requirements and obligations for effective governance arrangements.</li> <li>- Provide the background information to develop a legally binding governance agreement linked to the formulation of easements created by deed.</li> <li>- Provide background information to progress a Governance Framework for the Dumbleyung Landcare Zone.</li> </ul>
066	Technical Review of the Implementation of the Fence Road Drainage Scheme.	<p>One of the objectives the Dumbleyung Water Management Strategy Steering Committee was to allow upskilling of local contractors and Shire employees during the process of implementing the Fence Road Drainage Scheme. This was attempted in the following ways:</p> <ol style="list-style-type: none"> <li>1. Awarding the design of the scheme to a drainage contractor</li> <li>2. Tasking the contractor with developing and managing the Tender process</li> <li>3. Contract administration being undertaken by the Shire</li> <li>4. Development of a locally based self funding and managing governance model being led by the Shire, this aspect is not covered in this report</li> </ol>
067	Drain Construction photos.	Drain construction photos
068	Photos from Field Day 4th March 2009	
069	Trees South West: Our 2006-2009 celebrations & reflections.	This document provides a summary and reflections from Tree South West's work between 2006-2009
070	MERI Plan for the Oil Mallee Project (Monitoring, Evaluation, Reporting and Improvement)	

071	Performance Story Report	<p>This report examines the extent to which the activities of Trees South West, and the Farm Forestry Extension and the Oil Mallee Projects (Project Numbers SA.02, DS.07 &amp; 5.05), contributed to NRM outcomes in the South West NRM region.</p> <p>The following points summarise the Project's contribution to increasing the capacity of farmers to adopt farm forestry practices.</p> <ul style="list-style-type: none"> <li>• Farmers reported having the confidence to make decisions about their farm forestry plans and to getting their projects going.</li> <li>• Local Government representative reported being more knowledgeable about the plantation industry.</li> <li>• NRMOs reported starting to push farm forestry options with farmers.</li> <li>• A DAFWA survey found an 84% awareness level of farm forestry amongst farmers.</li> </ul>
072	Monitoring and Evaluation Report. RS03 Tone and Upper Warren Salinity Recovery "Warren perennials project 2007-2008".	<p>The South West Catchment Council funded, Department of Water delivered, project RS03 "Tone and Upper Warren Salinity Recovery" aimed to "ramp up" knowledge on establishing and managing perennial farming systems (PFS's) in the 290 gegalitre Warren River catchment. If perennial farming systems are to be part of a salinity recovery plan as proposed for the Warren under the Salinity Action Plan, it will be important that farmers in the catchment have a need for, and understanding of, how a perennial system may fit into their enterprise. This document provides a monitoring and evaluation report on the above project.</p>
073	Lower Harvey River Rehabilitation Plan	<p>Rehabilitation of the Harvey River must attend to catchment-wide problems including loss of vegetation, unsuitable land uses and further erosion prior to proposing techniques with which to restore the drain to an ecologically viable waterway. As such, the objectives of this report are as follows:</p> <ul style="list-style-type: none"> <li>• Analyse the current basic geomorphology of a stretch of the Harvey River</li> <li>• Consider principles of channel stability, sediment sources and sediment transport processes</li> <li>• Suggest rehabilitation strategies to convert the drain to a functioning stream.</li> </ul>
074	McLarty's River Restoration Project.	Case study PPT on the McLarty River Restoration Project
075	Middle Murray River Action Plan	This report aimed to providing a summary of Middle Murray River foreshore condition and weed presence, future works in the area can be more focused on identified management priorities and issues.
076	South Dandalup River Action Plan (December 2008).	This report aimed to provide a summary of South Dandalup River foreshore condition and weed presence, future works in the area can be more focused on identified management priorities and issues.
077	Fishway assessment for the Pinjarra Weir.	<p>The overall aim of the project is to determine the degree to which the Pinjarra Weir inhibits the migration of various fish species in the Murray River, through:</p> <ol style="list-style-type: none"> <li>1. Determining the fish species richness and abundance both upstream and downstream of the weir utilising a number of methods including set nets, seine nets, fyke nets and electrofishing.</li> <li>2. Comparing physico-chemical properties of specific sites, such as, pH, temperature, conductivity, salinity, turbidity, oxygen and flow.</li> <li>3. Determining whether fish move over the weir from downstream of the weir to upstream and from upstream of the weir to downstream. This will be achieved with the use of replicate fyke nets set for a period of 24h which will allow for both upstream and downstream movement.</li> <li>4. Using these results, make recommendations for the appropriateness of a fishway at the site.</li> </ol>
078	Survey of Rainbow Trout in Bancell Brook: Following the cessation of a stocking programme	As a follow-up to the cessation of stocking, the Peel-Harvey Catchment Council commissioned the Centre for Fish & Fisheries Research to determine if any trout remained in the stream, assuming that the population was not self-maintaining. This report provide a summary on the study's findings

079	Cowaramup Creeks Action Plan.	<p>This river action plan (RAP) was prepared for the Cape to Cape Catchments Group and the Cowaramup creeks community. It contains a detailed description of the current health of the waterways in terms of the condition of the fringing vegetation, weeds and erosion. It provides information on current management issues, and recommends strategies to address these issues. The report can be used to assist in prioritising actions in the catchment to protect and enhance the creeks.</p> <p>It provides background information to aid decision making for landholders, land managers and the community.</p>
080	Boodjidup Brook Action Plan	<p>This river action plan (RAP) was prepared for the Cape to Cape Catchments Group and the Boodjidup Brook community. It contains a detailed description of the current health of the waterways in terms of the condition of the fringing vegetation, weeds and erosion. It provides information on current management issues, and recommends strategies to address these issues.</p> <p>The report can be used to assist in prioritising actions in the catchment to protect and enhance the brook. It provides background information to aid decision making for landholders, land managers and the community</p>
081	Bramley Brook Action Plan.	<p>This river action plan (RAP) was prepared for the Cape to Cape Catchments Group and the Margaret River community. It provides a detailed description of the current condition of Bramley Brook with particular emphasise on the condition of the fringing vegetation, weeds and erosion. It provides information on current management issues, and recommends best practice actions to address these issues.</p> <p>The report has been developed to assist in prioritising actions in the catchment to protect and enhance the streams and tributaries within the Bramley Brook catchment and subsequently the health of the Margaret River itself. It provides background information to aid decision making for landholders, land managers and the community.</p>
082	Fish and freshwater crayfish of Boodjidup Brook, South-Western Australia.	<p>The aim of this study is to assess the fish and freshwater crayfish of Boodjidup Brook and make recommendations to aid in the sustainability of this fauna. This information will be incorporated into management plans for the Brook being compiled by the Cape to Cape Catchments Group.</p>
083	Freshwater fish and crayfish communities of the tributaries of the Margaret River.	<p>Tributaries and headwaters of major rivers are known to be important spawning and nursery habitats of freshwater endemic fishes in south-western Australia (see for example the Collie River in Pen &amp; Potter 1990, and the Blackwood River in Beatty et al. 2006, 2008). Fishes of the Margaret River have previously been examined by Morgan et al. (1998) and Morgan &amp; Beatty (2003) with the monitoring of the functioning of the two fishways on the river documented in Morgan &amp; Beatty (2004, 2007) and Beatty &amp; Morgan (2008). The river is known to be of conservation importance due to it housing five of the eight endemic freshwater fishes of the south-west region, as well as housing the majority (five of the six species) of the Cherax species of freshwater crayfishes found in the south-west; including the Margaret River endemic Critically Endangered Hairy Marron.</p> <p>Despite this known value and considerable volume of research on the fishes in the main channel of the Margaret River, little is known on the fishes and freshwater crayfishes of the river 19s major tributaries. The aim of this study is to document the freshwater fish distribution in the major tributaries of the Margaret River (i.e. Bramley, Darch, and Yalgardup Brooks) during or close to the breeding period for the majority of the species and to provide a broad assessment and comparison of population demographics of the different species in the different tributaries. This information is required for the formulation of River Action Plans for these systems by the Cape to Cape Catchments Group.</p>

084	Tributaries of the Lower Margaret River Action Plan	<p>This river action plan (RAP) was prepared for the Cape to Cape Catchments Group and the Margaret River community. It contains a detailed description of the current health of the waterways in terms of the condition of the fringing vegetation, weeds and erosion. It provides information on current management issues, and recommends strategies to address these issues.</p> <p>The report can be used to assist in prioritising actions in the catchment to protect and enhance the tributaries of the Margaret River and the Margaret River itself. It provides background information to aid decision making for landholders, land managers and the community.</p>
085	Report to Department of Water.	This brief document provides options for low flow by-pass and fish passage for on-stream dams.
086	Buayanyup River Action Plan	<p>The overall goal of this river action plan is to set out ways to improve water quality, increase biodiversity and reduce the incidence of weeds and feral animals within the Buayanyup catchment.</p> <p>It is hoped that the plan will increase awareness among land managers of the problems affecting the health of the catchment, and will encourage action to be taken to deal with them.</p> <p>Water quality monitoring has revealed that excess nutrients from agricultural and urban sources contribute to problems such as toxic algal blooms, fish deaths, odours and increased mosquito populations. On-ground surveys throughout the catchment have identified areas where improvements can be made to help address these issues.</p>
087	Freshwater fish and crayfish	This study is the first to examine the fish and freshwater crayfish of the Caribunup and
088	Review of River Action Plan Implementation in the Geographe Bay Catchment.	<p>The Geographe Catchment Council (GeoCatch) is committed to ongoing river restoration activities in the Geographe Bay Catchment. River Action Plans (RAPs) provide detailed assessments of the river condition and site-specific management recommendations. River action planning commenced in 1999 and RAPs have been produced for the Capel River, Vasse River, Caribunup River, Sabina, Abba and Ludlow Rivers, Gynudup Brook and Tren Creek and Cape Naturaliste Streams.</p> <p>This report provides a review of RAP implementation in the Geographe Bay Catchment, including an assessment of outcomes of implementation and recommendations for future implementation. The outcomes of RAP implementation have been substantial. A total of fifty-six projects have been undertaken, resulting in fencing of 39.9km of foreshore, 5.2ha of weed control and planting of 18,185 seedlings. Investment of funding for restoration projects has generated 1.5 times as much investment from individual landholders.</p> <p>Future implementation of RAPs should focus on fencing of areas that remain in good condition, however fencing of degraded areas is also important in addressing extensive erosion problems in cleared catchments. All landholders should be encouraged and supported in river restoration activities, however there is a need for further promotion of RAPs to increase uptake of new projects. Prioritised future works provided in this report will assist in targeting promotion activities.</p>
089	Progress Report: The feral Rosy Barb in Jingarmup Brook: biology, assessment and control program development.	

090	Sabina River Revegetation Site: Site Preparation Trial	<p>GeoCatch conducted a trial to determine if varying site preparation techniques aided in seedling survival at the Sabina River Restoration Site, north of Busselton in Western Australia. The findings showed that the addition of Terracottem to the hole prior to planting resulted in an increased overall seedling survival rate. Burying the seedlings 2/3 of their length also increased seedling survival.</p> <p>The results also showed that in this instance, Terracottem did not greatly aid in the survival of the more delicate species such as Hovea, Hardenbergia or Kennedia. Only the more hardy species like the Acacias, Melaleucas, Agonis and Viminaria had a strong survival rate.</p> <p>The trial also revealed that the treatments did not assist seedling survival in the plots with sandy soil, although the hot, dry summer of 2007/2008 is likely to have impacted on seedling survival, particularly the more delicate species mentioned above</p>
091	Carbunup River Action Plan	<p>This report provides an outline of the environmental issues identified in a survey of the Carbunup River foreshore and recommends appropriate management strategies. The aim of the Carbunup River Action Plan is to improve local knowledge and guide rehabilitation works. It also serves as a tool to record the community's future restoration activities. Considerable community input was obtained for the study, as well as professional technical advice. Many opportunities have been identified for land managers to protect and enhance the river's health for the long term. Acting now will greatly improve the overall condition of the river and the quality of water travelling through its system. The most prominent issues of concern along the Carbunup River are:</p> <ul style="list-style-type: none"> <li>• erosion;</li> <li>• lack of native vegetation; and</li> <li>• weed infestation.</li> </ul>
092	Case Study: Lot 42 Paris Road, Australind, Western Australia.	
093	Donnelly River River Action	<p>This report was prepared for the Manjimup Land Conservation District Committee (LCDC), government agencies and landholders in the Donnelly River catchment. It is hoped that by providing this summary of Donnelly River foreshore condition and weed presence, future works in the area can be more focused on identified management priorities and issues.</p> <p>The action plan is separated into eight sections. A brief overview of the river action plan and key findings is given in the summary. The Donnelly River has been divided into nine sections for assessment and reporting purposes. A map accompanying the summary (Figure 1, p. vii) gives an indication of these sections. This overall map relates to smaller, section-specific maps in Section seven.</p>
094	Monitoring Report: Project WH.03a.	<p>This report presents data recorded from wetland monitoring carried out in 2007 and 2008 by the Department of Environment and Conservation as part of the South West Catchment Council Project WH.03a: Mapping, classification and evaluation of wetlands. As well as co-ordinating a contractor to conduct wetland mapping, classification and evaluation within identified study areas in the south west of Western Australia, the project aims to monitor 40 sites at 25 wetlands within the south west. The purpose of the monitoring is to collect baseline condition data from the sites, which will then allow for detection of any changes in condition in the future. In conjunction with the mapping, this will assist in regional and local decision-making processes. Monitoring began in 2006 at 13 sites on the Swan Coastal Plain, and continued in 2007, including an additional 27 sites east of Margaret River. The monitoring has continued in 2008, with late spring and early summer monitoring completed.</p> <p>Sites were selected according to a range of criteria such as representiveness of habitat, function, processes, biodiversity, scientific and cultural values. Parameters measured include water quality, phytoplankton, macroinvertebrates, vegetation and vertebrate fauna.</p> <p>In addition to this report, the data will be made available via the DEC website on WetlandBase, Geographic Data Atlas (GDA) and the SLIP NRM portal.</p>

095	Appendix D: Monitoring and Evaluation Guide for the Peel-Yalgorup Ramsar Site.	<p>The Peel-Yalgorup wetland system is designated as a wetland of international importance under the Ramsar Convention. Consistent with the obligations under this convention, an ecological character description (ECD) has recently been completed for the site (Hale and Butcher 2008) and a management plan has been developed.</p> <p>Central to the management plan will be a monitoring and evaluation program that will inform on management activities and assess the ecological character of the site against limits of acceptable change. As always, resources for the management and monitoring are finite and therefore it is essential that a carefully coordinated monitoring and evaluation guide be developed.</p> <p>Monitoring, by definition, is undertaken to inform management and consequently the design of a program is dependent on the management objectives. This monitoring and evaluation guide for the Peel-Yalgorup Ramsar site is based on the overall management aim of managing the site to maintain its ecological character and, more specifically, on Objective 3 of the management plan:</p> <p>Long term positive outcomes are achieved for the Peel-Yalgorup Ramsar System where the ecological character of the Peel-Yalgorup System, including services and values, is maintained or improved.</p> <p>Therefore the objective of this project is to:</p> <ul style="list-style-type: none"> <li>• develop a monitoring and evaluation guide for the Peel-Yalgorup Ramsar site to: <ul style="list-style-type: none"> <li>o inform management of the site against Limits of Acceptable Changes (LAC) as detailed in the ECD</li> <li>o set baseline conditions, where there is currently information gaps, upon which Limits of Acceptable Change (LAC) can be based</li> </ul> </li> </ul>
096	Appendix E: Recommendations of the Goegrup and Black Lakes Action Plan (2006),	This appendix provides recommendations of the the Goegrup and Black Lakes Action Plan (2006),
097	Thrombolite (Stromatolite-Like Microbialite) Community Of A Coastal Brackish Lake (Lake Clifton): Interim Recovery Plan 2004-2009.	This document provides an Interim Recovery Plan (IRP) for the THROMBOLITE (STROMATOLITE-LIKE MICROBIALITE) COMMUNITY OF A COASTAL BRACKISH LAKE (Lake Clifton). To maintain or improve the overall condition of Lake Clifton thrombolites and reduce the level of threat. Thrombolite community formed by biologically influenced precipitation of aragonite in a coastal brackish lake (Lake Clifton). The community occurs on a relict foredune plain on Holocene sands at Lake Clifton, southwest of Mandurah and is a complex association of photosynthetic cyanobacteria and purple sulphur bacteria, eukaryotic microalgae and what are known as 'true bacteria'. Thrombolitic structures (those that have an internal clotted structure as opposed to those that have a laminated organisation which are stromatolitic) are formed through precipitation of calcium carbonate within the microenvironment of microbes as a result of photosynthetic and metabolic activity.

098	Ecological Character Description for the Peel-Yalgorup Ramsar site	<p>The Peel-Yalgorup wetland system, in south-western Australia, is located approximately 80 km south of Perth within the Swan Coastal Plain bioregion. The 26,000 hectare site includes shallow estuarine waters, saline, brackish and freshwater wetlands of the Peel Inlet, Harvey Estuary, several lake systems including Lake McLarty and Lake Mealup and the Yalgorup National Park. This ecological character description includes the current Ramsar listed site as well the proposed extension of the site, which encompasses Goegrup and Black Lakes.</p> <p>In June 1990, the Peel-Yalgorup wetland system was designated a “Wetland of International Importance” under the Ramsar Convention on Wetlands. As a Contracting Party to the Ramsar Convention, the Australian Government has accepted a number of obligations with regards to the management of listed wetlands; one of which is to manage listed wetlands in a manner that maintains their “ecological character”.</p> <p>Describing the ecological character of any wetland ecosystem is central to effective management, as the description forms the benchmark against which management planning and actions are set. This includes a description of the benchmark condition for future assessment and monitoring activities. The specific objectives relevant to the Peel-Yalgorup site are to produce a comprehensive description of the ecological character that:</p> <ol style="list-style-type: none"> <li>1. Describes the critical components, processes and benefits/services of the wetland found at the Peel-Yalgorup Wetlands Ramsar site and the relationships between them;</li> <li>2. Develops a conceptual model for the Peel-Yalgorup wetlands that describes the ‘ecological character’ in terms of components, processes and benefits/services and the relationships between them;</li> <li>3. Quantifies the limits of acceptable change for the critical components, processes and benefits/services of the wetland;</li> <li>4. Identifies, using existing knowledge, nutrient water quality objectives that will support the maintenance of critical components,</li> </ol>
099	A Review Of Studies On The Conservation Status, Evolution, Hydrology And Aquatic Biota Of The Yalgorup Lakes, South-Western Australia	This document provides a review of the studies on the conservation status, evolution, hydrology and aquatic biota of the Yalgorup Lakes, South-Western Australia
100	Peel-Yalgorup Ramsar Wetlands Monitoring: Littoral & Fringing Vegetation Mapping.	<p>The Peel-Yalgorup wetland system is designated as a wetland of international importance under the Ramsar Convention. Consistent with the obligations under this convention, an Ecological Character Description (ECD) and Management Plan (MP) have recently been completed for the site.</p> <p>One of the key recommendations of the ECD and actions in the MP is monitoring of critical components and processes to inform and assess against Limits of Acceptable Change (LAC).</p> <p>A monitoring and evaluation guide forms a part of the MP and details recommended methods and priorities for monitoring at the Ramsar site. Assessing the extent and composition of littoral and fringing vegetation was identified as a priority.</p> <p>The Peel-Harvey Catchment Council has commissioned the mapping of fringing and littoral vegetation within the Peel-Yalgorup Ramsar site and Lakes Goegrup and Black. The objectives of the littoral and fringing vegetation monitoring program (as defined by the MP) are:</p> <ul style="list-style-type: none"> <li>• To determine the extent and composition of littoral vegetation and paperbark communities at Lakes McLarty and Mealup to set a baseline against which change can be assessed;</li> <li>• To determine the extent and composition of samphire and paperbark communities fringing the Peel Harvey Estuary to set a baseline against which change can be assessed; and</li> <li>• To monitor the extent and composition of samphire and paperbark communities at Lakes Goegrup and Black to assess against LAC.</li> </ul> <p>In addition, comparisons have been made with saltmarsh mapping undertaken in the 1990s (Glasson et al. 1995) to report on changes in saltmarsh extent.</p>

101	Salinity Situation Statement Collie River	The state's salinity strategy (March 2000) stated that 'the target for the Collie River inflow to the Wellington Dam is to have potable water by 2015'. The Water and Rivers Commission undertook to 'arrange implementation of plans based on a cost-sharing framework that considers public benefit'. The Commission has established the community based Collie Recovery Team to assist the Commission to meet its commitments. The team prepared a Strategic Action Plan to guide its work. This salinity Situation Statement address 9 of the 39 high priority actions listed in the Plan.
102	Assessing chronological changes in remnant native forest at catchment level. A case study on the Toolibin catchment area.	This report summarises applied research work undertaken during January-December 2000 within the frame of the SPIRT project 'Rapid assessment and monitoring of vegetation conditions within agricultural landscapes'. It partly meets the following expected outcomes: <ul style="list-style-type: none"> <li>• An assessment and monitoring system for rapid assessment of vegetation conditions, that integrates remote sensing techniques with ground-based sampling using global positioning systems for geo-referencing, relational data bases and geographic information systems, providing a wide range of products designed to meet user needs.</li> <li>• Verification that the condition of remnant vegetation can be used as an overall indicator of environmental health.</li> <li>• Improvement of the scientific basis for management of existing remnant vegetation, by providing a methodology to monitor revegetation programs aimed at redressing problems of land degradation across the agricultural region.</li> <li>• Manuscripts, workshops, conference presentations and papers at national and international scientific magazines, reporting on the findings of the project.</li> </ul> The Toolibin catchment was selected as one of the pilot study areas. The specific objectives study were: <ul style="list-style-type: none"> <li>• To construct a digital database of the historical patterns of land clearing (amount, spatial distribution);</li> <li>• To reconstruct the historical vegetation of the catchment using mallet maps produced in the 1890s and 1900s , and reports of the period;</li> <li>• To produce maps showing the rate of clearing for the periods 1960-70, 1970-80, 1980-1996; and</li> <li>• To analyse the relationship between soil types, topographic position and land clearing.</li> </ul>
103	Environmental Protection Bulletin No. 12. Swan Bioplan - Peel Regionally Significant Natural Areas (Peel RSNA's).	The Environmental Protection Authority (EPA) endorses the use of the Swan Bioplan - Peel. Regionally Significant Natural Areas (Peel RSNA's) information to guide strategic land use and conservation planning in the Peel Sector of the Swan Coastal Plain. It was developed pursuant to a Memorandum of Understanding with the Western Australian Planning Commission. The information (digital mapping, spatial dataset and explanatory notes) identifies regionally significant natural areas that should be considered during strategic planning. In a highly cleared landscape, these areas represent the range of landscapes, habitats, vegetation and flora originally found in the area. Any developments in this area will be considered on their merits. However, those impacting on regionally significant natural areas will be subjected to higher scrutiny. Every effort should be made to locate any development in cleared areas in preference to uncleared lands. This Bulletin also defines the survey standards required to support any rezoning or development proposals. It also builds on previous advice by the EPA in May 2010 (EPA 2010) on the significance of the Dawesville to Binningup Region and environmentally acceptable development in that area. Identification and selection of the Peel RSNA's was based on 2009 aerial photography and their natural values at this time independent of current zoning or existing approvals that had yet to be implemented (e.g. Ministerial approvals, clearing permits or development approvals). Proposals that have already been approved may proceed consistent with any approval conditions. The EPA notes that: <ul style="list-style-type: none"> <li>• the primary protection of remnant native vegetation is best achieved by locating development in cleared areas in preference to un-cleared lands;</li> <li>• the Peel RSNA's information provides a key resource to inform strategic regional planning;</li> <li>• the information provides guidance to State and Local Government authorities, community, industry and developers in planning to firstly, avoid, and then minimise, the impacts of development proposals and planning schemes on natural areas; and,</li> <li>• development proposals and planning scheme amendments that impact on the Peel RSNA's will require detailed investigations of their natural values consistent</li> </ul>

104	Geographe Catchment Management Strategy.	This management strategy is one step in the National Resource Management (NRM) process as it summarises, prioritises and offers solutions to the problems of Geographe Bay and its catchment. It describes the background, establishes objectives and provides strategies for action. The strategy acknowledges progress already made and suggests how community and local and State government effort can be combined to maintain and improve the health of the catchment. It has been developed specifically to guide strategic natural resource management planning for the Geographe Catchment Council.
105	Hardy Inlet Augusta. Vegetation of the Estuary Foreshore. Community Caring for the Hardy Inlet.	This document provides an evaluation of the vegetation of the estuary foreshore of the Hardy Inlet Augusta.
106	Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System - Phosphorus Management.	<p>The EPA and the Australian Government has prepared a Water Quality Improvement Plan that takes the findings of seven supporting projects and recommends a combination of management measures to reduce phosphorus loss from land uses within the coastal sections of the three catchments - the Serpentine, Murray and Harvey - draining to the Peel-Harvey Estuary.</p> <p>In 2003 the Peel-Harvey Coastal Catchment was identified as a priority hotspot under the Australian Government's Coastal Catchments Initiative (CCI) and the subsequent component projects were developed in partnership with the Government of Western Australia.</p> <p>The CCI programme consisted of eight coordinated projects including the development of the Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System – Phosphorus Management (WQIP) by the Environmental Protection Authority (EPA) with assistance and coordination provided by the Peel-Harvey Catchment Council. The outputs of the seven remaining projects contributed to and assisted in the preparation of the WQIP. These CCI projects were as follows and their reports are included as appendices in the WQIP:</p> <ul style="list-style-type: none"> <li>- Decision Support System for Water Quality Protection</li> <li>- Support System for the Phosphorus Reduction Decisions</li> <li>- Water Quality Monitoring Program</li> <li>- Water Sensitive Urban Design</li> <li>- Regulation/ Licensing Review</li> <li>- Targeted Assistance to Intensive Agricultural Industries, and</li> <li>- Stock Exclusion from Catchment Waterways.</li> </ul>
107	The Social Values of South West Water Resources.	<p>Executive Summary: The inland water resources (e.g. aquifers, rivers and streams, wetlands and estuaries) of the South West are central to the Region's long-term socio-economic and ecological sustainability. Meeting the water resource needs of a wide range of sometimes competing. Study objectives: The DoW is undertaking a number of water resource management planning activities in the South West. These activities are guided by Statewide Policy No 5 Environmental Water Provisions Policy for Western Australia (WRC 2000). The policy describes WA's water allocation planning framework, which takes into account not only ecological but also social and economic values. The DoW retained Beckwith Environmental Planning Pty Ltd to document, at a regional scale, the non-consumptive social values associated with inland water dependent features in the South West. The study area extends from Bengar Swamp in the north to Augusta in the south and from the Indian Ocean in the west to east of Nannup. Key findings: Summary of the key findings: In total, 67 water-dependent features with social values were identified. Each of the identified features fell into one of five categories: waterways (e.g. rivers, lakes, drains), wetlands, cave systems, estuaries and inlets, and forests/vegetation. The categories with the most features were waterways (37 features) and wetlands (12 features). The majority of identified social values fell into one of three categories: heritage, education, or recreation. The most commonly identified recreation values were: walking/jogging (27 features), birding (21 features), picnicking (17 features), and fishing (15 features). The water dependent features with the highest number of social values are: Lower Blackwood River (15 social values), Lower Colliie River (14 social values), Margaret River (13 social values), the Leschenault Estuary (12 social values) and St John Brook (12 social values). The social value most frequently attributed to the cave systems, the majority of which are located along the Leeuwin-Naturaliste Ridge, was tourism. All of the water-dependent features have aesthetic value(s).</p>

108	State of Play: Peel-Harvey Eastern Estuary Catchment Environmental Assessment Discussion Paper.	<p>The objectives of this three-phase Study are:</p> <ol style="list-style-type: none"> <li>1. To provide increased knowledge of environmental and heritage constraints to enable DEC, DoW and DPI to provide more informed advice and appropriate recommendations to decision-making authorities on strategic land use planning proposals and developments within the Study area.</li> <li>2. To provide guidance on the types of environmental strategies and measures that should be considered by State Government authorities, and those that would be generally supported by stakeholders and the community.</li> <li>3. To provide an inventory and analysis discussion paper as a tool for dialogue with external stakeholders and the community.</li> <li>4. To determine stakeholder-endorsed criteria as a guide to sustainable planning and development.</li> <li>5. To establish mechanisms for meaningful stakeholder engagement that enable continued involvement.</li> <li>6. To provide a scientifically detailed and robust resource that meets technical and operational requirements of policy and decision makers working in government.</li> <li>7. To present information in a format that is conducive to dialogue and deliberation among the general public.</li> </ol> <p>The objectives for the overall Study and the 'State of Play' discussion document have expanded since the original project brief, due to a desire that the State of Play meet a latent need for a consolidated technical resource. Contextual and Study area boundary changes also meant the complexity of the project grew, and governance and technical expectations for the Study evolved further with the entry of the WAPC, which was represented on the project steering committee by the Department for Planning and Infrastructure (DPI), as a financial partner part way through development of 'State of Play'.</p>
109	Analysis and Comparison of Regional NRM Strategy and LGA Planning Documents.	<p>This project sought to investigate the current degree of involvement and commitment of Local Government to the principles and objectives of the Regional Natural Resource Management Strategy, principally in terms of alignment within their planning documents and the actions and decisions of the Council. To gain the broadest assessment within the constraints of the study budget and time frame, five Local Governments were chosen for detailed interview and these allowed for coverage of the six sub-catchments plus the full range of locations, population and development pressures, topographical, climatic and vegetation types, NRM issues and Council sizes. Those five Councils were the Shires of Augusta-Margaret River, Busselton, Harvey, Manjimup and Dumbleyung.</p>
110	Water planning for the South West Region 2010–2030	<p>The Plan's purpose is to provide the strategic direction for water management and planning in Western Australia's South West region to 2030. Specifically, the Plan:</p> <ul style="list-style-type: none"> <li>• sets a vision for water policy, planning and management in the region</li> <li>• assesses the current status of water resource management and service delivery</li> <li>• identifies and assesses current and future water availability and demand</li> <li>• engages with the south west community to understand local water issues</li> <li>• takes a whole-of-water-cycle approach</li> <li>• aligns, where possible, with natural resource management (NRM) activities</li> <li>• provides strategies, position statements and priority actions to support and guide improved water resource management.</li> </ul> <p>To identify the region's priority water management issues, the Department of Water convened the South West Water Forum. The forum examined the region's future water needs and otherwise helped to inform the Plan's development. It brought together representatives from industry, agriculture, public water supply, local government and recreation, as well as Indigenous, environmental and other interests in water management.</p> <p>Additional water management issues were identified during workshops with Aboriginal representatives in three different locations.</p>
111	Ecological Character Description, Vasse-Wonnerup Wetlands Ramsar Site, South-west Western Australia	<p>There are already a number of collaborative monitoring, rehabilitation and restoration programs for the Vasse-Wonnerup catchment undertaken by the Department of Environment and Conservation (DEC), GeoCatch,</p>
112	ICLEI Water Campaign, Corporate and Community Local Action Plan.	<p>The report provides a local action plan as the ICLEI Water Campaign for the Shire of Murray</p>

113	Design of a Program to Monitor Ecological Effects of Environmental Water Provisions in South-west Rivers.	<p>This project aims to design an integrated monitoring program for south-west river systems that will be able to assess whether values are being maintained in a condition consistent with the risk category relevant to the EWP and level of allocation assigned. This project is a critical component to resource planning in the south west of Western Australia and supports EWR/EWP work generally.</p> <p>The intention is to identify sampling sites (including test sites on systems currently receiving EWPs and reference sites on unregulated systems), sampling times, values and parameters to be monitored, data analysis techniques (including appropriate indices) and interpretative approach. The monitoring program will be designed to be used within an adaptive management approach.</p>
114	Economic evaluation of water allocation options in South West catchments: A case study of the Margaret River Catchment.	The purpose of this report is to provide an economic assessment of water allocation options for the Margaret River catchment. The study follows a previous report by the author that outlined a proposed economic evaluation framework to be used to assess water allocation issues in South West Catchments. One of the purposes of the case study presented here is to demonstrate the application of the proposed methodology. The main focus is on estimating current consumptive water use, determining methods for projecting likely growth in water use and for assessing the economic trade-offs associated with alternative water allocation strategies.
115	Aquatic Fauna Sampling: Identifying Ecological Values for the Southwest EWRs Project.	In line with protecting ecologically important ecosystems, the DoW have commissioned Wetland Research & Management to determine the Ecological Water Requirements (EWRs) of the Margaret River, Brunswick River, Wilyabrup Brook and Chapman Brook over the next two years. Concurrently, the DoW is determining EWRs for Lefroy Brook, Capel River and Cowaramup Brook. The location of these systems within the southwest is presented in Figure 1.
116	ICLEI Water Campaign™ Corporate and Community Shire or Capel Location	The Shire of Capel has embraced this challenge; participation in the International Council for Local Environmental Initiatives' Water Campaign™ and the development of
117	Ecological Water Requirements of Brunswick River	This study was carried out to determine the ecological water requirements (EWR) of the Brunswick River. It is one of seven similar studies of rivers in the south-west of Western Australia. The EWR study program also includes Capel River, Lefroy Brook, Wilyabrup Brook, Cowaramup Brook, Margaret River and Chapman Brook.
118	ICLEI Water Campaign Corporate Local Action Plan	The Town of Kwinana has embraced this challenge; participation in the International Council for Local Environmental Initiatives' Water Campaign and the development of this Corporate Local Action Plan (LAP) are subsets of many initiatives aimed at furthering the Town's overall mission of creating a vibrant and sustainable community. This Local Action Plan details the specific 'Management Actions' that the Town of Kwinana will undertake to achieve its objective(s)/mission(s)/goal(s) in relation to water conservation and water quality issues. This report a local action plan for the Town of Kwinana
119	Ecological Water Requirements for Margaret River.	The purpose of this study was to determine the ecological water requirements of the Margaret River. The study is part of the South-West Environmental Water Provisions Project, which is being delivered by the Department of Water in partnership with the South West Catchments Council (SWCC). During this project, the ecological water requirements of seven river systems in south-west Western Australia will be determined. The seven waterways and their catchments, which include the Capel, Brunswick and Margaret rivers and the Wilyabrup, Cowaramup, Chapman and Lefroy brooks, are priorities for research due to the high demand for water for irrigated agriculture, mining and water supply, and declining rainfall in the state's south-west.
120	Water Conservation Plan for the town of Kwinana	This document provides a summary of the workshop for the Town of Kwinana which conducted a Water Conservation Planning workshop on 11 June 2008 with representatives from irrigation, parks and environmental attending. The aim of the workshop was to identify issues and develop objectives, strategies and actions to manage water more sustainably. A component of a WCP is the collection, validation, collation and reporting of groundwater use and efficiency data. This data has been collected and a summary is presented in this report.

121	Ecological Values of Seven South-West Rivers: Desktop review	<p>This report presents the literature reviews which aim to document the current known ecological values for each system, and by doing so, highlight the values which have not been sufficiently studied. These water-dependent ecological values will then be targeted in specific field studies aimed at rivers or parts of rivers which have not been sufficiently surveyed. Field surveys will then be conducted in autumn and spring 2007. This approach, consisting of a combination of detailed review and targeted sampling, avoids duplication of effort as a result of resurveying the same area for values already well documented in the literature.</p>
122	The River Ecological Sustainable Yield Model (RESYM)	<p>Balancing the competing demands for water from consumptive users and the needs of the environment is the goal of sustainable water resource planning in Western Australia (WA). In the south west of WA, irrigated agriculture accounts for approximately 70% of total water use. To support water planning, estimates of consumptive demands for agriculture have been based on licensed entitlements, or where this information is not available, combinations of GIS-based land use mapping and published estimates of crop demand. Numerical models of the yield and reliability of large dams supplying consumptive users have been available for some time.</p> <p>A range of approaches have been used in Australia to estimate the environmental flow (EF) requirements of rivers. The methods used in Australia (and elsewhere) over the past two decades differ in detail but are essentially habitat approaches that identify flows that achieve a minimum water depth in important aquatic and riparian habitats. These threshold flows are then used to 'construct' an EF regime. Ecologically important flow thresholds include those that provide access to spawning habitats, or maintain river pools and riffles. High winter flows inundate the river channel and maintain river channel morphology. Other flows drown out barriers and allow upstream breeding migration of native fish. High winter flows inundate riparian vegetation and fill wetlands on the river floodplain.</p> <p>There has been no standard way however, to create an EF regime that approximates the natural seasonal pattern, frequency and duration of spells above ecologically important thresholds. Nor has there been a standard way to use the results of ecological studies to quantify the ecologically sustainable yields from surface waters and inter-annual variation in these yields. Previously in WA, researchers have used flow gauging records to calculate the historic frequency and duration of spells above ecologically important thresholds, and used these calculations to construct average annual and seasonal EF regimes.</p> <p>Recent water resource planning in south west WA has clearly shown that statistical</p>
123	Ecological Water Requirements of Chapman Brook	<p>The purpose of this report is to determine the water required to protect the existing ecological values of Chapman Brook. It is part of the South-West Environmental Water Provisions Project being delivered by the Department of Water (DoW) in partnership with the South-West Catchments Council. The project has identified seven key catchments where water resources are under particular demand pressure from development for agricultural, urban and mining uses and supply pressure from reduced regional rainfall. The Ecological Water Requirements (EWRs) will be determined for each of the seven catchments as part of the process of allocating water to competing uses.</p>
124	Ecological Water Requirements of Cowaramup Brook	<p>The purpose of this study was to determine the ecological water requirements (EWRs) of Cowaramup Brook, a small stream flowing west from the Dunsborough fault to the Indian Ocean. The study is part of the South-West Environmental Water Provisions Project, which is being delivered by the Department of Water in partnership with the South West Catchments Council (SWCC). During this project, the EWRs of seven river systems in Western Australia's south-west will be determined. The seven waterways and their catchments, which include the Capel, Brunswick and Margaret rivers and the Wilyabrup, Cowaramup, Chapman and Lefroy brooks, are priorities for research due to the high demand for water for irrigated agriculture, mining and water supply, and declining rainfall in the state's south-west.</p>

125	The evolutionary significance of Balston's Pygmy Perch and Mud Minnow populations in the Blackwood River	The aims of this study were to use genetic (mtDNA) data to assess: (1) the evolutionary significance of the populations of the Balston's Pygmy Perch ( <i>Nannatherina balstoni</i> ) in the Blackwood River; and (2) the connectivity among populations of the Mud Minnow ( <i>Galaxiella munda</i> ) in different tributaries in the Blackwood River. This work was commissioned by the Department of Water in view of the potential vulnerability of the populations of these threatened species due to historical and future environmental change.
126	Groundwater Conservation Plan: Operating Strategy for the City of Mandurah	The Groundwater Conservation Plan is a tool that aims to assist local government in devising strategies and actions that will achieve the requirements of the water licence and the groundwater conservation/efficiency goals of the council. The Groundwater Conservation Plan includes the council's goals, objectives, strategies and actions aimed at achieving the sustainable use of groundwater resources within the Local Government Area. This part uses best practice and benchmarks as tools to assist local government in achieving groundwater conservation outcomes and improving groundwater management.
127	Shire of Boddington ICLEI Water Campaign™ Local Action Plan.	The purpose of this document is to provide a strategic direction and implementation plan for improved water management. In accordance with the Water Campaign requirements for Milestone 3, this plan includes; 1. An outline of the National, State, Regional and Local context of water management 2. A baseline profile of water consumption and water quality issues with the Shire's boundaries 3. A statement of water conservation and water quality goals set by the Shire. 4. An outline of council actions and policies implemented by the Shire since the base year. 5. An outline of proposed actions and policies to be implemented by the Shire up until the target year and; 6. A commitment to monitoring and review of the local action plan
128	Shire of Cuballing ICLEI Water Campaign™ Local Action Plan	The purpose of this document is to provide a strategic direction and implementation plan for improved water management. In accordance with the Water Campaign™ requirements for Milestone 3, this plan includes; 1. An outline of the National, State, Regional and Local context of water management 2. A baseline profile of water consumption and water quality issues with the Shire's boundaries 3. A statement of water conservation and water quality goals set by the Shire. 4. An outline of council actions and policies implemented by the Shire since the base year. 5. An outline of proposed actions and policies to be implemented by the Shire up until the target year and; 6. A commitment to monitoring and review of the local action plan
129	Shire of Harvey ICLEI Water Campaign™ Corporate and Community Action Plan	This Local Action Plan details the specific 'Management Actions' that the shire of Harvey will undertake to achieve its objectives in relation to water conservation and water quality improvement.
130	Serpentine Jarrahdale Shire ICLEI Water Campaign™ Local Action Plan	The Shire's participation in the International Council for Local Environmental Initiatives' Water Campaign™ and the development of this Local Action Plan is a subset of many initiatives aimed at furthering the Shire's overall mission of creating a vibrant and sustainable community. This Local Action Plan details the specific 'Management Actions' that the Serpentine-Jarrahdale shire will undertake to achieve its objectives in relation to water conservation and water quality improvement.

131	Shire of Wandering ICLEI Water Campaign™ Milestone 3: Corporate and Community Local Action Plan	The purpose of this document is to provide a strategic direction and implementation plan for improved water management. In accordance with the Water Campaign requirements for Milestone 3, this plan includes;1. An outline of the National, State, Regional and Local context of water management 2. A baseline profile of water consumption and water quality issues with the Shire's boundaries 3. A statement of water conservation and water quality goals set by the Shire. 4. An outline of council actions and policies implemented by the Shire to date 5. An outline of proposed actions and policies to be implemented by the Shire up until the target year and; 6. A commitment to monitoring and review of the local action plan.
132	City of Mandurah ICLEI Water Campaign™ Corporate and Community Local Action Plan	The development of this Local Action Plan is a subset of many initiatives aimed at furthering the City's overall mission of creating a vibrant and sustainable community. This Local Action Plan details the specific 'Management Actions' that the City of Mandurah is implementing to achieve its objectives in relation to water conservation and water quality improvement.
133	Shire of Waroona ICLEI Water Campaign Corporate and Community Local Action Plan	The development of this Local Action Plan is a subset of many initiatives aimed at furthering the Shire's overall mission of delivering effective and efficient services to the community and strengthening its capacity to tackle the issues of sustainable development and conservation of its sensitive environments that are increasingly interconnected and interdependent. This Local Action Plan details the specific 'Management Actions' that the Shire of Waroona is implementing to achieve its water conservation goals and water quality outcomes in both the Corporate and Community sector.
134	Salinity tolerances of native freshwater fishes of the Blackwood River	The study therefore aims to first determine the acute (i.e. rapid change) salinity tolerances of the two most common and widespread endemic freshwater fish species of south-western Australia; the Western Minnow ( <i>Galaxias occidentalis</i> ) and Western Pygmy Perch ( <i>Edelia vittata</i> ) and the rare (EPBC Act listed as Vulnerable) Balston's Pygmy Perch ( <i>Nannatherina balstoni</i> ). As the Western Minnow continues to occupy both the salinised inland section and the fresher (due to fresh groundwater and surface water flows) section of the Blackwood River, the study also aims to assess whether there are differences in the salinity tolerance of the upstream and downstream populations of this species.
135	City of Mandurah Stormwater Management Plan	This document is a strategic plan for stormwater management in the City of Mandurah which will be regularly reviewed to ensure the stormwater management measures are consistent with Current Best Practise and incorporate any advancement in technology and research. The recommendations which have arisen as a result of the Plan include; 1. Council to commit funds to allow staged implementation of this Plan 2. Expansion of water quality monitoring program to collect baseline data 3. Collection of data on all existing stormwater infrastructure assets 4. Define sub-catchments 5. Prioritisation of stormwater management projects 6. Create timeline for implementation of projects 7. Implement projects using best practice water sensitive urban design
136	Boodjidup Brook Action Plan	The aim of the foreshore condition survey was to provide the community with information on the condition of the brook to assist and guide management.
137	Feral Goldfish ( <i>Carassius auratus</i> ) in the Warren River catchment	The main aim of this study was to implement an ongoing control programme for Goldfish in the highly nutrient enriched Vasse River and thereby reduce the biomass of the species. Secondary aims were to examine the distributions, habitat associations, age compositions and growth and diet of Goldfish and to develop an understanding of factors contributing to its success in this and other nutrient enriched waterbodies.
138	Middle Murray River Action Plan	The principal aims of the MMRAP are to achieve the protection of the Murray River ecosystem and to enhance the long term ecological condition of the river. The Action Plan seeks to achieve these aims by firstly ascertaining the current condition of the Murray River (within the study area) and having done that, establishing management issues and prioritising restorative measures to deal with those issues.

139	Cowaramup Creeks Action Plan	This River Action Plan contains a detailed description of the current health of the waterways in terms of the condition of the fringing vegetation, weeds and erosion. It provides information on current management issues, and recommends strategies to address these issues.
140	Buayanyup River Action Plan	The overall goal of this river action plan is to set out ways to improve water quality, increase biodiversity and reduce the incidence of weeds and feral animals within the Buayanyup catchment.
141	Freshwater fish and crayfish communities of the Carbunup and Buayanyup Rivers: conservation significance and management considerations	This study is the first to examine the fish and freshwater crayfish of the Carbunup and Buayanyup Rivers, south-western Australia. It aimed to determine the distribution of the fishes and freshwater crayfishes, their conservation significance and management implications to help ensure the ongoing viability of these communities. Ten sites each in the Carbunup and Buayanyup Rivers were sampled for fish and freshwater crayfish in November 2008.
142	Fish and freshwater crayfish of Boodjidup Brook, south-western Australia	The aim of this study is to assess the fish and freshwater crayfish of Boodjidup Brook and make recommendations to aid in the sustainability of this fauna.
143	Lower Harvey River Rehabilitation Plan	The objectives of this report were to: Analyse the current basic geomorphology of a stretch of the Harvey River Consider principles of channel stability, sediment sources and sediment transport processes Suggest rehabilitation strategies to convert the drain to a functioning stream.
144	Freshwater fish and crayfish communities of the tributaries of the Margaret River	The aim of this study is to document the freshwater fish distribution in the major tributaries of the Margaret River (i.e. Bramley, Darch, and Yalgardup Brooks) during or close to the breeding period for the majority of the species and to provide a broad assessment and comparison of population demographics of the different species in the different tributaries
145	Monitoring the Margaret River Fishways 2007	The aim of this study was to assess the functioning of the fishways on the Margaret River during 2007
146	McLeod Creek (Blackwood River) fish survey: December 2007	The aim of the study was to determine the fish and freshwater crayfish fauna in McLeod Creek and provide an assessment of its importance as a freshwater fish refuge.
147	Fishway assessment for the Pinjarra Weir	The overall aim of the project is to determine the degree to which the Pinjarra Weir inhibits the migration of various fish species in the Murray River
148	Preliminary assessment of the functioning of the bypass fishway on Wilyabrup Brook	This project provide a preliminary assessment of the functioning of the bypass fishway on Wilyabrup Brook
149	Survey of Rainbow Trout in Bancell Brook: following the cessation of a stocking programme	The project provide the result from a survey investigating Rainbow Trout in Bancell Brook following the cessation of a stocking programme
150	The feral Rosy Barb in Jingarmup Brook: biology, assessment and control program development (progress report)	The current project aims to both investigate the population biology (such as size structure and recruitment) and distribution in the system, and also intensively remove large numbers thus reducing its potential impact on the system. Furthermore, this information will contribute to the development of a control program.
151	Sabina River Revegetation Site: Site Preparation Trial	This document provide the finding from a site preparation trial on the Sabina River
152	South Dandalup River Action Plan	
153	Australasian Bittern Benger Swamp Nature Reserve (September 2008 to December 2008)	This survey aimed at determining if Australian Bittern were present in Benger Swamp nature reserve (September 2008 to December 2008)
154	Australasian Bittern Benger Swamp Nature Reserve (December 2007 to January 2008 Surveys)	This survey aimed at determining if Australian Bittern were present in Benger Swamp nature reserve (December 2007 to January 2008)
155	Vasse Wonnerup & Benger Swamp Rehabilitation Monitoring Progress Report 2008	This report aims to: - Outline the rehabilitation methods used on-ground at Webster Paddock and Benger Swamp sites in 2008. - Determine the success of the rehabilitation works at both locations. - Determine the best rehabilitation methods for future rehabilitation works in the area. - Determine the feasibility and practicability of using jute mat, black plastic and herbicide application over large areas in Benger Swamp Nature Reserve.

156	Benger Swamp Nature Reserve Water Monitoring Program (WH.03B) (July, August, October, November 2008)	The aim of the water monitoring program (July-Nov 2008 at Benger Swamp was to determine the current water quality, collect baseline data to later compare future monitoring against and to determine if current management practices are influencing water quality.
157	Benger Swamp Nature Reserve Water Monitoring Program (WH.03B) (October 2007 – May 2008)	The aim of the water monitoring program (Oct 2007- May 2008 at Benger Swamp was to determine the current water quality, collect baseline data to later compare future monitoring against and to determine if current management practices are influencing water quality.
158	A Review Of Studies On The Conservation Status, Evolution, Hydrology And Aquatic Biota Of The Yalgorup Lakes, South-Western Australia	This document provides a literature review on On The Conservation Status, Evolution, Hydrology And Aquatic Biota Of The Yalgorup Lakes, South-Western Australia
159	Vasse – Wonnerup Estuary (WH.03B) Water Monitoring Program (July 2008 to December 2008)	
160	Vasse – Wonnerup Estuary (WH.03B) Water Monitoring Program (September 2007 to June 2008)	This report aims to present gathered data in relation to the water quality bench marks set in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2002 (updates the ANZECC 1992 document) to determine water quality health
161	Ecological Character Description Vasse-Wonnerup Wetlands Ramsar Site South-west Western Australia	This document provides Ecological Character Description Vasse-Wonnerup Wetlands Ramsar Site South-west Western Australia. This include a site description, ecological character description and monitoring and research needs
162	Management of Diffuse Water Quality in the Peel-Harvey Coastal Drainage System (a literature review).	The Peel-Harvey catchment drains into the Peel-Harvey Estuarine System which is one of the most significant waterbird habitats in Australia. Decline in the estuary system has occurred since the 1950's and there is still an urgent need to undertake catchment-wide waterway protection and enhancement. This report focuses on Best Management Practices (BMPs) available to improve water quality; specifically those used adjacent or within waterways. International, national and local literature is organized into a format relevant to the Peel-Harvey catchment so that the primary knowledge is highlighted and gaps identified.
163	Development of a Stormwater Monitoring Program: Guidelines for Local Government.	The purpose of this document is to provide some basic understanding of the issues surrounding monitoring Stormwater. Indeed good monitoring information can be invaluable as Local Governments start to prioritise stormwater works. This document discusses the specifics of developing a monitoring program
164	Peel Harvey Modelling Analysis and Scenarios	This document provides modelling Analysis and Scenarios for the Peel Harvey
165	Model Local Planning Policy Water Sensitive Urban Design for the Leschenault Catchment	This document provides a model for local planning policy water sensitive urban design for Leschenault Catchments. This document provides a template for local governments to use and adapt to their respective needs to assist them in their commitments to water quantity and efficiency targets.
166	Goldfish control in the Vasse River: summary of the 2008 programme	This report summarises the results of the 2008 round of the feral Goldfish control in the lower Vasse River and comparisons made with previous control efforts since 2004. Previous reports that detail both the fish fauna of the Vasse River and Goldfish control efforts
167	Lower Vasse River Reed Raft Trial	This report provides an overview on the effectiveness of a trial floating reed raft. The trial look either raft would potentially maintain continued plant cover of native species and allow the establishment of a root mass in the water as well as provide habitat for waterbirds. The trial also aimed to help identify required replacement rates (if needed), planting times and plant species.
168	River action plan for the Sabina, Abba and Ludlow Rivers : volume 2 : maps and recommendations for Abba River	The aim of the foreshore condition survey was to provide landholders, The Vasse-Wonnerup LCDC and GeoCatch with information on the condition of the rivers so that the waterways can be better managed.

169	River action plan for the Sabina, Abba and Ludlow Rivers : volume 3 : maps and recommendations for Ludlow River and Tiger Gully	The aim of the foreshore condition survey was to provide landholders, The Vasse-Wonnerup LCDC and GeoCatch with information on the condition of the rivers so that the waterways can be better managed.
170	River action plan for the Sabina, Abba and Ludlow Rivers : volume 1 : maps and recommendations for Sabina River and Woddidup Creek	The aim of the foreshore condition survey was to provide landholders, The Vasse-Wonnerup LCDC and GeoCatch with information on the condition of the rivers so that the waterways can be better managed.
171	Capel River Action Plan	This report presents a summary of the environmental status of the Capel River foreshore, the issues associated with its use and management, and recommendations relating to the future management of the foreshore reserve. The report and associated maps are collectively referred to as a 'river action plan'. This action plan aims to provide landholders and the wider community of Capel with a tool to guide the use of limited resources available for weed control, erosion control and replanting of native vegetation along the foreshore reserve. environmental status of the Capel River foreshore, the issues associated with its use and management, and recommendations relating to the future management of the foreshore reserve. The report and associated maps are collectively referred to as a 'river action plan'. This action plan aims to provide landholders and the wider community of Capel with a tool to guide the use of limited resources available for weed control, erosion control and replanting of native vegetation along the foreshore reserve.
172	River Action Plan for the Cape Naturaliste Streams	This river action plan provides advice about the current health and management needs of the Jingarmup, Meelup, Dolugup, Dandatup and Dugulup Brooks flowing from Cape Naturaliste into Geographe Bay.
173	Carbanup River Action Plan	This report provides an outline of the environmental issues identified in a survey of the Carbanup River foreshore and recommends appropriate management strategies.
174	Ellen Brook Action Plan	The aim of the Ellen Brook Action Plan is to provide information to landholder and interested community members regarding the health and current state of Ellen Brook and to provide recommendations on how to best manage the brook
175	Gynudup Brook Action Plan	The aim of the Gynudup Brook Action Plan is to provide information to landholder and interested community members regarding the health and current state of Gynudup Brook and to provide recommendations on how to manage the brook
176	Gynudup Brook & Tren Creek Action Plan	The aim of the River Action Plan is to provide information to landholders, interested community members, the LCDC and Geocatch regarding the health and current state of Gynudup Brook and Trent Creek and to provide recommendations on how to manage them better
177	Margaret River Action Plan	The aim of the foreshore condition survey was to provide landholders and the Cape to Cape Catchments Group with information on the condition of the river so that it can be better managed.
178	Vasse River Action Plan	This Action Plan describes the current state of the Vasse River and provides recommendations and management advice to address river degradation
179	Yallingup Brook Action Plan	The aim of the Yallingup Brook Action Plan was to produce a large map of Yallingup Brook detailing land tenure and condition of the Brook. The map was to be accompanied by an Action Plan which provides an ongoing prioritised plan of action through which riverine degradation can be addressed. Objectives <ul style="list-style-type: none"> <li>• provide a benchmark against which the local community's future work to protect and rehabilitate the Brook can be gauged</li> <li>• provide a tool to better guide the expenditure of limited resources to achieve optimum usage, weed control, erosion control, tree planting and rehabilitation</li> <li>• provide a sound technical basis for future funding or project submissions.</li> </ul>
180	Migration patterns of the fish and crayfish fauna of the Blackwood River	The project monitored four main channel sites of the Blackwood river in order to determine fish migrations within and outside of the major area of groundwater discharge
181	Migration patterns of fishes on the Margaret River fishways: 2006	This report looked at migration patterns of fishes on the Margaret River Fishways

182	Estuary condition report 1999 to 2010	<p>Estuary condition report 1999 to 2010 A decade's worth of monitoring and scientific studies have been collated in this report for the Hardy Inlet estuary to provide a synopsis on the current state of its condition over that period. Key findings were:</p> <ul style="list-style-type: none"> <li>Water quality in the Hardy Inlet estuary deteriorated towards the upper estuary past Molloy Island.</li> <li>The condition of the lower estuary was 'moderate to good'. The water column was well-mixed and oxygenated, and nutrient concentrations were low (except after heavy rainfall and flow events). Aquatic plant life was dominated by seagrass – a favourable habitat for fish and invertebrates. Phytoplankton blooms were infrequent.</li> <li>Nutrients from urban drainage may contribute to the excessive macroalgal growth that has periodically impacted the Augusta foreshore.</li> <li>The condition of the upper estuary was poor. Dissolved oxygen concentrations in the water were low and nutrient concentrations were high. Nutrients from catchment run-off, and from sediment nutrient release in the deep channels have affected water quality. Phytoplankton blooms were a frequent symptom of nutrient-rich conditions in the upper estuary.</li> </ul>
183	Estuarine Processes in the Blackwood River Estuary	<p>The Blackwood River estuary is the largest river by flow volume in south west Australia. The estuary is under increasing pressure from climate change, dryland salinity, tourism and aquifer extractions. This study aimed to determine the current state of the estuary and the dominant estuarine processes, and to make predictions about the future of the estuary. To fulfill the objectives of the study, field work and hydrodynamic modeling were undertaken. Initial field measurements revealed that bottom waters in the tidal river of the estuary were saline and low in oxygen, most likely due to low rainfall throughout the catchment in the previous six months. The later field measurements were consistent with two storm events throughout the catchment having begun to flush the river. Modeling using HAMSOM provided information about the conditions that would completely flush the entire estuary. Previous estimates of the river flow required to flush the estuary were overestimated compared to the model results. High surge was associated with increased salt transport into the estuary as expected. Comparison of the field and model data suggested that the model overestimated tidal lag in the estuary. The dominant process affecting salinity structure in the estuary was streamflow. Tidal straining was evident in the salinity data, but not dominant in the overall energy balance. In the absence of streamflow, the estuary remained stratified, with gravitational circulation dominant. Climate change and aquifer extractions may decrease streamflow in the future, which would decrease both the oxygen supply to the estuary and the oxygen content in bottom waters. If dryland salinity results in an increase in the salt content of the river flow, the gravitational circulation in the estuary could be disturbed. Further research is recommended to determine the effect of increased salinity on ecological communities in the Blackwood, and to determine if the decrease in river flow in 2006 is due to climate change or natural variability of the river system.</p>
184	Baseline study on the fish and freshwater crayfish fauna in the Blackwood River and its tributaries receiving discharge from the Yarragadee Aquifer	<p>This document provides a Baseline study on the fish and freshwater crayfish fauna in the Blackwood River and its tributaries receiving discharge from the Yarragadee Aquifer</p>
185	PRORP History Documents from 1975 to 2014	<p>This provides a history of the conservation, planning and management of the biodiversity and landscape of the Greater Bunbury area.</p>
186	Hardy Inlet water quality improvement plan Stage one - the Scott River catchment	<p>This plan provides a strategic approach to reducing nutrients delivered to the Hardy Inlet from the Scott River catchment. The management practices described here have been selected for the local area using empirical models based on current knowledge and data verified by field measurements. The plan's aim is to provide clear and achievable advice about the best-possible mix of management tools to meet load reduction targets for nitrogen and phosphorus from the catchment for the next decade and beyond. Many of these tools (best-management practices) have previously been described in the water quality improvement plan for the Vasse-Geographe catchment (DoW 2009) and have been updated or refined for application in the Scott River catchment.</p> <p>It is anticipated the plan's recommendations will help governments and the community to achieve the long-term protection of water quality in the Hardy Inlet, while maintaining sustainable use of the wider Scott River catchment.</p>

187	Leschenault estuary water quality improvement plan	The WQIP's aim is thus to identify the values supported by the estuary and associated waterways (Section 2) and the factors threatening those values (Section 3), as well as to provide strategic and prioritised management recommendations to improve the water quality of these important assets.
188	Managing habitat for endangered species: Carnaby's black-cockatoo, food resources and time since last fire	This leaflet provides research findings from 2011 on the managing habitat for endangered species (i.e. Carnaby's black-cockatoo).
189	Riparian Land Management Technical Guidelines	These guidelines are intended to have a national scope, but Australia has a huge diversity of environments. Thus it is not possible to be prescriptive about what to do in every particular region. What is provided, is a review of crucial factors for riparian management that need to be considered in each situation, with suggestions about how to vary management in line with local conditions. The aim is provide the technical framework which will empower those with local knowledge to make appropriate local decisions.
190	The Cost of Revegetation Final Report	The project was developed in response to the increasing number of revegetation projects being proposed and carried out around the country, many of which involve the development of detailed funding proposals which must be assessed by various funding bodies. With revegetation work a rapidly growing field in Australia, and a relatively recent field, little work has been done to assess the type of costs typically incurred in revegetation work. The Costs of Revegetation project therefore aimed to develop benchmark data on the costs of conducting revegetation work. A particular problem with assessing the costs involved in conducting revegetation work is the high variability in the types of sites being revegetated, and the methods being used to revegetate them. Because of this high variability, the benchmark costs provided in this report are provided as a guide only, and may not apply to all projects in all locations. They do however serve to provide a benchmark range within which many costs should fall. This report represents Stage I of this project. Stage II, if funded, will create a decision support system that will allow revegetation officers to enter a description of the project envisaged into the support system and then cost a series of design scenarios so that the most cost effective combination can be proposed for funding. Funding agencies will use the system in a similar way to check funding proposals for cost effectiveness and correctness.
191	A field manual for describing and mapping revegetation activities in Australia	Investment in revegetation activities for land protection and vegetation enhancement has increased recently in Australia through programs such as the National Action Plan for Salinity and Water Quality and the Natural Heritage Trust. Until now however, there has been no simple and effective method for reporting on such activities. Revegetation competes with other land management activities for scarce resources. Setting priorities in terms of when and where to invest requires data and expertise. This manual, which has been developed by the Bureau of Rural Sciences, outlines procedures that, when applied, will encourage the collection of nationally consistent data and therefore help improve decision-making. It will greatly assist those people involved in revegetation to consistently monitor and report on their activities and the ability to collate the reported information at the national level. The manual can be applied to a wide range of plantings and revegetation activities. It targets land protection plantings that are often small in scale and designed to support rehabilitation and environment protection as part of agriculture and natural resource management programs. Activities include broadacre and biodiversity plantings, streamside and gully plantings, and the protection from grazing of areas to support natural regeneration. This manual is aimed primarily at regional communities and landholders, although natural resource coordinators in land management agencies as well as information managers and researchers will also find it useful. It describes the minimum amount of information considered essential for monitoring revegetation activities. It explains in detail the data collection and quality assurance procedures necessary to obtain information in a systematic way. Following these procedures will ensure that data are precise and comparable, and will enable planners and policymakers to better assess the effectiveness of revegetation activities. Landholders can also use the system to report on and monitor their individual revegetation activities. Ensuring consistent methods is a fundamental prerequisite for the collection of high-quality data. The methods described in this manual can be integrated with existing survey methods and combined to provide an accurate picture of

192	Provision of artificial shelter on beaches is associated with improved shorebird fledging success	This document provides an overview of artificial chick shelters that might improve productivity of beach-nesting birds threatened by anthropogenic disturbance. We investigated the efficacy of three different chick shelter designs against four criteria: accessibility to chicks over time, thermal insulation, conspicuousness to beach-goers, and practicality (cost and ease of transport).
193	Evaluation of the recreational marron fishery against environmental change and human interaction	The distribution of marron in the southwest of Australia has seen many changes since European settlement. This report investigates how effective recreational marron fishing is and suggests possible sustainable fishing
194	Planning and Management Foreshore condition assessment in farming areas of south-west Western Australia	Many Western Australian rivers are becoming degraded as a result of human activity within and along waterways and through the off-site effects of catchment land uses. The erosion of foreshores and invasion of weeds and feral animals are some of the more pressing problems. Water quality in our rivers is declining with many carrying excessive loads of nutrients and sediment and in some cases contaminated with synthetic chemicals and other pollutants. Many rivers in the south-west region are also becoming increasingly saline. The Water and Rivers Commission is responsible for coordinating the management of the state's waterways. Given that Western Australia has some 208 major rivers with a combined length of over 25 000 km, management can only be achieved through the development of partnerships between business, landowners, community groups, local governments and the Western Australian and Commonwealth Governments. The Water and Rivers Commission is the lead agency for the Waterways WA Program which is aimed at the protection and enhancement of Western Australia's waterways through support for on-ground action. One of these support functions is the development of river restoration literature that will assist Local Government, community groups and landholders to restore, protect and manage waterways. This document is part of an ongoing series of river restoration literature aimed at providing a guide to the nature, rehabilitation and long-term management of waterways in Western Australia. It is intended that the series will undergo continuous development and review. As part of this process any feedback on the series is welcomed and may be directed to the Catchment and Waterways Management Branch of the Water and Rivers Commission.
195	Planning and Management Foreshore condition assessment in urban and semi-rural areas of south-west WA	Many Western Australian rivers are becoming degraded as a result of human activity within and along waterways and through the off-site effects of catchment land uses. The erosion of foreshores and invasion of weeds and feral animals are some of the more pressing problems. Water quality in our rivers is declining with many carrying excessive loads of nutrients and sediment and in some cases contaminated with synthetic chemicals and other pollutants. Many rivers in the south-west region are also becoming increasingly saline. The Water and Rivers Commission is responsible for coordinating the management of the state's waterways. Given that Western Australia has some 208 major rivers with a combined length of over 25 000 km, management can only be achieved through the development of partnerships between business, landowners, community groups, local governments and the Western Australian and Commonwealth Governments. The Water and Rivers Commission is the lead agency for the Waterways WA Program which is aimed at the protection and enhancement of Western Australia's waterways through support for on-ground action. One of these support functions is the development of river restoration literature that will assist Local Government, community groups and landholders to restore, protect and manage waterways. This document is part of an ongoing series of river restoration literature aimed at providing a guide to the nature, rehabilitation and long-term management of waterways in Western Australia. It is intended that the series will undergo continuous development and review. As part of this process any feedback on the series is welcomed and may be directed to the Catchment and Waterways Management Branch of the Water and Rivers Commission.
196	Livestock management: Fence location and grazing control	This water notes provide guidelines for livestock management around rivers including fencing location and grazing control









