



Recfishing Research Subprogram: The Development and Learnings of Australia's Young Future Leaders in Recreational Fishing: A Synopsis of the 8th World Recreational Fishing and Study Tour - Vancouver, Canada 2017

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October 2017

FRDC Project No 2016/129

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ISBN 978-0-9577587-6-6

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2016-505

2017

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The Fisheries Research and Development Corporation plans, invests in and manages fisheries research and development throughout Australia. It is a statutory authority within the portfolio of the federal Minister for Agriculture, Fisheries and Forestry, jointly funded by the Australian Government and the fishing industry.

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Acknowledgments

The authors wish to acknowledge and thank the Fisheries Research and Development Corporation for providing the funding for this project and its ongoing support towards the development of young leaders within the recreational fishing sector.

We would like to thank Matt Barwick, Jo Starling and Brett Cleary for their assistance with the bursary selection process and the support of the Recfishing Research sub-program. The process was clearly appropriate given the high standard of successful candidates.

We would like to extend our sincerest thanks to:

- (Father) Frank Prokop for successfully leading the 2017 WRFC8 study tour. His selflessness and passion for developing capacity within the recreational fishing community was inspiring.
- David (Daisy) Ciaravolo for providing essential support to the group in his role as a co-manager and leadership development officer. David's strategic organisation of the group made the tour participants develop as individuals and as a collective.
- Joshua (Fishless) Fielding for providing the calm voice of reason and helping to deliver a well organised study tour.
- Allan Hansard for making the time to mentor and support the study tour participants.

Special mention needs to go to Carey Ryken-Rapp and Shuie Lui from Curtin University for their assistance and Amber Kerwin and the team from ATPI Travel for logistics assistance and bookings.

Outside of the study you we would like to give special mention to the freshwater fisheries society, notably Adrian Clarke, Andrew Wilson and Sue Pollard, whose guidance ensured that the tour experienced informative and extraordinary recreational fishing experiences in BC.

We would like to thank Martin Salter (UK), Dallas D'Silva, Leyland Campbell, Andy Moore, Andrew Rowland, Bryan Van Der Walt, Ross Winstanley and Matt Gillett for agreeing to act as informal mentors for the participants and assisting their integration with the conference participants.

We would also like that thank a number of supporting organisations who were integral to the success of the tour including, Fraser River Sturgeon Conservation Society, Seymour Salmonid Society, Fraser River Peacemakers, St Marys Fly Fishing and Fisheries and Oceans Canada.

Finally we would like to acknowledge the support from the employers, family and friends of the entire contingent. This strong support enabled the group to concentrate on their learnings. The time requirement prior to, during, and after the conference was greatly appreciated; with special thanks to ARFF, VRFish, AFANT, Recfishwest, UTAS and UQ.

Executive Summary

The 8th World Recreational Fishing Conference, held in Vancouver Canada in July 2017 was seen as an opportunity to build on previous educational and leadership opportunities associated with the 5th and 7th conferences, and to hopefully develop a new tranche of young leaders for the recreational fishing sector.

Through the Recfishing Research subprogram of the Fisheries Research and Development Corporation (FRDC), an application was made for a delegation to attend the conference and to conduct a study tour after the conference.

With a high standard of applicants, the project was enhanced to allow participants from all jurisdictions in Australia to attend. The group (13) included some working in existing leadership roles, scientist and grass root fishers. The bursary recipients composed a part of the Australian contingent of 38 (second largest) at the conference.

Although there were some challenges with the timing of the application process, some bursary recipients were able to take part in the conference, with a total of 6 presentations. All sessions of the conference were attended and summarised for this report and for a significant following on social media (Facebook).

Following the conference, the bursary recipients investigated salmon and halibut allocation and management processes, habitat restoration following natural and human impacts, the white sturgeon fishery and management of wilderness fishing for cut throat and bull trout. Key areas which drove fisheries, management and fishery related projects were the roles of hatchery fish, community education and advocacy processes.

There was considerable international interest in the FRDC structured study tour at the conference with several countries looking to emulate the program for the next World Recreational Fishing Conference.

The participants in the study tour performed extremely well, gelling together as a groups and operating as a team for all the tasks that they were given. They have been able to identify synergies with issues or opportunities investigated in Canada and have started to develop strategies and procedures for integrating several elements in Australia. Participants have identified personal development strategies and support networks to assist them with progressing these issues, the PI and also the FRDC will also be working to ensure participants have opportunities to further develop in the future.

There were many key leadership and development learnings within this project, however the compressed nature of the application process to tour meant there was little time for planning which would have been ideal for participants to connect prior to the trip. Most other of the elements of this study tour should be replicated should there be future opportunities for people in recreational fishing and associated industries to undertake a study tour.

1.0 Introduction

Vancouver Canada is presenting the 8th World Recreational Fishing Conference. Australia has played a prominent role in the previous 7 conferences, including hosting the third conference in Darwin. These conferences have enabled technical and non-technical people working in the recreational fishing field to gather together and examine world's best practice. This is particularly important for a country like Australia where our geographic isolation makes it difficult to get real time interaction and feedback on our programs, initiatives and their context.

The FRDC has funded a bursary program following the 5th (USA) and 7th (Brazil) World Conferences. Both have been extremely successful with many participants moving on to prominent national positions of influence. They have all suggested that the bursary program gave them confidence that Australia is often taking a lead role in research, management, community engagement and extension and they felt empowered to promote our programs to the wider community.

The Future Leaders program has invested in the development of young people in the recreational fishing sector since 2008. Young leaders from Western Australia, Northern Territory, Queensland, New South Wales, Victoria and South Australia have been given the opportunity to attend workshops aimed at developing networks, leadership qualities and knowledge of fisheries management.

As a result of the success of the state Future Leaders programs, an opportunity to apply and attend the World Recreational Fishing Conference 2017 in Vancouver Canada was offered to graduates of these courses, as well as to other recognised current and future leaders in the recreational fishing sector and young researchers. Future Leader participants selected to attend the conference will have a variety of backgrounds with a breadth of skills, knowledge and experiences. The project team will work with peak bodies and government officers to ensure that the best candidates apply and that there is support for them before and after the conference.

Applicants are expected to be sourced from individuals working for recreational sector peak bodies, fisheries management, small business owners & employees, public policy employees, young researchers working on applied research and sponsored recreational fishers. This diversity has been an important component of previous study tours, ensuring participating groups develop a broad understanding of the issues faced in the area of recreational fisheries management. The opportunity to interact with international leaders and champions of cutting edge programs while being able to participate in healthy, robust discussions throughout the conference and study tour, allows for the sharing of knowledge and innovative ideas to tackle some of the obstacles currently faced by recreational fishing in Australia.

The recreational fishing sector in Australia is extremely important. The FRDC has invested in development of responsible programs for innovative and outcome focused recreational fisheries management initiatives, with strong emphasis on empowering young leaders.

This project is based on the initiative of previous projects 2008-319 and 2006-314 relating to the 5th and 7th World Conferences respectively. Both were highly successful in providing an opportunity for future leaders to embark upon leadership and management careers which has resonated at the local, state and national level. The opportunity exists following the 8th World Recreational Fishing Conference in Vancouver Canada to establish a program based on merit-awarded bursaries to build on and enhance previous successful projects and provide significantly better outcomes beyond conference attendance.

Canada and Australia share many common interests in community attitudes towards fisheries management and administration. There will be delegates from around the world, with a strong

presence from the UK, Europe and central America. There will be delegates from New Zealand and South Africa which will also allow strong, relevant networking for bursary winners.

The selection process for the study tour was well run if slightly truncated. A total of 27 applications were received from around Australia. Several late applications were not considered.

A committee selection process was run and, based upon the quality of the applicants, additional funds were made available for the tour. It was unfortunate that the two high calibre female candidates were not able to attend the study tour and this is something that should be examined for future tours.

There were two levels of bursary offered, study bursary with costs met for the study tour only, and full bursary with the majority of costs met. The study bursary was intended to ensure that there was a strong scientific presence on the study tour to foster partnerships between community and researchers.

Although two very high calibre candidates were awarded study bursaries, it was not considered that this part of the project was particularly successful. The main reason for this was the fact that these people were required to have funding to get to the conference. For one of the recipients it required self-funding which was a major expense for a young researcher. In future it is felt that only full bursaries should be offered.

The 8th World Recreational Fishing conference was the focus and starting point for the tour. A number of attempts were made to establish introductions and rapport amongst the group prior to the tour commencing. Due to the short lead in time this was challenging. Few participants knew each other prior to this trip and as such a catalyst for starting this process was lacking. Strategies included email communication, setting up a closed Facebook page and phone calls from the PI were not very successful in establishing relationships. In future a longer lead in time and potentially allocating this introduction process as a task to be undertaken might see better results.

A phone hook-up in the week before the trip started the introductions and many of the participants met in Sydney before flying together as a group to Canada. The flight proved to be the most important catalyst for the group to begin to gel together. All of these were established by the PI, who paid particular attention to ensuring everyone was on the same flight. Again some catalyst to see participants initiate some of the introductory activities in future would be preferable.

Having an event before the conference – the inspection of the Seymour River habitat works, and including Craig Copeland's group and Bryan Van Der Walt was important in establishing bonds within the group.

Although the group felt like they were still raw when confronted with the conference, the organisers had already seen considerable growth within the group and were pleased with how well the participants performed during the conference.

The study tour selected activities representing some of the best projects and opportunities in British Columbia. Careful watch was made on the TV each night due to severe bushfires in the province, but fortunately they were not present in the areas which were visited.

The study tour group explored the views and attitudes of the community, fishing guides, advocates and managers that were involved with halibut, salmon, white sturgeon and wilderness trout fishing. They visited hatcheries, remedial habitat works, government offices and met with leaders in a variety of fisheries. The meetings and events were chosen to have the most direct applicability to the Australian environment; including resource allocation, licence management, resource sharing, first nation issues, habitat and hatchery remediation, conservation of vulnerable species and managing effort.

Overall the study tour was deemed a spectacular success and one that should be replicated not just for future recreational fishing conferences, but for other components of the Australia fishing industry.

2.0 Objectives

1. To build domestic capacity, empowerment and increase knowledge within and across the recreational fishing sector.
2. To establish and further develop strong effective national and international networks.
3. Educate recreational fishers in Australia of relevant recreational fisheries management initiatives for inclusion in strategic and operational plans and gain expert feedback on Australian initiatives.
4. Educate recreational fishers in Australia of international recreational fisheries research and management initiatives for inclusion in strategic and operational plans.

The itinerary was selected to offer a wide exposure to fisheries related issues and a diversity of challenges for the study tour participants. Due to the tyranny of distance, it was necessary to liaise with people in Canada to ensure that the tour was able to meet the objectives of the project.

Initially several options for the study tour were explored. These included visiting habitat projects in the Pacific north-west of the USA, and finishing the tour in Alaska to explore different management philosophies as they related to marine species and salmon. However, logistics and costs precluded these options, although the group that was led independently by Craig Copeland visited a number of projects in the US and were able to pass their learnings onto our group.

Adrian Clarke of the British Columbia Freshwater Fisheries Society was selfless in assisting the planning for the tour. The challenge that he was set, was that if he had to show some foreign dignitaries the best fisheries related projects in British Columbia, which would he choose. This formed the basis of the tour itinerary. The PI was able to critique the suggestions to ensure that the utility of the events and time were most likely to be of benefit in the Australian context.

2.1 Objective 1 – Capacity Building

This project was extremely successful in building capacity and increasing knowledge of the participants. With significant additional support from FRDC, additional bursaries were able to be awarded which allowed all jurisdictions to be represented. Not all of the participants had come from high profile positions within the recreational sector up to this point, however, all those selected strongly vindicated their selection.

The extent to which these participants are empowered to further advance the issues which were examined or those issues for which they have a personal or philosophical affinity will take time to develop. It is important that follow-up contact and support be provided for the numerous exceptional future and existing leaders which undertook this study tour.

The interactions within the group and the strong personal growth which was witnessed over the course of the project were clear indications of strong critical thinking and support for different management philosophies, both within the Australian and the international context.

Each and every member of the study tour performed their assigned leadership tasks with composure, maturity and respect.

2.2 Objective 2 – Networks

The networks which were developed should last throughout the careers of those who participated. For example, the group coordinated input into many components of this report and have maintained professional and social contact as they reintegrate into their respective jurisdictions.

All member of the tour got on extremely well and learned from the variety of experiences and challenges which were being faced. One of the most pleasing aspects of the tour were the number of international participants at the conference who asked how and why Australia had been able to prioritise the development of younger people and those from non-technical backgrounds to manifest itself in the quality of participants that were present.

The Freshwater Fisheries Society of British Columbia, who organised the conference were particularly effusive about the principles of the leadership program and are looking to implement similar exercises, for example, with their interns who run the successful fishing clinics program.

In addition it was extremely pleasing to meet up with the other bursary winners from the Habitat Conservation Trust Foundation. Several Board members, all pre-eminent scientists and high profile community leaders met with our group for dinner. What was surprising and satisfying, is that the meeting which we facilitated was the first time their bursary winners had met with the sponsors or each other. The interaction with our group and their leaders was very beneficial and several of the Habitat bursary winners developed strong relationships with the Australian contingent.

Some of the networks that were hoped to be established through the informal mentor/ informal host program had variable degrees of success. Some of this was due to several cliques which were present at the conference, specifically based around some of the stronger jurisdictional delegations.. These groups included a number of the mentors and Australian recreational fishing leaders, and tended to stay together and only offered limited support for the study tour participants. It is however pleasing to note that the study tour participants, although for many their first international conference experience, mixed with international delegates extremely well. The Freshwater Fisheries Society staff in particular were extremely gracious and engaging.

Objective 3 – Education

This report details a wide range of issues where the study tour members were able to glean information. These were in the technical, applied and human resource management areas of aquatic resources.

It is clear that exposure of this group to the World Recreational Fishing Conference and topics covered there has shown them that often Australia is very well placed in its handling of recreational fishing management and research, on the world stage at least. Key to this is community engagement, and skills of recreational participants as informed and passionate advocates, traits which are envied by others at the conference and discussed with bursary recipients. The development of versatile and generalist fisheries management skills are beneficial and envied by many countries with longer history of recreational fisheries management.

Objective 4 – Adoption pathways

This is a very ambitious objective, particularly in the context of a developmental pathway for less experienced leaders in the sector. This notwithstanding, the overarching passion, empowerment and breadth of experience and influence among the study tour participants should see a number of initiatives implemented.

The philosophy of the Recfishing Research sub-program; to foster the development of quality research to inform sustainable management and the recreational fishing experience, was strongly embraced by the group.

It will remain to be seen to what extent some of the features of Canadian, in particular, management strategies are able to be championed and then implemented in an Australia context. This will require ongoing support from developed leaders as well as the participants themselves. Some areas to watch for future adoption include more relevant volunteer based programs, more targeted fishing clinics and improved community stewardship and handling techniques for species such as Murray cod and impoundment barramundi.

The likelihood of adoption will be greatly enhanced by the inclusion of established leaders on the course who will be able to provide support, ideas and energy during the adoption process. It is recommended to have at least a presence of existing leaders on any future study tour projects to provide this platform for adoption upon return from the tour.

3.0 Method

The project will follow on from successful projects undertaken following the 5th (USA) and 7th (Brazil) World Recreational Fishing Conferences. The greatest strengths of the two projects will be utilised for this project. This will entail a transparent application process to ensure that the most suitable applicants from a geographical, vocational and inter-generational perspective are awarded bursaries. Bursaries will target future leaders of the Australian recreational fishing sector (people generally under the age of 35) who have not been to a World Recreational Fishing Conference previously. This was a feature of the first project.

The application for the bursaries will be advertised through state and national networks including Recfishing Research, Young Future Leaders, NSILP, tackle industry and various social media outlets. Applications will be reviewed and assessed by a committee consisting of Joshua Fielding (FRDC), Matt Barwick, Frank Prokop, Brett Cleary and Jo Starling as a high profile independent assessor. Successful applicants will be advised of the type of bursary that they have achieved.

High priority research areas from the Recfishing Research RD&E plan will be distributed and used as the basis for seeking collaborators attending the conference and those who are available post tour, who are addressing similar issues. Bursary winners will be encouraged to develop a list of issues and ideas that they want to explore with delegates beforehand.

Engagement will occur with bursary winners in the lead up to the WRFC to assist in progressing these issues. To assist networking, bursary winners will be encouraged to contact other members of the Australian delegation on a specific issue and to act as an informal mentor during the conference.

Site visits with key leaders in Canada and the US will enable interaction with the projects and their coordinators and provide opportunities for participants to undertake roles of group leader, rapporteur and logistics coordinators. This was a feature of the second project. Invitations will be extended to other members of the Australian contingent to the conference to attend the study tour as full fee paying participants. This will add to the diversity of participants and provide wider perspectives of the issues discussed and greater opportunities for the bursary winners to engage with other prominent Australian fisheries leaders. This was also a feature of the first study tour.

Issues to be examined were prioritised by the investigators in conjunction with the priorities of the Recfishing Research subprogram. They included - resource allocation between and among sectors, managing tourism and interactions between guided and non-guided fishers, community based education programs, angler participation in restoration of fish passage and habitat, first nation management issues and retaining/building social licence to operate. Importantly bursary winners will also be asked if there are issues or topics relevant to them which they have an interest in investigating in the study tour. Sites and sector leaders will be selected to best represent these issues and an itinerary which is most cost and impact effective will be arranged. Bursary winners will be given a variety of roles during portions of the tour and will be expected to represent Australia's fisheries sector with professionalism and integrity. A blog and Facebook page will be updated each day with events as they happen and those not successful or unable to attend will be given the opportunity to assist participants by asking questions about events undertaken or those to come. A daily debrief session will be held during the tour.

It is expected to potentially offer bursaries at three levels - 1. Demonstrated hardship - where an applicant offers excellent credentials or benefits to the study tour but is able to demonstrate an inability to meet the costs of the Conference and associated events. Full costs met by this application. This may not be required and a maximum of 1 bursary of this type would be awarded. 2. Standard bursary (12 total of type 1 and 2). A nominal contribution of \$500 is expected from bursary attendees

to demonstrate commitment to the project, and generally, support from a recreational fishing body such as a state or national organisation. Other costs associated with the conference and study tour will be met. 3. Young Scientist/Academic bursary. Costs of the study tour will be met by the project. It is anticipated that no more than two of this type of bursary will be offered. It represents an opportunity, especially for young researchers who are able to fund their attendance at the conference, to be able to attend the study tour to enhance their breadth of understanding of fisheries related issues and to benefit from the interactions with other bursary winners.

Each full bursary will include costs associated with the trip - including airfares, twin share accommodation, conference fees, travel, site visit and meeting costs associated with the study tour and costs to run the communications with Australian audiences while on tour. Academic bursary winners will have these costs met for the study tour component of the trip. Incidentals including some meals, personal insurance and any activities undertaken on a free day (Sunday) will be at the expense of bursary winners. There will be an end of tour dinner and debrief before returning to Australia. The costs of the PI in attending the conference and study tour will be funded through the project. The investigators will only be charging the project for direct incidentals, even though there is considerable organisational time required before, and oversight during the project. This is reflected in the high in-kind contribution for their time.

All bursary winners will be expected to cooperatively coordinate the final report and include recommendations for future improvement of any similar initiatives as part of their ongoing professional development. A post tour phone hook-up will provide feedback on the final report and any meetings which participants attend. All bursary winners will be encouraged to maintain contact with their Australian contacts, mentors and any key people with whom they liaised during the study tour. The PI and CI will follow-up contact 6 months and one year post tour to provide further encouragement and support.

4.0 Results and discussion

4.1 Overview of the application and project process

However, there were some challenges which arose with the project. One significant difficulty involved the timing of the application for the project. Another PI was initially looking to run the study tour and bursary program. Due to timing and other commitments, this application did not proceed and the FRDC and Recfishing Research program sought another suitable applicant.

Frank Prokop had run the first study tour to Florida and Matt Barwick the second tour to Brazil and both agreed to co-ordinate, at relatively short notice, the application for the Canadian study tour. David Ciaravolo, who had been a standout participant to the Brazil tour, agreed to act as co-investigator.

The project was given conditional support by the Recfishing Research subprogram requiring additional oversight from the committee to ensure that the selection process was transparent and merit based. Applications were called and were promoted by FRDC and through peak bodies, champions of recreational fishing development and widely on social media.

A very high standard of applications were received and were duly assessed by a committed and professional group. As the applications were of such a high standard, FRDC agreed to expand the number of bursaries such that all jurisdictions were able to be represented on the study tour. Selected applicants had a wide range of experience including management, research, trade, aquaculture and habitat expertise. Two female candidates were selected.

The FRDC agreed to include Mr Alan Hansard on the study tour to add his additional expertise and to assist the development of the National Recreational Fishing Conference in Darwin in November 2017.

Several applications were received just after the closing date and were not considered. This caused some minor difficulties but was well handled by the FRDC staff.

Unsuccessful applicants were sent a very encouraging letter as all had shown considerable promise in their endeavours to be part of this project. Successful applicants were advised of the conditions of the tour and the importance of representing the FRDC and Australian recreational fishing while in Canada.

Unfortunately, the two female candidates were not able to take up the offer for reasons not related to the tour. The group clearly identified the need for a strong female and indigenous component of any future tour.

There were some logistical issues associated with organising a trip to Canada from Perth, Australia. These included time difference (-15 hours), finding the right people to talk with, exchange rate differences and minor cultural differences (e.g. tipping or gratuities and how they might be accounted for).

The Freshwater Fisheries Society of British Columbia, the organisers of the conference, were extraordinarily helpful in selecting activities which highlighted the best scope for learnings during the study tour. Adrian Clarke, in particular, had developed a strong relationship with the Australians on the Brazil tour and deserves an enormous amount of recognition for the quality of the final itinerary.

Matt Barwick was forced to withdraw from the study tour due to his workload as the leader of the Carp Eradication program. David Ciaravolo took his place as a group leader and was able to make an excellent presentation at the conference using Matt's previously approved spot.

It was agreed to use Curtin University to administer the funds for the project and its insurance cover for the group. There were several challenges with the Curtin processes which made some of the bookings more difficult. However, Carey Ryken-Rapp and Shuie Lui were extremely helpful as was Amber Kerwin from the travel company.

It is extremely important to ensure that a more conservative timeframe for booking events is utilised for future events of this nature. For example, all except for the PI missed the early bird registration discount as funds had not been transferred in time. In addition, accommodation for the last night was more expensive as a major festival was starting in Vancouver which saw most hotels booked out and charging a premium.

4.2 Overview of the conference

The 8th World Recreational Fishing Conference (WRFC) formed the focal point of the FRDC Future Leader's Program. The conference was held in Victoria, British Columbia from the 16-20th of July and was attended by 396 delegates from 21 countries. The goal of the conference was to unite the global recreational fishing community by providing a forum to discuss current research and management. The conference was split into symposia, sessions and workshops to provide forums ranging from 'understanding angler behaviour through human dimensions and economic research' to 'monitoring and assessment of recreational fisheries'. The diverse backgrounds among members from the FRDC young leaders (e.g. peak body representatives, researchers and sector members) meant that the group attended a variety of presentations and were able to dissect the key outcomes from many of the conference sessions (See Appendix C). A key purpose for attending the conference was allowing the young leaders to become familiar with international programs, which encouraged conversations on licensing, resource allocation, restocking and sustainable handling practices during the study tour.



Image 1. Photo of a full house in the main theatre for the last keynote of the conference by Josh Abbott titled *'Improving recreational fisheries management: some thoughts from the dismal science'*.

This conference continues to struggle with its true identity. It is not sure whether it is a conference for recreational fisheries researchers with hopefully management applicability; or if it is a management conference with strong research input leading to ongoing improved management.

Victoria Australia put in a bid for the 9th World Recreational Fishing Conference which was unsuccessful (the winner was the Netherlands), due in part to wanting to strengthen the management aspects of the conference. The utility of this conference, as a component of the development of objective and broadly trained leaders, is as a component of community, management and sector development. In our opinion, otherwise, other conferences/events should be considered as the foundation for a study tour/ bursary program of this nature.

The Australian delegation at the conference was the strongest, outside of North America, with 38 representatives from government, universities, peak bodies, industry and independent researchers. A strong attendance of Australians at the WRFC allowed the young leaders to learn of best practice research and management occurring in Australia, and provided opportunities for the group to network with these key members of the Australian recreational fishing community (for more see section 4.6 - Interaction with Mentors).

The Australian presentations at the conference were of a high standard and were well received. These presentations included talks on research and management by Dr. Andy Moore, Scientist at ABARES, who discussed developing methods for optimal survey design for Southern Bluefin Tuna; Matt Gillett, Fishing Development Officer at Recfishwest, spoke about building capacity in Australia's recreational fishing sector; Dr. Mike Steer, Scientist at SARDI, talked on the re-engagement of the recreational sector with the South Australian government; Dr. Ben Diggles, research consultant at DiggsFish, addressed anglers and community working together to restore shellfish reefs; Craig Copeland, NSW fisheries, discussed recreational fisher taking action on restoring fish habitat; and FRDC tour leader, Frank Prokop, presented on the importance of large scale collaborative citizen science projects and maximum experiential yield for fisheries management decision making.

Talks were also presented by James Florisson (two presentations) and Leyland Campbell from Recfishwest, David Ciaravolo from AFANT, Alan Hansard from ARFF, Ross Winstanley from Victoria and Matt Hansen from NSW.

The Australian presentations were of a high standard and challenged some existing paradigms. The move to community involved and proactive management was not always appreciated by academics. There is a major difference in the resourcing of management and its relationship with science, particularly in the US. There were hundreds of management committees for Wisconsin lakes, often with fully funded sampling that was used for management reforms. However, there was NO coordination between these groups which may have seen significant streamlining and savings of research and community management. Therefore a move towards larger scale management principles was seen as a threat to Universities who undertook this fine scale research.

It was concluded that the conference achieved its objective of sharing information between academics, managers, and industry leaders while fostering new collaborations to ensure the future of recreational fishing is healthy and sustainable. Overall, the learned outcomes from the WRFC and connections made with Australian and International delegates proved an invaluable experience. For detailed overviews of key sessions attended by future leaders during the conference and case studies on novel concepts that could be applied in Australian fisheries, See Appendix C.

4.2 Overview of the Study Tour and learnings

Overall the study tour was extremely successful. Even though the group did not know each other, the common purpose and dedication to optimise learning opportunities from the tour meant that the group bonded quickly and strongly. A number of existing leaders enhanced their capabilities and several participants who were at an earlier stage of their recreational fishing careers proved themselves stars of the future.

All participants were given the opportunity to make the best use of their trip and to make supplementary travel arrangements that complemented the study tour. Many of the bursary winners were able to take advantage of this, which is very much to the long term benefit of Australia, but greatly increased the challenges and complexities of the bookings.

Isaac Tancred is a skilled maker of stick bait lures from jarrah, and he was commissioned to make lures to be used as gifts for those who assisted the study tour. These small tokens were extremely well received and Isaac was able to make contacts in his specialty while on the study tour. A special lure was presented to the FRDC in recognition of their support.

The itinerary was widely praised by participants as providing a diversity of experiences and opportunities for learning. The opportunity to undertake a formal activity (the inspection of the Seymour River rehabilitation works) prior to the conference was a major opportunity for the group dynamics to be strengthened and should be repeated for future tours if possible.

While some participants felt that they were thrown into the deep end at the conference, this was a key component of the project and one designed to allow people to show their leadership capacity to overcome these challenges. The organisers were able to observe spectacular growth by the study tour participants during the course of the conference, both in terms of participation as attendees and in accepting roles within the group.

A measure of the success of the dynamics of the group comes from the discussions before the float trip in Cranbrook, where all participants were equally pleased to be partnered with any other member of the study tour. This clearly indicated that they were comfortable with each other and welcomed the opportunity to interact with members of the group.

A final challenge for the group will be to maintain the momentum that was established during the study tour. On return to Australia, the tyranny of distance, that was apparent in the establishment phases of the project, are likely to manifest themselves. After the Brazil conference and study tour, participants were invited to the Australian Recreational Fishing Conference and assisted in its organisation. It is strongly recommended that as many of the Canadian study tour attendees as possible are able to attend the Darwin conference in 2017.

4.2.1 Licencing

The application of recreational licensing in British Columbia's (BC) fisheries is arguably the most important concept observed during the study tour. The governance of licensing in Canada varies by state jurisdiction as well as by fishery (fresh or saltwater tidal waters) and therefore is not applied uniformly across the country. In BC, there are two types of recreational fishing licenses; the freshwater fishing license which is governed by the Freshwater Fisheries Society of BC and the tidal waters fishing license which is regulated by the Canadian Federal Government. For the purposes of this report, there is a focus on the freshwater fishery which was where most of our interactions occurred.

A unique situation in British Columbia sees a private non-profit organisation, the Freshwater Fisheries Society of BC, manage the freshwater fish resources for the benefit of the public. This contractual arrangement is made possible through an agreement between the Province and the Freshwater

Fisheries Society of BC, which sees 100% of the revenue generated from fishing licences directly benefiting recreational fisheries.

To fish in fresh waters of BC, you first require a basic licence (+16 yrs). This licence differs depending on whether you are a 'resident', 'non-resident' (Canadian citizen, living outside of BC) or a 'non-residence alien' (foreigner). This differentiation allows the cost of licences for local anglers to be lower than that of visiting anglers. As a result, it seems that locals develop a greater sense of ownership of the resource and are thankful for visiting anglers bolstering funding. In addition to the basic license, there is an additional license (stamp) for fishing conservation species (e.g. Pacific salmon, steelhead or white sturgeon) and for accessing classified waters. Classified waters are specially designated trout streams, which provide unique fishing opportunities, which contribute significantly to the province's reputation as a world class fishing destination. While resident anglers only need to buy an annual (CA\$40) license to fish classified waters, non-residence are required to purchase a daily (CA\$15) license. In addition to this, many of the rivers require visiting anglers to be guided (i.e. fishing charter).

While there are considerable costs associated with the BC freshwater licensing system, it has extensive benefits. By having the Freshwater Fisheries Society of BC govern the fishery, it allows the recreational anglers to take ownership of their own resource (for more see section 4.2.3 and 4.2.7). This system has allowed 100% of the revenue generated from fishing licences to improve recreational fisheries. Benefits from licensing include stocking programs, through community owned and operated hatcheries, community education programs and fishing clinics (see section 4.2.6), research, enforcement of rules and regulations, infrastructure, habitat rehabilitation and sector development.

The supplementary conservation stamps such as that for the white sturgeon provides additional funding to sub-programs such as the Fraser River Sturgeon Conservation Society. These sub-programs run such things as research and education programs that directly benefit the target species. Data acquired through licence applications also benefits the state in the form of acquired knowledge. By requiring all active fishers to have a license in BC, government and NGOs are able to understand the social and economic value of the freshwater fisheries. When acquiring a licence in BC, you are required to report any retained catch. This information assists researchers and managers to understand the biological impact of recreational fishing and allows regulation development to be data driven.

In Australia, recreational fishing licensing is a controversial concept governed by state jurisdictions. The majority of Australian states and territories do not have licensing and those that do, expend the funds through different means. It has been acknowledged that in Australian states or territories with licences, recreational fishers often do not receive the full benefit of licensing due to a proportion of the generated funds going into general government revenue. While states or territories without licenses operate at a financial disadvantage, resulting in poor management of stocks, under resourcing for the sector and lack of infrastructure. Although there are considerable differences between BC fisheries and those in Australia, the value of the BC licensing system to the user, broader community, governing bodies and sector proves that considerable benefits can be gained through strategic, meaningful licensing of recreational anglers.

4.2.2 Collaboration with NGO's, charter operators and sector

White Sturgeon fishing on the Fraser River was an eye-opening experience on how fishing conservation can work harmoniously for the benefit of the community as well as for future sustainability. Spending a day with Tony Nootebos of BC Sport Fishing Group and Sarah Schreier of the Fraser River Sturgeon Conservation Society while targeting sturgeon on the Fraser River was an informative insight into the mechanisms of protecting the valuable and unique white sturgeon. Tony and Sarah's respective organisations have assisted in forming a collaborative and mutually beneficial link between catch and release sport fishing and research working toward sturgeon conservation.

The circumstances surrounding the Fraser River Sturgeon fishery provided an ideal environment for the collaboration between sport fishing and conservation. The sturgeon is an internationally recognised sport fish and is the world's largest freshwater fish. Due to poaching and environmental degradation, the population of the species was close to collapse. Recreational catch and release angling provided a mechanism to bring value to the fish and its protection as well as a means to study and monitor its recovery.

Conservation groups recognised the input and value which sport fishing brought both parties and that by combining their resources and efforts, they could fight for the same outcome despite different objectives. Tony and Sarah expressed how this was key for the collaboration and that it was not initially easy bringing two ideologically distinct groups together. A significant amount of ground work and person to person consultation was needed to get the movement off the ground and to break down traditional objections. Community leaders and "champions" were integral to creating the support, community spirit and morale. Local champion Rick Hansen was a major component in rallying the community to generate funding to establish fishing research partnerships.

Currently BC Sport Fishing Group operate the largest fleet of fishing charter boats on the Fraser River and each licenced guide carries specific data collection sheets, a measuring tape and an electronic PIT tag reader and tagging equipment to measure caught fish and record tag ID's. Untagged fish, which are now far less common than tagged fish, are implanted with a new PIT tag by the charter operators and details recorded. The vast majority of resident white sturgeon in the Fraser River catchment are now tagged as a result of recreational angling and an immense data set has been collated on the movements, abundance and growth of these fish. Many tagged fish have multiple recaptures over decades of data collection. The recreational fishing sector is now recognised as a key component in the continued conservation of the species.

There are certainly recreational fisheries in Australia which could learn from the sport fishing research and conservation initiatives in the Fraser River by studying how the groundwork was done on the Fraser to change attitudes and align all interested sectors for the ultimate outcome of conservation.

One significant difference between Australian and North American fishing related NGO's concerns their historical context. Many of the North American NGO's have a very long and proud history. They are founded by like-minded anglers with often very specific interests. They are strongly committed to their particular interest and are often extremely successful. Many of the groups are led by retired public servants or researchers and bring a special expertise to the Boards and governance structures of these organisations.

However, there are far fewer 'generalists' among their advocates. Australia, with a much more recent history of recreational fishing NGO's, has people like David Ciaravolo, Andrew Rowland and Mike Burgess to name a few who are often involved in all, or almost all, management processes and can negotiate across a much wider spectrum. This was difficult for the North American government and NGO organisations to grasp. However, the more specific advocacy of North America has seen them develop highly successful funding and volunteer networks as the relationship between individual contribution and angling related outcome is much easier to quantify or identify.

The big advantage of generalist operators is that they can negotiate across a much broader spectrum and ensure that one group is not being either played off against another, or is being disenfranchised during a discussion to which they are not a party. The disadvantage is that the strongest passion and dedication of both history and philosophy is somewhat diluted and there is likely a belief that the advocates are not necessarily working hard enough to meet their own specific needs. This is something that will bear watching as the sectoral advocacy matures in an Australian context.

4.2.3 Responsibility of sector

As recreational fishing is increasingly being recognised in Australia as a significant sector of Australian fishing and aquaculture, it is important that it does not become “too big for its boots” and assume power and position from the size of its following. Recreational fishers need to be aware of public attitude and responsibility of the sector as a whole in order to maintain growth and public image of recreational fishing in Australia.

As our world has seen some increasing levels of environmental degradation, the voice and power of conservation and environmental groups has grown, it has become more apparent that fishing, as an extractive practice to the natural environment, is viewed as an enemy to conservation. Higher avidity anglers know this isn't the case, and often have a high sense of stewardship for the environment, but if we are to continue to run with this line we must have the evidence to support our claims.

This is when the responsibility of the broader fishing sector, its trend setters and leaders need to step forward. The sector needs to promote best practise and development of projects to improve and give back to the environment. Peak bodies around Australia already recognise this and do a fantastic job on this front, but becoming more widely recognised in mainstream community will be part of their role in protecting and developing recreational fishing for the future.

Businesses within the sector need to take ownership and responsibility of this, by promoting appropriate fishing practice as well as a general ethos and educating anglers on using the right gear and techniques to minimise impacts on the fish and the environment. A lot of damage to the recreational fishing image is done simply because people don't know any better, in understanding the impact their actions can have. Simple things like knowing the appropriate gear to use, knot tying and assessing the risk of damage to fish or the environment need to be commonplace and promoted by the sector.

Charter operators and guides also have a role to play. For many novice anglers, their first taste of fishing is through a recreational fishing charter. Whilst charters blend the line between a commercial fishing practise and recreational fishing, their customers are part of the recreational fishing community. These customers need to see that the people who are setting the standard for them - the charter operators - are applying a high standard. Unregulated fishing charters are a good way to show a large customer base of how not to do the right thing, and can set a bad precedence for fishing ethos. Under-manned boats do not have the time to support proper catch care and whether this needs to be regulated or assisted is something to consider for the picture of recreational fishing, and for educating the next generation of anglers utilising a fishing guide or charter operator.

Another commonly discussed and extremely public issue that has strong potential to expose and encourage poor fishing practice is fishing TV shows. The demonstrated practices on these shows far too often demonstrates less than ideal circumstances for sustainable and ethical fishing. A classic case is when the presenter extends the time a fish spends out of water before release, as they discuss the tactics around how they caught it. This is setting a poor example for new fishers as well as tarnishing the reputation of the broader fishing community. We need this side of the fishing sector to step up and take more responsibility in showcasing best practise for sustainable and ethical fishing and set an example for the community.

4.2.4 Resource allocation

The total allowable catch of key species in British Columbia, Canada between the various stakeholders is an ongoing challenge for fisheries management, as it is in many other countries around the world. In BC, the total allowable catch for key species must be split between the recreational sector, commercial sector and first nations, with social, economic and cultural views measured to make a balanced decision for a fair outcome.

We met with Adam Keizer, from Fisheries and Oceans Canada to discuss resource allocation between the different sectors. Adam is the Regional Resource Manager for Groundfish species, and works closely with recreational fisheries managers to achieve a balanced allocation between the stakeholders. The key species under consideration were halibut and pacific salmon (all five species).

There was a similar difficulty to Australia in getting recreational fishers to negotiate at a broad scale and there was some tension between anglers and government officials. One interesting fact is that as Canada is a dual language country, many of the minutes of management meetings in British Columbia were not posted on the websites as there is a requirement to get them translated into French which was seen as a significant cost.

It was interesting to note the different management strategies between the various species. We also spent time with some salmon guides out of Victoria (Adam’s Fishing Charter), and with guides on the Fraser River (BC Sport Fishing Group) to glean a sector perspective of how they view the fishery is managed.

Pacific Halibut

The Pacific halibut is managed as a jurisdictional fishery, with different catch history and allocations between the US, Canada and Alaska. We will discuss the Canadian management of the species in this report. Recreational fishers, commercial and first nations are governed by an annual total allowable catch (TAC) of approximately 3.4 million tonnes split between the different sectors. The halibut season opens in mid-March and is open until the TAC has been achieved, which is usually in November.

First Nation aboriginals have sole access to the halibut fishery when the season opens. First Nations are still bound by commercial restrictions if they want to sell halibut into the market, with the initial access only intended for food consumption and ceremonial purposes. The Government has traditionally leased commercial quota and allocated it to First Nations if it appears they are going to exceed their allocated allowable catch. This is not perceived as a good deal for taxpayers, with the Government leasing commercial quota for approximately \$5/lb while the commercial catch is only valued at \$6/lb market price.

After the First Nations have caught their allocation, the remaining TAC is split between the commercial and recreational sectors. The below table represents the recommended and actual split of Pacific Halibut between the recreational and commercial sectors in Canada:

	TAC Commercial %	TAC recreational %
Recommended by commercial sector	95	5
Recommended by recreational sector	80	20
Recommended by arbitrator	91	9
Actual allocation	88	12

Table 1. Initial allocation of pacific halibut TAC between the recreational and commercial sectors implemented in 2004.

In 2004 – 2010 there was a reported over catch on halibut in the commercial sector.

New allocation implemented in 2012 as follows:

	TAC Commercial %	TAC recreational %
New allocation	85	15

Table 2. Updated allocation of pacific halibut TAC between the recreational and commercial sectors.

The initial TAC of Pacific halibut for the commercial sector was based on catch history in 2003, but later amended in 2012 based on catch history for the years 2004 to 2010. The commercial industry moved to transferrable quotas in 1989. The commercial fishery is closely monitored via logbooks, plus sea monitoring and dockside monitoring of all Pacific halibut licensed commercial fishers. In 2005 the commercial sector bought the under-catch of the recreational sector (recreational TAC not reached), but it's still unclear who the funding went to.

The recreational TAC was harder to set with limited catch history and challenges to verification of these catches offered by recreational fishers. The projected recreational catch is calculated by government authorities, with the season closed once the TAC is achieved. The recreational sector is given two weeks' notice before the season closes. This has proven problematic for guides and charter operators, who are unsure whether to take bookings late in the season as it is unclear exactly when the season will be closed.

The recreational sector would prefer input controls on the halibut fishery (ie governed by a set time-frame season and fallowing of grounds) rather than TAC's. The majority of the recreational fishing sector view the implementation of TAC's on the halibut fishery as a privatisation of a public resource. The application of a 'hard' TAC and deterministic closures is seen as a failure to recognise the differences in the recreational 'market' and a lack of flexibility by government.

The Recreational sector has the option to buy commercial quota to be allocated against the recreational TAC to increase potential catch biomass. The recreational sector could potentially stay open all season if enough quota was purchased, but this option has not been taken to date.

Pacific Salmon

All five species of Pacific salmon are distributed in British Columbia, and represent high-value recreational and commercial species. Unlike the halibut fishery, there is no set TAC on pacific salmon, it is a floating allocation determined on the salmon cycle and returning biomass. It's a very complex cycle and is largely dependent on environmental conditions and returning recruitment. Each species is reviewed over a 5 year period.

As with the halibut fishery, the First Nations aboriginals have first access to the salmon fishery when the season begins, for social and ceremonial requirements and treaty obligations. The authorities must accommodate the best interests of the First Nations when decision making concerning pacific salmon species. First Nations are beginning to integrate into guided fishing, lodges and hospitality.

There is an early season slot limit on spring salmon (Chinook) for the recreational sector, which require releasing if they are larger than 85cm at the beginning of the season, while First Nations have rights to gill net these same fish. This is creating divisions between First Nations and the recreational sector.

The commercial sector is allocated most of the Pacific salmon biomass, with the commercial harvesting taking place in tidal waters between July to November each year. While the commercial sector harvests all five species of Pacific salmon, it is pink, chum and sockeye that are the primary commercial species. The commercial sector is historically allocated around 95% of annual harvest of

these three species, with the recreational sector harvesting the remaining 5% (First Nations harvest excluded).

Chinook and Coho are the predominant recreational species, with approximately 20% of the annual catch allocated for the recreational sector. These two species are taken in tidal and fresh waters and are viewed as the premium species of Pacific salmon, with the priority allocation of the species to the recreational sector viewed as a net economic benefit to British Columbia. Tourism is the second largest industry in BC (after forestry), with recreational fishing contributing largely to this.

There are concerns with recreational fishers taking more than their allocation by printing multiple salmon stamps on their recreational licence, and if not checked, they re-use this stamp against other individual fish. Fisheries compliance officers have a mammoth task given the large area they police, however, there was strong evidence of community stewardship by the majority of responsible anglers.

Most recreational fishers believe more stocking of hatchery reared salmon is needed. At the moment salmon stocking is capped at an annual number with the progeny viewed as possessing lower genetic diversity. The brood stock which are used to produce future stockings are returning wild fish, and hence the offspring should be treated as wild fish in their opinion.

4.2.5 Falling recreational fisher participation

Throughout the 8th World Recreational Fishing Conference, it was a common theme in the presentations that recreational fisher participation is falling throughout the industrialised world.

There are many reasons for this decline in participation, examples include:

- Competition with technology
- Lack of time
- Cost
- Other recreational activities
- Lack of access to fishing areas
-

In Australia, multiple recreational fishing surveys indicate a reduction in participation rate in recreational fishing since the mid 1980s for most Australian states. This decline has a number of negative impacts not only for recreational fishing in Australia but the whole country. In a number of these surveys, the conclusion presented is the "baby boomer" generation is contributing to the decline in Australia. The number of fishers in the 60+ category has increased leading to natural attrition. This is why engaging youth in the activity at a young age is so important.

A number of Australian states and territories fund their research and recreational fisheries management agencies through licence sales from recreational fishers. If participation continues to decrease the funding will then decrease causing negative impacts on the management and science of recreational fisheries in Australia.

What is also rarely studied, but is also important is to study the avidity of those who fish. If people are only ever attracted to 'have a go' and then stop after success or failure, then continually developing new opportunities or markets will be an ongoing challenge. For example, we have little or no idea about the social factors that motivate new entrants to fishing to continue with the activity. Similarly, while through management channels we have some idea of the needs and motives of the most avid anglers, we have little understanding of the pathways or critical events that were responsible for their progression from causal to avid anglers.

There is also a risk if there are too many highly successful anglers competing for the resource. Management in Australia often lags behind the catch dynamics of commercial and recreational fishing and we need greater understanding of the wants and needs of a very diverse sector to be able to provide for an ‘experience’ where the catch itself varies in importance across the sector.

Recreational fishing is a significant social activity in Australia with an estimated 3.3 million people partaking in the recreation per year. More and more health professionals are realising that social activity is a way to help prevent many health issues, examples include Alzheimer’s disease, depression & arthritis. It is also acknowledged to improve health with physical activity and vitamin D exposure and better mental health wellbeing. It must be noted that most people fish recreationally to relax and unwind, and this cannot be overlooked. With a continued decline, Australians are missing out on these benefits.

During the study tour the group attended a fishing clinic hosted by the Freshwater Fishing Society of British Columbia. Revenue generated from recreational fishing license fees fund these clinics (section 4.2.6), and are one example of how declining participation rates could be addressed in Australia.

4.2.6 Education and kids clinics. Linking back to licencing

In the state of British Columbia, 100% of the revenue raised from over 300,000 freshwater fishing licences is directly invested towards improving fishing. A significant portion of the revenue raised from these licence fees is coupled with sponsorship funding to deliver a professionally planned and executed fishing program to children aged between 5 and 15. The ‘Learn to Fish’ program developed by the Freshwater Fisheries Society of BC provides learning to approximately 25,000 participants annually. In a half day course, children not only learn the basics of how, when and where to catch fish but are also introduced to fish biology, habitat and conservation. The Freshwater Fisheries Society of BC employs a number of young professional instructors; often University students during their summer breaks to deliver this organised and well-resourced program to the community. These half day courses are advertised and offered free to children and are also booked by groups such as schools, scouts and summer camps. This forward-thinking initiative demonstrates how fishing licence revenue can be invested effectively to improve the future of fishing.



Image 2. Teaching children to cast in the learn to fish program coordinated by the Freshwater Fisheries Society of BC.

During the WRFC study tour, we observed the delivery of this program at Hicks Lake in Sasquatch Provincial Park and admired its overall professionalism. In Australia, most of the fishing programs offered to young children are delivered only occasionally by clubs and other volunteer organisations.

Often funded by one off government grants, there are significant challenges developing quality programs and providing these opportunities to a large number of participants. The differences between voluntary and fully funded programs are noticeable, not just in the levels of participation but also in the quality of teaching, planning and equipment.

It was noted throughout the 8th World Recreational Fishing Conference that children who continue to fish, generally start fishing at a young age. It was also shown that there is an overall decline in fishing participation rates across the industrialised world, and especially in urban environments due to competition with technology and other recreational activities. Regular investments in youth fishing programs throughout Australia inspires future generations of children to participate in fishing and to conserve and sustainably manage the resource.

4.2.7 Stewardship

A common theme throughout the Canadian study tour and the World Recreational Fishing Conference was the importance of individuals, groups, peak bodies and governments taking care and ownership of their resources and their local fisheries. This stewardship is vital for peak bodies and governments, but the importance of educating the younger generation and grassroots of the sector was deemed significant. Moving towards an unknown future where food and fresh water is likely to be scarce, managing our fisheries is going to become increasingly vital. If positive behaviour is instilled into our younger generations and grassroots, it allows this movement to flow through to the wider population. These positive behaviours and stewardship of fisheries can be small scale to significantly large such as;

- Catch and release fishing
- Rules and regulations
- Protection of the environment – pollution, containments
- Reducing angler impact
- Marine parks and protection zones
- Education - why is it important?

There were many examples of anglers demonstrating proactive stewardship that were witnessed in Canada. The white sturgeon fishery is a great example of community engagement and stewardship for a species that was under significant threat. A group was formed to help conservation efforts for the species, and in the process, turned it into a world renowned freshwater fishery. Today white sturgeon numbers have rebuilt significantly in the Fraser River. They are a 'bucket list' species that anglers hold high regard for and will travel around the world to target. This generates a positive return for both the environment and local economy.

Talking with many trout anglers and guides across the British Columbia province, it was clear how much they value their fisheries. The majority of their rivers are pristine environments and the mainstream trout angler lives by the cliché 'take only photos, leave only foot prints'.

In Australia, there are examples of great efforts by anglers taking care of their fisheries. Matt Hansen from the Inland Waterways Rejuvenation Association, who presented at the conference, is a great example of how an individual and/or group can make a difference. They have not only restored their local fishery, but have educated the community on the importance of looking after this waterway,

respecting the aquatic life and the surrounding environment. There are many other examples of great works in Australia and it is important that these continue.

Education is fundamental in stewardship. Education on topics such as the environment and conservation to individuals, groups and communities is critical. Moving into an unknown future, anglers must take responsibility and ownership and pass this throughout the angling community. It was pleasing to see so much positive movement in stewardship conveyed at the World Recreational Fishing Conference, right across the world. At the end of the day all anglers hold a stewardship obligation, moving forward it's important we continue to educate this to others.

4.3 Relevant applications of key findings

Applications for key findings from the conference and study tour can be found across all Australian jurisdictions. For effective application of these learning's, efforts need to be focussed in to specific locations to have effective objectives and goals. Collaboration with relevant peak bodies and partner organisations will be essential as will a community and government mandate empowering these bodies to promote and support new projects.

Australia hosts many quality, iconic, native freshwater sport fish. Many of these fisheries are unlicensed and poorly studied and/or funded. We saw first-hand how the use of recreational freshwater fishing licences in British Columbia can bring multiple benefits back to the fisheries and can be broadly accepted by the public, fostering stewardship of the fish resource. In order to protect the valuable fisheries we have in Australia and with growing pressures on these fish from angling pressure and habitat alteration, we need to develop mechanisms which, assisted by the users of the resource, enable timely and quality management of these fish.

Licensing provides a means and is an effective way to study fishing pressure and fund fishery enhancements. For broader application and acceptance of licences in Australia, it will be vital that the fishing community who pays can clearly see how the licence money is being used to make their fishing better. Where licences do exist in Australia, it is not always clear where the money goes and fishers or stakeholders struggle to see the value in paying.. In British Columbia 100% of fresh water licensing is received by a third party, the Freshwater Fisheries Society of BC, who are able to clearly demonstrate where the dollars are spent.

There is enormous potential for some Australian fisheries to be special licensed recreational fisheries. As the fishery improves, so does its appeal and up to a point, revenue grows proportionately. If funds were reinvested into constantly improving the fishery and its habitat, the tourism and associated ecosystem benefits could be substantial. A few Australian examples are Murray cod in the south-east and Barramundi in the north.

A divide has somewhat always been present between fishers and conservationists, with the rise of fundamentalists and animal rights groups disenfranchising fishers. Increasing numbers of anglers not only love the act of fishing but have a great admiration of the fish themselves. The proportion of fish which are voluntarily released as part of a 'catch and release' philosophy is a demonstration of the shift from the catch quantity mentality of fishers past. Most fishers see themselves as conservationists. Canada provided a number of examples of where cooperation between angling groups and conservationists brought mutually beneficial results. It should be our goal in Australia to work and collaborate with moderate conservation groups for a mutual benefit.

A term coined at the conference was an "ecosystem accord" – an overarching agreed outcome whereby individual parties may still subscribe to their own values yet work harmoniously with diverse groups towards a common objective. Concentrating on common ground and agreements allows the setting aside differences and joining arms for the greater common good. Fraser River Sturgeon

Conservation showed us exactly how these two realities can work together once the initial walls are broken down.

It is the responsibility of the Australian recreational fishing sector to take the initiative in developing positive partnerships and set a positive vision for where fishing is heading into the future. We need to address poor behaviours in our sector where they are apparent. Failure to be proactive and positive could see many of the rights and accesses we take for granted eroded or lost.

Resource allocation is not a new concept to Australian fisheries. Many discussions find it difficult to quantify the experiential or social values for recreational anglers who fish for other reasons than to always keep fish to eat. Where negotiations have been based on respect or trust, generally a good balance is found between commercial and recreational allocation.

First Nation or Aboriginal considerations are always an additional challenge in resource allocation processes. In British Columbia, the Fraser River Peacemakers group provided a valuable insight into how to deal with such resource competition between distinct groups.

A key observation from the conference, particularly from those who are fishers, is that there is a disconnect between the anglers, the managers allocating the resources, and their scientists and advisors. This disconnect can be linked to changing motivations for why people go fishing and in Australia this has changed significantly from catching fish for a feed to much more commonly catch and release fishing. Managers need to realise you cannot simply manage “fishing” as an extractive activity, and it cannot be treated as a simple predator-prey relationship. There is much social fabric underpinning what anglers do, and managers must investigate ways to start to manage the expectation and experience of individual anglers.

With participation in recreational fishing overall and youth recruitment dropping, education and junior’s clinics are important avenues for engaging and exposing future fishing generations to the activity in a positive way. Kids have a strong affinity for fishing and if more kids can be involved and taught the right things about fishing, the sport should continue to grow. Public perceptions on things like catch and release are often dependent on whether the individual has experienced fishing in their life.

Have an appropriate structure to a junior fishing clinic is very important to appeal to the kids. This means using trained instructors who are enthusiastic, helpful and inspiring to the kids. The kids need to relate. The Freshwater Fisheries Society of BC demonstrated to our group how their kids clinics were run and it was amazing just how engaged the kids were towards fishing. The instructors were young and vibrant and connected with the kids.

A good ratio of kids, instructors and helpers also made the day run smoothly. Much can be learned from the thought, preparation and execution of these clinics and a world of difference could be made to the next generation of Australian anglers with effective programs underpinning the kid’s clinics. Not only do we want more involvement in fishing from younger generations but to keep them interested there needs to be access to fishing opportunities, especially close to urban areas.

Much of what has been stated about the key findings from the conference and study tour, and trends in where the future of recreational fishing is heading boils down to one thing: stewardship. The key for moving forward in sustainable, environmentally and ethically sound recreational fishing and providing an opportunity to build partnerships is instilling and fostering an inherent stewardship of fish and the environment. Anglers need to be recognised as those who love and care for the fish which they target so they can indisputably and ultimately be the fish’s biggest ally.

When anglers are recognised as those who give more back to fish than they take, the grounds will be set to support the future of recreational fishing in Australia. Already the trends in recreational fishing,

particularly by more avid anglers are moving toward this outlook, but the sector needs to work together in forming the path for future fishing stewards.

4.3.1 Differing attitudes amongst guides

As part of its investigation into management and consultative processes, the group undertook several angling opportunities. Professional guides were engaged and the group tasked with determining their attitudes and approaches to management and the business side of recreational fishing.

Fishing activities included half day salmon charters from Victoria town site; full day white sturgeon charters from Harrison Hot Springs and full day charters on remote rivers near Cranbrook. There were respectively 4, 4 and 6 guide operations engaged.

There was a surprising degree of heterogeneity in attitudes amongst the various operations, even though all charters were coordinated by a single company.

For example, there was particular variability between the salmon guides. On one boat, Jamie Crawford and James Florisson both caught chinook salmon. Both fish were dispatched extremely quickly and the guide retained the fish for other uses. On another boat, Russell Conway caught a nice salmon, and on this boat, the guide insisted on less than 30 seconds of photo opportunities before the fish was quickly and carefully released. Although catches were low for the salmon fishing, the other two guides were believed to hold opinions on catches between these two examples.

Another interesting feature of the salmon guides was their distaste for seals which were observed in the best fishing locations. The seals were believed to be fish stealing pests and one large seal in particular was the target of direct and radio derision for being adept at stealing hooked salmon.

The four guides for the sturgeon fishing were all under the auspices of a single guiding company. The bursary winners were extremely lucky to have Sarah Schreir who was in charge of the sturgeon conservation project on one of the boats. With her partner and owner of Fishing BC group, Tony Nootebos, the group were given an insight into the very strong partnership between anglers and scientists. The boat with these leaders also encountered an illegal net during the day and they were pleased to be able to take definitive action to have it dealt with by authorities.

The use of PIT tags, accurate measurements and angler involvement meant that the group were able to discover many interesting facts about the fish which we encountered. These included Sam Williams catching a 6 foot, previously untagged fish, and one of James Florisson's similar sized sturgeon having been captured for the 12th time.

There were still some differences in approaches even within this tight knit group. Different baits and favourite spots were targeted and information sharing was through a clear hierarchy of association within the group.

What was interesting with the sturgeon fishing was that Dr Ben Diggles and Martin Salter from the UK fished from nearby Chilliwack with another guiding company. This group did not participate in the tagging program and there was some tension between this group and the one which we used. So even where the white sturgeon project is world's best practice, it is still not universally adopted within the recreational fishing sector.

There were 6 different guides utilised for the wilderness fishing experience. One River, the Bull River, only has thirty trips allocated to the guiding company which was chartered. It was therefore an honour for two participants to be able to access this 'input' controlled fishery. The results were extremely good – with many good Western slopes cutthroat trout being taken on dry flies.

The other two rivers which were fished, the St Mary's and the Elk, also provided high quality fishing with even the inexperienced fly anglers in the group catching numerous fish. These rivers were less remote, with the Elk having the highway run next to it for part of the stretch fished, but was nonetheless extremely picturesque and felt remote.

Within the guides there was still some significant differences in philosophy and approach. Several guides insisted on only using dry flies for the aggressive cut-throat trout. Several allowed the group to use nymphs, and one guide allowed the lure maker in our group to test his own creation on spinning gear.

There were three categories of licences for these remote rivers – local British Columbia residents, non-resident Canadians (mainly from Alberta province in this case), and aliens from outside of Canada. Residents are not limited in their access to the Bull River, but other categories are tightly controlled.

Interestingly, there is a wide variety of nationalities which utilise the salmon fishery in Vancouver and Victoria, with it being considered a core tourist activity. The sturgeon fishing is very popular with European visitors, especially the British; while the fly fishing especially with drift boats is very popular with Americans. Market segmentation of this nature is not promoted in Australia, with few exceptions such as the Northern Territory barramundi fishery or game fishing, yet opportunities are present such as with Samson fish off Perth with Japanese anglers and even large catfish in the north with German and Spanish anglers.

4.4 Social Interaction of the group (group roles)

To help develop leadership skills in study tour participants, the tour organisers allocated daily roles to group members. These roles included a participant in charge of logistics, a communications manager, rapporteur and group leader.

The logistics role was tasked with ensuring that all the day's activities were organised and the group made it to scheduled events on time. The communications manager role was to develop a series of social media posts that could be uploaded to the Facebook page for engaging with the broader community. The rapporteur role supported the communications manager in documenting the day's activities and helping to develop the Facebook post through video, text and images. The group leader oversaw each of the other roles to make sure they were being achieved, answering questions of the broader group and representing the group during tour activities.

Allocating roles throughout the study tour shared responsibility and relieved some of the pressure from the tour leader. Overall the allocation of roles was important for the social interaction of the group and was an important leadership development tool. All participants performed extremely well in each of the different roles.

4.5 Interaction with Canadian Bursary Program

In addition to the Australian bursary contingent, several students from British Columbia also had the opportunity to take part in WRFC8. Four students (undergraduate and post graduate) were awarded bursaries to attend the conference from one of the main event sponsors, the Habitat Conservation Trust Foundation (HCTF). These students were from different universities around BC and were all studying fisheries management and/or research, and were passionate recreational anglers.

The Australian delegation spent time with the Canadian bursary winners during the conference and had several interactions outside of the conference. The interaction with the students had several different aims including establishing international networks, learning about recreational fisheries

management and research in other countries, and sharing knowledge and experiences around recreational fishing and habitat management, research and education.

Post conference, the Canadian bursary participants said that the best experience was witnessing and understanding the developmental and cultural differences between countries as presented at the conference. They were surprised how regulators and societies differed in their priorities and application of management resources to concerns in specific regions. They thought that although many countries have the same primary motive to protect, enhance and develop fisheries and fishing practises; the capacity by which that can be executed and prioritised differs significantly between countries and their fishers, and those that govern them.

With different species, fishing methods, environments (particularly saltwater vs freshwater), management regimes, issues and strengths, it was an extremely valuable opportunity to network with other young individuals that wish to make a positive change to recreational fishing. During future conferences, it is recommended that other countries that place a high value on recreation fishing also be invited to send a group of students and early career participants to attend. This benefits in building more of an international program (sponsored by individual countries) to create a global network of participants who will directly benefit recreational fishing in their own country, but also in other countries through sharing skills, knowledge and findings. It also sets in place international relationships which could be used throughout the careers of those who take part.

4.6 Interaction with mentors

Mentoring programs are considered a beneficial tool in capacity development in many industries across Australia. These programs involve establishing a relationship between a mentor (someone who is highly skilled in a certain area, in a position of power and/or has a vast knowledge in an industry) and a mentee (someone who is less skilled or established but is aiming to increase their professional and personal capabilities in their sector and/or industry). A mentoring program usually involves meetings at set intervals over time, in which discussions are had over the development of the mentee and how this is achieved, for example by setting goals.

Prior to the WRFC in July, FRDC Bursary participants were given the opportunity to contact a mentor, chosen from a list of sector leaders who were also attending the conference in Canada. These mentors were skilled individuals with various professional backgrounds, including Chief Executive Officers, Executive Officers, policy officers, political advisors, researchers and other respected figures in the sector. Participants were told to contact their chosen mentors and use 'ice breakers' to initiate discussions such as what the participants are aiming to gain from WRFC and the Canada leadership experience as well as why they applied for the program.

A small survey was undertaken with participants after returning home from Australia to ascertain the value they placed on the mentoring component of the trip. From the survey results we can conclude all participants contacted their mentors, and on average had at least seven interactions with their mentors. Interactions included emails, phone calls and meetings before, during and after the conference. Unfortunately, only 40% of participants rated their mentoring relationship and experience as good, while only 30% found that the mentoring experience provided them with any value, however 90% of participants think that mentoring in a general context is important.

There is a large amount of flexibility in mentoring programs which benefits both mentors and mentees however for a successful relationship, both the mentors and mentees need to clearly know the expectations of them and purpose behind the relationship. This has been signalled as one of the reasons the mentoring program wasn't as successful as it should have been. It should be noted that mentoring is a very individualistic activity and even with proper training and knowledge some

mentoring relationships still have difficulties. While this area is covered in the recommendations, it's noted that mentoring packages such as those used in the National Seafood Industry Leadership Program developed by the FRDC, could be included as a tool prior to the commencement of the tour in the future.

This part of the tour was perhaps the most poorly received by the participants. This was partly due to poor communication on behalf of the leaders. The term 'mentor' is a misnomer for what was actually formally proposed which was an informal arrangement to assist in the integration of the tour members into what, for many, was their first international conference. Any or all interactions beyond this were seen by the leaders as a bonus, and several of those who agreed to assist did a fantastic job more in line with the theoretical requirement for a formal mentor. Several others were either too busy or did not recognise the need and this is reflected in the feedback from participants.

This integration role and meeting/discussing with leaders from other jurisdictions is seen as advantageous, but there is a need for better role definition and understanding by all parties as to what the true expectations for this role would be for future projects of this nature.

4.7 Image gallery



Image 1. Visiting the education centre at the Seymour River Hatchery.



Image 2. Seymour River hatchery where Steelhead and Coho salmon were being reared for restocking.



Image 3. Viewing the habitat restoration work being undertaken on the lower Seymour River.



Image 4. Viewing the fish fence and collection gate for capturing returning salmon to be used as brood stock at the Seymour River hatchery.



Image 5. Attending the Learn to Fish program coordinated by the Freshwater Fisheries Society of BC.



Image 6. Sarah Schreier of the Fraser River Sturgeon Conservation Society recording PIT tag information from a white sturgeon that was caught in the Fraser River during the study tour.



Image 7. Measuring a white sturgeon before release.



Image 8. Visiting the Kootenay Trout hatchery near Cranbrook.



Image 9. Viewing rainbow trout destined for stocking into a nearby lake.



Image 10. One of the trucks used for stocking trout into nearby waterways.



Image 11. Visiting the white sturgeon larval rearing facility within the Kootenay Fish hatchery.



Image 12. White sturgeon fingerlings destined for restocking.

5.0 Conclusion

The FRDC bursary to the 8th World Recreational Fishing Conference in Victoria, British Columbia, Canada was a rewarding, and eye opening, challenging and fun, inspirational experience and opportunity for all young future leaders involved. The various backgrounds of the team from recreational fisheries management to research, aquaculture and the tackle industry, and combined experience and passion for fishing around Australia provided for fruitful and deep conversations and well considered, applied learning.

All participants revelled in the breadth of knowledge and passion for the recreational fishing sector which oozed from tour leader Frank Prokop and took inspiration from the enthusiasm, drive and charm of past bursary winner and assistant leader David Ciaravolo. It was also a pleasure to have Allan Hansard join in discussions for a tackle industry perspective and having Josh Fielding as a welcoming leader who helped to reassure the participants of the value and amenity of the FRDC for future Australian fishery issues, and that recreational fishers are well supported and represented by the Australian government.

The tour to the WRFC8 provided a truly world class experience in all aspects of recreational fishing for the bursary winners. Words can only deliver so much but to experience first-hand the way British Columbia fisheries operate inspired everyone on the tour. There are many parallels and challenges faced in BC which emanate those at home in various parts of Australia and we have much to learn from how Canada has tackled some of these challenges and ideas and positive outlooks on how to approach situations at home.

Friendships were built and networks established by all bursary winners, who with the guidance of tour leaders and mentors found opportunities to branch out to other Australians as well as fishers and scholars from around the world. Taking inspiration from these people and their stories will help motivate us as the next lot of leaders in the Australian recreational fishing sector, and staying connected through the bursary group will empower individuals to find and take advantage of the opportunities which present, as well as look for support when challenges arise. Having built relationships with others in the recreational fishing field from across the world will provide an avenue for a fresh approach and an outsider perspective which is often invaluable information and advice when tackling new issues.

Every individual returned from the conference with a head full of new learnings, information and empowerment in continuing their personal journeys and leadership in the recreational fishing space. It is hard to predict as of this point what the future holds for the pathways of the bursary group, but since concluding the tour, communication has been great with members and spirits remain high for the future of Australian recreational fishing. We all look forward to staying involved and building the recreational fishing sector of Australia into the future and grasping the opportunities which present to us, with our newfound knowledge, inspiration and support networks.

6.0 Implications

The group was overwhelmed with the professional governance, funding models and collective outcomes of respective peak body organisations in Canada (Freshwater Fisheries Society of British Columbia, Alberta Conservation Association), Netherlands (National Sportsfishing Association) and New Zealand (Fish and Game). These organisations are receiving up to 100% of recreational licence fees to undertake management, research, education, communication, promotion, stocking and regulatory functions in a ‘user pays, user says’ model. In Australia, Recfishwest and to some degree VRFish have been able to receive ongoing funding from recreational licence fee trusts but is starkly insignificant when compared to the global benchmarks experienced first-hand by the group.

Our experience on this study tour has indicated the Australian recreational fishing sector is lagging behind global leaders as recreational anglers, via peak bodies, are unable to take ownership for their own resource. State Governments are performing a range of functions to manage and administer recreational fishing, however a review of its core functions and responsibilities to determine functions that can be delegated to peak bodies should be undertaken. Not-for-profits are more agile, flexible and efficient than Government, deliver greater value to recreational fishers and can attract funding from the private sector and other funding streams. We foresee some governments; may be reluctant to do so as recreational fishing licence fees may be funding internal resources, do not acknowledge fees as angler’s money, lack trust with sector and fear the sector will criticise Government with increased resources and capacity.

A co-management model reduces financial and liability advantages for government and builds greater trust and collaboration between the sector. Some Australian jurisdictions already have the governance and expertise in place in peak bodies to take this next step. Other states without a strong peak body presence must be addressed, and quickly.

The significant benefit of re-investment of recreational fishing licence fees back into the management and development of the sector was evident globally. Australian jurisdictions that do not have a comprehensive recreational fishing licence system are restricting the development of the sector and oppressing the sector’s capacity to engage in co-management and provide for the needs of recreational fishers now and into the future. Detractors of licence systems within our sector must embrace the benefits being realised already in WA, Victoria, NSW and globally. Political leaders must take a bi-partisan approach to remove the politics and fearmongering behind a ‘tax’ being introduced and focus on benefits to sector demonstrated globally.

Funding and a co-management approach is key to arresting the falling recreation fisher participation across the industrialised world including Australia at the same time socioeconomic benefits of recreational fishing are being recognised and better understood. This situation reinforcing the urgent need to increase fisher participation rates. School and community fishing workshops have been demonstrated in British Columbia to address declining participations rates resulting in an increase in licences. These activities are routinely conducted across Australia in varying degrees by volunteers, fishing clubs, peak bodies, community groups and Government. We propose these activities have been largely undervalued in its importance to grow participation and instil environmental stewardship ethics. The burden of this vital work has been left by at large to volunteers or programs that receive little or sporadic funding.

Adequate funding should be delivered to high-quality, standardised and curriculum-based programs so that a public profile large enough to compete with other sports and hobbies and attract corporate sponsorship is attained. Volunteers from the sector will continue to be involved in such programs however, paid permanent and seasonal staff as facilitators are essential. As this is a long-term strategy involving the development of the sector it should be the role of peak bodies to lead.

The Charter Industry is playing an important role in the leadership and stewardship of the recreational fishing sector overseas. In Australia, the charter industry blends the line between a commercial fishing and recreational fishing operation and has arguably not been recognised for its potential to help grow recreational fishing, collect research data, advocate for responsible fishing behaviours and environmental issues and support the sustainable management of our fish stocks. The group experienced a number of examples where associations and individual operators were formally working together to ensure paying recreational fishing customers across the sector had an enjoyable experience meeting their expectations. Further work in Australia to remove latent effort, support the economic development of the sector, professional development of its people and incorporation into a governance model may be required.

There were many examples of recreational fishers playing an integral role in promoting best practices for catch and release, promoting sustainable fishing, engaging in conservation angling to support the recovery of threatened species, fish habitat restoration and collecting research data. The concept of 'stewardship' was resounding and again supports the notion that the recreational fishing sector should be given the capacity to manage its own resource, be change agents and protect its social licence. Yet, managers and scientists are still attempting to learn what recreational fishers are thinking and what they would support, even down to what a hypothetical 'average' angler is thinking.

Fishers respond to open communication, genuine consultation, build trust through effective partnerships and are more likely to listen to other fishers, than other sources including Government. Implications for Australia is consultation processes with and within the recreational fishing sector should be examined. Representative models may indicate what fishers 'want' however expertise models may indicate what the sector 'needs' to achieve its objectives and future direction. Further opportunities where recreational fishers can participate in citizen science, education and on-ground works should be actively pursued.

Finally, FRDC's investment in Australia's young leaders was applauded by other nations indicating that Australia is leading the way and there are opportunities for the program to be modelled upon and expanded overseas. A common theme at the conference was a need to involve more young people in all facets of the sector, particularly in consultation processes. This study group with its diversity and Australia-wide representation could continue to provide a voice at the national level to facilitate positive change.

7.0 Recommendations

Participant Diversity:

It was felt by the group that the geographical diversity of the participants on the study tour was an asset to the tour. Having representatives from across Australia, with diverse interests and responsibilities within the recreational fishing sector provided fresh perspectives and a holistic insight to the group. To further participant diversity, it would be beneficial to future study tours to encourage a greater number of female, ethnic and indigenous applicants to ensure that the broader recreational fishing community is represented.

Rotating Roles (*Group Leader, Logistics, Communications, and Rapporteur*):

Providing opportunities for participants to act in different roles throughout the tour was an effective management strategy which is recommended for future tours. Allocating roles to study tour participants allowed the responsibility of tour management to be shared and relieved some of the pressure from the tour leader. This strategy helped participants to develop confidence and to take ownership for the success of the tour. Developing clear 'Role Descriptions' and providing these to the participants ahead of the tour would improve this process. Further expanding of the 'group roles' concept could be made to further improve the tour by requiring participants to encompass additional roles including a brief to the group on activities for the coming day, provide background information and set learning goals.

Pre-Tour Liaisons, Introductory Period:

Given the geographical distances separating the study tour participants, pre-tour liaisons were challenging. The teleconference held before the tour was a valuable experience and provide the opportunity to initiate relationships. Establishing a web conference platform could be considered as an alternative option through the added benefit of putting the face to a voice. Travelling together during the tour was identified as a successful way of providing informal social opportunities. If financially feasible, it is suggested that there could be scope for future tours to include an informal, social activity at the start of the trip to strengthen relationships.

Mentor Roles:

Establishing a mentor relationship provided an opportunity for participants to have a point of contact at the conference. The mentors were asked to introduce the study tour participant to key figures in the Australian and International recreational fishing community to broaden their networks and develop their confidence. While the onus was left mainly to the study tour applicants to seize the opportunity, a more formally structured meeting set aside during the tour is something to consider for future improvement. Such meetings would provide an opportunity for mentors to assist applicants to develop personal goals and discuss future pathways.

Tour Organisation:

It was felt that there was an exceptional number of meaningful formal and informal learning opportunities provided to the group. Although the schedule was busy, the extensive list of activities perfectly balanced theoretical learning with first hand experiences.

An important consideration for future study tours is earlier call and notifications of successful applicants. The late call for applicants for the 2017 study tour, resulted in successful candidates being notified of their outcome after the conference abstract submission date had past. This meant that a number of the study tour members were unable to present at the conference. As the study tours are centred around the world recreational fishing conferences it will be important to future study tours.

Reporting Process:

Greater scaffolding and the provision of clear reporting expectations/instructions is worth considering. Many of the participants were unaware to the extent of reporting that was required following the study tour. Without clear directions or expectations provided, coordinating the group to complete the report was a challenging task. It is felt that if more instructions around reporting had been provided prior to the tour it would have allowed members to be better prepared.

Maintaining the momentum:

The National Recreational Fishing Conference in Darwin in November 2017 represents an opportunity for further networking and a revitalisation of the study tour members who have returned from Canada. Although not part of the formal application, it is strongly recommended that FRDC fund four or more of the Canadian bursary winners to attend the conference in Darwin. Obviously the NT representatives, who performed exceptionally should attend.

In addition, it is recommended that two bursary winners meet with the FRDC Board and staff in Canberra to present the findings from the study tour and to identify further professional development opportunities.

Where possible, participants should be offered the opportunity to act as an observer at the Recfishing Research subprogram meeting or the Research Advisory Committee in their home jurisdiction.

Finally, participants should be encouraged to apply for the National Seafood Industry Leadership Program (NSILP) to further develop their skill sets.

8.0 Further Development

The project provided a very strong baseline for the successful bursary winners to progress. This progress will be at different levels and speeds depending upon the skills and experiences of each participant, which vary.

It is clear from the tour itself that a large number of participants have the skills set to make an immediate impact, in much the same way as was clearly demonstrated by David Ciaravolo following the Brazil study tour. It is also clear that the needs for direct and indirect support for the participants varies considerably.

Many of the participants, notably those from the NT, Western Australia, Tasmania and Victoria, have strong support through committed peak body infrastructure. It is important that the peak bodies continue to develop the skills which were apparent on the study tour and offer challenging work that will test but not overwhelm the participants.

Some of the participants have less well developed support structures and networks. These people need further direct contact and the development of a more formal action plan. It is also important to formalise a mentoring and support structure for these people, both within their jurisdiction and among the wider study tour group, to keep them vibrant and energised.

There is an opportunity for further engagement and learning as part of the Australian Recreational Fishing Conference to be held in Darwin in November 2017. Many of the participants, especially those without strong and direct support networks, would gain great benefit from establishing further

networks within Australia, and exchanging ideas with other sector leaders. There is also an important opportunity to reinforce the learnings from the Canadian trip, as some of the initial enthusiasm for change may have been tempered by the reality of a return to existing, more change resistant structures.

As the 9th World Recreational Fishing Conference approaches, it is important to build upon the capacity that has been developed in this project and ensure that some of the participants from this project take a lead role in future tours. The group strongly supported having some more experienced sector people on the tour, but they should be there primarily as secondary support or to organise logistics as part of the application process.

It is a further strong recommendation that several participants be invited to Canberra to meet with the FRDC Board and staff to present the results of this project. Other members should be encouraged to observe the activities of the Recfishing Research subprogram as observers where this is feasible to continue to build strong relationships and support networks. Where possible, the participants should be encouraged to be involved with the Research Advisory Committees in their home states and if possible, to be on advisory committees for projects where they have relevant expertise. In the long term, the participants should be encouraged to act as co-investigators of projects which meet the strategic objectives of FRDC and the Recfishing Research subprogram.

9.0 Extension and Adoption

The extension and ultimate adoption of the key findings of the conference and study tour to user groups, sector, managers, researchers and the broader community is crucial to the project's success.

A Facebook page (*Australian WRFC 8 Study Tour*) was set up to communicate to the general community the activities and associated learnings during the tour (see Appendix 3). A number of detailed (but consumable) posts were created on the page in which key days of the tour were summarised with a brief discussion of what they may mean for Australian fisheries. Tour participant Jamie Crawford, in his capacity as a writer for the *Fishing World* publication, has to date written two online news articles which have been posted on the *Fishing World* website, in addition to a feature article outlining the tour, its purposes and the learnings of participants. Furthermore, there is a second article due to be published which will focus on the Fraser River Sturgeon Fishery. These actions have the greatest reach in regards to communicating to the general community of what the study tour is doing (and its value to participants), as well as detailing the alternative fisheries management methods utilised in Canada, specifically those that could be relevant to Australian fisheries.

The varied backgrounds of the bursary winners will mean there is potential to have a great depth and breadth of information dissemination (from what participants learnt during the tour) into the recreational fishing community across Australia. The roles that the study tour participants hold within recreational fisheries will aid in reaching the different groups concerned with recreational fisheries.

A primary goal of the project was to develop the leadership skills of participants, the general consensus in the group was that these goals was achieved. A number of participants will look to further their leadership skills by taking part in some other programmes available within their jurisdictions. The ultimate success of this project in fostering the development of young members to fisheries leaders will be determined in years to come.

With regards to the adoption of any fisheries management actions similar to those witnessed in Canada, there can be increased confidence in decision making regarding their ultimate social impact, given the cultural similarities observed between Canada and Australia.

Appendices

Appendix 1: Study tour itinerary

Thursday 13/07/2017 Fly from home to Sydney for study tour participants from further reaches

Note that Evan Dixon will have already departed for Canada. Sean Tracey and Allan Hansard have made their own arrangements. Arriving between 11:50 am Travis Preece and 19:00 Mike Burgess in Sydney. Staying at the Mercure International Airport Hotel – 22 Levey St Wolli Creek.

Friday 14/07/17 - Fly from Australia

15/07/2017 Saturday – Seymour River Inspection

Seymour River site inspection is on the Saturday afternoon. Craig Copeland from NSW is taking a group on habitat inspections, concentrating on Oregon and Washington state and their group will be accompanying us on the tour as will Bryan Van Der Walt from NSW Fisheries.

Starting at the estuary, and working upstream we could spend the better part of a day (6 hours with driving times) touring the Seymour watershed.

We have done (through BCIT students) extensive work in the estuary, putting in woody debris, and building structure to a once channelized river mouth.

Next we have our fish fence. Installed late last Spring, we installed the fence to allow us to capture returning mature fish, for transport to our hatchery, and to the 40,000 square meters of off channel habitat that we have built for spawning and rearing salmon.

A short (15 min drive) brings us to the top of Riverside Drive, where a 15-minute walk will bring us to the rockslide which was a naturally occurring event of December 7, 2014. We anticipate that we will have a crew drilling and blasting starting in July, however they only work during the week, and not on weekends, but you can certainly see the enormity of the slide (80,000 m³) that tumbled into the river, blocking both upstream and downstream travel by fish.

From there we could drive to the hatchery. The hatchery is located just below the dam which is located on the Seymour River (utilized for drinking water for the greater Vancouver area), and view our holding, and rearing facilities. Staff would be pleased to give you a tour of the facility, right from the aeration tower, to the Capilano troughs, fibreglass circ tubs, and natural holding ponds.

We could also stroll down the river, and view what once was our pool for seining fish for broodstock at the hatchery.

Start up to the hatchery first, and then tour downstream, stopping by a local restaurant/pub for a bite to eat, and then finish the tour of the fish fence, and estuary.

Shaun Hollingsworth will ride along as the tour guide. Website <http://www.seymoursalmon.com/>.

Contact: Shaun Hollingsworth

Drop off at ferry and travel to Victoria early evening and check into hotel . Strathcona Hotel Victoria – 919 Douglas Street Victoria.

16/07/2017 Conference welcome drinks

Sunday morning will be free to explore the city and further recover from the flight.

6pm – Conference welcome drinks. The [Victoria Conference Centre](#), 720 Douglas Street, Victoria

Main contact: "Clarke, Adrian" Adrian.Clarke@gofishbc.com - T 0011 1 250.414.4205 Mob 0011 1 250.360.6100

17/07/2017 Monday - Conference

Booking made at Strathcona Hotel. Bursary winners will be expected to arrange to attend all sessions and report back to group and via blog/social media on findings.

Dinner tonight -arrangements are being made to meet up with bursary winners being run by Canadian habitat organisation and Craig Copeland group.

18/07/2017 Tuesday - Conference

19/07/2017 Wednesday – plus Conference Dinner (booked with registration)

20/07/2017 Thursday - Conference concludes

Conference closes at noon. Group meeting about learnings to date and logistics associated with study tour at hotel from 1:30 – 3:30.

21/07/2017 Friday - Post conference study tour commences - Charter fishing Victoria - travel to Harrison Hot Springs

Half day charter fishing with Adam's Fishing Charters Victoria, BC 250-727-5575 (contact Adam and Temple). Tides too strong for halibut so salmon fishing (kings, pinks and Coho). Participants expected to discuss management options and solutions with charter operators. Four boats/captains reserved for your group of 14 anglers on July 21st.

7AM departure returning at noon from dock directly below the Visitor Info Centre at 812 Wharf St. Need to get fishing licenses and Pacific Salmon Stamps. They must be printed and brought on the boat.

Back to hotel to pick up bags. Catch the [BC Transit](#) bus #70 Downtown/Airport bus. Cost is \$2.50 and the ride is 1 hour. Leaves from corner of Fort Street – 1 block from hotel at 12:47 pm. Take 2 pm ferry to Vancouver where Sport Fishing BC will meet the party and take us to Harrison Hot Springs. Sean Tracey is heading to Seattle to meet with the Pacific Halibut Commission.

Rooms booked - Harrison Lake Hotel 190 Lillooet Avenue, Harrison Hot Springs, V0M 1K0, Canada - Phone: +16047965555 Booking number: 1512431502.

22/07/2017 Saturday - Sturgeon Fishing - Harrison Hot Springs

Four boats booked for sturgeon fishing through Tony, a pioneer of this highly innovative fishery. Sarah is in charge of sturgeon conservation program and has offered to attend one of the boats to help explain the methods used in tagging and recording data.

Sean Tracey rejoins group mid afternoon in hire car. Saturday night Tony and Sarah will join the group for dinner (will pick up dinner for guests – bursary winners to meet own costs) at Old Settlers Pub 222 Cedar Ave, Harrison Hot Springs,

BC Sport Fishing Ltd 100 Esplanade Ave, Harrison Hot Springs, BC V0M 1K0, Phone: +1 604-796-3345 Tony direct 0011 – 1 -604 – 845 0420.

23/07/2017 Sunday free day - stay Harrison Hot Springs

A number of options for members to undertake activities at their own cost.

24/07/2017 Monday - Return to Vancouver – attend fishing clinic; lectures halibut, sturgeon etc

Freshwater Fisheries Society are arranging a fishing clinic under their Learn to Fish program at Hicks Lake which is located in Sasquatch Provincial Park from 10:30 – 12:30. Lunch in Harrison Hot Springs with local Freshwater Fisheries Society staff.

Bus back to Sandman Suites on Davie in Vancouver. Joshua Fielding and Allan Hansard leave group in hire car to return to Australia.

Contacts - "Gass, Mike" <Mike.Gass@gofishbc.com>,"Laird, Tanya" Tanya.Laird@gofishbc.com "Yarwood, Jessica" Jessica.Yarwood@gofishbc.com.

Additional contacts: "Godin, Theresa" Theresa.Godin@gofishbc.com ; "Pollard, Sue" Sue.Pollard@gofishbc.com

25/07/2017 Tuesday - Fly to Cranbrook - drive to hatchery - inspection.

Air Canada – AC8215 8:50am arrive 11:18 am. Pick up hire cars at Cranbrook – 2 Budget 7 seater vans booked. Frank Prokop and Evan Dixon drivers. Lorilee at [1-250-489-4371](tel:1-250-489-4371) (Budget Rental Car).

Drop off bags at hotel. Accommodation in Cranbrook – Days Inn Motel. 600 Cranbrook Street North, Cranbrook, BC. Contact Jennifer: jbouchard@daysinncranbrook.com

Hatchery is 45-minute drive from Cranbrook. Drive to hatchery for tour and discussions on river classification system.

Hatchery manager - "Schoenberger, Owen" Owen.Schoenberger@gofishbc.com

26/07/2017 Wednesday - Drift fishing for bull trout/ cutthroat

Booked 6 guides through St Marys angling for drift boat fishing for cutthroat trout or bull trout. Will be able to get onto some wilderness water and see how they are managed. Some of these waters have fisher/day caps and others have restricted access.

<https://www.facebook.com/StMaryAnglerBC/>

We will be floating some or all of these rivers in different groups:

ST. MARY RIVER

Born in the Purcell Mountains, the St. Mary River is a classic free stone stream which flows gently for some 50 miles before joining the Kootenay River. We consider the St. Mary to be one of the finest dry fly fisheries in North America. You will enjoy wild West Slope Cutthroats and Cutbows from 12 to 18 inches and catch rates of 10 to 50 fish per day. As an added bonus, there is a good chance you will not see another angler during your float. The lack of angling pressure is due to the absence of roads along the length of the River. Fortunately, we have secured a number of private launching sites that we have access to for your float trip.

The St. Mary becomes fishable in mid June with good hatches of stoneflies, caddis and midges. By July and all the way through August most attractor patterns work well.

ELK RIVER

The Elk River begins its journey in the MacDonald Range of the Rocky Mountains. It flows some 135 miles (220 kilometres) south and drains into the Kootenay River. With wild West Slope Cutthroats from 13 to 20 inches and Bull Trout from 18 to 30, the Elk is our regions' best-known river. It has quickly gained a reputation as a must fish river when you come to this region of British Columbia. During the fishing season, you can expect catch rates from 10 to 30 cutthroats per day with the odd Bull trout mixed in.

The season on the Elk River usually begins in late June with good hatches of stoneflies and some mayflies. Nymphing with a Prince Nymph, Bead Head Stoneflies and Hares Ears will work well all summer long. Any good attractor or terrestrial will work great all of August and September. October is a great time to fish Blue Winged Olives.

BULL RIVER

Emerging from the Macdonald Range of the Rockies, the Bull River flows about 50 miles southwest until it joins the Kootenay River. It is a scenic little stream with an extraordinarily robust population of wild west slope cutthroats. Most of the cuts are in the 10-12 inch range with some to 14. Catch rates are from 20-100 per day.

The Bull River has a lot of structure to it with many large rocks and boulders and is narrower than the St. Mary and Elk rivers. In addition, it has a lot of Class 2 and 3 water which our guides will skilfully manoeuvre you through. A float on the Bull is a particularly beautiful trip as the River flows along the back side of the "Steeple" which are part of the Hughes Range of the Rockies making for some spectacular views.

The season on the Bull River is from late July through August. The River is blessed with robust hatches of caddis and mayflies. Any good attractor pattern works well; i.e. Royal Wulffs, Royal Coachman, Parachute Adams, etc. Since the fishing pressure on the Bull is very low and the number of cuts is quite high, you are in for some fun days on the scenic little emerald river.

ST.MARY ANGLER FLY SHOP LTD. 401 Cranbrook St. N Cranbrook, B.C. CANADA Toll Free 1-800-667-2311 email: stmaryangler@gmail.com www.stmaryangler.com Contact: Kelly and Karen Laatsch

27/07/2017 Thursday - Return Vancouver

Fly back – Air Canada to Vancouver. AC8216 11:40 am arrives 13:30

Afternoon group meeting and debrief at hotel:

Sandman Suites on Davie 1160 Davie Street Vancouver.

28/07/2017 Friday - Meetings in Vancouver - end of tour dinner

Final meetings probably at University of British Columbia on halibut management, first nation issues and angler advocacy. Group discussions and work on logistics of final report.

End of tour dinner - Cardero's restaurant & live bait marine pub. 1583 Coal Harbour Quay, Vancouver, BC V6G 3E7, Phone: +1 604-669-7666 Menu: vancouverdine.com. One of the top seafood restaurants in Vancouver. Adrian Clarke and partner Nora King will be joining us and perhaps some others. Note – first sitting at 5:30 pm. Participants free to kick on after dinner as they choose.

29/07/2017 Saturday - Return to Australia

Tour complete.

Day free for last minute shopping etc. Mike Burgess leaves tour on his own.

Fly out – United Airlines to San Francisco – UA2423 leaving 19:26 – Arrive SF 21:48

QF74 to Sydney 23:25 arriving on the 31st due to international dateline at 7:00 am.

Connecting flights booked as required.

Appendix 2: Participant bios

Australian WRFC8 Study Tour Team

Evan Dixon

Evan Dixon is a Northern Territory born recreational fisher and primary school teacher. He spends his free time fishing in the greater Darwin region for barramundi, pelagic and tropical reef species.

For several years, Evan has fished competitively in the Top End Barra Series, a local competition with six rounds of barramundi fishing held across a range of locations. Evan holds a committee position with the Amateur Fishers's Association of the Northern Territory (AFANT). As a committee member, he dedicates his time to supporting AFANT's mission to represent recreational fishing in the NT and ensure the quality of the sport. Evan has recently taken on the role of convening the AFANT Recreational Fishing Research and Tagging Subcommittee.



James Florisson

James Florisson is the Research Officer at Recfishwest, in Western Australia. James commenced work in the recreational fishing sector while participating in the Young Future Leadership program and studying Marine Science at Murdoch University in 2013. In 2014-15, James took part in the National Seafood Industry Leadership Program, as well as completing a Diploma in Fisheries Compliance and Management from the Kimberley Training Institute. Following this, he started his Honours degree in using citizen science as a tool for monitoring artificial reefs.

James's current role involves conducting research into citizen science, monitoring methods and the development of Habitat Enhancement Structures. He is also assisting in recreational fishing research around Western Australia.



Jamie Crawford

Jamie Crawford is from Port Lincoln in South Australia. His professional background is marine aquaculture where, after completing a Diploma in Aquaculture in 1999 he has been working in the hatchery production of temperate finfish species.

A keen recreational fisher, Jamie has been a freelance writer for 18 years. He has contributed to SA Angler, Fishing World and Sport Fishing Australia and several other publications. Jamie has been a Shimano Sponsored angler for around 10 years and recently co-authored the Fishing Guide to South Australia.

Jamie has worked as a creel clerk undertaking recreational fishing surveys at boat ramps on the Eyre Peninsula in South Australia (co-ordinated through Fisheries Victoria).

At the WRFC8 Jamie is keen to learn more about how other countries manage a shared resource between the recreational and commercial sectors. He is also interested in learning about the structure of peak recreational bodies and recreational fishing licences, as he believes the South Australian recreational sector would benefit from this knowledge.



Domenic Holland

Domenic has worked in the retail side of the tackle industry for the past five years and has been in daily contact with recreational anglers. After taking up angling at a young age, fishing has been a life-long passion, with Domenic still wetting a line at every opportunity.

Following his completion of a Bachelor's degree in marine science at Curtin University in 2015, Domenic is currently undertaking an honours project studying wild Marron (a freshwater crayfish commonly targeted by recreational anglers) populations in the south-western Australia. Domenic's aim for his research is to contribute to an improved management plan.



Michael Burgess

Mike has been hooked on fishing from a young age, especially surf beach fishing for elusive mulloway, big tailor and Australian salmon off the west coast of WA.

With 15 years' experience in fisheries and natural resource management, in both Western Australia and Victoria, Mike commenced in the role of Executive Officer for the Victorian Recreational Fishing Peak Body, VRFish in February this year after a short period coordinating Fishcare Victoria. In WA, Mike led community education and engagement programs for the Department of Fisheries WA and held a 2-year term as an elected Director of Recfishwest.



Sean Tracey

Sean has worked as a fisheries scientist for the last 18 years, conducting research on the role of fish in global food security, assessing the biology and ecology of a range of temperate fish and invertebrate species. Other work includes investigating the effect of ocean currents and temperature on the dispersal of marine larvae and how the ocean drives changes in suitable habitat of marine biota. Sean finds this topic particularly interesting, as the waters off temperate southeast Australia are increasingly becoming warmer.

After completing a PhD in 2007, Sean commenced the role of a research fellow at the Institute for Marine and Antarctic Studies in the field of recreational fishing research. Growing up, Sean spent most of his time in, on, or fishing around the waters of Tasmania. His research has allowed Sean to blend his passions for science and recreational fishing.

Sean continues in this role and has led and participated in a broad range of recreational fishing research and engagement in stakeholder and management issues at the local, national and international levels.



Sam Williams

Sam is a young fisheries researcher in the final six months of his PhD, at the University of Queensland. His studies focus on resolving the biology and ecology of billfish (marlin), as well as developing a framework to better facilitate collaboration between Australian fisheries researchers and recreational anglers.

Sam sits on the Resource Assessment Group for the Eastern Tuna and Billfish Fishery, where he has developed a keen interest in resource sharing arrangement between the commercial and recreational sectors.

Beyond his work, Sam loves the water and recreational angling. He enjoys targeting anything from flathead in the estuaries to large pelagic fish offshore.



Travis Preece

Travis is from Tasmania and has spent his entire life fishing recreationally. He pursues a range of species, from trout in the Central Highlands, to Southern Bluefin tuna off the continental shelf on the East Coast.

Travis has been on the TarFish (Tasmanian Association for Recreational Fishing) committee since 2012 and now holds the position of Northern Tasmanian Regional Representative.

Travis is very passionate about recreational fishers having their fair share of the resource and that the resources are managed well, so as to ensure great sport and recreational fishing can be enjoyed for generations to come.



Isaac Tancred

Isaac first developed a love for fishing living in the Pilbara region of WA for part of his childhood. Family trips to the beach and creeks were fond memories that Isaac held through adolescence as he began to develop fishing skills and knowledge in his own right. Fishing grew into a passion and an obsession as Isaac soaked up all the fishing knowledge he could get his hands on.

Isaac followed his passion into a marine science degree, which he hoped would lead him to a career providing and improving sustainable fishing opportunities for the future. Since graduating Isaacs first real taste of the formal fishing sector was a short-lived role at Recfishwest. Today Isaac is building a brand and working his way up in the saltwater sport fishing market as a craftsman of innovative and artistic, upmarket handmade timber fishing lures. Isaac hopes to continue building on this reputation and to use the brand recognition to empower his own personal standing in the fishing community to influence positive change in social fishing practise.



Australian WRFC8 Study Tour Leaders/ Mentors

Frank Prokop

Frank leads the 2017 WRFC8 study tour with a wealth of experience and a 30-year career in the sector, including a role as Australia's first dedicated recreational fisheries manager. Frank is currently working with Curtin University on social licence and on gas facility decommissioning, citizen science and applied climate change research/management.

Frank has worked in NSW, WA and on the National Policy Development committee - National Oceans Advisory group. He also has extensive experience in the areas of commercial fishing, aquaculture, terrestrial and aquatic conservation. For 14 years Frank worked in the role of CEO at Recfishwest. There, he pioneered Young Future Leaders programs and fishing clinics for breast cancer survivors. He also worked on resource sharing initiatives, recreational property rights and outcome driven recreational fisheries management. Frank led the Australian delegation to the WRFC5 in the USA.

Frank has written 15 books, 50 articles and numerous columns for regional and national fishing publications. He also has considerable media experience. Other roles include past President of Recfish Australia, Member of the Recfishing Research committee, member of the People Development committee and a FRDC Board member.

Frank was the inaugural winner of the Recfish Australia lifetime achievement award and Australian Sports Medal in 2000 for service to recreational fishing.



Allan Hansard

Allan Hansard is Managing Director of the Australian Recreational Fishing Foundation (ARFF) and CEO of the Australian Fishing Trade Association (AFTA). To Allan, recreational fishing is in the genes, as he comes from a strong lineage of recreational fishers, with his great, great, great, great uncle authoring a book on trout and salmon fishing in Wales in the 1830's. Before moving into representation of recreational fishing, Allan represented the forestry and plantation industries at the national level.

Allan has degrees in Economics, Science and Resource Economics. Before joining the private sector, he worked for the Australian Bureau of Agricultural and Resource Economics (ABARE).



David Ciaravolo

David Ciaravolo is a professional in the area of recreational fishery representation and management, and is passionate about the sustainable development of recreational fishing in Australia.

Hailing from Adelaide, where he worked as Executive Director of RecFish SA, David now lives in Darwin, where he has taken on the role of Executive Officer at the Amateur Fishers's Association of the NT (AFANT), earlier this year.

A keen fisher with varied interests, from trout to tuna, David enjoys a career focused on improving opportunities and experiences for recreational fishers. David was a participant in the FRDC's 2014 Future Leaders Study tour to the WRFC7, and has since become even more passionate about capacity building in the sector, which has driven him to work towards developing state-based and regional future leadership opportunities for others.

David will be presenting at the WRFC8 about how AFANT and Fisheries NT engage fishers in the management of iconic barramundi fisheries.



Josh Fielding

Josh Fielding has worked with the FRDC since 2014, leading their strategic planning and RD&E planning processes. He now project manages several research portfolio areas, including recreational fishing.

Prior to working at the FRDC, Josh worked in the aquaculture industry, as well as working for some time in the Australian Fisheries Management Authority across various fisheries.



Appendix 3: Social media blog posts

Australian WRFC8 Study Tour added 3 new photos.

Published by James Florisson [?] · July 25 at 2:06pm · 🌐

Today we had the chance to join the Freshwater Fisheries Society Of BC as they ran a 'learn to fish clinic' with 12 kids on summer camp. Tanya, Doug and Marleau who work out of the Abbotsford trout hatchery allowed us to listen in as they taught the kids many aspects of recreational fishing with great passion. They introduced the Freshwater Fisheries Society of BC and what they do.

The kids enjoyed learning the basic of fishing, including how to cast, how to bait hooks, corre... [See More](#)



1,378 people reached [Boost Post](#)

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👍 29 [Chronological](#)

3 shares

 **Johan van der Walt** Mmmm this is great, give a man a fish and he has food for a day, teach a man to fish and he has to buy a rod, a reel, lures, a boat, a suv.....
[Like](#) · [Reply](#) · [Message](#) · July 25 at 2:48pm

 **Geoff Dobson** Nathan Huizing if you zoom in on the side of the ute you will see the number to contact. 🙌
[Like](#) · [Reply](#) · [Message](#) · 1 · July 25 at 5:13pm

👤 3 Replies



Australian WRFC8 Study Tour added [4 new photos](#)

Published by David Ciaravolo [?] · July 24 at 9:22am · Vancouver, BC, Canada ·

Have you ever heard of the white sturgeon (*Acipenser transmontanus*)? Growing to over 20 feet and over 100 years old, the white sturgeon was made famous on the show *River Monsters*. However, the history and importance of this species in North America goes far beyond its aesthetic value.

We were lucky enough to spend the day tagging and releasing white sturgeons with Sarah Schreier from the Fraser River Sturgeon Conservation Society (FRSCS). The white sturgeon was classified as ... [See More](#)



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[Australian WRFC8 Study Tour](#), [Kevin Bamford](#), [Fishing with Rod](#) and 53 others

21 shares



Australian WRFC8 Study Tour added 3 new photos

Published by Isaac Tancred (??) · July 22 at 2:25pm · 🌐

Today the Australian #wrfc8 bursary were blessed with a sample of one of coastal British Columbia's most iconic fisheries.

The cold marine environment fed also by the glacial flow of the provinces rivers hosts migrant populations of chinook salmon as they gather momentum for their spawning run up the BC rivers around the province capital, Victoria.

The highly tidal coastal marine environment provides challenges to the local fishers while some quality fishing can be enjoyed i... [See More](#)



904 people reached

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[Like](#) [Comment](#) [Share](#)

[Australian WRFC8 Study Tour](#), Fishing with Rod, Marcus South and 42 others



Write a comment...



Press Enter to post.



Australian WRFC8 Study Tour

Published by Isaac Tancred [?] · July 21 at 2:30pm · 🌐

Today we wrap up the learnings from the [#wrfc8](#) World Rec Fishing Conference in Victoria, British Columbia, Canada. The last day at the conference saw our Australian bursary delegates explore the topics of Monitoring and Assessment, Understanding Angler Behaviour Through Human Dimensions and Economic Research, the Use and Challenges of Catch & Release and more.

Stay tuned to see how our team of young leaders take their learnings and apply them to Australian recreational fisheries.

Now we start the next leg of the journey, a study tour of British Columbia's world renowned recreational fisheries including a half day fishing for King or Chinook Salmon.

FRDC Recfishing Research



1,147 people reached

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👤 Marcus South, Jenny Stephen and 41 others

Chronological



Anthony McGrath Why only a half day????

Like · Reply · Message · July 21 at 6:09pm



Craig Grose Tough gig Evan Dixon, do a fulls tebs and sort out the raft up!! Seriously doing us proud mate!

Like · Reply · Message · 🗨️ 1 · July 22 at 4:43pm



Australian WRFC8 Study Tour

Published by Isaac Tancred [?] · July 21 at 9:43am · 🌐

An interesting dynamic exists in British Columbia lake fisheries whereby rec fishing lakes are stocked with trout and the stocking is published alongside lake environmental data and fishing class ratings for the public to access.

Fishery managers are faced with the challenge of balancing stocking with fish populations in the lake which affect food availability and fish growth. The publishing of stocking locations also creates a social dynamic directing fishing pressure.

The constant balance of fishing quality, fishing pressure and stocking provides a unique challenge and has resulted in the development of some interesting models to predict stocking requirements and of which may be useful for stocking local lakes and dams in Australia.

Photo courtesy <https://pembertonfishfinder.com/.../may-fishing-anderson-lak.../>

#wrfc8 FRDC Recfishing Research



661 people reached

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👤 Australian WRFC8 Study Tour, Marcus South, Kosta Angler and 10 others

2 shares



Australian WRFC8 Study Tour added 2 new photos.

Published by Jamie Crawford [?] · July 20 at 8:52am · 🌐

Pictured is Travis Preece, part of the Australian contingent presenting a RedTank hand crafted lure to Andrew Wilson (President of the Freshwater Fisheries Society of BC) and to Sue Pollard (part of the organising committee), both of whom helped the Australian bursary winners to plan their itinerary to British Columbia. The lures were hand crafted by Isaac Tancred, who is one of the Australian delegates. #wrfc8 FRDC



1,324 people reached

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👤 Lizzy Preece, Marcus South and 44 others

Chronological ▾

1 share



Australian WRFC8 Study Tour

Published by Jamie Crawford (?) · July 20 at 5:32am · 🌐

One of the most conversation provoking sessions so far between our group has been keynote speaker Josh Abbotts presentation on Improving Recreational Fisheries Management through Economics, which was presented at the world recreational fishing conference this morning.

Josh looked at the case scenario of the red snapper fishery in the Gulf of Mexico where the species biomass was harvested to a non sustainable level throughout the 1960s and 70s. The fishery has been highly regulated since that time, and now the stocks are rebuilding Josh suggests a user pays system and in effect "allocating fish to those who value them the most". This would be based through a quota system where rec anglers and charter boats could "buy" harvest tags to be applied to individual red snapper during the season.

This moves away from the mindset that fish should be classified as "free" and elevates the social and economic value of that species.

Does this create exclusivity to a fishery?

Thought provoking.

#wrfc8 FRDC Australian Recreational Fishing Foundation Recfishing Research



1,558 people reached

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👤 Marcus South, Kosta Angler and 12 others

Chronological

2 shares



Jo Howes I have many thoughts to this.. Commercial maybe above a certain quota but not Rec.. I hope this never eventuates in Aus.. How is their research/stockings funded?

Way too exclusive for my liking! I feel like this idea goes against the freedom fishing brings.. What if you accidentally hook up to one of these snapper by accident, how would C&R apply.. That's what regulations are for in my opinion.



👍 Like · Reply · Message · 🌐 · July 20 at 6:32am



Australian WRFC8 Study Tour

Published by Sam Williams [?] · July 19 at 10:18am · 🌐

Understanding recreational fishing effort is a complex issue. To resolve this, Scott Brodie, a Habitat Conservation Trust Foundation Bursary recipient has come up with a simple solution.

By installing remote traffic counters at boat ramps, they were able to monitor the daily fishing effort at popular fishing lakes (creel surveys were used to validate their results).

FRDC Recfishing Research



291 people reached

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👤 Pascale Zufferey, Marcus South and 10 others

Chronological



Malcolm Poole So this provided both recreational fishing and recreational boating effort at boat ramps. What about shore based or non boat ramp launched paddle craft fishing effort? How was this captured or assessed?

Like · Reply · Message · July 19 at 12:46pm



Write a comment...



Press Enter to post.



Australian WRFC8 Study Tour

Published by Sam Williams [?] · July 19 at 6:26am · 🌐

The #KEEPEMWET catch and release social phenomenon has taken off in North America to encourage anglers to respect the fish they are catching (by keeping them wet while unhooking).

Through anglers promoting stewardship of their resource on social media, taking care of fish has become common practice.

How could we take from this great work to improve fish care practices in Australian fisheries?

FRDC Recfishing Research Australian Fishing Trade Association



5,224 people reached

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👍❤️ 31

Chronological

18 shares



Brett Cleary Great idea, pretty common here too especially trout fishery

Like · Reply · Message · 🗨️ 3 · July 19 at 9:23am



Tristan Robert Common practice for marlin and sailfish too

Like · Reply · Message · 🗨️ 2 · July 19 at 9:28am



Matt Byrne Put it on your list Dallas, it's a major piece of the big picture if you want 'one million' to have a sustainable wild fishery.

Like · Reply · Message · 🗨️ 1 · July 19 at 5:59pm



Mikey Campbell I think we should encourage long handled environets rather than boga grips., reduced time out of water and spearing back rather than reviving (for barra)

Like · Reply · Message · 🗨️ 4 · July 19 at 7:49pm

➦ 1 Reply



Ben Diggles Boga grips can be used without lifting fish from the water.... They are not mutually exclusive for best practice release methods.....



Australian WRFC8 Study Tour added 4 new photos — with Jamie Crawford and 3 others at [WRFC8](#).

Published by Evan Dixon [?] · July 18 at 12:34pm · Victoria, BC, Canada ·

Our young Australian team were amongst 380 enthusiastic delegates from over 20 countries up early this morning for the first day of the World Recreational Fishing Conference, WRFC 8. It was an empowering day and an opportunity for our young leaders to expand their knowledge through a suite of inspiring presentations and informative research.

A big achievement for one of our bursary winners, James Florisson (RecFishWest), was his poised delivery of a fascinating study into the effectiveness of using recreational fishers to monitor artificial reef modules being trialled in southern Western Australia.

Tour leader Frank Prokop also led by example, confidently delivering his knowledge into the importance of using citizens and avid anglers to collect data and assess fish stocks across various waterways.

After an exciting first day, the team are looking forward to the rest of the conference and are optimistic about the potential for new found knowledge to benefit local, Australian and international fisheries in the future.



2,401 people reached

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32

Chronological



Australian WRFC8 Study Tour added 2 photos and a video.

Published by James Florisson (?) · July 16 at 12:37pm · 🌐

Today we were lucky enough to spend some time with Shaun Hollingsworth and Dr Ken Ashley to check out some of the habitat related issues and community driven habitat restoration activities undertaken in the Seymour River watershed in Vancouver, British Columbia. A dam, poor estuarine habitat and a rockslide had affected salmon populations, however work to remove rocks, a hatchery, habitat restoration and a fish trap were helping recover stocks. **FACT:** in the river about 60 percent of fish are from the hatchery and fishers cannot keep wild fish. Seymour Salmonid Society
British Columbia Institute of Technology FRDC Recfishing Research



2,904 people reached

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Australian WRFC8 Study Tour, Pascale Zufferey, Marcus South and 18 others

4 shares



Australian WRFC8 Study Tour with David Ciaravolo and 3 others.

Published by David Ciaravolo [?] · July 15 at 10:15pm · 🌐

The team arrives in Vancouver, British Columbia. Ready for a big day touring the Seymour catchment to learn about fish habitat tomorrow...



1,480 people reached

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👤 Steven Reif, VRFish and 48 others

Chronological

1 share

View 3 more comments



Victorian Fisheries Authority Pretty impressive business plan. Stock fish. Improve habitat and mobilise an army of volunteers!



Like · Reply · Message · 🗨️ 2 · July 16 at 8:40am · Edited



Rural Training Initiatives P/L - Leadership and Capacity Building Great to see a few of our grads on board - Josh Fielding James Florisson Isaac Tancred

Like · Reply · Message · August 2 at 12:52pm



Australian WRFC8 Study Tour

Published by David Ciaravolo [?] · July 15 at 10:08pm · 🌐

Meet the team of Australian recreational fishers who are heading to Canada for the 8th World Recreational Fishing Conference. Follow their journey and learn with them as they engage with leaders and ideas from around the world.



Meet the 2017 Australian World Recreational Fishing Conference Study T | recfish

Meet the team of passionate Aussie recfishers, who are heading to Canada to learn from the world and to enhance the capacity of Australia's recreational fishing sector.

RECISHINGRESEARCH.COM.AU

1,907 people reached

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👍 VRFish, Beverly Giannone and 11 others

Chronological

3 shares



Samantha Nowland Sam Williams sounds like fun!!!

Like · Reply · Message · 🗨 1 · July 17 at 1:49pm

➦ 1 Reply



Write a comment...



Press Enter to post.



Australian WRFC8 Study Tour added 3 photos and 3 videos.

Published by David Ciaravolo [?] · July 28 at 1:12pm · 🌐

The study tour team hopped on a plane from Vancouver and headed inland to Cranbrook, a town surrounded by picturesque scenery at the foot of the southern end of the Rocky Mountain range. Here they met with Traci and Erin from the Freshwater Society of BC (Go Fish BC) for a tour of the Kootenay Trout Hatchery.

The facility was first opened in 1966, but has moved with the times and is a first-class modern hatchery with all the bells and whistles to effectively rear large number... See More



6,715 people reached

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33

Chronological

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Australian WRFC8 Study Tour FRDC, Frdc Comms, Recfishing Research, Australian Recreational Fishing Foundation, VRFish, TARFish, Recfish SA, Recfishwest, Recreational Fishing Alliance of NSW
Like · Reply · Commented on by David Ciaravolo [?] · July 28 at 1:35pm



Malcolm Poole Sounds interesting, have they assess and found the optimum fingerling size for stocking and fish survival? How do they handle and track the genetics in broodstock, and do they look at DNA string references for wild fish verses recaptured previously stocked

World Recreational Fishing Conference in Victoria, Canada

By Jamie Crawford | 23 July 2017

1 Comment



THE 2017 World Recreational Fishing Conference has just concluded in Victoria, on Vancouver Island in Canada. The conference is held every third year and sees the world's leading fisheries research scientists and managers converge for four days to showcase leading research and management strategies.

Some of the hot topics at the conference this year included post release survival and post release predation in catch and release fisheries, post release survival related to water and air temperatures, eradicating invasive species, artificial reefs and habitat restoration, satellite and telemetry tagging of key recreational species, management strategies for declining fish stocks, managing a shared resource, fish stocking programs and data and statistics collation. A lot of information was delivered over the four days, which will be discussed, dissected and filtered through to the general recreational fishing public via various means.

Proving the FRDC's commitment to the recreational fishing sector, travel bursaries were awarded to nine young Australians who had demonstrated leadership qualities and a commitment to Australia's recreational fishing sector to attend the conference. The group also visited the Seymour fish hatchery (Chinooks, Coho and steelhead), plus some habitat restoration work currently underway on the Seymour River.

Out of the 21 countries represented at the WRFC8, Australia was well represented with 38 delegates out of the 396 attendees. Australia also had a number of key presenters at the conference, including Frank Prokop, Craig Copeland, Alan Hansard and *Fisho's* own Ben Diggle. *Fisho's* UK correspondent Martin Salter was also present, reporting on the UK's experience in engaging recreational anglers.

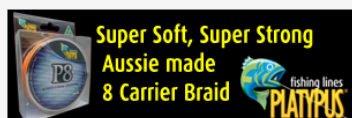
For Australia's nine bursary recipients, the study tour is about to commence where the group will meet with key industry personnel and visit some important recreational destinations and managed fisheries over the following week.



Newsletter Signup

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WRFC8 Rec Fishing Study Tour in Canada

By Jamie Crawford | 6 August 2017

1 Comment



A COUPLE of weeks ago we reported on the World Recreational Fishing Conference that was held in Victoria, Canada. As proof of its commitment to the recreational fishing sector, the Fisheries Research and Development Corporation (FRDC) sent a group of young adults from Australia to attend the conference and undertake a study tour.

The study tour has just come to completion. It offered a first-hand experience of Canada's recreational fishing sector, and provided insights into the well-managed recreational licencing and re-stocking programs as well as the challenges of stock assessment and allocation.

“ It offered a first-hand experience of Canada’s recreational fishing sector ”

Our group visited two fish hatcheries, both of which were funded by fishing licence revenue for the sole purpose of restocking waterways. The species included rainbow trout, steelhead, coho salmon and white sturgeon. As well as the paid employees, there were a number of volunteer workers ensuring the long-term viability of the hatcheries, with this level of community engagement proving how valuable the restocking

program is to the residents of British Columbia.



We also had some meetings with a Government department, discussing stock allocation between the commercial and recreational sectors, and it was quite interesting how the biomass is managed. Similarly, we had a meeting with a First Nations peacekeeper board, during which river access and stock allocation between the indigenous community and the remaining recreational sector was discussed.

Our group also attended a kids' fishing clinic, where the Freshwater Fisheries Society of BC coordinate 'learn to fish' sessions for kids during their summer holiday.

We got to spend three days with fishing guides operating in different regions who relied on Canada's recreational fishing sector as their primary income. It was good to get an industry perspective of the various management strategies and licencing system with surprisingly differing opinions.

One of the highlights for the group was spending a day with Tony Nootebos of BC Sport Fishing Group on the mighty Fraser River. BC Sport Fishing Group in conjunction with the Fraser River Sturgeon Conservation Society (FRSCS) have PIT tagged over 65,000 white sturgeon in the river system and surrounding tributaries in an effort to track and monitor this protected species. Our 4 boats managed to land 14 sturgeon for the day, up to 265cm fork length. Of these fish, 12 were recaptures and 2 were new individuals, which were subsequently tagged. We also found an illegal set-net on the river that we reported, and which was subsequently retrieved and destroyed. Sturgeon are a high value species, for both their meat and caviar, and poaching is a problem.

The conference and study tour bursaries were a great initiative by the FRDC, and we should see this investment flowing through these young leaders in the years to come.



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Appendix 4: WRFC8 Session overviews

SYMPOSIUM 2 - USE & CHALLENGES OF CATCH & RELEASE IN RECREATIONAL FISHERIES

The use and challenges of the catch & release session, was centred on research measuring the impact of catch and release fishing on fish stocks. Although case studies in this session were diverse and context specific, they were focused on understanding the variables effecting discard mortality, reducing sub-lethal impacts on fish and building partnerships with the recreational angling community to implement and foster sustainable angling practices. The following case study from this session serves as an example of how science is being supported by anglers to ensure the long-term sustainability of a fishery.

Case Studies Study 1 - The Fraser River Sturgeon Conservation Society: Forced Marriage or Perfect Union: Collaboration between Science and Recreation for Conservation

The Fraser River Sturgeon Conservation Society is a not-for-profit organization dedicated to the conservation and restoration of wild Fraser River white sturgeon. Using angler data collection, the organisation has identified and is working towards solving issues which affect the recovery of the world's largest freshwater species, the white sturgeon. The society provides PIT tags, hypodermic needles and electronic tag readers to fishing guides, select trained anglers and volunteers. From October 1999 through December 2016, 66,904 white sturgeon have been PIT tagged with 69,667 recapture events recorded. Through this program the society has successfully brought together a diverse community of stakeholders, engaging them in conservation science. Through the organisation's collaborative program, they have educated the public about the conservation of the white sturgeon, introduced handling guidelines and affect change in industry practices.

Other Case Study Key findings:

Handling methods effect post release mortality and fitness in fish.

- The two-handed horizontal support treatment minimizes the time required for fish to regain equilibrium following an angling event.

Bleeding caused by hooking damage increases the risk of post release mortality.

- The use of circle hooks reduces the likelihood of deep hooking.
- J hooks on trolled lures cause far less damage than treble hooks.

Longer fight times increase the risk of post release mortality.

- Heavier line classes and appropriate tackle reduce fight times.

Longer air exposure increases the risk of post release mortality.

- Keeping fish in the water where possible limits air exposure and helps avoid instances of fish bruising and contact with dry surfaces.
- An appropriate unhooking tool reduces air exposure.
- Rubber nets with medium sized holes decrease hook snagging (time) and limit slime loss.

Higher water & air temperatures increase the risk of post release mortality.

Key take home messages:

- There is potential for anglers to produce science which improves recreational catch and release practices.
- Anglers are more responsive to scientific intervention when partnerships are developed through open communication and consultation.
- Anglers play an integral role promoting catch and release best practices and making conservation a social norm.
- Voluntary adoption of best practices is more effective than regulation due to the logistical challenges facing enforcement.

It is important that management of recreational fishing takes a balanced approach, taking into consideration social values, biology and economics.

SESSION 1: MONITORING AND ASSESSMENT OF RECREATIONAL FISHERIES

Monitoring and Assessment of Recreational Fisheries

Covering a diverse range of issues and approaches the monitoring and assessment of recreational fisheries session provided many ideas which could be transferred to use in Australian fisheries. Traditional and more novel approaches to monitoring were presented; ranging from creel surveys, tag and recapture studies to the modern utilisation of mobile apps in which anglers can report recreational catch data. The overarching theme of the session was the importance placed on the role of collecting recreational catch data that is reliable to inform assessments of stocks, and the efficacy of recreational fishery management actions. The presentations at the session covered the advantages, drawbacks and optimisation of the various approaches. The following overview of two case studies that cover these themes have been provided.

Case Study 1 – Sampling Rare, Diffuse and Episodic Fishing Events: Developing Methods for Optimal Survey Design

Access point surveys are a common method for sampling recreational fisheries data. To develop a cost and time efficient sampling design where error is suitably reduced, the sample size needs to be optimised. This is particularly the case in the Australian recreational Southern bluefin tuna fishery where fishing is undertaken rarely, episodically and over a wide area. Andy Moore led a study in which a simulation was developed to test sampling and survey designs. This was generated based upon data from historical access point surveys and commercial catch records. The research team developed a stratified sampling method, which was then run through the simulation in comparison to previous surveys. From this, the sampling coverage, error and cost was able to be determined for each survey design. Taking into account the results from the simulation the national recreational on-site survey for Southern bluefin tuna was developed. The survey optimisation approach taken in this study has the potential to be used in other recreational fishery surveys (particularly large pelagic game fish fisheries) to reduce the burden on time and finances.

Case Study 2 – Appy Days on the Horizon: Preliminary Results from a Nationwide Smartphone App for Collecting Recreational Fisheries Data

The collection of recreational catch data from recreational fishers via smartphone apps has been a developing trend in recent years. A well-designed user friendly app has the potential to produce reliable data at a lower cost than traditional survey methods. Christian Skov presented the preliminary results from the “Fangstjournalen” app released in Denmark in 2016. The development of this app was largely funded through angling licence fees. Despite there being a perceived bias towards higher avidity anglers with app surveys, the preliminary results (in the case of size classes of fish kept) show similar results to creel surveys. Furthermore, angling effort gathered from aerial surveys was similar

to that collected from the app. One of the main challenges to the app was the ‘retention time’ amongst anglers. Some anglers abandoned using the app after a few months due to issues with functionality, and the time taken for anglers to enter data. In a novel approach, the ability for anglers to compare their catches against others was included. This may aid in maintaining the interest of anglers, thereby increasing retention rates of app users. The utilisation of apps such as this one has the potential to reduce the cost of collecting recreation fisheries data compared to traditional methods. This case shows the importance of providing an engaging, functional and easy to use app to increase adoption and retention.

Additional Case Study Findings

Further to the collection of recreational catch and effort data and without going into too much case by case detail, the multifunctional role of modern apps for recreational fishers was outlined on more than one occasion. The app would serve to interconnect recreational fishers and to better advise managers not only of the angler’s activities but also of their needs and desires. The app serves to function as a regulation tool (A26) and works hand in hand with licenced fisheries, telling an angler where and when they can fish (enabled by a map function) as well as further regulations on fish retention etc. Most of these app-based systems are licence enabled and fees fund the production and maintenance of the app. Certain jurisdictions (i.e. Netherlands - A27) operate licencing through fishing clubs which service different areas and this is advised to the angler by the app. The clubs have a mandate to monitor the recreational fishing in that area and manage the service function to access licenced fisheries, whilst being funded through fees. This creates a community ownership and an area focus for management, alleviating some government oversight with a more hands on approach. Government fisheries department would oversee the network of clubs and advise broader management changes.

Due to the variable and changing nature of fisheries management, communication of the regulatory information to the end user for compliance has always been challenging. Furthermore balancing access to the fishery and conservation efforts compounds complexity. A case study from Canada (A37) discussed how the key to managing the increasingly complex regulatory environments requires partnerships between the regulatory body and others invested in the resource to succeed. NGO and government partnerships (for example FRIS) along with open communication (and open data on the fishery) have been shown to be successful.

Another point to be made on the collection of recreational catch and effort data for high value recreational fisheries is the inclusion of charter operations catch logs (A30). As a user of high value fisheries, charter operators are in a position to provide some recreational take data along with the monitoring of these fisheries (numbers, size, bycatch etc.). There is a further point to be made on the role of recreational fishing charter operations as a point source for angler education on best practise for catch care for consumption and catch and release, including the treatment of bycatch. A potentially large resource is available that would have significant impact on public views of some of these issues for “first-time” or “once-a-year” charter anglers.

A26 T. Aarts. Regulating Fisheries by an App

A27 T. Aarts. A Membership Survey as Guidance for Future Areas of Focus

A30 M. Paish. Improving Catch Monitoring and Assessment of Guides, Lodges and Charters on the West Coast of Vancouver Island.

A37 M. Adam. Communicating Regulatory Information for Compliance in the Recreational Fishery

SESSION 2: CITIZEN SCIENCE AND RECREATIONAL FISHERIES

The citizen science and recreational fisheries session, chaired by Brian Riddell (President and CEO of the Pacific Salmon Foundation) was a diverse research focused session. While the importance of collaborative research was highlighted during the key note talk by Brian Chan, the citizen science session expanded on this framework through a number of case studies to recognise how anglers can contribute to understanding the biology, ecology and stock status of key recreational species. The case studies ranged from research demonstrating how recreational anglers can provide a valuable resource for assessing juvenile fish habitat, to the development of mobile phone applications for collecting catch data for fisheries management. Despite the differences in research methods and target species, two common themes were present, these were; (1) how recreational anglers can provide a valuable resource to assist scientists in achieving their research objectives; and (2) that there is a need to better understand recreational fishing catch through collaborative programs. To provide a greater insight into how these two common themes were applied in a research framework an overview of two case studies is provided below.

Case study 1 - Reef Vision: Successfully Using Recreational Fishers to Monitor Artificial Reefs using Baited Remote Underwater Video Systems

Undertaking reef monitoring across broad geographic areas is both a costly and time-consuming task, as the need for extensive spatial and temporal sampling is critical to ensure changes in fish abundance can be adequately assessed. To provide an innovative solution for routine reef monitoring, a team of Western Australian researchers lead by James Florisson collaborated with the local recreational fishing community to develop a program called 'Reef Vision'. Reef Vision provided twenty local volunteer fishers with Baited Remote Underwater Video systems (BRUVs) to collect data on fish assemblages at two offshore artificial reefs. Anglers each collected two videos per months for each reef, which resulted in over 250hrs of video monitoring. Through this collaborative research program researchers identified over 30,000 fish, consisting of 82 difference species, the results of which were used to inform whether seasonal and inter-annual changes are occurring in the community structure at each reef. The success of this project resulted in not only in economic benefits through a cost-effective method for monitoring, but also promoted social benefits, with anglers taking stewardship in future of their local resource. Reef Vision has continued to grow, going state-wide in WA.

Case study 2 - Recreational Fisheries Data Collection Led by the Sport Fishing Association of California (SAC)

The recreational charter industry in Southern California targets a number of commercially important species including Pacific Bluefin Tuna. This fishery was known to operate in different waters to the commercial sector and as a result was thought to be targeting a different size class of the fishery. To understand the size structure of the fishery for management, it was important the charter sector was accounted for, however, due to poor and inaccurate data reporting it was traditionally considered to be an unreliable source. To fill these data gaps, the sports fishing association collaborated with the department of fish and wildlife to collect size structure data on the fish that they landed and implement an electronic logbook program (e-logs). The department provided tablets containing the e-logs software to every charter captain in the fishery. To encourage reporting, vessels were paid for contributing information on key species (Yellowfin, Bigeye and Bluefin Tuna), which resulted in a high reporting rate of 'real time' data which is currently being used to inform management. The trust and long history of collaborations between the department of fish and wildlife with the sports fishing association was critical to facilitating this valuable resource to collect information on data limited stocks. This work provides valuable insights as to how reliable recreational fishing data could be collected in prominent Australian fisheries where current catch reporting is unreliable.

SESSION 3: RECONCILING STOCKING, MANAGEMENT AND CONSERVATION

This session explored the social and economic impacts of conservation and restocking practices of various finfish species. There was a strong focus on Northern Hemisphere freshwater species. The session addressed such topics as evaluating put-and-take fisheries, assessing whether restocking can return a fishery to a stable and self-sustaining level, funding marine restocking, encouraging and building recreational fishing participation while maintaining conservation, and evaluating the social and cultural importance of small scale hatcheries. There was discussion around conservation practices and education, but the primary focus was on evaluating the effectiveness of finfish restocking programs, and models for successful stocking.

Case study: Can Stocking Cure the Collapse of inland Recreational Fisheries? The Case of Walleye (*Sander vitreus*) in Alberta, Canada

The walleye (*Sander vitreus*) is a popular target in freshwater lakes and rivers in Alberta, Canada. Due to its schooling nature, fine eating and sport fishing qualities, the species is vulnerable to overfishing. Throughout the 1980's and 1990's stocks were in serious decline. Stocking efforts began in the late 1990's and early 2000's from the Cold Lake Fish Hatchery to boost local populations. Initial stocking objectives were largely to maintain tourism through a put-and-take fishery at these lakes. Stocking efforts later shifted to management objectives to preserve endemic biodiversity and to achieve self-sustaining populations. Commercial gill netting was banned and strict recreational fishing regulations were introduced to limit the harvest of the species. The walleye recreational fishery in Alberta is now based on a Walleye Licence Draw, where recreational anglers can pay a nominal fee to enter a draw for a Walleye tag, to allow them to retain a fish. The season is only open for a short period and outside of the known spawning season.

However, after 20-odd years of restocking, walleye populations are not showing signs of rebuilding in some lakes. A selection of lakes are swing-netted for data collection, revealing that 59% of the stocked lakes had no evidence of an increase in walleye populations, and thus had not improved catch rates. These poor performing lakes were investigated as to why the stocks were not rebuilding, with the following key points identified: (1) Declining water quality of the lakes; (2) Behaviour of stocked fish (newly stocked fingerlings were not structure-oriented like wild fish and thus were susceptible to predation); (3) Falling water levels were pushing natural-recruitment larvae away from bank-side snags and cover; (4) Ongoing illegal fishing in the lakes; (5) ongoing legal recreational fishing effort; (6) slow maturation of 8yrs for interior lakes compared to 3yrs elsewhere; (7) Non-endemic species in the lakes predated on fingerlings.

Key Findings for Session 3

- 1) Many factors influence the success of returning a fish species back to a self-sustaining population. Environmental factors and human interactions have a significant influence on the return of a species rather than just restocking alone.
- 2) Restocking programs are very difficult to implement and sustain without recreational fishing licence revenue, and a peak body or organisation to drive the program.
- 3) There is a strong social importance and community engagement in restocking programs. The community are willing to volunteer their time to help in the daily running of a hatchery and to assist in restocking.
- 4) Education can be as important for conservation as some restocking programs.
- 5) The activity of fish stocking results in a positive perception of the fishery and increase in tourism, even disproportionately to the improvement of the fishery.

Take home message

Restocking fish in waterways is increasing in popularity and demand by recreational fishers, with this trend set to continue into the foreseeable future. To be successful in providing a quality recreational fishery and meet conservation targets environmental factors must be understood and addressed. Funding through recreational licence fees and coordination by recreational fishing peak bodies is pivotal for success.

SESSION 4: MANAGEMENT STRATEGIES, POLICY DEVELOPMENT AND GOVERNANCE

The socioeconomic importance of recreational fishing is increasingly being integrated into management, policy and governance. With increased regulation and desire to protect these values, recreational fishers have become more interested and informed in all facets of fisheries and environmental management.

Without involving recreational fishers in the management processes, fishery managers experience criticism and lack of trust from recreational fishers in the effectiveness of compliance programs, rebuilding of stocks, or when new regulations are implemented. The concept of Optimal Yield (OY) was reintroduced as an effective way to define recreational fisheries objectives.

Governance models where recreational fishers are engaged in co-management are resulting in success through day to day operations of the fishery, promotion of recreational fishing, research, compliance and enforcement, communication, fish habitat restoration and protection, advocating for environmental flows and rectifying over-allocation and attracting co-investment.

Case Study: Alberta Conservation Association

The Alberta Conservation Association (ACA) is a not-for-profit organisation that was established in 1997 as a Delegated Administration Organisation (DAO) under the Alberta Wildlife Act. As a DAO, they receive direction from stakeholders and government to undertake the day to day fisheries management and conservation activities and operate at ‘arms-length’ of government.

They receive approximately CAD\$14.5 million from fishing and hunting licences (64% of fishing license revenue) and an additional CAD\$4.0 million from grants and donations. Their governance structure consists of an 18-member board from stakeholder groups, public and one Minister appointed government representative. DAOs offer advantages by ensuring recreational fishers get the most value from license fee, empower the sector to determine future direction and resolve challenges and reduce the financial and legal liability to Government.

Key Findings:

- Not-for-profit recreational fishing organisations are providing an effective co-management governance model.
- Co-management models are being established with First Nation/traditional owners that respects local, traditional and scientific knowledge.
- Fishery managers and scientists are attempting to, with varying results, find out recreational fisher’s perspectives and aspirations and incorporate into management strategies and policy.
- Greater environmental stewardship is resulting in fisher-led fish habitat protection and restoration, conservation activities, advocating for environmental flows and water quality and attracting co-investment.
- Recreational fisher participation in citizen science has the potential to increase understanding and support for future management decisions.
- Optimising artificial reservoir fisheries requires an understanding of food webs and influence of water management regimes

Take home messages:

- A delegated administration governance model for recreational fishing should be explored in Australia to empower, manage and grow its own sector. Not-for-profit organisations such as Alberta Conservation Association (Canada), Fish and Game (NZ), Freshwater Fisheries Society of British Columbia (Canada) and Royal Dutch Sport Fishing Association (Netherlands) present diverse and successful models.
- Fishery managers need to recognise recreational fisheries objectives are very different to commercial fisheries and as such, recreational fishers must be involved in the decision-making and management process. An optimal yield concept is suggested as a better fit for recreational fisheries than the traditional concept of maximum sustainable yield.

SYMPOSIUM 3: RECREATIONAL ANGLERS DRIVING FISH HABITAT OUTCOMES

The main threats to the fisheries targeted by recreational fishers are primarily due to habitat degradation. Both freshwater and coastal fisheries provide considerable social and economic benefits for both regional and national economies, it is therefore paramount that these systems are managed correctly. Gradually Governments are understanding and are increasing efforts to rehabilitate and restore fish habitat but it is recreational fishers that are making a big effort as they take stewardship over the resource.

Australia was well represented in this symposium, many key case studies from right across the country, both freshwater and coastal, were presented.

Identified case studies;

- Matt Hanson from the Inland Waterways Rejuvenation Association (IWRA) presented a passionate talk on how his group got the support of the local community to significantly change the mindsets and tradition of many stakeholders. In Dubbo NSW and surrounds, illegal fishing was a way of life passed down by generation. Whilst once legal, fishing with drum nets and set lines for Australian Natives is now a big issue in rural Eastern Australia. The IWRA took these law breakers head on and have had great success in removing the illegal activity from the local community. It's not just illegal fishing they deal with, in fact their primary focus is on habitat restoration in the Macquarie river which flows through Dubbo. In the early years of IWRA they focused on fish stockings but have since realised that the economic value of just one wild fish successfully breeding far out ways that of stocking efforts. They have therefore shifted their efforts to ensuring that native fish populations have the cleanest system possible and habitat to survive and breed with. The bulk of their funding comes from an annually run competition that attracts over 3000 visitors to the region. Matt and IWRA are an example of fishers taking stewardship and caring, maintaining and restoring their local waterways.
- Robert Masonis from Trout Unlimited in America gave a key insight into how they manage stream habitat from the headwaters right through to the confluence with the ocean. Their mission is to conserve, protect, reconnect and restore North America's coldwater fisheries and their watersheds. Founded in 1959, Trout Unlimited is a grassroots army that currently has over 300,000 members.
- A great example of the reconnect phase was the Millstone River Coho Salmon project. The Millstone system had a waterfall blocking spawning migration of Coho Salmon, an 800m side trail was created to allow fish to bypass the barrier. Now successful spawning migration

occurs in the system and the side trail that was built acts as an important area for survey science to be undertaken as well as educating the community.

Key roles fishers play in fish habitat outcomes;

- Habitat identification
- Policy advocacy
- Supporting funding
- Obtaining funding
- Implanting habitat projects
- Data collection

Key take home messages;

- Fishers play a significant role in habitat outcomes, by taking stewardship they have the ability to dictate positive movement.
- Even at a grassroots level, fishers can make a difference shown by the achievements of the Inland Waterways Rejuvenation Association.
- Fish passage remediation and wetland rehabilitation has become more common but the level of degradation remains high and the potential improvement of fish stocks remains high.
- Community engagement is fundamental in moving forward.
- Protect > manage > restore > reconnect, all key stages and processes that need to be addressed.
- Habitat enhancement structures (artificial reefs) have significant economic and social value.
- There is always going to be challenges, how these are dealt with will determine the outcome.
- Angling groups play a key role in stewardship activities and management strategies.
- Important to educate and invest in the next generation.

SESSION 5- ENGAGEMENT OF FISHERS IN THE MANAGEMENT PROCESS

The engagement of fishers in the management process session was centred on numerous case studies and examples of where recreational fishers were engaged in management and scientific studies to achieve better outcomes for both recreational fishers and managers alike. Although all the case study subjects were diverse in nature, it was highlighted that recreational fishers are a valuable resource for fisheries scientists and managers once engaged towards a common goal. Another challenge highlighted is that an average recreational fisher is very hard to determine, this then introduces errors and inaccurate data that is used to determine the management of fisheries.

Case Study- Idaho Department of Fish and Game

How angler involvement contributed to public acceptance and eventual success of a management program designed to recover the recreational fishery in Lake Pend Oreille, Idaho.

Historically, Lake Pend Oreille supported the most popular recreational fishery in Idaho. Fishery declines occurred over time, and by the year 2000 an increasing population of non-native lake trout *Salvelinus namaycush* threatened to collapse the fishery. In response, they closed harvest for kokanee *Oncorhynchus nerka* and determined that suppression of the lake trout population was necessary. Lack of angler support often constrains management actions that seek to reduce or eliminate a popular sport fish. To help overcome this obstacle, they formed a Citizens Advisory Committee (CAC) in the

year 2002 to define socially acceptable methods for suppressing lake trout. The CAC recommended the use of a commercial rod-and-reel fishery, but did not support a net fishery. They moved forward with lake trout suppression in 2003 using nets, but lack of public and political support forced suppression efforts to be halted. Instead, they used nets to conduct lake trout population dynamics research. By 2006, enough evidence was presented to move forward with a suppression program that included both incentivised angler harvest and commercial-scale netting. A focused public outreach program and development of a community stakeholder group were critical to developing and maintaining support for this program. Additionally, involving anglers using incentivised harvest was a valuable tool, both for reducing the lake trout population and gaining public support. At present, the lake trout population has been effectively suppressed, kokanee harvest has been re-opened, native bull trout *Salvelinus confluentus* have benefitted, and the trophy fishery for Gerrard-strain rainbow trout *Oncorhynchus mykiss* has markedly improved.

Key findings:

- Solid scientific foundation is crucial to gain trust and engagement
- Incentives are a powerful motivator for participation
- Engage early and often with recreational fishers
- 3rd party (independent) scientist can enhance credibility
- Timing is important; keep engaging throughout the program

Take home messages from session 5

- Youth participation around the world in recreational fisheries is declining. Invest in youth, pass on knowledge, and keep engagement to maintain leadership passion.
- Recreational fishers can be the voice of change if engaged early and a common goal is set.
- The average fisher is very hard to determine, maybe a different model to determine this is needed to ensure management measures are effective.
- Engage recreational fishers early to promote better engagement and trust.

SESSION 6: SOCIAL AND ECONOMIC VALUES OF RECREATIONAL FISHING

The Social and Economic Values of Recreational Fisheries Session was held on the 19th of July and sponsored by Bass Pro Shops. The session was chaired by Shannon Bower, a Ph.D. candidate of Cooke Lab at Carleton University and Dr Kevin Pope from the university of Nebraska-Lincoln. Speakers discussed the trade-offs that recreational fishers make among fishing opportunities and behaviours, as well as between fishing and other activities. These trade-offs were connected to valuation and the distribution of benefits. The role recreational fishers' play in local and regional communities was also explored. Twelve different speakers from around the world discussed an array of topics. Commonly reoccurring themes included investigating the social values of species specific fisheries, measuring economic impacts of the charter sector, estimating the significance and contribution of recreational fisheries (particularly through specific trends in angler behaviour) to various countries' economies and crowd sourcing social and economic data. The social and economic valuation of recreational fisheries is a significant space that does exist to a certain degree in Australian fisheries management, however these values can still take a back seat in general decision making. One of the reasons behind this is the lack of social and economic data available. While there were many presentations that explored very important aspects of social and economic valuation with a range of data collection methods, two presentations in particular used new and innovative crowd sourcing methods of data collection that could be applied in Australia.

Crowdsourcing For-Hire Sporting Trip Price Data from Websites

This study conducted by the National Oceanic and Atmospheric Administration (NOAA) presented by Elizabeth Overstreet used a crowdsourcing tool to collect data from for-hire (charter) websites to understand the economics of the sector and to conduct economic analyses of fishery policy. Since 2011 each year a contractor is hired to collect information on retail prices of sport fishing trips posted on charter websites, which is costly, time consuming and prone to errors. While this research is important, it's not ground breaking, however it's the new crowd sourcing method that has application worldwide.

NOAA staff utilised Amazon Turk (mTurk) a crowdsourcing internet marketplace owned by Amazon. Employers or researchers can post tasks known as Human Intelligence Tasks (HITs) such as in this case, looking up the cost of a charter on the businesses website. The jobs are performed in lightning speed by 'workers' (also known as Turkers) who then get paid a small amount by the employer. Furthermore, it is extremely accurate as a crowd sourcing method, as multiple workers (at least two) who are independent of each other have to collect the same data from the same website. This then validates the data by checking the accuracy of each observation. If workers provide different answers from the same site, automatic algorithms direct more workers to the task and the job is flagged. In 22 hours data was collected from 2031 charter vessels by 240 workers at 35% of the cost of traditional methods. This study developed a protocol using this software for data collection that can be used to collect all types of data. This method has application all over the globe and Australia, as it's cheap, accurate and fast to collect large amounts of data. It could be applied when needing to collect data from a large number of online sources, not just for economic studies, but for a range of research related to recreational fishing.

Anglersatlas.com – Lessons in Crowd Sourcing Data from Anglers Across Canada

Presented by Sean Simmons, the publisher of Anglers Atlas, this case study investigated an online platform that has been crowd sourcing recreational fishing data for over 10 years known as Anglers Atlas. Since being established in 1999, the platform now has a strong community of over 100,000 anglers who regularly contribute information back into the platform. The platform works on the premise that if you provide value to the anglers, they will provide information back and is an extremely efficient form of citizen science. The platform provides fishers with over 80,000 maps of Canada and the United States which include depth charts and GPS data at no cost. Anglers then provide data on the presence of different fish species, access information, hot fishing locations and thousands of fishing photos all tied to specific waterbodies. Furthermore, on the online portal this information can then be validated through the input of other anglers fishing the same system. To assist in the development of this method, the compulsion loop was used as an example looking at performing a task, obtaining the reward and then using the reward to perform more tasks. With the compulsion loop model, angler's motivations can be established and fishers can be further engaged to connect and grow the resource centre for their own use. Some other worthy notes of this platform include the creation of proactive fisher champions through photo competitions (over 22,500 photos contributed), the printing of hard copy guides, using satellite data to analyse ice conditions and using natural language processing algorithms on YouTube to tag over 5300 fishing videos to their unique waterbodies on the angler's atlas website.