



Session 6: Social and Economic Values of Recreational Fisheries

G1

Recreational Fishing for Sea Trout – For Whom and to What Value?

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Sea trout (*Salmo trutta trutta*) is an important species that supports a variety of recreational fisheries in northern Europe. A survey of 471 resource users on Gotland, a Swedish island in the Baltic Sea, assessed catches, proportion of catch & release, and economic value (expenditures and willingness to pay, WTP) of sea trout fishing in 2015-2016. Data was analysed in relation to type of fishery (fly and spin angling, nets and mixed fishery), proximity to resource (permanent and periodic residents, Swedish and international tourists), fishers' consumptive orientation and their voluntary involvement in fishery management activities. There were significant differences in annual catches (11-20 fish) for fishery types, with highest catches for anglers using both spin and fly followed by mixed fishery (nets and angling). Catch and release rates differed significantly between fly (>95% release), spin (84%) and net fishers (5%). Permanent residents also kept significantly more fish than periodic residents or tourists. Anglers, particularly fly fishers, had much higher expenditures per fish caught compared to net fishers (444 and 73 Euros respectively), and this difference was even more pronounced for retained catch. WTP before refraining from fishing was also highest among anglers. There were significant differences in WTP for potential doubling of sea trout population between different fishery types, respondents with different relation to Gotland, and consumptive orientation. The results are discussed in the context of environmental and economic sustainability of future resource use and assessment criteria for potential regulations of distributing the rights to fish among recreational fisheries.



G2

Recreational Sea Angling and its Significance to the English Economy?

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Evaluating the economic value of recreational sea angling is necessary in a number of related policy contexts, from tourism management and economic development policy, to the sustainable management of inshore fish stocks, particularly those seeking to in an ecosystems services framework. The research in our paper shows some of the issues in estimating the economic effects associated with recreational sea angling. In conclusion, we provide estimates of the economic value of recreational sea angling in England. The results were derived from research undertaken in England in 2011-13 which was conducted as part a wide-ranging government-funded study which attempted to develop intelligence of sea angler spending and activity. We show that recreational sea angling supported just over £2bn of output and almost 24,000 jobs in England. Such information provides useful context and quantification of the possible economic consequences of government actions that may seek to limit, or enhance, sea angling activity.



G3

Measuring the Economic Impact of the San Diego Sportfishing Headboat and Charter Fleet

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The San Diego based Commercial Passenger Fishing Vessel (CPFV) fleet provides recreational fishing opportunities in both US and non-US waters to anglers, and economic impacts in terms of expenditures and supported employment to the local and national economy. While angler trip expenditures for US waters trips are collected using a California fishing license sample frame, no sample frame exists for participants of the non-US waters fishery. The resulting gap in non-US waters angler trip expenditure data hinders the conservation and management of the San Diego and broader regional and national recreational fisheries; this presentation reports on a multi-year effort to fill this gap.

In the development phase, a pilot study was conducted to examine multiple competing survey methodologies including: in-person intercept and interviewer-assisted surveys; in-person intercept and distribution with post-completion mail-back; and in-person intercept with address collection and survey distribution by mail. Selection of the in-person intercept instrument for the survey phase was based on an analysis (N=638) of response rates, completion rates, expected costs, and feedback from the field interview staff.

The data collection component of the project was administered throughout 2016, with 3,806 in-person interviews initiated resulting in 1,990 completed surveys. Survey results fill the data gap, and analysis of the survey data provides information on angler-trip expenditures and characteristics, and demographic information for anglers utilizing the San Diego CPFV fleet on non-US waters trips.



G4

Estimating Marine Recreational Fishing's Economic Contributions in New Zealand

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Economic information is critical for explaining why recreational fishing and marine stewardship is important to all citizens of a nation. Successfully raising public awareness of the importance of healthy and abundant marine fisheries is dependent on having reliable economic insights. Trustworthy economic data can be used to inform discussions about how to institute better conservation policies, secure new partners and resources for conservation initiatives, and ultimately boost the long-term health and productivity of marine fisheries. Until now, the economic contribution of recreational marine fishing in New Zealand has not been measured, placing recreational fishing interests at a disadvantage compared to the commercial sector that has such information in various forms. This project filled that vacuum. Beginning with the \$946 million spent annually by more than 600,000 resident and visiting New Zealand fishers, these dollars circulate through the national economy, supporting 8,000 jobs, stimulating \$1.7 billion in total economic activity, contributing \$638 million in Gross Domestic Product and \$342 million in salaries, wages and small business profits while adding nearly \$187 million in tax revenues. Presented in easy-to-read colorful format friendly to non-scientific policy makers, this study was built using unique data collection and analytical approaches available for other nations to use in increasing public awareness of the critical economic importance of their marine fisheries.



G5

From Disarray to Gone Fishing Day

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Recreational fishing in Australia is one of the most popular outdoors activities with an estimated 5 million of the 24 million Australians going fishing every year and spending an estimated \$10 billion in doing so. However, Australia's recreational fishers faced a major threat to their future when the federal Government announced it was proposing to lock recreational fishers out of over 3 million square kilometres of Australian seas – the biggest “lock out” in Australian history. Multinational environmental groups, who invested millions of dollars in Media campaigns, supported the Government's “lock out” approach.

Faced with what many thought was an inevitable outcome, Australia's recreational fishers decided to unite under one banner and one voice – the Australian Recreational Fishing Foundation (ARFF) - to fight the “lock outs”.

Some four years on we are still not “locked out” and ARFF has achieved a string of outcomes, including:

- Legislative recognition for recreational fishing
- A national recreational Fishing Council
- A National Code of Practice
- Better fisheries management for recreational fishing; and
- A National Gone Fishing day

The first National gone fishing day was held in October 2016, was recognised by the Federal and all state Government and included over 130 events across the nation. How did we do it? We started with three objectives - unity, recognition and self-determination and built our arguments to Governments and the broader community on the economic and social benefits that recreational fishing brings to our nation.



G6

Coastal Fish Monitoring Through Crowd Sourcing in Denmark

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Coastal fish communities are important components of marine coastal systems and many fish species constitute a socio-economic value for small scale coastal recreational fisheries. In countries with relatively long coastlines, coastal fish contribute proportionately more to both community identity and to the overall fishery. Due to the methods used in commercial fisheries, scientific monitoring is often geared toward covering deeper waters with more commercial-like gears and coastal monitoring may be excluded or conducted at very low spatial resolution. In collaboration with locally organized recreational fishermen, a voluntary catch registration system was established to regularly monitor fish catches from gill-net and fyke-net fisheries in coastal waters around Denmark. The project started in 2002, where recreational fishermen could use their own gear and fish where they normally fished. After three years the data was evaluated and the method was switched in 2005 to fixed gears and methods, to enable comparison between areas, years and season. The project has been very successful in recruiting highly motivated fishers, who register their entire catch regularly. The data now comprises more than a decade of time-series and covers over 19,000 instances of fishing. The data from this project are now being used to create indices for the status of coastal fish for managers at a regional scale and is being utilised by other projects interested in close, coastal waters. Simultaneously, the fishers involved act as ambassadors for the coastal marine environment, responsible fishing practices and safety at sea.



G7

Crowdsourcing For-Hire Sportfishing Trip Price Data from Websites

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Information on the prices for for-hire sportfishing services is needed to understand the economics of the industry and to conduct economic analyses of fishery policy. The U.S. National Marine Fisheries Service currently does not collect information about prices for actual for-hire trips taken. We have, however, been collecting information on the retail prices for sportfishing trips posted on the websites of for-hire operations since 2011. Each year a contractor is hired to locate the websites of for-hire operations and record the prices for different types of trips. This process is relatively slow and prone to mistakes.

We recently used Amazon Turk (mTurk) to collect price data from for-hire fishing websites. mTurk is a crowdsourcing tool where small tasks can be distributed among many workers who get paid for each task completed. Furthermore, the same task can be completed by multiple workers allowing an easy way to check the accuracy of each price observation. We requested that each worker record prices for different sportfishing trips available on the websites of for-hire fishing operations. The task was completed in a matter of hours and multiple workers provided price observations for the same trip so that the prices can be cross-checked. Based on this case study we develop a protocol for data collection that can be used to collect for-hire prices in other areas and to collect other types of data that is regularly posted on the internet (e.g., retail fish prices).



8th World Recreational
Fishing Conference

G8

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

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Angler's Atlas is an online platform that has been crowd sourcing sportfishing data for over a decade. Through our platform we have developed a strong community of over 100,000 anglers, many of whom regularly contribute information back to the platform. This data includes fish species, access information (e.g. boat launches), hot fishing spots, and thousands of fishing photos — with each contribution tied to a specific waterbody. Through the platform we have been able to test a wide range of data collection models and learned valuable lessons in how to engage anglers so they are willing to contribute data. In this seminar, we will share with you some of techniques we have developed to create effective crowd sourcing campaigns, and how you can use these techniques to develop your own “Citizen Science” initiatives.



G9

Estimating the Economic Impact of the Recreational Fishery in a Developing Country, South Africa

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There is a general lack of economic data for recreational fisheries in developing countries and this hinders their sustainable development and effective management. Recreational fishing is extremely popular in South Africa. However, recreational fisheries receive minimal recognition as a sector and their management is largely focussed on effort controls through conservation legislation in freshwater environments and by legislation developed on a per species basis for the combined commercial, small-scale and recreational fisheries in the marine environment. Recreational fishers therefore have very little influence on the governance and management of their fishery. This project, aimed to describe the economic impact of all recreational fishing sectors in South Africa in order to leverage support for governance practices that are specific to this sector. The study followed standard methods outlined in the FAO Economic Impact Assessment Manual. Angler expenditure was estimated using a standardised questionnaire which was disseminated online and using face-to-face surveys. The number of participants was estimated from the proportion of anglers that answered the questionnaire that were 1) affiliated to competitive angling bodies and 2) licenced by management agencies. A total of 305 face-to face and 1180 online questionnaires were completed. Preliminary results indicate that recreational angling has a considerable impact on South Africa's GDP and provides many job opportunities for South Africans. This kind of baseline information adds to our limited knowledge on the economic impact of recreational fisheries relative to the commercial and artisanal sectors in developing nations and will be used to demonstrate the importance and potential of well managed recreational fisheries to the South African economy. The results also point to the need for increased engagement between stakeholders that can lead to improvements in the governance of the fishery.



G10

Freshwater Angling in England: Its Contribution to the Economy and Trends in Activity

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Freshwater anglers in England are required to buy a rod licence. A survey of rod licence holders, commissioned by the Environment Agency, responsible for inland fisheries, found that overall angling activity in 2015 was lower than indicated by the previous survey in 2005, though anglers' expenditure was of a similar magnitude. The reduction in activity may be weather related as the number of rod licences sold was similar in the two years. Changes in activity varied between different branches of the sport, by types of fish sought and water body. Some changes continue trends apparent over several decades, reflecting changes in regulations and availability of angling opportunities, as well as changes in tastes. There is no reason to believe that angling is becoming less acceptable socially but sales of rod licences and income having been on a rising trend in 2005 have since fallen, coincident with a change in policy in 2010 constraining marketing of rod licences and angling opportunities. Other surveys indicate a recent decline in monthly, as opposed to occasional, angling activity in England. The Environment Agency has announced revisions in the types and prices of rod licences from 2017 in an effort to increase its revenue whilst retaining the support of the angling community and encouraging participation amongst anglers aged 12 to 16



G11

Promoting Fishing in a Dry Province: Balancing Fisheries Conservation with Opportunity in Alberta, Canada

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With seven percent of the world's renewable water supply and more lake area than any other country in the world, Canada is blessed with abundant freshwater. Unfortunately, Alberta received relatively little of that blessing. With only 1,100 lakes capable of providing a recreational fishery (cf. British Columbia's 20,000 lakes), Alberta routinely sees in excess of 270,000 fishing licences sold annually, resulting in relatively high use of the province's fisheries (3.4 million angler days in 2010). Alberta Conservation Association (ACA) depends upon hunting and fishing licence sales to fund much of its programming, the levy on fishing licence sales alone provides over \$4 million in funds annually. More broadly, Alberta anglers contribute some \$400 – \$500 million to the provincial economy each year and are vocal advocates for conservation of the province's fisheries resource. Alberta's angling population is aging however, the majority of licence holders are now between 45 and 65 (seniors are not required to hold a licence). For these reasons recruitment and retention of anglers is a high priority for ACA and its stakeholders. With a mission to: "conserve, protect and enhance fish and wildlife populations and their habitats for Albertans to enjoy, value and use." the challenge for ACA and similar organizations, is to promote recreational fishing while remaining sensitive to the attendant challenges of increasing angler participation when fishery resources are limited. We review fishing licence sales trends in Alberta, explore factors underlying those trends and relate this information to current fisheries programming undertaken by ACA.



G12

Selling Out: Implications for Recreation Valuation

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Nonmarket valuation often relies on random utility models (RUM) that have the implicit assumption that the econometrician knows the choices consumers faced. Choices, however, are often limited as the most popular alternatives are chosen and sell out. If alternatives do sell out --- and, as is commonly the case, the consumers who faced the sellout are unknown --- then the invalid assumption that all choices were available may lead to incorrect willingness to pay (WTP) parameters. We provide a solution that can be implemented using only aggregate level data. Our empirical application is the recreational overnight fishing trip market in San Diego --- where particular boats are sold out. We find the estimates for WTP for proportion of highly migratory species fish catch on these trips increase when we account for sellouts. Since RUM models are often used in fishery management decisions, not accounting for sellouts may lead to an undervaluation of important fishery resources.