RECFISHING RESEARCH BUSINESS PLAN

RECFISHING RESEARCH

STATUS REPORT

2010/11

Recfishing Research is an initiative of Recfish Australia and the Fisheries Research and Development Corporation

RECFISH AUSTRALIA

Australian Government
Fisheries Research and Development Corporation

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Recfishing Research

Status Report

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Recfishing Research bringing recreational fisheries into focus

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Cover: Recfishing Research bringing recreational fisheries into focus - Cover design by Creative Avenue

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Source: Matt Daniels

Highlights for 2010/11

2010/11 has been a time of progress for the recreational fishing sector. A number of important Research, Development and Extension (RD&E) initiatives commenced during this period to underpin further development of recreational fishing in Australia. An emphasis on education and leadership was a notable feature of R&D investment, which will be sustained into the future to help to build capacity within our sector.

In 2008 the then Minister for Agriculture, Fisheries and Forestry (DAFF) formed the Recreational Fishing Advisory Committee (RFAC). Part of the role of this group has been development of a National Recreational Fishing Industry Development Strategy (RFIDS). Following extensive consultation with recreational fishing interests around Australia this culminated in the release of the document "Recreational fishing in Australia - 2011 and beyond: a national industry development strategy" in 2011. As well as providing strategic guidance for the future of recreational fishing the Australian Government allocated $1.7m to projects indentified as high priority within the Strategy. The Fisheries Research and Development Corporation (FRDC) has been contracted by DAFF to develop and implement these projects. Recfishing Research is playing a key role in providing advice to FRDC relating to the development of these projects, and will continue to monitor their delivery to ensure achievement of desired outcomes.

As well as being identified as priority projects under the RFIDS the following projects address a number of RD&E priorities identified within the Recfishing Research Business Plan. Projects 1-7 are being commissioned and managed by FRDC while projects 8-10 are commissioned and managed by DAFF and ABARES. The projects are:

1. A coordinated national data collection for recreational fishing in Australia
2. National education program
3. Identifying the health and well-being benefits of recreational fishing
4. Expanding the future leaders program
5. A national conference on recreational fishing
6. Development of a climate change implications paper for recreational fishers
7. A national program for the roll-out of Angel Rings
8. Improving consultations between government and the recreational fishing sector
9. Developing a methodology for obtaining regular, statistically robust estimates of recreational and charter fishing catch of Southern Bluefin Tuna in Australian waters
10. Monitoring the recreational take of Shark species in Australian waters.

The FRDC continues to invest significantly in the development of Australia's recreational fishing industry (see Figure 1). Recfishing Research continues to play an important role in articulating RD&E priorities for the recreational sector since its formation in 2005, which has helped to influence a general trend of increased investment in RD&E initiatives during that period (See Figure 1).

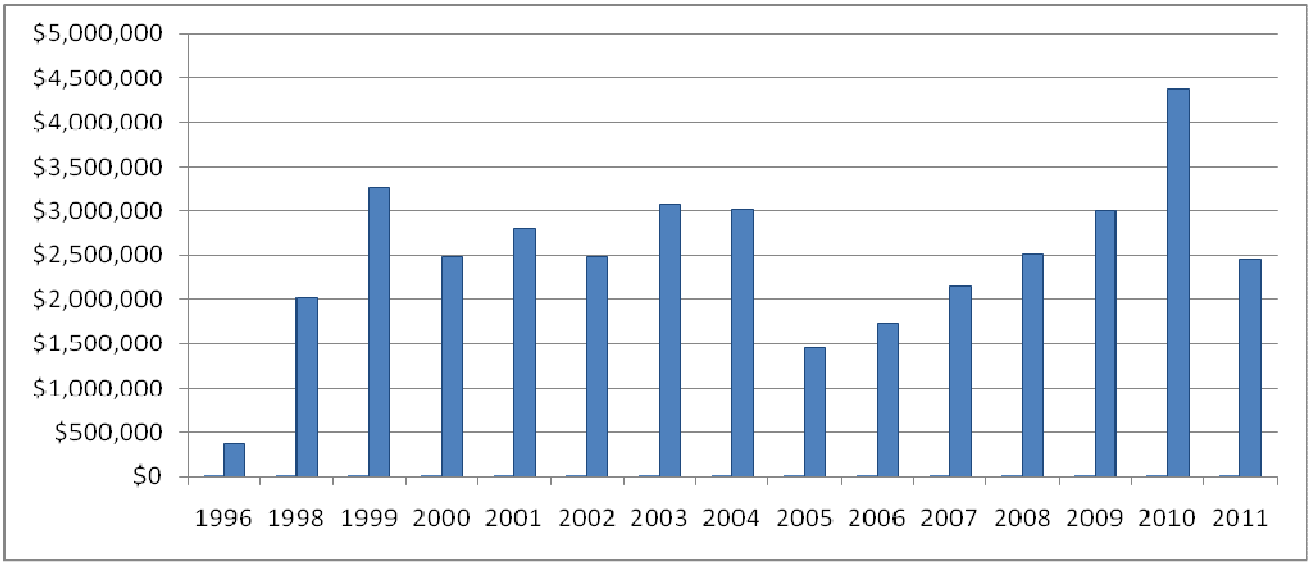

Figure 1 FRDC Investment in R&D relevant to the recreational sector 1996 – 2011 (note: this analysis is not exhaustive, and activities such as biological research which would benefit all sectors was not included as the FOB was not captured.

The FRDC has invested in a number of RD&E projects during 2010/2011 which benefit the recreational fishing community (Table 1).

Table 1 Projects funded by the FRDC in 2010/11 which are relevant to the recreational sector

Project No.	Project Title
2010/309	Extension and Adoption - Climate Change Effects on Fish and Fisheries - Forecasting Impacts, Assessing Ecosystem Responses, and Evaluating Management Strategies
2010/050	A regional socioeconomic evaluation of gamefishing in eastern Australia
2010/211	Recfishing Research - addressing recreational fishing research priorities and improving extension
2010/007	Utilising innovative technology to better understand Spanish mackerel spawning aggregations and the protection offered by marine protected areas

2010/004	Passive acoustic techniques to monitor aggregations of sound producing fish species
2010/040	Developing and testing social objectives for fisheries management
2010/038	Improving the cost effectiveness of displaced fishing effort adjustment programmes using ex post socio-economic impact analysis
2009/333	Tactical Research Fund - Review and extension of conservation and sustainability-focused initiatives which have been funded, supported or undertaken by Australia's recreational fishing sector
2009/094	Tactical Research Fund - topping up the 'Crystal Bowl' for Barramundi
2009/060	Tactical Research Fund - enhanced Murray cod recreational fisheries outcomes across the Murray-Darling Basin through improved collaboration and alignment of management and research activities
2009/040	Fish stocking programs - assessing the benefits against potential long term genetic and ecological impacts
2009/031	Taking female mud crabs (*Scylla serrata*) - assessment of risks and benefits

A number of FRDC projects relevant to recreational fishing which were also completed during 2010/11 (Table 2). Associated reports are now available from www.frdc.com.au:

Table 2 FRDC-funded projects of relevance to the recreational sector which were completed during 2010/11

Project No.	Project Title
2009/314	Strengthening partnerships and relationships within the recreational fishing sector
2009/312	Educating though Escape with ET
2009/214	Sector Overview: National Fisheries and Aquaculture RD&E Framework
2008/353	Tactical Research Fund: Australian Society for Fish Biology 2009 Workshop: Biodiversity of aquatic ecosystems – What to measure and monitor for fisheries and ecosystem management.
2008/348	Sponsorship of 13th International Echinoderm Conference
2008/336	2nd biennial national recreational fishing conference, 2008 recreational fishing awards ceremony and 2nd Recfishing Research national workshop.
2008/319	Tactical Research Fund: Recreational fishing industry bursary and study tour to United States
2008/314	People Development Program: FRDC international travel bursaries
2008/312	Fostering a partnership between FRDC and MDCA to improve communication of research to the community
2008/301	Australian society for fish biology annual national workshop 2008: assessment of recreational fisheries - current strategies, challenges and future directions
2008/215	Tactical Response Fund: Implementation of the NEATFish environmental standard for recreational fishing tournaments
2008/103	Tactical Research Fund: Adapting to change - minimising uncertainty about the effects of rapidly-changing environmental conditions on the Queensland Coral Reef Fin Fish Fishery
2008/058	Tactical Research Fund: Biology, fisheries and status of longtail tuna (Thunnus tonggol), with special reference to recreational fisheries in Australian waters
2008/057	Geelong revisited: from ESD to EBFM – future directions for fisheries management.
2008/042	Tactical Research Fund: Development of a plan to address national needs for recreational fishing data for fisheries management and development
2008/033	Development of an agent-based model to communicate implications of recruitment variability of finfish to recreational fishers
2008/006	Exploration of the effectiveness of alternative management responses to variable recruitment
2007/304	Empowering stakeholders to initiate and advance R&D projects in the seafood industry

2007/227	Recfishing Research: National Strategy for Recreational Fisheries Research, Development and Extension
2007/225	Aquatic Animal Health Subprogram: Metazoan parasite survey of selected macro-inshore fish of southeastern Australia, including species of commercial importance
2007/064	Tactical Research Fund: Developing an analytical module for large-scale recreational fishery data based on phone/diary survey methodology
2007/058	Strategic revenue options for the recreational fishing sector
2007/057	Towards responsible native fish stocking: Identifying management concerns and appropriate research methodologies
2007/053	Regional impact assessment for the Moreton Bay Marine Park
2007/048	Towards evaluating the socio-economic impacts of changes to Queensland's inshore fishery management
2007/033	Development of a DNA based aging technique for use in fisheries assessments
2007/029	Spatial management of garfish in SA - stock structure and adult movement
2007/016	Development of national guidelines to improve the application of risk-based methods in the scope, implementation and interpretation of stock assessments for data-poor species
2007/014	Developing innovative and cost-effective tools for monitoring recreational fishing in Commonwealth fisheries
2006/311	Science and Innovation Awards for Young People
2006/053	Sustainability of recreational fisheries for Murray cod in the Murray Darling Basin
2006/046	Effects of environmental variability on recruitment to fisheries in South Australia
2006/044	Implications of environmental change and mortality estimates for sustaining fish populations in south coast estuaries
2006/038	Evaluating how food webs and the fisheries they support are affected by fishing closures in Jurien Bay, temperate Western Australia
2005/072	Water use across a catchment and effects on estuarine health and productivity
2005/063	Development of an ecosystem approach to the monitoring and management of Western Australian fisheries
2005/061	Gear interaction of non-targeted species in the Lakes and Coorong commercial and recreational fisheries of South Australia
2005/036	A preliminary study of the dynamics of recreational fishing in the western rock lobster fishery for use in integrated fisheries management
2005/011	Development of Field Implemented Fillet Identification (FIFI) for coral reef fin fish
2004/315	RecFish Funding Review
2004/091	Aquatic Animal Health Subprogram: further research and laboratory trials for diagnostic tests for the detection of A invadans (EUS) and A astaci (Crayfish Plague)
2004/045	Relationships between fish faunas and habitat type in south-western Australian estuaries
2004/042	Determination of a cost effective methodology for ongoing age monitoring needed for the management of finfish fisheries in Western Australia
2004/013	Towards integrated multi-species management of Australia's SE reef fisheries: A Tasmanian example
2004/002	Spatial management of reef fisheries and ecosystems: understanding the importance of movement
2003/074	National Strategy for the Survival of Released Line Caught Fish: survival of snapper and bream released by recreational fishers in sheltered coastal temperate ecosystems
2003/052	Spatial scales of exploitation among populations of demersal scalefish: implications for wetline management
2003/047	Evaluation of methods of obtaining annual catch estimates for individual Victorian bay and inlet recreational fisheries
2003/041	Estimation of natural and fishing mortality using length composition data
2003/019	National Strategy for the Survival of Released Line Caught Fish: investigating survival of fish released in Australia's tropical and subtropical line fisheries

2002/059	Developing fishery-independent surveys for the adaptive management of NSW's estuarine fisheries
2001/069	Compliance program evaluation and optimisation in commercial and recreational Western Australian fisheries
2001/029	Studies of the growth and mortality of school prawns
2001/020	Modelling multi species targeting of fishing effort in the Queensland Coral Reef Finfish Fishery
2000/311	Development of research methodology and quantitative skills for integrated fisheries management in WA
2000/194	Maximising survival of released undersize west coast reef fish

During 2010/11 Recfishing Research sought to enhance R&D extension through the appointment of a part-time Extension Manager. This new role will play a valued role in helping fishers to discover more about interesting and relevant research projects and initiatives going on around Australia.

Funds collected through State recreational fishing licences continue to stimulate development of the recreational fishing sector, particularly in areas including:

- installation of artificial reefs and FADs to increase productivity/available of fish;
- education/extension to increase fisher participation and use of best practices;
- improvement of fisher access and facilities;
- protection and rehabilitation of aquatic habitats;
- research and monitoring into fishery sustainability and handling practices;
- monitoring of benefits derived through fishery enhancement programs; and
- Understanding social and attitudinal and economic traits of recreational fishers.

Western Australia also introduced a new boat-based licence for recreational fishers in 2009/10, enabling continued self-funded development of the recreational fishing industry.

In 2010/11 the establishment of artificial reefs around Australia gained momentum with new development projects proposed as offsets for losses in fishing access through marine protected areas in Moreton Bay, and through mining developments in NT and WA. In 2011 a series of workshops to review the latest developments were held around Australia as part of FRDC Tactical Research Fund project 2010/400 "Artificial Reefs - Design and Monitoring Standards Workshops".

Who is Recfishing Research?

Recfishing Research was established in 2005, with the primary objective of helping to improve investment and the return on investment derived from RD&E activities which benefit the recreational fishing sector at a national scale. Recfishing Research is managed by Infofish Australia on behalf of Recfish Australia and the FRDC.

The Recfishing Research Steering Committee is comprised of 14 representatives offering expertise in a range of disciplines relevant to recreational fishing including biological, economic and social research, knowledge extension, and fisheries management. Collectively, this group provides strategic guidance to Recfishing Research.

Our Business Plan

A key function performed by Recfishing Research in pursuit of its primary objective is the collaborative development and communication of RD&E priorities held by the collective recreational fishing community. Recfishing Research also works closely with researchers, funding bodies and end-users to ensure these priorities are addressed and outputs are adopted.

Recfishing Research maintains an annual Business Plan[1] which identifies key national RD&E priorities. The Business Plan identifies five strategic challenges facing the recreational fishing sector in Australia:

Strategic Challenges

1. Ensuring the sustainability of fisheries resources;
2. Ensuring that the social, health and economic benefits of recreational fishing are recognised and valued by communities and governments, and considered in decisions that affect recreational fishing;
3. Improving the engagement of the recreational fishing sector with governments, other fisheries stakeholders, and organisations that can impact on recreational fishing;
4. Protecting and improving recreational fishing opportunities;
5. Improving the adaptive capacity of the recreational fishing sector in the face of environmental (eg climate change, diminishing resources) and social change.

Seven national RD&E priorities are then described for the recreational fishing sector which address one or more of the abovementioned strategic challenges:

National Priorities

- Quantifying the social and economic benefits of recreational fishing;
- Building capacity in the recreational fishing sector;
- Maintaining recreational fishing statistics;
- Developing and promoting best practices in recreational fishing;
- Understanding the impacts of management measures;
- Enhancing recreational fisheries;
- Understanding the impacts of environmental and climate change.

[1] Available at www.recfishingresearch.org

Underpinning these RD&E priorities is the need to improve the communication and uptake of research and development results among governments, fishing organisations, recreational fishers and the wider community.

The desired outcomes which are being pursued through delivery of R&D which relate to the abovementioned priority areas and adoption of relevant outputs by end-users are as follows:

Desired Outcomes

- Increased fishing participation across all demographic groups;
- Increased social and economic value of recreational fishing;
- Improved sustainability and quality of recreational fishing;
- Improved access to fisheries, fishing locations and fish resources;
- Increased involvement of recreational fishers in natural resources management decisions that affect them;
- Increased use of best practices in all aspects of recreational fishing;
- Development of the skills and leadership needed within the recreational sector to guide recreational fishing into the future.

Recfishing Research's 2010/11 Status Report

The purpose of this Status Report - the second prepared by Recfishing Research to date - is to provide a summary of progress made with respect to addressing the abovementioned national RD&E priorities. Progress against each national priority is described using the following template:

Title of Relevant Research, Development or Extension Priority

Desired Outcome: Explains the result we are seeking

Significance of Issue: Describes why the issue is important

Priority Areas for Investment: Advises where attention should be focused

Current Status: Summarises what is currently happening in relation to the issue

New Projects in 2010/11: Highlights recently approved projects that have commenced or projects being developed

Recent Reports and Scientific Publications: Lists new relevant reports and publications in 2010/11

Projects currently being monitored by Recfishing Research: Lists projects that are currently underway that are being monitored by Recfishing Research

NOTE: In this status report priorities that have recently been, or are currently being addressed are shown in **black bold**. Priorities for 2011/12 are shown in **red bold**.

Quantifying the Social and Economic Benefits of Fishing

Desired Outcome:

Communities and governments recognise and value the social, health and economic benefits of recreational fishing, and consider these in decisions which may affect recreational fishing.

Significance of Issue:

The social and economic benefits associated with recreational fishing in Australia are generally not well understood by decision makers and the broader community. This can make it difficult for recreational fishing bodies and recreational fishers to argue the importance of their sector in resource allocation forums, including discussions regarding potential reallocation of resources to non fishing interests through processes such as the declaration of Marine Protected Areas.

The potential benefits of recreational fishing with respect to physical and psychological health and well-being at both an individual, family and community level are also poorly understood, and under-appreciated. There is a need to gather robust data on the social importance of recreational fishing in terms of human health benefits, its role as an alternative in dealing with anti-social behaviour, and influence on social well-being within the community. This will require developing an understanding of levels of participation in fishing, reasons that people go fishing, and the attitudes, preferences and practices of anglers. It will also require detailed comparison of the level of mental and physical health enjoyed by anglers, and social skills they possess, compared to that of other groups within the community.

There is also a need to gather robust data on the economic importance of recreational fishing in Australia. This will require development of a detailed understanding of the contribution that recreational fishing makes to the national economy, both through expenditure (e.g. tackle and boat sales, license revenue, international and domestic tourism), and job generation. It has been estimated that there are 90,000 jobs supported by recreational fishing compared with around 16,000 jobs in commercial fishing, hunting, trapping and aquaculture in 2006.[2]

Priority Areas for Investment:

- Measuring the social benefits of recreation fishing and fish stocking, especially to regional communities;
- **Understand the health and well-being benefits of recreational fishing;**
- **Understand why people stop fishing or are constrained from taking up fishing;**
- **Improving fisher's behaviour in relation to best practices;**
- Making recreational fishing attractive;
- **Non-participants' perceptions of recreational fishing.**

[2] ABARE-ABS 2010: Australian fisheries statistics 2009: Canberra

The following are current priorities for investment in the economic benefits of recreational fishing:

- **Measuring the economic value of recreational fishing at a national level;**
- Measuring the economic value of recreation fishing and fish stocking, especially to regional communities;
- Measuring the number of people employed in the recreational fishing industry.

Current Status:

Despite a general poor knowledge of social and economic benefits of fishing, there are a small number of projects underway or recently completed around Australia in this area. The Institute for Marine and Antarctic Studies (IMAS) released a report in 2010 examining the motivations, attitudes and awareness of Tasmanian recreational fishers. This study also examined reasons why anglers fish less often. Time demands associated with work was noted as the most prominent issue. IMAS also released a report in 2010 assessing the socio-economics of the Tasmanian Recreational Rock Lobster Fishery.

James Cook University are undertaking a number of relevant projects addressing issues primarily related to the Great Barrier Reef. Recfishing Research has been active in assisting James Cook University in the development of these projects. One example is a current study entitled "Social assessment of recreational fishing in the Great Barrier Reef region" by Dr Steven Sutton and his colleagues, which is examining the social and family benefits of fishing, and anglers' attitudes toward conservation, catch-and-release, fish consumption, and fisheries and Marine Park management. This information will give anglers a voice in how they feel recreational fisheries should be managed.

A survey of recreational fishers was undertaken in South Australia during 2007/08 which examined who was fishing, what they were fishing for, where they were fishing, and what they caught. Results can be found here.

A project was also initiated to underpin the RFIDS in 2010/11 by Curtin University to collate information relating to research activities and programs which have been undertaken in Australia on the health and well-being benefits of recreational fishing, to identify future research priorities in this area.

New Projects in 2010/11:

Victoria's peak body VRFish is undertaking an economic study of recreational fishing in Victoria, focussing on Murray cod with funding from the Victorian Recreational Fishing License Trust. The survey estimated the economic impact of Murray Cod recreational fishing in Victoria for 2009-10 is estimated to be:

- $166.7 million in direct expenditure;
- $59.0 million in contribution to GSP; and
- 374 jobs.

A statewide survey of recreational fishers is currently underway in Queensland to collect accurate information on participation rates among various subgroups (e.g. age, gender, area of residence), the regions where people fish and the species people catch. This study will also be collecting other data to help understand the recreational fishing industry, including information on boat ownership and fishing club ownership, and gauging fishers' awareness and opinions on fisheries-related issues.

FRDC project 2011/017
"Identifying the health and well-being benefits of recreational fishing"
Curtin University: Alexander McManus A.McManus@curtin.edu.au
Timeframe: June 2011 - November 2011

Recent Reports and Scientific Publications:

The following is a list of reports and scientific publications that have been published since 2009. The list may not be complete due to the difficulty in identifying and locating the relevant material.

Frijlink S. & Lyle J.M. (2010) *Social and Attitudinal Assessment of Recreational Fishers in Tasmania*. Tasmanian Aquaculture and Fisheries Institute: Fishwise Community Grants Program TAFI report

Frijlink S. & Lyle J.M. (2010) *A Socio-Economic Assessment of the Tasmanian Recreational Rock Lobster Fishery*. Tasmanian Aquaculture and Fisheries Institute: Fishwise Community Grants Program TAFI report

Tobin, R.C., Sutton, S.G., and Penny, A.L. (2010) *Towards Evaluating the Socio-economic Impacts of Changes to Queensland's Inshore Fishery Management.* Report. Fishing and Fisheries Research Centre, Townsville, QLD, Australia.

Ernst and Young (2009) *Economic study of recreational fishing in Victoria* Consultant report

Sutton, Stephen G., and Tobin, Renae C. (2009) *Recreational fishers' attitudes towards the 2004 rezoning of the Great Barrier Reef Marine Park*. Environmental Conservation, 36 (3). pp. 245-252. ISSN 1469-4387

Sutton, Stephen G., Dew, Kara, and Higgs, Jim (2009) *Why do people drop out of recreational fishing? a study of lapsed fishers from Queensland, Australia*. Fisheries, 34 (9). pp. 443-452. ISSN 1548-8446

Projects Currently being monitored by Recfishing Research

Recfishing Research is currently monitoring a number of research projects and initiatives which relate to this topic. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers. Recfishing Research will continue to provide updates to its network through regular e-newsletters and other means.

FRDC project 2009/041
"Fisheries Social Science Research Coordination Program"
KAL Analysis Pty Ltd: Kate Brooks kate@kalanalysis.com.au
Timeframe: July 2009 - February 2012

FRDC project 2008/306
"Building economic capability to improve the management of marine resources in Australia"
University of Tasmania: Sarah Jennings sarah.jennings@utas.edu.au
Timeframe: July 2008 - June 2013

FRDC project 2010/050
"A regional socioeconomic evaluation of gamefishing in eastern Australia"
ABARES: Peter Ward Peter.Ward@abares.gov.au
Timeframe: 2010 - December 2011

Source: Matt Daniels

Building Capacity within the Recreational Fishing Sector

Desired Outcome:

The recreational fishing sector has the leadership, capability and resources to research and advocate its views effectively in decision-making forums.

Significance of Issue:

The current cohort of leaders within the Australian recreational fishing sector is ageing, and there is a need to attract 'young blood' to represent their industry into the future. Whilst many peak bodies and representative groups have recognised this as an issue through the implementation of succession plans, there has generally been limited success in attracting involvement from younger, highly skilled individuals. There is a clear need to develop leadership skills within younger fishers in order to facilitate effective and progressive generational change. Equally, there is a need to continue to develop the mentoring skills of older fishers to support the transfer of knowledge to our future young future leaders.

The recreational fishing industry also needs to develop an internal capacity to undertake its own research into issues which are identified as industry priorities. Many issues viewed as important by the recreational fishing community are not seen as priorities for government or research organisations and are not funded or delivered through those traditional pathways. Building capacity within the fishing community to identify priorities, and develop and deliver projects which address them will be critical to the progressive development of our sector.

Priority Areas for Investment:

The following are current priorities which relate to building capacity in the recreational fishing sector:

- **Programs aimed at developing the leadership skills of future fishers**;
- **Programs aimed at developing the mentoring skills of older fishers**;
- Harnessing the resources of recreational fishing organisations and social fishing networks;
- **Increasing sector capacity to undertake research particularly in relation to social and economic research.**

Current Status:

A number of leadership programs have been implemented in recent years to address the current capacity shortage within Australia's recreational fishing industry. Recfish Australia delivered a project to generate the "*Next Generation of Leaders*" in the Northern Territory in 2007. A Western Australian program entitled the "*Young Future Leaders in Recreational Fishing*" was also completed in 2008 with funding from the Recreational Fishing Community Grants Program. New South Wales have also delivered their own leadership program, "*Young Leaders supporting the Future of Recreational Fishing*" which was completed in 2009 with funded from the Recreational Fishing Community Grants Program.

Some of the participants in the abovementioned programs have already taken up leadership positions or positions which may lead to leadership roles.

A project which seeks to expand the development of leaders is currently underway with funding through the RFIDS. Titled "*Future Leaders in Recreational Fishing*", the project involves development of a national leadership development framework, with a workshop held for WA/NT in March 2011 and workshops planned for NSW/Qld (November 2011) and Tas/Vic/SA (March 2012).

A second project funded through the RFIDS to facilitate industry capacity and leadership will be the Australian National Recreational Fishing Conference to be held in 2012 with a focus on the future of recreational fishing in Australia.

In addition to building the capacity of individuals and bodies within the fishing community, there is also a need to continue to work with industry researchers to develop their capacity to undertake RD&E projects, and enhance their competitiveness in pursuing RD&E contracts. Recfishing Research will continue to work with industry researchers who can address the national priorities identified for the recreational sector, and facilitate the development of projects in order to improve the quality and success rate of applications. Emphasis will continue to be placed upon bringing industry, fisheries managers, researchers and recreational fishers together to develop collaborative projects which address priority issues while building industry's skills base.

The FRDC has recently funded two projects which will help to build both economic and social research capacity of the recreational sector in Australia. The FRDC's Social Sciences Research Coordination Program has identified the issues and key research priorities for social science in relation to fisheries which are available at www.frdc.com.au/social. The FRDC is also investing in developing skills for economists who wish to work in the area of marine resources and fisheries, through a consortium led by the University of Tasmania, to address an identified lack of economic research capacity in Australia.

Fishers themselves are progressively becoming more involved in research and monitoring activities around Australia, particularly through research angler diary programs, involvement in hooking trials and tagging programs. Examples include the Angler Diary Program in Victoria, Gamefish Tagging Program in NSW, Suntag in Queensland and Westag in Western Australia, to name a few. Fishers are also progressively expanding into monitoring and assessment to evaluate the impacts and effectiveness of management changes through initiatives such as the CapReef Program in Queensland.

In addition to the abovementioned initiatives to build capacity within the recreational sector, Recfishing Research has also created a position on its steering committee for a younger fisher, to provide them with exposure to research prioritisation, management and extension processes.

New Projects in 2010/11:

The following are new projects funded in 2010/11.

FRDC project 2011/403
"Future Leaders in Recreational Fishing"

Recfishwest: Kane Moyle kane@recfishwest.org.au
Timeframe: March 2011 - June 2012

FRDC project 2011/502
"Australian National Recreational Fishing Conference 2012"
Australian Fishing Trade Association and Recfish Australia: Doug Joyner tackletrade@optusnet.com.au

FRDC project 2011/230
"Tactical Research Fund: Identifying indigenous business opportunities in the recreational fishing tourism industry on Cape York peninsula"
BarraDave Sportfishing Services: Dave Donald barradave@gmail.com
Timeframe: July 2011 to February 2012

Recent Reports and Scientific Publications:

The following is a list of reports and scientific publications published since 2009. The list may not be complete due to the difficulty in identifying and locating the relevant material.

Sawynok, W. Winstanley, R. and Olyott, L. (2010) 2007/227 - *National Strategy for Recreational Fisheries Research, Development and Extension* FRDC final report

L. Olyott and D. Joyner (2009) 2009/314 - *Strengthening partnerships and relationships within the recreational fishing sector* FRDC final report

Projects currently being monitored by Recfishing Research

The following is a list of projects which are currently underway that Recfishing Research is monitoring. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers. Recfishing Research will continue to provide updates to its network through regular e-newsletters and other means.

FRDC Peter Dundas-Smith scholarship program
This provides a scholarship to a young leader in the recreational sector every 2 years.

Australian Rural Leadership Development program
This is open to participation by emerging leaders in the recreational fishing industry.

FRDC project 2009/300
"Empowering Industry R&D: Developing an industry driven R&D model for the Australian fishing and seafood industry"
Fishwell Consulting: Ian Knuckey
Timeframe: July 2009 - June 2012

Maintaining Recreational Fishing Statistics

Desired Outcome:

Data on attitudes, motivation, demographics, participation, fishing methods, catch and effort are available at state and national levels to assist decision making on recreational fishing.

Significance of Issue:

The 2000 National Survey of Recreational Fishing produced the first national snapshot of recreational fishing in Australia, including information on participation, fishing effort, catch, expenditure, attitudes and awareness. Whilst information collected through the national survey is still widely used, it is now out of date. A number of attempts to initiate a follow-up national survey have been unsuccessful.

The collection of basic statistics on recreational fishing (catch, participation, expenditure etc) is essential to ensure that recreational fisheries continue to be sustainably managed. It is also critical to enable recreational fishing bodies to engage objectively in debates on national issues such as Government fisheries policy development, increasing funding for recreational fishing, recreational fishers' rights and resource allocation. Continuing to improve our understanding of recreational catches will continue to become increasingly important in the assessment of fish stocks and evaluating the performance of fisheries management arrangements as participation in recreational fishing grows and fishing efficiency continues to increase.

Priority Areas for Investment:

The following are the priorities for investment in statistics on recreational fishing:

- **Recreational catch of high priority species, particularly Southern Bluefin Tuna, Striped Marlin and Pelagic Sharks;**
- **Methodology and tools for access and analysis of data collected across jurisdictions;**
- **Catch and effort of recreational fishers in key fisheries;**
- **Participation in recreational fishing;**
- **Demographics of recreational fishers;**
- **A national register of recreational fishers.**

Current Status:

In the last few years a number of States including South Australia, Tasmania, Victoria, the Northern Territory and Queensland have initiated their own surveys using the same or similar methodology to that used in the national survey. Regional surveys are also being undertaken in Western Australia and fishery-specific surveys are being conducted in Western Australia and NSW.

Surveys are now complete in Tasmania and South Australia. Amongst the main findings of the Tasmanian survey:

- More than one in four Tasmanians (over 118 000 people) went fishing at least once in 2007.

- 1.07 million flathead (or 293 tonnes) were kept and 745 000 (41%) were released by Tasmanian recreational fishers. Other important species were Australian salmon (110 000) and flounder (32 000).
- Over half the state's total fishing effort (54%) occurred off the east and south-east coasts.

Key findings of the South Australian survey include:

- Approximately 16.2% of the South Australian population went fishing at least once in the year prior to October 2007.
- 97% of fishing effort occurred in marine waters, including estuaries, inshore and offshore waters.
- A total of 98 individual species or species groups were caught during 2007/08, translating to over 6.5 million marine finfish, 3.3 million marine shellfish (crustaceans, molluscs) and almost 400 000 freshwater fish/yabbies.
- The release rates varied considerably with the different species, ranging from very high rates (> 70%) for Mulloway, Snapper and Murray Cod, to very low rates (< 10%) for Southern Calamari.

A project was recently initiated under the RFIDS to develop a process for aggregation of data collected within each State and territory, to provide a national picture of recreational catch and participation.

A project has also recently commenced with funding from FRDC to develop an integrated Fisheries Stakeholder Database, which will collate contact details for individuals within the fishing industry (including the recreational, indigenous and commercial sectors). While this initiative will not produce a register of all Australian anglers, it will provide a comprehensive database of key individuals and bodies (e.g. major angling clubs).

New Projects in 2010/11:

The following are new projects initiated in 2010/11 or are currently being planned.

"Statewide Recreational Boat Fishing Survey"
WA Department of Fisheries: ResearchSurveys@fish.wa.gov.au
Timeframe: January 2011 - September 2012

"Developing a methodology for obtaining regular, statistically robust estimates of recreational and charter fishing catch of Southern Bluefin Tuna in Australian waters"
Department of Agriculture, Fisheries and Forestry and ABARES: Gavin Begg Gavin.Begg@abares.gov.au
Timeframe: December 2012

"Monitoring the recreational take of Shark species in Australia"
Department of Agriculture, Fisheries and Forestry and ABARES: Peter Ward Peter.Ward@abares.gov.au

"Counting the catch – *quantify the recreational catch of Southern Bluefin Tuna in south western Victoria*"
Fisheries Victoria: James Andrews james.andrews@dpi.vic.gov.au Timeframe: 2011 - January 2012

Recent Reports and Scientific Publications:

The following is a list of reports and scientific publications which have been published since 2009. The list may not be complete due to the difficulty in identifying and locating the relevant material.

Smallwood, C.B., Pollock, K.H., Wise, B.S., Hall, N.G. and Gaughan, D.J. (2011) *Quantifying recreational fishing catch and effort: a pilot study of shore-based fishers in the Perth Metropolitan area*.

Ghosn, D., Steffe, A. and Murphy, J. (2010) An assessment of the effort and catch of shore-based and boat-based recreational fishers in the Sydney Harbour estuary over the 2007/08 summer period. Final report to the NSW Recreational Fishing Trust Fund. Industry & Investment NSW – Fisheries Final Report Series No. 122. Cronulla, NSW, Australia. 60pp

Appleford, P. and Hurst, A. (2009) 2008/042 Tactical Research Fund: *Development of a plan to address national needs for recreational fishing data for fisheries management and development*. FRDC final report

Griffiths, S., Pepperell, J., Tonks, M., Sawynok, W., Olyott, L., Tickell, S., Zischke, M., Lynne, J., Burgess, J., Jones, E., Joyner, D., Makepeace, C. and Moyle, K. (2008). 2008/058 - *Biology, fisheries and status of longtail tuna (Thunnus tonggol), with special reference to recreational fisheries in Australian waters*. FRDC.final report

Griffiths, s., Pepperell, J., Tonks, M., Fay, G., Venables, W., Lyle, J., Olyott, L., Sawynok, W., Edgar, S. 2007/014 (2010). "*Developing innovative and cost-effective tools for monitoring recreational fishing in Commonwealth fisheries*." FRDC final report

Rogers, P.J., Loisier, A. and Ferguson, G. (2010) *Development of an On-site Recreational Fishery Survey for mulloway Argyrosomus japonicas (Sciaenidae) in the Yalata Indigenous Protected Area*. South Australian Research and Development Institute, Report Series No. 483. 32pp.

Lyle, J.M, Wotherspoon, S. and Stark, K. (2010) 2007/064 "*Tactical Research Fund: Developing an analytical model for large-scale recreational fishery data based on a phone/diary survey methodology*". FRDC final report

Jones, K. (2009) South Australian Recreational Fishing Survey. PIRSA Fisheries, Adelaide, 84 pp. South Australian Fisheries Management Series Paper No 54.

Lyle, J.M., Tracey, S.R., Stark, K.E. & Wotherspoon, S. (2009). "*2007-08 Survey of Recreational Fishing In Tasmania*". Fishwise Community Grants.

Knight, M (2009). *The South Australian Recreational Charter Boat Fishery Report 2009*. South Australian Research and Development Institute, Adelaide. 46p.

FRDC project 2007/014 "*Developing innovative and cost-effective tools for monitoring recreational fishing in Commonwealth fisheries*."

K.L. Ryan, A.K. Morison, S. Conron (2009). 2003/047 - *Evaluation of methods of obtaining annual catch estimates for individual Victorian bay and inlet recreational fisheries*. FRDC final report

Australian Underwater Federation (2009) *The Great Australian Shark Count*

Gray, C.A., Scandol, J.P., Steffe, A.S. and Ferrell, D.J. (2009). 2008/301 - Australian society for fish biology annual national workshop 2008: *assessment of recreational fisheries - current strategies, challenges and future directions*. FRDC final report

Steffe A (2008) Preliminary results of the surveys of recreational anglers and spearfishers in the Greater Sydney region from March 2007 to February 2008 inclusive.

Projects currently being monitored by Recfishing Research

The following is a list of projects which are currently underway that Recfishing Research is monitoring. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers. Recfishing Research will continue to provide updates to its network through regular e-newsletters and other means.

State surveys are ongoing in Queensland and the Northern Territory using similar methodology to that used in the 2000 national survey. Regional surveys are also being undertaken in Western Australia and fishery-specific surveys are being conducted in Western Australia and NSW.

FRDC project 2008/005
"New and innovative approaches to monitoring small-scale recreational fisheries"
Fisheries Victoria: Daniel Grixti Daniel.Grixti@dpi.vic.gov.au
Timeframe: July 2008 - August 2011

FRDC project 2008/004
"Integrating fishery-independent and dependent data for improved sustainability of fisheries resources and other aspects of biodiversity"
NSW Department of Primary Industries: Dr D Rotherham
Timeframe: July 2008 - October 2011

"Monitoring and research of landed fish and game fishing tournaments"
NSW Saltwater Recreational Fishing Trust: Julian Pepperell
Timeframe: 2008/09 – 2010/11

FRDC project 2005/034
"Determination of cost-effective techniques to monitor recreational catch and effort in Western Australian demersal finfish fisheries"
WA Fisheries: Rick Fletcher Rick.Fletcher@fish.wa.gov.au
Timeframe: June 2005 - June 2010

Monitoring of Gamefish and Australian bass fisheries in NSW via competition-based angling.
NSW DPI: Ms Danielle Ghosn danielle.ghosn@dpi.nsw.gov.au
Timeframe: 2007-2009

Steffe A (2008) Preliminary results of the surveys of recreational anglers and spearfishers in the Greater Sydney region from March 2007 to February 2008 inclusive

Source: Matt Daniels

Best Practices in Recreational Fishing

Desired Outcome:

Ensure that Recreational fishing practices are sustainable, ethical and humane.

Significance of Issue:

Fish welfare is a growing concern among animal rights groups and many within the broader community. Maximising the survival of released fish is an issue of increasing prominence as an ever growing proportion of the recreational catch is released due to more stringent regulations and increasing voluntary release of fish. There is also a need to ensure that best practices are utilised by anglers in dispatching fish intended for the table. Fishing competitions are coming under increased scrutiny from environmental groups, animal rights groups and some within the broader community.

It is critical that fishers adopt best practices in their fishing and particularly when handling fish, to minimise and where possible eliminate environmental disturbance and/or stress to fish. Recreational fishing is a pastime regularly re-shaped by innovation, and consequently best practice is constantly evolving as new technology and techniques emerge. As a result there is a need to clearly define and regularly re-visit best practices which should be used by recreational fishers, and seek continual improvement in the ways that we communicate relevant messages about correct fishing and fish handling practices to anglers. As a first point of contact with recreational fishing for many, and a place of education for experienced fishers, there is also a need to ensure that best practices are extended to and adopted by charter and guided fishing operators as well.

Priority Areas for Investment:

The priorities relating to best practices in releasing fish are the extension of information promoting best practices (see improving extension). There has been considerable research in this area and significant new knowledge is available. Getting this information into recreational fisher networks and to recreational fishers to increase adoption is the current main concern. The key areas for extension are:

- **Best practices in releasing fish;**
- **Best practices in killing fish humanely;**
- **Best practices for fishing competitions;**
- **Best practices in guided and charter fishing;**
- **National Code of Practice for Recreational and Sport Fishing.**

Priorities relating to best practices in releasing fish are as follows:

- **Promotion and extension of best practices for the release of line-caught fish;**
- **Survival rates of released high priority species, particularly Southern Bluefin Tuna, Striped Marlin and Pelagic Sharks;**

- **Species highly susceptible to barotrauma eg Tuskfish species and deep water Black Jewfish and Teraglin;**
- **Reduction of mortality from deep hooking;**
- **Factors affecting the survival of large catch-and-release iconic fish, eg Murray Cod and Mulloway.**

Other research priorities relating to best practices are:

- **The development of environmentally friendly tackle (eg alternatives to lead sinkers, biodegradable fishing line);**
- Understanding the process whereby new practices are taken up by individual fishers and the fishing community, and identifying and removing constraints on the uptake of best practices.

Current Status:

FRDC initiated the Released Fish Survival Program to provide advice on research priorities relating to maximising the survival of released fish, and enhancing outcomes of this research through extension of results. The Released Fish Survival Program commenced in 2002/03 and concluded in 2007/08. During that time a total of $7.3m was invested in twenty research projects relating to survival of released fish (of which the FRDC invested $2.4m). Survival rates were known for four species when the strategy was initially commenced, and following its conclusion this number had increased to twenty one species. Since then survival rates have been determined for an additional six species, bringing the tally to 27 species. Research on the survival of released fish continues to be monitored by Recfishing Research however because of the large body of work now complete in this area it is no longer considered to be among the highest national priorities. However, there is still a need to continue to increase adoption of best practice in releasing fish among the broader angling community, and consequently communication of the findings of this research remains a high priority for Recfishing Research.

Research has been completed on Mulloway, Black Jewfish and Murray Cod, Australian Bass, Murray cod, Golden Perch, Sand Mullet, Yellowtail Kingfish, Eastern Sea Garfish and Mud Crab. Work is currently underway on freshwater catfish, Pearl Perch, Teraglin, Blue Swimmer Crabs and Rock Lobster.

Figure 2 summarises the survival rates obtained for Australian species from research undertaken. Species shown in yellow and blue are reef species which will often show the symptoms of barotrauma when caught from depths greater than 15-20m. It should be noted that the design of these studies differs widely, which can influence results obtained, however survival rates obtained are considered to be a reliable estimate.

Continued extension of material on best practices for recreational fishing has been a key activity during 2010/11(see Improve Extension to Recreational Fishers).

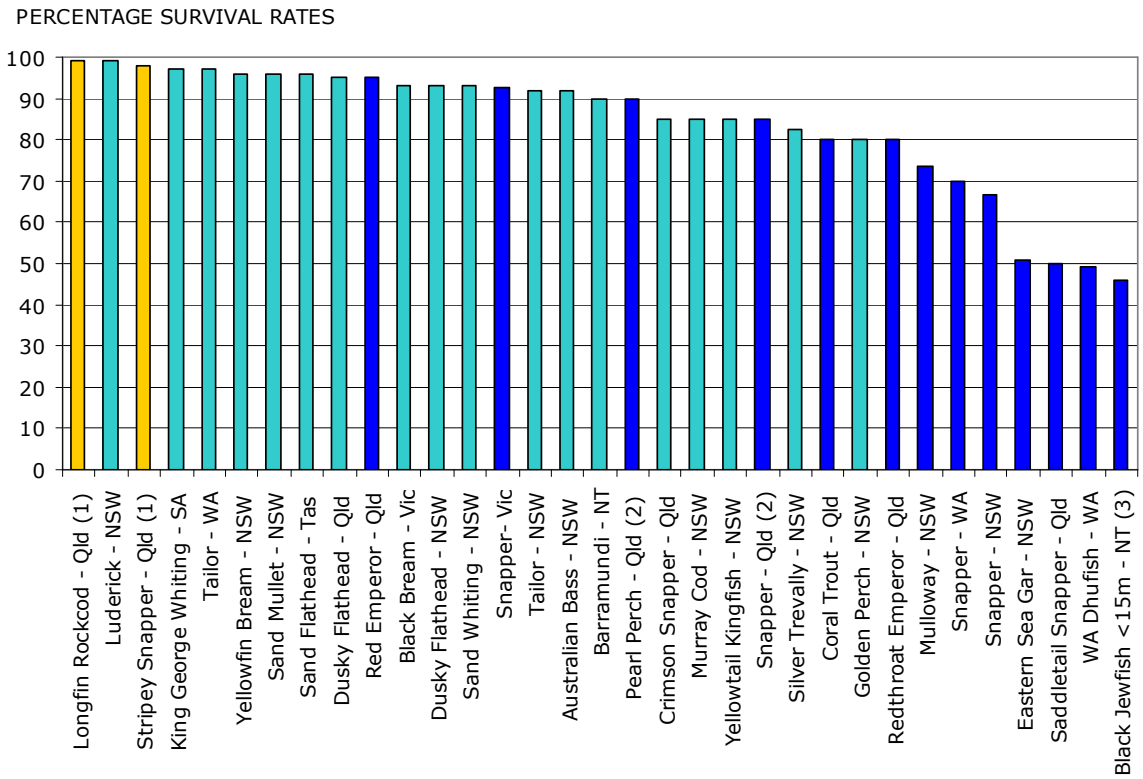

Figure 2 Survival rates of key species obtained from research throughout Australia

PLEASE NOTE:

(1) Results for survival rates of reef species are based on fish caught in shallow water <10m, however many of these species are caught in deep water

(2) These results are preliminary as the work is still in progress and the final results may be different

(3) The research indicates that the survival rate for fish from greater than 15m was near zero

Recfish Australia developed the National Environmental Assessment for Tournament Fishing (NEATFish) to International Standard ISO17050 for the assessment of recreational fishing competitions. NEATFish is managed by Digsfish Services and the assessment process is available online at www.neatfish.com. The assessment process results in a 1-5 star rating based on points scored in the areas of environmental, social, economic and risk management issues.

Recfish Australia has produced a National Code of Practice for Recreational and Sport Fishing. Individual codes of practice which deal with key elements discussed within the National Code of Practice have also been developed in a number of State including Victoria, Tasmania, Western Australia and New South Wales (for fishing competitions).

The Professional Fishing Instructors and Guides Association (PFIGA), and several State-based industry associations such as the NT Guided Fishing Industry Association (NTGFIA) are also currently revitalising their Codes of Conduct for their members as a pre-requisite for accreditation for tourism.

The tackle industry is taking the lead on developing more environmentally friendly fishing tackle. Biodegradable soft plastic lures, alternatives to lead sinkers and biodegradable fishing line are among the range of products now available to fishers, with more in development as consumer demand for environmentally friendly tackle options grows.

Biodegradable line has proven to be a particularly useful product in reducing environmental impacts of fishing. Despite trials proving the industry leading brand of biodegradable line's capacity to biodegrade quickly in a composting environment, testing undertaken by the Australian National Sportfishing Association (ANSA) in 2009 demonstrated a reduction in breaking strain of only 3.7 percent after 12 months of exposure to the sun, wind and rain.

New Projects in 2010/11:

Digsfish Services and Future Fisheries Veterinary Services have commenced a project with funding through the Department of Agriculture Fisheries and Forestry's Animal Welfare Program to develop resources to promote best practice in the humane dispatch of finfish caught by recreational fishers.

Recent Reports and Scientific Publications:

The following is a list of reports and scientific publications which have been published since 2009. The list may not be complete due to the difficulty in identifying and locating the relevant material.

Broadhurst M.K., Butcher P.A., and Cullis B.R. (2011) "*Post-release mortality of angled Sand Mullet (Myxus elongatus: Mugilidae)*". Fisheries Conservation Technology Unit - Industry and Investment NSW. Fisheries Research 107 (2011) 272-275

Robbins, W. & Peddemors, V. (2011) "*Investigating the behavioural response of grey nurse sharks to recreational lures and baited lines*" Cronulla Fisheries Research Centre of Excellence

Fulton, W. (2010) 2006/063 "*Sustainability of recreational fishing for Murray Cod in the Murray Darling Basin*" FRDC final report

Dowling C, Hall KC and Broadhurst MK (2010) "*Immediate fate of angled-and-released Australian bass Macquaria novemaculeata*" Hydrobiologia, 641(1): 145-157

Butcher P.A., Broadhurst M.K., Orchard B.A. and Ellis M.T. (2010) *Using biotelemetry to assess the fate of yellowfin bream (Acanthopagrus australis) released with ingested hooks* ICES Journal of Marine Science, 67:1175–1184

Roberts L. W., Butcher P.A., Broadhurst M.K. and Cullis B.R. (2010) "*Using a multi-experimental approach to assess the fate of angled-and-released Yellowtail Kingfish (Seriola lalandi)* Fisheries Conservation Technology Unit - Industry and Investment NSW. ICES Journal of Marine Science

Butcher P.A., Broadhurst M.K., Hall K.C., and Cooke S.J. (2010) "*Post-release survival and physiology of angled Luderick (Girella tricuspidata) after confinement in keeper nets in an Australian estuary*". Fisheries Conservation Technology Unit - Industry and Investment NSW ICES Journal of Marine Science

Diggles BK (2010) Draft Risk Analysis. *Hazard identification - aquatic animal diseases associated with domestic bait translocation*. Draft prepared for the Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, FRDC Project No. 2009/072. 119 pgs. Report available from Digsfish Services

Hall KC**,** Broadhurst MK, Butcher PA and Rowland SJ (2009) *Effects of angling on post-release mortality, gonadal development and somatic condition of Australian bass Macquaria novemaculeata* *Journal of Fish Biology* 75: 2737-2755.

Butcher PA, Broadhurst MK, Hall KC, Cullis BR and Nicoll RG (2009) *Scale loss and mortality in angled-and-released eastern sea garfish (Hypohamphus australis)* ICES J. Mar. Sci*. (in press).*

Hall KC, Butcher PA and Broadhurst MK (2009). *Short-term mortality of Australian bass, Macquaria novemaculeata, after catch-and-release angling* *Fish. Manage. Ecol*. 16, 235-247

McGrath S, Butcher PA, and Broadhurst MK (2009) *Effects of salinity and anatomical hook location on the mortality and physiological response of angled-and-released sand whiting (Sillago ciliata)* Journal of Fish Biology*,* 74, 220-234

Reynolds D, Broadhurst MK, Butcher PA, and Rolf M (2009) *Effects of angler-induced exercise and air exposure on the mortality of mouth-hooked yellowfin bream (Acanthopagrus australis)*. Journal of Applied Ichthyology*, 25, 100-103.*

Diggles, B. and Olyott, L. (2009). 2008/215 *Tactical Response Fund: Implementation of the NEATFish environmental standard for recreational fishing tournaments* FRDC final report

Robbins, W. and Peddermors, V "*Investigating the behavioural response of grey nurse sharks to recreational lures and baited lines*". NSW DPI.

Poole S, Mayze J, Exley P and Paulo C (2008). 2003/240 - Maximising revenue within the NT mud crab fishery by enhancing post-harvest survival of mud crabs. FRDC final report

Projects Recfishing Research is Monitoring

The following is a list of projects which are currently underway that Recfishing Research is monitoring. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers. Recfishing Research will continue to provide updates to its network through regular e-newsletters and other means.

"*Assessment of barotrauma and its mitigation measures on the behaviour and survival of offshore species in NSW*"

NSW DPI: Dr John Stewart john.stewart@dpi.nsw.gov.au
Timeframe: 2010 - June 2012

"*Maximising the post-release survival of angler-caught native freshwater fish in NSW – Phase 2*"
NSW DPI: Dr Matt Broadhurst and Dr Karina Hall mbroadhurst@nmsc.edu.au
Timeframe: 2009 – December 2012

"*Estimating and maximising the survival of key species released by recreational fishers in NSW – Phase 3*"
NSW DPI. Dr Matt Broadhurst mbroadhurst@nmsc.edu.au
Timeframe: Due for completion March 2011

Source: Matt Daniels

Impacts of Management Measures

Desired Outcome:

Management measures which affect recreational fishers are implemented with maximum engagement of fishers and result in minimum adverse impacts. Recreational fishers' access rights are acknowledged by water, land and biodiversity conservation agencies.

Significance of Issue:

Fish resources in Australia are managed through a variety of management measures which limit how you fish (through implementation of fishing regulations controlling gear able to be used, when and where you are able to fish etc), what you can catch (through species, bag, size limits), and in some cases, who can fish (e.g. through distribution of fishing licenses). Access is also restricted through allocation of resources between user groups; both consumptive users such as recreational, commercial, and indigenous fishers, and non-consumptive users through the establishment of management arrangements for National Parks, Marine Parks (through Marine Protected Areas or MPAs), water storages and public land. There are a number of resource allocation issues in Australia which are at various stages of progress and may impact on recreational fishers.

Priority Areas for Investment:

The following are the priorities for investment in the impacts of management change:

- **Assessing the impact of recreational fishing methods on conservation values of aquatic habitats;**
- **Documenting the outcomes for recreational fishers from management change (eg MPAs and fisheries management plans), and understanding the factors that lead to good and bad outcomes for the recreational fishing sector;**
- **Baseline data and monitoring to collect before-and-after data to assist in demonstrating the effects of management changes (eg CapReef monitoring fish resources in Central Queensland);**
- Research to understand changes in fishers' behaviour following management change;
- **Determination of any 'spillover' effects from no take zones in MPAs;**
- Monitoring the impacts of regulations that significantly restrict recreational fishers' access to popular species and fishing locations.

Current Status:

The level of access to quality fishing grounds enjoyed by Australian fishers is progressively being eroded by spatial closures or boating restrictions associated with marine planning processes and security of water infrastructure assets, closure of fire-access trails through National Parks and limited entry to Aboriginal-controlled lands. Restricted landing on offshore lands and limits on camping at coastal sites are further constraining access. In many cases, access restrictions and severe fishing regulations aimed at protecting threatened fish are

imposed on recreational fishers when fishing is simply one of many factors interacting with fish and environments.

A system of MPAs is currently being implemented by the Commonwealth Government within Commonwealth waters around Australia. A draft Bioregional Plan has now been released for the South West, and plans for the North West, Northern and Eastern regions expected within months. Many State Governments are also implementing Marine Parks within their waters which also include no fishing areas. These plans hold particular consequence for recreational fishers, who risk losing access to significant historical fishing areas, such as was the case in 2004 when Great Barrier Reef Marine Park rezoning resulted in the effective closure of 33% of the Marine Park to fishing.

A common view expressed among Australian recreational fishers who have had some involvement in marine park planning processes is a sense of frustration at a perceived inability to influence the outcome despite representing a user group which is significantly impacted.

Though some research exists which has been referenced to justify the need for MPAs, likely benefits and optimal sized areas for closure, politics has played a dominant role, with most politicians of all parties supporting the establishment of MPAs.

Unfortunately the influence of politics in aquatic resource management decision-making is not limited to MPAs. Another example demonstrating the significant role that politics plays in fisheries management was the recent listing of Mako and Porbeagle Sharks under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. This decision presented significant implications for recreational fishers, whose fishing for these species would have been prevented with no evidence of their being under threat in Australian waters. Federal Parliament has now passed legislation to amend its *EPBC Act 1999* to allow for the sustainable fishing of Longfin and Shortfin Mako and Porbeagle Sharks within Commonwealth waters.

The Commonwealth Department of Sustainability, Environment, Water, Population and Communities is also currently working with fisheries managers and fishers to improve data on these sharks. In May 2010 Victoria hosted a national recreational Mako Shark fishery research and management workshop, which was attended by recreational game fishing representatives from all States. The forum agreed to support a 'desk top' data collection program and explore opportunities to rationalise management arrangements across Australia.

Recfishing Research continues to play a role in encouraging research and monitoring to provide a rigorous scientific basis for decision-making. A project is currently under development under the RFIDS to study the recreational catch of pelagic Shark species (see Maintaining National Recreational Fishing Statistics).

In dealing with access, resource allocation and regulations the most appropriate approach for recreational fishers is to work collaboratively with agencies in the development of management plans to seek to minimise unnecessary impact to recreational fishers. Recfishing Research will continue to assist recreational

fishers in the collection of relevant data to support objective positions put during planning and to facilitate independent review of processes.

Recfishing Research continues to play a role in identifying case studies where recreational fishers have been successful in contributing to an acceptable outcome, and disseminating key lessons from these experiences to fishers around Australia. The Queensland Capricorn Coast fishing community was successful in achieving a result which had a minimum impact on fishers in their area in the rezoning of the GBR while meeting conservation objectives. The process used by the Capricorn Coast fishers was later applied by Recfish Australia to achieve a positive outcome for recreational fishers in a proposed MPA off the Freycinet Peninsula in Tasmania.

The Capricorn Coast fishers were also successful in establishing the CapReef community based monitoring program that is collecting data on the effects of the management changes in their area. This is to ensure that fishers and the community have a greater understanding and involvement in the future management decisions.

Recfishing Research will continue to identify case studies which can assist recreational fishers and groups in negotiating successful outcomes through engagement in resource allocation processes.

New Projects in 2010/11:

Recently approved projects that have commenced or projects being developed include:

FRDC project 2011/216: "Co management Review"
PJ Neville and Associates: Peter Neville peterjneville@bigpond.com
Timeframe: December 2012

FRDC project 2011/215: "Resource Access and Resource Allocation"
PJ Neville and Associates: Peter Neville peterjneville@bigpond.com
Timeframe: April 2012

FRDC project 2010/001 "Predicting the impacts of shifting recreational fishing effort towards inshore species"
Murdoch University: Alex Hesp a.hesp@murdoch.edu.au
Timeframe: March 2013

Recent Reports and Scientific Publications:

The following is a list of reports and scientific publications that have been published since 2009. The list may not be complete due to the difficulty in identifying and locating the relevant material.

Sutton, S. (2010) "*Incorporating stakeholders and their values, knowledge and aspirations in the care and development of the Great Barrier Reef Marine Park*". James Cook University.

Williamson, D. (2010) "*Larval dispersal, population connectivity and export effects of no-take marine reserves on the Great Barrier Reef*". James Cook University

Brown, I. (2010) FRDC project 2009/031 "*Taking female mud crabs (Scylla serrata): assessments of risks and benefits*". Fisheries Queensland.

Projects Recfishing Research is Monitoring

The following is a list of projects which are currently underway that Recfishing Research is monitoring. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers.

"Development of cost-effective methods for monitoring and assessing spatial management options for recreational fisheries in NSW"
NSW DPI: Dr Aldo Steffe
Timeframe: 2009/10 – 2011/12

"Evaluating the recreational fisheries of Recreational Fishing Havens and other key recreationally-fished estuaries in NSW"
NSW DPI: Dr Charles Gray, Dr Doug Rotherham and Dr Aldo Steffe
Timeframe: 2009/10 – 2011/12

FRDC Project 2008/015 "Addressing knowledge gaps for the sustainable management of rocky reef species in Queensland"
DEEDI QLD: Wayne Sumpton.
Timeframe: June 2012

"Community involvement in recreational fisheries data collection: Opportunities and challenges".
ABARES: Nryee Stenekes and Phil Sahlqvist
Timeframe: Completed - awaiting release of final report

FRDC project 2009/211 "Whose fish is it anyway? - Investigation of co-management and self-governance solutions to local issues in Queensland's inshore fisheries"
Bond University: Daryl McPhee dmcphee@bond.edu.au
Timeframe: August 2009 - June 2011

FRDC project 2010/001 "Predicting the impacts of shifting recreational fishing effort towards inshore species"
Murdoch University: Alex Hesp a.hesp@murdoch.edu.au
Timeframe: June 2010 - January 2013

FRDC project 2010/016 "Assessing the impacts of gill-netting in Tasmania: implications for bycatch and biodiversity"
University of Tasmania: Jeremy Lyle jeremy.lyle@utas.edu.au
Timeframe: June 2010 - February 2013

Enhancing Recreational Fisheries

Desired Outcome:

Fishery enhancement is conducted in an environmentally sustainable manner and is socially and economically beneficial to communities adjacent to where it occurs.

Significance of Issue:

Fishery enhancement includes various activities employed to improve the quality of recreational fisheries. Examples include habitat enhancement, stocking of fish and food sources, and stock recovery. As well as enhancing fisheries or creating new fisheries, stocking can be used as a means of maintaining or rehabilitating stocks of protected, endangered or threatened fish species.

Many inland recreational fisheries around Australia are maintained partly or wholly through the periodic release of hatchery-produced fish. Variable or failed recruitment, drought and climate change impacts on established fisheries are resulting in demands for expanded stocking programs. These pressures and demands are expected to increase. At the same time, fish stocking is increasingly being questioned in relation to its effects on wild fish stocks and threatened fauna. Stocking is (Victoria) or has been proposed for listing as a key threatening process when carried out in areas outside the normal range for the species proposed to be stocked.

Many of Australia's rivers, estuaries and marine environments are in a degraded state, with concerning loss and degradation of significant fish habitat including seagrass beds, snags, riparian vegetation and wetlands. There is a significant need to undertake catchment-scale rehabilitation to restore water and habitat quality, and safeguard our fish stocks.

Habitat and fishery enhancement can include installation of artificial reefs and other in-stream structures, re-snagging and riparian revegetation, implementation of measures to improve water quality, placement of fish attraction devices (FADs), dredging or other forms of modification which can provide additional or improved habitat for fish stocks. Artificial reefs have been proposed as a form of "compensation" for the introduction of no-fishing zones in marine parks, eg Moreton Bay. This has been opposed by some green groups and there is a need to have factual information on which to base decisions.

Priority Areas for Investment:

Priorities for understanding the effects of stock enhancement are:

- Experimental application of stock enhancement as a learning tool (ie adaptive management) and for addressing factors that limit productivity of wild fish stocks;
- Development of aids to decision-making in the planning and implementation of stock enhancement programs;
- **Assessment of the impacts of fish stocking in terms of:**
  - **impacts on wild stocks;**
  - **impacts on the environment;**
  - **rehabilitating threatened species.**

The following are the priorities for fishery enhancement:

- **Developing and promoting new fishing opportunities**;
- **Improving fish passage particularly between marine and freshwater habitats**;
- **Assessment of social, economic and ecological costs and benefits of fishery enhancements such as fish stocking, artificial reefs and FADs**;

Current Status:

The FRDC and Murray-Darling Basin Commission (MDBC) funded a workshop in Brisbane in February 2006 to identify the key RDE priorities associated with stock enhancement, fish stocking and stock recovery. The proceedings of the workshop have been published to guide future investment in research in this area. Available at www.recfishingresearch.org,

A further workshop funded by FRDC was held at Bribie Island in March 2008 to determine management issues and the research required. The final report for this project has been published and is available from the Fisheries Queensland website www.dpi.qld.gov.au/fishweb or www.recfishingresearch.org.

Recfishing Research has worked with Queensland researchers on the development of a project to address the long term ecological impacts of fish stocking. The University of NSW (UNSW) has also completed pilot research in partnership with NSW DPI to evaluate the ecological aspects of stocking mulloway and Eastern king prawns into NSW estuaries, and investigating the effectiveness of stockings as a fisheries enhancement tool. In 2010 UNSW also completed a preliminary assessment of the potential suitability of selected marine waters in Victoria for fish releases.

There are a number of habitat rehabilitation initiatives currently underway around Australia, with varying degrees of support from the recreational sector. An annual forum entitled 'Fishers for Fish Habitat' has been held in New South Wales in 2009, 2010 and 2011 (the most recent was held in Tamworth in May 2011) to showcase habitat rehabilitation initiatives underway which have angler involvement. An FRDC-funded project 2009/333 "Review and extension of conservation and sustainability-focused initiatives which have been funded - supported or undertaken by Australia's recreational fishing sector" is also compiling a database of conservation-focussed initiatives (such as habitat rehabilitation projects) which have angler involvement.

There are a number of activities going on around Australia regarding fishery enhancement through implementation of artificial reefs. A project is underway to hold workshops for the development and implementation of standards relating to the design and monitoring of artificial reefs in Australia (FRDC Project 2010/400). These workshops have been timely, with a number of projects in various states of implementation around Australia. Artificial reefs have been implemented in NSW estuaries and Port Philip Bay in Victoria, are currently being implemented in Moreton Bay and the Northern Territory. Fisheries Western Australia and Recfish West will shortly commence deployment of an artificial reef in Geographe Bay, and a number of large mining organisations have also indicated their interest in partnering in the installation of additional reef systems in other locations, such as

Port Hedland. NSW DPI has also recently completed an environmental assessment for deploying 3 artificial reefs off Newcastle, Sydney and Wollongong.

There are also a number projects underway which seek to improve fish passage, and develop improved techniques for enhancing fish passage. Examples include a project underway by NSW DPI seeking to assess fish passage improvements in the Nepean River, and fishway construction projects on Tallowa Dam on the Shoalhaven River, and Deights Falls on the Yarra River in Abbortsford, Victoria. The Fifth Australian Technical Workshop on Fishways will be held in July 2011, showcasing projects from around Australia demonstrating the need for fish passage, downstream fish passage solutions, monitoring techniques and advancements and discussing fish passage policy.

New Projects in 2010/11:

Recently approved projects that have commenced or projects being developed include:

Developing jungle perch fingerling production to improve fishing opportunities
DEEDI
Timeframe: Under development

Artificial Reef installation, Geographe Bay
Western Australian Department of Fisheries/Recfish West
Timeframe: 2011-2013

FRDC Project 2010/400 "2010/400 Tactical Research Fund: "Artificial Reefs - Design and Monitoring Standards Workshops".
Hamata Pty Ltd. john.diplock@hamata.com.au
Timeframe: July 2011

Fishway construction at Deights Falls, Yarra River, Abbortsford, Victoria.
Melbourne Water
Timeframe: November 2010 – June 2011

Fishway construction on the Macquarie River
State Water Corporation
Timeframe: July 2011

Fishway construction at Brewarrina on the Barwon-Darling River
NSW DPI
Timeframe: estimated completion December 2011

Recent Reports and Scientific Publications:

The following is a list of reports and scientific publications which have been published in the last 12 months. The list may not be complete due to the difficulty in identifying and locating the relevant material.

Woodstock, S.H., Gillanders, B.M., Munro, A.R., McGovern, F., Crook, D.A., Sanger, A.C. (2011) *Using enriched stable isotopes of barium and*

magnesium to batch mark otoliths of larval golden perch (Macquaria ambigua, Richardson). Ecology of Freshwater Fish, 20(1): 157–165

Taylor, M. (2010) "A Preliminary Assessment of the Potential Suitability of Victorian Waters Selected for Fish Releases". UNSW Global

Gilligan, D., McGarry, T. and Carter, S., (2010) *A scientific approach to developing habitat rehabilitation strategies in aquatic environments: A case study on the endangered Macquarie perch (Macquaria australasica) in the Lachlan catchment.* Final report to the Lachlan Catchment Management Authority. Industry & Investment NSW – Fisheries Final Report Series No. 128. Cronulla, NSW, Australia. 61pp.

University of NSW (2010) *"Optimised stocking of Australian Bass by testing modelled estimates of predator impact - develop a predatory impact model to optimise stocking rates of Australian Bass in freshwater impoundments"* NSW Freshwater Recreational Fishing Trust

Hutchison M. (2010). Improving post-release survival of hatchery reared threatened fish. Murray-Darling Basin Authority

Fishers for Fish Habitat Forum, Lake Macquarie, 2010

Lowry M., Folpp H., Gregson M. and McKenzie R., (2010). *Assessment of artificial reefs in Lake Macquarie NSW*. Final report to the NSW Recreational Freshwater Fishing Trust. Industry & Investment – Fisheries Final Report Series No. 125. 47pp.

Western Australian Department of Fisheries (2010) "*Western Australian Department of Fisheries Delegation to South Korea and China - Review and assessment of artificial reefs for use in Western Australia*".

Suthers, Loneragan, Taylor, & Gray (2010) Stocking of fish and prawns at ecologically determined densities into urbanized estuaries. ARC, LP-Round 1

Suthers, Taylor, & Baumgartner (2007-2010). Establishing an ecological basis for stocking density of Australian bass in freshwaters: Experimental field tests of a general numerical model. ARC Linkage Project

Projects Recfishing Research is Monitoring

The following is a list of projects which are currently underway that Recfishing Research is monitoring. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers. Recfishing Research will continue to provide updates to its network through regular e-newsletters and other means.

FRDC Project 2010/400 "Tactical Research Fund: Artificial Reefs - Design and Monitoring Standards Workshops"
Hamata Pty Ltd: John Diplock John.diplock@hamata.com.au

Timeframe: July 2011

Monitoring and evaluation of NSW demonstration reaches
NSW DPI: Craig Boys craig.boys@nsw.dpi.gov.au

Evaluating freshwater fish stocking and other freshwater recreational fishing activities in NSW
NSW DPI. L Baumgartner lee.baumgartner@dpi.nsw.gov.au
Timeframe: Completion in 2014

Effectiveness of stocking – Snowy River Bass
NSW DPI: L Baumgartner and L Cameron
lee.baumgartner@dpi.nsw.gov.au
Timeframe: Final report currently under review

FRDC project 2009/040 "*Fish stocking programs: are there long term genetic and ecological impacts*?"
Fisheries Queensland. John Russell John.Russell@deedi.qld.gov.au
Timeframe: August 2012

An assessment of Murray cod, fish communities and the effects of stocking in the Border Rivers region of the Murray-Darling River System
NSW DPI: Stuart Rowland and G Butler gavin.butler@industry.nsw.gov.au
Timeframe: 2014

Phylogeography, conservation genetics and stocking management of perch and bass (Macquaria spp.) in New South Wales
NSW DPI: L Faulks and D Gilligan dean.gilligan@dpi.nsw.gov.au

Building seawalls to sustain intertidal biodiversity in altered and urbanized estuaries
NSW DPI & University of Sydney: Gee Chapman and Tim Glasby tim.glasby@dpi.nsw.gov.au
Timeframe: complete 2010.

Monitoring and rehabilitation of seagrass
NSW DPI: T Glasby tim.glasby@dpi.nsw.gov.au
Timeframe: project funding finished July 2011 however project will continue

Artificial reef projects in Moreton Bay, Port Phillip Bay, Geographe Bay and Lee Point

Estuarine Artificial Reefs Research Program
NSW DPI: Dr Michael Lowry michael.lowry@industry.nsw.gov.au

Offshore Artificial Reefs Research Program
NSW DPI: Dr Michael Lowry michael.lowry@industry.nsw.gov.au

Fish Aggregation Device (FAD) Monitoring Program
NSW DPI: Dr Michael Lowry michael.lowry@industry.nsw.gov.au

Environmental assessment of marine stocking of important recreational fish species in coastal waters - Environmental Impact Statement and Fisheries Management Strategy for marine stocking followed by implementation of a marine stocking program of key recreational species to enhance recreational fishing
NSW DPI project
Timeframe: 2009/09 – 2012/13

Recreational fishing and environmental outcomes of responsible stocking practices for Mulloway and Eastern King Prawns - continues the final 2 years of monitoring of Mulloway and Eastern King Prawn stocking in estuaries to determine the effectiveness of the programs
University of NSW project
Timeframe: 2009/10-2010/11

Source: Matt Daniels

Impacts of Environmental and Climate Change

Desired Outcome:

Recreational fishers understand the impacts of environmental and climate change and have the knowledge to change practices to help mitigate the impacts or be able to adapt to the change.

Significance of Issue:

Climate change is already affecting many of Australia's aquatic ecosystems, and consequently, many of our recreational fisheries as well. A number of species have been observed to increase the southern extent of their distribution on the east coast of Australia, as a result of the strengthening of the East Australia Current, and warming of waters in southern regions (both expected impacts of climate change). For example, a recent shift in the distribution of the long-spined sea urchin (*Centrostephanus rogersii*) in south-eastern Australia, thought to be caused by environmental changes, is creating desert-like urchin barrens where little else (including recreationally valued species) can persist.

The primary ways that climate change will affect our recreational fisheries include increases in global temperature, rising sea level, increasing acidity of marine waters, and changing rainfall patterns. Two recent reviews commissioned by the Australian Greenhouse Office (see Recent Reports and Publications) provide a summary of likely impacts on Australia's fisheries (though neither deal directly with recreational fisheries). These studies explain that the East Australian Current, which plays a significant role in driving the productivity of marine ecosystems in eastern Australia have been observed, and is likely to increase by up to 20% by 2100. Growth rate of massive corals has also been observed to decline by over 10% on the Great Barrier Reef, which is thought to be due to ocean acidification and thermal stress.

Changes in fresh water inflows are expected to further increase competition for this scarce resource, and unfortunately environmental requirements for healthy fish habitat are generally well down the list of priorities when it comes to decisions on water allocation and usage. A number of our key recreational species are already struggling to cope with environmental and climatic changes which are occurring, and the retreat of mainland Trout fisheries into highland waters has already been predicted.

In the coastal zone, reduced freshwater inflows will alter the way nutrients are dispersed from rivers as well, resulting in nutrient-rich nearshore coastal environments. Predicted increases in the intensity of storm surges will also influence habitats present within these nearshore areas.

Whilst it should be noted that not all changes to our recreational fisheries will be negative, there is little doubt that climate change will continue to bring about changes to habitats, to aquatic food chains, and to the recruitment, abundance and availability of many recreationally valued species.

Like the rest of the community, Australia's recreational fishers need to understand the contribution their activities make to global warming, and the steps they can make to reduce their impacts.

Priority Areas for Investment:

The following are the priorities for impacts of environmental and climate change on recreational fishing.

- **Assessment of the likely impacts of environmental and climate change on recreational fishing;**
- **Monitor fish recruitment for effects of environmental and climate change;**
- **Determine the carbon footprint of recreational fishing and how it can be reduced;**
- Examine the effect of reduced carbon emissions of outboard motors on the carbon footprint of recreational fishing.
- Understanding fishers' knowledge, attitudes, beliefs, and behaviour regarding environmental and climate change, and how these influence fishers' ability to mitigate or adapt to change.

Current Status:

For recreational fishers, climate change may bring about changes in fisher satisfaction (both in terms of catch and experience), which may result from changes in catch or quality in fishing experience, and cause changes to participation levels, and expenditure over time. There is a need to understand what the impacts of climate change are likely to be on recreational fishing so that fishers can:

- increase their resilience to the impacts of climate change;
- assist in mitigating the effects of climate change by reducing carbon emissions through changing their practices; and,
- determine how best of adapt to climate change.

There has been significant investment during 2010/11 in R&D relating to the understanding and mitigating likely impacts of climate change on the fishing industry, particularly through the Department of Climate Change and Energy Efficiency and FRDC (see Projects Recfishing Research is Monitoring). Additionally, a project has been funded under the RFIDS to provide an understanding of likely impacts to recreationally significant species in south western, south eastern and tropical regions of Australia.

A report card on marine climate change for Australia was developed in 2009 under the CSIRO Climate Adaptation Flagship, which summarises present knowledge on marine climate change impacts and identifies knowledge gaps and adaptation responses in Australia.

A National Climate Change Adaptation Research Plan (NARP) for Marine Biodiversity and Resources was published in 2010 which identifies research required over the next 5-7 years to inform policy development and help managers of coastal ecosystems and the marine environment and associated industries (including the recreational fishing industry) and communities prepare for the consequences of climate change. It provides a framework to guide research funding decisions and key directions for Australia's marine research

community. A number of priority research questions are identified within the plan which relate to the recreational sector:

- Which fishery stocks, in which locations, are most likely to change as a result of climate change? What will those changes be (e.g., in distribution, productivity) and when are they likely to appear under alternative climate change scenarios?
- What and where are the most likely effects of climate change on oceanographic conditions affecting fishery access (e.g., wind and wave effects for boating access)?
- Which local or regional communities or economies, if any, are dependent on commercial and/or recreational fishing?
- How will changes in fisheries (especially declines in activity) affect those vulnerable communities socially and economically?
- What are the likely policy changes that may be driven by climate change that could affect commercial and recreational fisheries either directly, for example through changes in harvest policies, or indirectly because of changes in non-harvest marine policies or changes in non-marine climate adaptation or mitigation policies?
- What options or opportunities are there for commercial fishers in identified impacted fisheries to adapt to climate change effects through changing target species, capture methods and management regimes, industry diversification, relocation or disinvestment?
- What options or opportunities exist or might become available for recreational fishers in identified vulnerable fisheries to adapt to climate change effects through changing target species or preferred fishing methods or through travelling to pursue their preferred target species or methods?
- What are the barriers to fishers implementing such options, including existing fishery management arrangements and fisher motivations that impede:
- autonomous adjustment;
- reliability of information about species changes;
- cost–benefit analyses of different options;
- current or prospective availability of support industries and services in new locations;
- jurisdictional, legal, administrative or regulatory uncertainties or constraints; and
- market drivers or constraints?
- How might barriers to adaptation be overcome? What significant changes in fisheries have occurred before because of extrinsic factors and what can be learned from those changes that will inform adaptation to climate change?

Recreational anglers are beginning to get proactively involved in reducing carbon omissions associated with fishing activities. Gary Fooks, president of Eco Friendly Fishing Association received the News Talk 1116 4BC Industry category of the 2007 Healthy Waterways Awards for his role in the development and implementation of a Voluntary Outboard Emissions Labelling Scheme (VELS), believed to be the first in the world. Smaller initiatives such as a project entitled "Carbon Footprint Awareness of Recreational Anglers" delivered by the Bundaberg Sportsfishing Club in 2010 have also helped to educate recreational anglers on the need to adopt newer, more sustainable technology to reduce their environmental impact.

CapReef in Central Queensland has examined changes in local climate and its impact on Barramundi recruitment and is continuing to examine the likely impact on Barramundi stocks.

Recfishing Research will continue to work with researchers, government agencies and community groups in the development of projects which address possible impacts resulting from climate change on fish habitat and stocks. Recfishing Research has a representative on the Stakeholder Advisory Group for the Adaptation of fisheries, aquaculture and fisheries management to climate change program in south-eastern Australia.

New Projects in 2010/11:

The following are new projects initiated in 2010/11 or are currently being planned.

FRDC-Department of Climate Change and Energy Efficiency Project 2010/536 "Beach and surf tourism and recreation in Australia: vulnerability and adaptation"
Bond University: Mike Raybould mrayboul@bond.edu.au
Timeframe: June 2012

FRDC-Department of Climate Change and Energy Efficiency Project 2010/565 "Management implications of climate change impacts on fisheries resources of northern Australia"
James Cook University: David Welch, david.welch@jcu.edu.au
Timeframe: March 2014

FRDC-Department of Climate Change and Energy Efficiency Project 2010/564 "Preadapting a Tasmanian coastal ecosystem to ongoing climate change through reintroduction of a locally extinct species"
CSIRO: Nic Bax nic.bax@csiro.au
Timeframe: March 2013

FRDC-Department of Climate Change and Energy Efficiency Project 2010/554 "Effects of climate change on reproduction, larval development, and population growth of coral trout (Plectropomus spp.)"
James Cook University: Morgan Pratchett morgan.pratchett@jcu.edu.au
Timeframe: June 2013

FRDC-Department of Climate Change and Energy Efficiency Project 2010/542 "A climate change adaptation blueprint for coastal regional communities"
University of Tasmania: Stewart Frusher stewart.frusher@utas.edu.au
Timeframe: 30/6/13

FRDC-Department of Climate Change and Energy Efficiency Project 2010/535 "Management implications of climate change effect on fisheries in Western Australia"
Fisheries Western Australia: Nick Caputi ncaputi@fish.wa.gov.au
Timeframe: December 2013

FRDC-Department of Climate Change and Energy Efficiency Project 2010/524 "Identification of climate-driven species shifts and adaptation options for recreational fishers: learning general lessons from a data rich case

CSIRO: Daniel Gledhill daniel.gledhill@csiro.au
Timeframe: May 2013

FRDC-Department of Climate Change and Energy Efficiency Project 2010/521 "Vulnerability of an iconic Australian finfish (barramundi, *Lates calcarifer*) and related industries to altered climate across tropical Australia"
James Cook University: Dean Jerry dean.jerry@jcu.edu.au
Timeframe: 31/12/2013

FRDC-Department of Climate Change and Energy Efficiency Project 2010/506 "Adaptive management of temperate reefs to minimise effects of climate change: developing new effective approaches for ecological monitoring and predictive modelling"
University of Tasmania: Neville Barrett Neville.barrett@utas.edu.au
Timeframe: April 2014

FRDC project 2011/037 "Implications of climate change for recreational fishers and the recreational fishing industry"
FRDC: Colin Creighton and Bill Sawynok colinmwnrm@bigpond.com
Timeframe: May 2011 - September 2011

Recent Reports and Scientific Publications:

The following is a list of reports and scientific publications which have been published since 2009. The list may not be complete due to the difficulty in identifying and locating the relevant material.

Poloczanksa ES, Smith S, Fauconnet L, Healy J, Tibbetts IR, Burrows MT, Richardson AJ (2011) *Little change in the distribution of rocky shore faunal communities on the Australian east coast after 50 years of rapid warming* Journal of Experimental Marine Biology and Ecology. DOI: 10.1016/j.jembe.2011.02.018

Neuheimer AB, Thresher RE, Lyle JM, Semmens JM (2011) *Tolerance limit for fish growth exceeded by warming waters*. Nature Climate Change

Hobday AJ (in press) Sliding baselines and shuffling species: implications of climate change for marine conservation. Marine Ecology (accepted April 2011)

National Climate Change Adaption Research Facility (2010) *National Climate Change Adaptation Research Plan (NARP) for Marine Biodiversity and Resources*

Scandol, J. and Gillson, J. (2010) Spreading the risk: management strategies for multi-method inshore fisheries in a changing climate. Final report to the Fisheries Research & Development Corporation for project no. 2009/053. University of New South Wales. 53pp. ISBN 978-0-7334-2942-2.

Bundaberg Sportsfishing Club (2010) "Carbon Footprint Awareness of Recreational Anglers".

Last, P. R., W. T. White, D. C. Gledhill, A. J. Hobday, R. Brown, G. J. Edgar and G. T. Pecl (2010) *Long-term shifts in abundance and distribution of a temperate fish fauna: a response to climate change and fishing practices*. Global Ecology and Biogeography.

Report card on marine climate change for Australia (2009) CSIRO Climate Adaptation Flagship

Brown CJ, Fulton EA, Hobday AJ, Matear R, Possingham HP, Bulman C, Christensen V, Forrest RE, Gehrke PC, Gribble NA, Griffiths SP, Lozano-Montes H, Martin JM, Metcalf S, Okey TA, Watson R, Richardson AJ (2009) Effects of climate-driven primary production change on marine food webs: implications for fisheries and conservation. Global Change Biology 16: 1194-1212

Projects Recfishing Research is Monitoring

The following is a list of projects which are currently underway that Recfishing Research is monitoring. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers. Recfishing Research will continue to provide updates to its network through regular e-newsletters and other means.

eWater Cooperative Research Centre
"Ecological response modelling: Development of a mathematically driven size and age model for the Fitzroy River Barramundi stock and provision of ecological response models for a range of estuarine dependent species linking freshwater flows and population parameters"
Fisheries Queensland: Ian Halliday Ian.Halliday@deedi.qld.gov.au
Timeframe: 2007 - 2010

FRDC project 2009/333 "Tactical Research Fund: Review and extension of conservation and sustainability-focused initiatives which have been funded, supported or undertaken by Australia's recreational fishing sector"
Greenfish Consulting: Matt Barwick matt.greenfish@gmail.com
Timeframe: March 2010 - September 2010

Source: Matt Daniels

Improving Extension of R&D to Recreational Fishers

Desired Outcome:

The benefits of new knowledge from research and development are available and taken up by recreational fishers, government and the community.

Priority Areas for Investment

The following are the priorities for extension:

- **Existing and new material on best practices in recreational fishing to be distributed;**
- **Development of partnership with research projects to extend new knowledge generated from their work**;
- Encourage researchers to collect video footage during projects which can be used in the development of suitable extension material;
- Market research into the effectiveness of Recfishing Research.

Significance of Issue

Extension of R&D outputs is critical to the accomplishment of Recfishing Research's primary objective of improving investment and the return on investment derived from research, development and extension activities which benefit the recreational fishing sector at a national scale. It will be important to plan, develop and implement a range of extension initiatives targeting various audiences including governments, fishing organisations, recreational fishers and the wider community to achieve desired outcomes.

Current Status

R&D extension has always been a component of project delivery, however it is only relatively recently that the need has been identified to look more closely at how we do it, to seek opportunities to enhance resultant outcomes. Many projects and researchers still treat extension as an "add on" to be tackled upon project completion, and fewer resources and time are committed to this important aspect of the work. Additionally, the skill-sets required to undertake R&D are quite different to those required to effectively extend findings in order to achieve desired outcomes. Consequently delivery of these functions by the research team often leads to sub-optimal outcomes. Many also try to provide information in a way which is most efficient from a delivery perspective, without looking at where, how, and from whom the target audience prefers to obtain information.

Recfishing Research sees extension as a critical and historically under-performing area of the R&D supply chain. Consequently in 2011 Recfishing Research formalised their extension service to improve the extension and uptake of new knowledge obtained through R&D and appointed a part time Extension Manager.

The Recfishing Research Extension Service will focus on getting information into recreational fishers' existing information networks rather than on the

employment of people and development of new infrastructure although some investment is needed for this to be effective.

The Released Fish Survival program established links with information networks that are used by recreational fishers including websites, fishing magazines, fishing television presenters and fishing tackle outlets. Recfishing Research will continue to build its contacts with these networks and will support the development of new methods of providing access to information.

Information Products Being Distributed

Recfishing Research has developed an extension plan, which describes what Recfishing Research intends to accomplish through extension activities, who they intend to engage with, and how. This plan will soon be available on the Recfishing Research website (www.recfishingresearch.org).

Recfishing Research is currently undertaking a review of its online services to identify and act upon opportunities for improvement. A key action currently underway is revision of Recfishing Research's website, to increase traffic and discovery of R&D outputs via this medium.

Recfishing Research will also continue to build its network of individuals and organisations who are interested in receiving FRDC final reports, technical reports and scientific publications of interest. These reports and papers are distributed by email to the network.

There continues to be a demand for information products developed and distributed through the Released Fish Survival program:

- Gently Does It: Best Practices in Releasing Fish
- Gently Does It: Releasing Snapper and Bream
- Gently Does It: Releasing Tropical Reef Fish (now out of stock)
- Flathead Survival (now out of stock)
- Barramundi: What happens to Barramundi that you release?
- Barramundi: Handling of Barramundi
- Fish Friendly Tackle
- Fish Friendly Tackle kids cartoon version
- Gently Does it #2 DVD (now out of stock)
- NSW DPI Catch and Release - A Guide to Survival
- The Release Weight pamphlet and DVD (reprinted)

Projects Recfishing Research is Working With

Recfishing Research is assisting with the following in promotion of the results of research.

FRDC project 2009/312
"Educating through Escape with ET"
Escape with ET: Lisa Campbell
Timeframe: May 2009 - June 2012
Segments on the "Escape with ET" TV show promoting research and the results of research

Projects That Recfishing Research is Assisting with Extension

Recfishing Research is assisting the following projects in the extension of the results of their work.

- Longtail Tuna and other recreational fishing research being undertaken by CSIRO.
- FRDC project 2009/333 "Tactical Research Fund: Review and extension of conservation and sustainability-focused initiatives which have been funded, supported or undertaken by Australia's recreational fishing sector"
- FRDC project 2007/032 "Defining the stock structure of northern Australia's Threadfin Salmon species"

Projects Recfishing Research is Monitoring

The following is a list of projects which are currently underway that Recfishing Research is monitoring. Where appropriate, Recfishing Research receives milestone reports for those projects of specific interest to recreational fishers. Recfishing Research will continue to provide updates to its network through regular e-newsletters and other means.

> "Getting research results to grass-roots anglers - Web based portal - extension plan for the project "Recreational Fishing Surveys in the Greater Sydney Region to facilitate dissemination of survey information to anglers".
> NSW DPI
> Timeframe: 2010-2011

Products under Development

Recfishing Research is currently reviewing its Extension Service.

Survey of Awareness and the Effectiveness of Recfishing Research

In 2010 Recfishing Research commissioned a survey to evaluate awareness of Recfishing Research, and the effectiveness of extension initiatives undertaken by this body.

"Recfishing Research: Survey of Awareness and Roles of Recfishing Research among User Groups"
Pepperell Research and Consulting: Julian Pepperell julianp@internode.on.net
Published: May 2010
Available from: Recfishing Research website www.recfishingresearch.org

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