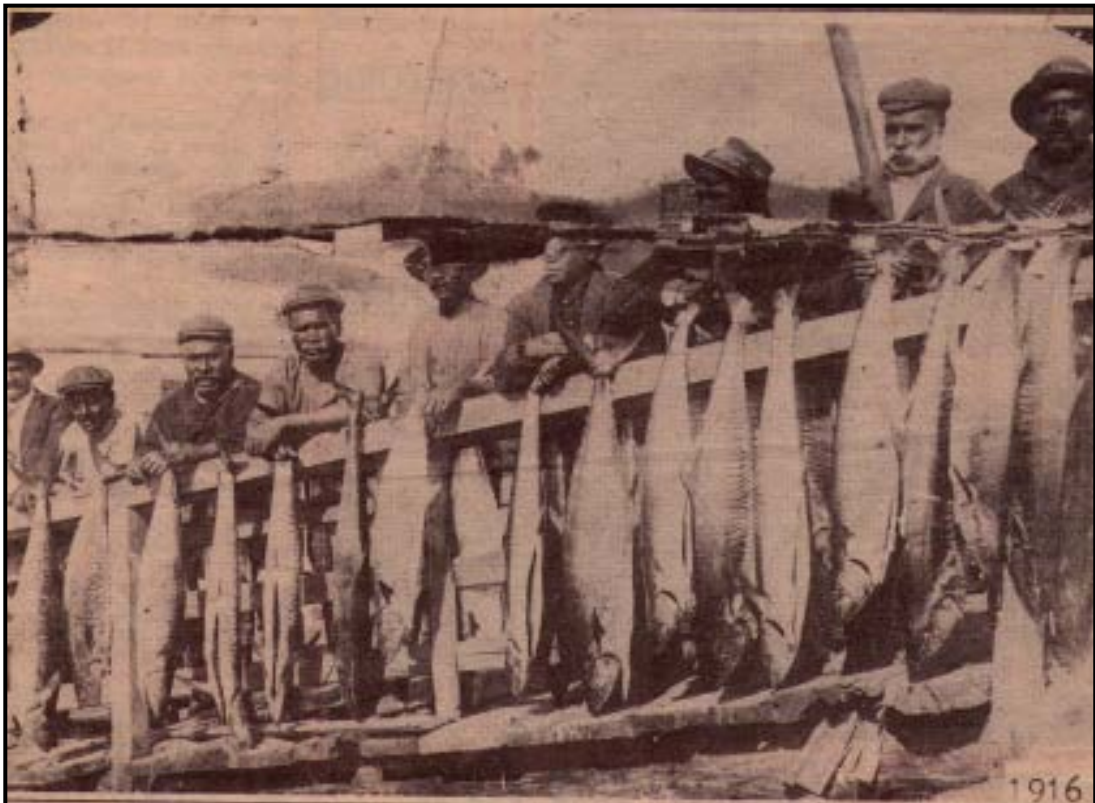


Aboriginal fisheries in New South Wales: determining catch, cultural significance of species and traditional fishing knowledge needs

Associate Professor Stephan Schnierer



Australian Government
**Fisheries Research and
Development Corporation**

Project No. 2009/038

**Aboriginal fisheries in New South Wales: determining catch, cultural
significance of species and traditional fishing knowledge needs**

Final Report to the Fisheries Research Development Corporation

Stephan Schnierer
Southern Cross University

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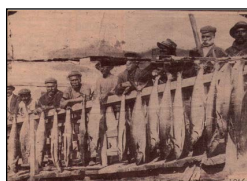
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Cover photograph 'A fine catch at Tweed Heads' taken in 1916 and published in a local newspaper. It shows some early residents of Fingal Head with their catch at Crane Wharf Tweed Heads.



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Non Technical Summary

2009/038	Aboriginal fisheries in New South Wales: determining catch, cultural significance of species and traditional fishing knowledge needs
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OBJECTIVES:

1. Determine what aquatic organisms (fish) are of specific cultural relevance to Traditional Owner groups (identify species and their location).
2. Seek to quantify the Indigenous catch (species, numbers, weight, frequency of fishing) at the level of Traditional Owner groups.
3. Develop an ongoing research partnership with Traditional Owner groups based on trust to be able to move to the documentation of traditional fishing knowledge and the establishment of community owned and controlled data bases.
4. Build capacity of Indigenous people to conduct fisheries related research.

NON TECHNICAL SUMMARY:

OUTCOMES ACHIEVED TO DATE

Outcome 1: Equitable allocation of a proportion of traditionally targeted species to Indigenous fishers achieved through more culturally informed fisheries management strategies.

Achievement of this outcome to date

The report's results will continue to inform the New South Wales Department of Primary Industry (NSW DPI) and the New South Wales Aboriginal Fishing Advisory Council (NSW AFAC) in the development of strategies to address cultural fishing. The Principal Investigator is a member of the NSW AFAC. A recommendation to double the daily recreational bag limits for Indigenous cultural

fishers has been put to the NSW AFAC with advice from the research team for consideration. This is part of the development of interim regulations for cultural fishing under the *Fisheries Management Act 1994* (NSW) (NSW FMA). The report's findings will empower Indigenous communities, particularly in the Tweed region, to provide input into fisheries management decision-making processes about management of cultural fisheries.

Outcome 2: Reduced conflict between Indigenous and non-Indigenous fishers based on a better understanding of the needs of each group.

Achievement of this outcome to date

During the project commercial and recreational representatives were informed of emerging project results through the New South Wales Seafood Industry Advisory Council (NSW SIAC) and the New South Wales Fisheries Research Advisory Body (NSW FRAB). Papers publishing the methodology and results of the research are being prepared and will be made available through a wide range of formal (journals) and informal outlets (websites). This outcome will require time for information from the report to disseminate, be discussed and then acted on.

Outcome 3: Better working relationship between the NSW DPI and local Aboriginal communities in the area of fish resources management.

Achievement of this outcome to date

The establishment of the NSW AFAC under the amended NSW FMA is an outcome of the efforts of many Indigenous people. The researchers also provided a submission based on this project supporting the establishment of the NSW AFAC. New South Wales DPI representatives were provided with regular briefings during the project. One representative attended a community workshop at the invitation of the researchers and the Tweed community. Some of the project findings were presented to a meeting of the NSW DPI compliance officers for the Far North Coast Zone Region in March 2010.

Outcome 4: A more informed public understanding of the role of Indigenous cultural fishing in a modern day context.

Achievement of this outcome to date

The project's results and methodology:

- are being used to inform other Fisheries Research and Development Corporation (FRDC) funded projects including a national forum on shaping Indigenous fishing and aquaculture research and development, and another project on engaging Indigenous communities on fishing issues;
- have informed input into 'Evaluating the Performance of Australian Marine Capture Fisheries 2009' a report completed for the FRDC;
- have been presented at a Victorian Department of Primary Industries (VIC DPI) workshop in 2011 about developing a strategy for the future management of wild caught fisheries in that state; and
- have been presented, in part, at two international conferences – the second International Marine Conservation Congress in Victoria, British Columbia, Canada in May 2011 and a United Nations workshop on article 10(c) of the

Convention on Biological Diversity (CBD) held in Montreal, Canada in June 2011.

Outcome 5: Some capacity building of Indigenous communities.

Achievement of this outcome to date

No Indigenous student was available to undertake the honours project, which was instead undertaken by a non-Indigenous student who was subsequently awarded first class honours for her project work. This student is now enrolled in a doctoral studies program and is pursuing research closely related to this project. There is now trust between the Tweed community and the research team, which will lead to new research opportunities. Already the community has sought the researcher's assistance in developing funding applications for scholarships and research. Capacity building with the Tweed Indigenous community has resulted in:

- a community member applying for membership of the NSW AFAC;
- a community member enrolling in the Bachelor's Degree in Environmental Sciences and Management at Southern Cross University (SCU) in 2011;
- a community member applying for a Fish Habitat Protection Grant through NSW DPI;
- the development of an application for a FRDC funded Indigenous scholarship;
- four community members delivering a poster presentation on cultural fishing at the 20th NSW Coastal Conference in Tweed Heads from the 8th to the 11th of November 2011; and
- three community members giving presentations on cultural fishing to third year university students studying fisheries management at SCU.

This report presents the results of a Fisheries Research Development Corporation (FRDC) funded study of Aboriginal fisheries in New South Wales. A key objective of the study was to address information gaps in relation to catch, cultural significance of species and traditional fishing knowledge (TFK) needs. Due to project resources, the scope of this study was limited to a single site in far north New South Wales, the Tweed River Catchment, in partnership with the site's Traditional Owners, the Minjungbal people. An important outcome of this project was the development of a culturally appropriate methodology to collect Indigenous cultural fishing data, which it is hoped will form the basis of further research into cultural fishing across New South Wales.

Indigenous cultural fisheries are now acknowledged as one of three fishing sectors in Australia along with the commercial and recreational sectors. In comparison to what is known about the nature and dimensions of the other two sectors, little is known about the Indigenous cultural fisheries sector. The 2003 National Recreational and Indigenous Fishing Survey (NRIFS), which collected data from Indigenous residents in northern Australia, is still one of the few references used by fisheries management agencies when thinking about Indigenous cultural fishing strategies.

The New South Wales government implemented an Indigenous Fisheries Strategy (IFS) in 2001, which acknowledged that fishing was an integral part of the cultural and economic life of Aboriginal communities. The full implementation of the IFS

was impeded by a lack of information on cultural fisheries and it was against this backdrop that this research project was submitted to the FRDC for consideration.

It should be noted that during the project, in 2010, the New South Wales government amended the *Fisheries Management Act 1994* (NSW) (NSW FMA) to recognise Indigenous cultural fishing and establish the Aboriginal Fishing Advisory Council (NSW AFAC). This development further emphasises the need for more research into the nature and dimensions of Indigenous cultural fishing in New South Wales.

In accordance with national and international best practice protocols for research in Indigenous communities, the research team used a collaborative research methodology with a focus on obtaining 'prior informed consent' from project participants and ensuring 'benefit sharing' arrangements were in place. The research team undertook an extensive amount community consultation. Community feedback was actively sought and incorporated into the methodology on an ongoing basis.

The researchers had originally intended to limit project participation to Traditional Owners, however community feedback during initial workshops indicated that participation should extend to non-Traditional Owners. Project participants were selected through a process of self-identification and the 'snow-balling' technique.

Using a specially designed questionnaire and cultural fishing logbook, the research team sought quantitative data on the nature of the Tweed Indigenous cultural catch. Fifty-six participants completed the questionnaire while 20 participated in the cultural fishing logbook. The research team also used focus groups and individual interviews to obtain qualitative insights into the values of cultural fishing, economic benefits, perceptions of management approaches and community aspirations in the Tweed region. There were 15 participants in the focus groups and 10 individual interviews. Project participants included women and men spanning an age range of 18 to 56 years and older.

This report found that cultural fishing in the Tweed region occurs on a regular basis, is predominantly shore-based and focussed around the estuary and adjacent coastal waters. The main gear types used are rods and handlines with nets, traps and spears used to catch some species.

The top 10 culturally most important species, based on a ranking given by participants, comprised a mix of finfish and invertebrates. Pipis (*Plebidonax deltoides*) and mud crabs (*Scylla serrata*) were the top two, followed by sea mullet (*Mugil cephalus*), tailor (*Pomatomus saltatrix*), sand whiting (*Sillago ciliata*), dusky flathead (*Platycephalus fuscus*), beach worms (F. Onuphidae), Sydney rock oysters (*Saccostrea glomerata*) and the bait yabby (*Callinassa australiensis*). These rankings were somewhat similar to the rankings given for the preferred target species – that is species that fishers go out to catch on a regular basis. However pipis, which are seen as a culturally important species and are taken in large numbers, are not specifically targeted as much as other species. Sea mullet are also regarded as a culturally important species and are consistently targeted, but they are numerically less important than tailor or sand whiting.

The cultural catch was made up of a range of finfish and invertebrate species. The finfish component was dominated by estuarine and near-shore species such as tailor,

sand whiting, mullet, swallowtail dart (*Trachinotus coppingeri*), bream (*Acanthopagrus australis*) and dusky flathead. A few Indigenous fishers fish offshore in deeper waters and their catch tends to be dominated by snapper (*Pagrus auratus*). A variety of invertebrates are also caught with the dominant species being pipis, oysters, beach worms, bait yabbies, mud crabs and prawns.

Most of the cultural catch is consumed either by the fisher, their family and extended family or the community as a whole. Some of the catch is also used for bait. To a lesser extent, but still importantly, some of the catch is bartered or traded for other goods and services within the community and some is sold.

The use of cultural fishing logbooks showed some promise in collecting real time data to support the data collected in the questionnaires. However, some of the fishers using logbooks found them time consuming and cumbersome. The research team still believes that logbooks are worth persisting with, but more development is required.

Most of the species dominating the cultural catch today have been caught for many generations and there is ample evidence of this in local middens in the Tweed region. This long attachment to culturally significant species is the basis for the rights expressed by current cultural fishers – that is the right to be able to fish for, and dispose of, a cultural catch according to existing Indigenous cultural norms.

The results of the focus group and individual interviews show that cultural fishing in the Tweed region is still as relevant today as it has always been. The cultural catch remains an important source of food and is a means for the barter of goods and services. Cultural fishing is also seen as a potential source of revenue, as well as a mechanism for maintaining connections within and between families and the rest of the community. Cultural fishing plays an important role in the maintenance of traditional fishing knowledge (TFK).

Focus group participants were optimistic about the recent legislative recognition of Indigenous cultural fishing in New South Wales and expressed great interest in how the community might play a greater role in the management of their cultural fisheries. They are particularly interested in resolving issues that include: the development of culturally suitable bag limits for key species; the use of large nets to catch culturally iconic species, such as sea mullet, in larger numbers and on a more regular basis; restrictions on the consumption of certain bivalves such as pipis and oysters; translocation or reseedling of species like the Sydney cockle (*Anadara trapezia*) from one estuary to another; the selling of species taken in a cultural catch; and enforcing compliance through community rangers or more culturally sensitive fisheries officers.

Participants were interested in the potential for aquaculture to replenish natural stocks, particularly of traditionally targeted species, which would in turn facilitate the maintenance of cultural fishing practices and the community's connection with marine and freshwater environments. On the issue of marine parks, participants understood the need for them, provided they are developed through negotiation with the Traditional Owners.

Extensive community engagement and capacity building by the research team facilitated the collection of data on cultural fishing in the Tweed region. It also

provided the research team with the opportunity present information to the community on research methods and aspects of fisheries management. Some community members were also enabled to apply for educational and funding programs and give presentations on cultural fishing.

The trust that the research team developed with the Tweed community has led to mutual discussions about engaging in further cultural fishing projects in the Tweed region and across New South Wales, including exploration of the possibility of fisheries self-governance and a feasibility study of the potential for aquaculture ventures in the Tweed region. The research team recommends refining the questionnaire and producing a version that could be delivered online through Local Aboriginal Land Councils. This would greatly increase coverage in New South Wales and help develop a broader understanding of Indigenous cultural fishing.

The involvement of the NSW DPI during the project has helped the department refine its strategies for engagement with Indigenous communities and to implement recent legislative changes that recognise cultural fishing. Input from the research team has already played a small but important role in informing the development of draft interim regulations applying to bag limits for a cultural catch. It is envisaged that the results of this project will further inform the development of strategies for the management of Indigenous cultural fishing.

KEYWORDS: **Aboriginal, Indigenous, Cultural fishing, Management**

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Stephan Schnierer

November 2011

1. Background

Indigenous cultural fisheries are now acknowledged as one of three fishing sectors in Australia along with the commercial and recreational sectors. This recognition has been the result of persistent Indigenous advocacy for fishing rights over many years. The Australian Law Reform Commission (ALRC) inquiry into the *Recognition of Aboriginal Customary Laws* in 1986 suggested:

...as a general principle Aboriginal traditional hunting and fishing should take priority over non-traditional activities, including commercial and recreational activities, at least where the traditional activity is carried on for subsistence purposes. Once this principle is established the precise allocation is a matter for the appropriate authority acting in consultation with Aboriginal and other user groups.

In 1993, the Royal Commission into Aboriginal Deaths in Custody provided further support for the ALRC recommendations including recognising the rights of Indigenous Australians to maintain their hunting and fishing practice. The Resource Assessment Commission (RAC) *Coastal Zone Inquiry* in 1993 (CZI) also affirmed the ALRC recommendations adding, among others, that:

Australian Governments, in conjunction with representatives of land councils and other Indigenous organisations, initiate a process whereby traditional hunting, fishing and gathering rights are recognised by governments and amendments are made to laws and regulations to incorporate this recognition and provide mechanisms for resolving disputes.

In comparison to what is known about the nature and dimensions of the other two sectors, little is known about the Indigenous cultural fisheries sector. A background report completed for the *State of the Marine Environment Report for Australia 1995* found that Aboriginal people on the far north coast of New South Wales were still harvesting a variety of marine species for food including pipis, periwinkles and a range of finfish species (Schnierer and Robinson, 1993). In 2000, a survey of Aboriginal fishing across New South Wales identified 42 species of finfish and 25 species of invertebrates making up a contemporary catch (Schnierer *et al* unpublished).

In 2003, the *National Recreational and Indigenous Fishing Survey* (NRIFS) collected data from approximately 5,100 Indigenous residents in northern Australia between Cairns and Broome over a two-year period (Coleman *et al*, 2003). This survey is still one of the few main sources of information used by fisheries management agencies to develop strategies addressing Indigenous fisheries. The NRIFS proved controversial for some northern Indigenous organisations and the use of data in southern states has been problematic because of the northern bias.

In 2003, the National Native Title Tribunal (NNTT) convened a national Indigenous fisheries conference to assist fisheries management agencies and Indigenous groups to resolve issues relating to Indigenous fishing rights, particularly in light of recognition of Native Title in Mabo (High Court of Australia, 1992) and the statutory recognition of these rights in the *Native Title Act 1993* (Cth). One outcome of the conference was the formation of the National Indigenous Fishing Technical Working Group (NIFTWG), comprising representatives of Indigenous bodies, state and territory governments, the Australian Government, and national commercial and recreational fisheries interests. In 2004, the NIFTWG proposed a set of national principles on Indigenous fishing to guide the future development of Indigenous

fishing strategies (NIFTWG, 2004). These principles are not yet fully reflected in legislation and policy in all Australian jurisdictions, but they provide a benchmark for discussions and negotiations to take place regarding legislative and policy reform.

In 1998, the New South Wales Government began developing an Indigenous Fisheries Strategy (IFS) with Commonwealth funding, based on the recommendations of the CZI. The IFS was eventually completed and implementation began in 2001. The IFS acknowledged that fishing was an integral part of the cultural and economic life of Aboriginal communities and it contained a number of strategies aimed at achieving equitable outcomes for Aboriginal people. However, full implementation of the IFS was impeded by a lack of information on Indigenous cultural fisheries and a lack of Indigenous expertise in governmental decision-making processes. It was against this backdrop that a number of research projects on Indigenous cultural fishing were developed during the early 2000s and submitted to various funding bodies, including the Fisheries Research Development Corporation (FRDC), for consideration.

The consultation associated with the development of this research project has a 15-year history and involved a number of different groups. The New South Wales Interim Indigenous Fisheries Advisory Group had discussed and supported this project on several occasions between 2001 and 2004. This was an Indigenous group set up to advise on the implementation of the IFS. Discussions had also taken place with the New South Wales Aboriginal Land Council (NSWALC), the former Aboriginal and Torres Strait Islander Commission (ATSIC) and the New South Wales Department Aboriginal Affairs (NSW DAA), all of whom supported the need for research into Indigenous cultural fishing. Support also came from the New South Wales Minister for Fisheries, the New South Wales Fisheries Research Advisory Board (NSW FRAB) and New South Wales Seafood Industry Advisory Council (NSW SIAC).



Clarence Williams catching beach worms at Fingal beach near Tweed Heads.

Photographer: Lexene Busbridge

2. Need

Indigenous access to traditional aquatic biological resources is not only important economically and socially, but also culturally and spiritually. Indigenous people still assert their right to procure a regular supply of fresh seafood for consumption, barter and trade. Historically, fisheries management agencies have ignored Indigenous fishing rights with negative impacts on Indigenous cultural practices. In some cases, Indigenous people have been made to feel like criminals when accessing traditional target species for food or other cultural purposes. Restrictions preventing cultural fishing can result in conflict, non-compliance and a loss of traditional fishing knowledge (TFK).

Sustainable use of fish stocks should be based on management strategies that deliver a fair share of the potential total catch to all users, including Indigenous fishers. There is strong international support for the protection of Indigenous rights to a customary harvest of biological resources, as well as the traditional knowledge associated with these resources. See, for example, the United Nations *Convention on Biological Diversity* (CBD), articles 8(j) and 10(c). The Australian Government has also enshrined these CBD principles, to varying degrees, in the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC).

In 2010, the New South Wales Government amended the *Fisheries Management Act 1994* (NSW) (NSW FMA) to recognise Indigenous cultural fishing. The NSW FMA also establishes the Aboriginal Fishing Advisory Council (NSW AFAC) to advise the Minister and the New South Wales Department of Primary Industries (NSW DPI) on the development of culturally appropriate management measures. The development of culturally appropriate management approaches requires research to help the NSW DPI understand the nature and dimensions of Indigenous cultural fishing in New South Wales.

There are information gaps in relation to the size, composition and location of the Indigenous catch, the present day cultural associations with target species, and the status of TFK. This research project aims to develop a culturally appropriate methodology to collect data on Indigenous cultural fishing for use by Indigenous communities and the NSW DPI. At the same time, the research will provide an opportunity for empowering Indigenous communities to better engage with the NSW DPI.



Indigenous fisher fishing from Fingal beach near Tweed Heads.

Photographer: Gina Combo

3. Objectives

The project objectives, as set out in the project application, were:

1. Determine what aquatic organisms (fish) are of specific cultural relevance to Traditional Owner groups (identify species and their location).
2. Seek to quantify the Indigenous catch (species, numbers, weight, frequency of fishing) at the level of Traditional Owner groups.
3. Develop an ongoing research partnership with Traditional Owner groups based on trust to be able to move to the documentation of traditional fishing knowledge and the establishment of community owned and controlled databases.
4. Build capacity of Indigenous people to conduct fisheries related research.



Indigenous fishers returning home after fishing from Fingal beach near Tweed Heads, with other fishers in background collecting pipis.

Photographer: Gina Combo

4. Methods

4.1 Study site

The scope of this study was limited to a single site in far north New South Wales, the Tweed River catchment, in partnership with the site's Traditional Owners, the Minjungbal people (the 'study site').

The boundaries of the study site, as negotiated with the community, were the southern side of Tallebudgera Creek in the north and Tyagarah in the south (Figure 1). The research team noted the contested nature of boundaries and so avoided including definitive boundaries.

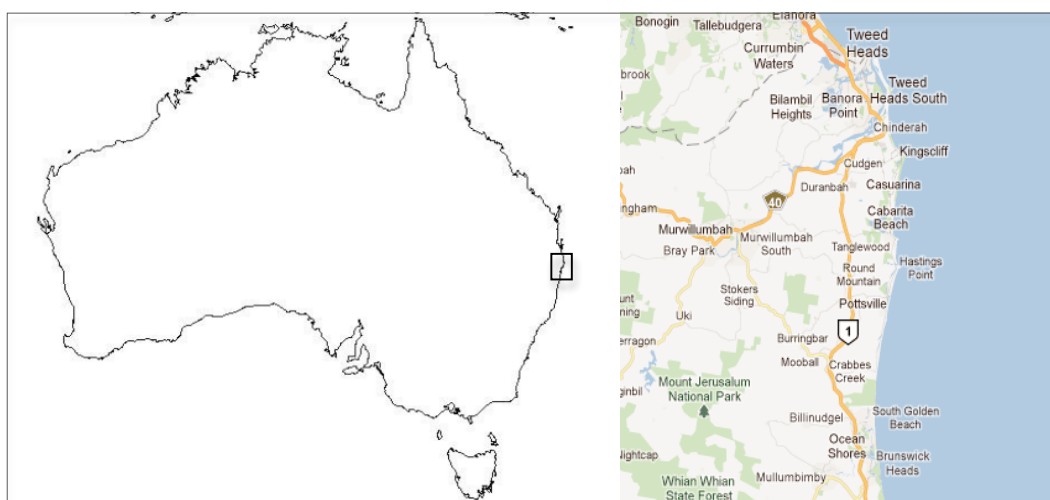


Figure 1: The Tweed River study site (Source: Google Maps 2011)

4.2 Indigenous research protocols and ethics approval

This project was undertaken in accordance with national and international best practice protocols for research in Indigenous communities, in particular the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) *Guidelines for Ethical Research in Australian Indigenous Studies* (2011) and the International Society for Ethnobiologists (ISE) *Code of Ethics* (2006). Indigenous communities are the most researched communities in the world (Lloyd, 2009). These Indigenous research protocols are in place to ensure Indigenous rights are upheld and there is a two-way flow of benefits during research in Indigenous communities.

In accordance with the protocols for research in Indigenous communities, a collaborative research methodology was adopted for this project. Collaborative research involves culturally appropriate engagement with Indigenous people in all aspects of the research as both 'givers' and 'receivers' of information (AIATSIS, 2011). Uppermost in the minds of the researchers was the need to obtain 'prior informed consent' from project participants and ensure there were 'benefit sharing' arrangements in place with the Indigenous community (AIATSIS, 2011).

It must be recognised that collaborative research, by design, may be iterant, emergent and require modifications or adaptations (ISE, 2006). The researchers sought and obtained feedback from the community at different stages of the project. This report identifies where community feedback was received and was subsequently incorporated into the methodology.

Ethics approval for the project was granted by the Southern Cross University (SCU) Human Research and Ethics Committee, ethics approval number EC00137.

4.3 Community engagement strategy

As part of the collaborative research methodology, a community engagement strategy was developed that required the research team to:

- utilise key individuals in the community as contacts;
- consult with peak and local Indigenous organisations;
- develop culturally appropriate information about the project and disseminate it within the community;
- conduct community workshops and attend community meetings and cultural events;
- develop culturally appropriate data collection instruments;
- employ a process to keep the community informed at all stages of the project; and
- receive prior informed consent for each stage of the project.

The research team undertook an extensive amount community engagement with Indigenous community organisations, government organisations, educational institutions and individuals at all stages of the project. For a detailed account of the community engagement approach refer to the *Report on Community Engagement for Project No. 2009/038* in Appendix 3.

4.4 Project development

The researchers held two initial meetings with the Tweed Byron Local Aboriginal Land Council (TBLALC) to discuss the project methodology and identify further contact organisations and individuals.

Out of these meetings it was suggested that the research team formally present the research proposal to a full meeting of the TBLALC and Tweed Shire Council Aboriginal Advisory Committee (TSCAAC). The outcome of the meeting with TBLALC and TSCAAC was support from both organisations for the research proposal. It was suggested that the research team run community workshops for other members of the Tweed Indigenous community to learn about the project.

The research team held three community workshops with Indigenous fishers from the Tweed region. The aims of the first two community workshops were to inform community members about the research, determine appropriate ways to collect data taking into consideration cultural sensitivities and identify potential participants. The community workshops also enabled the researchers to build rapport with Indigenous fishers and share information about fishing issues and the impact of then current changes to New South Wales fisheries legislation. At the third community workshop the research team presented preliminary findings and analysis.

Two Indigenous community liaison officers were appointed out of the initial community workshops. The role of the liaison officers was to work within the community to find potential participants and to disseminate information about the project.

The research team also set up an information stall at the Tweed National Aboriginal and Islander Day of Celebration (NAIDOC) sports day. Information pamphlets were distributed about the cultural fishing project, proposed interim fishing regulations for cultural fishing, the FRDC Indigenous scholarship program and project participant consent forms.

The researchers also held three project update meetings with the project partners (the NSW DPI, the NSW DAA and NSWALC) at key stages in the research.

4.5 Selection of project participants

The two main centres of Indigenous population (n= 2384) within the study site are Tweed Heads and Fingal Head (ABS Census 2006). The Indigenous population is comprised of both Traditional Owners and a mix of Indigenous Australians from other areas who have settled in the region (non-Traditional Owners). The study site also has a large Australian South Sea Islander population (descendants of Pacific island indentured labourers) who have married into some local Indigenous families.

The researchers had intended to limit project participation to Traditional Owners, however the feedback from the initial community workshops indicated that participation should be broader. Acknowledging this feedback, and the complexity of issues relating to Indigenous identity, the research team modified the methodology to include participation of Traditional Owners and non-Traditional Owners.

Project participants were selected through a process of self-identification and ‘snow-balling’ (Morrison, 1988). A number of participants were recruited through the community workshops and the NAIDOC information stall. Others responded to local press releases and notices posted on notice boards by leaving their contact details on lists placed in several local Indigenous organisations.

The participants were briefed on all aspects of the project and were then asked to sign participant consent forms (Appendix 4).

4.6 Data collected

The following quantitative data was sought from Indigenous participants:

- frequency and duration of fishing events;
- rate of participation in fishing;
- preferred fishing locations, platforms and gear used;
- distance travelled to fishing grounds;
- species targeted and the size of the catch in numbers;
- cultural importance of species;
- destination of the cultural catch; and
- source and frequency of seafood consumption.

The following qualitative data was sought from Indigenous participants:

- value of cultural fishing and barriers to its maintenance;
- importance of traditional target species to the community's economy;
- perceptions of management changes, rights, recognition and community aspirations for future involvement and more effective management of cultural fishing; and
- ideas for the future of Indigenous cultural fishing.

4.7 Data collection methodology

The methods of collecting data were agreed to in consultation with the Indigenous community.

4.7.1 Questionnaire

Data was primarily collected through a survey-style questionnaire, delivered face-to-face at a location of the participant's choice. The questionnaire sought to obtain quantitative data on the Indigenous cultural catch.

The questionnaire contained closed-ended questions and used a 'funnel' technique in which the initial questions were broad and easy to answer, followed by ones of a more specific nature. A draft questionnaire was developed and circulated prior to the second community workshop for comment and endorsement. The final questionnaire is available in Appendix 5.

The questionnaire produced data that is based on the participant's recollections of their cultural fishing activity over the previous 12 months. To validate and improve the accuracy of the questionnaire data, a cultural fishing logbook was developed.

4.7.2 Cultural fishing logbook

A trial study was conducted using a cultural fishing logbook (FLB) to determine whether it had the potential to provide more accurate cultural fishing data in comparison to that gained from the questionnaires. The final FLB is available in Appendix 6.

The FLB was designed after examining other logbooks used to gather related information in other fishing sectors in Australia. A simple design was agreed upon and then trialled with two participants. Feedback from those participants resulted in modifications to the FLB through an iterative process. The FLB was printed on waterproof paper and distributed to those participants who had indicated a desire to be part of the trial. Logbooks were numbered to ensure the anonymity of each participant.

Participants were contacted monthly to address any problems associated with the use and interpretation of the FLB. Whenever possible the researchers took the opportunity to accompany participants to observe fishing and use of the FLB.

4.7.3 Focus group interviews

Focus group interviews (FGI) were employed in this project to obtain qualitative data on cultural fishing practices, fishing values and community aspirations. Typically a focus group comprises a facilitator and selected participants, usually five

to 12, who share a common interest or background (Stewart, 2005). Focus groups are used to elicit and validate collective testimonies while giving a voice to those previously 'silenced' by creating a safe space for sharing one's life experiences (Chase and Sutton, 1981).

For this project, the FGI questions were developed around three themes: cultural and socio-economic issues; management of fisheries; and future directions for cultural fishing. Four questions were developed, consistent with the range recommended for FGI (Stewart, 2007). The wording of the questions was developed in consultation with the community. Leading questions were avoided so that open and reflective discussion could take place. The final FGI discussion guide is available in Appendix 7.

Two focus groups were conducted, one for women and one for men. Participants were recruited from those who completed the questionnaire. Each participant was sent an information sheet beforehand describing the FGI procedures and what was expected of the participant and the facilitator.

Each FGI was scheduled for two hours duration and in venue familiar to the participants: the Minjungbal Cultural Museum. Both FGI were facilitated by the Principal Investigator and a research assistant. At the start of each FGI the facilitators clarified the purpose of FGI, the role of the parties and answered questions in relation to the information sheets. When the facilitators were satisfied that all participants understood the process they asked participants to sign a research consent form.

The facilitators made an audio recording of each FGI. The audio recordings are stored on a computer and backed up on a compact disc. As part of the requirements of the SCU ethics approval process, the recordings are being stored in a secured cabinet in the Principal Investigator's office at the SCU Lismore campus.

4.7.4 Individual interviews and comments

Interviews were conducted with individuals who completed the questionnaire but did not want to, or could not, participate in the FGI. These interviews were used to gain qualitative insights into cultural practice, fishing values and community aspirations. Additional qualitative data was noted, as were issues raised by community members and participants during the consultation and research phases of the project.

4.8 Method of analysing data

4.8.1 Questionnaire and cultural fishing logbook

Quantitative data was analysed using a Microsoft Excel program. Some data sets were converted to percentages, for example, for gender and age. Raw data on the frequency of fishing in the previous 12 months was converted to actual days for each fisher and this was combined with the duration of fishing events for each fisher to produce an estimate of the total number of hours fished. Total number of hours for each fisher was converted to a percentage and then these were ranked from highest to lowest to show whether fishing effort was consistent or variable within the sample of participants.

For Likert scale data on ‘cultural importance’, the number of rankings (low, medium or high) given by each fisher for each species was totalled. The species were then ordered from highest to lowest using the total high-ranking score and graphs were produced to show the top 10 culturally important species.

In analysing the ‘top target species’ data, the number of times a particular species was given a rating (one to five) was totalled for all fishers. These totals were then ordered from highest to lowest to show the top 10 targeted species.

For catch size determination, the totals, means and standard deviations based on the lower and upper values were calculated for each species and each fisher (see Table 1 – Hypothetical example). Catch size calculations were tabulated for both finfish and invertebrates and graphs produced to show the dominant species numerically. Total catch size ranges for each fisher were also ordered from highest to lowest.

Table 1: Hypothetical raw data table of nominated catch size ranges showing an example calculation of total, mean and standard deviations for lower and upper ranges for each species and each fisher

	Fisher 1		Fisher 2		Fisher 3		Total		Average		SD	
<i>Species</i>	<i>L</i>	<i>U</i>	<i>L</i>	<i>U</i>	<i>L</i>	<i>U</i>	<i>L</i>	<i>U</i>	<i>L</i>	<i>U</i>	<i>L</i>	<i>U</i>
1	11	50	51	100	1	10	63	160	21.0	53.3	26.46	45.09
2	51	100	51	100	11	50	113	250	37.7	83.3	23.09	28.87
3	101	250	251	400	51	100	403	750	134.3	250.0	104.08	150.00
4	1	10	1	10	11	50	13	70	4.3	23.3	5.77	23.09
total	164	410	354	610	74	210	592	1230	197.3	410.0	142.95	200.00
average	41.0	102.5	88.5	152.5	18.5	52.5						
SD	45.46	105.00	110.87	170.37	22.17	36.86						

Example 1. *Fisher 1* indicated on their questionnaire that in the last 12 months they had caught between 11 and 50 individuals of *Species 1*, 51 and 100 of *Species 2* etc. giving a low range total of 164 (average 41.0) and an upper value of 410 (average 102.5).

Example 2. *Species 1* was caught by all three fishers, *Fisher 1* indicating a catch range of 11 to 50, *Fisher 2*, 51 to 100 and *Fisher 3*, 1 to 10, giving a low range total of 63 (average 21.0) and an upper value of 160 (average 53.3) for *Species 1*.

4.8.2 Focus groups and individual interviews

The FGI were transcribed and copies sent to each of the participants for feedback and clarification. The participants were allocated one week in which to respond. Some of the individual interviews were recorded, while for others the researcher took notes.

The transcribed text from the FGI and the transcribed text and notes from the individual interviews were analysed by searching for common themes using key words and selecting key quotes for presentation in the results section. Additional comments provided by participants were used to support the analysis of the FGI and individual interviews.

5. Results

Fifty-six people completed the questionnaire. Twenty fishers were given FLBs but only seven were completed and returned. Fifteen people participated in the two FGI, while a further 10 participants were involved in individual interviews.

5.1 Questionnaire data

5.1.1 Participants profile

Women made up a smaller proportion of the fishers (29%) interviewed but it is likely, based on participant's comments, that more women engage in cultural fishing than the results suggest. Participants ranged in age from 18 to 56 and over, with the dominant age groups being 36 to 45 (30.5%), 26 to 35 (25.4%), 56 and over (25.4%) and 46 to 55 (15.3%). There were two participants in the 18 to 26 year age group.

5.1.2 Fishing frequency

About 30% of the participants indicated they fished on a weekly basis (Figure 2), and a small proportion (5%) fished everyday.

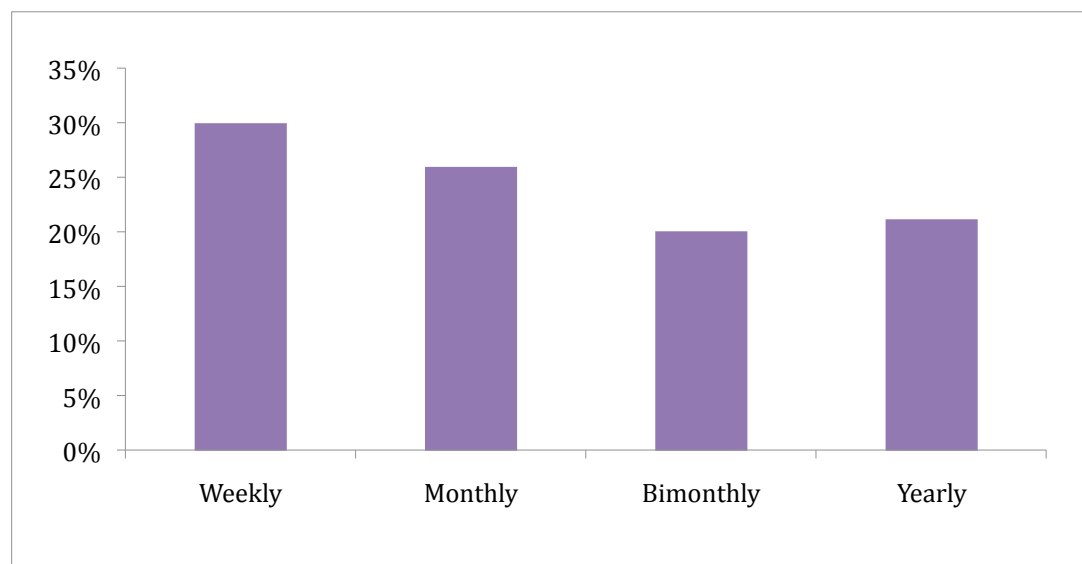


Figure 2: The frequency of fishing trips taken by participants in the Tweed region (n=59)

When participants were asked how often they thought other family and community members fished they estimated about 40% and 36%, respectively, fished on a regular basis.

5.1.3 Duration of fishing events

The average duration of a fishing event was 3.4 hours. Men fished for longer on average (3.76 hours) than women (2.4 hours). The estimated total hours fished by all participants in the 12-month period was 15,509. A few fishers (8.7%) accounted for most of the fishing time (47%) while 66.7% of the fishers accounted for only 12% of the fishing time.

5.1.4 Fishing with children

Children regularly accompanied adults when fishing (Figure 3). Women took children more often than men.

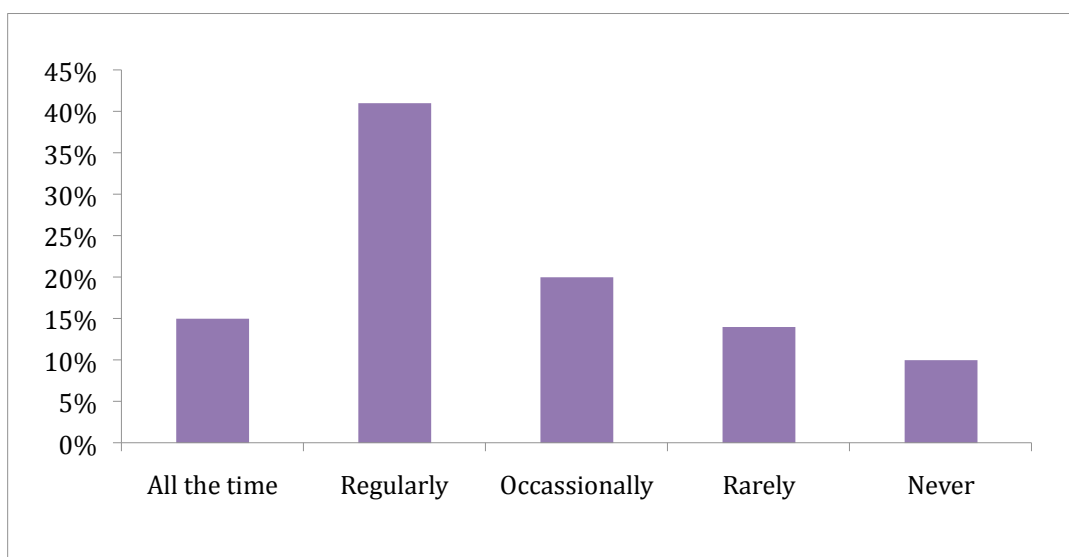


Figure 3: The frequency with which children accompanied adults fishing (n=59)

5.1.5 Preferred fishing platforms

Some of the fishing effort (25%) occurred from boats and the rest was shore-based. More men fished from boats than women.

5.1.6 Fishing locations

Participants showed a preference for fishing in estuaries and near-shore coastal areas including beaches and headlands (Figure 4).

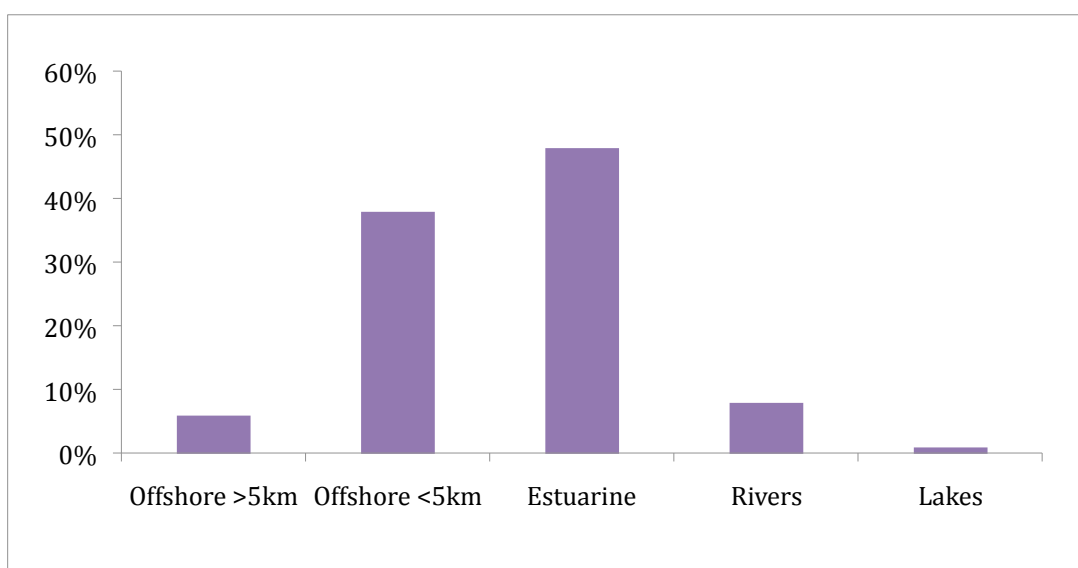


Figure 4: Percentage of participants fishing in different environments (n=58)

Most cultural fishing occurs within 10 kilometres of the participant's home location (Figure 5).

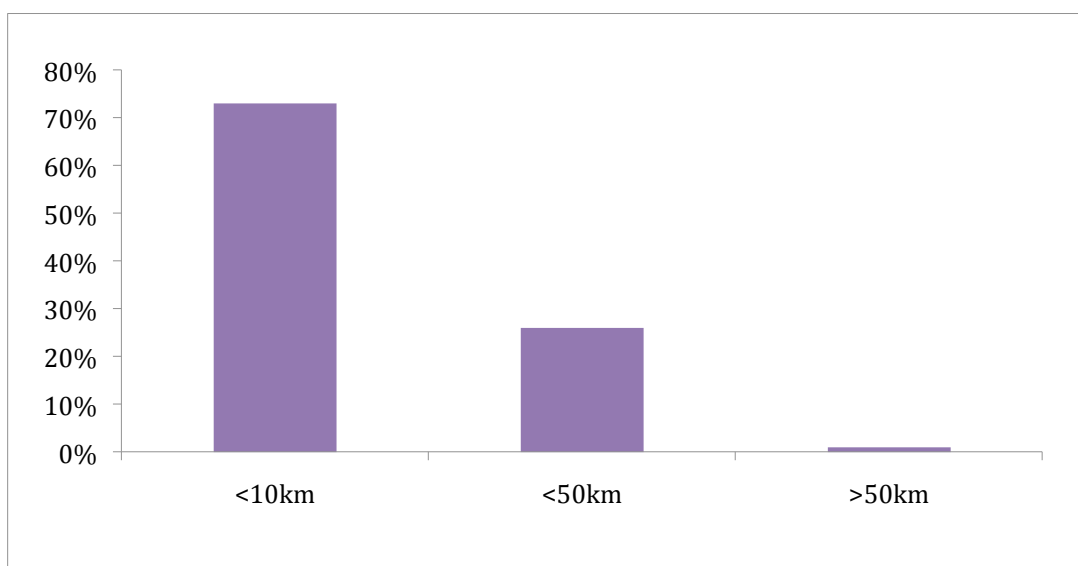


Figure 5: The distances travelled from home to fishing location (n=58)

Fishing further than 50 kilometres from home was infrequent and usually happened during holidays, or when seasonal species were ‘running’. It also occurred when participants wanted to use gear, such as cast nets, which is legal in Queensland but not in New South Wales.

Identifying the exact geographic location of fishing spots was problematic for participants because of the sensitive nature of the information. Some participants were happy to reveal exact locations, others only indicated general areas on a map and some refused to provide any information. From what data was gathered it was clear that most fishing spots were located in the Tweed River Catchment and along the adjacent coastline.

5.1.7 Preferred fishing gear

The predominant gear types used in the Tweed region were rods and lines followed by fish-traps, spears, gaffs and nets (Figure 6).

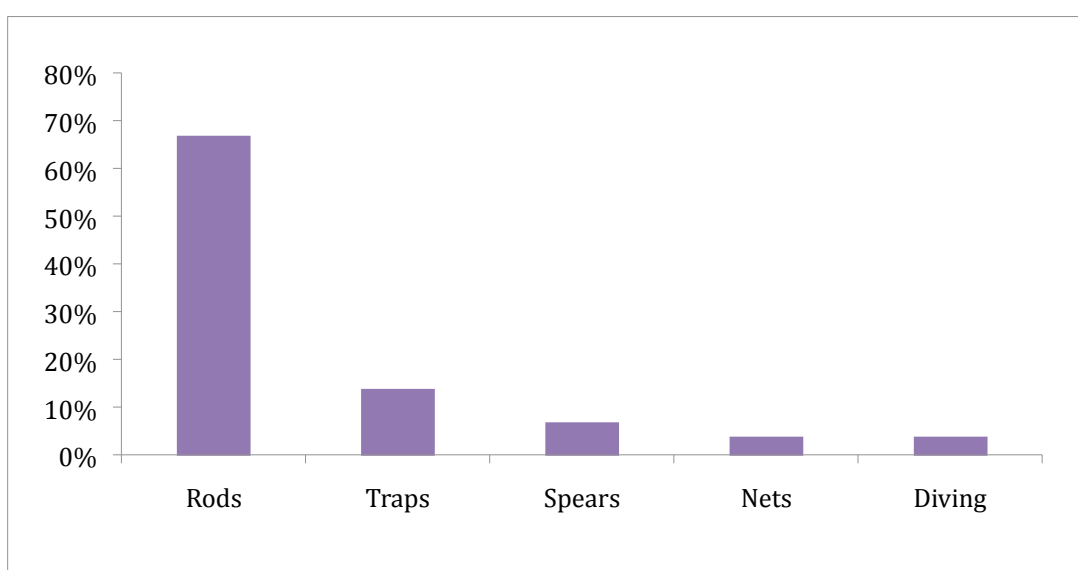


Figure 6: Percentage of each fishing gear type used in the Tweed community (n=59)

Hand gathering was important for collecting intertidal organisms with most participants indicating they had engaged in this activity in the previous 12 months.

5.1.8 Destination of cultural catch

Most participants identified their household as the main destination for their catch followed by immediate family and extended family (Figure 7).

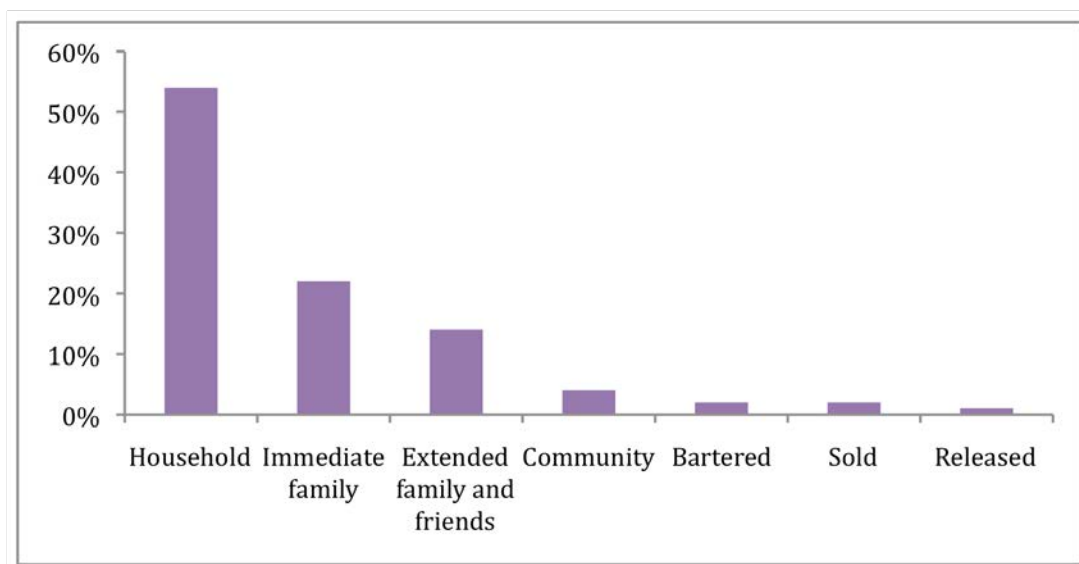


Figure 7: The percentage of catch going to various destinations (n=59)

Some participants indicated that they bartered and/or sold some of the catch.

5.1.9 Seafood consumption

Seafood consumed by participants came from personal and family catches, with smaller amounts obtained from other fishers or the fish co-op (Figure 8). Some came from local Indigenous commercial fishers, highlighting their role in providing their communities with seafood.

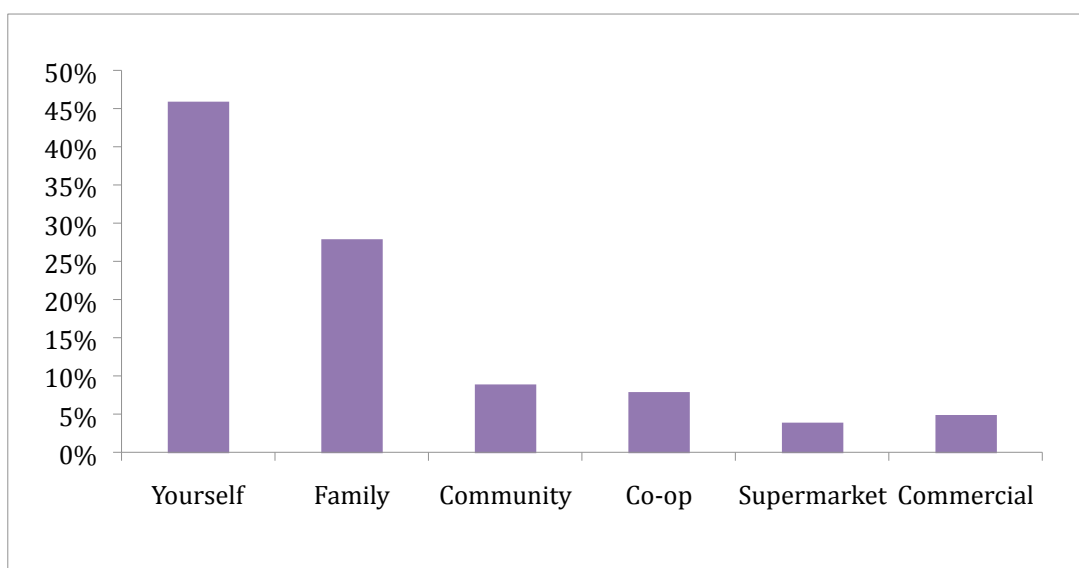


Figure 8: The percentage contribution of each source of seafood consumed by participants (n=57)

The consumption rate of seafood in the Tweed region is reasonably high (Figure 9). However participants indicated they would prefer to eat seafood at an even higher rate. For example, approximately 60% said they would prefer to eat seafood everyday.

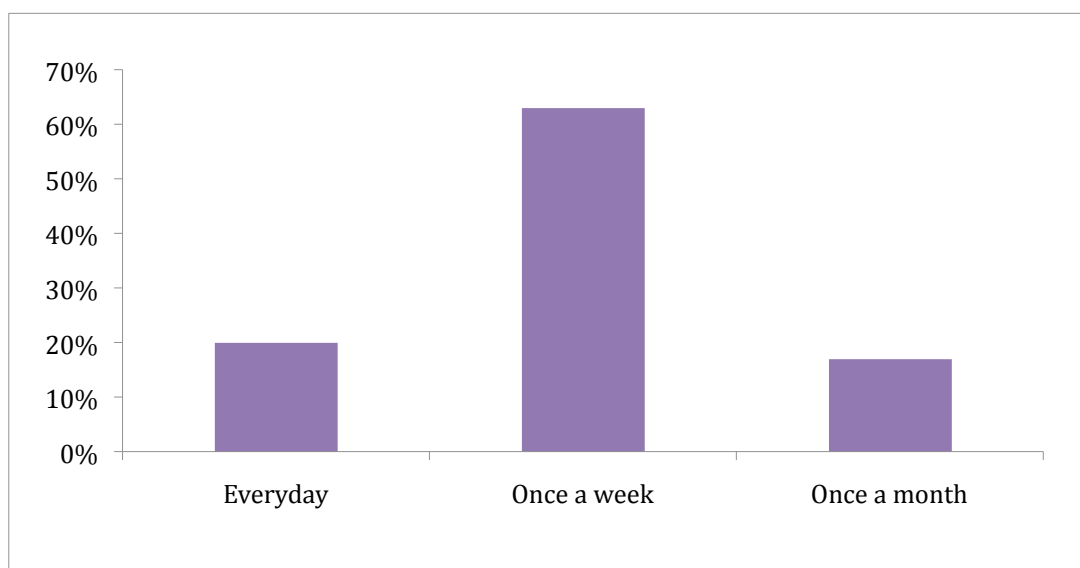


Figure 9: The actual frequency with which participants consume seafood (n=59)

5.1.9 Nominated top target species

Twenty-eight species were identified as preferred target species comprising 19 finfish and nine invertebrates. The top 10 target species included finfish and invertebrates, most of which are also targeted by recreational and commercial fishers (Figure 10).

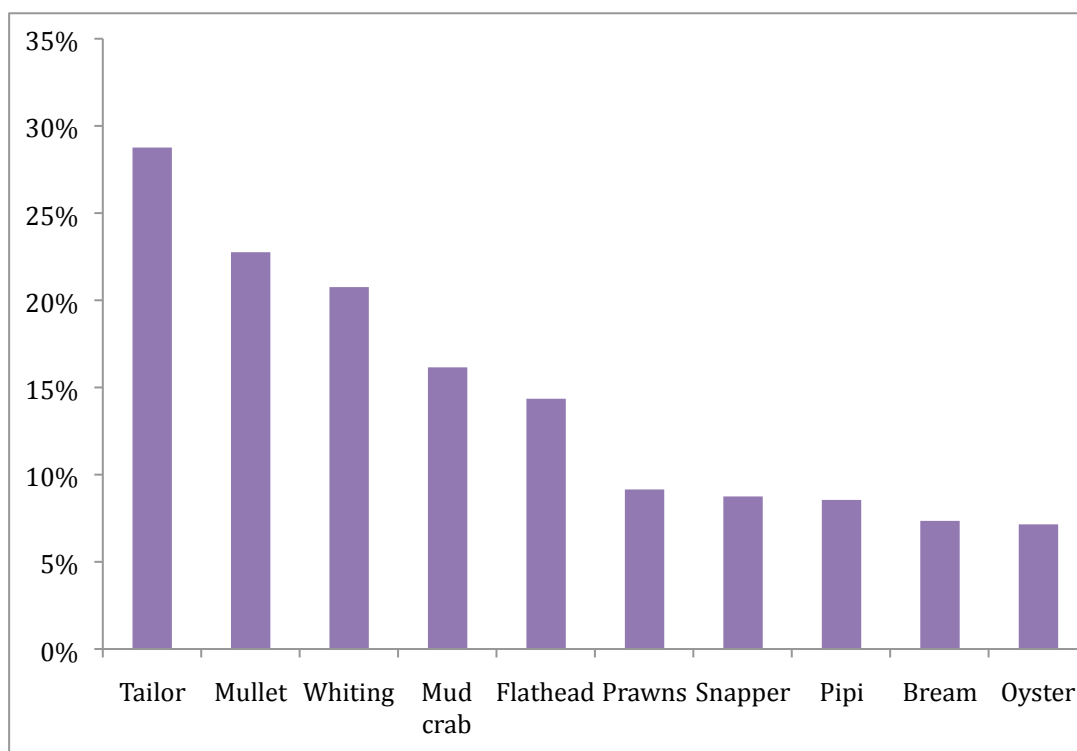


Figure 10: The top 10 nominated targeted species for Tweed (n=59)

5.1.10 Indigenous catch size

Catch range estimates were given for most of the 62 species listed in the questionnaire, as well as three additional species (Appendix 8, Tables 1 and 2). The estimated total catch in numbers was within the range of approximately 29,900 to 77,100 for the year.

The top 10 species caught were pipis (*Plebidonax deltoides*), followed by tailor (*Pomatomus saltatrix*), sand whiting (*Sillago ciliata*), Sydney rock oysters (*Saccostrea glomerata*), beach worms (F. Onuphidae), bait yabbies (*Callinassa australiensis*), sea mullet (*Mugil cephalus*), swallowtail dart (*Trachinotus coppingeri*), mud crabs (*Scylla serrata*) and school prawns (*Metapenaeus macleayi*) (Figure 11).

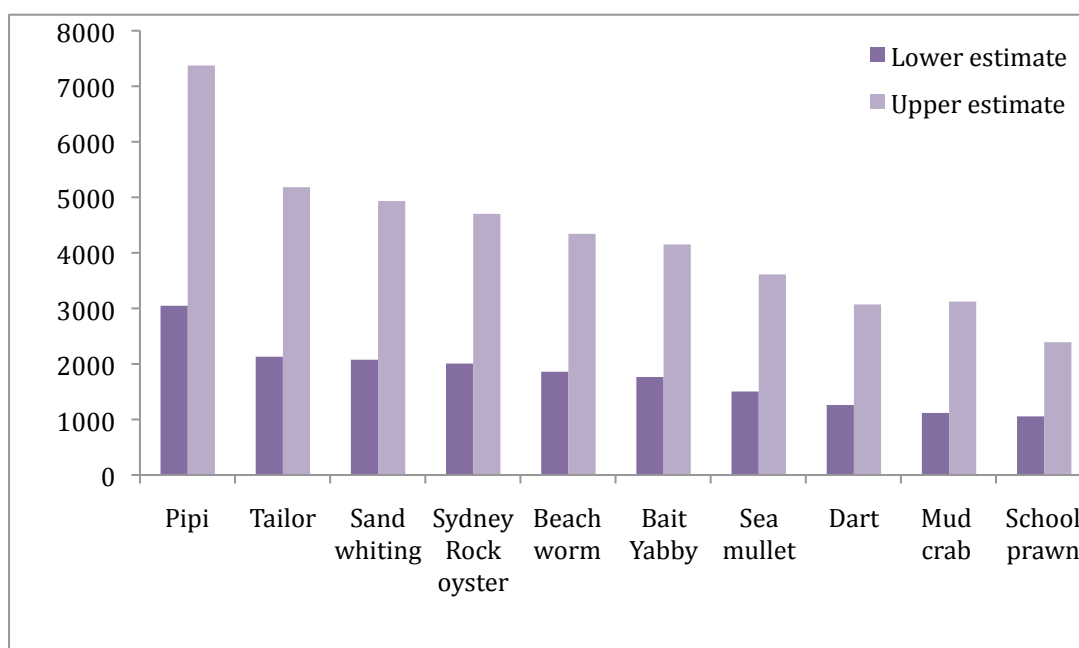


Figure 11: The top 10 species numerically by catch range (n=56).

The top five finfish were tailor, sand whiting, sea mullet, swallowtail dart, and yellow-fin bream (*Acanthopagrus australis*). Pipis dominated the invertebrate catch, followed by beach worms, bait yabbies, Sydney rock oysters and mud crabs. Women collected more pipis compared to men. Small numbers of freshwater turtles (*F. Chelidae*) and saltwater turtles (*F. Cheloniidae*) were also caught.

5.1.11 Cultural importance

The most important cultural species were pipis, mud crabs, sea mullet, tailor and sand whiting (Figure 12).

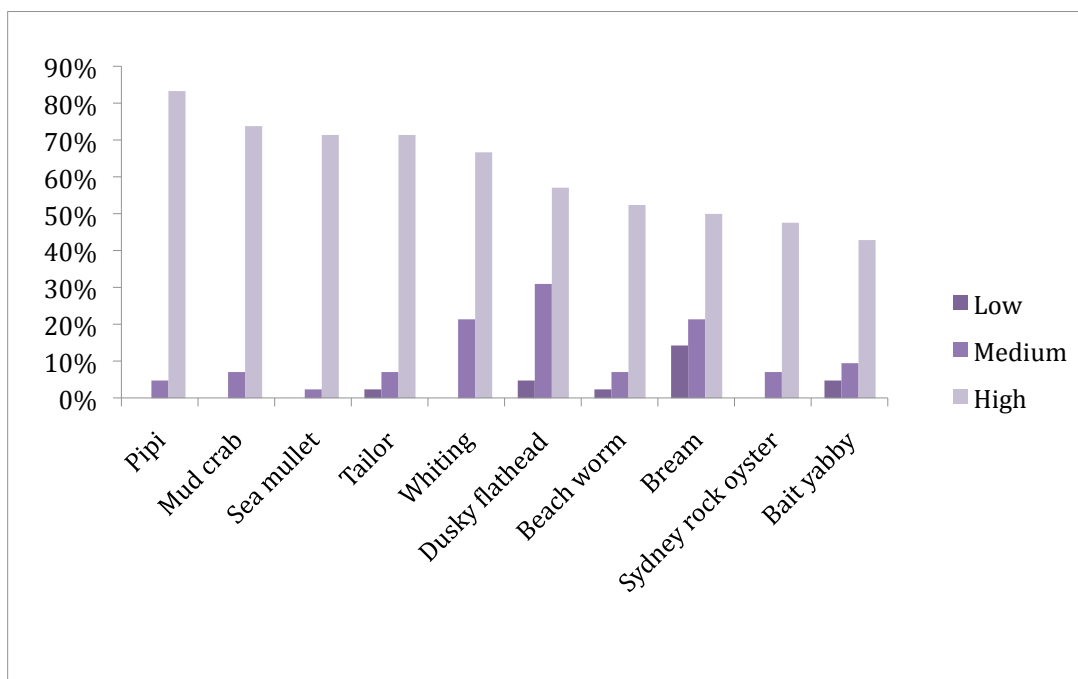


Figure 12: The top 10 culturally significant species as ranked by participants in the Tweed (n=56)

5.2 Cultural fishing logbooks

5.2.1 Fishing effort

The total number of hours fished based on FLB entries was 542.4, over a total of 92 fishing days, giving an approximate average of 54.2 hours per fishermen (Appendix 8, Table 3). When hourly rates are converted to a 12-month period then the FLB data yields an estimate of 215 hours a year per fisherman. This estimate may be compared to 263 hours from the questionnaire.

5.2.2 Gear and platform

Fishing occurred predominantly from the shore (68%) and the rest from boats. The dominant type of fishing gear used was fishing lines comprising rods and handlines. There was some hand gathering, as well as use of nets (cast nets and possibly gill and seine nets) and traps (crabs). Again this data compares favourably with that from the questionnaire.

5.2.3 Catch composition

Overall, 1879 individual finfish and 5959 invertebrates were caught for a total catch of 7838 (Appendix 8, Table 4). Twenty-seven species were recorded of which 18 were finfish and nine invertebrates. The dominant finfish was fan-tail mullet (*Myxus elongates*) (Figure 13).

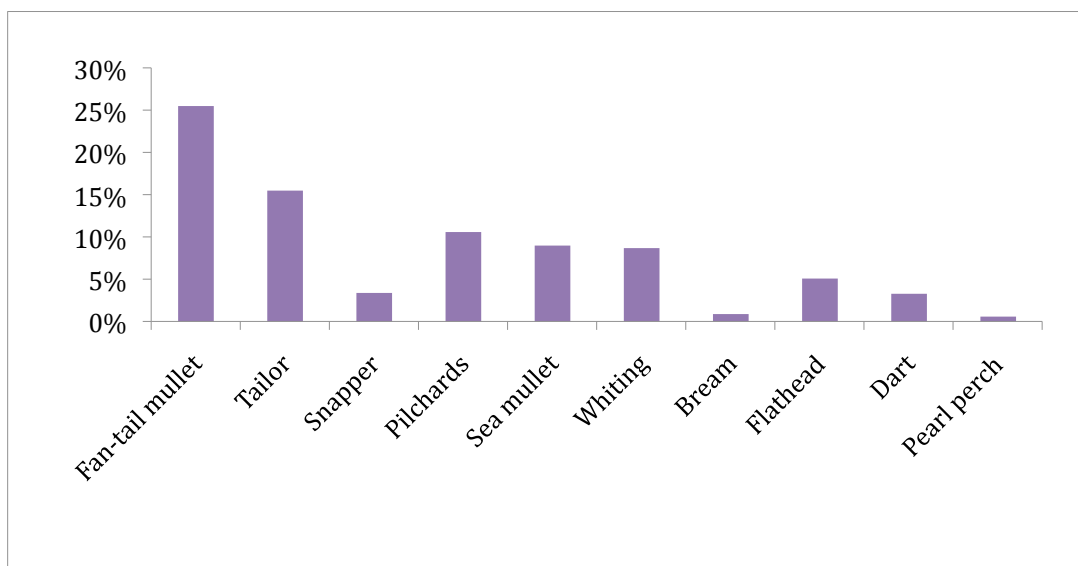


Figure 13: Top 10 finfish species by percentage in the cultural catch based on logbook data (n=7)

Most of the fan-tail mullet were ‘poddy size’ (undersize) and all were caught on the one day by a single fisher using a cast net. The next most prevalent species in the catch were tailor, snapper (*Pagrus auratus*), pilchards (*Sardinops neoplichardus*), sea mullet and sand whiting, bream, dusky flathead and swallowtail dart. The pilchards were all caught during a single fishing event, presumably by net. They were also used for bait. A large proportion of the sea-mullet catch was also poddy size. Snapper were more prominent in the FLB data than the questionnaire because one fisher spent a large amount of time during the period fishing on offshore reefs. The poddy mullet were all caught for use as bait.

The dominant invertebrates in the catch were oysters followed by pipis (Figure 14). This is similar to the findings for the questionnaire data. However, cockles are important in the FLB data as a result of two fishing events where these species were targeted. Some of the cockles were consumed and some were transplanted to ‘secret areas’ for later harvest. Mud crabs, while not numerically important, made up a larger proportion of overall catch biomass.

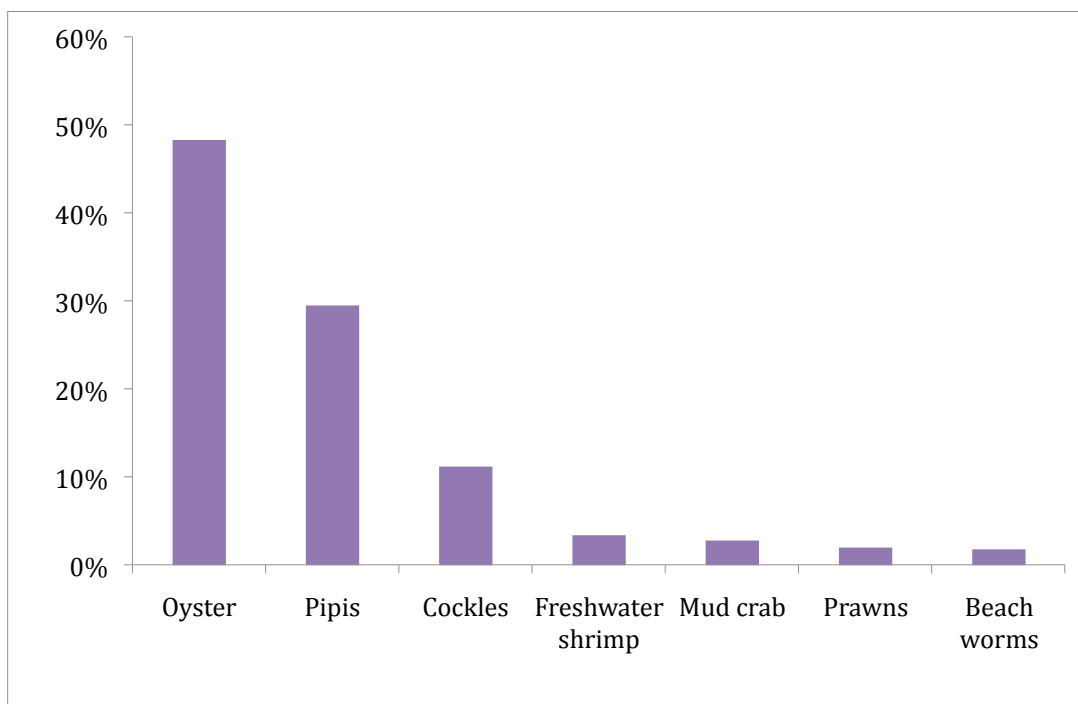


Figure 14: Invertebrate species in the cultural catch by percentage based on logbook data (n=7)

5.2.4 Destination of the catch

Some of the fishers had combined destination categories in their FLB therefore making direct comparisons with the questionnaire data problematic. A large proportion of the catch was bartered (B); a large amount was consumed by family members (F), the fisher's household (P) and the community (C); some was sold (S); some was used as bait (Ba); and a small proportion was released (R) (Figure 15).

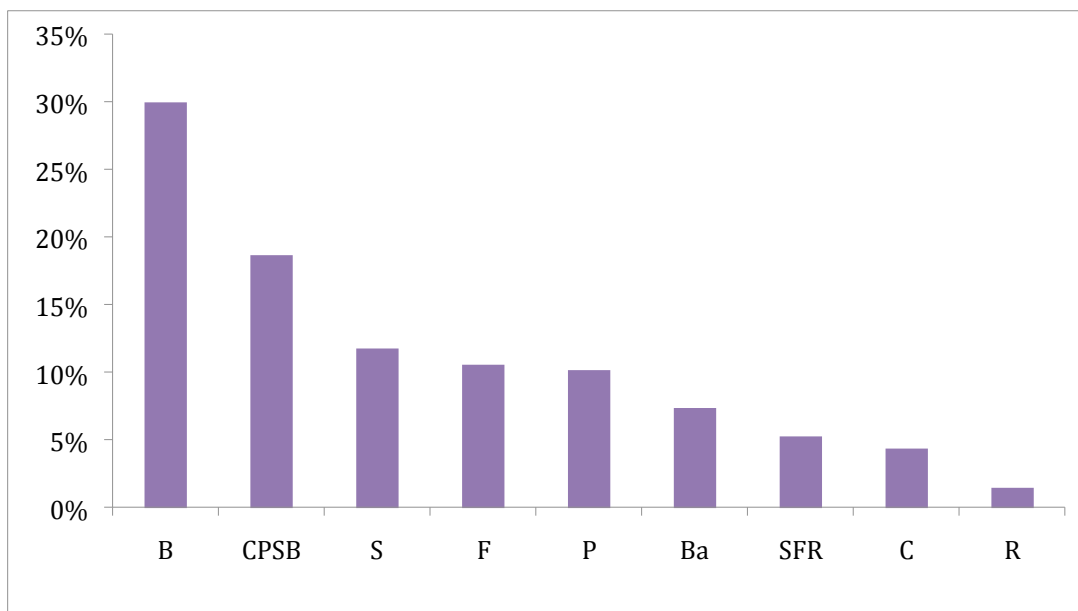


Figure 15: The various destinations of the cultural catch as recorded in the logbooks (n=7). (B=barter, C=community, P=personal, S=sold, F=family, Ba=bait and R=released)

Oysters and pipis were the main species bartered. Pilchards, poddy mullet and some pipis were used as bait.

5.3 Focus groups and individual interviews

The FGI and individual interviews provided project participants with an opportunity to elaborate on cultural fishing, fisheries management and future issues.

5.3.1 *Values of cultural fishing*

When asked about cultural fishing, FGI participants included social, economic and educational values, as well as elements of traditional knowledge, family cohesion and the environment in their responses. Participants emphasised the long connection their people had with fishing, for example:

It's something that's been happening for a long, long time. Like a lot of generations. My dad learned from his father or uncle. Things are passed down and it continues to filter down through generations, but also it's knowledge about seasons and things like that, like when particular fish are running, or when crabs are good or when the mackerels on. [We pass down] what our families done in the past about anything that comes out of the sea and how they lived, how they got it, who ate it. [It's about survival]. That sort of thing. (Women's focus group (wFG))

They also emphasised the fact that cultural fishing defined them as a people, as well as playing a role in binding the community together:

It's part of our identity. We are coastal people. (Men's focus group (mFG))

It's an activity that combines or binds us all together. (mFG)

A strong theme, particularly from the women's focus group, was the role of cultural fishing in maintenance of the family and extended family, for example:

My dad is teaching my kids certain things about fishing now, but it's also the time that they spend together, and I see that sort of reaffirms their bond that they have as grandfather and grandchild and that's important. (wFG)

When our family fishes, usually it is not just going fishing, it's a bit of family time. The whole family seems to have participation in it. But also then whatever we catch feeds the rest of our family and extended family or neighbours and that, I suppose, brings about a certain bind or connection between people or families and is an experience rather than just an activity. (wFG)

Women highlighted their role in cultural fishing, for example:

Our influences with fishing was old nanny Faye, she was fishing till she was well into her 90s. And then there was the sister aunty Queenie, she was...I don't know how old she was...must have been 80-90. My Nan was fishing right up till she was, must have been 70 or 80 something. Lots of strong fisherwoman living down there. (wFG)

5.3.2 *Traditional fishing knowledge*

Most participants made a strong connection between cultural fishing and TFK and how this knowledge is transferred:

Culturally [TFK is] handed down. I was taught to fish from my father. We were taught how to catch them, when to catch them, when to go out. You knew when the sea mullet were coming around because the different blooms in the bush would tell you, especially the Ti-tree flower they're always blooming when sea mullet season's on. (mFG)

Traditional Fishing Knowledge is a locally based knowledge system that provides holders with an intimate understanding of the immediate environment and the resources contained. It is also a key component of the cultural practices of a group, informing them of the state of the environment and guiding the ways various resources should be harvested and used. Issues relating to the value of TFK, and the concern about its loss, were raised by several participants, for example:

Well it's all about handing on the knowledge. I know when dad died a lot of information got lost on that day because he was a good fisher he could see fish. (mFG)

Participants expressed a strong desire to revitalise TFK:

Yeah techniques, especially today with the breakup of the culture, we're learning a lot of new stuff about all these old techniques that were used. It's good for a lot of young fellas that want to get back and maybe have another go at that, you know, re-invent it, bring it back in you, and then I suppose also with the catch as to how it was distributed amongst families. (mFG)

Some believed there was a need for proactive strategies to maintain TFK, through teaching in fishing classes run at the local high schools. One participant suggested:

Seize the opportunity as well to talk about the Bunjalung tribe, tell them, 'This is all Aboriginal land here. There's a midden over there. See those trees flowering? That's a good time for this type of fish'. That's another indicator for me, is when I see trees flowering, it's connected to the fish. (mFG)

5.3.3 *Economic benefits of cultural fishing*

A recurring theme was the importance of a cultural catch in delivering economic benefits to the community, for example:

The economic side of going out and getting your own bait, digging up yabbies, going and getting pipis, going and getting sea worms, blood worms whatever it is, it's a big saving. If you were to go and buy stuff like that, you'd spend a fortune before you'd even wet a line. Even to buy fish, I don't think I've ever bought fish in my life and I can honestly say that because I live right next to the river. I fish practically every day. It's a big saving. If you were going to head out and buy half a dozen fillets of flathead you're looking at a lot of money. (mFG)

Bartering some of the cultural catch is still widely practiced in the Tweed region:

Bartering has been carried on for so long, without money changing hands. Just say I'm feeding my family with fish and someone else might be feeding us with bananas in the family or like that and it fits into that sort of culture. (mFG)

I take crabs around to the uncles and they give me a bottle of chilli because they don't get out that much and [fish]. But if you go and give it to them, they can sit there and make some chilies and all that sort of stuff. (mFG)

The selling of some of the cultural catch was also raised by individual participants, for example:

If ever work dried up or slowed down and money was tight we used to sell fish for extra income. (Participant 31, pers. comm., 2010)

The health benefits derived from a cultural catch were also pointed out:

Relief, all the stress is going down that fishing line. (mFG)

When we were growing up at Fingal, like I said, you go down there to the bay and your down there having a big feed all day, but you were healthier because you were walking and eating good food. (wFG)

5.3.4 *Barriers to cultural fishing*

Participants felt that the main barriers to cultural fishing were related to various state based environmental and natural resources management practices, especially state-sanctioned 'closed areas', marine parks, bag limits and gear restrictions. There was a defiant attitude towards what participants described as 'non-negotiated, unilateral decisions' on the part of the New South Wales Government in relation to imposition of fishing regulations impacting their cultural fishing rights.

Most people would bend that law as far as they could because that law is preventing them from doing what they've been brought up to do. (wFG)

While they understood the need for compliance, participants felt compliance officers should be more tolerant of Indigenous cultural fishing practices.

Well you see with dad, he got spoken to by the fisheries dudes for getting oysters a couple of years ago. I think he's only been oystering once since then because he's still got this fear. He doesn't like confrontation at all, so he's still got this fear that if they come along while he's there. (wFG)

(a) *Closed areas*

The use of state-sanctioned 'closed areas' over certain waters was seen as a barrier to cultural fishing. For example, the closure of Wommin Lake on the Tweed River has prevented cultural fishing practices that target finfish species. The closure of Cook Island to the south of the Tweed River mouth was also a contentious issue. Participants all agreed that there had been insufficient consultation before the closure of what they saw as culturally significant fishing areas. Participants all expressed a strong desire to regain their access to these areas for cultural fishing.

(b) *Marine parks*

The establishment of marine parks has affected people living in the south near Brunswick Heads, where sections of the Brunswick River are now part of the Cape Byron Marine Park. There was a desire to revitalise cultural practice in the Brunswick River by rebuilding a traditional fish trap there for use. The proposed Commonwealth Marine Park, off the Tweed coast, would only affect a few offshore Indigenous fishers, but the participants indicated they wanted to be consulted about the possible impact on their access now and in the future.

(c) *Bag limits*

Participants saw the current New South Wales recreational fishing bag limits as inadequate to provide a cultural catch sufficient to meet the needs of the community, particularly the elderly and non-fishers. They were positive about the interim fishing regulations proposed in response to the 2010 amendments to the NSW FMA recognising cultural fishing, but they were unsure whether the new regulations would allow them to fish in a manner that promotes the continuation of their cultural practices.

One invertebrate species of particular concern is the pipi. Papis have been part of the traditional diet from before European invasion. The interim regulations would allow for an increase from 50 to 100 papis per fisher. However the fisheries regulations prevent gatherers taking papis beyond the high tide mark or for human consumption. This regulation has not stopped some individuals from collecting papis for consumption.

Indigenous fishers felt that the bag limit of five mud crabs per person per day was an impost on their cultural practice. They were annoyed by the fact that commercial fishing interests had been protected, but not their cultural fishing rights. Some Indigenous fishers in the Tweed River have been fined for being having more than the set bag limit for mud crabs.

(d) Gear restrictions

Gear restrictions have negatively impacted the cultural catch rates of sea mullet, which is a species of significant cultural value for the community. Mullet are typically caught in large numbers using seine or gill nets – gear restricted to commercial fishers. Traditionally mullet were speared or caught using traditional tow-row net. One participant also indicated how in the past they:

[H]elped commercial beach haul crews with their nets and for this we were given a feed of fish. But due to restrictions now in place about effort and only crew members touching nets, the community have little access to mullet. (Participant 9, pers. comm., 2010)

Many participants indicated that mullet may also be caught by ‘jagging’, a method of hooking a fish from within a dense school, other than through the mouth, by using a jerking action to impale the fish on an unbaited treble hook and weight:

Other than netting, the only other way to catch mullet during this time is to jag them, which is illegal in New South Wales. (Participants 7, 8, 9, 11, 16, 18 and 24, pers. comm., 2010)

5.3.5 Management of cultural fishing

(a) Cultural fishing charter and strategy

In thinking about tackling management issues, the participants in both FGI came to a similar conclusion, that is, the need for a local community organisation to take the lead and develop a cultural fishing strategy:

If the community was to get together and develop a charter they could get the resources, the money. They could then get a hold of a scientist and say, ‘We want you to come up here and look at these stocks, these species and inform us what you think is the best take in terms of what’s known in science’. Then bring in what the traditional fishermen are seeing and try and work the two together. Then use that as a basis as to what might be a reasonable catch. It’s doing basically what the fisheries has been. (mFG)

All participants were hopeful that recognition of Indigenous cultural fishing in the NSW FMA and subsequent establishment of the NSW AFAC would result in culturally appropriate management measures being put in place for cultural fishing. They felt that these developments could be built on by ensuring that the aspirations of their community were incorporated into decision-making processes at the state level. Establishing a local Indigenous fisheries governing body for the Tweed region, guided in turn by a community developed charter on cultural fishing, could facilitate such a process.

(b) Indigenous cultural fishing rangers

Participants also discussed the use of community members acting as cultural fishing rangers to enforce Indigenous cultural fishing regulations:

Whether you would do it with the fisheries or do it with your own say, volunteer ranges or selected rangers or elders or something like that. (mFG)

Participants pointed out that, while appealing, the idea of using community members acting as fisheries rangers could be problematic in terms of familiarity between fishers and the rangers. Enforcing rules and regulations may create tensions within the community between fishers and rangers. To deal with this one participant suggested there would need to be a degree of flexibility in the compliance enforcement, for example:

If someone took over the quota or something like that there's a certain amount of leeway for you as a community to be able to understand, rather than say, 'This is the law. This is what you've got to follow'. (wFG)

Other participants were less sympathetic, for example:

I reckon you have to be strict, they've all got to, otherwise you're just going to, we've got a big community here, it's a massive community. (wFG)

The implication here is that if you make an exception you may have to make many, particularly in a large community.

One participant suggested that rather than create positions for Indigenous community fishing rangers to enforce community derived fishing regulations, this could be done by existing New South Wales fisheries compliance officers:

Why employ rangers when we've already got rangers now who can be culturally educated...yeah fisheries, the guys that chase you. Why re-invent the wheel? Why not bring those guys on board too and say, 'Hey, this is what the Aboriginals [do] or this is what's been culturally accepted in this area for a long, long time'. (mFG)

This idea raised the vexed issue then of how would fisheries compliance officers determine whether they are dealing with an Indigenous person:

Some [of our people] have got red hair and green eyes. Does that mean we all have to carry identification around? (mFG)

So do we become registered, like they were saying, to fish [or] to be fisherman? Mind you, it is part of that registration to show your Aboriginality. (mFG)

The women's FGI suggested that state fisheries compliance officers work with the community to sought out issues relating to identity as had happened recently:

We've had a guy from the fisheries office ring and ask us if we knew them. Well that comes back down here to your database and your licence, not your licence, but your card. (wFG)

The participant was referring to an incident where Aboriginal fishers from another area wanted to fish around Cook Island claiming that they had a right to do so. The compliance officers contacted the TBLALC who informed them that the fishers were not from the Tweed area.

(c) Compliance

Participants explored a number of methods of ensuring compliance with community derived fishing regulations. In relation to penalties for non-compliance it was suggested that:

If somebody is caught, instead of saying, 'Bang, there's your \$100 fine or \$50 fine', you say, 'No, it's not a fine, it's for you to go out and research why it was out of season and why it was wrong for you to do that'. That then educates them. They've got to be going out and seeking a lot of information from other people so hopefully it will [also] have a little bit of a domino effect. (wFG)

Maybe we could have some way that [the penalty] could come back into the community. Maybe not even a fine, but something to do with management. Like stick up sign or make them do community work [to help the restricted species they fished]. (wFG)

While some of these suggestions may seem optimistic in bringing about compliance they show that the participants have ideas about how to manage cultural fishing and are willing to discuss them.

Education was also highlighted as a way to encourage compliance, for example:

If [rangers] come across someone in the community that they know they can talk to, then they could start that education process you were talking about. (wFG)

I think education is a big key, especially with kids, and there's a lot knowledge with older generations. That's how that [knowledge] could be passed on to some degree. (wFG)

One suggestion was that community leaders and cultural fishers could become involved in schools, teaching about cultural fishing and the need for fishing to be sustainable.

5.3.6 *Future issues relating to cultural fishing*

(a) *Aquaculture*

Along with the idea of greater community involvement in managing cultural fishing, a new theme emerged on aquaculture. Some participants thought Moreton Bay bugs, abalone, mud crabs or even oysters could be farmed. One participant mentioned the possibility of mussel farming around Cook Island off the mouth of the Tweed River:

Over in New Zealand people run mussels off islands. Growing mussels at Cook Island [would be] the perfect spot, for it's nice and deep on the other side there. (mFG)

The women's FGI focussed more on the potential for aquaculture to boost natural fish stocks as a means to keep traditional fishing alive, for example:

I reckon it is something to keep as an option, to keep open for the future, especially because there's more population coming to this area and more development and more impact on fisheries in the river. It's something as a re-stocking [measure] that should be kept open as an option. (wFG)

Establishing exclusive Indigenous use zones in rivers was also raised as a way to get into aquaculture ventures:

I think you also need to look at other areas, like where you've got exclusive zones to particular areas, like Ukerebagh, have that area zoned just for local Aboriginal people's use. And within that same context they may be able to develop ways to start farming mud crabs, looking after the ecology there, have the community better manage it so we've got more mud crabs. (mFG)

(b) *Marine protected areas*

The future impact of marine protected areas was also an issue of debate. One participant seemed to understand the role of marine protected areas:

I think that [marine protected areas are] a good thing for conservation. You've got certain areas where the fish, or whatever's in that area, is going to have a safe haven and to have [these protected areas] all along the east coast would probably be a good thing. (wFG)

However there was still a general lack of understanding in the community as to the ultimate role of marine protected areas, in terms of the protection of biodiversity:

So are the parks put in place for the fish stocks to build up? Is that the reason they're put in place? (wFG)

All participants emphasised the need for marine protected areas to be developed in consultation with the Traditional Owners so as to accommodate cultural fishing rights within the boundaries.

If the future direction [is for] marine parks, there's no reason why we couldn't have a cultural sanctuary tacked on too somewhere near these marine parks. (wFG)



Geoff Togo with a Dusky flathead caught in the Tweed River.

Photographer: Jackie McDonald

6. Discussion

The results in this project indicate that Indigenous cultural fishing is still alive and strong and practiced on a regular basis in the Tweed region.

6.1 Dimensions of Indigenous cultural catch

Indigenous cultural fishing takes place close to the fisher's home, is predominantly shore-based and focuses on the Tweed River estuary and adjacent coastal waters. These results are slightly different to the NRIFS findings which indicated that most Indigenous fishing in northern Australia is shore-based and concentrated in coastal waters rather than estuaries (Coleman *et al*, 2003). Also, compared to the Tweed region, there is more fishing in freshwater systems in northern Australia.

The main types of gear used in the Tweed region are rod and handlines however nets, traps and spears are used to catch species like mullet and crabs. In northern Australia, 53% of fishers used rods and lines and 26% engaged in hand gathering (Coleman *et al*, 2003). The use of nets was higher in northern Australia compared to the Tweed region, probably reflecting the New South Wales Government ban on gill and seine nets. This ban will need to be reviewed by the NSW DPI to take into consideration the desire of Indigenous fishers to catch culturally important species that are best captured in large numbers using nets.

The cultural catch in the Tweed region comprised a range of mostly estuarine and near-shore finfish and invertebrate species. Tailor, sand whiting, mullet, swallowtail dart, bream and dusky flathead dominated the finfish catch, while pipis, Sydney rock oysters, beach worms, bait yabbies, mud crabs and school prawns dominated the invertebrate catch. Most of these species have been harvested by Indigenous people in the Tweed region for many generations and this is supported by evidence found in local middens (Everick Heritage Consultants, 2009).

Analysis of the data from the FLB revealed some similarities with the data from the questionnaire in terms of gear, fishing platforms and the species composition of the catch. Snapper were more prominent in the FLB than the questionnaire data, probably because of the efforts of one fisher who was targeting them at the time. Poddy mullet were noted in the FLB but not in the questionnaire, probably because questionnaire participants were not questioned about fish length.

The main destination for the cultural catch was for personal consumption either by the fisher themselves, their family and extended family, or the community as a whole. Some of the catch was also used as bait. To a lesser extent, but still importantly, some of the cultural catch was bartered or traded for other goods and services within the community. The cultural catch not only provides the community with a healthy food product, but is cheaper than purchasing product from commercial outlets. The sale of some of the cultural catch is a vexed issue and is addressed later in this discussion section.

6.2 Focus group and individual interviews

The qualitative data from the FGI and individual interviews not only supported the quantitative data but also contained possible solutions for tackling issues associated with the management of Indigenous cultural fishing.

The role of cultural fishing in providing economic, social and cultural benefits (including sustenance, health and trade) was a constant theme in all interviews. The value of fishing was seen by participants to be important in maintaining the social cohesion of Indigenous communities. Social networks are reinforced through the customary sharing of food (Bomford and Caughley, 1996, Walsh, 1992). The fact that children also accompanied adults on a regular basis when fishing was seen by the participants to be important for the maintenance of cultural fishing practices and the transmission of TFK. Taking children on fishing trips provides an opportunity for adults to pass on their TFK.

Most participants felt that cultural fishing, as an activity, had declined over time as a result of state based fisheries management measures that were not sensitive to the cultural needs of the community. The establishment of marine parks and reserves, the closing of areas to fishing, the establishment of inadequate bag limits, restrictions on gear use and culturally insensitive compliance officers have created barriers to the continuation of cultural fishing in the Tweed region. The participants recognised the need to control fishing effort but they felt the development of regulations by NSW DPI should be done via a process of full engagement with the community.

6.3 Issues identified

6.3.1 Harvesting sea mullet using haul and mesh nets

Sea mullet are a target species that the Tweed community are concerned about. Sea mullet are a culturally iconic species for the Tweed people and they are still sought after in large numbers. The problem for the community is that the best method of capture for taking large numbers involves the use of large nets (seine and gill) both of which are restricted to commercial use in New South Wales. This is an example of how a fisheries management measure has a negative impact on Indigenous cultural fishing practices. Some participants are probably using nets, based on the large numbers of sea mullet making up the catch in the 12-month period prior to the questionnaire.

Currently Indigenous communities can obtain a special permit under section 37 of the NSW FMA to catch a large number of fish for a one off cultural event. However the process of applying for a section 37 permit tests the capacity of communities and the fact that it is for a one off event hinders their ability to obtain a regular supply of fish. All participants in this project strongly supported the need to change the current regulations in order to allow them to use nets on a regular basis to catch enough sea mullet to meet the community's needs. It is recommended that NSW DPI open a dialogue with the Tweed community on this issue and this could be achieved by referring it to the NSW AFAC for further discussion and development.

6.3.2 Management of pipi in Tweed region

Pipi are also a target species for which there is a great deal of angst in the Tweed community. Like sea mullet, pipis have a high cultural importance in the community. Pipis have been harvested for thousands of years, as evidenced in middens in the area (Everick Heritage Consultants, 2009).

Pipis are still harvested in large numbers, predominantly for food and also for bait. The community is concerned about the decline in numbers of pipis on local beaches over the last 20 years. They blame this decline on poor management, overfishing by

commercial operators and declining environmental conditions. All participants wanted NSW DPI to restrict commercial fishing for pipis and to do more research to identify the cause of the decline in numbers. The community also expressed a desire to be involved in any possible future research.

Participants were also unhappy with the current bag limits restriction of 50 pipis and they wanted this significantly increased. There is a recommendation by NSW DPI that the current bag limit be doubled as an interim measure. The NSW AFAC is currently discussing this recommendation.

The community was also concerned about the NSW DPI ban on the removal of pipis from the beach for consumption. They understood that this ban was related to the fact that pipis can become contaminated with toxins from planktonic algae and that commercial operations can proceed provided there is a marine biotoxin management plan (MBP) in place. They were keen to explore the possibility of developing their own MBP so they could continue to harvest pipis for food. Such a scenario would require assistance from NSW DPI on the best way to develop a MBP. As a starting point, the community suggested the issue be referred to the NSW AFAC for further discussion and development.

6.3.3 Management of oysters in Tweed River

Sydney rock oysters are still harvested today and are also a species of concern to the Tweed community. Whereas pipis are collected from ocean beaches, oysters are taken out of the Tweed River. Oysters have always been taken for consumption in the area and for many years some were sold in small jars. The concern about the oysters is two fold, it relates to the inadequate bag limits placed on them by NSW DPI and the periodic contamination of oysters particularly after floods. Participants all indicated that the bag limit on oysters of 50 per individual needed to be increased significantly.

Another regulation that is of concern to Indigenous fishers is that they are not permitted to take shucked oysters more than 50 metres from the river. A similar rule applies to pipis. This rule prevents them from sharing their catch with the elderly and/or incapacitated members of the community who cannot get down to the river if they want a feed of oysters. This issue has been raised with NSW DPI through the NSW AFAC working group on bag limits. A draft amendment to allow the removal of shucked oysters from the river has been developed for further discussion.

6.3.4 Management of cockles in Tweed estuary

Cockles are still harvested today in the Tweed estuary and they are another species that the community is concerned about. The community believe that recreational overharvesting of cockles in the Tweed estuary has greatly impacted their ability to catch enough for consumption. Some participants mentioned that members from the community had taken matters in their own hands and were now transplanting cockles from other estuaries to 'secret' intertidal areas in the Tweed estuary to boost the harvestable stocks. This practice may need further research to ensure that it is within the current regulations and, if so, to perhaps explore the need for a management plan.

6.3.5 Sale of cultural catch

Some of the cultural catch is being sold in the Tweed region. This is a contentious issue for NSW DPI as such a practice requires licences and permits. Many

participants considered it their right to dispose of a cultural catch how they saw fit. The risk in doing so, however, is that they may be charged with a fisheries offence.

The Tweed community were very supportive of the need for more research to explore the possibility that a proportion of a cultural catch might be sold. Their rationale was based on the long association they had with certain target species that are commercially harvested. This long association is the basis for the rights expressed by Indigenous fishers, to be able to fish for and dispose of a cultural catch according to existing Indigenous cultural norms. This area of rights to traditionally caught species needs to be further researched in the development of any new fisheries management regimes that have the potential to impact cultural fishing practices today.

In addressing the issue of selling a cultural catch, NSW DPI could refer to the principles developed by the NIFTWG to guide the development of fishing strategies for Indigenous people across Australia (Smyth *et al*, unpublished) and the recent Torres Strait Island Regional Seas Claim which acknowledged the right of Islanders to sell their cultural catch (Federal Court of Australia, 2010).

6.3.6 Local Indigenous fisheries governing body for the Tweed

The FGI explored the notion that the community might manage their own cultural fisheries at the local level. This could be achieved through the establishment of either a new Indigenous organisation that focussed on management or an existing organisation that incorporated cultural fishing management into its activities. Such an organisation could provide employment for community-based rangers to monitor compliance with cultural fishing norms.

While this idea had a significant degree of support from FGI participants, some were concerned about whether sufficient resources could be sourced to maintain such an organisation. Another issue was how would local community rangers deal with fishers breaking the cultural fishing norms, most of whom would be familiar to them and in some cases related. Participants felt that this situation has the potential to create tensions within the community and some participants suggested it would be better to work with existing state fisheries compliance officers to enforce community derived fishing rules and regulations.

The FGI participants thought that this idea merited further investigation and could be the basis for a future funding application to FRDC or AIATSIS.

6.3.7 Cultural fishing charter and strategy for Tweed

Another related idea was the potential development of a cultural fishing charter for the Tweed community. Such a charter would be developed by the community and therefore owned by the community. It would set out the community's position on cultural fishing including the following possible elements: identification of key target species; nomination of Indigenous fishing areas; and description of appropriate fishing gear.

Once such a charter was developed and agreed to, the community would be in a position to develop a cultural fishing strategy, which could include mutually acceptable rules and regulations to guide cultural fishing practices in the area. The charter could also provide a basis for the Tweed community to negotiate with the NSW DPI on the allocation of a proportion of the overall catch taken by all three

sectors (commercial, recreational and Indigenous). The FGI participants thought that this idea also warranted further investigation and could be the basis for a future funding application to FRDC or AIATSIS.

6.3.8 *Role of education*

All participants agreed that education should play a significant role into the future. Programs are needed to raise community awareness about the role of centralised management agencies such as the NSW DPI, while at the same time cross-cultural training is needed within the NSW DPI to raise staff awareness about all facets of Indigenous cultural fishing. Such a two-way approach would provide a better platform for future engagement between the community and the agency.

Education programs on Indigenous cultural fishing could be developed for schools, particularly those with fishing already in their curricula. This would help to build a much wider appreciation of Indigenous cultural fishing in Australian society in general.

6.3.9 *Issues with the cultural fishing logbooks*

Most participants found recording the weight of catch to be too time consuming as it interfered with their fishing activity. Some participants did not want reveal their fishing locations as these locations hold special significance for them, their families and the community. One participant indicated that some locations were connected to 'men's business'. Another issue for some fishers was indicating the gear used, as some gear types are currently restricted to commercial use. Fisher's justify their use of these restricted gear types by the fact that they cannot catch some of their culturally important species, like mullet, without using these gear types.

The use of FLB to record cultural catch shows some promise but requires a lot more support of individual fishers to ensure consistency of data input. While some participants were familiar with filling in forms, and so found the process familiar, others found it alien, even confronting. Some did not remember to fill in the FLB after the fishing event. Some were not comfortable recording their fishing activities especially when they had not caught any fish, saying they felt silly because they might not have caught enough. Some of these issues can be resolved through the fishers gaining more experience with the process and seeing the outcomes of the data generated from such research. However this will require time, resources and ongoing engagement outside the life of this project.



Indigenous fisher at Fingal beach near Tweed Heads.

Photographer: Gina Combo

7. Benefits and Adoption

The sectors that will benefit, the nature of those benefits and an estimate of the adoption of benefits by beneficiaries are presented in Table 2.

Table 2: Estimated status of adoption of benefits from the FRDC research project number 2009/038 flowing to beneficiaries

Beneficiaries	Benefits	Adoption
Tweed Indigenous community	<ul style="list-style-type: none"> - A report that can be used in negotiating fisheries policy development. - Research findings that can be used to raise awareness. - Community capacity building. 	<p><u>Partial and ongoing</u></p> <ul style="list-style-type: none"> - First draft final report endorsed by the Tweed community for submission to the FRDC. - Some community members have used the experience to develop applications for scholarships and other projects. - Some community members are developing a poster on the research for the next New South Wales Coastal Conference.
Indigenous communities more widely	<ul style="list-style-type: none"> - Case study of what can be achieved with research into cultural fishing. - How research can be used to effect change. 	<p><u>Partial and ongoing</u></p> <ul style="list-style-type: none"> - Presentation given to NSWALC. - Briefings given to NSW AFAC and used in developing changes to regulations on bag limits.
Recreational and commercial fishers	<ul style="list-style-type: none"> - Better understanding of Indigenous cultural fishing, leading to support for adequate allocation of catch between sectors. 	<p><u>Partial and ongoing</u></p> <ul style="list-style-type: none"> - Principal Investigator is member of the NSW SIAC and has quoted research findings at meetings to influence policy development, for example, in relation to oysters.
Government Agencies: NSW DPI NSW DAA NSW DECC VIC DPI FRDC	<ul style="list-style-type: none"> - Better understanding of Indigenous cultural fishing, resulting more culturally appropriate policy and program development and implementation. 	<p><u>Partial and ongoing</u></p> <ul style="list-style-type: none"> - NSW DPI with NSW AFAC developing changes to regulations on bag limits and others. - NSW DPI compliance officers in far north coast region given presentation on cultural fishing in 2010 in Tweed Heads. - NSW DECC development of New South Wales cultural resource use framework. - Principal Investigator on VIC DPI working group redesigning approach to fisheries management in Victoria. - Principal Investigator is member of the FRDC Indigenous Reference Group advising on research strategy.
Conservation Non-Government Organisations	<ul style="list-style-type: none"> - Better understanding of Indigenous cultural fishing resulting in support for the maintenance of cultural fishing practices, particularly in aquatic environments targeted for conservation measures. 	<p><u>Yet to happen</u></p> <ul style="list-style-type: none"> - Will be ongoing through presentations to organisations and/or publications.

Researchers and consultants	<ul style="list-style-type: none"> - Better understanding of the need for more research into Indigenous cultural fishing. - Better understanding of the research methodologies to use in Indigenous communities. 	<p><u><i>Partial and ongoing</i></u></p> <ul style="list-style-type: none"> - Project researchers participating in other FRDC projects on Indigenous fishing. - Presentation made at United Nations workshop on customary use of biological resources in Montreal, Canada in 2011.
Australian society	<ul style="list-style-type: none"> - Better understanding of Indigenous cultural fishing resulting in support for policy and program development. - More culturally sensitive environment and resource management tertiary curricula. 	<p><u><i>Partial and ongoing.</i></u></p> <ul style="list-style-type: none"> - Curriculum material developed and used in teaching of fisheries management at SCU. - Development of publications based on research in initial phases. - Presentation and poster display on the research to be given at the next New South Wales Coastal Conference. - Media releases and interviews given by Principal Investigator on the project.

The benefits from this research compare closely with those stated in the original application. Some decision-making processes of the NSW DPI have been influenced as a result of the Principal Investigator providing numerous briefings on the project results. The results of this project will further inform the development of strategies to address Indigenous cultural fishing, as the Principal Investigator is now a member of the NSW AFAC.

8. Further Development

Recommendations for further development include:

- development of a PowerPoint presentation to be given to Indigenous communities around New South Wales and for use at regional, national and international conferences;
- development of two research papers for publication in internationally recognised journals;
- development of an Indigenous cultural fishing website hosted by the NSW DPI or SCU;
- further refinement of the FLB;
- development of a reduced version of the questionnaire for online delivery;
- development of a research funding proposal to investigate and support the development of an Indigenous community fishing charter and cultural fishing management plan for the Tweed, to address the issues raised in this project;
- development of a research funding proposal to expand research on cultural fishing to other Indigenous communities across New South Wales; and
- development of a strategy to incorporate Indigenous cultural fishing into secondary and tertiary education curricula.



Indigenous fisher at Fingal beach near Tweed Heads.

Photographer: Gina Combo

9. Planned Outcomes

The main outputs planned for this project in the original application to FRDC were:

- a report detailing the elements that comprise Indigenous cultural fishing at the Traditional Owner level and a description of Indigenous catch, rates, locations; and
- a report describing the methodology to be used to determine Indigenous cultural fishing effort.

Both of these outputs now comprise the one report. How the outputs contribute to the five planned outcomes listed in the original application to FRDC is presented in terms of each outcome, as set out in Table 3. It is worth emphasising that the process for adoption of these outcomes will be ongoing as some require extensive negotiation and paradigm shifts in the way each of the stakeholders view their roles in relation to each other.

Table 3: The five planned outcomes with outputs and adoptions as described in the FRDC application for project 2009/038 and their perceived current status

Planned Outcomes/Outputs/Adoptions	Status
<p><u>Outcome 1.</u> Equitable allocation of a proportion of traditionally targeted species to Indigenous fishers achieved through more culturally informed fisheries management strategies.</p> <p><u>Output 1.</u> A database on Indigenous cultural catch rates for traditionally targeted species.</p> <p><u>Adoption 1.</u> Incorporation of Indigenous cultural catch requirements into state-based fisheries management plans.</p>	<p><i><u>Partial and Ongoing</u></i></p> <ul style="list-style-type: none"> - The report's findings will continue to inform the NSW DPI and the NSW AFAC, in the development of strategies to address cultural fishing. The Principal Investigator is a member of the NSW AFAC. - Doubling of the daily bag limit for Indigenous cultural fishers as part of the interim regulations for cultural fishing under the NSW FMA was partly a result of advice based on the report's findings. - The report's findings will empower Indigenous communities, particularly in the Tweed region, to provide input into fisheries management decision-making processes about management of cultural fisheries.
<p><u>Outcome 2.</u> Reduced conflict between Indigenous and non-Indigenous fishers based on a better understanding of the needs of each group.</p> <p><u>Output 2.</u> Information available in printed and electronic form about the nature and role of Indigenous cultural fishing practices.</p> <p><u>Adoption 2.</u> Acknowledgment of Indigenous cultural fishing practices by recreational and commercial fisheries in a range of forums and media including newsletters and workshops.</p>	<p><i><u>Partial and Ongoing.</u></i></p> <ul style="list-style-type: none"> - During the project commercial and recreational representatives were informed of emerging project results through NSW SIAC and NSW FRAB. - Papers publishing the methodology and results of the research are being prepared and will be made available through a wide range of formal (journals) and informal outlets (websites). - This outcome will require time for information from the report to disseminate and for the information to be absorbed and acted on.
<p><u>Outcome 3.</u> Better working relationship between the NSW DPI and local Indigenous communities in fish resources management.</p> <p><u>Output 3.</u> Information available in printed and electronic form about the nature and role of Indigenous cultural fishing practices. Cross-cultural workshops based on the information contained in the reports.</p> <p><u>Adoption 3.</u> Resources allocated by the NSW DPI to implement strategies of the IFS.</p>	<p><i><u>Partial and Ongoing</u></i></p> <ul style="list-style-type: none"> - The establishment of the NSW AFAC under the amended NSW FMA is an outcome of the efforts of many Indigenous people. The researchers also provided a submission based on this project supporting the establishment of the NSW AFAC. - NSW DPI representatives have been provided with briefings and one representative attended a community workshop at the invitation of the researchers and the Tweed community. - Some of the project findings were presented to a meeting of the NSW DPI compliance officers for Far North Coast Zone Region in March 2010.
<p><u>Outcome 4.</u> A more informed public understanding of the role of Indigenous cultural fishing in a modern day context.</p> <p><u>Output 4.</u> Articles in newsletters, newspapers etc. highlighting the benefits of</p>	<p><i><u>Partial and Ongoing</u></i></p> <p>The project's results and methodology:</p> <ul style="list-style-type: none"> - are being fed into other FRDC funded projects including a national forum on shaping Indigenous

<p>protecting Indigenous cultural fishing practices.</p> <p><u>Adoption 4.</u> Public support for Indigenous initiatives to maintain cultural fishing practices.</p>	<p>fishing and aquaculture research and development and engaging Indigenous communities;</p> <ul style="list-style-type: none"> - have informed input into 'Evaluating the Performance of Australian Marine Capture Fisheries' a 2009 report completed for the FRDC; - have been presented at a VIC DPI workshop in 2011 for developing a strategy on the future management of wild caught fisheries; and - have been presented, in part, at two international conferences - the second International Marine Conservation Congress held in Victoria, British Columbia, Canada in May 2011 and the United Nations Workshop on article 10(c) of the CBD held in Montreal, Canada in June 2011.
<p><u>Outcome 5.</u> Some capacity building of Indigenous communities.</p> <p><u>Output 5.</u> An honours student.</p> <p><u>Adoption 5.</u> More research undertaken by Indigenous people on Indigenous fisheries.</p>	<p><u>Partial and ongoing</u></p> <ul style="list-style-type: none"> - No Indigenous student was available to undertake the honours project. The project was instead undertaken by a non-Indigenous student, who was awarded first class honours. This student is now enrolled in a doctoral studies program and is pursuing research closely related to this project. - There is now trust between the Tweed community and the research team, which will lead to new research opportunities. Already the community has sought the researcher's assistance in developing funding applications for scholarships and research. - Capacity building with the Tweed Indigenous community has resulted in: <ul style="list-style-type: none"> • a community member applying for membership of the newly established NSW AFAC; • a community member enrolling in the Bachelors Degree in Environmental Sciences and Management at SCU in 2011; • a community member applying for a Fish Habitat Protection Grant through the NSW DPI; • the development of an application for a FRDC funded Indigenous scholarship; and • three community members giving presentations on cultural fishing to third year students studying fisheries management at SCU.



Indigenous fishers catching beach worms at Fingal beach near Tweed Heads.

Photographer: Gina Combo

10. Conclusion

The conclusions are presented in relation to the original four project objectives, which were:

1. Determine what aquatic organisms (fish) are of specific cultural relevance to Traditional Owner groups (identify species and their location).
2. Seek to quantify the Indigenous catch (species, numbers, weight, frequency of fishing) at the level of Traditional Owner groups.
3. Develop an ongoing research partnership with Traditional Owner groups based on trust to be able to move to the documentation of traditional fishing knowledge and the establishment of community owned and controlled data bases.
4. Build capacity of Indigenous people to conduct fisheries related research.

10.1 Conclusions in relation to objectives 1 and 2

Cultural fishing in the Tweed region is predominantly shore-based and focussed around the estuary and adjacent coastal waters. Rods and handlines are the main gear types used, while nets, traps and spears are used to catch species such as mullet and crabs.

The top 10 culturally most important species comprised a mix of finfish and invertebrates. Pipis and mud crabs were the top two, followed by sea mullet, tailor, whiting, dusky flathead, beach worms, Sydney rock oysters and the bait yabby. These rankings were somewhat similar to the rankings given for the preferred target species, that is, species that fishers go out to catch on a regular basis. However pipis, which are seen as a culturally important species and are taken in large numbers, are not specifically targeted as much as other species. Sea mullet are also regarded as a culturally important species, and they are consistently targeted, but they are numerically less important than tailor or sand whiting.

Most of the cultural catch is consumed either by the fisher, their family and extended family or the community as a whole. Some of the catch is also used for bait. To a lesser extent, but still importantly, some of the catch is bartered or traded for other goods and services within the community and some is sold.

The research team was able to determine the species composition of the catch and an indication of the size of the take, on a species-by-species basis, using a system where fishers nominated a catch range for each species over a 12-month period. Participants were comfortable with this approach as they felt it was less intimidating than specifying a single figure. Using this approach it was determined that the cultural catch was made up of a range of finfish and invertebrate species. The finfish component was dominated by estuarine and near-shore species such as tailor, sand whiting, mullet, swallowtail dart, bream and dusky flathead. A few Indigenous fishers fish offshore in deeper waters and their catch tends to be dominated by snapper. A variety of invertebrates are also caught with pipis, oysters, beach worms, bait yabbies, mud crabs and prawns dominating.

Most of the species dominating the catch are also valued highly as culturally important species, especially pipis, mullet, mud crabs and Sydney rock oysters. This

is not only a result of their presence in the current catch, but because some species have been caught for many generations as evidenced in local middens in the Tweed region. This long attachment to culturally significant species is the basis for the rights expressed by current cultural fishers, that is, the right to be able to fish for, and dispose of, a cultural catch according to existing Indigenous cultural norms.

10.2 Conclusions in relation to objectives 3 and 4

Extensive community engagement and capacity building by the research team facilitated the collection of data on cultural fishing in the Tweed region. It also provided the research team with the opportunity present information to the community on research methods and aspects of fisheries management. As a result of close contact with the research team, some community members gained enough confidence to:

- apply for a Fish Habitat Protection Grant through the NSW DPI;
- apply to become a member of the newly established NSW AFAC;
- enrol in the Bachelor Degree in Environmental Sciences and Management with a major in fisheries at SCU;
- develop an application for a FRDC funded Indigenous scholarship;
- give presentations on cultural fishing to third year university students studying fisheries management at SCU; and
- assist in the development of a presentation at the next New South Wales Coastal Conference.

The trust that the research team developed with the Tweed community has led to mutual discussions about engaging in further projects, including:

- continuing the research on cultural fishing catch to build a more detailed database and extending the study to the whole of New South Wales;
- exploring the possibility of fisheries self-governance at the local level, including the development of a cultural fishing charter and a local Indigenous fisheries strategy; and
- conducting a feasibility study of the potential for aquaculture ventures in the Tweed region.

Involving the NSW DPI during the project through regular updates and presentations has helped the department refine its strategies for engagement with Indigenous communities. This will greatly assist them in implementing the 2010 changes to the NSW FMA to recognise cultural fishing. Input from the research team has already played a small but important role in informing the development of draft interim regulations applying to bag limits for a cultural catch. It is envisaged that the results of this project will further inform the development of strategies for the management of Indigenous cultural fishing.

10.3 Conclusions in relation to objectives 1 and 4

The FGI provided valuable insights into the meaning of cultural fishing to the Tweed community, something the questionnaires could not achieve. The FGI also allowed participants to raise issues impacting their cultural fishing practices and then explore solutions in a safe environment. The FGI reinforced the view that

cultural fishing in the Tweed region is still as relevant today as it has always been. The interviews emphasised the importance of the cultural catch as a source of food and a means for the barter of goods and services. Cultural fishing is also seen as a potential source of revenue, as well as a mechanism for maintaining connections within and between families and the rest of the community. Participants particularly stressed the role that cultural fishing played in the maintenance of TFK, for example, through children accompanying adults on fishing trips and learning about cultural fishing.

Participants were optimistic about the recent legislative recognition of Indigenous cultural fishing in New South Wales and the establishment of the NSW AFAC. They also expressed great interest in how the community might play a greater role in the management of their cultural fisheries particularly in resolving issues, including:

- the development of culturally suitable bag limits for key species;
- the use of large nets to catch culturally iconic species like sea mullet in larger numbers and on a more regular basis;
- restriction on the consumption of certain bivalves such as pipis and oysters;
- translocation or reseedling of species like the cockle from one estuary to another;
- the selling of species taken in the cultural catch; and
- enforcing compliance through community rangers or more culturally sensitive fisheries officers.

In terms of aquaculture, there did seem to be a need for the community to be provided with a lot more information about aquaculture and its potential. The women's FGI thought aquaculture could play a role in replenishing natural stocks, particularly of traditionally targeted species, which could facilitate the maintenance of fishing cultural practices and their connection with marine and freshwater environments.

On the issue of marine parks, participants in both FGI understood the need for them, provided the parks are developed via negotiation with the Traditional Owners.

10.4 Conclusions in relation to objective 2

The use of the FLB showed some promise in collecting real time data to support the data collected in the questionnaires. However, some of the fishers using the FLB found them time consuming and cumbersome. The research team still believes that the FLB are worth persisting with, but more development is required.

The research team also recommends refining the questionnaire and producing a version that could be delivered online through Local Aboriginal Land Councils. This would greatly increase coverage in New South Wales and help develop a broader understanding of Indigenous cultural fishing. Some initial contact with several Local Aboriginal Land Councils has revealed much support for this idea.



Indigenous fishers fishing at Fingal beach near Tweed Heads.

Photographer: Gina Combo

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Appendices

1. Intellectual property
2. Staff engaged in this project
3. Report on Community Engagement for Project No. 2009/038 – H. Egan, Southern Cross University
4. Project participant consent forms
5. Questionnaire
6. Cultural fishing logbook
7. Focus group discussion guide
8. Data tables
9. List of tables and figures
10. Acronyms
11. List of cases and legislation

Appendix 1. Intellectual Property

This report is not to be cited without permission from the author.

Background intellectual property (IP)

Item:	Nature of right	Description sufficient to identify background IP
1	Know-how	Pre-existing IP relating to Indigenous fisheries owned by A/Prof Stephan Schnierer arising from his culturally embedded knowledge and know-how
2	Know-how	Research methodologies used within the School of Environmental Science and Management at Southern Cross University
3	Know-how	Southern Cross University cultural mapping protocols used within the School of Environmental Science and Management
4	Copyright	Unpublished research project by A/Prof Stephan Schnierer entitled 'A description of the Indigenous Fisheries of New South Wales', Fisheries Action Program Natural Heritage Trust, Project no. NC0958.98, Indigenous Environmental Research Centre, Southern Cross University, Lismore.

Appendix 2. Staff engaged in this project

A/Prof Stephan Schnierer, Southern Cross University

Dr. David Lloyd, Southern Cross University

Hayley Egan, Southern Cross University

Dr. Damien Jacobsen, Southern Cross University

Dr. David Newell, Southern Cross University

David Edwards, Eco-Connections, Lismore NSW

Clarence Williams

Lexene Busbridge

Appendix 3. Report on Community Engagement for Project No. 2009/038

H. Egan and S. Schnierer
Southern Cross University

Background

A key element of the collaborative methodology for this project (Project No. 2009/038) was to engage Indigenous people in the Tweed region in all aspects of the research not just as givers of information but receivers of information.

Indigenous communities and individuals have a right to be involved in any research project focused upon them and their culture. Participants have the right to withdraw from the project at any time. Research on Indigenous issues should also incorporate Indigenous perspectives and this is often most effectively achieved by facilitating more direct involvement in the research. (AIATSIS, 2011)

Before engaging directly with the community the research team gained familiarity with the community location and representative organisations:

Prior to undertaking any research activities, a good understanding of the local community institutions with relevant authority and their interest in the research is required, as well as knowledge of cultural protocols of the community shall be developed. A thorough effort shall be made in good faith to enhance such understandings through ongoing communication and active participation throughout the duration of the research process. (ISE, 2006)

To achieve effective engagement the researchers held meetings with key community members including the chairs of local Indigenous organisations and their members. Once key stakeholders had been identified, discussions took place to devise strategies on how to engage the wider Indigenous community in the initial stages of the project. The strategies were to include provision of verbal and written information at meetings of organisations, during community information workshops or at Indigenous cultural events.

The project information provided to the community was designed to be easy to understand and comprehensive enough for participants to make informed decisions about whether to participate or not. The International Society of Ethnobiology *Code of Ethics* (2006) (ISE Code of Ethics) emphasises the importance of establishing 'educated, prior, informed consent' prior to undertaking any research activities. 'Educated, prior, informed consent' includes full disclosure to potentially affected communities and mechanisms to ensure mutual understanding of the following:

- the full range of potential benefits (tangible and intangible) to the communities, researchers and any other parties involved;
- the extent of reasonably foreseeable harms (tangible and intangible) to such communities;
- all relevant affiliations of the individual(s) or organisation(s) seeking to undertake the activities, including where appropriate the contact information of institutional research ethics boards and copies of ethics board approvals for research;
- all sponsors of the individual(s) or organisation(s) involved in the undertaking of the activities; and

- any intent to commercialise outcomes of the activities, or foreseeable commercial potential that may be of interest to the parties involved in the project, and/or to third parties who may access project outcomes directly (e.g., by contacting researchers or communities) or indirectly (e.g., through the published literature).

Another important component of the ISE Code of Ethics is incorporation of community input into the types of data collected and data collection methods, during the research development phase. This facilitates ongoing engagement once the research begins.

Indigenous communities must also be involved in setting the terms of the research. The researchers must employ full communication and consultation with potentially affected communities to develop the terms of the research in a manner that complies with the ISE Principles (ISE, 2006). Prior to commencing research activities, the researchers must ensure that approval is granted in the manner defined by the local governance system of each affected community (ISE, 2006).

It must be noted that the protocols relating to consultation about and approval of research in Indigenous communities takes both time and resources. It is important to allow sufficient time to allow full and effective consultation to occur in project planning.

After full disclosure and educated prior informed consent has been achieved, and before research can commence, an agreement should be reached with the community that:

- addresses foreseeable uses and property ownership issues of the research outcomes, including a clear agreement on rights and conditions related to who holds, maintains, uses, controls, owns, and has rights to the research processes, data, and outcomes (direct and indirect);
- specifies attribution, credit, authorship, co-authorship, and due acknowledgement for all contributors to the research processes and outcomes, recognizing and valuing academic as well as cultural and local expertise;
- specifies how and in what forms the resulting information and outcomes shall be shared with each affected community, and ensure that access and forms are appropriate and acceptable to that community. Community data and information management systems, such as local registries and databases, shall be supported to the greatest extent possible; and
- represents what understandings have been reached regarding what is potentially sacred, secret or confidential and how such will be treated and communicated, if at all, within and beyond the direct parties to the research. (ISE, 2006)

It is also important for the researchers to keep in constant contact with participants so as to incorporate recommendations about research methods.

Objectives, conditions and mutually-agreed terms should be totally revealed and agreed to by all parties prior to the initiation of research activities. It is recognized that collaborative research, by design, may be iterative, emergent and require modifications or adaptations. When such is the case, these changes shall be brought to the attention of and agreed to by all parties to the research. (ISE, 2006)

The research team must also endeavour to deliver benefits to the Indigenous participants during the research process.

A researched community should benefit from, and not be disadvantaged by, the research project. Research in Indigenous studies should benefit Indigenous peoples at a local level, and more generally. A reciprocal benefit should accrue for their allowing researchers' often intimate access to their personal and community knowledge. (AIATSIS, 2011)

These benefits can include employment as community liaison officers and capacity building activities. An example of a capacity building could include the dissemination and explanation of information in relation to fishing regulations and legislation that might have otherwise been inaccessible.

Key informant approach

This approach is utilised to obtain information from individuals whose place or role in a community suggest they have knowledge about specific characteristics of that community (Eyler *et al*, 1999). Researchers can obtain specific knowledge about a particular problem by witnessing people's lives and circumstances firsthand (Marshall, 1996; Weinberg, 2002). For this research it was important to identify individuals from the community who were fishers that had a long association with the area. The key informant approach enabled the research team to ask questions of community experts and also learn which questions to ask (Wolcott, 1997).

In this project, the key informants helped to 'break the ice' at community events, to identify other potential informants and to collect data on the catch and cultural significance. Initially the research team identified three key informants to help gain access to other fishers in the area. Two of these were identified through the first community workshop and the third was identified through a local Aboriginal organisation. All three key informants were not only a part of the local fishing community all their lives, they were also respected and acknowledged by the community.

Prior informed consent

Prior informed consent (PIC) is a prerequisite in qualitative research involving people (Konza, 2005). The Australian Institute of Aboriginal and Torres Strait Islander Studies *Guidelines for Ethical Research in Indigenous Communities (2011)* (AIATSIS Guidelines) clearly state that research concerning Indigenous communities:

...should be carried out with appropriate consultation about the aims and objectives and meaningful negotiation of processes, outcomes and involvement. Relevant communities and individuals should be involved at all stages of the research process.

These themes and principles were used to guide the design, approach and conduct of this project, with a special emphasis on maintaining respect, recognition and involvement for Indigenous participants through clear consultation and negotiation processes.

Research fatigue

Research fatigue is widely recognised within the Australian Indigenous community, who have been exposed to western inquiry concerned mainly with the history of white colonisation and the self-interests of the scientific movement (Humphery, 2001). Within the last three decades in particular the term 'research' in itself has

developed negative connotations for Indigenous people, some of whom believe that researchers are simply intent on taking knowledge (Smith, 1999). These perceptions have potential implications for this research and for future studies on Indigenous culture in Australia.

The AIATSIS Guidelines aim to address these issues by ensuring that Indigenous people have more control to participate in research, culturally sensitive methodologies are employed and the research offers benefits to communities (Humphery, 2001). These principles were adopted in developing relationships with project participants and the community more broadly, creating greater access to knowledge and collaboration throughout the project.

Use of traditional knowledge

The ethical use and distribution of traditional knowledge and respect for intellectual and cultural property is another important consideration. Indigenous cultural and intellectual property rights are part of the heritage that exists in the cultural practices, resources and knowledge systems of Indigenous peoples, and that are passed on by them in expressing their cultural identity (AIATSIS, 2011).

Research into traditional culture can have both positive and negative impacts for Indigenous communities (Harmsworth, 1998; Mackay, 2009; Rose, 2005). Sharing of knowledge can bring benefit to communities through greater appreciation of Indigenous knowledge and culture by the broader population (Parlee and Berkes, 2006). However, a potentially negative impact has been the inappropriate dissemination and handling of unique and sometimes sacred knowledge. Without Indigenous consent or control over the publication of research findings important knowledge can be misused and exploited by third parties in an inappropriate way (Drew, 2005).

Description of approach used in this project

The Chair of the Tweed Byron Local Aboriginal Land Council (TBLALC) was contacted and two meetings were held to discuss the project and identify further local organisations including the Tweed Shire Council Aboriginal Advisory Committee (TSCAAC). The researchers then gave a presentation on all aspects of the project to a full meeting of the TBLALC and the TSCAAC. A PowerPoint presentation was developed with the following content:

1. Project context

- General fisheries management structures and processes in New South Wales.
- The 2010 changes to the *Fisheries Management Act 1994* (NSW) (NSW FMA) recognising Indigenous cultural fishing.

2. Project details

- Aims, objectives and possible research methodology.
- The source of project funding – Fisheries Research Development Corporation (FRDC).
- Project funding agreement between Southern Cross University (SCU) and FRDC.

- Southern Cross University's ethical research protocol and an outline of the SCU Human Research Ethics Authority for the project.

3. Project Benefits

- Community owned database for use in future negotiations with New South Wales Department of Primary Industries (NSW DPI).
- Use of research results to stimulate further research or generate development projects.
- Greater awareness of governmental fisheries management processes.
- Enhanced capacity to participate in fisheries management advisory structures.

4. Process for participation

- Opportunity for attendees to provide comment and input on the project.
- Individual nomination to participate.
- Identification of other individuals and organisations to contact.
- Future project information sessions.
- Seeking a formal expression of support for the project from the TBLALC and TSCAAC.

A written copy of the presentation was given to meeting attendees. Outcomes from meetings with TBLALC and TSCAAC included a formal expression of support for the project and the suggestion to host two community workshops for other members of the Tweed community to learn about the project.

In order to promote the workshops, the attendees suggested making a local media release (Appendix 3.1). An information poster (Appendix 3.2) was also developed and placed at key meeting places, including the Minjungbal Cultural Centre at Tweed Heads.

Other local Aboriginal organisations were contacted by the researcher at the suggestion of the attendees. The organisations included: Krurungal Aboriginal and Torres Strait Islander Corporation for Welfare Resource and Housing; Bugleweenah Service, Tweed Community Health; Far North Coast Area, Aboriginal Home Care Service Development Unit, Ageing, Disability and Home Care, New South Wales Department of Family and Community Service; Tweed Aboriginal Co-op Society Ltd; Madhima Gulgan Community Association Inc; and Canowindra Tweed Byron Aged and Disabled Aboriginal Corporation. These organisations provided some access to member mailing lists to enable distribution of invitations to attend the first community workshop.

Information pamphlets (Appendix 3.3) were developed and distributed using the mailing lists provided. Contact detail sheets were also left with key Aboriginal organisations with instructions on how to become involved in the project.

A local Indigenous artist was commissioned by the research team to paint a sign depicting Indigenous cultural fishing and this was used at workshops and cultural events as an identifying banner for the project.

Community workshops

Three community workshops were held on 18 March, 29 April 2010 and 31 January 2011. Each workshop was held at the Minjungbal Cultural Centre, a location identified as a neutral and familiar meeting place for the Tweed community.

The first workshop provided an opportunity for Indigenous fishers from the Tweed region to learn more about the project and to meet the researchers. The researchers gave a similar presentation to the one delivered at the initial TBLALC and TSCAAC meeting. Time was allowed for participants to provide input. Community workshop participants were then invited to express their interest in being involved in the project.

The first community workshop allowed the researchers to mingle with Indigenous fishers from the Tweed region and build rapport to support the long-term implementation of the project. Twenty-five participants took part in the first community workshop. From the workshop discussion it was clear that fishing remains an important activity for many Aboriginal people in the region.

The second community workshop followed the structure of the first one. The purposes of the second community workshop were to provide information to the community about the 2010 changes to the NSW FMA and to determine a culturally appropriate way to collect data.

A representative from NSW DPI gave a presentation on the changes in 2010 to the NSW FMA. During the presentation, specific information was provided on the changes to the legislation and the interim regulatory measures that will follow. This presentation was highly interactive and the community were very involved in the discussion, which revealed a number of concerns.

The researchers also showed the participants the draft questionnaire, highlighting the types of questions that may be asked. The community made it clear that the use of a questionnaire was a good way to collect data, but they emphasised the need for the researcher to do it in person and not as a mail out. Following the formal proceedings there was considerable conversation and community interaction during which the researcher took the time to have open conversations on fishing issues and how the new changes in legislation will help the community gain recognition for traditional fishing practises.

Before the workshop concluded, interested individuals were invited to nominate to participate in the project. Potential participants were given a SCU Participant Consent Form (Appendix 3.3) followed by an explanation of the content and then asked to sign.

Contact details for all participants and interested organisations were entered into a spreadsheet and updated continuously as more individuals self-nominated. An outcome of the initial community workshops was the appointment of two Indigenous community liaison officers whose role was to work with the community to find potential participants and to disseminate information about the project.

Meetings with project partners

Project partners included NSW DPI, the New South Wales Department of Aboriginal Affairs (NSW DAA) and New South Wales Aboriginal Land Council

(NSWALC). These organisations were kept up to date with the community consultation process, the development of the methodology, data collection and analysis. The updates took place via phone, e-mail and face-to-face meetings.

The research team held three formal meetings with project partners. The first meeting took place on 7 April 2010 at the NSW DPI offices in Cronulla, Sydney. At this meeting the researcher gave a presentation on the proposed project methodology and sought feedback. The second meeting took place on 16 December 2010, again at the NSW DPI offices in Cronulla, and involved a two-hour presentation highlighting the preliminary results and analysis. A third meeting was held on 20 July 2011 at NSWALC offices in Parramatta and the same presentation of preliminary results and analysis was given.

Cultural events

The research team also attended the Tweed community National Aboriginal and Islander Day of Celebration (NAIDOC) sports day on 7 July 2010. The NAIDOC sports day is an annual cultural event that attracts large numbers of the Tweed community. The researchers set up a tent and distributed the following:

- an information pamphlet about the cultural fishing project;
- an information pamphlet about the proposed interim fishing regulations for cultural fishing;
- information on the FRDC Indigenous scholarship program; and
- Project participant consent forms.

As an incentive to attract onlookers to tent, the researcher offered a prize consisting of a rod and tackle set. To win the prize, entrants had to answer a question based on some of the information in the tent. The NSW DPI also helped by donating several 'Salt Water Fishing Guides' and size limit measuring tapes. The researchers had project participant consent forms and questionnaires on hand.

On the day, 31 participants signed consent forms and some gave contact details of other potential participants. In total 42 participant contacts were obtained and one questionnaire was completed.

Selecting participants for the project

Ideally, selecting participants for the project would have involved identifying the Indigenous population in the Tweed region and then randomly selecting a sample from that population. However randomly identifying a sample from the 2,329 Indigenous people out of the 79,317 non-Indigenous people in the region was beyond the resources provided for this project. Instead, a process involving self-identification and 'snow-balling' (Morrison, 1988) was used to identify participants for this project.

A press release describing the project and calling for potential participants was released to the local and national media. Information 'flyers' were also posted on several notice boards in the Tweed region. Two community workshops held at the Minjungbal Cultural Centre also provided an opportunity to recruit participants. The researcher also attended a NAIDOC gathering at the Tweed Heads High School and distributed information on the project.

Participants volunteered their name and contact details by writing them down on lists left with key local Indigenous organisations after reading the project information sheets displayed at offices. Some of these organisations also let us know when they were having informal gatherings and invited the researchers to visit during lunch breaks to mingle with the community and explain the project. These occasions proved beneficial with many people agreed to participate on these visit.

From this contact list the researchers were able to contact the participant either via phone or email to make an appointment. For some participants this took just one call consisting of an introduction by the researcher, suggested locations for the meeting at or close to the participant's home and confirmation of the date and time, for others it took up to five calls.

Outcomes of community engagement process

A total of 149 meetings were held with a range of Indigenous organisations, groups and individuals (Table 1). A total of 352 hours was spent in these meetings, which required 376 phone calls to organise. In total seven Aboriginal organisations, one local government, two educational institutions, and two state government departments and a number of individuals were variously engaged in the project.

Table 1: Number of meetings with organisations, groups and individuals as part of the community engagement process for FRDC project no. 2009/038

Organisations	Meetings
New South Wales Aboriginal Land Council (NSWALC)	3
Tweed Byron Local Aboriginal Land Council (TBLALC)	11
Tweed Shire Council Aboriginal Advisory Committee (TSCAAC)	5
Madhima Gulgan Community Association Inc.	7
Bugalwenah Service, Tweed Community Health	2
Krurungal Aboriginal and Torres Strait Islander Corporation	4
Canowindrah Tweed Byron Aged and Disabled Aboriginal Corporation	2
Government organisation	
New South Wales Department of Primary Industries (NSW DPI)	3
New South Wales Department of Aboriginal Affairs (NSW DAA)	3
Tweed Shire Council	2
Centrelink (Tweed Heads)	2
Department of Community Services (Tweed Heads)	2
Education Organisations	
TAFE – New South Wales	3
TAFE – Queensland	5
Department of Education, Indigenous liaison officer	2
Community groups	
NAIDOC Information Stall	1
Community Workshops	3
<u>Organisations total</u>	35
Individuals	
Chair, Tweed Byron Local Aboriginal Land Council (TBLALC)	4
Community Liaison Officers for project	35
Chair, Tweed Aboriginal Co-op Society Ltd (TAC)	50
<u>Individuals and organisations total</u>	<u>149</u>

A total of 269 hours was spent organising and conducting each of the three data collection methods (Table 2.)

Table 2: Time spent (hours) and number of phone calls made to organise and conduct each of the three data collection stages (questionnaire, focus groups, cultural fishing log book) of the project

Activity	Hours	Phone
Organising and conducting individual interviews (questionnaires)	142	236
Organising and conducting focus group interviews	40	240
Organising and overseeing cultural fishing logbook distribution and use	56	160
Capacity building meetings	32	27
Total	<u>269</u>	<u>663</u>

The level of community engagement and capacity building undertaken during this project was the key reason why this research project was ultimately successful in collecting data. The amount of time spent in face-to-face contact with participants and members of the broader community built trust between the community and the researchers, it also gave participants the opportunity to ask questions and take an interest in the project without judgement from the broader community. In this information exchange, community members gained confidence. Some participants, with the help of the researchers, went on to apply for a Habitat Protection Grant and enrol in a University Degree with a major in fisheries. This project also started the process of gathering information to assemble submissions for funding in both fisheries and education for the Tweed community. Feedback from participants in this regard included:

So now that I have that information it strengthens my support for what your trying to do, you know I'm sitting here going, 'oh yes, yeah that's a good idea' but now I know the reason behind this and [that] strengthens when you really start talking about it and more from a position of strength this is the reason why we're doing it the core reason. (mFG).

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Appendix 3.1 Community Workshop media release

MEDIA MONITORS

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Koori Mail
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Circulation: 9562
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Size: 367.65 sq.cms
Fortnightly

Fishing study focus



ABORIGINAL people are being invited to take part in a study into cultural fishing activity in the Tweed Heads area of northern NSW.

Southern Cross University researchers have started the 12-month study, which will examine recent amendments to the *NSW Fisheries Management Act 1994*.

The Act now recognises Aboriginal cultural fishing activity alongside commercial and recreational fishing groups.

The study will assist in fulfilling objectives of the NSW Indigenous Fishing Strategy (IFS), which is a tool for carrying out recognition of cultural fishing activity under the Act.

Principal researcher Associate Professor Stephan Schnierer said the success of the NSW IFS had been hampered by lack of information about cultural fisheries.

"Historically fisheries management agencies have ignored Indigenous fishing rights which has resulted in restrictions on cultural practices which have contributed not only to a loss of access to traditional target species but a loss of traditional fisheries knowledge," he said.

"Fishing remains an important activity for Aboriginal people in the Tweed region, as it is for Aboriginal people all over Australia, and the amendment to the Act signals a shift to formally recognise Aboriginal fishing activities in NSW."

The SCU study seeks to determine which fish species are of cultural relevance in the Tweed region; gain quantitative information about cultural catch (for example species, numbers, weight, frequency of fishing); and establish a community-owned fishing database and build community capacity to conduct fisheries research.

The information will assist the

Tweed community to better negotiate with the Government on such things as management options for cultural fishing.

Prof Schnierer said support and enthusiasm from the Tweed Byron Aboriginal Land Council and the Tweed Shire Aboriginal Advisory Committee for the project had been encouraging.

He said he hoped the wider Aboriginal community in the Tweed region would also embrace the opportunity to increase the representation and recognition of Aboriginal cultural fishing interests in NSW.

Aboriginal people interested in getting involved in the study should call (02) 6620 3572 or 0416 662 009.

The study is being done in consultation with the Tweed Byron Aboriginal Land Council and the Tweed Shire Aboriginal Advisory Committee, with funding from a grant from the Fisheries Research and Development Corporation.



'Fishing remains an important activity for Aboriginal people in the Tweed region, as it is for Aboriginal people all over Australia, and the amendment to the Act signals a shift to formally recognise Aboriginal fishing activities in NSW'

– Stephan Schnierer

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Ref: 69218

Appendix 3.2 Project information poster



Study on the Aboriginal cultural fisheries of the Tweed Region

A team headed up by A/Prof Stephan Schnierer is seeking to carry out a study that will support the expression of Aboriginal rights for full and effective involvement in all aspects of the use and management of fisheries resources in northern N.S.W. Recent amendments to NSW Fisheries Management Act recognise the spiritual, social and customary significance of fisheries resources to Aboriginal fishing communities. There is, however, still a way to go yet in ensuring culturally appropriate management strategies are implemented that address these new changes.

To ensure that Aboriginal fishing rights are given their fullest expression more needs to be known about the cultural dimensions of the fisheries and how it interacts with other fisheries (commercial and recreational). Estimating the size of the cultural catch will provide a basis for future management decisions on allocations between the three fishing sectors. By doing this study in partnership with Aboriginal communities will help an exchange of ideas with researchers and managers on how to sustain fish stocks and at the same time build Indigenous capacity to play a more effective and proactive role.

We are seeking the support of Aboriginal people in the Tweed region to be participants and partners in this exciting project.

What we are trying to do

1. We (the study team) in partnership with the Tweed mob would like to:

- Determine which fish are of cultural relevance (species and location);
- Estimate the size of the cultural catch (species, numbers, weight, frequency of fishing);
- Assist in establishing a community owned and controlled fisheries data-base;
- Help build the capacity of the community to conduct do it own fisheries research; and,
- Raise the awareness in the broader society about Indigenous cultural fishing.

How we will go about it

- Questionnaires, interviews (focus group and individual) and observations of fishing expeditions are a range of ways we may use to collect information on catch.
- These methods to be used have been developed in consultation with Aboriginal fisher participants at a community workshop held in late April.
- Information will be gathered together and discussed with community at a second workshop to determine the best way to use and disseminate the findings.

How can you get involved

If you are interested in taking part or you would like more information please contact:

Hayley Egan: phone no.: 0409023197 or email: hayley.egan@scu.edu.au

or

Stephan Schnierer: email: stephan.schnierer@scu.edu.au



Appendix 3.3 Community workshop invitation and program

CULTURAL FISHING PROJECT INFORMATION DAY

PROGRAM

Thursday 18th March 2010

10.30am MORNING TEA
11am Welcome / Introductions
11.15am Project information session
11.45am Initial comments & questions
Noon BBQ LUNCH
12.30pm Yarn time & identify interested fishers
1pm FINISH

RSVP By Monday 12th March 2010
To Damien Jacobsen, SCU project officer
Via MOB 0416 662 009 or
Email: whojaar@mail.com

For more information, ring Stephan Schnierer, (02) 6620 3572



ABORIGINAL CULTURAL FISHING PROJECT BBQ & INFORMATION DAY



WHO *Tweed mob* interested in cultural fishing, particularly cultural fishers.

WHEN **10.30am-1pm** (BBQ lunch provided)
Thursday 18th March 2010

WHERE **Minjungbal Cultural Center,**
Kirkwood Rd, Tweed Heads South.

What's It about?

A team of researchers, led by Stephan Schnierer, from Southern Cross University want to work with the Tweed mob to do a study on cultural fishing. This study is an important step in raising government awareness about protecting indigenous fishing rights.

Come and join the mob to have a yarn about the project and perhaps get involved. Jarjums welcome!

P.T.O. for the Information Day program

Appendix 4. Project participant consent forms



Participant Consent Form

Project Title: Aboriginal Fisheries in New South Wales: Determining Catch, Cultural Significance of Species and Traditional Fishing Knowledge Needs.

Researchers: Stephan Schnierer (Principal Researcher); Hayley Egan.

I agree participate in the research project specified above under 'Project Title'. Yes ☐ No ☐

I understand all the information provided by the researchers about my participation in this project. Yes ☐ No ☐

I agree to participate in this project by providing information to the researcher via questionnaires and/or face-to-face interviews. Yes ☐ No ☐

I agree to allow any interviews to be audio-taped. Yes ☐ No ☐

I understand that my participation in this project is on a voluntary basis. Yes ☐ No ☐

I understand that I can cease my participation in this project at any time. Yes ☐ No ☐

I understand that my identity, whilst participating in this project, will be kept anonymous and that information identifying me will be removed when the data is analysed. Yes ☐ No ☐

I understand that all information gathered in this research is confidential and will be kept secure for 7 years at SCU. Yes ☐ No ☐

I am aware that I can contact the researchers at any time to seek clarification about this project and my participation. Yes ☐ No ☐

I understand that this project was approved by the SCU Human Research Ethics Committee. Yes ☐ No ☐

Participant's name: _____

Date: _____

Participant's signature: _____

☐ Please tick this box and provide your email or mail address below if you wish to receive a summary of the results:

Email: _____

Appendix 5. Questionnaire

Page 1.

Indigenous Fishing Survey

1. Name:

2. What is your gender:

☐ Male

☐ Female

3. Age:

☐ 18 - 25

☐ 26 - 35

☐ 36 - 45

☐ 46 - 55

☐ 56+

Contact details

4. Address:

.....
.....
.....
.....

5. Phone number:

6. How often do you go fishing?

☐ Everyday

☐ 2-3 times weekly

☐ Once a month

☐ 6 or more times a year

☐ Yearly

7. When you go fishing do you take children also?

☐ never

☐ rarely

☐ occasionally

☐ regularly

☐ all the time

8. Of your family living in the Tweed area, what percentage would you estimate go fishing?

	Percentage				
	0	25	50	75	100
Regularly					
Occasionally					
Rarely					

9. Number of indigenous fishers in your household.

	Number														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
How many live in your household															
How many living in your household go fishing regularly (once a week)															

10. Number and duration of fishing events

On average how many fishing events, including bait gathering does the day involve?

On average how many hours do you spend on a fishing event?

11. What percentage of your fishing time would you spend in the following general Locations?

	Percentage of time				
	0	25	50	75	100
Offshore >5km					
Coastal water to 5km					
Estuarine					
Freshwater 'rivers'					
Freshwater 'lakes'					

12. How far do you travel from your home to go fishing?

	0	25	50	75	100
< 10 kilometres					
Between 10 and 50 kilometres					
> 50 kilometres					

13. What percentage of your fishing time occurs from the following fishing plat-

	0	25	50	75	100
Boat					
Shore					

14. Where do you fish?

Please indicate on the map provided

	Latitude	Longitude
Site 1		
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		
Site 7		
Site 8		
Site 9		
Site 10		

15. What type of fishing gears do you use?

	Percentage of time				
	0	25	50	75	100
Rods					
Traps					
Spears					
Nets					
Diving					

Page 4.

16. Please indicate primary target species (PTS), how many were caught in the last 12months, and the cultural importance (CI) of each species (L=low, M=medium, H=high)

Species	PTS	<10	10-50	50-100	>100	LCI	MCI	HCI
Bass, Australian (Fw Perch)								
Blackfish, Rock (Drummer)								
Bream, Yellow-fin								
Catfish, Eel tail								
Catfish, Fork tail								
Cod, Estuary rock								
Cod, Red Rock								
Dart, Swallowtail								
Drummer, Silver								
Eel, Long fin								
Eel, Short fin								
Flathead, Dusky								
Flounder,								
Garfish, Eastern Sea								
Groper, Blue								
Jack, Mangrove								
Jewfish (Mulloway)								
Kingfish, Yellowtail								
Leatherjacket								
Luderick								
Mackerel (spotted)								
Mahi mahi								
Mullet, Sand								
Mullet, Sea (Bully, Hardgut)								
Mullet, Yelloweye								
Salmon, Australian								
Shark,								
Snapper								
Sole								
Tailor								
Tarwhine								
Teraglin								
Trevally								
Whiting, Sand								
Abalone								
Cockle, Sydney								
Crab, Blue Swimmer								
Crab, Mud								
Crab, Spanner								
Cunjevoi								
Cuttlefish								
Limpets								
Lobster, Eastern Rock								
Lobster, Ornate Rock								
Lobster, Southern Rock								
Mussels, Hairv								
Nerites, Black								
Octopus								
Oyster, Pacific								
Oyster, Sydney Rock								
Pipi								
Prawn, King								
Prawn, School								
Snails, Turban								
Soldier Crabs								
Squid								
Whelks								
Worm, Beach								
Yabby, Bait (estuary)								
Crayfish, freshwater								

17. List your 5 most sought after fish from 1 - 5 (1 being most preferred).

1	
2	
3	
4	
5	

18. What happens to your catch?

	Percentage				
	0	25	50	75	100
Consumed by your household					
Shared with immediate family					
Shared with extended family and friends					
Shared at community gatherings					
Bartered					
Sold					
Release					

19. How frequently do you eat fish?

☐ Everyday ☐ once a week ☐ once a month ☐ once a year ☐ never

20. How often would you like to eat fish?

☐ Everyday ☐ once a week ☐ once a month ☐ once a year ☐ never

21. What are the sources of the fish that you eat?

	Percentage				
	0	25	50	75	100
Caught yourself					
From family					
From community members					
From a fish co-op					
From a supermarket					
From an indigenous commercial fisher					

22. Of the Indigenous community living in the Tweed area, what percentage would you estimate go fishing?

	Percentage				
	0	25	50	75	100
Regularly					
Occasionally					
Rarely					

23. How important is cultural fishing to indigenous people in the tweed area?

☐ Not important ☐ Somewhat important ☐ Highly important

24. Would you be willing to participate in a group interview?

☐ Yes ☐ No

25. Would you be willing to keep a fishing diary?

☐ Yes ☐ No

Thankyou for your participation

Appendix 6. Cultural fishing logbook

Indigenous Fishing Logbook

000 SCU Contact No.: 0409023197

Fishing Event Information:

Location:		Date:	
Target species:		No. fishers:	Gear:
Start time:	Finish time:	Platform:	

Catch Information:

[illegible]

Appendix 7. Focus group discussion guide

Focus Group Questions

- Question 1. Sought information about the participant's perceived value of cultural fishing, (including economic, social and traditional knowledge) and any perceived barriers to its maintenance.
- Question 2. Sought information on the importance of traditional target species to the community's economy, as a food source, savings and also health. With this question the researchers were trying to find whether target species within a group were similar and also highlight how valued the resource was perceived.
- Question 3. This was a key question; it addressed management changes, rights, recognition and community aspirations for future involvement and more effective management of cultural fishing.
- Question 4. Sought information about the future in terms of Indigenous cultural fishing.

Appendix 8. Data tables

Table 1: Totals and means of the lower (L) and upper range (U) estimates of finfish species taken by Indigenous fishers in the last 12 months for the Tweed region (n=56)

Common name	Scientific name	Total		Mean		SD	
		L	U	L	U	L	U
Tailor	<i>Pomatomus saltatrix</i>	2139	5190	38.9	94.4	54.44	112.06
Sand whiting	<i>Sillago ciliata</i>	2085	4940	37.9	89.8	52.08	104.06
Sea mullet	<i>Mugil cephalus</i>	1513	3620	27.5	65.8	53.08	108.26
Swallowtail dart	<i>Trachinotus sp.</i>	1270	3080	23.1	56.0	44.01	86.64
Yellow-fin bream	<i>Acanthopagrus australis</i>	1043	2970	19.0	54.0	30.20	69.83
Dusky flathead	<i>Platycephalus fuscus</i>	923	2760	16.8	50.2	27.59	63.84
Sand mullet	<i>Myxus elongatus</i>	527	1480	9.6	26.9	32.51	71.10
Mangrove jack	<i>Lutjanus argentimaculatus</i>	493	1230	9.0	22.4	36.58	64.38
Snapper	<i>Pagrus auratus</i>	431	1370	7.8	24.9	23.00	57.99
Yellowtail kingfish	<i>Seriola lalandi</i>	310	870	5.6	15.8	20.12	49.80
Luderick	<i>Girella tricuspidata</i>	310	870	5.6	15.8	20.12	49.80
Leatherjacket	Monacanthidae	291	800	5.3	14.5	20.11	49.32
Mullocky	<i>Argyrosomus japonicus</i>	226	730	4.1	13.3	15.28	38.15
Eastern sea garfish	<i>Hyporhamphus australis</i>	223	700	4.1	12.7	15.29	38.27
Black drummer	<i>Girella elevata</i>	208	780	3.8	14.2	13.95	37.20
Tarwhine	<i>Rhabdosargus sarba</i>	158	520	2.9	9.5	13.85	36.08
Trevally	<i>Pseudocaranx sp.</i>	157	620	2.9	11.3	7.76	22.03
Blue groper	<i>Archoerodus viridis</i>	157	400	2.9	7.3	15.13	36.03
Estuary perch	<i>Macquaria colonorum</i>	154	370	2.8	6.7	15.14	36.06
Shark	Various species	144	500	2.6	9.1	13.74	35.08
Spotted mackerel	<i>Scomberomorus munroi</i>	134	510	2.4	9.3	7.61	20.80
Flounder	Pleuronectidae	126	380	2.3	6.9	13.71	34.74
Long finned eel	<i>Anguilla rheinhardtii</i>	117	350	2.1	6.4	13.66	34.23
Estuary rock cod	<i>Epinephelus daemeli</i>	114	320	2.1	5.8	13.67	34.25
Teraglin	<i>Atractoscione equidens</i>	112	300	2.0	5.5	13.67	34.25
Short finned eel	<i>Anguilla australis</i>	105	290	1.9	5.3	13.61	33.71
Silver drummer	<i>Kyphosus sydneyanus</i>	102	260	1.9	4.7	13.62	33.71
Sole	Soleidae	64	170	1.2	3.1	7.00	15.02
Mahimahi	<i>Coryphaena hippurus</i>	55	140	1.0	2.5	6.87	13.64
Yellow-eye mullet	<i>Aldrichetta forsteri</i>	46	220	0.8	4.0	2.88	13.14
Australian bass	<i>Macquaria novemaculeata</i>	25	130	0.5	2.4	2.08	9.62
Eel-tail catfish	<i>Tandanus tandanus</i>	24	120	0.4	2.2	2.08	9.56
Red rock cod	<i>Scorpaena cardinalis</i>	2	20	0.0	0.4	0.19	1.89
Australian salmon	<i>Arripes trutta</i>	1	10	0.0	0.2	0.13	1.35
	<i>Total</i>	13789	37020				

Table 2: Totals and means of the lower (L) and upper (U) range estimates of aquatic invertebrate species taken by Indigenous participants during the last 12 months in the Tweed region (n=56)

Common name	Scientific name	Total		Mean		Stand. Dev.	
		L	U	L	U	L	U
Pipi	<i>Plebidonax deltoides</i>	3056	7380	56.6	136.7	51.25	110.2
Sydney rock oyster	<i>Saccostrea glomerata</i>	2016	4710	36.7	85.6	52.35	114.0
Beach worm	<i>Onuphidae</i>	1869	4350	34.0	79.1	51.03	109.4
Bait yabby	<i>Callinassa australiensis</i>	1774	4160	32.3	75.6	51.24	110.3
Mud crab	<i>Scylla serrata</i>	1127	3130	20.5	56.9	37.02	79.60
School prawn	<i>Metapenaeus macleayi</i>	1065	2400	19.7	44.4	47.31	98.22
Pacific oyster	<i>Crassostrea gigas</i>	890	2160	16.2	39.3	29.83	69.76
King prawn	<i>Penaeus plebejus</i>	731	1810	13.3	32.9	32.47	79.41
Sydney cockle	<i>Anadara trapezia</i>	464	1120	8.4	20.4	20.41	45.62
Blue swimmer crab	<i>Portunus pelagicus</i>	447	1060	8.1	19.3	25.55	44.13
Soldier crabs	<i>Mictyris longicarpus</i>	389	1020	7.1	18.5	23.89	58.73
Hairy mussel	<i>Trichomya hirsuta</i>	357	1040	6.5	18.9	17.63	42.11
Cunjevoi	<i>Pyura stolonifera</i>	222	800	4.0	14.5	14.03	38.09
Turban snail	<i>Turbo sp.</i>	213	550	3.9	10.0	19.10	47.53
Spanner crab	<i>Ranina ranina</i>	201	600	3.7	10.9	15.25	37.63
Freshwater crayfish	<i>Cherax destructor</i>	187	520	3.4	9.5	15.23	37.34
Freshwater yabby	<i>Cherax sp.</i>	176	470	3.2	8.5	15.20	36.94
Mud whelk	<i>Pyrazus ebeninus</i>	152	350	2.8	6.4	15.14	36.07
Squid	<i>Notodarus sp.</i>	119	420	2.2	7.6	7.54	20.18
Limpets	<i>Cellana tramoserica</i>	112	300	2.0	5.5	13.67	34.25
Cuttlefish	<i>Sepia sp.</i>	104	280	1.9	5.1	13.61	33.71
Southern rock lobster	<i>Jasus edwardsii</i>	102	260	1.9	4.7	13.62	33.71
Abalone	<i>Haliotis sp.</i>	101	250	1.8	4.5	13.62	33.71
Nerites	<i>Nerita atramentosa</i>	101	250	1.8	4.5	13.62	33.71
Octopus	<i>Octopus sp.</i>	38	200	0.7	3.6	2.52	11.61
Eastern rock lobster	<i>Jasus verreauxi</i>	16	100	0.3	1.8	1.50	7.22
Razor clam	<i>Pinna sp.</i>	1	10	0.0	0.4	0.19	1.89
Total		16183	40060				

Table 3: Catch numbers, hours and days fished and number of fishers based on data from the cultural fishing logbooks (n=7)

	Fishers							Total
	1	2	3	4	5	6	7	
Finfish catch	420	73	690	338	324	34	0	1879
Invertebrate catch	4997	830	0	80	52	0	0	5959
Total catch	5417	903	690	418	376	34	0	7838
Total hours fished	182	129.5	27	54.4	122.5	20.5	6.5	542.4
No. of days	12	15	18	18	20	6	3	92
No. fishing location	12	7	5	3	6	3	2	38
No. participants	4	1	1	1	1	1	1	10

Table 4: Total numbers of each species caught by individual cultural fishers for 2010 in the Tweed region, based on data from fishing logbooks (n=7)

Common name	Scientific Name	Fisher No.							Total
		1	2	3	4	5	6	7	
Flat-tail mullet	<i>Liza argentea</i>	0	0	0	0	0	480	0	480
Tailor	<i>Pomatomus saltatrix</i>	81	0	0	0	0	0	210	291
Snapper	<i>Pagrus auratus</i>	0	252	0	0	0	0	0	252
Pilchards	<i>Sardinops neoplichardus</i>	200	0	0	0	0	0	0	200
Sea mullet	<i>Mugil cephalus</i>	0	0	0	0	0	160	10	170
Whiting	<i>Sillago ciliata</i>	0	13	0	71	2	10	68	164
Bream	<i>Acanthopagrus australis</i>	0	18	0	0	14	28	50	110
Flathead	<i>Platycephalus fuscus</i>	0	16	0	2	13	9	55	95
Swallowtail dart	<i>Trachinotus sp.</i>	56	6	0	0	0	0	0	62
Pearl perch	<i>Glaucosoma scapulare</i>	0	12	0	0	0	0	0	12
Australian bass	<i>Macquaria novemaculeatus</i>	0	0	0	0	0	0	10	10
Luderick	<i>Girella tricuspidata</i>	0	0	0	0	0	0	8	8
Mulloway	<i>Argyrosomus japonicus</i>	0	1	0	0	0	0	5	6
Toado	F. Tetraodontidae	0	0	0	0	5	0	0	5
Stingray	F. Dasyatidae	1	0	0	0	0	3	0	4
Parrot fish	F. Scaridae	0	3	0	0	0	0	0	3
Pig fish	<i>Bodianus sp.</i>	0	3	0	0	0	0	0	3
Catfish	<i>Tandanus tandanus</i>	0	0	0	0	0	0	4	4
Oyster	<i>Saccostrea glomerata</i>	0	0	0	0	0	0	2880	2880
Pipis	<i>Plebidonax deltoides</i>	0	30	0	130	0	0	1600	1760
Cockles	<i>Anadara trapezia</i>	0	0	0	670	0	0	0	670
Freshwater shrimp	<i>Macrobrachium sp.</i>	0	0	0	0	0	0	200	200
Mud crab	<i>Scylla serrata</i>	0	22	0	30	0	0	115	167
Prawn	<i>Metapenaeus macleayi</i>	0	0	0	0	0	0	120	120
Beach worm	<i>F. Onuphidae</i>	80	0	0	0	0	0	30	110
Squid	<i>Notodarus sp.</i>	0	0	0	0	0	0	32	32
Freshwater crayfish	<i>Cherax destructor</i>	0	0	0	0	0	0	20	20
Greenweed	<i>Ulva sp.</i>	0	0	0	0	0	0	0	0
Totals		418	376	0	903	34	690	5417	7838

Appendix 9. List of figures and tables

Figures

1. The Tweed River Catchment study site
2. The frequency of fishing trips taken by participants in the Tweed region (n=59)
3. The frequency with which children accompanied adults fishing (n=59)
4. Percentage of participants' fishing in different environments (n=58)
5. The distances travelled from home to fishing location (n=58)
6. Percentage of each fishing gear type used in the Tweed community (n=59)
7. The percentage of catch going to various destinations (n=59)
8. The percentage contribution of each source of seafood consumed by participants (n=57)
9. The actual frequency with which participants consume seafood (n=59)
10. The top ten nominated targeted species for Tweed (n=59)
11. The top ten species numerically by catch range (lower and upper estimates (n=56)
12. The top ten culturally significant species as ranked by participants in the Tweed (n=56)
13. Top ten finfish species by percentage in the cultural catch based on logbook data (n=7)
14. Invertebrate species in the cultural catch by percentage based on logbook records (n=7)
15. The various destinations of the cultural catch as recorded in the logbooks (N=7). (B=barter, C=community, P=personal, S=sold, F=family, Ba=bait and R=released)

Tables

1. Hypothetical raw data table of nominated catch size ranges showing an example calculation of total, mean and standard deviations for lower and upper ranges for each species and each fisher
2. Estimated status of adoption of benefits from the FRDC research project number 2009/038 flowing to beneficiaries
3. The five planned outcomes with outputs and adoptions as described in the FRDC application number SS019 (Research project no. 2009/038) and their perceived current status

Appendix 10. Acronyms

AIATSIS Australian Institute of Aboriginal and Torres Strait Islander Studies
ALRC Australian Law Reform Commission
ARC Australian Research Council
CZI Resource Assessment Commission's Coastal Zone Inquiry
EPBC *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
FGI Focus group interviews
FLB Cultural fishing logbook
FMA *Fisheries Management Act 1994* (NSW)
FRDC Fisheries Research and Development Corporation
IFS Indigenous Fisheries Strategy (NSW)
ISE International Society for Ethnobiologists
mFG Men's Focus Group
NAIDOC National Aboriginal and Islander Day of Celebration
NIFTWG National Indigenous Fishing Technical Working Group
NNTT National Native Title Tribunal
NRIFS National Recreational and Indigenous Fishing Survey
NSWALC New South Wales Aboriginal Land Council
NSW AFAC Aboriginal Fishing Advisory Council (NSW)
NSW DAA Department of Aboriginal Affairs (NSW)
NSW DECC Department of Environment and Climate Change (NSW)
NSW DPI New South Wales Department of Primary Industries
NSW FRAB New South Wales Fisheries Research Advisory Body
NSW SIAC New South Wales Seafood Industry Advisory Council
SCU Southern Cross University
TBLALC Tweed Byron Local Aboriginal Land Council
TSCAAC Tweed Shire Council Aboriginal Advisory Committee
TFK Traditional fishing knowledge
VIC DPI Victoria Department of Primary Industries
wFG Women's Focus Group

Appendix 11. List of cases and legislation

Cases

Mabo and others v Queensland (No. 2) [1992] HCA 23

Akiba on behalf of the Torres Strait Regional Sea Claim Group v Queensland [2010] FCA 321

Legislation

Fisheries Management Act 1994 (NSW)

Native Title Act 1993 (Cth)

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

International

United Nations Convention on Biological Diversity