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A boundary organization facilitates a collaborative approach to recreational fisheries research, management, and education

Presenter: Aaron Adams - Bonefish & Tarpon Trust
Co-authors: Wilson JK, Lewis JL, Boucek R, Perez A
Email: aaron@bonefishtarpontrust.org
Presentation type: Oral presentation

Effective modern conservation depends on active stakeholder participation. Although stakeholder engagement is increasing, the extent of this engagement and the successful application of outcomes to science and management varies regionally and among types of fisheries. A collaborative model that emphasizes knowledge coproduction with stakeholders better identifies research needs and conservation threats, influences research, and improves policy outcomes. Stakeholder integration can be facilitated by nongovernment organizations, such as boundary organizations. Bonefish & Tarpon Trust is a type of boundary organization called a Habitat-Dependent Outdoor Recreationist Organization that is strategically placed at the center of a conceptual triangle—the points represented by 1) the fishing community, 2) resource management agencies, 3) academia—to maximize information exchange and build relationships among stakeholders, and engage fishers in science, advocacy, and management. The integration with fishers is structured as either an informed nested or parallel mixed-methods approach: fishers' Local Ecological Knowledge informs perceptions of the fishery to help guide research efforts, and fishers participate in project design and data collection, and advocate for application of research findings to management and conservation. This presentation will demonstrate BTT's approach using case studies for the recreational flats fisheries in the Caribbean Sea, Gulf of Mexico, and western North Atlantic Ocean that show integration of recreational fishers in science, assessment of conservation threats, and application of findings to management in the context of broader efforts of stakeholder collaboration (fishers, resource managers, scientists) toward actionable science to inform management.

Keywords: Coproduction, collaborative research, local ecological knowledge, flats fishery

DRAFT

Guidelines for establishing and maintaining catch and release marine recreational fisheries

Presenter: Aaron Adams - Bonefish & Tarpon Trust
Co-authors: Wilson JK, Lewis JL, Boucek R, Perez A
Email: aaron@bonefishtarpontrust.org
Presentation type: Oral presentation

Bonefish & Tarpon Trust (BTT), a US-based, non-profit, science-based conservation organization, has been conducting research on and been active in conservation of catch and release (C&R) flats fisheries in the Caribbean Sea, Gulf of Mexico, and southeastern coast of North America since 1998. The flats fisheries of this region are comprised of bonefish (*Albula vulpes*), Atlantic tarpon (*Megalops atlanticus*), permit (*Trachinotus falcatus*), and common snook (*Centropomus undecimalis*), support an economically valuable recreational fishery that is C&R in many locations throughout its geographic range. Over this 27 years, BTT has developed a template for approaching research and conservation of these fisheries that previously received little scientific and management attention. The approach begins by determining the status of knowledge (scientific and local ecological knowledge) for target species and ecosystems, conservation threats, management capacity and gaps. The resulting matrix is used to prioritize research, advocacy, and education efforts. Subsequent collaborative efforts address topics including species and location suitability for a C&R fishery, habitat health, water quality, fishery status, fishery capacity, socioeconomics, cultural factors, enforcement and compliance, and education. The challenges BTT has faced with established fisheries are magnified for new fisheries that are being established because, often, C&R fisheries are perceived as economically valuable, automatically self-sustaining, with low environmental impact, which promotes investment in the fishery without necessary information on fishery sustainability. This can lead to fisheries that are not sustainable due to low post-release mortality, overfishing, loss of critical habitats. In locations with limited resources, a framework is needed to maximize these resources to provide sufficient information for fisheries management and evaluation.

Keywords: Recreational fisheries, flats fisheries, ecotourism, sustainable fisheries, catch and release, collaboration

Assessing the performance of rigid one-size-fits-all vs. locally adaptive harvest regulations in a regional freshwater recreational fishery with mobile, heterogenous anglers

Presenter: Robert Arlinghaus - Leibniz Institute of Freshwater Ecology and Inland Fisheries and Humboldt-Universität zu Berlin
Co-authors: Matsumura S
Email: Arlinghaus@igb-berlin.de
Presentation type: Oral presentation

We present a novel coupled social-ecological landscape model of a freshwater open-access recreational fishery with heterogenous anglers targeting northern pike (*Esox lucius*) as example predator. We examine whether adaptive harvest regulations tailored to stock status achieves triple-bottom-line benefits over non-adaptive one-size-fits all harvest policies. Four key insights are presented. First, active harvest regulation planning of a small set of minimum-length and daily bag limit combinations outperforms one-size-fits all harvest regulations that are applied in all lakes. Second, closing off collapsed lakes in the landscape is of limited additional use provided that the output-oriented harvest regulations that are applied are sufficiently restrictive. Third, managers concerned with the costs needed to regularly monitor stock status for planning of adaptive harvest regulations can achieve a second-best alternative with a conservative one-size-fits all combination of a reasonably large size limit and a low daily bag limit, but this comes at the cost of reduced regional fish yield. Finally, a fine-tuned adaptive harvest management policy can be implemented with relatively coarse sampling schemes, but this elevates uncertainty in outcomes.

Keywords: Angler behaviour, landscape dynamics, harvest regulations, simulation model

DRAFT

Measuring the causal impact of harvest restrictions on Western Baltic cod anglers' effort, stock status perception, and harvest policy preferences

Presenter: Robert Arlinghaus - Leibniz Institute of Freshwater Ecology and Inland Fisheries and Humboldt-Universität zu Berlin
Co-authors: Arlidge WNS, Riepe C
Email: Arlinghaus@igb-berlin.de
Presentation type: Oral presentation

The western Baltic cod (*Gadus morhua*) stock collapsed in 2016, leading to the closure of the cod recreational fishery as of January, 1, 2024. We measured the closure's causal effects on recreational fishers via a difference-in-difference design, surveying German Baltic cod anglers in 2020 (pre-closure) and again in 2024 (post-closure). As a counterfactual we surveyed anglers fishing Baltic lagoon pike *(Esox lucius*), who did not experience a closure but also witnessed stock declines. We found no causal effect of the harvest closure on total angling effort. However, cod-directed effort in German marine waters dropped sharply following restrictions – due to introduction of daily bag limits and that eventually reached zero upon closure of the harvest fishery. Anglers causally redirected their fishing activity toward other marine species in national, but not international waters, demonstrating a spillover effect in species targeting behaviour. The closure also causally altered perceptions of cod's dire stock status. Additionally, the closure prompted changes in daily bag limit preferences in cod anglers, suggesting a rapidly shifting perspective on harvest regulations among anglers. Our data reveal how a single-species closure can reverberate throughout recreational fisheries, reshaping angler behaviours through species-spill over, altering stock status perceptions and strengthening preferences for more rigorous harvest regulations should the fishery be reopened in the future. Due to the design of the study, the reported changes can be causally related to the closure of the harvest fishery for western Baltic cod.

Keywords: Difference-in-difference, effort changes, changing preferences, experimental design

DRAFT

Catch uncertainty as attraction force to fish recreationally

Presenter: Robert Arlinghaus - Leibniz Institute of Freshwater Ecology and Inland Fisheries and Humboldt-Universität zu Berlin
Co-authors:
Email: Arlinghaus@igb-berlin.de
Presentation type: Oral presentation

Why do people fish for recreation? Social science literature suggests that both catch (e.g., number or sizes of fish) and non-catch dimensions (e.g., nature experience, temporary escape) play a role. After reviewing the literature from environmental psychology, neuroscience, anthropology, recreational fisher motivation research as well as popular fishing books, I find that the opposite of catching fish, more specifically the uncertainty of the catch, maybe another, perhaps fundamental force that explains the attraction of the activity to millions of people. There appears to be strong utility in the gaming nature of the recreational fishing, although this might work unconsciously to many. This quality explains various patterns that are well known, e.g., the overinvestment of time and money by recreational fishers that drastically exceed the market value of fish, the lack of self-regulation of a local recreational fishery in terms of effort being spent also on low stock sizes, the disutility associated with providing certain catch probability information, diminishing marginal utility return for increasing catch rates, management regulations that make fishing harder than necessary, suboptimal satisfaction despite rising catch rates, and finally the dominance of men among populations of recreational fishers. I present a serious of testable propositions and call for a novel research focus that seeks to better understand what makes catch ambiguity attractive psychologically and emotionally.

Keywords: Motivations, human dimensions

DRAFT

What constitutes Marine Recreational and Sports Fisheries in Kenya?

Presenter: Sarah Ater - Technical University of Mombasa
Co-authors: Munga CN, Badurdeen FA, Imam R, Wambiji N, Kadagi NI
Email: atersy@gmail.com
Presentation type: Oral presentation

The marine recreational fishery also known as sport or game fishing in Kenya, has been practiced for several decades. Sport fishing is an important contributor to the socio-economic dynamics of coastal communities including provision of direct employment. This fishery was first introduced in Kenya in the 1950s and is mainly operated by private sport fishing clubs along the Kenya coast. We examined the status of marine recreational and sport fishery in Kenya using available information from published and grey literature sources. A total of 447 publications were initially retrieved and reduced to 15 after removing duplicates and those that did not meet the proper search criteria. We also assessed 17 grey literature records and historical data ranging from 1990 to 2006 from sport fishing clubs and boats. Our findings indicate that sailfish belonging to family Istiophoridae dominated the fishery and that Malindi and Watamu were important sport fishing hotspots. Approximately, the fishery consisted of between 50 and 150 private and charter vessels with boat days declining from 1827 to 833 and 180 per fishing season in 1991, 2008 and 2021 respectively. Higher total numbers were recorded for the years 1991-1994, 2000 – 2001 and 2004 – 2005. Lowest numbers were recorded in 1996 and 2003. Within this 16-year period, the proportion of fish caught and released fluctuated due to various factors. Our findings highlight that marine recreational and sport fishery in Kenya remain data deficient and are rapidly declining with the sub-sector conspicuously missing out from the annual national landings statistics and discourse on sustainable fisheries. Given the historical significance of these fisheries in Kenya, strengthening the various communities involved in the fishery will be crucial for revitalizing the opportunities that the fishery presents for livelihoods and ocean stewardship.

Keywords: Angler, Blue Economy, sustainable fisheries, Ocean Decade, fishing tourism

Simulating non-probabilistic sampling through onsite records selection for monitoring seasonal recreational mackerel fishing in the eastern Cantabrian Sea (Bay of Biscay)

Presenter: Eneko Bachiller - AZTI
Co-authors: Zarauz L, Korta M, Mateo M, Mugerza E
Email: ebachiller@azti.es
Presentation type: Oral presentation

To assess marine recreational fisheries (MRF) along coastal villages in the Basque Country (southeastern Bay of Biscay), an onsite probabilistic sampling survey has been conducted from 2021 to present. This involved direct counts and in-person surveys, providing data on the number of active fishers and their total catch, respectively. Screening results showed higher seasonal MRF activity by shore-fishers in spring, primarily targeting Atlantic mackerel (*Scomber scombrus*), predominantly in harbours. Then, we estimated the total number of fishers using a two-stage cluster sampling design, defining clusters by region (first stage) and randomly selecting day*location (second stage) as the Primary Sampling Unit (PSU). Total mackerel catch was estimated through a three-stage cluster sampling design, which included a randomly selected fisher within each PSU (third stage) who voluntarily reported the catch. These results were compared with estimates obtained from conveniently sampled records at key harbours during peak mackerel-fishing months, using non-probability extrapolation methods. Sampling seasonal recreational fisheries involves a trade-off between representativeness, sampling effort, and efficiency in data collection. Focusing on main harbours enhances inter-annual assessment efficiency and may reduce sampling effort, resulting in higher cost-effectiveness. However, this approach may introduce bias and greater uncertainty in catch estimates due to the lack of randomization. Importantly, our approach revealed that total mackerel catch estimates by MRF may be more substantial than previously anticipated, while also enabling the evaluation of different raising methods to assess the potential impact of MRF during spring, an essential step for sustainable species management in the region. This kind of approach may also be applicable in other regions with similar sampling constraints and seasonal fishing peaks.

Keywords: Marine Recreational Fisheries (MRF), *Scomber scombrus*, seasonal fisheries, sampling method, catch estimates, Bay of Biscay

Spatial dynamics in coastal fisheries for northern albacore: insights from the Bay of Biscay

Presenter: Eneko Bachiller - AZTI
Co-authors: Mateo M, Korta M, Zarauz L, Mugerza E
Email: ebachiller@azti.es
Presentation type: Oral presentation

Understanding the spatial and temporal dynamics of marine recreational fisheries (MRF) and their spatial interactions with small-scale fisheries (SSF) is essential for sustainable fisheries governance. This study presents a high-resolution spatial analysis of northern albacore (*Thunnus alalunga*) coastal fisheries in the eastern Cantabrian Sea (Bay of Biscay), focusing on MRF and SSF using trolling lines. Using data from onsite and phone-based surveys under the Basque Recreational Fisheries Sampling Program (2022 – 2024), and SSF data derived from AIS and GPS, combined with logbooks and/or sales notes, we mapped fishing effort (hours per trip) and estimated the total catch by MRF and SSF at a fine spatial resolution (0.01° csquares). MRF activity was georeferenced using either true fishing locations or by assuming the same operating csquare as the commercial SSF vessels from the same base port, while SSF distributions were derived from highly resolved geospatial data. We quantified the percentage contribution of MRF and SSF to total albacore catch per csquare, identifying zones of high spatial interaction and potential competition. Scenario modeling explored the implications of increased MRF activity, including a doubling of effort, highlighting potential shifts in spatial pressure and catch distribution. Additionally, we incorporated a census of charter-boat operations, emerging contributors to MRF activity. Our analysis reveals nearshore zones adjacent to key harbours emerging as spatial hotspots where MRF catches were higher than anticipated, in some cases rivaling SSF, underscoring the growing relevance of recreational fishing in regional albacore harvests. This transdisciplinary approach – integrating survey data, spatial modeling, and stakeholder insights– offers a replicable framework for assessing recreational-commercial interactions and informing adaptive management strategies that address spatial overlap and effort dynamics in shared marine resources.

Keywords: Marine Recreational Fisheries (MRF), small-scale fisheries (SSF), *Thunnus alalunga*, fisheries interactions, spatial distribution, catch estimates, fishing effort, Bay of Biscay

DRAFT

The first thermal tolerance assessment of juvenile white steenbras, *Lithognathus lithognathus*

Presenter: Tristan Banfield - Rhodes University
Co-authors: AR Childs, AC Winkler, J Frachet, WM Potts
Email: tristanbanfield123@gmail.com
Presentation type: Oral presentation

The white steenbras, is an endemic South African inshore sparid, that can attain 140cm FL (26 kgs) and is well known for its strong fighting abilities and palatable flesh. As a result of fishing overexploitation, despite it being decommercialed in the early 2000s, the stock is considered collapsed and the species is on the IUCN Red List as Endangered. Additionally, this species utilises estuaries for nurseries, a marine habitat in South Africa that is under severe pressure from urbanisation and infrastructure development. Climate change is unfortunately exacerbating and intensifying thermal variability in our already degraded estuarine environments. We therefore seek to understand how future temperature extreme events may differentially affect juveniles. By identifying the critical thermal limits (CT_{min}, CT_{max}) and ventilatory lower and upper breakpoints (LBP, UBP). Twenty-one juveniles (14.8 - 26.5 cm FL) were collected from East Kleinemonde Estuary, PIT-tagged, and acclimated at 18 °C. Using dynamic ramping (1 °C h^{-1}), fish were exposed to warming and cooling until loss of equilibrium to determine CT_{max} and CT_{min}. Opercular beats were recorded at each 1 °C change to determine LBP and UBP. Individuals were ranked using percentile scores and classified into five performance phenotype groups. Batch differences were tested using t-tests ($p > 0.05$). Mean CT_{min} was 5.5 ± 0.29 °C and CT_{max} 32.8 ± 0.31 °C, giving a mean thermal range of 27.3 ± 0.39 °C. Mean LBP and UBP were 11.3 ± 3.07 °C and 28.5 ± 2.46 °C, indicating sub-lethal stress several degrees before loss of equilibrium. Five phenotypic groups were identified: cold-water-tolerant (6.25%), warm-water-tolerant (6.25%), overall high performer (37.5%), overall low performer (43.75%), and generalist (6.25%). These data reveal substantial intra-population variability, suggesting that physiological diversity may underestimate resilience.

Keywords: Phenotypes, critical thermal limits, breakpoints, fish physiology, climate change, estuaries, movement, adaptability

DRAFT

Are anglers‘ preferences reflected in harvest records? Insights from Czech recreational fisheries

Presenter: Daniel Bartoň - Institute of Hydrobiology, Biology Centre of the Czech Academy of Sciences, Na Sádkách 7, 370 05, České Budějovice, Czech Republic
Co-authors: Godana MT, Váchová V, Šmejkal M
Email: daniel.barton@hbu.cas.cz
Presentation type: Poster presentation

Recreational fisheries represent an important socio-ecological system in which angler motivations and behaviour can influence fish populations and harvest dynamics. To examine the relationship between declared species preferences and actual harvest patterns, we combined data from a questionnaire survey among Czech recreational anglers with 12 years of harvest records from angling logbooks. Respondents predominantly fish in non-salmonid waters, prefer bottom fishing techniques (60%), and a majority report generally releasing their catch. The most preferred target species is common carp (*Cyprinus carpio*, 56%), followed by northern pike (*Esox lucius*, 12%), rainbow and brown trout (Oncorhynchus mykiss and *Salmo trutta*, 10.9%) and pikeperch (*Sander lucioperca*, 10.4%). A similar species ranking appears in the most retained catches, with common carp dominating (57%) and predatory fishes occupying the next positions. These results indicate a strong agreement between anglers' stated preferences and the composition of documented harvests in Czech recreational fisheries, suggesting that questionnaire surveys can serve as a valuable complementary tool to logbook-based harvest statistics by providing additional insight into angler motivations and potential implications for fishery management.

Keywords: Angler preference, citizen science, harvest records, recreational fishing pressure, species selectivity

DRAFT

Evaluating bias in app-based fishing data: Insights from probability-based surveys

Presenter: Crystal Beckmann - South Australian Research and Development Institute
Co-authors: Leonardo M. Durante, Kate Stark, Sean Tracey
Email: crystal.beckmann@sa.gov.au
Presentation type: Oral presentation

Smartphone apps help track recreational fishing, but voluntary participation introduces biases. Avid fishers are overrepresented, while low- and zero-catch trips are underreported, distorting catch rates and effort estimates. This study compares app-based catch and effort estimates to a probability-based state-wide survey in South Australia. We tested species-specific adjustments (q coefficient) and multiple expansion techniques, including raking, propensity scores, statistical matching, and a model-based approach to improve comparability. App users reported significantly higher catch per unit effort (CPUE) for Western Australian Salmon (*Arripis truttaceus*), Southern Calamari (*Sepioteuthis australis*), King George Whiting (*Sillaginodes punctatus*), and Australian Herring (*Arripis georgianus*) while recording fewer trips across all species. This pattern suggests systematic biases in voluntary app-based data, requiring statistical adjustments to align with probability-based estimates. App-based data can't fully replace probability-based surveys, but proper corrections help fill gaps between survey periods. Adjusting for biases improves recreational catch estimates for fisheries management. We explore ways to enhance data quality through better fisher recruitment, stronger engagement, and refined correction methods. Addressing biases will improve app-based surveys' role in fisheries monitoring and stock assessments.

Keywords: Bias correction, app-based surveys, probability-based surveys, catch estimation, expansion methods

DRAFT

The Fishing BC App: Enhancing communication, compliance, and convenience for British Columbia's tidal water recreational fishery

Presenter: Owen Bird - Sport Fishing Institute of British Columbia
Co-authors:
Email: birdo@sportfishing.bc.ca
Presentation type: Oral presentation

Digital tools are playing an increasingly important role in modern fisheries management. In British Columbia, the Fishing BC app represents a significant step forward in streamlining communication between regulators and recreational anglers, improving compliance, and improving and simplifying catch reporting in tidal waters. Launched as a free, mobile-friendly platform, the Fishing BC app enables anglers to easily access up-to-date tidal fishing regulations, area closures, and licensing information—reducing confusion and enhancing real-time compliance. The app's built-in GPS functionality helps anglers identify their fishing location relative to specific regulatory boundaries and automated real time updates ensures users always have the most current information at their fingertips. Two important features of the app are its digital catch log and licence integration which allow anglers to quickly and accurately record their salmon and halibut catches on their mobile device, thereby fulfilling mandatory reporting requirements. These functions not only offer convenience to users but also provide fisheries managers with near real-time data to support science-based decision-making and more responsive management. The digital format enhances data quality and completeness compared to traditional paper-based methods. By bridging communication gaps, supporting transparent enforcement, and offering a user-friendly experience, the Fishing BC app is a model for how digital innovation can support sustainable, resilient recreational fisheries. This presentation will explore the app's development, key features, uptake among anglers, and its growing role and challenges faced as a critical tool for both fisheries governance and public engagement in British Columbia.

Keywords: Catch monitoring, data collection, digital app, licence, communication

DRAFT

Sharing experiences to promote resilient and sustainable recreational fisheries: Socializing best release practices in British Columbia's tidal water salmon fisheries

Presenter: Owen Bird - Sport Fishing Institute of British Columbia
Co-authors:
Email: birdo@sportfishing.bc.ca
Presentation type: Oral presentation

As recreational fisheries face mounting pressures from social, climate, and habitat-based issues, the need for resilient, adaptive management practices has never been more important. Integral to resilience and a sustainable future is communication and adoption of responsible angling behaviors—particularly best practices for releasing fish for any reason. This presentation explores the importance of sharing experiences and local strategies to foster sustainable fisheries from both a resource management and social perception perspectives focusing on the British Columbia (BC) tidal water salmon fishery. Drawing on lessons from international initiatives, peer-to-peer learning models, and study findings from collaborative work of the University of BC and the Sport Fishing Institute of BC, we showcase ongoing and evolving efforts to socialize best release practices among recreational salmon anglers. These efforts include the development and dissemination of evidence-based handling guidelines, emphasizing reduced air exposure, appropriate gear selection, and safe fish revival techniques. Through a suite of diverse communication pathways—including angler-led outreach, social media campaigns, visual storytelling, signage at access points, peer pressure and direct engagement via charter operators and tackle shops — BC stakeholders are building a culture of stewardship grounded in scientific knowledge and community values. This presentation highlights the role of inclusive, co-designed communication tools and trusted messengers in enhancing angler uptake of conservation practices. We will share successes and challenges of messaging to regions and a diverse, geographically dispersed angling public. By sharing insights from BC's multifaceted approach, we aim to inspire collaborative initiatives that enhance the sustainability of and foster positive perception for recreational fisheries while contributing to the long-term health of iconic species like Pacific salmon.

Keywords: Best practices, release practices, communication, management aids, conservation, sustainable

Spending for salmon and sea trout: Examining angler expenses, perceptions, and support for fisheries management

Presenter: Samuel Blyth - Uppsala University
Co-authors: Blyth S, van den Heuvel L
Email: patrik.ronnback@geo.uu.se
Presentation type: Oral presentation

Recreational fisheries have the potential to support significant socio-economic values as indicated in this study of salmon and sea trout fisheries in river Mörrum, southern Sweden. A survey of anglers showed that the total expenses per salmonid caught was 5900 Euro and that only 17% of caught fish was retained, resulting in total expenses per retained salmonid of 31 200 Euro. The local economic effects were substantial with more than 50% of the total expenses attributed to the two municipalities along the Mörrum River. The study also investigated consumer surplus and willingness-to-pay for doubling of total fish stocks and doubling of large sized fish (> 80 cm). The results on economic expenses and willingness-to-pay are analyzed and discussed in the context of anglers' support of different fisheries management, perceived stock trends, satisfaction, motivation, demographics, etc. Willingness-to-pay for increased catch rates and increased catches of large fish had positive relationships with support for regulations requiring the release of post spawn and female fish and negative relationships with ending stocking programs. These findings demonstrate opportunities to maintain the economic benefits of recreational fishing activity while identifying avenues to increase the resources available for conservation and habitat restoration.

Keywords: Salmonids, valuation, catch-and-release, conservation, stock trends

DRAFT

Expanding knowledge on gender in recreational fishing

Presenter: Samuel Blyth - Uppsala University
Co-authors: Björkvik E, van den Heuvel L, Rönnbäck P
Email: samuel.blyth@geo.uu.se
Presentation type: Oral presentation

Recent projections indicate that women will make up an increasing share of the total number of anglers in the coming years. An ecofeminist perspective, which posits that women are more likely to protect the environment than men, suggests that the greater female participation could improve sustainability and responsibility in recreational fishing. However, the extent to which fishing practices actually differ between men and women remains insufficiently understood. Recognizing this gap, this study aims to compare variation in fishing practices both between and within groups of male and female anglers. Drawing on survey responses from 612 members of Sweden's largest angler association, we present a quantitative analysis of angler preferences, motivations, and experience from a gender perspective. Results indicate that the male and female anglers participating in our study were very similar in many aspects, such as number of fishing days per year, preferences for fishing public or private waters, and motivations to catch many fish, retain catches, relax, and experience nature. However, they differed in terms of target species, fishing location, and fishing method preferences, as well as social motivations for fishing. The findings can contribute to the understanding of how gender intersects with existing fishing practices, and to inform more inclusive and effective fisheries management strategies.

Keywords: Behaviour, online survey, human dimensions, angler characteristics

DRAFT

Responsibility for a changing future – Anglers' perspectives on 10 key themes related to sustainable recreational fisheries management in Sweden

Presenter: Samuel Blyth - Uppsala University
Co-authors: van den Heuvel L, Björkvik E, Rönnbäck P
Email: samuel.blyth@geo.uu.se
Presentation type: Oral presentation

In the horizon scan by Holder et al. (2020) researchers and experts identified a series of 10 research themes or categories to guide the collection of new knowledge, inform policies, and support the responsible and sustainable development of recreational fisheries. Through a survey of members of Sweden's national anglers association (Sportfiskarna, a conservation oriented NGO), we quantitatively analyzed anglers' perspectives on these 10 themes in the context of Swedish recreational fisheries management. Our findings reveal the relative importance anglers place on each theme, and to whom they attribute responsibility for addressing each theme (including private fishing rights holders, the recreational fishing industry, Sportfiskarna, governmental institutions, and anglers themselves). Respondents ranked themes relating to environmental challenges and regulations as the most important. Themes relating to human dimensions, catch and release, bioeconomics, and fishing pressure were ranked as the least important. For the majority of the 10 key themes, anglers placed the greatest responsibility for addressing these themes on Sportfiskarna and various levels of government, while placing less responsibility on the anglers themselves, the recreational fishing industry, and fishing rights holders that privately manage fisheries in the majority of inland waters. The results of this study improve our understanding of resource users' perceptions of the challenges facing recreational fisheries, and their expectations regarding personal and institutional responsibilities for addressing these challenges.

Keywords: Human dimensions, stakeholder engagement, governance, public fisheries management, private fisheries management

Angler perceptions of access to information on best practices for catch-and-release, and fishing regulations

Presenter: Samuel Blyth - Uppsala University
Co-authors: Björkvik E, van den Heuvel L, Rönnbäck P
Email: samuel.blyth@geo.uu.se
Presentation type: Oral presentation

The sustainability of many recreational fisheries relies on the use of catch-and-release (C&R) as a voluntary practice or as a component of fishing regulations, such as size limits. C&R is best able to function if anglers adopt scientifically informed best practices that are appropriate to the target species and local conditions. However, previous research has found communication of best practices for C&R to be lacking in both quantity and quality of information in Sweden's privately managed inland fisheries. To address these shortcomings in communication and bridge the associated knowledge and behaviour gaps further understanding is needed of where anglers find information on fishing regulations and best practices, as well as how they engage with fishery management. This study explores Swedish anglers' perceptions of the availability of information on C&R best practices and what sources they access this information from. Our findings indicate that anglers rely heavily on fishing license sellers for information on fishing regulations, but find significantly more of their information on C&R best practices coming from a conservation focused NGO and other anglers. Findings indicate significant differences in the perceived availability of information based on preferences for target species and type of fishing water. These results are further explored in the context of additional angler characteristics and willingness to participate in training programs to become a fishery control officer. These findings provide valuable insights about where to focus efforts on improving the communication of information on best practices and regulations, and angler engagement in fisheries management.

Keywords: Stakeholder engagement, multi-species fisheries, local management, knowledge transfer

DRAFT

Mapping undiscovered bonefish spawning aggregation sites in the Florida Keys

Presenter: Ross Boucek - Bonefish & Tarpon Trust
Co-authors: V McDonough, R Lennox
Email: ross@bonefishtarpontrust.org
Presentation type: Oral presentation

Traditional approaches to manage fishing Fish Spawning Aggregations (FSAs) generally focus on known FSAs that are experiencing overfishing or overfished. Protecting these fished FSAs can lead to conflicts between managers and fishers due to the loss of fishing access. And come with socially hard to accept decadal long lags between management actions and improvements to adjacent fishery resources. Instead, identifying and protecting unfished aggregations should result in less impact fishers, thus enabling protection with less conflict. The Florida Keys Bonefish fishery is now experiencing a phenomenal recovery following an economic fishery collapse in 2010. The demography of the fishery now indicates that populations should be forming exploitable aggregations again. Here, our objective is to discover Florida Keys bonefish FSAs (otherwise referred to as Pre-spawning Aggregations) and assess needs for proactive conservation strategies to protect them. Using multiple methods that include local ecological knowledge, novel acoustic telemetry technology, and visual surveillance, we discovered one bonefish FSA in the Upper Keys. Through this discovery, we documented the time, depth and location of spawning, mapped the space use of the FSA across two spawning seasons, habitat characteristics at the FSA site, and modelled the larval local retention during one spawning event. Last, we contrast the Upper Keys FSA spatial temporal characteristics with another Florida Keys Bonefish FSA in Key West. And, how that information can be used to prioritize spatial management needs at each site.

Keywords: Fish spawning aggregations, bonefish, catch and release, Marine Protected Areas

DRAFT

Co-producing knowledge to reduce conflicts between sharks and fishers in the sportfishing capitol of the world (Florida Keys U.S.)

Presenter: Ross Boucek - Bonefish & Tarpon Trust
Co-authors: Rowen Fleischer, Ross Boucek
Email: jose@bonefishtarpontrust.org
Presentation type: Oral presentation

Globally, depredation and post-release predation are becoming a major stressor on recreational fisheries. The Florida Keys (U.S.) provides diverse fishing opportunities with high recreational fishing effort, and functions as an overwintering site and migratory corridor for coastal sharks. Over the last 10 years, fishers noted that interactions with sharks have increased. Our goals are to work with the fishing community to identify depredation hotspots in the inshore waters of the Florida Keys, 2) investigate drivers responsible for creating these hotspots, and 3) define mitigation strategies to resolve conflicts between fishers and sharks. First, we mapped conflict areas via a survey and workshop. Results showed that a marine lagoon known as Flamingo (Everglades National Park) as the most intense depredation hotspot in the inshore waters of the archipelago. Conflicts are caused by lemon sharks consuming hooked snook and red drum. And that rate of depredation increased approximately 10 years ago, then again five years later. Focusing on Flamingo, we are using a multi-methods approach to evaluate two competing hypothesis co-designed with for-hire fishers. 1) The depredation hotspot is a result of an “over population” of lemon sharks increasing conflict or 2) Increasing interactions between sharks and fishers is a result of sharks changing their foraging behaviors to be more reliant on hooked or released gamefish. This presentation overviews results of the survey, preliminary findings from field research, and discusses potential mitigation strategies to be evaluated in the future.

Keywords: Depredation, snook, red drum, predator prey ecology

DRAFT

Drop the Bass: Non-compliance with European sea bass (*Dicentrarchus labrax*) regulations in the United Kingdom's recreational sea fishery

Presenter: Christopher Bova - Rhodes University
Co-authors: Kieran Hyder, Warren Potts, Zachary Radford, Hannah Rudd
Email: csbova@gmail.com
Presentation type: Oral presentation

With the United Kingdom's (UK) departure from the EU Common Fisheries Policy, ensuring sustainable management now requires a better understanding of compliance behaviour among recreational fishers. This study explored compliance with sea fisheries regulations among sea anglers in England and Wales through an online questionnaire completed by 335 participants. The survey captured behavioural drivers across normative, instrumental, and various affective factors. Latent class analysis was used to categorise respondents according to these drivers, while Bayesian modelling assessed the influence of behavioural factors on non-compliance. Due to inconsistent management frameworks across regions, overall compliance estimates were not feasible and analyses focused on European sea bass (*Dicentrarchus labrax*) regulations. Findings revealed that 24.17% of anglers reported at least one violation. The most common breaches related to the minimum conservation reference size (MCRS) (19.8%), closed season restrictions (9.9%), and daily bag limits (9.2%). These figures indicate that non-compliance with sea bass regulations is relatively high compared to expectations for a regulated recreational fishery. The presentation will highlight how behavioural drivers help explain these patterns of non-compliance and their implications for management. By providing the first baseline measure of sea bass compliance in UK recreational fisheries, this study offers valuable insights for designing targeted interventions to improve compliance behaviour. Such evidence is critical for strengthening governance, supporting stock sustainability, and ensuring that recreational fisheries continue to provide ecological, social, and economic benefits in the post-Brexit policy context.

Keywords: Human dimensions, interventions, angler behaviour, fisheries management

DRAFT

Not all valuations are in the same boat: Why some research on the economic contributions of recreational fisheries is not making waves

Presenter: Christopher Bova - Rhodes University
Co-authors:
Email: csbova@gmail.com
Presentation type: Oral presentation

While ecological aspects of recreational fisheries have long been the focus of management and research, gaining traction with policymakers has often relied on demonstrating economic contributions. Because the central “output” of recreational fishing is the experience and satisfaction of participants rather than a traded commodity, valuations typically draw on expenditure-based measures that capture the flows of spending associated with fishing trips. In some cases, more detailed approaches such as Tourism Satellite Accounts (TSA) have been applied, offering insights into how recreational fishing contributes to Gross Domestic Product. However, these approaches are not always interpreted consistently. Expenditure-based assessments, for example, are sometimes placed alongside sectoral output figures from commercial fisheries or agriculture. While such comparisons may seem intuitive, they can be misleading, as the underlying valuation methods differ in important ways. Rather than being “incorrect,” these assessments are often simply framed in ways that obscure their intended meaning. This presentation clarifies the appropriate use and limitations of common economic contribution methods for recreational fisheries and highlights practical guidelines for interpreting results. It also points toward opportunities for advancing valuation approaches, including adapting satellite account frameworks to provide more comparable measures across sectors. Ultimately, the aim is to stimulate discussion on how best to represent the economic importance of recreational fisheries in ways that are rigorous, transparent, and useful for both policy and management.

Keywords: Best Practice, travel-cost, impact, science for policy

DRAFT

Recreational fishing data collection architecture: A roadmap to data integration

Presenter: Catherine Bruger - Ocean Conservancy
Co-authors: Conrad MK, Drexler M
Email: cbruger@oceanconservancy.org
Presentation type: Oral presentation

Recreational fishing in the Southeast USA plays a tremendous role in the overall fishing effort, allocation, sustainability, and economy of marine fisheries in the region. Dissatisfaction with federal data collection programs and a desire to address place-based management objectives has resulted in multiple disparate and divisive data collection systems affecting shared stocks within a regional ecosystem. Data collection systems have becoming increasingly proprietary, disconnected, and data is often difficult to access, which makes it challenging to review, compare, and use for management. We reviewed the six existing catch monitoring programs throughout the region to support the management of a single stock and compared them to national data standards and other regional guidance. We find four components to both reform and support the existing data collection system in the region and recreational monitoring system more broadly: compiling and sharing the data, understanding the data and making it usable, managing the data and accountability, and improving the data and adaptability. Combined, these components can ensure consistency with supplemental data systems, support innovative solutions, clarify roles and responsibilities, and serve as a platform for continuous improvements, with an end goal of reducing uncertainty in recreational catch estimates. Recreational fisheries management will be supported best when all contributors (e.g. state, regional and federal) and data sources can be used concurrently to provide the fullest picture possible of catch, effort, and stock status. We conclude that a stronger data collection partnership where partners adhere to minimum data standards and cooperatively work to improve the quality, timeliness, and transparency of recreational fishing data will improve precision of estimates, build trust, and ultimately prevent overfishing while providing the greatest benefit to the fishing community.

Keywords: Recreational fisheries, catch monitoring, recreational data standards, data collection

DRAFT

Sustainable fly fishing: Building expertise, conservation skills, and eco-entrepreneurship in the Turks and Caicos Islands

Presenter: Edward Butler - Parrot Cay Sustainability Foundation, Parrot Cay Island TKCA 1ZZ, Turks and Caicos Islands
Co-authors: L Talbot, E Arrocet, S Busuttil, P Smith, J Moxey, A Albury
Email: ed.butler.fish@gmail.com
Presentation type: Oral presentation

The Turks & Caicos Islands (TCI) have experienced intense tourism growth over the past 25 years, yet have seldom balanced this with considerations for the environment that the sector relies on. Simultaneously, traditional small-scale fishing communities, who were once at the center of the local economy, have not integrated successfully into the tourism sector or adequately benefited from its development. The emergence of a new high-value recreational fishing sector provides a unique opportunity to advance community-based sustainable tourism, ecological stewardship and livelihood diversification. The initiative positions flats fishing as a structured and sustainable component of the national eco-tourism economy. Building on recreational fisheries development models from across the region, the project aims to promote the formal recognition of the flats fishing industry in local policy and legislation; establish structures which ensure local community ownership and participation; and establish an angler-led tag-recapture programme. A key outcome is the development of a course curriculum, integrating technical, ecological, and socio-economic competencies. Training modules encompass advanced fly-fishing techniques, ecosystem and habitat literacy, catch-and-release best practices, fish tagging and data collection, and environmental storytelling for sustainable marketing. By collaborating with local educational bodies, a formalized and accredited certification will be accessible to local guides and anglers who complete the course, inserting fly-fishing into the national educational curriculum. By embedding conservation ethics, technical skill, and entrepreneurial capacity within a single framework, the model contributes to broader discussions on social-ecological systems science, island resilience, blue economy development, and the co-production of sustainable tourism practices.

Keywords: Fishing tourism, community-based conservation, blue economy, eco-tourism; Caribbean

Catching the benefits: Exploring the angling intervention Samen VISsen for elderly in Dutch nursing homes

Presenter: Rob Ceelen - Royal Dutch Sport Fishing Association (Koninklijke Sportvisserij Nederland)
Co-authors:
Email: ceelen@sportvisserijnederland.nl
Presentation type: Oral presentation

With life expectancy increasing, challenges occur in maintaining the health and well-being of the elderly. For this reason, the World Health Organization and United Nations endorsed the current decade as the Decade of Healthy Ageing, aiming to identify initiatives that improve lives and enhance quality of life in later years. Recognizing that nature-based interventions can improve the health and well-being of the elderly and knowing that an increasing group of elderly is lacking the ability to participate in activities like angling by themselves, the Royal Dutch Sport Fishing Association developed the Samen VISsen [Angling Together] intervention. In this intervention, volunteers go angling with residents of Dutch nursing homes. Led and organized by a certified coach from local angling clubs and supported by additional volunteers during activities. Starting with 64 activities in 2021, the intervention has grown to 235 activities in 2024, engaging a total of 1,804 participants last year. Although scientific evidence on the benefits of angling interventions for people with Post-Traumatic Stress Disorder is emerging, evidence of the effects of angling interventions on elderly is lacking. To examine elements and mechanisms, and to further explore the perceived effects of the intervention, a qualitative study was performed. Fifteen interviews were conducted among participants and involved caregivers using the Positive Health dialogue tool, and six observations. Results showed that participants experienced contributions within all dimensions of Positive Health. The elements of Nature exposure, Angling activities, Volunteer support, Caregiver involvement, and Participant relation regulation, were perceived to work through a variety of potential mechanisms, which are gathered in the proposed CATCH-framework. Overall, the Samen VISsen intervention can be seen as potentially meaningful and suitable to improve the quality of life for the elderly in Dutch nursing homes.

Keywords: Health promotion, angling intervention, elderly, nursing home

Lessons about angling in primary schools: Teach children about nature and the passion of angling

Presenter: Rob Ceelen - Royal Dutch Sport Fishing Association (Koninklijke Sportvisserij Nederland)
Co-authors:
Email: ceelen@sportvisserijnederland.nl
Presentation type: Oral presentation

Children in the Netherlands grow up with increasingly problematic screen time, in urbanized areas, and spend decreasing amounts of time playing outdoors. As a result, children are gradually losing their connection with nature. The Royal Dutch Sport Fishing Association acknowledges these developments and considers it to be an important topic. So, to reconnect children with nature, and since research shows that adults who participate in angling often did so in their childhood, we designed the VISlessen [FISHlessons] intervention. Within this intervention, we teach children in primary schools about fish biology and familiarize them with angling. The intervention contains two parts, one indoors, in which children are educated on the theory about fish species, their anatomy, ecology, as well as the interaction with angling. This first part is led by a volunteer, trained to teach fish biology and lead the intervention in general. In the second part, children go angling with the guidance of experienced volunteers. Besides the leading volunteer, additional volunteers assist with the activity, who are trained specifically to assist children during such practical activities. So, with the intervention, the Royal Dutch Sport Fishing Association is relying on a big network of educated volunteers, all from local Dutch angling clubs, for responsible guidance for children during the whole activity. These volunteers realized over 500 lessons in 2023, reaching more than 10,000 children nationwide. In 2024 we had a small decrease, with 467 lessons, but still reached nearly 10,000 participants. Systematic evaluations after all activities' feedback consistently show undiminished enthusiasm. Besides offering a fun and educational day outdoors, we aim to foster children's interest in angling and ensure its future by inspiring the next generation of anglers.

Keywords: Primary school, lessons, angling, volunteers

DRAFT

Examining spatiotemporal shifts in steelhead angling effort and the utility of recreational catch data for assessing abundance in British Columbia

Presenter: Julie Charbonneau - Simon Fraser University
Co-authors:
Email: julie_charbonneau@sfu.ca
Presentation type: Oral presentation

Recreational fisheries represent complex socio-ecological systems. Angler effort can be driven by local or global social factors, ranging from expanding human populations, shifting social norms to the dynamics of fish populations. Yet in many cases, recreationally targeted species lack fisheries-independent monitoring, and angler catch and effort metrics remain the best available data to infer information about population status and trends. Here, examining steelhead trout (*Oncorhynchus mykiss*) recreational fisheries in British Columbia (BC) Canada we 1) quantify spatio-temporal shifts in angler effort and catch rates, and 2) assess the utility and limitations of recreational-catch-per-unit-effort (CPUE), as an index of spawner abundance.

Patterns of catch and effort were assessed in over 200 steelhead-bearing streams during a 60-year period that included major shifts in abundance of several stocks. We discovered that effort varies through time, and regionally. Steelhead fisheries in some regions have collapsed completely, while angler effort has expanded in other regions, revealing a spatial restructuring of the fishery. However, there are relatively few long-term monitoring programs for steelhead which creates major uncertainties. Thus, we quantified the relationship between angler CPUE from the recreational fishery and fisheries-independent abundance indices in 14 streams. Our findings reveal sweeping patterns of hyperstability, indicating that when populations are depressed, CPUE does not decrease as rapidly as abundance. Taken together, these findings showcase the collapse and expansion of a globally renowned recreational fishery, and highlight the challenges, opportunities and limitations of using recreational fishery data to monitor the status of this at-risk species.

Keywords:

Unveiling spatial differentiation of China's inland recreational fishing: novel insights from multi-source data

Presenter: Guiying Chen - Shanghai Ocean University
Co-authors: Zhengyong Yang, Qilei Zhao, Zhe Chen, Bo Han, Wenhao Sha, Xinjun Chen
Email: chengy_net@163.com
Presentation type: Oral presentation

Inland recreational fishing (IRF) is crucial for creating economic value, employment opportunities and nutritional supplementation. Globally, research on IRF suffers from data scarcity and insufficient attention to spatial differentiation. This study integrates enterprise business registration data, geographic point-of-interest data, and angling app data, using spatial statistical models to analyze the spatial differentiation of IRF in China. The analysis focuses on the characteristics and spatial distribution of fishing sites, stocked fish species, angling activity levels, and associated leisure services. Key findings reveal: (1) IRF sites exhibits an "east-dense, west-sparse, multi-core clustering" pattern, with 92.99% concentrated east of the Hu Line. High-density cores emerge in urban service circles and hydrologically affluent regions. (2) Three fishing types (pond angling, tourism-oriented angling, and river-lake-reservoir angling) show spatial heterogeneity, with pond angling being the dominant form, accounting for 66.77%. (3) A pyramid scale structure emerges, where small and micro sites (91.28%) act as long-tail nodes filling urban-rural leisure gaps, while medium and large sites concentrate along major economic corridors. (4) Over 60% of sites stock crucian carp, carp, or grass carp. High-density multi-species stocking zones occur in the coastal provinces (Jiangsu, Zhejiang, Shandong) and inland aquaculture hubs (Hubei, Hunan). (5) Angling activity levels exhibit spatial clustering, with Sichuan, Guangdong, and Jiangsu emerging as national hotspots. China's "angling+" model integrates catering, boating, and social recreation into single-day leisure experiences, shaping a distinctive "micro-vacation" paradigm. Our findings offer practical guidance for the spatial planning and governance of IRF, especially in regions lacking comprehensive official data.

Keywords: Recreational fisheries, inland recreational fishing, angling sites, spatial differentiation, multi-source data integration

A multi-disciplinary approach to the promoting the sustainability of South African shore-based linefishery

Presenter: Amber Childs - Rhodes University
Co-authors: W Potts, M Farthing, A Winkler, C Bova, M Parkinson, T Murray, D Kaplan, N James, R Henriques, B Mann, K Smith, K Sink, J Mann-Lang, M Du Toit, N Mlotshwa, S Ngcefa, T Knight, K Lehleonya, M Mackenzie, J Frachet, C Hempel, W Olivier, K Hewitt, E Oosthuisen, E Jule
Email: a.childs@ru.ac.za
Presentation type: Oral presentation

Marine shore-based fisheries provide considerable economic and livelihood benefits, yet their governance is poor, particularly in developing countries, with the overexploitation of most stocks attributed to excessive harvest. South Africa's inshore fishery resources are heavily exploited by a large marine shore-based recreational fishery which has reduced the abundance of these species and the opportunities for a growing small-scale fishery. Research on this fishery has focused on life history and stock assessment of some species, but critical knowledge gaps on the ecological, human dimensions and governance aspects of the fishery still exist. An improved understanding of how to conserve nearshore linefish species is necessary for the persistence of coastal fish populations and livelihoods dependent on them. While compliance is poor with most fisheries regulations (i.e. traditional output controls), closed areas appear to be relatively well respected by shore-based recreational anglers but come at a socio-economic cost. This research highlights the potential for other effective conservation measures, such as non-consumptive catch-and-release zones, which may yield considerable benefits for species targeted in this fishery. Given that knowledge on the spatial distribution and connectivity of fish is critical for spatial-based management and conservation strategies, this research highlights the valuable role that both traditional and innovative methods, such as fishery catch data, species distribution modelling, ecophysiology, population connectivity, acoustic telemetry and angler perceptions and attitudes can play in assessing marine protected area connectivity in our shore-based linefishery. It is hoped that this trans-and-multi-discipline approach will provide a framework for linefish research, management and conservation in our changing climate.

Keywords: Catch-and-release, acoustic telemetry, social science, physiology, recreational fisheries

DRAFT

From satisfaction to strategy: Turning recreational fisher experiences into management action in the NT barramundi fishery

Presenter: David Ciaravolo - AFANT - Northern Territory Recreational Fishing Peak Body
Co-authors: Howell N, Sexton L, Knuckey I, Maldonado R, and Dysart K
Email: ceo@afant.com.au
Presentation type: Oral presentation

In the Northern Territory, Australia, Barramundi fishing is more than a pastime; it's part of the culture, has its own discourse, supports economies, and inspires a 30% fishing participation rate in men and women. Stocks of the tasty and iconic sportfish are abundant, and key regions have rules intended to support high quality fishing experiences.

Until recently, the opportunity for formal integration of rec fisher perspectives into fisheries management has been limited and reliant on somewhat effective but ultimately ad hoc advocacy. Our project (FRDC 2022-170) addresses that by delivering a structured, evidence-based framework for capturing and applying recreational fisher satisfaction metrics to the NT Barramundi fishery. The focus was practical and collaborative from the outset. From problem identification to study design, researchers, industry bodies & fishery managers worked together. The research team delivered a suite of outputs: a fit-for-purpose survey instrument, a segmentation framework based on fisher behaviours and attitudes, regional and demographic benchmarks for satisfaction, and guidance on how these metrics can be used to inform management frameworks and decisions.

With NT fisheries managers now exploring the integration of fisher satisfaction indicators into harvest strategy reviews, it’s hoped this study will empower a practical shift in an evolving management culture; providing tools to move beyond a focus on biological and economic indicators, to frameworks that include social & experiential performance measures. The project has laid groundwork for more responsive adaptive management; where fisher experiences can help shape policy, regulation and intervention in a timely and transparent way. With growing awareness across jurisdictions that social outcomes matter, interest extends beyond NT Barramundi. Yet, understanding that such approaches may fit fisheries with certain characteristics more than others will be essential for fishery managers.

Keywords: Barramundi, NT Australia, management, satisfaction, experiences, social values, fishery performance, collaboration

Zooming in to scale up: How focusing on the importance of each fish can be a catalyst for conservation

Presenter: Sascha Clark Danylchuk - Keep Fish Wet
Co-authors: Tracey SR, Danylchuk AJ, Cooke SJ
Email: sascha@keepfishwet.org
Presentation type: Oral presentation

While traditional fisheries conservation and management focuses on populations and/or habitat, we make the case for why each interaction an angler has with fish can create better outcomes for recreational fisheries overall. We present biological, ecological, and social imperatives as to why individual fish matter and how focusing attention on each fish can be a catalyst for the conservation of entire ecosystems. Furthermore, in the face of climate change, environmental degradation, and increasing participation rates in recreational fisheries, we argue for the need to embrace a diversity of strategies rather than the all-or-nothing approaches that are typically utilized in fisheries management and conservation, and demonstrate how using non-traditional, grassroots approaches can help scale up positive impacts.

Keywords: Conservation, catch-and-release

DRAFT

Tightening the lines of communication between agencies and anglers

Presenter: Julie Claussen - Fisheries Conservation Foundation
Co-authors:
Email: juliec@illinois.edu
Presentation type: Oral presentation

Agency fisheries biologists often serve as the first line of contact for educating, informing, and requesting cooperation with the fishing public. Despite this critical role, most biologists receive limited professional training on how to effectively communicate agency goals, regulatory changes, or scientific findings—particularly to non-expert audiences. As a result, new regulations are frequently met with confusion or resistance, leading to non-compliance and reduced public cooperation—both of which can undermine the effectiveness of management efforts. In contrast, when communication strategies are tailored to build on shared values and a deeper understanding of the science behind management decisions, anglers are more likely to understand, support, and engage with those efforts. This talk will highlight the common communication pitfalls that occur between agencies and anglers, and present effective strategies that have successfully built angler trust, improved cooperation, and strengthened support for fisheries management.

Keywords: Communication

DRAFT

From experience to indicators: Using Local Ecological Knowledge to strengthen recreational fisheries management

Presenter: Sophia Costa - Florida International University
Co-authors: Benjamin Jones, Rolando Santos, W. Ryan James, Jennifer S. Rehage
Email: scost039@fiu.edu
Presentation type: Oral presentation

Effective management of recreational fisheries requires innovative solutions and the integration of diverse knowledge systems to address data limitations and impacts of environmental changes. Local ecological knowledge (LEK) from professional recreational fishing guides represents a valuable yet underutilized resource with the potential to substantially enhance fisheries resilience. Guides accumulate extensive observational data on species behaviour, habitat dynamics, and fishery conditions through consistent on-water experience, offering critical insights often overlooked by traditional scientific monitoring. Despite its clear value, effectively capturing and communicating LEK remains challenging, limiting its practical integration into management decisions.

Our project addressed this gap by incorporating structured LEK from recreational fishing guides into a novel, visual, and quantitative communication tool—a Recreational Fisheries Report Card. Guides provided standardized data through structured surveys on historical and recent fish catches, habitat changes, and overall fishery satisfaction. These observations were then translated into a stoplight-style scoring system using threshold-based methodologies, facilitating clear, actionable guidance for management practices.

This approach not only enhances adaptive capacity within specific fisheries but serves as a globally applicable and scalable model for integrating local knowledge into effective, resilience-based management. By fostering stronger connections among managers, researchers, and recreational fishers, this framework demonstrates a transdisciplinary pathway toward sustainable fisheries management under dynamic environmental conditions.

Keywords: Recreational fisheries, fisheries management, Local Ecological Knowledge (LEK), fishing guides, stoplight indicators report card

DRAFT

Transboundary migration dynamics of the largest giant trevally (*Caranx ignobilis*) aggregation on record: Implications for management

Presenter: Ryan Daly - Oceanographic Research Institute
Co-authors: Filmalter JD, Bennett RH, Pereira MAM, Mann BQ, Cowley PD.
Email: rdaly@ori.org.za
Presentation type: Oral presentation

Predictable fish aggregations of commercially valuable species are particularly susceptible to overexploitation. Giant trevally (*Caranx ignobilis*) are an ecologically important top predatory fish targeted in both recreational and commercial fisheries, however, little is known about their aggregation dynamics or susceptibility to overexploitation. This study describes the largest aggregation of the species on record in southern Mozambique using photographic and stereo-video observations over six years. Additionally, we employed acoustic telemetry to investigate the temporal and spatial dynamics of the seasonal aggregation. Tagged fish (n = 30) were monitored for between 457 and 911 days during which time they exhibited distinct aggregative periods during austral spring and summer. The detection frequency of fish at the aggregation site was significantly ($p < 0.01$) associated with rising mean sea temperatures and the full moon period. All fish were absent from the aggregation site for periods between 254 and 382 days between summer seasons in which time many of them ranged across an international border for distances of between 11 and 633km before returning to aggregate at the same site the following season. These results confirmed that the studied giant trevally aggregation is temporally and spatially predictable and consistent with a transient site-specific fish spawning aggregation. The spatiotemporal predictability of the aggregation highlights the need for the effective management of this transboundary population of giant trevally for which this study has provided conservation management guidelines. The implementation of the studies management recommendations specific to recreational fishing regulations are discussed ten years after the initial study.

Keywords: Western Indian Ocean, fisheries management, Mozambique, fish tagging

No more bombs: Embracing co-management as path to recreational fisheries conservation in Kiritimati, Republic of Kiribati

Presenter: Andy Danylchuk - University of Massachusetts Amherst
Co-authors: Peter M., Clark Danylchuk S., Frazer J.
Email: adanylch@umass.edu
Presentation type: Oral presentation

Kiritimati (Christmas Island) is the largest coral atoll in the world. Thanks to its remote location in the Pacific Ocean, it was the focus of thermonuclear weapons testing by the UK and US between 1957-1962. These bombs disrupted the lives of indigenous residents and left behind deleterious health effects that can still be measured today. Paradoxically, the military activities also drew attention to the vast inner lagoon comprised of sandy flats, turquoise waters, ample bonefish, giant trevally, and other species attractive to recreational anglers. From the onset of the recreational fishery, catch-and-release was a common practice of visiting anglers, however, it was at odds with the subsistence-based fishery for bonefish. As such, the harvest of bonefish was banned 2008 and remains one of the only controls used for recreationally targeted species on Kiritimati. Today, Kiritimati attracts nearly 5,000 anglers per year (predominantly from the US, Australia, and Japan) and there is a push to develop more fishing-based ecotourism. As with many small countries in remote locations, the government bodies responsible for fisheries management do not have the capacity to keep up with enforcement of the existing laws and regulations, let alone have the means to monitor fish stocks or navigate the needs for new regulations to adapt to new or increasing threats. For our presentation, we will share our collaborative efforts focused on a path towards co-management between fishing lodges, guides, visiting anglers, and the Ministry of Fisheries & Ocean Resources. Our approach focuses on aspects of fisheries management that are logistically possible, financially achievable, and avoids idea ‘bombs’ that exploit the people and resources of Kiritimati.

Keywords: Co-management, flats fishery, Pacific, enforcement, monitoring

DRAFT

Catch-and-release and the Blue Economy: Using multi-species science in the Seychelles to inform actionable conservation and management

Presenter: Andy Danylchuk - University of Massachusetts Amherst
Co-authors: Griffin LP, Brighton E, Rose-Innes K, Berke G, Clark Danylchuk S, Cooke SJ
Email: adanylch@umass.edu
Presentation type: Oral presentation

Flats fisheries are an integral and important part of the Blue Economy in tropical and subtropical parts of the World. In these recreational fisheries, a considerable portion of fish are released because of regulations and a growing conservation ethos. Since 2018, we have been using a collaborative science-based framework to evaluate how a suite of flats species targeted by recreational anglers in the Alphonse Group, Republic of Seychelles, respond to mandatory catch-and-release. Our efforts include a monitoring program focused on the five most frequently targeted fish species, giant trevally, moustache triggerfish, Indo-Pacific permit, milkfish, and yellowmargin triggerfish. Based on data from the monitoring program as well as stakeholder interest to bolster best practices, we also used a combination of acoustic telemetry, PIT tagging, and short-term behavioural monitoring to evaluate how giant trevally respond to capture and handling, angling pressure, and habituation. Bonefish (*Albula glossodonta*) are also a popular target species in the fishery. As a result of guide observations, we tested a hypothesis about site-specific post-release predation. With increasing interest in targeting milkfish as well as frequently shared sentiments on social media about how they may have a unique physiology, our collaborative efforts also included the first-ever assessment of how this species responds to angling. The collective outcome of our research efforts to date emphasize how catch-and-release and related science-based best practices are critical for the conservation and management of flats fisheries in the Seychelles and the Blue Economy they are a part of. This body of work reveals the importance and benefits of collaborations that involve fishing lodges, guides, anglers, conservation bodies, and researchers working in partnership for the benefit of fish and people.

Keywords: Flats fishing, Seychelles, Blue Economy, Catch-and-release, bonefish, giant trevally, milkfish, collaboration

As good as gold: Angler perceptions of the golden dorado (*Salminus brasiliensis*) recreational fishery in the Neotropics

Presenter: Andy Danylchuk - University of Massachusetts Amherst
Co-authors: Ezra M. Markowitz, Juan Pablo Gozio, Domingos Garrone Neto, Eva Rueda, Natalia Silva, Nadia B. Fernandez, Sascha Clark Danylchuk, Meaghan L. Guckian, Lisa M. Komoroske, Andy J. Danylchuk
Email: gcasselberry@umass.edu
Presentation type: Oral presentation

Golden dorado (*Salminus brasiliensis*) are the focus of an increasingly popular recreational fishery, where domestic and international anglers target them throughout their native range in Argentina, Brazil, Bolivia, Paraguay, and Uruguay. They are a “bucket list” sportfish due to their strong fight, acrobatic jumps, and brilliant yellow coloration. This increasing popularity has been a driver of local economic growth but also presents management challenges, particularly if anglers are not engaging in catch-and-release best practices. To better understand fishing practices of anglers and their perceived threats to golden dorado, we developed an online survey targeting both domestic and international dorado anglers. After post-processing, 816 respondents from 19 countries completed the survey. Respondents were primarily from Argentina, Brazil, the United States, and Uruguay. South American anglers primarily targeted dorado in their home country, while international anglers reported mainly traveling to Argentina and Bolivia. Preliminary results showed that primary motivations to target dorado were for the thrill of the catch and to connect with nature, as opposed to subsistence or to set size records. Most anglers reported air exposing their fish to take photos, and anglers that traveled >100 km to target dorado were more likely to engage in this behavior. Local anglers were less likely to feel that fish handling practices had a negative impact on dorado populations than tourists. Collectively these results could indicate stronger resource stewardship among local anglers. While tourists report greater awareness of the effects of handling, they are less likely to engage in best practices for a photo with their catch, highlighting the need for better angler education. Since the international fishery is largely lodge and guide-based, these efforts could start in collaboration with industry partners to promote better post-release outcomes in the catch-and-release fishery.

Keywords: Catch-and-release, best practices, social science, threats

Stripers on the Line: Integrating field and social science to improve post-release outcomes in the striped bass (*Morone saxatilis*) recreational fishery

Presenter: Andy Danylchuk - University of Massachusetts Amherst
Co-authors: Olivia L. Dinkelacker, Lucas P. Griffin, Meaghan L. Guckian, Steven J. Cooke, Sascha Clark Danylchuk, and Andy J. Danylchuk
Email: gcasselberry@umass.edu
Presentation type: Oral presentation

Striped bass (*Morone saxatilis*) are one of the most sought-after species in recreational saltwater fisheries along the Atlantic coast of the United States. Their seasonal coastal migrations make them widely accessible for anglers of all skillsets and socioeconomic backgrounds fishing from shore and by boat. High participation rates equate to millions of striped bass being caught annually, with a high portion of these fish being released due to harvest restrictions and voluntary conservation actions. In 2023, growing concerns about the status of the striped bass stock triggered emergency regulations to further restrict the slot limit across US Atlantic states, meaning even more striped bass are being released due to regulations. Despite their popularity and high release rates, significant knowledge gaps remain in our understanding of striped bass post-release behavior and survival, as well as angler engagement in best handling practices. In 2023, we launched a two-tiered project that combined a multi-year field study focusing on how striped bass respond to capture and handling across a range of angling techniques, environmental conditions, and life history stages, as well as an online angler survey that evaluated angler fishing practices and perceptions of threats to the striped bass stock. Using a combination of reflex action mortality predictors and post-release monitoring with accelerometer data loggers, we found that air exposure duration, in combination with increasing fight time, body size, and water temperature significantly increased physiological stress and decreased post-release activity. Despite this, our survey showed that anglers regularly fished at high temperatures and air exposed fish, highlighting the need for improved education on handling practices to improve post-release outcomes. Collectively, these studies advance our understanding of angling impacts on striped bass and angler understanding of their fishery.

Keywords: Catch-and-release, post-release behaviour, best practices, angler perceptions

Assessing spatial behaviour and recapture likelihood in a catch-and-release fishery targeting giant trevally

Presenter: Andy Danylchuk - University of South Florida
Co-authors: Fordham G, Curd G, Adam PA, Narty C, Rose-Innes K, Vd Merwe D, Brighton E, Danylchuk SC, McGarigal C, Allen MAW, Cooke SJ, Danylchuk AJ
Email: lpgriffin@usf.edu
Presentation type: Oral presentation

Understanding how fish respond to catch-and-release angling is critical for managing recreational fisheries, particularly in remote, high-value destinations where sustainability hinges on repeated angler-fish interactions. We used a multi-method approach, acoustic telemetry, mark-and-recapture, and location-specific to investigate how giant trevally (*Caranx ignobilis*) responded to varying levels of fishing and human activity across the Alphonse Island Group, Seychelles. Giant trevally near a high human use area with limited provisioning showed restricted movements during the tourism fishing season and had home ranges nearly 50% smaller than those of adult giant trevally from other parts of the atoll group. Overlap between catch maps and giant trevally core-use areas was moderate (~30%), yet recaptures were rare, consistent with potential hook avoidance or learned wariness. When recaptures did occur, they typically happened close in space and time to the original capture event, suggesting short-term residual vulnerability for some individuals. Although no immediate spatial shifts were detected during a COVID-19-related fishing closure, non-habituated giant trevally expanded their ranging movements across seasons, potentially reflecting gradual spatial avoidance of high angling activity areas. These patterns, combined with evidence of high post-release survival and limited sub-lethal effects, suggest that behavioural responses may drive longer-term ecological consequences and feedbacks on catchability. Our results underscore the need to consider behavioural plasticity and learning in the management of catch-and-release fisheries, as repeated interactions may subtly and cumulatively reshape fish behaviour, space use, and catchability, with potential implications for long-term fishery viability.

Keywords: Acoustic telemetry, behavioural plasticity, catchability, giant trevally, recreational fisheries

DRAFT

The Jaguar of the River: Using a community centered approach for science-based conservation and management of Golden Dorado in the Neotropics

Presenter: Andy Danylchuk - University of Massachusetts Amherst
Co-authors: Fernandez NB, Casselberry G, Rueda E, Gozio JP, Garrone-Neto D, Hahn L, McLaughlin JF, Silva N, Martinez A, Cooke SJ, Clark Danylchuk S, Guckian M, Markowitz E, Komoroske LM
Email: adanylch@umass.edu
Presentation type: Oral presentation

Golden dorado (*Salminus brasiliensis*) is an iconic wild fish species inhabiting neotropical watersheds in parts of South America. As an aggressive predator, golden dorado play an important ecological role in structuring food webs, while their striking golden-yellow body coloring and dramatic fight on the end of a fishing line helps drive an economically and culturally important recreational fishery. Unfortunately, golden dorado are under a wide range of human mediated disturbances (i.e., dams, climate change), and their extremely wide geographic distribution spanning massive watersheds can make understanding and responding to such threats challenging. To mitigate these challenges, we shed light on how we used a community centered approach to first assemble a chromosomal-level reference genome of golden dorado and combine it with whole genome re-sequencing of individuals across their range to assess contemporary population structure and historical gene flow. Identifying hierarchical genetic population differentiation across their distribution at both geographic breaks and at human-mediated barriers is now being used to inform community centered tagging efforts to better understand movement contingencies and finer-scale gene flow. A community centered approach was also used to survey recreational anglers to understand their awareness of potential threats to golden dorado populations and identify knowledge gaps that could help shape education and outreach campaigns. Such consistent engagement with the recreational angling community created momentum that has fostered the formation of a grassroots stakeholder movement (the Golden Dorado Conservation Coalition) that is advocating for science-informed conservation and management efforts for golden dorado and the watersheds they inhabit.

Keywords: Neotropics, golden dorado, community centered, collaboration, conservation

Reef cover restoration of inshore reefs degraded by recreational activity and terminal tackle loss

Presenter: Mark Dixon - Strandloper Project NPC
Co-authors:
Email: ghostfishing@strandloperproject.org
Presentation type: Oral presentation

In the Southern Cape, lost and discarded recreational fishing terminal tackle from shore based fishing contributes to ghost fishing fatalities, avian entanglements and physical reef cover damage. In high cast zones on rocky reefs, snagged fishing line and tackle degrade reef cover, resulting in barren zones with minimal cover. Target species and income level of fishermen influence the set up of terminal tackle which results in different methods of snagging, and influences the risk of fatalities caused by ghost fishing. Clean up dives and reef surveys have documented ghost fishing fatalities of 13 fish species and entanglement fatalities of seven avian species. Monthly removal of terminal tackle from inshore reefs, particularly lead sinkers, and snagged line promoted regeneration of reef cover within 11 months. Regeneration was inclusive of flora and fauna species, leading to an increase in juvenile fish feeding on the reef. In Kelp forests, the recovery of monofilament suggest that snag rates are higher than along rocky shorelines and can result in higher ghost fishing fatalities.

Keywords: ALDFG, ghost fishing, high cast zone, reef damage, reef degradation, reef cover scouring, avian entanglements, reef restoration, BRUV, kelp forest

DRAFT

Coastal sharks on the line: Insights from recreational anglers

Presenter: Sally Dowd - Institute of Marine Sciences, University of North Carolina at Chapel Hill
Co-authors: Murray G, Black CL, Covington R, Fodrie J, Nye JA
Email: sdowd@nyelab.org
Presentation type: Oral presentation

Despite recent expansions in scientific monitoring of our oceans, many marine species and fisheries remain understudied. As recreational fisheries expand around the world, we must use approaches to characterize fishing activity and fill in data gaps on the species that they target. Along the U.S. Atlantic coast, land-based shark fishing (LBSF) is an increasingly popular way to catch and release large coastal sharks. While we know the broad distribution of these sharks, gaps in scientific surveys in space and time limit our understanding of their fine-scale distribution to inform conservation and management actions. The anglers in this sport interact with sharks more frequently than a scientific survey and hold valuable local ecological knowledge (LEK). This research relies on LEK interviews to 1) define the seasonal distribution of large coastal sharks in North Carolina, and to 2) collect angler behaviour and effort information to increase our understanding of this unstudied state-water shark fishery. Findings from interviews reveal a clear picture of coastal shark distribution and its drivers, interactions with protected species, fishing activity, and angler opinions on science and management. This study will help inform future LBSF regulations in North Carolina and can serve as a framework to learn more about data-limited recreational fisheries around the world.

Keywords: Angler interviews, coastal sharks, data-limitations, land-based shark fishing, recreational fisheries, species distribution

DRAFT

Recreational discards: How many dead discards are too many?

Presenter: Michael Drexler - Ocean Conservancy
Co-authors: Michael Drexler, Dan Portnof, Catherine Bruger, Anthony Rogers, Michele K. Conrad
Email: mdrexler@oceanconservancy.org
Presentation type: Oral presentation

One of the major sources of mortality from recreational fisheries is from dead discards – fish that are caught and released in a condition that results in their death. We performed a meta-analysis reviewing recreational data collected across the United States and assessed the magnitude and role of discard mortality to overall stock health. We include several case studies for stocks in the Southeast region of the United States, where the total dead discards far exceed the retained catch. We found that despite federal legal mandates to minimize bycatch, discarding by recreational fisheries has remained steady or increased with direct impacts to stock health and access to the fishery. Discarding as a practice has complex interactions with management measures that reduce access to prevent overfishing, which can in turn increase out-of-season discarding. Which begs the question: how many discards are too many for a sustainably managed fishery?

Keywords: Recreational fisheries, discards, recreational management

DRAFT

Himalayan Bhutan: Flyfishing's New Frontier

Presenter: Bryant Dunn - Dunn Outfitting International/Himalayan Flyfishing Adventures/Christmas Island Lodge/Idaho Wilderness Outfitters/Fly Fishers Interanational/Fisheries COnservation FOundation/Himalayan Rivers United
Co-authors: N/A
Email: svoutfitter@gmail.com
Presentation type: Oral presentation

Nestled between Tibet to the north and India to the south, east and west, Bhutan is best known for its rugged Himalayan landscapes, burgundy-robed Buddhist monks and primary socio-economic indicator, Gross National Happiness (GNH). Less well-known are its pristine southern river systems, home to Golden Mahseer (*Tor putitora*) and Chocolate Mahseer (*Neolissochilus hexangonalepis*), which were until recently, closed to recreational angling. However, after a five-year radio telemetry study spearheaded by American-based Fisheries Conservation Foundation (FCF) in conjunction with World Wildlife Fund (WWF) and the Royal Government of Bhutan, in addition to contributions from international consultants on best angling and handling practices and a post-COVID need for novel revenue streams, a single barbless hook, catch-and-release angling program was adopted by the Bhutanese parliament. This presentation will focus on the past, present and future of fisheries conservation in Bhutan, the science which lead to the approval of a national recreational angling program, the potential of recreational angling in Bhutan and the threats which persist both internally and externally. Presenter, Bryant Dunn is the owner of Himalayan Flyfishing Adventures based in Bhutan, Board Member of FCF, Himalayan Rivers United, Fly Fishers International and owner of Dunn Outfitting International and has pioneered recreational angling in Bhutan since 2007 serving as Master Trainer of Fishing Guides for the Royal Government of Bhutan.

Keywords: Bhutan, mahseer, Himalayas, flyfishing, fisheries conservation, radio telemetry

Assessing machine learning approaches in travel cost modelling for recreational fisheries

Presenter: Wendy Edwards - Cefas
Co-authors: Muench A, Radford Z, Hyder K
Email: wendy.edwards@cefas.gov.uk
Presentation type: Oral presentation

Recreational sea angling is a widely practised activity in England and Wales, offering significant social and economic benefits while also exerting pressure on fish stocks. Effective fisheries management requires an understanding of angler preferences and behaviour to balance conservation efforts with recreational demand. Understanding the drivers of anglers' fishing activity and their preferences for catch will allow for more target management measures.

The Travel Cost Method (TCM) is a widely used approach for estimating the economic value of recreational trips and modelling site selection behaviour. However, traditional implementations often rely on predefined functional forms and assumptions that can limit model flexibility and performance, particularly when working with large, complex datasets. Recent research has begun to explore the use of machine learning techniques as a way to address these limitations.

This study investigates how machine learning (ML) techniques, specifically Boosted Random Forests and Neural Networks, can be applied within a TCM framework. Using existing socio-economic, environmental, and historical trip datasets, the analysis focuses on predicting site choice behaviour based on factors such as travel cost, species preferences, and site attributes.

By comparing ML-based models with conventional discrete choice approaches, the study aims to assess the potential of machine learning to improve the flexibility and performance of travel cost modelling in recreational fisheries. The findings are intended to support more responsive, data-driven fisheries management that reflects the preferences of the angling community.

Keywords: Marine recreational fisheries, travel cost, machine learning

DRAFT

Assessing the economic impact of recreational sea angling in the UK

Presenter: Wendy Edwards - Cefas
Co-authors: Muench A, Radford Z, Hook SA, Bell B, Mills R, Brown A, Hyder K
Email: wendy.edwards@cefas.co.uk
Presentation type: Oral presentation

Sea angling in the UK is an important activity that may impact fish stocks, but it also has important economic and social benefits. Economic data are needed to support the development of MRF, assess the impact on coastal communities, and support decisions on the allocation of fisheries resources. Here, we assess the total economic impact of sea angling in the UK. The total economic impact, Gross Value Added (GVA), and employment supported by sea angling in the UK in 2016, 2017, and 2021 were estimated using an Input-Output method. Expenditure on trips and major items (capital) was collected from a sample of sea anglers and raised to the total population using information from a national survey of sea angling participation. Taxes were removed, and expenditure partitioned between industrial sectors accounting for imports. Modelling approaches were used to assess the drivers of economic impact and reduce uncertainty in the estimates. The importance of the economic impact generated by sea angling in the UK will be discussed in the context of fisheries management and government levelling up agenda.

Keywords: Marine recreational fisheries, economic impact, UK

DRAFT

Economic impact of catch and release Atlantic bluefin tuna fishery from angler expenditure

Presenter: Wendy Edwards - Cefas
Co-authors: Muench A, Ford J, Radford Z, Righton D, Hyder K
Email: wendy.edwards@cefas.co.uk
Presentation type: Oral presentation

In recent years, the number of sightings of Atlantic Bluefin Tuna (BFT) in UK waters has been increasing. This has led to a growing interest in the recreational fishing community and the potential socio-economic benefits it would bring to coastal communities. A pilot catch and release tagging programme for BFT was conducted from August to November 2021 across 15 vessels in the Southwest of England. This study estimated the socio-economic impact generated directly by the anglers that took part in the pilot programme. The pilot was expanded in subsequent years, involving 25 vessels from August to December 2022 and 24 vessels in the same period during 2023. We identified the general profile of anglers, their opinions and personal benefits generated from the programme as well as the overall economic impact generated from the spend by anglers. A survey was done of anglers engaging in the programme to assess the economic impact in 2021, 2022 and 2023. In 2021, 111 of 1,069 anglers that fished completed the survey, covering 80 of the 407 trips with paying anglers onboard. In 2022, 95 of 1,755 anglers responded, covering 69 of 622 trips. In 2023, 75 of 1,667 anglers responded, providing data for 62 of 595 trips. Anglers responding to the survey were between mostly 50-60 years old with high household income and had positive opinions about the program. Expenditure was estimated for each trip and raised to the total number of trips. Removing taxes and imports provided the direct impact, with total economic impact and jobs supported calculated using an input-output method. Using information on what anglers would do if the fishery was not available, it was possible to determine the proportion of angler spend that could be directly attributed to the fishery (counterfactual).

Keywords: Recreational fisheries, economic impact, Atlantic bluefin tuna

DRAFT

The ORI Cooperative Fish Tagging Project: Recreational anglers catching conservation success

Presenter: Chantel Elston - Oceanographic Research Institute
Co-authors: Daly R, Jordaan GJ, Mann BQ
Email: celston@ori.org.za
Presentation type: Oral presentation

Fish tagging is a critical tool to generate knowledge on the life-history traits and movements of marine fishes, and to subsequently manage and conserve their populations. In South Africa, the ORI Cooperative Fish Tagging Project (ORI-CFTP) is the longest standing fish tagging project, leveraging the power of recreational angles to collect important scientific data. The project began as a simple idea of tagging one species (*Pomatomus saltatrix*) to understand stock structure but has evolved into one of the most successful citizen science projects of its kind on a global scale. With more than 386 000 fish tagged, an approximate 6% recapture rate and over 7 000 tagging members, this project has not only allowed anglers to actively participate in collecting scientific data, but also to collaborate with managers and scientists for improved management of important recreational fishery species. Furthermore, the project has made a considerable contribution towards improving the conservation ethics and behaviour of marine recreational anglers in South Africa. Notably, anglers have learned the value of correct fish capture and handling procedures to reduce post-release mortality. This presentation will look at the 40-year history of the ORI-CFTP, summarise the vast amount of data that has been collected and how this has been used in science and management, detail how this project has changed the attitudes and behaviours of anglers over the years, and identify important lessons learned and challenges faced.

Keywords: Citizen science, recreational fisheries management, conventional tagging

DRAFT

Best guess, but better: a management tool for estimating post-release mortality in data-poor marine recreational fisheries

Presenter: Matthew Farthing - Rhodes University
Co-authors: Winkler A, Radford Z, Hyder K, Potts W, Ferter K, Weltersbach S, Arlinghaus R, Cooke S, Zhang J, Rochelle L, Feldhege F, Tracey S
Email: matthew.farthing.rsa@gmail.com
Presentation type: Oral presentation

Most reviews of catch-and-release in recreational fisheries to date have focused primarily on identifying key drivers of post-release mortality and other sub-lethal impacts to develop best practices (e.g. Brownscombe et al. 2017, Bartholomew and Bohnsack 2005). There has been little effort to develop a basis for predicting post-release mortality (PRM) at a scale useful for fisheries managers seeking to incorporate discrete PRM estimates in stock assessments and other decision-making. While independent studies investigating PRM do exist, they often only investigate a single species or a suite of similar species in one location using specific angling techniques. Consequently this leaves managers and decision makers to use existing estimates for similar/related species, or estimates from potentially dissimilar species but in similar fisheries, or simply to subjectively interpret the likelihood of PRM being higher or lower than that of other taxa. To this end, this study aimed to review and consolidate all available estimates of PRM in marine recreational fisheries, and to then interrogate these estimates using a Bayesian framework to develop a model for estimating PRM at various levels. This model was then packaged into a user-friendly application designed for managers and practitioners to engage with both the dataset and the model to obtain defensible, bounded estimates of PRM at various taxonomic levels and under various fishery pre-conditions. This global marine recreational fisheries PRM database will be routinely updated to incorporate new PRM estimates from the ever-growing body of catch-and-release literature.

Keywords: Catch-and-release, discard, survival, application, stock-assessment, sport fishing

DRAFT

Linking video footage and electronic tagging to investigate rod-and-line capture behaviour in Atlantic bluefin tuna

Presenter: Keno Ferter - Institute of Marine Research, Norway
Co-authors: Maddalena Glass, Neil Anders, Otte Bjelland, Jan Hinriksson & Michael Breen
Email: keno@hi.no
Presentation type: Oral presentation

Following the recent return of Atlantic bluefin tuna (*Thunnus thynnus*) to Nordic waters, rod-and-line fisheries — both recreational and commercial — have developed in several countries. A common capture method is trolling with spreader bars (i.e. several artificial squid lures rigged to a metal bar) behind coastal powerboats. However, the stress response of bluefin tuna to rod-and-line capture remains poorly understood. To address this, we initiated a behavioural study aimed at quantifying and, if necessary, mitigating capture-induced stress to support animal welfare and maintain flesh quality. Spreader bars were equipped with cameras and accelerometers as part of the scientific rod-and-line fishery off the west coast of Norway. Preliminary analyses show that behavioural states observed via video recordings generally align with activity levels derived from accelerometer data. High activity was typically observed during the initial hook-up, followed by a decrease in activity. Several individuals were seen rejoining their school and swimming at cruising speed, with occasional bursts during retrieval. After the initial run, activity was generally low and fish did not struggle during retrieval, but it remains unknown if this was due to exhaustion or if the fish calmed down. Accelerometer data also show potential for detecting fine-scale behaviours, such as tail-beat frequency. Future work will correlate these behavioural patterns with physiological stress responses and post-capture flesh quality. Beyond improving capture practices for Atlantic bluefin tuna, the methodologies developed here offer a framework for investigating capture dynamics in other large fish species targeted by recreational fisheries.

Keywords: Best practice, tagging, fish welfare, catch-and-release, sublethal impacts, recreational fishing, big-game fishing, physiology

DRAFT

The role of methods and analysis in efficiently capturing heterogeneity among recreational sea anglers

Presenter: Adam Fisher - University of Gloucestershire, UK
Co-authors: Kieran Hyder (CEFAS - UK) and Julie Urquhart (University of Gloucestershire, UK)
Email: afisher9@glos.ac.uk
Presentation type: Oral presentation

Recognizing angler heterogeneity can benefit multiple aspects of fishery management from evaluating sample bias in monitoring participation to understanding variation in regulatory compliance. Angler typologies can be broadly grouped into hierarchical composite measures (e.g. specialization) or lateral models where groups are defined by different, unrelated, metrics. In previous work, we developed a typology of recreational sea anglers in England and Wales (UK) demonstrating that in a multi-species, open access, context a lateral model of four angler types best described the sample: consumers, trophy anglers, leisure-identity anglers and social anglers (Fisher et al., 2025). At a time when angling communities are increasingly being approached to take part in policy-orientated research, however, the way in which heterogeneity is captured is key: enough information needs to be gathered to reveal diversity but too many questions risks dropout or repeat response bias. Our previous work recommended ways to address this problem including angler group-self-selection and using singular proxy-statements (Likert data) from the typology components/metrics. The latter, however, raises potentially significant questions: firstly, clustering usually requires numerical data, therefore does adopting different, appropriate, analysis techniques affect the typology outcome? And, secondly, if certain components are removed from the typology to either improve model quality or to streamline future data collection, what is lost in the process? This paper presents a newly conducted single-statement two-step clustering approach utilizing the same component framework developed in Fisher et al. (2025) with the aim to compare the resulting and historical typologies. This work offers insights on the benefits and drawbacks of streamlining data collection when measuring angler heterogeneity.

Fisher, A., et al. 2025. A typology of recreational sea anglers in England and Wales. Fish. Res. 285

Keywords: Angler heterogeneity, typologies, cluster analysis

DRAFT

Impacts of non-consumptive, catch-and-release based recreational fishing on catch rate in freshwater predators: a BACI whole-lake experiment

Presenter: Ryo Futamura - Leibniz Institute of Freshwater Ecology and Inland Fisheries
Co-authors: Maximilian Roederer, Tammo Steinke, Manu Cover, Malte Bochow, Fritz Feldhege, Robert Arlinghaus
Email: rfutamurattg@gmail.com
Presentation type: Oral presentation

Total catch-and-release fishing can significantly reduce mortality on exploited fish stocks, but catch rates may still be going down over time as fish learn to avoid baited hooks or lures. Controlled replicated whole-ecosystem studies are needed to separate lure avoidance impacts of intensive recreational fishing pressure from temporal changes unrelated to fishing. We conducted a whole-lake scale before-after-control-impact (BACI) study relying on total catch-and-release fishing using artificial lures and dead baitfish targeting previously angling-naive pike (*Esox lucius*) and European perch (P*erca fluviatis*). We used two lakes (one control and one treatment lake) and simulated the presence of a non-fishing protected area installed on half of the treatment lake. Experimental angling pressure of about 100 angling-hours per ha was applied and distributed over a period of two months from May to end of June 2025. Catch-and-release fishing causally reduced catch rates by about 50 % after one month of exposure to heavy fishing, especially in pike. The impact of total catch-and-release was less pronounced after two month of heavy fishing, which either indicates an impact rising temperature strongly reducing catch rates of pike independent of hook avoidance learning or rapid hook avoidance learning happening also after occasional experimental fishing in the protected zone of the treatment lake and the control lake. Our data suggest that high catch rates in angling-naive freshwater predatory fishing cannot be sustained because of rapid lure avoidance learning, which will negatively affect angler satisfaction.

Keywords: Catch and release, Northern pike, European perch, CPUE, field experiment

DRAFT

Reducing environmental impacts of recreational fishing: examples from Germany

Presenter: Juergen Geist - Technical University of Munich, Germany
Co-authors: Beggel S, Pander J
Email: geist@tum.de
Presentation type: Oral presentation

Recreational anglers often actively engage in nature conservation and want to minimize negative impacts of their activities on aquatic ecosystems. This includes reducing pollution as well as taking appropriate measures to maintain healthy fish stocks. In our study, we assessed the environmental impacts related to the loss of recreational fishing gear based on a quantification of lost fishing tackle in a reservoir over a defined time period. We also tested the ecotoxicological effects of leachates of various lure types and components on aquatic species in experiments with and without sediment. Braided and monofilament fishing lines, along with lures composed of lead, other metals and various plastic materials comprised the biggest share of lost tackle. Soft lures - including those claiming to be environmentally friendly – mostly consisted of PVC and contained plasticizers, including substances of high concern such as diethylhexyl-phthalate and dibutylphthalate, as well as other additives. Depending on tested lure type, even dilutions of the leachate to 1.5 % were highly toxic and caused up to 100 % mortality in H. azteca after 96 h exposures. Our findings suggest that environmental pollution by lost fishing tackle deserves greater attention. Due to the potential environmental consequences, anglers should be given a choice to select less toxic tackle to reduce their environmental impacts.

Keywords: Recreational fishing, environmental pollution, tackle, ecotoxicology, plastics

DRAFT

Spatial trophic variability and genetic connectivity of giant and bluefin kingfish across the Indo-Pacific

Presenter: Jessica Glass - University of Alaska Fairbanks/South African Institute for Aquatic Biodiversity
Co-authors: Glass JR, Daly R, Santos SR, Kauwe JSK, Pickett B, Post DM, Cowley PD
Email: jrglass@alaska.edu
Presentation type: Oral presentation

Giant trevallies (*Caranx ignobilis*) and bluefin trevallies (*Caranx melampygus*) are highly-targeted recreational fishery species. Identifying spatial patterns of diet variability and gene flow are critical components of fisheries management. We studied the genetic connectivity of giant and bluefin trevallies throughout their Indo-Pacific ranges. From several sites in the western Indian Ocean (WIO), we also collected muscle tissue of giant trevally to examine trophic position across multiple habitat types: coral atolls, coastal reefs, and granitic islands. Analyses of population structure indicate the two species display different phylogeographic patterns across the Indo-Pacific, with both species exhibiting population substructure in the Central Pacific. Both species maintain gene flow throughout the WIO, displaying patterns that resemble large pelagic predators such as sharks and tunas rather than most reef-associated teleost fishes. In spite of genetic connectivity in the WIO, giant trevallies display trophic variability that is reflective of habitat. We observed patterns suggestive of ontogenetic changes in diet and habitat utilization, and an offshore to coastal gradient in carbon that drove niche distinctiveness between localities. Trophic position estimates of giant trevally ranged from 3.5 – 5, placing it at the equivalent trophic level as many predatory sharks. This work demonstrates how evaluating spatial components of trophic ecology and genetic connectivity can characterize organisms' functional roles and ecosystem influence, allowing for spatially explicit conservation and management efforts.

Keywords: Kingfish, trevallies, stable isotopes, genetics

DRAFT

Temperature driven increase in trophy size of warmwater species: Insight from 50-years of angler´s records

Presenter: Million Tesfaye Godana - Institute of Hydrobiology, Biology Centre of the Czech Academy of Sciences, Na Sádkách 7, 370 05, České Budějovice, Czech Republic
Co-authors: Marek Šmejkal, Marek Brabec
Email: million.godana@hbu.cas.cz
Presentation type: Oral presentation

Climate change modifies functioning of freshwater ecosystems and may shift performance of species favouring warmer environment. The maximum body size of fish is an important parameter that influences their interactions with another biota. Harnessing historical recreational angling data provides a unique opportunity to retrospectively uncover such changes in maximum fish size. Here, we compiled a dataset which contained trophy freshwater fishes from 877 angling grounds spanning from the 1973 to 2022 in Czechia. In all, total lengths of 2158 trophy individuals were analysed for four warm water fish species: common carp (*Cyprinus carpio*), European catfish (*Silurus glanis*), grass carp (*Ctenopharyngodon idella*) and silver carp (*Hypophthalmichthys molitrix*). The climate data were used to relate the changes in maximum attainable size with climatic conditions. The study demonstrates the general increase in reported size of the catches of selected warm-water species reflecting the more favourable conditions for increasing maximum attainable size, as well as it likely represents improving angler´s equipment. Species increasing length shows nearly linear trend in European catfish, grass carp, and common carp, suggesting that these species may reach even bigger sizes in close future. Lentic water bodies were more likely to produce larger individuals than lotic waters in European catfish and common carp, while no difference was found in silver carp and grass carp. This study demonstrates that despite its selective nature, recreational angling may still uncover key ecosystem processes such as change in observed maximum attainable size of species, which may have further implications for community and ecosystem functioning.

Keywords: Culturomics, iEcology, angling, fish records, aquatic conservation, climate change

DRAFT

Recreational catch data; A citizen scientists explains why a transdisciplinary approach is essential for a resilient recreational fishery in South Africa and possibly elsewhere

Presenter: Malcolm Grant - South African Deep Sea Angling Association
Co-authors: None
Email: mpca99@telkomsa.net
Presentation type: Oral presentation

It has been documented repeatedly why recreational anglers are difficult to monitor and why their catch data are hard to obtain and use. The reasons most commonly sighted are:

- The diversity of anglers - whether shore based, ski-boat, kayak, spear fishers or estuary anglers
- The large number of access points - where they fish
- The lack of management goals and objectives
- The lack of a universal mandatory catch reporting system
- The challenges associated to trip goals or satisfaction drivers - whether for pot, pleasure or prestige
- Recreational catch data is considered inferior to commercial catch data
- That fishery dependent data lacks verification protocols
- That unlicensed recreational anglers add to the uncertainty of catch estimates
- The biases associated with recreational catch data mobile apps make the data unreliable

To complicate matters at times certain species are prohibited while moratoriums are placed on others. Thus no data at all arises from these situations from either the recreational or commercial sectors. And, for those de-commercialized species, only recreational anglers could yet be a continuous source for their catch data.

From inheriting a paper based social recreational catch reporting system in 2008 to glimpse the possibility of an AI enhanced catch reporting system in 2025 my journey tells the tale and conclusions reached to enable all recreational catch data to be aggregated for the benefit of those contributing the data and those that need the data. It will require a transdisciplinary approach and the time is right for concerned individuals to come together as equals to chart the way forward to a more sustainable recreational fishery.

Keywords: Recreational catch data, transdisciplinary, sustainable

Competitive angling data in predicting the stock status of species targeted by shore-based recreational anglers in South Africa

Presenter: Natanah Gusha - South African Institute for Aquatic Biodiversity
Co-authors: Attwood C, Childs AR, Winkler AC, Farthing MW, Parkinson M, Potts WM
Email: natanahgush03@gmail.com
Presentation type: Oral presentation

While the South African Marine Living Resources Act 18 of 1998 under the Department of Forestry, Fisheries and Environment (DFFE) aims to provide for long-term sustainable management of marine living resources to the benefit of all citizens, there is still an urgent need to improve the current governance institutions particularly in the small-scale and recreational fisheries sectors. A fundamental component of fisheries governance is to accurately provide information on fish stocks. One way to do this is the use of stock assessments protocols that can predict stock abundance and patterns over time. Currently, there are less than five stock assessment scientists in South Africa promoting this objective and none work on small-scale and recreational fisheries despite the massive importance of these fisheries in supporting livelihoods and the tourism economy, respectively. However, although there is limited stock assessment capacity and the dearth of suitable stock assessment information, there is a big opportunity for the scientific community to make worthwhile contributions through targeted research efforts that explore plausible future scenarios, consider uncertainties, and suggest strategic ways that can conserve fish stock and biodiversity. In 2012, scientists and researchers from Rhodes University developed the Rock and Surf Super Pro League (RASSPL) database for this purpose. The focus of this ongoing competitive league is capturing fish diversity through a scoring system, and as such this dataset provides a critical opportunity to examine population trends for a wide range of species over time and along the South African coastline. Herein, we present on the use of competitive data in updating and understanding the stock status of the top targeted species by shore-based recreational anglers in South Africa and make suggestions on how these can be used in promoting sustainable shore-based fisheries management.

Keywords: Governance, fisheries management, assessments, livelihoods, data-poor systems, teleosts

DRAFT

Expanding the global Fishing Vessel Ocean Observation Network with recreational anglers and fishing guides in The Bahamas

Presenter: Sepp Haukebo - Environmental Defense Fund
Co-authors: Cooper Van Vranken, Chris Cusack, and Adrian Laroda
Email: shaukebo@edf.org
Presentation type: Oral presentation

The Fishing Vessel Ocean Observing Network (FVON) is a collaborative global initiative to enhance subsurface coastal observations by leveraging the long range and routine operations of fishing activities. During this session we will share the successes and future plans of this program on improving ocean observations and hurricane forecasting in The Bahamas, where the program has expanded to include recreational anglers and fishing guides. Endorsed by the UN Decade of Ocean Science through the CoastPredict programme and recognized as an emerging Global Ocean Observing System (GOOS) network, FVON fosters collaborative, cost-effective ocean data collection; establishes common standards and best practices; and facilitates the uptake of observations to improve ocean predictions while promoting sustainable fishing practices. Fundamentally a citizen science initiative, FVON includes key stakeholders in data collection and enables more affordable and accessible ocean observation. This inclusivity democratizes traditional ocean science and integrates it with powerful local knowledge. Furthermore, data from FVON represent a win-win scenario for all stakeholders—enabling the fishing industry, anglers, fisheries scientists, and decision-makers to co-develop innovative, scalable tools that enhance fisheries sustainability and community resilience.

Keywords: Citizen science, ocean observing systems, oceanography, hazard preparedness, fishing guides

DRAFT

A practitioner's guide for marine recreational fisheries management in countries with a developing recreational fishery

Presenter: Sepp Haukebo - Environmental Defense Fund
Co-authors: Warren Potts, Kieran Hyder, Zachary Radford
Email: shaukebo@edf.org
Presentation type: Oral presentation

Recreational fisheries have several unique characteristics which make them difficult to manage using the traditional approaches employed for the commercial sector. Many countries that have sizeable or growing marine recreational fisheries have not yet developed the policy, institutional structures nor management capacity to adequately manage their marine recreational fisheries.

In this session we will present a practitioner's guide that was developed in response to numerous requests from fisheries managers for user-friendly advice on the most appropriate methods to govern marine recreational fisheries. The guide is a synthesis of existing approaches, providing a step-by-step guide for fisheries managers who are tasked with managing marine recreational fisheries that target fish. These guidelines are embedded in socio-ecological systems thinking, which considers all dimensions (governance, ecological and human) of recreational fisheries and incorporates the principles of the Ecosystem Approach to Fisheries Management, including co-design, co-management and consideration for the ecosystem and societal system. The guide provides recommendations on the most appropriate methods for each of the primary steps and the different components of the structured adaptive co-management process (e.g., monitoring methods, compliance strategies) and provides additional recommendations for managing recreational fisheries for social development. While this guide has been developed for countries with growing marine recreational fisheries, the principles presented are general and have relevance to countries with large marine recreational fisheries, recreational fisheries in freshwater, and recreational fisheries that target non-fish species.

Keywords: Recreational fisheries management, governance, guidance, fisheries managers

DRAFT

The economics of the recreational fishery in Seychelles, a Small Island Developing State

Presenter: Tom Hecht - Rhodes University; Advance Africa Management Services
Co-authors: Bova C, McCafferty J, Wright R, Bijoux J, Pringle, B
Email: tomh@advanceafrica.co.za
Presentation type: Oral presentation

In Seychelles, as in other Small Island Developing States, the sport and recreational fishery has been identified as a potential contributor to the National Blue Economy Strategy. However, there is very limited information on the scale, value, and impacts of the fishery, which remains largely unregulated, with no formal licensing or monitoring systems in place.

This study assessed the social and economic characteristics of the fishery towards understanding its importance and its contribution to the economy. Surveys were conducted from March-October 2022 through structured questionnaires with resident and non-resident anglers, tourists, and households, complemented by stakeholder interviews and secondary data collection.

The economic impact of the fishery was found to be substantial, mostly via non-resident expenditures which introduce new money into the economy. The annual economic expenditures of the Seychelles recreational fishery (USD 167-196 million) and its contribution to the country's economy (USD 80-94 million) are in-line with other recreational fisheries, such as in Costa Rica, Galicia (Spain) and Hawai'i. It is highly likely that the fishery's economic value is higher than that of the artisanal fishery.

The findings support the recognition and prioritisation of the recreational fishery as a key component of the country's Blue Economy Strategy, and provide a foundation for the development of a policy for the fishery. The results support the introduction of management measures, such as size and bag limits, closed seasons and catch-and-release only zones, and the establishment of a permitting system. The establishment of a monitoring programme is also recommended, alongside stock assessments of major target species, and angler education for both resident and non-resident participants.

Keywords: Small Island Developing State, economic impact, economic contribution, recreational and sport fishery, social importance, Blue Economy

DRAFT

Global recreational fishing licenses: A comparative review toward best governance practices

Presenter: Kirsten Hendricks - Rhodes University
Co-authors: W Potts, C Bova
Email: kchendricks09@gmail.com
Presentation type: Oral presentation

This study provides a global review of recreational fishing license systems to evaluate their structure, accessibility, affordability, and contributions to fisheries management. Using an online expert questionnaire distributed through the ICES Working Group on Recreational Fisheries Surveys, 70 responses were obtained from 31 countries. Results revealed that while recreational licenses have the potential to promote cost recovery and participation monitoring, systemic governance issues limit their effectiveness. A large number of respondents were unaware of how license revenues were distributed or unclear on the existence of earmarking legislation. Highlighting widespread transparency and communication challenges. In most countries, license revenue was channelled into national funds rather than reinvested in fisheries management, undermining the cost-recovery function. Where reinvestment occurred, funding was skewed toward compliance, with limited contributions to science and assessment. Overall, the findings indicate that recreational fishing license systems are constrained by weak earmarking legislation, inconsistent reinvestment practices, and limited stakeholder engagement, underscoring the need for clearer governance frameworks, participatory management, and transparent revenue reporting.

Keywords: Governance, recreation, licenses

DRAFT

Recreational fishers are key partners and not just passengers in the recovery of Australia's most iconic fish species – the mighty Murray cod

Presenter: Taylor Hunt - Victorian Fisheries Authority
Co-authors: O'Sullivan L, Forster A, Mottram, B and Rowland S.
Email: taylor.hunt@vfa.vic.gov.au
Presentation type: Oral presentation

The Murray Cod (*Maccullochella peelii*) is Australia's most iconic fish species due to its rich history, deep cultural importance and booming recreational fishery. Over much of the 1900's, the species experienced an enormous decline in range and abundance compared to pre-European times, due to a combination of factors including the regulation of river flows, habitat degradation, overharvest and invasive species. However, over the past 30 years, major fisheries management and conservation efforts have been implemented to save Murray cod from extinction, recover the stocks and facilitate the incredible resurgence of the recreational fishery that we enjoy today. This presentation shares and celebrates the Murray cod recovery story and demonstrates that recreational fishers are key partners, rather than just passengers in the Murray cod recovery story. From the cessation of commercial fishing, implementation of improved recreational fishing practices, large-scale hatchery production and stocking, habitat restoration and improved water flows, research and monitoring informing regulation changes, increased voluntary release of caught fish, introduction of the slot-limit, improved handling of caught fish, and strong stakeholder engagement and advocacy for native fish recovery - we highlight the key steps in the Murray cod recovery story and examine the key partnership role recreational fishers have played along the journey. We share reflections and learnings, challenges and opportunities going forward that may serve as useful experiences for the recovery of other recreational fish species in Australia and globally to promote resilient recreational fisheries.

Keywords: Recreational, fisher, Murray cod, fishery, native fish, recovery, partnership, stocking, habitat, regulation, advocacy, engagement

Enhancing participation in data collection: case study of the Sea Angling Diary in England and Wales

Presenter: Kieran Hyder - Centre for Environment, Fisheries and Aquaculture (Cefas)
Co-authors: Radford, Z., Rudd, H., Mills, R., Schiefer, P.
Email: kieran.hyder@cefas.gov.uk
Presentation type: Oral presentation

Recreational fisheries science relies not only on robust data but also on meaningful engagement with stakeholders to ensure the relevance of the data collected. This paper presents a case study of the Sea Angling Diary, a self-reporting tool developed to gather data on catch, effort, and socio-economic aspects of recreational sea angling across England and Wales. The Sea Angling Diary aims to enhance the quality and quantity of data available for fisheries science and management by involving anglers directly in the data collection process. By fostering a collaborative approach, the project seeks to build trust and demonstrate the value of self-reported data to both the angling community and fisheries scientists.

The research is part of an ongoing project aimed at strengthening science-industry collaboration between CEFAS and all fishing sectors. The focus is especially on improving the uptake of the Sea Angling Diary through collaborative engagement with anglers, angling clubs, and other organizations. A co-design approach was employed to identify barriers and opportunities for increased participation by directly involving the angling community in the research process. This approach ensured that the tool was adapted to the needs and preferences of its users, increasing its overall functionality, accessibility, and perceived value.

We explored user experiences, preferences for potential new data collected, and concerns around self-reporting. Emphasis was placed on building trust and demonstrating the relevance of self-reported data to fisheries science. This paper presents insights from stakeholder engagement and proposes recommendations for enhancing voluntary data collection practices across the wider recreational fishing sector.

Keywords: Science-Industry Research Collaboration, co-design, self-reporting tool, data collection

DRAFT

A roadmap for inclusion of marine recreational fisheries in advice

Presenter: Kieran Hyder - Cefas
Co-authors: Mugerza E
Email: kieran.hyder@cefas.gov.uk
Presentation type: Oral presentation

The International Council for Exploration of the Seas (ICES) conducts stock assessment and provides catch advice for many European fish stocks. Marine Recreational Fisheries (MRF) can be excluded from ICES assessment and advice, which may impact on the ability to manage fish stocks within sustainable limits. This issue has been recognised by ICES leading to the development of a roadmap for inclusion of MRF in advice (https://www.ices.dk/news-and-events/news-archive/news/Pages/RoadmapMRF.aspx).
To embed MRF in ICES advice, a step change in approach is needed. A way forward has been identified using the DAISY model: Data must be robust and accessible; an agreed and consistent approach should be used for MRF Advice; Integration of MRF into assessment is needed; Science is required to meet future needs; and these steps must be implemented Yearly within the annual advice cycle. Twelve recommendations associated with the DAISY model provide a roadmap for provision of MRF advice by ICES. The potential to use this model to frame inclusion of MRF in fisheries advice in other countries will be assessed.

Keywords: Fisheries advice, ICES, roadmap

DRAFT

Embedding marine recreational fisheries in stock assessment

Presenter: Kieran Hyder - Cefas
Co-authors: Edwards W, Radford Z
Email: kieran.hyder@cefas.gov.uk
Presentation type: Oral presentation

Marine recreational fishing (MRF) is a high-participation activity with large economic value and social benefits globally, but can impact on fish stocks. Despite their importance, MRF can be excluded from fisheries assessment, which may impact on the ability to manage fish stocks within sustainable limits. Excluding MRF is driven by several factors including: data issues; modelling challenges; communication issues; and resourcing problems. Data issues were related on quality, quantity, and consistency. Generating time-series of catches and length-frequencies for a stock is often challenging, especially in Europe where different survey methods and frequency need to be collated and processed. Here, we develop an approach to synthesise data from different sources to generate coherent MRF time-series for use in assessment that include errors, an assessment of bias, and approaches to understand the impact of management measures. The approach is applied to generate MRF time series for sea bass (*Dicentrarchus labrax*), pollack (*Pollachius pollachius*) and whiting (*Merlanguis merlangus*). Then outcomes from stock assessment including MRF alongside commercial catches will be shown. Lessons learned about inclusion of MRF in stock assessment will be shared.

Keywords: Marine recreational fisheries, stock assessment, Europe

DRAFT

ICES Working Group on Recreational Fisheries Surveys

Presenter: Kieran Hyder - Cefas
Co-authors: Mugerza E, Strehlow HV
Email: kieran.hyder@cefas.gov.uk
Presentation type: Poster presentation

The International Council for Exploration of the Seas (ICES) conducts stock assessment and provides catch advice for many European fish stocks. As part of this process, ICES convenes many working groups to address key issues for fisheries assessment and advice. For over 15 years, ICES has been bringing together scientists to discuss issues around marine recreational fisheries (MRF) through their Working Group on Recreational Fisheries Surveys (WGRFS). The group is now one the largest global network with over 140 members from 36 countries, with an annual meeting and intersessional topics. The objectives of the group are to: compile & validate MRF data & contribute to ICES advisory processes; assess validity of traditional & novel data collection approaches for MRF; provide guidance on MRF data collection & its use to support assessment & management; develop regional MRF data collection; evaluate the use of economic, social, & communication to support MRF; and interface with other MRF networks. Our current themes include: governance; survey methods; data quality; regional coordination; catch & release; stock assessment; novel methods; human dimensions; and communication & engagement. More information and the latest reports can be found on the WGRFS webpage (https://www.ices.dk/community/groups/Pages/wgrfs.aspx). All are welcome and the annual meeting runs as hybrid, so you can attend in person or virtually. If you are interested in joining and getting involved, please contact Kieran Hyder (kieran.hyder@cefas.gov.uk).

Keywords: Global network, WGRFS, ICES, MRF

Draft

Healthy estuaries serve as a refuge for fishery species within coastal seascapes ensuring resilience against a changing climate

Presenter: Nicola James - South African Institute for Aquatic Biodiversity
Co-authors: Edworthy C, van Niekerk L, Lamberth SJ, Adams JB, Whitfield AK, Deyzel SHP
Email: nc.james@saiab.nrf.ac.za
Presentation type: Oral presentation

The capacity for estuaries in coastal seascapes to mitigate the effects of regional climate change for fishery species should be considered in adaptation planning. Work undertaken in South Africa's warm-temperate estuaries shows how healthy, fully functional estuaries within coastal seascapes not only promote climate change resilience for associated fish species but also potentially provide refuge from climate change impacts. Although juvenile estuary-associated fishery species were found to be tolerant of extreme hot and cold temperatures, most species do not tolerate rapid fluctuations in temperature. The thermal refuge provided by the middle and upper reaches of predominantly open estuaries for fish species is illustrated from long-term daily temperature monitoring in the Kariega and Kromme estuaries and adjacent coastline. During extreme temperature events (marine heat waves followed by upwelling) in the nearshore and lower reaches thermal variability is minimal in middle and upper reaches providing animals with a refuge against extreme thermal variability. In healthy estuaries seagrass meadows are particularly important nursery habitats, which have the added ecosystem service of providing ocean acidification refuges for associated animals. We deployed pH loggers in the predominantly open Kromme Estuary and found that the overall mean pH is higher in seagrass meadows than nearby non-vegetated areas. However, this refuge potential declined when high water temperatures coupled with nutrient enrichment caused macroalgae blooms (*Ulva intestinalis*) in the seagrass meadows. Despite mean pH remaining higher in the vegetated sites, diurnal pH variability increased substantially and extreme lows of pH <7.5 were recorded, which may surpass the pH tipping point for some fishery species. Protecting or restoring the processes and patterns that provide for refuge in estuaries is essential to the mitigation of both ever-increasing anthropogenic and climate change stressors.

Keywords: Climate change, warm-temperate, coastal seascapes, refuge, temperature, ocean acidification

Assessing the impact of marine recreational fishing on mortality of released coho salmon in British Columbia, Canada

Presenter: Quin Johnston - University of British Columbia
Co-authors: Johnston QVA, Lunzmann-Cooke EL, Zinn KR, Johnston SD, Weber L, Hinch SG
Email: quinvajohnston@gmail.com
Presentation type: Oral presentation

Marine recreational anglers in British Columbia (BC) often release captured coho salmon because of size regulations or a mark-selective fishery wherein all wild fish must be released. A recent acoustic telemetry study found coho released in good physical condition exhibited 17% and 40% mortality to three- and nine-days post release, respectively. Fish released in poor condition (e.g. severe bleeding, scale loss or eye injuries) had far higher mortality levels (48% and 71%, respectively). We used a laboratory holding study to examine the specific factors causing mortality in released coho. In 2024, we examined consequences of landing coho with a traditional “fish-friendly” net in contrast to a boat-side sling which minimizes damage to fins, scales and mucus. Coho (n = 123) were captured in Barkley Sound, BC, transported to a field lab and monitored in marine tanks. Survival was not related to landing treatment, but injuries nonetheless had a strong effect on survival. We only observed one mortality at three days but mortality was 18% at 14 days. Coho with damage to scales and mucus, caused by either the landing net, or the fishing line wrapping around their body during the fight, had particularly high mortality (25%) compared to those with no physical damage (0%). Like with the telemetry results, more damaged fish had much higher mortality than good conditioned fish. The lower mortalities in general in the holding study may reflect the better initial condition of captured fish. Additionally, as fish became more mature later in the holding study, females exhibited higher mortality (22%) than males (13%), the first evidence of female-biased mortality of salmon in the marine environment. The telemetry study suggested that large hooks may eye damage leading to high levels of mortality, so in 2025 we will examine the effects of hook size in a holding study.

Keywords: Pacific salmon, catch-and-release, post-release mortality, acoustic telemetry, holding study, best practices

A best catch approach to transform data-poor recreational fisheries

Presenter: Benjamin Jones - Project Seagrass
Co-authors: Costa S, Santos R, James WR, Adams A, Rehage JS
Email: ben@projectseagrass.org
Presentation type: Oral presentation

By harnessing local ecological knowledge through structured surveys, a ‘best catch’ provides a cost-effective, standardized way to generate robust, management-relevant data in data-poor systems—enabling informed conservation and policy decisions where population estimates are absent and traditional stock assessments are not feasible. A Best Catch Assessment leverages local angler and fishing guide knowledge approachs in a standardized, quantitative protocol to assess the status and trends of flats fisheries. The approach involves anglers recounting their most successful catches over time, and emphasizes diverse respondent sampling, and community validation through workshops. The approach was applied to bonefish in South Florida to reconstruct a 60-year trajectory of population trends (via “shots” at bonefish) and fish size across regions. Findings revealed that bonefish abundance peaked in the mid-1980s, experienced a significant decline through 2010, and has shown signs of steady recovery since—though the population now appears dominated by smaller individuals. Overall, this standardized and quantitative assessment approach effectively integrates local ecological knowledge into fisheries monitoring, ensuring robust, inclusive, and data-driven management decisions for data-poor fisheries, including the flats fisheries.

Keywords: Data-poor, monitoring, local knowledge, angler knowledge

DRAFT

Tides of change: Anglers at the frontline of estuary monitoring

Presenter: Sam Jones - Angling Trust
Co-authors:
Email: sam.jones@anglingtrust.net
Presentation type: Oral presentation

Estuaries provide a range of ecosystem services such as flood protection, carbon sequestration, nursery habitat for commercially and recreationally important species, and acts as culturally significant areas for anglers and the wider public. Despite their importance, estuarine water quality is poorly understood, largely due to the complexities involved in monitoring these dynamic environments. With over 81% of England's estuaries not meeting the Water Framework Directive standards for good water quality, the need to advocate for cleaner, healthier environments has never been more urgent. To address these challenges and engage recreational fishers in active stewardship, the Angling Trust has developed the Estuary Water Quality Monitoring Network, a citizen science initiative that empowers UK anglers to collect standardized water quality data across estuarine sites.

Anglers are uniquely placed to monitor their local estuaries. Their detailed knowledge of local tides and conditions is necessary for safe sampling within these dynamic environments. The frequency in which they visit estuaries allows for a far more comprehensive view of water quality trends than statutory monitoring. This project brings together NGOs, local angling clubs, and policy stakeholders to co-produce monitoring protocols, share data in real-time, and link water quality trends with governmental water quality standards. By volunteering, anglers are helping to collect vital data to drive positive environmental change—while reshaping public perception of anglers as active stewards of the environment.

Early results show strong angler engagement and high-quality datasets that complement official monitoring schemes, helping identify pollution hotspots and seasonal variation in estuarine conditions. This presentation will explore lessons learned from the pilot phase, discuss pathways for scaling and replication, and reflect on the unique role anglers play in protecting our coastal ecosystems.

Keywords: Water quality, citizen science, recreational fishermen, angler engagement, estuaries, coastal ecosystems, water quality monitoring

African tigerfish (*Hydrocynus vittatus*) movement in Lake Jozini: insights from a catch-mark-recapture study

Presenter: Angelica Kaiser-Reichel - University of Mpumalanga/ Charles Sturt University
Co-authors: Matthew Burnett, Adam Wyness, Jonathan Boulton, Gordon O'Brien
Email: angelica97.ak@gmail.com
Presentation type: Oral presentation

Tigerfish (*Hydrocynus vittatus*) have high ecological, economic, and social value. Tigerfish are also important indicators of habitat change, responding sensitively to environmental pressures. Despite their importance, the movement ecology of many populations of tigerfish is poorly understood. This gap in knowledge is problematic, as understanding fish migration patterns, habitat use, and behaviour is important for the effective management and conservation of freshwater ecosystems. Capture-mark-recapture (CMR) using external tags remains one of the most widely used methods for studying fish movement, growth, and population dynamics. However, CMR studies involving African tigerfish in southern Africa have generally had limited success. Tigerfish do not generally retain tags well, but limited opportunities for good retention still afford research opportunities. This study aimed to investigate the movement patterns and population size of H. vittatus in Lake Jozini and to evaluate the effectiveness of CMR as a monitoring tool for movement dynamics in this lake. The CMR study was successfully implemented at Lake Jozini, with 188 individuals tagged and ten recaptures reported over three years. The recapture rate was 5.32%, highlighting the role of recreational anglers in supporting citizen science initiatives for the conservation of key species like tigerfish. Tigerfish movement was variable, with some individuals indicating site fidelity, while others travelled 27km from mark to recapture point. The average time between marking and recapturing was 416 days, with the shortest duration being 10 days and the longest being 1059 days. The tigerfish population estimates indicate a decline in the tigerfish population in Lake Jozini. The low recapture rate and observed decline in the population size during a relatively productive period are concerning and warrant further investigation into potential causes, long-term population dynamics and population management.

Keywords: Catch mark recapture, citizen science, feeding behaviour, population size, tigerfish ecology

Evaluation of the Japanese eel (*Anguilla japonica*) and Fresh water fish habitats in Japan (Kyushu) using eDNA analysis

Presenter: Satoshi Kameyama - National Institute for Environmental Studies-JAPAN
Co-authors: Towa ONDA (Tohoku University), Hiroaki MURAKAMI (Tohoku University), Masaru TANAKA (Moune Institute for Forest-Sato-Sea Studies)
Email: kame@nies.go.jp
Presentation type: Oral presentation

The Japanese eel (*Anguilla japonica*) has traditionally been an important food in Japan, likewise it's a representative target for recreational fishing. Since the 1970s, the Japanese eel stocks have decreased drastically, resulting in glass eels and eel-based food becoming expensive. In this study, we conducted surveys of Japanese eel and Fresh water fish using eDNA in western Kyushu of Japan. The study area is characterized by the diverse coastal environments—tidal flats, highly-enclosed bays, and open ocean areas—within a compact geographic region.

The objectives of this study were: (1) to assess the presence and distribution of Japanese Eel and Fresh water fish; and (2) to characterize important water quality parameters. We conducted the survey from April 18 to 21 in 2025(33 sites across 32 watersheds). For eDNA sampling, 300 mL of river water was filtered on-site using a 50 mL syringe and a Sterivex filter unit (0.45 μm). After filtration, we added 1.6 mL of RNAlater to sample and stored under refrigerated conditions. eDNA was analyzed at Tohoku University, where the abundance of Japanese eel was quantified as copy number. Simultaneously, we measured river water quality using a CTD profiler.

As a result, Japanese Eel was detected at most of the surveyed sites, particularly high eDNA observed around the Shimabara Peninsula. Notably, Japanese eel eDNA was also detected in the Honmyō River (inside the Isahaya levee). However, adult Japanese eels are regularly released into the Honmyō River, and the surrounding area have some eel restaurants and fish markets. Therefore, the positive eDNA results are possibly affected by anthropogenic eDNA input. Kyushu is considered one of the most important regions in terms of glass eel arrival and habitat quality. Thus, maintaining ecological and socio-cultural connectivity is also crucial for the continuation of traditional eel fisheries, eel aquaculture, and food culture.

Keywords: Japanese eel, eel fishing, environmental DNA, habitat monitoring, Isahata, GIS

Spawning migration of North Sea Houting in the River Overijsselse Vecht

Presenter: Jan Kamman - Sportvisserij Nederland
Co-authors:
Email: kamman@sportvisserijnederland.nl
Presentation type: Oral presentation

North Sea Houting (*Coregonus oxyrinchus*) was extinct in the Netherlands. From 1996 to 2006 a reintroduction program was carried out in the river Rhine. Reintroduction efforts were stopped after 2006, when a large part of houtings caught in Lake IJsselmeer turned out to originate from natural reproduction. Since then, the number of houtings observed in the Netherlands has continued to increase. Research with tagged adults and larvae revealed that houting probably spawns in the IJssel, a Rhine branch that flows into Lake IJsselmeer. In 2018, during research in the river Overijsselse Vecht (Swimway Vecht), more than 150 houtings were unexpectedly caught during their spawning migration. To follow their annual migration, we tagged a total of 61 houtings in 2019 and 2020 with an acoustic transmitter (Innovasea V13, estimated tag life: 1105 days). A telemetry network of 57 hydrophones was installed for project Swimway Vecht, ranging from the upper reaches of the river in Germany past the mouth up to and including lake Ketelmeer. These hydrophones were located below and above each weir in the river and in the largest tributary waters. Several houtings migrated annually towards the Vecht during their spawning period, which occurred in the first half of December. In the following years, a few houtings were detected at the fish passage of the first weir, but only one houting briefly managed to pass through the fish passage at higher discharge. In December 2023 the river Vecht had extremely high levels of discharge. This record discharge coincided with the spawning migration of the houting. All three houting detected at the first weir passed. Conclusions are that North Sea houting is homing to spawn in the Overijsselse Vecht and that at normal discharge the river is still largely inaccessible for the species, only at extreme discharge are the weirs passable.

Keywords: North Sea Houting, reintroduction, acoustic telemetry, fish migration

DRAFT

Fish for Connection (in Dutch: Vissen voor Verbinding)

Presenter: Jan Kamman - Sportvisserij Nederland
Co-authors:
Email: kamman@sportvisserijnederland.nl
Presentation type: Oral presentation

A well-functioning ecosystem in the Wadden Sea, Lake Lauwersmeer and its tributaries requires good connections between the sea and connecting inland waters. Currently, migratory fish populations in these waters are not doing well. Due to the construction of dams, locks, weirs and canalization of streams, the water systems have changed significantly, connectivity between the different areas is reduced and the ecological quality has declined. This has a major impact on fish stocks and populations of birds and mammals, among others.

The project Vissen voor Verbinding tries to restore this system by making connections: between the headwater streams and the estuary by constructing and improving habitat and fish passages; between improvement of angling possibilities and economic gains in the area; and finally between authorities, knowledge institutes, nature organizations and angling organizations. Monitoring that took place in this project recorded the ecological qualities of the various waters in the project area and the effects of restoration measures that have been taken. The sea trout (Salmo trutta) was chosen as our flagship species. Sea trout is a demanding species when it comes to growing and spawning habitat, water quality and inter-habitat connectivity of the system. In addition, sea trout is a much sought-after catch for anglers. Anglers can target this species and associated expenditures will benefit the local economy. The sea trout is therefore our leading species, but other fish species will also benefit from all measures taken. Vissen voor Verbinding is a unique collaboration between local governments, sport fishing organizations, nature organizations and a university of applied sciences. In this presentation, an overview is given of the different activities and the results of the monitoring. Which includes monitoring of sport fishing use, through counts from an aircraft.

Keywords: Sea trout, Ide, fish migration, habitat, monitoring, acoustic telemetry, eDNA, sport fishing, promotion

Building capacity in the rock-based fishing community through a fisher-led rescue programme

Presenter: Mick Kearney - Drowning Prevention Auckland
Co-authors:
Email: mick.kearney@dpanz.org.nz
Presentation type: Oral presentation

Rock-based fishing is a popular but high-risk activity in New Zealand, particularly along exposed coastlines where wave action, slippery rock platforms, and sudden weather changes create hazardous conditions. Drowning incidents are disproportionately represented within this group, often occurring in locations with no immediate lifeguard or emergency service coverage. Preliminary research in New Zealand indicates that nearly one-quarter of surveyed rock-based fishers have personally rescued another fisher who unintentionally entered the water, highlighting both the frequency of such incidents and the critical role of bystander intervention.

This project seeks to build capacity within the rock-based fishing community through the development of a Rock-Based Fishers Rescue Course. The course will be designed by integrating proven water safety practices with the lived experience and technical expertise of competent, long-term fishers. It will focus on equipping participants with the knowledge, skills, and confidence to safely perform bystander rescues, including the effective use of flotation devices, throw ropes, and safe approach strategies in high-energy coastal environments.

By leveraging community knowledge and fostering peer-to-peer learning, the programme will not only enhance individual rescue capability but also strengthen collective safety culture within the fishing community. The initiative aligns with principles of community-led safety, encouraging local ownership and sustainable skill development. Ultimately, the Rock-Based Fishers Rescue Course aims to reduce drowning risk, improve rescue outcomes, and position experienced fishers as leaders in promoting safe fishing practices among their peers.

Keywords: Fisher-led rescue programme, bystander rescue

DRAFT

The spatial-ecology of an endemic shark in the South African marine shored-based recreational fishery

Presenter: Reagan Kieck - Rhodes University
Co-authors: A-R Childs, M Potts, T Murray, M Parkinson, A Winkler
Email: rnkieck@gmail.com
Presentation type: Oral presentation

The global decline of elasmobranch populations, driven by overfishing and climate change, poses a significant threat to marine ecosystems. Conservation becomes a priority if ecosystems are to remain balanced. Among these species, the spotted gully shark, *Triakis megalopterus*, a coastal endemic to southern Africa, remains understudied—particularly in its juvenile life stage. This study aimed to assess the spatial and temporal movement dynamics of juvenile *T. megalopterus* within a predicted hotspot near Port Alfred, Eastern Cape, South Africa. Fifteen juveniles were tagged with acoustic transmitters and tracked over a 10-month period using the Port Alfred Array (PAA), an array consisting of 18 acoustic receivers deployed in the inshore environment between 10 and 40 m in depth. Eight sharks were detected 2757 times, showing low overall residency to the PAA (residency index <0.04), with higher detection frequencies on inshore receivers located around shallow reefs (<15 m depth). Four individuals displayed distinct movement patterns, including longshore and inshore-offshore connectivity, with one individual traveling 80 km westwards to Algoa Bay, and another potentially exhibiting movement characteristic of predation. Results suggest a strong preference by juveniles for shallow nearshore reef habitats, which may fall outside current array detection ranges. These findings highlight the need for expanded inshore acoustic monitoring and extended tracking periods. Moreover, tagging adult individuals within the same region is recommended to assess ontogenetic shifts in movement behaviour. This study provides novel insights into the residency of juvenile *T. megalopterus*, representing a critical step towards informed conservation and management strategies for this species along the southern African coast.

Keywords: Acoustic telemetry, home range, Eastern Cape, exposed coast

DRAFT

Global recreational fisheries management school - an introduction

Presenter: Thomas Klefoth - Hochschule Bremen
Co-authors: Christian Skov
Email: thomas.klefoth@hs-bremen.de
Presentation type: Oral presentation

The idea of the online school in recreational fisheries management and science is to inspire and recruit future managers and scientists within the field of recreational fisheries. The course is based on a set of specific learning objectives (ILOs), i.e., elements/topics that we think are central for understanding recreational fisheries management. For example, topics include biological impacts and benefits from recreational fisheries, the role of human dimensions, appropriate management tools and their methods as well as case studies and career statements. The structure of the course is a portfolio of recorded lectures by experts (or soon-to-be-experts) that cover the different learning objectives and topics. Each lecture comes together with a set of multiple-choice questions, a few suggested readings and maybe a small assignment. All the lectures are stored in a repository on an electronic platform that teachers around the globe can get access to. Teachers can cherry pick from lectures or incorporate all of them into their teaching. The target audience of the school are students (B.Sc., M.Sc., Ph.D.), who are mostly encountering the topics of recreational fisheries management for the first time. Each online lecture lasts approximately 20-25 minutes. The school so far involves more than 40 experts, and about 100 lectures and we are still interested in welcoming new experts to our portfolio. The electronic platform has been established already. Here we present the current status of the school, the electronic platform and our thoughts on how to implement it on a global scale.

Keywords: Teaching, education, online module

Comparison of natural and artificial maggots as bait in a coarse fishery

Presenter: Thomas Klefoth - Hochschule Bremen
Co-authors: Max Jankovic, Simon Halt, Matthias Emmrich
Email: thomas.klefoth@hs-bremen.de
Presentation type: Oral presentation

Artificial lures that mimic natural fish are well established in recreational fisheries, particularly for targeting predatory species. By contrast, the use of artificial imitations of invertebrates, such as maggots, in passive coarse fishing has attracted little attention and has rarely been investigated. This study compared catch rates and hooking locations between natural live maggots and artificial plastic maggots using standardized gear and methods in a freshwater course fishery dominated by invasive round gobies (*Neogobius melanostomus*). Angling took place on 24 sampling days with two fishing rods used simultaneously in eight one-hour intervals per day at one out of six randomly selected adjacent fishing spots. Chi-square tests were used to compare hooking depth, categorized in three levels, and selectivity of natural and artificial maggot. The size of the caught fish and catch rates (expressed as number per unit effort - NPUE) were compared using ANOVA. A total of 1377 individual fish were caught, of which 1092 (79.3%) were round gobies. Natural bait led to deeper hooking across all species caught. Artificial bait exhibited greater specificity for round gobies and resulted in slightly larger goby sizes. The mean (±SD) NPUE of natural bait (4.69 ± 1.36 fish / h) was almost twice as high as that of artificial baits (2.48 ± 0.74 fish / h). This study is one of the first investigating potential substitutions of natural bait in course angling and provides insights for sampling techniques specifically targeting invasive round gobies with reduced bycatch of native species.

Keywords: Round goby, bait substitution, catch rate, hooking depth

DRAFT

Spatial connectivity of an important marine-shore-based fishery species assessed using acoustic telemetry

Presenter: Thomas Knight - Rhodes University
Co-authors:
Email: thomasknight2000@gmail.com
Presentation type: Oral presentation

The Dusky kob (*Argyrosomus japonicus*) is the most targeted species in South Africa's marine shore-based fishery (MSBF), which includes recreational (SBR) and small-scale (SBSS) subsectors. The species is classified as collapsed, largely due to its vulnerability to exploitation, including late maturity, slow growth, and predictable behaviour. A. japonicus plays a critical ecological and socioeconomic role in coastal fisheries, and its decline affects both biodiversity and community livelihoods. Improved spatial protection strategies, such as catch-and-release (C&R) zones, may support conservation efforts by offering refuge to vulnerable individuals, enhancing spawning success, and aiding population recovery. However, the success of such measures hinges on understanding species-specific spatial ecology — including habitat connectivity, home range fidelity, and fine-scale movement patterns. To address this, forty *A. japonicus* individuals were captured, tagged and released at four different sites across the Southern African Coastline, namely, the Breede Estuary, De Hoop Marine Protected Area (MPA), Addo Elephant Park MPA and between Port Alfred and Great Fish River Mouth. Initial analyses from the Breede Estuary and De Hoop MPA show that fish tend to remain near their tagging site, suggesting that these areas reflect core habitat. In the Breede Estuary, the middle (47.63%) and upper (46.71%) reaches reflect high usage and links of connectivity, compared to the lower reaches. Fish tagged in the De Hoop MPA spent more time in the surrounding waters than within the MPA itself. Early findings emphasize the importance of marine-estuarine connectivity and suggest that protection should extend beyond MPA boundaries. Continued research into the spatial behaviour of *A. japonicus* is essential to inform science-based management and ensure the long-term resilience of both the species and the communities that rely on them.

Keywords: MSBF, catch-and-release zones, compliance, movement behaviour, *Argyrosomus japonicus*

Validation of a style of participation self-classification measure to recreational spotted seatrout anglers in Texas

Presenter: Gerard Kyle - Texas A&M University
Co-authors: Daniel Pilgreen, Bill Smith
Email: gkyle@tamu.edu
Presentation type: Oral presentation

Recreation specialization has been consistently used to understand the heterogeneity of recreational anglers' preferences and needs. Research by Smith and colleagues (2010, 2012) characterized angling guides' style of participation by context-specific attributes such as tackle type, bait type, fishing technique, casting tactic, water depth, and fish species. Further, previous research has developed and used a style of participation self-classification measure to accurately classify fishing guides based on these attributes (Smith et al., 2023). Self-classification measures offer natural resource managers a parsimonious and user-friendly technique to segment anglers that incorporates multiple dimensions of participation style. The purpose of this research is to further Smith et al.'s (2023) self-classification of the style of participation measure to a population that is diverse in specialization, inshore saltwater recreational anglers, and explore the variability of fisheries management preferences across styles of participation. Data were collected from 846 licensed anglers in the state of Texas. The sample was comprised of both recreational anglers (N = 491) and fishing guides (N = 355). Results displayed significant heterogeneity in the style of participation of both guides and recreational anglers. Findings support the use of Smith et al.'s (2023) style of participation self-classification measure in populations that exhibit diverse levels of specialization. Further, they identify significant differences in preferences for slot limit regulations across styles of participation. While prescribing slot limit regulations to meet the needs of diverse constituents is a difficult task, the self-classification measure provides an opportunity for fishery managers to leverage participation styles to find common management preferences across their users.

Keywords: Specialization, style of participation, self classification measure

DRAFT

How long are freshwater sportfish behaviourally impaired following a catch-and-release event?

Presenter: Luc LaRochelle - Carleton University
Co-authors: Danylchuk, AJ and Cooke, SJ
Email: larochelle96@gmail.com
Presentation type: Oral presentation

Catch-and-release angling is an important tool used to conserve fisheries. This practice works on the assumption that released fish survive the interaction with minimal sub-lethal impacts. Captured fish can experience physiological changes and deviations in behaviour once released. Assessing the behaviour of fish in the wild provides a good indicator on the welfare status of the animal and can be used to create proper fish handling practices for anglers. Yet, there is a lack of evidence on how long wild fish are behaviourally impaired following capture. Recently, biologgers have been used to assess the fine-scale post-release behaviour of fish to create best fish handling practices for anglers. Biologgers can be quickly attached (< 30s) to fish using Velcro straps or pop-off biologging packages and can remain attached to fish for 5 minutes, and up to 20 days. To determine how long it takes fish to return to normal behaviour, or recover from the capture event, we captured and internally tagged two sportfish species of fish with acoustic transmitters. Those same individuals were recaptured > 30 days later and affixed with a biologging package. Using a whole-lake positioning system with the combination of biologger data, we were able to assess several different endpoints (e.g., depth, home range, movement rate) to identify when fish were recovered. Recovery time differed between species and endpoints assessed. These results suggest that fish can be behaviourally impaired for several days after capture and this impairment may have fitness implications in terms of energetic allocation and acquisition (e.g., ability to feed). Finally, behaviour as a welfare indicator is sensitive and should be considered as an assessment tool more often for creating best fish handling practices.

Keywords: Catch-and-release, post-release, behaviour, freshwater, biologging, biotelemetry

DRAFT

Capture probability and effects of bait/lure types on individual learning behaviour in an unexploited population of northern pike

Presenter: Jorrit Lucas - LAZBW Fisheries Research Station
Co-authors: Ros A, Geist J, Brinker A
Email: jorrit.lucas@lazbw.bwl.de
Presentation type: Oral presentation

Many predatory fish species are highly valued as trophy fish and thus subject to significant recreational fishing pressures. Their vulnerability to capture can be affected by their physiological condition, behavioural type, and life history traits. Fish can learn from capture events, whether they are released or escape. Given the wide variety of recreational fishing baits and lures available today, an important question is whether different types of bait and lures affect bite behaviour and learning differently. Thus, this study investigated the attack behaviour elicited by different baits and lures, as well as learning following capture events, in a natural population of northern pike. Over three years, an unexploited pike population was exposed to angling involving a standardized number of casts with three bait/lure types. They were: a dead baitfish; a soft plastic lure in natural colours; and a soft plastic lure in bright colours. Two sessions of six angling days each, with two participating anglers per session, were conducted per year, one in the spring and one in the fall. A total of 22.213 casts were distributed among the bait and lure types, 238 attacks were observed, and 69 pike were caught. 30 % of pike were caught at least twice. After the final angling session each fall, electrofishing was conducted to gather additional information about the pike population (electrofishing sample: n = 134). Each pike was photographed, safely released, and its unique skin pattern stored in a database for identification purposes. This enabled the estimation of the likelihood of recapturing an individual within the study period. Capture rate decreased within angling sessions, indicating a clear learning effect due to fishing pressure, this seemed to be reset between seasonal sessions. The results, which will be presented, should aid in the sustainable management of future recreational fisheries of predatory species worldwide.

Keywords: Bait/lure avoidance, angling, apex predator, behavioural types, foraging behaviour

DRAFT

Fish habitat associations in the marine bay region of the Knysna Estuary

Presenter: Lutholwethu Mabaleka - Rhodes University
Co-authors: James NC, Nodo P, Childs A-R, Smith KM
Email: l.mabaleka@saiab.nrf.ac.za
Presentation type: Oral presentation

Shallow littoral marine and estuarine habitats are important nursery areas for juvenile marine fish. Their nursery function is associated with the availability of food, reduced predation risks and their structural complexity. Despite the ecological importance of estuarine habitats, they are amongst the most threatened habitats globally. For example, the Knysna Estuary faces chronic sewerage pollution leading to increased potential algal blooms. Moreover, the invasive red-algae *Asparagopsis taxiformis* is now widely distributed in the estuary, occurring within the seagrass beds yet its nursery function is unknown. The marine bay and lagoon regions of the Knysna Estuary have been identified as conservation priority areas for juvenile sparids caught in the shore-based line-fishery. However, fine-scale habitat specific fish assemblages and hotspots within these regions are unknown. This study seeks to examine the nature of habitat usage by juvenile fish in the marine bay and lagoon regions of the Knysna Estuary by assessing habitat structure and habitat specific fish assemblages. A total of 5724 individuals (14 families, 30 fish species) were caught in the shallow waters (<1 m) of the Knysna Estuary in seagrass, salt marsh, sand and macroalgae using a small mesh seine net in October 2024, February 2025 and June 2025. Preliminary analysis shows that total fish abundance does not differ by habitat type ($p = 0.07$), highlighting that the overall abundance of fish is not determined by habitat type. However, species-specific analysis shows that vegetation-associated species are more abundant in vegetated sites. *Rhabdosargus holubi* is associated with seagrass *Zostera capensis* with a preference for long dense seagrass. The herbivorous *Sarpa salpa* is abundant in sites with *A. taxiformis* and *Diplodus capensis* was abundant in *Z. capensis* and *A. taxiformis*. These findings highlight that, conserving a mosaic of habitats within a protected area is important for juvenile fishes.

Keywords: Estuarine, conservation, nursery areas, juvenile fish

Using volunteer anglers to help monitor the effectiveness of South Africa's coastal marine protected areas (MPAs)

Presenter: Bruce Mann - Department of Ichthyology and Fisheries Science, Rhodes University, Makhanda
Co-authors: Swart L, Attwood CG, Potts WM, Spencer K, Bullock K
Email: bruce@ori.org.za
Presentation type: Oral presentation

Starting in 1985 in the De Hoop MPA, the use of volunteer anglers (citizen scientists) has proved to be an effective method of monitoring the relative abundance and movement patterns of coastal fishes in MPAs. Seven MPA monitoring projects have been established including Table Mountain National Park, De Hoop MPA, Goukamma MPA, Tsitsikamma MPA, Dwesa-Cwebe MPA, Pondoland MPA and iSimangaliso MPA. All these long-term projects (>10 years duration) used trained anglers to catch, measure, tag and release target species using best catch-and-release practices, with tags supplied by the Oceanographic Research Institute's Cooperative Fish Tagging Project. The results are impressive. Cumulatively, over 933 field trips (2680 sampling days) have been conducted involving 796 anglers, 179464 fish have been caught and measured, 104831 fish have been tagged, and 9049 (8.6%) have been recaptured. This research has contributed to the publication of at least 83 peer-reviewed scientific papers over the past 40 years, some of which have shown conclusively how effective no-take MPAs are in providing protection for a greater abundance and biomass of important coastal fish species. Evidence of spill-over from these MPAs has also been shown in several cases, highlighting benefits to adjacent exploited areas. Importantly, the experiences of many of the anglers participating in these projects have made them strong advocates for MPAs and improving angler catch-and-release practices.

Keywords: Citizen science, catch-and-release, monitoring, tagging

DRAFT

“Data baby, data!”: Inclusion of recreational data in data-limited stock assessments

Presenter: Johanna Marcussen - Institute of Marine Research / University of Agder
Co-authors: Zimmermann, F
Email: johanna.bjaanes.marcussen@hi.no
Presentation type: Oral presentation

What should you do when you know there is substantial recreational harvest, but only limited or sparse data to quantify it? For data-limited stocks, surplus production models are one of the applicable and thus recommended assessment methods—models that require estimates of total removals, including both commercial and recreational catches. Ignoring the recreational catch component risks biasing the assessment, even if the available data are imperfect. In this presentation, we explore three case studies from Norway—Nephrops, Atlantic halibut, and European lobster—to demonstrate practical, alternative approaches for incorporating recreational catch data into stock assessments. Each case highlights different strategies for estimating recreational removals under data-limited conditions, showcasing how assumptions, auxiliary data and few years of survey data can be leveraged to build more robust assessments. Rather than omitting recreational catches due to uncertainty, these approaches explicitly include them, accounting for the associated uncertainty to approximate true total removals. Our findings underscore the importance of early integration of recreational harvest data into assessment models—not only to improve the accuracy of current evaluations but also to future-proof assessment frameworks considering growing recreational fisheries. Recognising and quantifying this sector, even with limitations, is a necessary step toward holistic and sustainable fisheries management.

Keywords: Data-limited, stock assessment, recreational harvest, Nephrops, European lobster, Atlantic halibut

DRAFT

"Woops, I lost it”: Gear Loss in the Norwegian Recreational Lobster Fishery

Presenter: Johanna Marcussen - Institute of Marine Research / University of Agder
Co-authors: Thorbjørnsen SH, Kleiven AR
Email: johanna.bjaanes.marcussen@hi.no
Presentation type: Oral presentation

Lost and abandoned fishing gear, particularly passive gear such as gillnet, fyke-nets and traps, contributes to marine litter and ghost fishing—posing ecological, economic, and navigational risks. In Norway, European lobster (*Homarus gammarus*) fishing is carried out by both recreational and commercial fishers. Recreational fishers account for the vast majority of participants, making gear loss from this group a significant concern. Despite regulations limiting the number of traps (10 for recreational, 100 for commercial), the cumulative pressure from recreational activity is substantial and difficult to monitor effectively.

To estimate trap loss and understand contributing factors, an annual digital survey is conducted among a stratified random sample of registered lobster fishers in Norway. This study aims to estimate total trap loss in the lobster fishery and identify spatial, temporal, and behavioural factors associated with gear loss. Despite stricter gear limits for recreational fishers, their large numbers (>95% of participants) result in the majority of lost traps originating from this group. In 2024, we estimated that mean loss from recreational fishers was 15,671 traps while commercial fishers lost 548 traps, a stable and slightly decreasing trend since 2017. Self-reported loss causes include theft, weather, and propeller damage—where the latter highlights ongoing spatial conflicts between fishing and vessel traffic. Longer fishing seasons were positively associated with trap loss. Recreational fishers displayed varied knowledge and practices, and their awareness of good practice (“Teinevett”) was modest but increasing.

This study underscores the importance of targeted outreach, improved reporting, and adaptive management strategies to reduce ghost fishing and promote sustainable practices, particularly within the heterogeneous recreational sector.

Keywords: Ghost fishing, marine litter, recreational fishing, European lobster, lost pots

"Beyond the catch”: Lessons from 11 Years of linefish monitoring in a rural MPA

Presenter: Sisanda Mayekiso - Eastern Cape Parks and Tourism Agency
Co-authors: Bullock K, Wood A, Dames VA, Venter JA, Greeff, J
Email: Sisanda.Mayekiso@ecpta.co.za
Presentation type: Poster presentation

The Dwesa-Cwebe Marine Protected Area (MPA) serves as a management tool for supporting the recovery of overexploited species, while balancing the needs of community and recreational fishers. From 2009 to 2023, the Eastern Cape Parks and Tourism Agency (ECPTA) implemented a long-term linefish monitoring program to assess species composition, relative abundance, size structure, and movement patterns across controlled and no-take zones. Understanding how effective the MPA’s zonation—no-take versus partially protected areas (PPAs)—is, remains important for ecological recovery. A standardised catch-and-release method was used during seasonal eight-hour fishing days, with volunteer anglers using various bait types. Over the 11-year period, 7241 fish representing 43 species were recorded. Many of these were of conservation concern: 39.5% were endemic, 29.5% threatened, and 27.3% overexploited or declining. Of the 3,963 fish tagged, only 3.2% were recaptured, with most (62%) showing no movement, indicating small home ranges. Localised differences were observed in species diversity, size frequency, and catch per unit effort (CPUE) between Dwesa and Cwebe. In Dwesa’s controlled zones, fish were smaller and CPUE lower than in no-take zones. This was especially true for long-lived, slow-growing species, highlighting their vulnerability to exploitation. So, what are the challenges for this MPA? Scientific data alone does not measure success. For MPAs like Dwesa-Cwebe to be effective, investments in education, awareness, and consistent enforcement are just as important. Understanding zonation rules and fish status must become common knowledge. As human pressures grow, combining social and ecological science—and using tools like stereo-BRUVs—can better guide conservation.

Keywords: Marine Protected Areas fish diversity CPUE Dwesa Cwebe MPA

DRAFT

Angling tourism and dam-affected rural communities: a case study from the Lesotho Highlands Water Project Area, southern Africa

Presenter: James McCafferty - Rhodes University; Advance Africa Management Services
Co-authors: Bova CS, Potts WM, Winkler AC, Farthing MW, Pringle BA, Wright RB, Hecht T
Email: jimm@advanceafrica.co.za
Presentation type: Oral presentation

Large dam projects in the developing world support recreational fisheries that attract tourists from around the world. Given the often-reported negative impacts of large dams on local livelihoods, foreign fishing tourism (FFT) has been identified as a potential mechanism for generating socio-economic benefits for dam-affected communities. However, limited information on the benefits and risks of FFT in these settings constrains effective development and decision-making. We examined the outcomes of FFT development in a dam-affected area using a case study of a catch-and-release operation in the Lesotho Highlands Water Project area. A mixed-methods approach was used to understand fishery characteristics, economic and social impacts, stakeholder perceptions, access-related conflicts, and potential to support local development. The results showed that FFT can contribute to rural economies and livelihood diversification where structured approaches to community engagement and local employment are in place. However, the study also highlights difficulties in benefit sharing and resource access, exacerbated by displacement-related grievances and mistrust of authorities. Addressing these challenges requires early stakeholder consultation, balanced local participation strategies that do not deter investment, structured capacity building, and innovative benefit-sharing mechanisms that extend opportunities beyond immediately proximate areas while maintaining the exclusivity that underpins economic viability. These insights may prove useful given the increasing number of large dams being developed in the Global South, their social consequences, and the urgent need to identify viable alternative livelihoods for affected communities.

Keywords: Foreign fishing tourism, large dam projects, Lesotho Highlands Water Project, dam-affected communities, socio-economic impacts, rural livelihoods, developing world

DRAFT

Assessing the health and survival of a dominant species in the South African marine shore- based fishery (MSBF), the blacktail seabream, *Diplodus capensis*, to catch and release

Presenter: Michael McKenzie - Rhodes University
Co-authors:
Email: mjmakenzie@gmail.com
Presentation type: Oral presentation

In South Africa, the recreational MSBF is the largest sector within the marine fisheries sector both economically and participatory. *Diplodus capensis* is one of the most targeted fisheries species due to its abundance and palatability. This study aimed to investigate the effects of catch and release (C&R) practices on the health and survival of *D. capensis*, addressing concerns over fish welfare post-release. There is an urgent need to understand and mitigate the impacts of recreational fishing practices to ensure the long-term health of marine ecosystems and organisms. One facet of recreational fishing pertains to C&R, both mandatory and voluntary. However, little is known about the impacts of C&R on fish health and mortality post release in the South African MSBF. This project focused on identifying the peak stress responses in *D. capensis* after experiencing a C&R event and to test the effects of air exposure and hook placement on the level of stress experienced by individuals after being caught, by monitoring individual blood glucose and blood lactate concentrations. To determine the effects of air exposure on fish peak physiological stress, the average air exposure fish experienced when being caught by public anglers was investigated through covert angler behaviour observations. Angler observations showed that angler behaviour in the Eastern Cape region is similar throughout public, estuarine and MSBF competitive anglers from three separate studies. A laboratory experiment was then conducted to determine the peak physiological stress responses in *D. capensis*. The peak physiological stress response was identified to be 59 minutes for blood lactate levels post C&R, and 65 minutes for blood glucose concentrations. Thereafter all the findings will be used to conduct a field experiment to test the short-term survival of *D. capensis* to a simulated catch and release event.

Keywords: Air exposure, angler behaviour, catch and release, marine, recreational fisheries, Sparidae

Omakala (My fish) – experiences with the recreational fishery mobile application

Presenter: Olin Mikko - Natural Resource Institute Finland
Co-authors: Kimmo Murto
Email: mikko.olin@luke.fi
Presentation type: Oral presentation

Recreational fishing produces large and growing fraction of the total fish catch worldwide. The catch of the recreational fishery, however, is hard to estimate and traditional methods e.g. postal enquiries suffer from nonresponse bias. Mobile applications are promising tool to collect detailed, on-line recreational fishery data. The Omakala (”Myfish”) implementation project is focused on developing, deploying, and maintaining the Omakala e-service including mobile applications for Android and iOS as well as web platform. This digital platform is planned to enhance the management and dissemination of fisheries data across Finland, with a fundamental target of serving the recreational fishing community including anglers as well as gillnet and trap users. The mobile application was published in June 2022 and nowadays has more than 26 000 users and data of ca. 65 000 fish individuals. Omakala forms an extensive, detailed, and up-to-date sample of recreational fishing in Finland. It produces diverse material for various research related to recreational fishing and fish stocks. The data can be validated by comparing it to national long-term postal query data on recreational fishery in Finland. The challenge is that the produced data is focused on males, city people and the most active fishing enthusiasts. The goal is to make Omakala more attractive to other groups as well.

Keywords:

DRAFT

Phenotypic variability in the aerobic scope of an exploited population of bronze bream, an important target of the recreational marine shored-based fishery

Presenter: Nonhle Mlotshwa - Rhodes University
Co-authors: A-R Childs, WM Potts, DM Kaplan
Email: mlotshwant@gmail.com
Presentation type: Oral presentation

The impacts of climate-mediated stressors such as temperature and dissolved oxygen (DO) have been known to influence the physiology and performance of marine fish. When fish are subjected to these stressors at levels outside their tolerance thresholds, this often leads to reduced growth, performance, biomass and diversity fluctuations. Exposure to prolonged periods of these stressors may, in the worst-case scenario, result in fish kills and accelerated ecosystem destabilization. This puts a strain in our marine resources, ultimately impacting the sustainability and persistence of fisheries due to the lack of goods and services provided by the marine environment. Fortunately, it is thought that in some fish populations there exist individuals with diverse physiological phenotypes that enhance the performance of fish populations, making them resilient to environmental perturbation. This study therefore seeks to assess the physiological capacities and phenotypic variation of an important coastal fishery species, the bronze bream (*Pachymetopon grande*) when subjected to thermal variability. This was achieved through the use of intermittent flow respirometry to measure the aerobic scope, hypoxia tolerance and performance phenotype *of P. grande* at three different test temperatures (10, 18 and 22 °C). It was found that within the sample *P. grande* population existed diverse performance phenotypes and that temperature had a significant effect on their aerobic scope of ($p < 0.05$). This species also displayed a decrease in its hypoxia tolerance, with increasing temperatures, highlighting the mismatch between oxygen supply and demand as temperatures increase. These results provide insight into some of the important physiological aspects required within fish populations to combat climate mediated perturbations and the role played by diverse physiological phenotypes in the persistence and survival of transgenerational populations in the Anthropocene

Keywords: Aerobic scope, hypoxia tolerance, physiological phenotypes, resilience, climate variability

Understanding prey means understanding predators: exploring the influence of temperature on a mullet species

Presenter: Dinah Mukhari - South African Institute for Aquatic Biodiversity

Co-authors: AR Childs, BA Ziko, MC Parkinson, TS Murray

Email: d.mukhari@saiab.nrf.ac.za
Presentation type: Oral presentation

Estuaries generally provide good fishing opportunities for various angling groups, where both smaller prey species and larger predatory species are targeted alike. In aquatic systems, predator distributions are assumed to reflect prey availability; however, prey movements themselves may be strongly constrained by abiotic conditions. In this study, the effect of temperature on the movement and habitat use of an estuary-associated prey species, *Mugil cephalus* was investigated using a multi-method approach, and the implications of these patterns on predator distribution are explored. Twenty one *M. cephalus* were tagged with acoustic transmitters and their movements were monitored for one year in Kowie Estuary, South Africa. The results revealed extensive estuary use, with high seasonal variation in movement patterns. Specifically, *M. cephalus* were absent in the upper reaches of the estuary when the estuary minimum winter temperature approached the experimentally determined lower thermal stress points (13.5 °C), despite the species being tolerance to a wide range of temperatures (CT_{min} = 3.2 °C; CT_{max} = 37.7 °C). Similarly, previous telemetry studies on Lichia amia a piscivorous fish in similar systems shown seasonal variation in area-use, i.e., downstream shift to lower reaches as temperatures decreased. *Mugil cephalus* access to the upper reaches of the estuary was markedly reduced during colder periods, suggesting that thermal constraints may act as a key abiotic filter structuring prey distribution, and this may indirectly influence predator distributions and consequently recreational fishing success. As climate variability intensifies, understanding how physiological constraints shape movement pathways will be critical for anticipating changes in habitat accessibility, catch variability and the management of estuarine fisheries.

Keywords: Estuaries, acoustic telemetry, thermal stress, habitat-use

Lending a helping hand: The role recreational fishers play in movement ecology research

Presenter: Taryn Murray - SAIAB
Co-authors: Parkinson M
Email: TS.Murray@saiab.nrf.ac.za
Presentation type: Oral presentation

The field of movement ecology has grown exponentially over the past two decades, with acoustic telemetry currently being the most popular research method. Due to its popularity, and as technology has developed, many studies have moved from small-scale localised arrays studying movement aspects like residency and site fidelity, to larger, countrywide arrays that can now monitor the largescale movements and migrations of multiple different species over hundreds to thousands of kilometres. In order to tag study species with acoustic transmitters, a helpful hand is often needed, especially for those species that are generally more time consuming and tricky to catch. Over the past 15 years, South Africa's Acoustic Tracking Array Platform, a network of acoustic receivers spread along 2300 km of the coastline, has been monitoring the movements and migrations of 56 recreationally important species, ranging from those dependent on estuaries as juveniles to Critically Endangered rays to reef-associated sparids to species of tourism importance to mobile shark species to predatory sharks. Recreational anglers, both competitive and social, have played a crucial role in the capture of at least half these species, highlighting the important link between these researchers and this group. This presentation will showcase some of the movement ecology work conducted over the past 15 years, especially in those studies where recreational anglers played a crucial part in the capture of the study species.

Keywords: Acoustic telemetry, citizen science

DRAFT

Recreational angling selectively removes high performance physiological phenotypes from fish populations

Presenter: Xolani Nabani - Rhodes University
Co-authors: LA Bailey, C Muller, A Childs, WM Potts
Email: nabanixp@gmail.com
Presentation type: Oral presentation

Anthropogenically-induced climate change, coupled with exploitation, places marine fish populations under pressure. Changes in sea surface temperature have a direct impact on the physiology of ectothermic organisms such as fish, potentially resulting in changes to population distribution, abundance, and demographics. In the face of climate change, the impacts of increasing temperature variability on fish populations may be exacerbated by exploitation. Understanding how the resilience of exploited populations is affected by climate change is critical for predicting how fish will respond in the future. The aim of this study was to augment our knowledge on the impact of exploitation and thermal variability on fishes by comparing the thermal physiology of the resident, reef-dwelling, *Chrysoblephus laticeps* in an exploited and unexploited site. The metabolic performance, in terms of standard metabolic rate (SMR), maximum metabolic rate (MMR) and aerobic scope (AS) of individual *C. laticeps* was estimated using a repeated-measures approach at 10 °C, 16 °C and 21 °C. The findings of this study showed that *C. laticeps* from the unexploited site maintained a significantly higher MMR and AS across all temperature treatments. In addition, the individual variability in physiological performance (AS) was higher in the unexploited site, with 42% of individuals categorised as high performance phenotypes, compared with none in the exploited site. These findings suggest that passive fishing may selectively remove high performance physiological phenotypes and in so doing, reduce the physiological performance of fish populations and their resilience to thermal change.

Keywords: Climate change, red roman, South Africa, inshore reefs, intermittent respirometry

DRAFT

Integrating ecological niche modelling and thermal performance to quantify the climate change response of *Diplodus capensis* in South Africa

Presenter: Samkele Ngcefa - Rhodes University
Co-authors:
Email: ngcefasiphosethu@gmail.com
Presentation type: Oral presentation

This study integrated ecological niche modelling (ENM) with thermal physiology experiments to understand the impact of climate change on *Diplodus capensis* (blacktail), a key species in South Africa's shore-based fishery. Occurrence records were sourced from the Rock and Surf Super Pro League (RASSPL), the Oceanographic Research Institute Conventional Fish Tagging Programme (ORI-CFTP), and the Global Biodiversity Information Facility (GBIF). These were combined with environmental data, including sea surface temperature (SST) and bathymetry from Copernicus and BIO-ORACLE, to model the species' distribution under current and projected climate conditions. Results from the ENM revealed that bathymetry and summer SST were the most influential predictors of *D. capensis* distribution. The model predicted that the strong cooling trends along the west coast may lead to range contraction at the species' western edge, while warming trends may lead to a range contraction along the tropical eastern distributional edge. The depth limitations of this species will restrict expansion into the deeper waters in areas that are warming rapidly. While the ENM did not predict significant changes in the warm temperate zone along the south coast, increased thermal variability is predicted for this zone. As such thermal physiological experiments were used to assess the likely energetic response of the fish to changing temperatures and thermal extremes (such as upwelling and cold spell events and marine heatwaves) in this zone. To do this, the standard and maximum metabolic rates of adult *D. capensis* were measured to calculate aerobic scope, along with critical oxygen concentration (O_2crit), across a temperature range of 10 to 24 °C. A biphasic relationship was observed for both aerobic scope and O_2crit, with performance peaking between 16 and 18 °C. Based on these findings, it is likely that the increasing thermal fluctuations predicted for the warm temperate zone will result in compromised metabolic performance and energy budgeting, ultimately affecting population productivity. These findings have important implications for fisheries management and adaptation. Declining catch rates for this species are expected predominantly along their western and eastern distributions, while long-term productivity is likely to decline along in the southern coast. This study highlights the potential role that physiological data can play in informing the responses of fish populations where ENMs may not detect subtle but ecologically meaningful shifts in species' responses to climate change.

Keywords: *Diplodus capensis*, ecological niche modelling, climate change, sea surface temperature, physiological responses, thermal performance

Provisioning fisheries: recognizing the fuzzy boundaries around commercial, subsistence, and recreational fisheries

Presenter: Vivian Nguyen - Carleton University
Co-authors: Leandro Castello, Katie Fiorella, Mahatub Khan Badhon, Jeanne Coffin-Schmitt, Emma Rice, Elizabeth Nyboer, Sarah Lavallee
Email: viviannguyen@cunet.carleton.ca
Presentation type: Oral presentation

Although sparse, increasing evidence suggests an overlooked population of fishers whose fishing motivations and outcomes overlap across commercial, subsistence and recreational fishing sectors, resulting in underrepresented groups of fishers in management and policy frameworks. These fishers, participate in what we tentatively frame as 'provisioning fisheries', a concept we propose to highlight the underrepresented values from fishing and fisheries across recreational, socio-cultural, psychological, economic, health, and nutritional dimensions. Provisioning fisheries often support underserved groups, provisioning fishers may engage in informal markets, and, that distinction exists from sport-oriented recreational fisheries in power, risks, access barriers, fishing motivation, attitudes, and practices including rule and advisory awareness. We propose that provisioning fisheries should be consciously considered - whether as part of existing fisheries structures or even its own sector to promote more sustainable and inclusive fisheries management. Overlooking this population of fishers may risk further marginalization, conflicts, contaminant exposure, and inaccurate stock estimates. Therefore, the talk discusses how provisioning fisheries may be a useful analytical category to explore the heterogeneity of fishers and their distinct needs, motivations, and behaviours using the Great Lakes as a case study.

Keywords: Recreational fishing, subsistence fishing, environmental justice, Great Lakes, food security and sovereignty, socio-cultural services

DRAFT

Engaging underrepresented fishers in the Great Lakes: a research and action agenda for provisioning fisheries

Presenter: Vivian Nguyen - Carleton University
Co-authors: Elizabeth Nyboer, Katie Fiorella, Jeanne Coffin-Schmitt, Emma Rice, Dan O'Keefe, Tamara Donnelly, Tea Falzata, Sarah Lavallee
Email: viviannguyen@cunet.carleton.ca
Presentation type: Oral presentation

The heterogeneity of users in recreational fisheries makes it extremely challenging to manage and is exacerbated by power dynamics and unequal capacity and voice among the various sub-groups of fishers, particularly in developed and Western countries. For instance, diverse values and beliefs on resources use has led to intra-sectoral conflict, stigma associated with different socio-demographic groups, and policies perceived to favour some groups over others. In this presentation, we discuss a research and action agenda that resulted from a summit that gathered fisheries professionals around the Laurentian Great Lakes. The summit goals were to: 1) identify research and policy gaps, needs and actions for underrepresented fishers; 2) identify examples of activities that are in conflict or benefit these fishers; and 3) discuss the pros and cons of formalizing this sub-group of fishers. The talk summarizes findings and discussions from this summit.

Keywords: Recreational fisher, subsistence fisher, urban fishing, immigrant fishers, socio-economic, socio-cultural, fisheries policy, fisheries management

DRAFT

Beyond the catch: Identifying and understanding the drivers of coastal fisheries in Massachusetts

Presenter: Tasha O'Hara - Coonamessett Farm Foundation/ Northeastern University
Co-authors: Luisa Garcia, Natalie Jennings, Brian Helmuth, PhD
Email: tohara@cfarm.org
Presentation type: Oral presentation

Saltwater fishing plays a vital role beyond leisure, contributing to food access, health, and both individual and community resilience. Our recent work in Massachusetts (USA) focuses on identifying the social drivers of coastal fisheries participation, with particular attention to often-overlooked recreational and subsistence fishing populations. Our study area encompasses racially and economically diverse coastal towns with strong historical ties to maritime industries. Through interviews and community engagement, we explore how individuals and families use coastal fishing not only for enjoyment but also to supplement household food stores, support mental and physical health, and share cultural and practical knowledge. Coastal fishing activities can function as low-cost health interventions, help build skills and community capacity, and foster strong connections to place.

Our research also considers how recreational fishing supports aging populations, offering accessible, meaningful engagement that promotes mobility, mental health, social connection, and food security. For many older adults, fishing represents a self-directed activity that enhances quality of life while sustaining ties to coastal heritage. Findings from this work underscore the need to evolve recreational fisheries frameworks to reflect their broader contributions to land-based community well-being. Key themes include infrastructure needs, safety, shoreline access, and the recognition of fishing as a means of nutritional support and wellness.

By grounding our study in the lived experiences of Massachusetts coastal residents, we contribute to a growing global understanding that resilient recreational fisheries require holistic, equity-focused approaches. This case study offers practical insights for fisheries managers, public health professionals, and policymakers working to align fisheries governance with broader goals related to community development, social equity, aging, and well-being.

Keywords: Subsistence, wellbeing, community fishing, elderly health, safety

DRAFT

Bridging data gaps: Social and cultural dimensions of shoreline recreational fishing in the Northeast U.S.

Presenter: Tasha O'Hara - Coonamessett Farm Foundation/Northeastern University
Co-authors: Luisa Garcia; Natalie Jennings; Brian Helmuth, PhD
Email: tohara@cfarm.org
Presentation type: Poster presentation

Recreational fishing is a vital part of life in many coastal Massachusetts towns, shaping community identity, supporting well-being, and sustaining local economies. This study explores the social, economic, and cultural factors that motivate individuals to fish, with attention to how these drivers vary across racial, age, and geographic groups. While commercial and vessel-based recreational fisheries are routinely surveyed, individual or small-group land-based fishers remain understudied in Massachusetts and the broader Northeast—representing a critical data gap in understanding coastal community needs. To address this, in-person surveys were conducted during key fishing seasons in 2024 and 2025 at publicly accessible shoreline sites across multiple towns. Interviewers engaged all willing participants and offered multiple language options to reduce communication barriers. The survey covered fishing frequency, motivations, social dynamics, and perceived benefits and challenges. Respondents shared diverse perspectives on why they fish, including connection to place, food access, intergenerational ties, recreation, stress relief, and cultural expression. Findings from this research can inform local and national efforts to better support coastal communities that rely on these resources but are often underrepresented in policymaking. Recognizing the full spectrum of recreational fishing populations can lead to more inclusive and responsive strategies for coastal planning, resource management, and community well-being.

Keywords: Resilience, wellbeing, coastal fishing, fishing culture

DRAFT

Investigating population dynamics of the Critically Endangered whitespotted wedgefish (*Rhynchobatus djiddensis*) in South Africa's iSimangaliso Wetland Park

Presenter: Niall O'Reilly - na
Co-authors: Peters A, Talwar B, Wells RJD, Drymon JM, Smith G
Email: niall760@gmail.com
Presentation type: Oral presentation

Rhinopristoformes (a.k.a., rhino rays) are among the most threatened vertebrate groups on the planet. Commercial and recreational fishing are among the greatest threats to these imperiled fishes, yet a lack of basic understanding of population demographics for most rhino rays precludes the implementation of effective management measures. The whitespotted wedgefish (*Rhynchobatus djiddensis*) is a Critically Endangered rhino ray that occurs within South Africa's iSimangaliso Wetland Park (IWP), located along the coast of KwaZulu-Natal province. The goals of this study were to 1) identify patterns in distribution, relative abundance, and demographic structure of the whitespotted wedgefish and 2) investigate potential environmental variables influencing these population dynamics. Baited Remote Underwater Video systems (BRUVs) were used to capture images of Whitespotted Wedgefish in the IWP. The BRUVs were deployed in shallow (<15 m), medium (15-25 m) and deep (26-35 m) depth zones. Videos from the BRUVs were viewed to establish a MaxN. Between December 2019 and December 2022, 794 BRUVs were deployed in the summer (n=355) and winter (n=439). Whitespotted Wedgefish varied in size from 94 – 333 cm fork length, and the ratio of females to males was 4.5:1. MaxN (± SD) varied little from summer (0.19 ± 0.49) to winter (0.21 ± 0.50). The relationships between potential predictor variables (e.g., photoperiod, bottom sea temperature, depth) and MaxN were explored using generalized additive models, but most model iterations were uninformative. Ultimately, this work increases our understanding of Whitespotted Wedgefish population dynamics in the IWP, with the goal of informing responses to fishing-related pressures. This research was conducted under permit in collaboration with the iSimangaliso Wetland Park Authority and Ezemvelo KZN Wildlife. iSimangaliso is a World Heritage Site listed for its natural attributes, including its rich biodiversity and rare and threatened species.

Keywords: Rhino rays, IUCN, BRUVs, elasmobranch

British Columbia's chinook salmon reference fishery - a collaborative enhanced monitoring program

Presenter: Martin Paish - Sport Fishing Institute of British Columbia
Co-authors: Phil Lemp, Strait Of Georgia Stock Assessment Biologist, Fisheries & Oceans Canada
Email: martinpaish1@gmail.com
Presentation type: Oral presentation

The tidal recreational salmon fishery in British Columbia supports over 200,000 participants annually across a vast coastal region. Anglers encounter multiple pacific salmon species and thousands of distinct runs, including both abundant and conservation-sensitive Chinook Salmon stocks. Managing these fisheries poses significant challenges, as conservation objectives for depressed stocks increasingly constrain access to more productive runs.

To help address this, Mark-Selective Fisheries (MSFs) have been introduced in parts of BC's coast, aiming to shift harvest from natural-origin to hatchery-origin Chinook. However, the success of MSFs depends on enhanced monitoring capable of accurately assessing mark rates and catch composition particularly for unmarked Chinook which are not available to traditional dockside sampling but are still susceptible to release mortality. We will present the Chinook Salmon Reference Fishery Program, a collaborative initiative between Fisheries and Oceans Canada and the Sport Fishing Institute of BC. This presentation will explore how the program could serve as a source of high-resolution, fisher-independent data to support retrospective assessments of MSF performance and inform adaptive management decisions. We will describe the program's design, evolution, and operational methods, and how its outputs have improved understanding of mark rates, stock composition, and release mortality.

Importantly, we highlight how the reference fishery serves as a practical tool to balance competing objectives in mixed-stock fisheries, supporting conservation while enabling modified retention opportunities. The reference fishery model offers lessons for jurisdictions facing similar challenges in managing mixed-stock fisheries under uncertainty, stakeholder pressure, and conservation mandates. We will explore the program's strengths, limitations, and potential to inform the future of MSFs in BC and beyond.

Keywords: Catch monitoring, chinook salmon, mark selective fisheries

Modernizing the British Columbia Sport Fishing Advisory Board

Presenter: Martin Paish - Sport Fishing Institute of British Columbia
Co-authors:
Email: martinpaish1@gmail.com
Presentation type: Oral presentation

The tidal waters recreational fishery in British Columbia attracts 200,000 to 350,000 participants each year. The fishery provides access to harvest a multitude of fish and invertebrate species over a 12-month season, is spread over a vast coastline, often in remote areas, and implements increasingly complex regulations to ensure sustainability for marine resources and recreational fishing opportunity.

Effectively consulting and seeking advice from participants in the fishery is undertaken by a collaborative process between volunteer anglers and Fisheries and Oceans Canada (DFO) staff called the Sport Fishing Advisory Board of British Columbia (SFAB). In existence since 1964, the SFAB is one of Canada's longest standing stake holders to government advisory bodies.

The SFAB recently engaged in a review and then a modernization process to enable increased efficiency, more effective use of technology, better alignment with Integrated Fishery Management plans, increased support for SFAB participants and increased participation from anglers.

We will explore the history and evolution of the SFAB, discuss the need for modernization as identified by both government and volunteer angler participants, and explore how the modernization process took place in an inclusive and transparent way. We will discuss the new operating model and Terms of Reference and compare efficiencies between a species based and geographic based format. We will consider the challenges of effectively consulting with a diverse group of interests spread out over 27,000 km of coastline and discuss the future of the SFAB in its new format.

Keywords: Stakeholder, advisory, collaboration, modernization

Nearly 40 Years of marine recreational fishing history: Trends in the principles of responsible and sustainable angling as reflected in a French fishing magazine (1985-2023)

Presenter: Julien Panaget - PhD student at the TELEMMe laboratory (UMR 7303, AMU, CNRS) of Aix-Marseille University
Co-authors:
Email: julien.panaget@univ-amu.fr
Presentation type: Oral presentation

The notion of « responsible and sustainable recreational fisheries » has received growing attention over the past decade from scientists and decision-makers (Arlinghaus et al., 2010, 2016; Brownscombe et al., 2016; Cooke et al., 2019; Elmer et al., 2017). How do recreational fishers respond to the underlying philosophy embedded in these notions and how does it transform their conception and practice of leisure fishing? Is the consideration of fish welfare and the degraded condition of fish stocks truly a recent concern among recreational anglers?

To investigate these questions, this proposal draws on a content analysis I conducted on Pêche en Mer—the leading French monthly magazine devoted to marine recreational fishing. Despite their historical depth, specialized media in recreational fishing have been understudied. Yet these media offer a valuable lens through which we can observe shifts in anglers' preoccupations over time. This analysis spans 461 issues published between 1985 and 2023, and integrates both textual and visual data from several core magazine sections. Selected features include: (a) reader submissions, offering insight into anglers' own voices; (b) product-focused pages promoting recent fishing gear innovations; and (c) editorial articles—opinion pieces that reflect contemporary discourses.
Our findings demonstrate a steady increase over time in coverage related to sustainable and responsible fishing practices. Crucially, we also identify evidence of such concerns preceding the EIFAC Code of Practice for Recreational Fisheries (2008)—for example, archival advertisements for "eco-friendly hooks designed to dissolve more rapidly if lost in water or in a fish's mouth."

This presentation will thus contribute both methodologically, by showcasing the utility of long-term media analysis in recreational fisheries research, and historically, by tracing the early emergence of sustainability awareness within the angling community.

Keywords: Responsible and sustainable recreational fisheries, specialized media, historical approach, France

Recreational fishing in the Calanques National Park (Mediterranean, France): A sustainable practice or a growing pressure on marine resources?

Presenter: Julien Panaget - Aix Marseille University
Co-authors: Le Direach L, Rouanet E, Schohn T, Cadoret A, Dubois Y, Dziegala L-C, Lefevre A, Vogeleisen F, Panaget
Email: panagetj@gmail.com
Presentation type: Poster presentation

The northwestern Mediterranean coast has seen rapid growth in marine leisure activities during the lasts decades, significantly reshaping traditional coastal fishing dynamics. The establishment of the Calanques National Park in 2012 (97 000 ha near the harbor city of Marseille), including seven no-take zones (NTZs) situated in the core of the park (4630 ha), marked a turning point by restricting fishing access in key areas, particularly affecting both professional and recreational fishers.

This study, conducted in 2021-2022, focused on three types of recreational fishing: shore-based line fishing (SL), boat-based line fishing (BL), and spearfishing (SF). Through direct counts, interviews, and photo documentation, researchers characterized fishing effort, practices, and catches. Data collection involved scientists, park rangers and fishers. Findings show substantial biomass removed annually by recreational activities within the park: 3.4 tons (SF), 23.3 tons (BF), and 2.4 tons (SF) a year, likely underestimated. Recreational fishing thus represents significant pressure on fish stocks, rivaling professional efforts and targeting the same species. Despite extensive information campaigns, 58% of shore fishers remain unaware of NTZs. However, 50% of boat fishers and 65% of spearfishers perceive these zones as beneficial for their activity, likely due to perceived stock regeneration.

The Park has introduced several management and consultation tools, including a Fishing Commission, a voluntary Fishing Charter, leisure fishing regulations, and most recently, a mandatory digital catch declaration system for recreational fishers. These initiatives aim to support sustainable practices through improved governance and stakeholder dialogue. The study highlights the growing ecological and social impact of recreational fishing, underscoring the need for integrated management involving both amateur and professional communities to ensure sustainable fishing in the Marseille area.

Keywords: Recreational fishing, small scale fisheries, targeted species, fishing effort, practices and catches, no take zones

Recruitment overfishing from angling nesting males is changing bass populations…and not in a good way

Presenter: David Phillip - Fisheries Conservation Foundation
Co-authors: Cooke S, Zhang J, Lombardo J, Claussen J
Email: philipp@illinois.edu
Presentation type: Oral presentation

Recruitment overfishing occurs when the number of juvenile fish ("recruits") entering a population is insufficient to maintain population stability. In some cases, fisheries regulations may appear to protect sport fish from recruitment overfishing, but fail to do so in practice. As part of our long-term research program in Ontario, Canada, we have found that the existing fishing regulations intended to protect black bass (*Micropterus* spp.) during their reproductive period are largely ineffective and unenforceable. Consequently, bass populations have undergone significant demographic and behavioural shifts as a result of high levels of fishing pressure during the reproductive period. To mitigate these impacts, in collaboration with the Ontario Ministry of Natural Resources, we implemented a pilot regulation on two lakes, establishing Bass Spawning Sanctuaries—spatially defined areas within lakes closed to all angling throughout the entire bass reproductive period. Results after one year were so positive that the program garnered strong support from local anglers, who have since advocated for expanding the program to an additional 15 lakes. The results after just one year demonstrated not only positive effects on bass populations, but also increased angler awareness, engagement, and advocacy for sustainable fisheries management. This collaborative approach shows strong potential as a scalable model for developing innovative regulations that protect vulnerable sportfish during critical life stages.

Keywords: Recruitment overfishing, bass reproductive ecology, spawning sancturies

DRAFT

From monitoring design to data: Challenges from onsite surveys in Catalonia's marine recreational fisheries program

Presenter: Patrícia Poch Isern - ICATMAR / ICM-CSIC
Co-authors: Pujol-Baucells M, de Groote A, Prista N, Galimany E, Company JB
Email: patriciapoch@icm.csic.es
Presentation type: Poster presentation

Across the globe, marine recreational fishing (MRF) has gained popularity as a key coastal leisure activity. Still, despite its scale and relevance, it continues to receive limited management attention, especially in terms of monitoring. To address this gap, the Catalan Institute of Research for the Governance of the Sea (ICATMAR) launched a MRF monitoring program in 2020. This program includes both online and onsite components, the latter involving face-to-face interviews with fishers at coastal sites. Sampling is conducted throughout the year and it is spatio-temporally stratified (local geographic divisions, seasons and day type), covering several fishing modalities (shore angling, boat angling, and spearfishing). The survey records information on fishing effort, catch composition, and the main biological parameters of the catch. This study reviews step-by-step the sampling design applied over the past five years to identify potential sources of error. Our exercise revealed several key challenges during the following specific stages: (1) in stratification, some gaps were found in site and time selection; (2) in sampling, there was an incomplete coverage for some active fishers (e.g., spearfishers); (3) in interviews stage, significant non-response occurred, from full refusals to partial answers or denial of catch measurements; (4) in data recording, inconsistencies in fisher responses and errors in data entry were found; (5) in the estimation stage, uncertainties in scaling effort from individual observations to target fishers population-level estimates were observed. We evaluate each of these issues and show that their proper consideration and minimization is critical to improve the accuracy and reliability of the monitoring effort and improve its design.

Keywords: Monitoring program, sampling design, data quality, sources of error, survey validation

DRAFT

Angling selectively removes high performance physiological phenotypes and alters fish boldness, activity and susceptibility to capture

Presenter: Warren Potts - Rhodes University
Co-authors: WM Potts, L Bailey, M Duncan, C Muller, Mlotshwa N, X Nabani, M Skeeles, A Winkler, A-R Childs
Email: w.potts@ru.ac.za
Presentation type: Oral presentation

Despite several studies documenting changes in the vulnerability of fish populations to recreational fishing, there is relatively little understanding of the mechanisms driving these changes. In this talk, we present findings from several SAFER Lab studies over the past eight years, using the overexploited Red Roman, *Chrysoblephus laticeps* (Sparidae), as a model species. Our research began by comparing the thermal physiology of the species (at a population level) in an exploited and an environmentally comparable sanctuary MPA. We found that the unexploited population had a significantly higher aerobic scope (AS) at thermal extremes than the exploited population. We then used a repeated measures approach to compare individual AS performance between fish from another environmentally comparable exploited and unexploited area. We found that individuals with high AS across the temperature range (High Physiological Phenotypes – HPPs) were absent from the exploited area, suggesting that these individuals were removed from the exploited population by fishing. We then developed individual thermal performance (AS) curves using a repeated-measures approach and subjected individuals to a range of behavioural tests (novel object, mirror, duel for food) across the thermal range. We found that individuals with high AS at any given temperature were not only bold but also outcompeted individuals (even larger specimens) with lower AS for food in a duel. Finally, we compared fish acceleration using acoustic accelerometery and found that fish in unexploited zones had significantly higher acceleration at thermal extremes, providing a clear link between AS and fish behaviour. Together, these findings suggest that fish with high physiological performance are bolder and more active, and therefore more likely to be caught by angling. As angling removes these individuals, their genes are lost, and fish populations will become less active and timid, particularly at thermal extremes.

Keywords: Vulnerability, behavioural tests, High Physiological Phenotypes, individual thermal performance

Promoting best practice for the governance of recreational fisheries in Lower Middle Income Countries

Presenter: Warren Potts - Rhodes University
Co-authors: Kieran Hyder, Sepp Haukebo, Alex Winkler, Matthew Farthing, Christopher Bova
Email: w.potts@ru.ac.za
Presentation type: Oral presentation

Participation in recreational fisheries is growing in lower-middle-income countries.

While recreational fishing participation is relatively low (1–5% of the population) in LMICs, it is growing rapidly in some countries. The evolution of recreational fisheries in these countries does not always follow the traditional pattern seen in HICs, which tends to grow with economic development. This may be associated with the influx of foreign tourist recreational fishers, whose activities and interactions with local fishers tend to accelerate the development of the activity. Consequently, recreational fisheries in LMIC can develop more rapidly, and not always align with economic development. Because of this, the governance strategies for recreational fisheries often lag, undermining sustainable practices. This is particularly concerning in the LMIC context because recreational fisheries often compete directly with subsistence small-scale fisheries for resources, leading to resource depletion, conflict, and ultimately harming local livelihoods. Despite this, recreational fisheries in LMICs offer extensive opportunities for social development through ecotourism and, when well-managed, can do so with less ecological impact than traditional food fisheries. This talk, based on discussions at workshops among experts from several LMICs, examines fundamental governance challenges for recreational fisheries in LMICs and, by drawing on examples of bright spots from around the world, identifies some potential solutions.

Keywords: Governance, sustainability, resource conflict, economic development, local livelihoods, bright spots

DRAFT

OzFish – 10 years of lessons from growing the Aussie rec fisher stewardship movement

Presenter: Cassie Price - OzFish Unlimited Ltd
Co-authors:
Email: cassieprice@ozfish.org.au
Presentation type: Oral presentation

OzFish was set up in Australian in 2015 to fill a gap in both the rec fisher and environmental restoration sectors, using a model that emulates the Trout Unlimited in the US. The dream; to have a dedicated group of rec fishers caring for every Aussie River! And we're well on our way, with 50 Chapters of rec fishers taking action to restore over 150 waterways around Australia.

We're tackling everything from complex coastal wetland restoration efforts, through to litter prevention and circularity for the tackle industry. From sustainable fishing practices and competitions to fish passage. Seagrass and shellfish restoration to indigenous cultural fishing places.

As a new movement, we've learned a great deal about engaging the recreational fishing audience, showing the environmental sector we're serious and getting the job of waterway restoration done, sometimes with sheer will alone!

More than 5000 OzFisher's turn out annually to give more than 20 000 hours of their time to restore; 124,130 newly planted trees on riverbanks, 2,413 snags/fish hotels/rocky reef habitats instream, 14,173 shellfish reef units (ROBs) over 36 hectares, 4.21 million seagrass seeds/shoots over 24 hectares of restored seagrass beds and at least 38 tons of rubbish removed from waterways.

OzFish is fast establishing recreational fishers as key stewards for waterway health in Australia. Earning the sector valuable social license and beyond that where rec fishers are leading the charge to improve the health of the waterways most important to them. We're now recording tangible results, and are counting our impact in the number of fish our habitats contribute each and every year – that number is now a staggering 2.43 million more fish annually and growing.

Keywords: Stewardship, conservation, recreational fishers, fish habitat, social license

Sampling frame challenges under a flexible licensing regime: a case study from Catalonia (NW Mediterranean Sea)

Presenter: Marta Pujol-Baucells - (1) Institut de Ciències del Mar (ICM-CSIC), Passeig Marítim de la Barceloneta 37–49, 08003 Barcelona, Spain (2) Institut Català de Recerca per a la Governança del Mar (ICATMAR), Passeig Marítim de la Barceloneta 37–49, 08003 Barcelona, Spain
Co-authors: Annica de Groote, Nuno Prista, Patrícia Poch, Eve Galimany and Joan B. Company
Email: martap@gencat.cat
Presentation type: Oral presentation

Proper management of marine recreational fisheries requires survey-based monitoring to ensure a sustainable use of the resources. Since 2020, ICATMAR, a cooperation body between the Institute of Marines Sciences (ICM-CSIC) and the Government of Catalonia, has been conducting monthly online surveys to target fishing licence holders with a licence that allows them to fish in Catalonia. Each month, the sampling frame for the survey, updated with newly issued licenses. A random sample of license holders is drawn from the frame, and selected number of individuals were invited to respond to a web questionnaire via email. This study focuses on some key methodological challenges, in particularly the difficulty of building an efficient sampling frame. Fishers often hold multiple licenses for different fishing types, which can introduce biases and errors that compromise survey estimates. Furthermore, even if among survey recipients, the vast majority of email addresses are linked to individual fishers, there are also small groups (e.g., families), and some larger groups (e.g., fishing clubs or shops) present in the samples. By adopting a total survey error approach, we assess how inaccuracies present at various stages (i.e., from the generation of monthly email samples to the collection and classification of responses and estimation) can affect the overall survey quality. The final goal of the survey is to provide detailed information for decision-making in the management of Catalan recreational fisheries thus data treatment accuracy is key to support best fisheries strategies.

Keywords: License register, online survey, marine recreational fisheries

Comparing probabilistic onsite and self-selecting offsite surveys to monitor marine recreational fishers

Presenter: Zachary Radford - Cefas
Co-authors: Samantha Hook, Wendy Edwards, Grace Farrell, Rebecca Mills, Hannah Rudd, Galini Samlidou & Kieran Hyder
Email: zachary.radford@cefas.gov.uk
Presentation type: Oral presentation

Monitoring marine recreational fisheries often relies on offsite, self-selecting surveys or probabilistic onsite surveys. Offsite surveys, although cost-effective, are argued to suffer greater bias due to self-selection, while onsite probability surveys, despite reducing selection bias, are more resource intensive. Direct comparisons between these survey types remain scarce and challenging. This study addresses this gap by comparing two surveys conducted within England and Wales: Catchwise, a probabilistic onsite survey, and the Sea Angling Diary project, an offsite self-selecting logbook-based study. Specifically, we compared results for angling effort and shore-based catch. Our methodological approach included both traditional design-based raising and advanced multi-level regression with post-stratification (MRP). MRP is a common technique in political science for extrapolating exit-polling data and involved training Bayesian hierarchical models on survey data, which are then applied to a sampling frame. The comparative analysis revealed notable differences in estimated effort and catch between survey types using traditional design-based methods. However, when applying MRP techniques, both surveys produced similar estimates, suggesting that MRP effectively reduces biases inherent in the offsite survey method. Performance metrics consistently favoured the MRP-based approach, underscoring its greater reliability. These findings underscore that survey extrapolation methods significantly influence conclusions about marine recreational fisheries. The enhanced performance of model-based methods, particularly MRP, emphasises their value for accurate estimation and monitoring. Researchers should, therefore, consider adopting model-based raising approaches, such as MRP, to improve survey precision and accuracy as well as to better inform fisheries management and policy decisions.

Keywords: Survey design, onsite-offsite comparison, bias evaluation, multi-level regression, survey estimation

Developing priorities for marine recreational fisheries data-collection and inclusion in stock assessment in data-limited scenarios

Presenter: Zachary Radford - Cefas
Co-authors: Martina Scanu, Kieran Hyder, Wendy Edwards, Sophy Phillips
Email: zachary.radford@cefas.gov.uk
Presentation type: Oral presentation

Marine recreational fisheries (MRF) are often data-limited as dedicated surveys or robust monitoring programmes are lacking. The diversity of species caught by recreational anglers further increases the challenge in determining where resources for data collection should be directed. Consequently, recreational fisheries data are infrequently incorporated into formal stock assessments, potentially overlooking key impacts on fish populations. There is a clear need for a structured approach to prioritising data collection by assessing species-specific risks in data-limited recreational fisheries. This study addresses this need by adapting productivity-susceptibility analysis (PSA) for recreational fisheries. A PSA combines species-specific fishing susceptibility with biological productivity traits to assess relative vulnerability to fishing pressure. Here, we adapted the traditional PSA methodology specifically for recreational fisheries, incorporating expert-derived susceptibility scores tailored to recreational angling across multiple European ecoregions. Life-history parameters were extracted from FishBase. Additionally, we employed novel approaches for variance estimation to quantify uncertainty, allowing the generation of confidence intervals around risk assessments. Results from our analysis reveal clear distinctions in vulnerability among species, highlighting priority candidates for improved data collection and inclusion in stock assessment. We discuss methodological challenges and propose approaches to address these issues. The developed framework can be transferred to other geographical regions, providing a structured, transparent approach to prioritising species for focused research and management action in data-limited marine recreational fisheries. This prioritisation enhances resource allocation efficiency and helps ensure recreational fisheries' sustainability within broader stock management contexts.

Keywords: Data-limited, productivity-susceptibility analysis, stock assessment integration, risk assessment, prioritisation framework

Employing multi-level regression and poststratification to extrapolate recreational fisheries surveys

Presenter: Zachary Radford - Cefas
Co-authors: Zachary Radford, Wendy Edwards, Samantha Hook, Grace Farrell, Rebecca Mills, Hannah Rudd, Galini Samlidou & Kieran Hyder
Email: zachary.radford@cefas.gov.uk
Presentation type: Oral presentation

Accurately extrapolating results from recreational fisheries surveys to wider populations is crucial but challenging, often complicated by biased sampling, incomplete data, and undersampling. Traditional design-based extrapolation techniques, while widely used, frequently fail to capture important variations in angler behaviours and site characteristics. Multi-level regression and poststratification (MRP), a method originally developed in political science, offers considerable promise by integrating Bayesian hierarchical modelling with population-level poststratification, enabling more accurate and nuanced extrapolations.

This presentation describes practical steps for implementing MRP in recreational fisheries surveys. Using two real-world examples from marine fisheries surveys in England and Wales, we outline essential data requirements, including survey data structures and the selection of informative predictors, and demonstrate Bayesian hierarchical model-building procedures alongside validation strategies to assess reliability and predictive accuracy. The examples presented clearly illustrate improved estimation precision and reduced bias compared to traditional methods.

Ultimately, adopting MRP-based extrapolation provides robust, accurate insights crucial for informing recreational fisheries management and policy. We recommend that fisheries researchers consider integrating MRP into routine survey analyses to enhance monitoring precision, inform resource allocation, and strengthen evidence-based decision-making.

Keywords: Multi-level regression, poststratification, Bayesian modelling, survey extrapolation, hierarchical models

DRAFT

Making the most of angler knowledge in recreational fisheries management

Presenter: Jennifer Rehage - Florida International University
Co-authors: Sophia Costa, Rolando Santos, W. Ryan James, Aaron Adams, Benjamin Jones
Email: rehagej@fiu.edu
Presentation type: Oral presentation

Globally, the need for data on the status and trends of recreational fisheries is profound. Yet, for most recreational fisheries worldwide, these population estimates remain elusive due to numerous data unknowns and gaps. Importantly, without this information, fisheries management is more or less a 'guessing game.' Thus, to generate data in data-poor scenarios, we need to think outside the box. Arguments for the importance of alternative sources of information are now becoming mainstream, particularly those relying on fisher knowledge. In this study, (1) we review previous fisheries research to examine how fisher's knowledge is treated, 2) we conduct simulations to show that small, diverse respondent group of fishers can yield accurate trend data, and (3) we propose on angler knowledge can be elicited in quantitative ways that can foster better application and integration of fisher's knowledge into fisheries management. Together these efforts highlight that quantitative fisher's knowledge, when properly implemented and standardized, provides robust and credible data that can enhance the management of data-poor recreational fisheries.

Keywords: Recreational fisheries, fisheries management, data-limited, Local Ecological Knowledge (LEK), fisher knowledge

DRAFT

Using behavioural insights from marine acoustic telemetry to inform the conservation Permit (*Trachinotus falcatus*) in South Florida

Presenter: Jessica Robichaud - Carleton University
Co-authors: Griffin LP, LaRochelle L, Casselberry GA, Morley D, Keller JA, Binder B, Clementi GM, Gastrich KR, Heithaus MR, Boswell KM, Danylchuk AJ, Adams AJ, Cooke SJ, Brownscombe JW
Email: jrobichaud15@gmail.com
Presentation type: Oral presentation

Permit (*Trachinotus falcatus*) are an iconic marine sportfish, popularly targeted by recreational anglers on the nearshore flats and offshore reefs and shipwrecks of South Florida. Over the past decade, acoustic telemetry has greatly advanced our understanding of Permit mobility, habitat use, and seasonal behaviour. These insights have informed management efforts, including the establishment of the Western Dry Rocks Marine Protected Area (WDR MPA) in 2021, which prohibits fishing from April to July to protect spawning aggregations. Traditional metrics used to assess MPA effectiveness, such as changes in biomass and size structure, often require several generations to detect meaningful changes. Here, we demonstrate how shorter-term behavioural indicators can provide earlier insights into how Permit are responding to protection at WDR MPA. The extensive data generated by this long-term tracking effort has enabled a before-after-control-impact (BACI) study design to evaluate changes in key spatial metrics at spawning sites in the Florida Keys, including: (1) the extent of space use in and around the WDR MPA, (2) residency duration, and (3) connectivity at WDR and nearby unprotected spawning sites. Our results indicate that the WDR MPA is largely achieving its primary goal of protecting spawning Permit, however, opportunities for refinement remain. Some individuals continue to utilize areas outside the current MPA boundaries during the closure period, and increased residency at WDR often begins as early as March. These findings suggest that expanding the spatial boundaries or adjusting the timing of the closure could further enhance protection. Additionally, limited connectivity between WDR and spawning sites farther north in the Florida Keys suggests that current protections may not fully encompass the broader Permit population across the region.

Keywords: Marine, acoustic telemetry, behaviour, protected area, sportfish, *Trachintous falcatus*

Catching pp: Integrating marine recreational fisheries into the UK's Post-Brexit future

Presenter: Hannah Rudd - Angling Trust
Co-authors:
Email: hannah.rudd@anglingtrust.net
Presentation type: Oral presentation

Marine recreational fishing is a high-participation activity in the UK, with considerable socio-economic value, particularly for coastal communities. However, it has historically been underrepresented within United Kingdom (UK) fisheries governance, receiving limited political recognition and minimal management integration. The lack of political recognition has contributed to stakeholder disengagement, under-utilisation of its socio-economic potential, and a lack of alignment with sustainable fisheries management objectives.

The UK's departure from the European Union led to its establishment as an independent coastal state, marking a notable step change in the political recognition of marine recreational fisheries. Under the Fisheries Act (2020), marine recreational fisheries are formally recognised as stakeholders in UK fisheries. This inclusion has created new opportunities for integration into policy and management processes, particularly through the development of Fisheries Management Plans (FMPs), which are the UK government's flagship mechanism for delivering sustainable fisheries.

FMPs are being co-designed with commercial and recreational sectors, encouraging greater collaboration between stakeholder interests. Given that the UK's marine recreational fisheries remain unlicensed, largely unregulated, and unmonitored, this shift represents a significant step change in governance approach. It identifies clear challenges in effective engagement with the sector, due to historic apathy and the data-poor nature of recreational fisheries, which risks decision-making that may have unintended consequences. Drawing on stakeholder perspectives, this presentation will explore the challenges and opportunities presented by this new policy landscape and reflect on what is needed to ensure the meaningful inclusion of marine recreational fisheries in future fisheries management, aiming to achieve social, economic, and environmental sustainability.

Keywords: Governance, policy framework, United Kingdom; marine recreational fisheries, fisheries policy, fisheries management, stakeholder engagement

Schooling together: What bluefin tuna can teach us about science-led, stakeholder-driven fisheries management

Presenter: Hannah Rudd - Angling Trust
Co-authors: Righton David, McCully Phillips S, Murphy S, Singleton-White S, Hyder K, et al.
Email: hannah.rudd@anglingtrust.net
Presentation type: Oral presentation

The return of Atlantic bluefin tuna (*Thunnus thynnus*) to UK waters has provided a rare opportunity to design and establish a new recreational fishery with a focus on prioritising scientific evidence, sustainability goals, stakeholder collaboration, while maximising societal benefit. In contrast to many other fisheries frameworks, which have historically struggled to accommodate the recreational sector, the development of the UK's catch-and-release bluefin tuna fishery has demonstrated the potential of a true co-designed approach.

This presentation explores how fishing skippers, anglers, researchers, regulators and policymakers worked together to co-design and establish an open catch and release recreational fishery (CRRF, 2024- present), based on the principles established within a closely monitored three-year scientific fishery (the CHART (Catch and Release Tagging) initiative, 2021-2023). Through this collaborative model, scientific, social and economic data collection, fish welfare, fishers' knowledge and access for recreational skippers were integrated and evaluated from the outset. The process has not only generated (and continues to generate) valuable data on a recovering species but has also fostered strong trust and shared responsibility among stakeholders.

Drawing on lessons from the CHART programme and its progression to the introduction of a catch-and-release recreational fishery in English waters in 2024, this case study highlights how co-design and early stakeholder involvement can overcome historic barriers between sectors, build legitimacy, enable knowledge transfer and create more resilient, sustainable fisheries. The UK bluefin tuna CRRF offers a valuable blueprint for future stakeholder-led fisheries management in the UK and beyond.

Keywords: Atlantic bluefin tuna, fisheries policy, catch-and-release, tuna, stakeholder engagement, fisheries management

Beyond the science: Lessons from pollack politics

Presenter: Hannah Rudd - Angling Trust
Co-authors: Bryce D. Stewart, Simon Thomas, Dave Uren, Thomas Stamp, Jessica Roberts, Rebecca Nesbitt, Amy Neal, Keiran Hyder, Peter Davies, Alice Hall, Ronan Conlon, Emma Sheehan
Email: hannah.rudd@anglingtrust.net
Presentation type: Oral presentation

Pollack (*Pollachius pollachius*) is a key species in the political spotlight, valued for recreational and commercial fishing in southwest England. However, it is considered data-poor. Following ICES advice for 2024, the UK Government imposed restrictions on the commercial fishery with a bycatch-only Total Allowable Catch (TAC), leading to calls for recreational management to support stock recovery.

To enhance knowledge about pollack, we initiated the Defra-funded Pollack Fisheries Industry Partnership (FISP) Project. We collaborated with 14 recreational fishing charter vessels to gather catch and biological data from over 16,000 pollack across 800 trips since mid-2022. We examined fishers' diaries, angling club records, and conducted interviews and workshops, fostering a collaborative environment between scientists and fishers during turbulent times in fisheries politics.

In response to stock concerns and the results of our project, the Pollack Pact - voluntary guidelines for recreational fishing - was developed, promoting the use of descending devices to improve post-release survival rates. In 2025, ICES advised catches of no more than 3,310 tonnes in 2026, impacting discussions within the community on if recreational fishers need to be managed to support pollack recovery. This presentation highlights key insights and lessons from our experience with pollack at the policy-stakeholder interface.

Keywords: Pollack, co-design, voluntary guidelines, best-practice, recreational fisheries, fisheries management, education, outreach, engagement

DRAFT

Rec-Digital: Machine learning-based analysis of social media data for monitoring recreational fisheries

Presenter: Beatriz Salvador - Institute of Marine Sciences (ICM-CSIC)
Co-authors: García JA, Manjabacas A, Medina A, Sbragaglia V
Email: bsalvador@icm.csic.es
Presentation type: Oral presentation

Recreational fishing is a globally important activity that is highly diverse and geographically dispersed, posing significant challenges for monitoring. Recreational fishers increasingly use social media, and mining this data can advance monitoring and research. Our systematic review shows that the number of studies focused on the use of social media as a data source for monitoring recreational fisheries has increased over the past decade. These studies have been carried out in several regions of the world, with higher frequency in the Mediterranean Sea. Facebook (34%) and YouTube (28%) have been the most commonly used platforms for extracting relevant data. The studies usually focused on a single species, with fish (59%) being the most monitored group in recreational fishing, followed by sharks (22%) and rays (9%). However, a key limitation is processing large volumes of unstructured data while ensuring outputs are accessible and usable for stakeholders. To overcome these limitations, we are developing a machine-learning algorithm based on 2 main components: (1) Natural language processing to detect the language of the textual content associated to YouTube videos and assist in determining the geographic location through gazetteer-based matching; (2) Computer vision to classify the type of recreational fishing (angling or spearfishing) and the target species displayed in the videos. Preliminary results from Italy, France, and Spain (focusing on 5 target species) showed good accuracy (84%) in recognizing recreational fishing methods and target species. Once biases are correctly identified, this approach may advance monitoring (including social aspects) of recreational fishing on a large spatio-temporal scale and with limited costs. Furthermore, observations of recreational fishing catches can provide valuable insights into macroecological dynamics.

Keywords: Recreational fisheries, social media, machine-learning, monitoring, Mediterranean Sea

DRAFT

A thematic analysis of Iranian diasporic fishing influencers on social media in Canada

Presenter: Pourya Sardari - Human Dimensions of Natural Resources Lab, Rangeland, Wildlife and Fisheries Management Department, Texas A&M University.
Co-authors: Kyle G.
Email: pourya@tamu.edu
Presentation type: Poster presentation

Recreational fishing is becoming increasingly popular among immigrant communities in Canada, where social media platforms, particularly Instagram, serve as spaces for expression, skill-sharing, and community building. This qualitative study examines a year of content from three influential Iranian-run fishing accounts in Canada, with 87,000, 82,000, and 6,000 followers, all of which primarily post in Persian, with some content in English. Using reflexive thematic analysis, we analyzed their posts to explore how diasporic fishing identities are performed and communicated. From the data three themes emerged: 1) Performing Masculine Pride through the Catch, where large fish, advanced gear, and techniques like fly fishing are showcased as markers of skill and status; 2) Fishing as Escape from Urban Life and Embrace of Nature, where influencers describe fishing not only as a hobby but as a meaningful lifestyle tied to being outdoors, away from cities, and rooted in a desire for tranquility and connection with nature; and 3) The Absence of Regulatory Guidance, where despite producing educational content about fishing, influencers rarely mention fishing licenses, species-specific regulations, or conservation rules, especially critical in the Canadian context, where fishing laws are complex and vary by province.

These findings highlight the dual role of diasporic influencers as both cultural storytellers and informal educators. While they show pride, connection to nature, and recreational inclusion, the lack of regulatory framing raises concerns about unintentional rule-breaking. As immigrant participation in outdoor recreation grows, more culturally attuned outreach and partnerships with content creators may help bridge regulatory gaps, supporting safe, informed, and equitable access to natural resources.

Keywords: Immigrants, recreational fishing, Instagram

DRAFT

A systematic review of global recreational fishery economic research based on PRISMA

Presenter: WenHao Sha - SHANGHAI OCEAN UNIVERSITY College of Marine Living Resource Sciences and Management
Co-authors: Qilei Zhao, Guiying Chen, Bo Han, Siqiong Qi, Xinjun Chen
Email: m240250766@st.shou.edu.cn
Presentation type: Oral presentation

Recreational fisheries play a crucial role worldwide, contributing not only to employment and income generation but also to government tourism revenues. However, the development of the recreational fisheries economy from a global perspective remains underexplored, although there are many case studies in countries or areas. This paper presents a systematic review of 124 peer-reviewed articles published in the Web of Science between 1991 and 2024, focusing on the recreational fisheries economy. Based on this review, we categorized the research into four key domains—economic and consumer behaviour, resource utilization and management, environmental and ecological effects, and emergencies. Our results showed that: (1) The development of the recreational fishery economy exhibits polarization worldwide. High-income countries lead in resource management and policy support, whereas low- and middle-income countries face challenges in resource utilization and inadequate infrastructure. (2) Willingness to pay for environmental protection, consumer surplus and travel cost method estimation represent key research directions in economic contributions and consumer behaviour analysis. (3) Catch per unit effort and bag limits serve as fundamental management tools to mitigate fishing pressure in recreational fisheries. By implementing long-term resource conservation measures, management authorities can sustain the economic viability of recreational fisheries. (4) Ecological protection, restoration, and environmental governance yield direct economic benefits, a factor increasingly prioritized by governmental management bodies. (5) Emergencies have adversely impacted the global recreational fishery economy, such as COVID-19 pandemic, inflicting direct and indirect economic losses on related sectors. This paper aims to synthesize global research on the recreational fisheries economy, leverage the successful models of more developed nations as references for less developed regions.

Keywords: Recreational fishery economy, PRISM, visual analysis

Fisher's Ecological Knowledge on spawning locations of *Argyrosomus japonicus* along the South African coastline

Presenter: Jodie Shaw - Rhodes University
Co-authors: M Farthing, C Bova, A Winkler, W Potts, A Childs
Email: jodiegishaw@gmail.com
Presentation type: Oral presentation

Spawning aggregations represent a period of vulnerability for many species and require protection for effective management and conservation. However, the spawning locations of *Argyrosomus japonicus* (dusky kob) remain largely undocumented and consequently unprotected along the South African coastline. This study utilised Fisher Ecological Knowledge (FEK) to identify potential locations and seasonal patterns of *A. japonicus* spawning in South Africa. An online survey (June – August; 27 questions) was distributed to key Facebook and WhatsApp groups to recruit fishers that have caught a large (>100cm) *A. japonicus* releasing sperm or eggs when being handled. The survey assessed angler specialisation through avidity, centrality to life and skill, while a validation process evaluated respondent's ability to distinguish *A. japonicus* from other Argyrosomus species and to determine the level of our confidence in the fishers ability that the reported spawning observation was actually a *A. japonicus*. Of the 315 responses obtained from shore anglers, boat anglers and spear fishers, 85% of respondents could correctly distinguish *A. japonicus* from other *Argyrosomus* species. Using a multi-step decision tree, the 37 reported spawning observations were assessed, with 11 classified as "likely a dusky kob". The 11 validated responses revealed a concentration of spawning observations in Southern KwaZulu-Natal, particularly around Port Shepstone, Umkomaas, Tugela mouth and Mtunzini during winter and spring months. In the Southern Cape, spawning was observed in the summer months from Arniston to Gourtizmond river mouth. This study demonstrates both the potential and limitations of using FEK for identifying spawning locations of a cryptic species, highlighting the need to train fishers to distinguish *Argyrosomus* species to support effective management.

Keywords: Dusky kob, spawning aggregations, angle specialisation, species identification, survey, seasonal patterns

DRAFT

Using participatory mapping to support resource allocation and management in Belize's data - limited recreational fishery

Presenter: Victor Sho - Coastal Zone Management Authority and Institute
Co-authors:
Email: victor.m.sho@gmail.com
Presentation type: Oral presentation

In 2009, Belize recognized the importance of the sport fishing sector in local coastal economies and sought to ensure its long-term sustainability, to this end it protected Bonefish (*Albula vulpes*), Tarpon (*Megalops atlanticus*) and Permit (*Trachinotus falcatus*) (Statutory Instrument 114, 2009), which were widely regarded as being the most important fish species to this activity. Additionally, a sport fishing licensing system was introduced to monitor the pressure being exerted on this fishery (Statutory Instrument 115. 2009). These regulations were largely a result of stakeholder lobbying in conjunction with an economic report that quantified the contribution of the sport fishing sector towards Belize's GDP at 50 million Belize Dollars (Fedler and Hayes 2008). Belize's Sport fishing sector can be considered as a data-less fishery as there were no structured management framework in place before 2010. The first attempt to establish baseline data for the fishery was in 2010 by Ecoworks and the Green Reef Environment Institute with funding from the Protected Area Conservation Trust (PACT). This is the first study that has been carried out in Belize to map the recreational fishing pressure distribution along Belize's coast, using local expert knowledge. Additionally, this research also leverages local knowledge to track change in fishing pressure distribution over the last 10 years and identify the drivers of these trends under three general themes, anthropogenic activity, climate change, change in target species habitats.

Keywords: Recreational fishing pressure distribution, heat maps, change in fishing pressure, Local Expert Knowledge

DRAFT

Heterogeneity of coastal seatrout (*Salmo trutta*) anglers in the Baltic Sea explored through the recreational specialization framework

Presenter: Christian Skov - Section of Freshwater Fisheries and Ecology, Technical University of Denmark, DTU Aqua, Silkeborg, Denmark
Co-authors: Gundelund, C., Olesen H.J., Arlinghaus, R.
Email: ck@aqua.dtu.dk
Presentation type: Oral presentation

Seatrout (*Salmo trutta*) angling in the Baltic is a popular fishery that attracts residents as well as national and international tourists. Therefore, the anglers involved in sea trout angling are likely to constitute a highly diverse group, suitable to re-examine classical hypotheses about angler heterogeneity using the angler specialization framework. To that end, we conducted a roving creel survey combined with a follow-up internet survey and used the specialization framework to examine a total of five hypothesized relationships between specialization degree and angler attitudes, preferences and behaviours. Specialization was treated as a multidimensional construct. We operationalized two subdimensions: psychological commitment and skill (PCS), and behavioural commitment (BC). The five hypothesized relationships were confirmed for the PCS dimension of specialization. Specifically, tourists and fly fishers exhibited greater PCS, and with increasing PCS we saw stronger preferences for catching trophy fish, stronger expectations to catching large fish and less focus on fish retention after the catch. We also found trip satisfaction to decrease with increasing PCS, while controlling for the impact of fish catch on satisfaction. This finding suggested that psychologically more committed and more skillful anglers carry elevated expectations about fishing outcomes. We conclude that the specialization correlates in a predicable fashion with multiple managerially relevant aspects of recreational fisheries for sea trout in the Baltic and that the psychological subdimension of specialization carries more explanatory value than behavioural commitment and avidity.

Keywords: Angler segmentation, catch-and-release, catch orientation, diversity, involvement, roving creel survey, satisfaction, tourism

DRAFT

Assessing the heterogeneity in management approaches voluntarily chosen by recreational angler communities in Germany under private fishing rights: an archetype approach

Presenter: Hadjer Smati - Department of Fish Biology, Fisheries and Aquaculture, Leibniz Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany/ Division of Integrative Fisheries Management, Faculty of Life Science and Integrative Research Institute on Transformations of Human-Environment Systems (IRI THESys), Humboldt-Universität zu Berlin, Berlin, Germany
Co-authors: Sebastian Theis, Carsten Riepe, Robert Arlinghaus
Email: hadjer.smati@igb-berlin.de
Presentation type: Oral presentation

In Germany, inland fishing rights are privately held, with around 10,000 angling communities managing local freshwater fisheries as rights holders. These clubs are autonomous in their decisions, using various strategies such as harvest regulations, fish stocking, and habitat management. This study explored the diversity in management approaches among these angling clubs by applying an archetype analysis. We used data from a random survey of 1222 decision-makers from Northwestern German angling clubs, contained data on the management practices applied across their waters. Five distinct archetypes emerged from the analysis, all of which relied on fish stocking as a core management tool. However, significant differences appeared regarding their use of other management measures. The “Holistic Control”, representing 28.8% of clubs, combined moderate stocking intensity with broad array of output-focused harvest regulations across both lakes and rivers. These clubs often extended controls beyond legal minimums and occasionally applied effort-based (input) restrictions and habitat management. The “Output Control” clubs (27.5%) focused almost exclusively on harvest regulations alongside stocking, primarily managing small, artificial lakes. The “Laissez-faire” archetype (17.8%) rarely adopted proactive management beyond state requirements and had the lowest stocking levels. These clubs typically held non-exclusive property rights under governance by regional umbrella angler associations, mostly in Eastern Germany. The “Habitat” archetype (12.3%) combined intensive stocking with extensive habitat improvement efforts, mainly in river environments, and exhibited stronger biocentric values among decision-makers. Finally, the “Do-it-all” clubs (13.7%) employed available management tools intensively under mostly exclusive fishing rights, with more biocentric values. Overall, management heterogeneity in German angling clubs driven by structural and psychological factors.

Keywords: Angler communities, archetype analysis, club heterogeneity, fish stocking

The 50-year history of anglers' record catches of genus *Carassius*: Circumstantial evidence of competitive exclusion of native species by invasive species

Presenter: Marek Šmejkal - Institute of Hydrobiology, Biology Centre of the Czech Academy of Sciences, Na Sádkách 7, 370 05, České Budějovice, Czech Republic
Co-authors:
Email: marek.smejkal@hbu.cas.cz
Presentation type: Oral presentation

Successful invasive non-native fish species can cause enormous damage to native biodiversity. In mainland Europe, the introduction of the gibel carp (*Carassius gibelio*) has led to a decline in populations of the formerly widespread native crucian carp (*C. carassius*). Both invasive and native species develop two phenotypes, namely stunted and deep-bodied, which depend on the intensity of competition and predation in the water body. The deep-bodied phenotype is associated with a more diverse fish community composition, can attain large sizes and is very attractive to recreational anglers. This study analysed trends in the record sizes of native crucian carp and invasive gibel carp (individuals close to the maximum attainable size of the species) reported by recreational anglers over the last 50 years in Czechia, recording the invasion of gibel carp from its beginnings to the fully established population phase. The study provides circumstantial evidence that gibel carp is behind transition from the relative abundance of large crucian carp to near extirpation, while large gibel carp have taken over the reports of record catches in the genus *Carassius*. This indicates that the crucian carp, which is currently classified as critically endangered in the red list of Czechia, has very limited possibilities to realise its deep-bodied phenotype. It also shows the potential of using data from recreational anglers for mapping invasion processes and as a source of relatively localised information on endangered species.

Keywords: Aquatic conservation, culturomics, crucian carp, gibel carp, iEcology, Prussian carp

The influence of mouth state on local estuarine linefisheries in Garden Route National Parks, South Africa

Presenter: Kyle Smith - South African National Parks; Department of Ichthyology and Fisheries Science, Rhodes University
Co-authors: Padare G
Email: Kyle.smith@sanparks.org
Presentation type: Oral presentation

Despite their popularity for both recreational and livelihood fishing, the linefisheries of relatively few of South Africa's estuaries have been formally assessed. In this paper, traditional roving creel surveys, conducted over a two-year period (Feb 2022 – Mar 2024), were used to collect catch and effort data on the shore- and boat-based linefisheries on the Touw Estuary and Wilderness Lakes. Participation within the fishery was estimated at 384 anglers, with total annual fishing effort estimated at 2 683 and 3 252 angler outings or 13 022 and 17 356 angler hours for each year. Overall catch-per-unit-effort (CPUE) amounted to 0.20 ± 0.37 fish angler-1.hr-1 with an estimated total annual catch of 5412 fish and 1586 for the two years, respectively. A generalised linear mixed-effects model indicated that season, day type, and estuarine mouth state influence fishing effort with an increase in fishing effort over autumn, weekends, and during periods when the estuarine mouth is open. Furthermore, targeted species and catch composition were significantly different between mouth states, with more white steenbras (endemic and endangered) and Cape stumpnose (endemic with population concerns) being targeted and caught during the open phase. When the mouth is closed, Mozambique tilapia, an invasive freshwater species, is more actively targeted and dominates catches. This study has shown that estuarine mouth manipulation has a direct influence on species targeted, frequency of outings, and spatial distribution of fishers, which needs to be considered by local management authorities.

Keywords: Fishing surveys, catch-per-unit-effort, target species, fishing effort

DRAFT

Assessing the knowledge, perceptions, attitudes and behaviours of deep-sea anglers off East London, South Africa

Presenter: Hermi Spangenberg - Rhodes University
Co-authors: M Farthing, C Bova, C Muller, W Potts, A Childs, N Hiestermann, A Winkler
Email: hermi.spangen@gmail.com
Presentation type: Oral presentation

Boat-based recreational angling exerts substantial pressure on vulnerable marine fish stocks in South Africa. Unfortunately, conventional management techniques have failed to slow the continual demise of old, slow-growing bottom fish species. Necessitating novel approaches, such as sustained angler education strategies where fish handling knowledge is lacking. To devise effective educational strategies, an understanding of angler knowledge, perceptions, and behaviours is required to inform educators. This study presents a baseline assessment of boat-based marine anglers (BBMAs) in East London, South Africa. It compares these findings with a previous study conducted in Gqeberha (Port Elizabeth), South Africa. Questionnaire-based surveys were administered through recreational fishing clubs, and responses were analysed using descriptive statistics and heatmaps. Anglers in both regions identified commercial and illegal fishing as the principal drivers of bottom fish stock declines. However, respondents from East London demonstrated greater recognition of additional contributing factors, including recreational fishing non-compliance and the ecological role of marine protected areas. Support for catch-and-release (C&R) as a conservation measure was high in both regions (East London: 75.68%; Algoa: 70.59%), yet substantial knowledge deficiencies were evident regarding barotrauma onset depths and the appropriate application of mitigation measures, particularly venting. While East London anglers reported higher uptake of descender devices, a continued preference for J-Hooks over conservation-oriented circle hooks was observed. Notably, levels of institutional trust were low across both regions, with more than 80% of East London respondents and 60% of Algoa Bay respondents expressing dissatisfaction with the effectiveness of the management authority in conserving bottom fish stocks. These results highlight critical gaps in angler knowledge and compliance, and underscore the need for targeted education on barotrauma mitigation, behavioural interventions addressing social norms, and enhanced transparency and engagement by management authorities to rebuild trust and promote pro-environmental behaviours essential for the conservation of threatened bottom fish stocks.

Keywords: Eastern Cape, Sparidae, Scaenidae, bottom-fish, barotrauma

German recreational anglers and digital media – no love affair

Presenter: Harry Strehlow - Thünen-Institute of Baltic Sea Fisheries
Co-authors: Lewin WD, Weltersbach MS
Email: harry.strehlow@thuenen.de
Presentation type: Oral presentation

Despite high participation in recreational fishing worldwide, data reliability and quantity are limited. Managers and scientists are turning to digital platforms to engage with anglers and collect data that is otherwise difficult to obtain. This study used a representative survey to investigate which media (face-to-face communication, angling magazines, TV/radio, YouTube, messenger services, websites, social media, angling apps) German anglers use and how trusted they are. Most participants rarely or never used digital platforms to obtain angling related information. YouTube was the most used platform by 30% of participants. Approximately 1.5% of participants reported that they frequently or regularly angling apps to share angling related information, while 9.5% preferred other digital platforms. 76% trusted personal communication moderately and highly, while 29% trusted angling magazines. Conversely, only 14% of respondents rated social media platforms such as Facebook and X as fairly or very trustworthy. Angling apps were rated as fairly and very trustworthy by 27% of participants. A moderate correlation was identified between trustworthiness and frequency of use across all digital media (Spearman's r^2s 0.5 - 0.7). Multinomial regressions revealed a positive relationship between angling centrality and digital media use, and a marginal relationship with education level. Age was associated with decreased frequency of use, while the influence of angling club membership, network size, and angling motives was negligible. The findings highlight potential limitations of collecting representative data via digital platforms and underline the need for research to explore motivators and barriers that influence anglers' participation in digital platforms.

Keywords: Recreational fisheries, digital platforms, media use, angling apps, data collection

Nature’s contribution to people – how anglers value NCPs in the Baltic Sea

Presenter: Harry Strehlow - Thünen-Institute of Baltic Sea Fisheries
Co-authors: Niewöhner M, Lewin WC, Riechers M, Weltersbach, MS
Email: harry.strehlow@thuenen.de
Presentation type: Oral presentation

Recreational fishing in the western Baltic Sea has long focused on species like cod and herring. However, stock declines due to mismanagement, climate change, and nutrient inputs have led to strict regulations and fishing bans, impacting both the angling experience and the regional economy. With angling tourism generating significant revenue, these changes raise concerns about the future of the sector.

This transition offers a chance to shift perspectives on angling—not merely as an extractive activity but as a profound interaction with nature, highlighting its role in fostering well-being and cultural identity. Using the Nature’s Contributions to People (NCP) framework, this study explores how anglers in Germany’s coastal waters experience non-material benefits of nature. We employed a telephone survey of 500 coastal fishery license holders in Mecklenburg-Western Pomerania, Germany.

Our results show that angling co-produces NCP, enhancing psychological well-being, cultural identity, and place attachment. Recognizing these relational values allows fisheries management to go beyond stock assessments, promoting a resilient angling culture even as key species decline. This perspective shift helps sustain both economic and cultural benefits while reinforcing connections between anglers and marine conservation.

Keywords: Recreational fisheries, nature’s contribution to people, anglers’ ecological knowledge, Baltic Sea

DRAFT

Reconsidering how we understand sport fishing: Through the lens of human–nature reciprocity

Presenter: Rentaro Tahira - Fukuoka University Graduate School of Humanities, Japan
Co-authors: Rentaro Tahira
Email: ld244501@cis.fukuoka-u.ac.jp
Presentation type: Oral presentation

This study reconsiders sport fishing, which is often criticized from the perspective of animal protection through the lenses of stewardship and the traditional Japanese view of the “kakawari” (interconnectedness) between humans and nature.

Since the 17th century, fishing has been practiced in Europe primarily as a pastime of the aristocracy and, like hunting, has also served to display power. Such display included the reaffirmation of the human position as a being that dominates nature and this feature can still be observed in modern sport fishing. The act of releasing the fish or preserving it as a mounted specimen functions as a symbol of having won a contest against nature, especially in methods such as catch-and-release and trophy fishing. These practices have been criticized within animal protection thought, which seeks to move away from anthropocentrism, as emblematic of exploitative attitudes toward the environment grounded in Western modernity.

Today, sport fishing has come to be associated with environmental issues and conflicts with local communities. Accordingly, how should we grasp its anthropocentric orientation? This study argues that an effective approach can be found in the concepts of stewardship (Cf. Shephard, et al., 2024) and the idea of “kakawari (interconnectedness)” with nature (Cf. Kito, 1996). Within these frameworks, the relationship between humans and nature is relativized, and attention is drawn not only to the exploitative aspect of the fishing, but also to its social and cultural dimensions. These concepts allow the reinterpretation of the active involvement inherent in sport fishing as a form of engagement with the environment that can foster environmental awareness and ethical sensibilities. Rethinking of sport fishing through its active qualities invites a shift from anthropocentric critique to a relational understanding of human–nature interaction.

Keywords: Sport fishing, stewardship, kakawari

DRAFT

Impact of technological innovations on catch inequality in recreational spearfishing

Presenter: Giulio Tarantino - University of Barcelona
Co-authors: Valerio Sbragaglia, Antonio Terlizzi, Robert Arlinghaus
Email: giuliotarantino94@gmail.com
Presentation type: Oral presentation

Catch inequality is common in recreational and commercial fishing. It occurs when few fishers catch a disproportionate number of fish or when many fishers catch nothing or very little. Skill, experience and heterogenous investment of time and resources are typical factors proposed to underly catch inequality in both commercial and recreational fishing (Seekell, 2011). Technological innovations that have impacts on catch outcomes may either increase (if only adopted by a minority) or decrease catch inequality (if adopted by a majority and it reduces skill differences among fishers), We investigated the combined effect that technology and average fishers' skill levels have on catch inequality in a case of recreational fishing, relying on data from a monitoring program of Italian spearfishing tournaments from 2004 to 2024. We quantified catch inequality using the Gini coefficient and tested the effect of technological innovations (i.e., side -scan sonar and mobile lead) and average fisher skills (represented by different categories of tournaments) on inequality. The use of novel technologies did not impact catch inequality in spearfishing tournaments. Instead, the average fisher skill level in a tournament had a significant effect on catch inequality, where catch inequality was substantially lower in the highest ranked categories that represented the most skilled spearfishers. We conclude that a minority of highly skilled fishers are responsible for the majority of catches and are the key source of catch inequality. By contrast, at least in the case of fishing tournaments, the appearance of novel technology did not alter catch inequality, probably because it was adopted by all fishers in a given tournament and because there is a skill effect in using novel technology.

Keywords: Side scan sonar, live image sonar, Gini coefficient, Fisher's ability, recreational fishing management

DRAFT

Artificial reefs in Western Australia: a review of over a decade of habitat enhancement for resilient recreational fisheries

Presenter: James Florison - Recfishwest
Co-authors:
Email: james@recfishwest.org.au
Presentation type: Oral presentation

Artificial reefs are increasingly being deployed around the coast of Australia to enhance aquatic habitats and increase recreational fishing experiences and opportunities. In Western Australia (WA), eight artificial reefs for recreational fishing have been deployed since 2013. These reefs are made up of almost 1000 modules from eight different designs in total weighing over 2,500 tonnes. Covering over 330,000 m^2 of what was once desolate seafloor, these structures now provide habitat to a range of recreational target species and provide unique fishing experiences in support of WA's 750,000 recreational fishers. Each of these reefs are vastly different with regards to scale, material, design, purpose, fishing methods, target species, and monitoring and research methods and outcomes. In this study we will investigate the evolution of materials, opportunities and challenges to ensure continuous improvement in artificial reef programs, to provide the best value to fishers. Some areas of focus include reef material, funding source variability, community advocacy and stewardship, alternative decommissioning, citizen science and navigating legislative/approvals pathways. An extension from previous presentations at the WRFC (Canada and Melbourne), this presentation will review over a decade of artificial reef developments in Western Australia and illustrate how the evolution of aquatic habitat enhancement, retention and restoration is contributing to resilient recreational fisheries.

Keywords: Recreational fishing, artificial reef, habitat enhancement, habitat retention, research

DRAFT

Reimagining African coastal food heritage: Decolonising knowledge for sustainability and cultural resilience

Presenter: Jessica Thornton - Nelson Mandela University
Co-authors:
Email: jessleighthornton@gmail.com
Presentation type: Poster presentation

This poster explores African coastal food heritage as a living archive of cultural identity, ecological knowledge, and community resilience along the continent's shorelines. Moving beyond static notions of tradition, the project highlights coastal foodways as dynamic practices that embody human adaptability, spiritual connection to the sea, and sustainable lifeways. It challenges Eurocentric narratives in food heritage discourse by foregrounding Indigenous Knowledge Systems rooted in coastal ecologies.

The research draws on symbolic interactionism, cultural ecology, and social theory to investigate the symbolic, spiritual, and ecological meanings embedded in coastal food practices. Using sensory ethnography, oral histories, culinary workshops, and participatory food mapping, the study captures the lived and embodied experiences of coastal communities.

Case studies from South Africa, Namibia, and Kenya reveal how traditional fishing, foraging, and preservation methods serve not only as adaptive responses to environmental and social change, but also as powerful acts of cultural continuity and ecological stewardship. These examples demonstrate the critical role of coastal food heritage in addressing global challenges like marine degradation, climate change, and food insecurity.

The poster also presents inclusive tools, such as digital storytelling and community mapping, to support ethical documentation and revitalisation of coastal food knowledge. Ultimately, this work reimagines African coastal food heritage as a vital resource for building sustainable, just, and locally grounded food futures.

Keywords: Coastal food heritage, African shoreline communities, Indigenous Knowledge Systems, ecological sustainability, decolonial food studies, sensory ethnography

DRAFT

Profiling recreational fishers to inform recovery of a depleted stock: Insights from Tasmania's sand flathead fishery

Presenter: Sean Tracey - Institute for Marine and Antarctic Studies - University of Tasmania
Co-authors: Sven Frijlink, Alexia Graba-Landry, Mary Mackay, Steven Rust, Kate Stark, Barrett Wolfe
Email: Sean.Tracey@utas.edu.au
Presentation type: Oral presentation

Effective management of recreational fisheries requires understanding the diversity of fisher values, behaviours, and motivations, particularly when public support is critical to stock recovery. In Tasmania, Sand Flathead (*Platycephalus bassensis*) comprise 68% of the recreational scalefish catch and are targeted by approximately 70% of the state's 106,000 recreational fishers. The total catch is attributed 98% to the recreational sector. Following a 2022 stock assessment that classified the fishery as depleted, a survey of 1,453 fishers was conducted to evaluate demographic and psychographic factors influencing perceptions of stock health and support for potential management actions. In addition to standard demographic profiling, four psychographic typologies were applied: (1) environmental value orientation (biospheric, altruistic, egoistic), (2) fishing motivation (e.g., sport, leisure, community), (3) fishing modality (platform, gear, and species targeted), and (4) harvest versus recreation orientation. Profiles revealed distinct differences in awareness, satisfaction, and support for management. Recreation-oriented, biospheric-altruistic, less avid, and shore-based fishers were more likely to perceive the stock as depleted, express dissatisfaction with catch size and abundance, and support stricter measures, particularly lower bag limits. In contrast, harvest-oriented and more avid boat-based fishers, including community and marine generalist types, were more resistant to change and less likely to perceive poor stock conditions. These findings highlight the value of integrating psychographic segmentation into recreational fisheries management. Targeted, profile-specific engagement offers a pathway to improved legitimacy, compliance, and effectiveness of stock recovery strategies in high-participation, data-limited fisheries such as Tasmania's Sand Flathead fishery.

Keywords: Typologies, human dimension, recreational fisheries, fisheries management

DRAFT

Assessing species substitution potential to support sand flathead stock recovery in Tasmania

Presenter: Sean Tracey - Institute for Marine and Antarctic Studies - University of Tasmania
Co-authors: Sven Frijlink, Alexia Graba-Landry, Mary Mackay, Steven Rust, Kate Stark, Barrett Wolfe
Email: sean.tracey@utas.edu.au
Presentation type: Oral presentation

As management measures are introduced to rebuild Tasmania's depleted sand flathead stock, understanding species preferences of recreational fishers offers a tool to assess and promote catch substitution, maintaining engagement while reducing fishing mortality. Using data from a 2023 survey of 1453 fishers, this study analysed the relative experiential and consumptive value of 15 commonly caught scalefish species. Respondents rated sand flathead highest across all measures, with 99% reporting catching and eating the species, and over 80% assigning a rating of six or above (on a 10-point scale) for both fishing enjoyment and eating quality. Tiger Flathead and Southern Calamari followed, though substitution potential is limited by depth preferences and current stock status, respectively.

Several range-extending or underutilised species, such as kingfish, King George whiting, and snapper, were identified as promising substitutes due to high ratings among those who catch them, accessibility from shore and boat, and anticipated biomass increases under climate change. Species like Eastern Australian salmon, while abundant and sustainable, were rated poorly for eating and catching, suggesting the need for targeted education to improve perceptions. Conversely, high-quality but underappreciated species such as ocean perch and gurnard could be better utilised with improved handling and preparation knowledge. Our findings indicate no single species can replace the cultural and experiential value of sand flathead. However, strategic promotion of selected species, alongside management, may help buffer effort displacement. Substitution strategies should be paired with sustainability assessments and informed outreach to maximise acceptance and avoid unintended impacts on other stocks. These insights offer a pathway to more adaptive, fisher-centered management during stock rebuilding, particularly for high-participation, multi-species recreational fisheries.

Keywords: Species substitution, recreational fisheries, fisheries management, behavioural change, human dimensions

DRAFT

Rethinking our relationship with the fishing ground: Angler-led stewardship and resource monitoring without stocking

Presenter: Jun-ichi Tsuboi - Japan Fisheries and Education Agency
Co-authors: Wakabayashi M, Furuya M
Email: tsuboi118@affrc.go.jp
Presentation type: Oral presentation

Inland recreational fisheries often face complex challenges such as environmental change, habitat degradation, and fishing pressure, yet they typically lack formal stock assessments. Originally designed for large-scale marine systems, many conventional assessment tools are not suitable for inland contexts. Instead, flexible, community-based approaches can offer practical alternatives.

In Japanese mountain streams, salmonids such as white-spotted charr and red-spotted masu salmon are popular targets for angling. In the Hikawa River, a tributary of the Fuji River basin, local anglers, the fisheries cooperative, and scientists have collaborated since 2018 on an annual Petersen mark-recapture survey. Anglers working with a researcher conducted the marking survey using single-pass electrofishing in early summer, followed by voluntary recapture reports by anglers through the fishing season. In 2023, driven by anglers' growing desire to catch beautiful, truly wild fish, they reached a consensus with the cooperative to suspend all hatchery stocking within the monitoring section.

As of the 2025 survey, no clear decline in resource abundance has been detected. This outcome suggests that sustainable use and conservation of stream salmonids can be achieved without hatchery-reared fish stocking. The approach represents a shift away from top-down propagation obligations led by government authorities toward local stewardship.

This collaboration has resulted not only in maintaining wild populations, but also in revitalizing the area, as seen in increased angling license sales and greater participation. Although this is a single case from a small stream, it demonstrates how inland recreational fisheries can function sustainably through a feedback loop of monitoring, assessment, community-based decision-making, and visible outcomes. It also suggests a transferable model for participatory governance in other inland fisheries.

Keywords: Citizen science, resource monitoring, mark-recapture, participatory governance, wild salmonids

Latitudinal clines in territorial aggressiveness and angling vulnerability in an amphidromous fish

Presenter: Jun-ichi Tsuboi - Japan Fisheries and Education Agency
Co-authors: Oda N, Yamashita Y
Email: tsuboi118@affrc.go.jp
Presentation type: Oral presentation

In many organisms, high-latitude populations exhibit slower growth and extended lifespans due to colder climates. However, in semelparous species with a single-year lifespan, individuals must grow and mature within a short summer period. This can lead to faster growth at higher latitudes—a phenomenon known as countergradient variation, though the behavioural mechanisms underlying such patterns remain poorly understood.

We investigated this phenomenon in ayu (*Plecoglossus altivelis*), a semelparous fish that feeds on benthic algae and establishes feeding territories. Its territorial behaviour forms the basis for a traditional Japanese fishing method called “tomozuri,” in which a live decoy fish is used to provoke territorial attacks from wild individuals. This approach allows behavioural aggressiveness to be quantified as angling vulnerability.

To isolate geographic behavioural differences from environmental effects, we conducted a common-garden experiment in central Japan, comparing ayu populations originating from southern, central, and northern regions under identical conditions. All fish were individually marked with fluorescent elastomer tags, enabling us to track individual patterns of growth and maturation throughout the experiment.

Our preliminary data indicate a clear latitudinal trend in territorial attack frequency, with individuals from the northern population exhibiting significantly stronger aggression. Interestingly, southern fish also showed high aggression and growth, possibly reflecting regional time constraints such as the need to spawn before frequent autumn typhoons. These findings support the hypothesis that behavioral adaptations can compensate for the constraint of a short growing season, enabling rapid growth and maturation despite strict seasonal limits.

Keywords: Territorial aggression, growth compensation, countergradient variation, latitudinal gradient, behavioural adaptation

Warming waters and shifting behaviours: Cognitive limits and species interactions in a recreational fishery under climate stress

Presenter: Kelsey Vaughn - University of Georgia
Co-authors: Craig W. Osenberg
Email: kelsey.vaughn@uga.edu
Presentation type: Oral presentation

Temperature is a fundamental driver of animal behaviour and fitness. As climate change increases the frequency and intensity of thermal stress events, new challenges are posed for recreationally important fish species. In ectothermic fishes, such as those targeted by anglers, thermal stress can influence the foraging success, predator avoidance, and catchability. This study explores how elevated temperatures affect cognitive performance—including learning, memory, and decision-making—in a freshwater predator-prey system. Through controlled experimental trials, we compare the performance of both naive and experienced predators (*Pomoxis annularis*, a species commonly targeted in recreational lake fisheries) and prey (*Pimephales promelas*, a common co-occurring bait fish) across three temperature treatments to assess how warming influences learning and, by extension predator efficiency and prey avoidance behaviours. Further, by separately allowing both species to learn, we can better uncover how temperature-driven cognitive limitations shape the outcomes of predator-prey interactions under changing thermal conditions. These effects may influence broader food web structure, ultimately yielding potential consequences for angler catch rates, species interactions, and fish community structure. This novel behavioural lens highlights the importance of incorporating cognitive and ecological responses into recreational fisheries management. By identifying temperature-sensitive mechanisms underlying fish behaviour, our results will contribute to a more intricate understanding of climate impacts that may affect recreational fish populations and their future sustainability.

Keywords: Climate impacts, thermal stress, thermal response, sustainability

DRAFT

Impact of wading on brown trout egg and fry mortality

Presenter: Santtu Voutilainen - University of Eastern Finland
Co-authors: Aatu Turunen, Janne Jansa, Pekka Hyvärinen, Anssi Vainikka
Email: voutilainen.santtu@gmail.com
Presentation type: Poster presentation

Brown trout (*Salmo trutta*) is an iconic target of recreational fishing yet under population declines in many locations including Finland. It has suffered from overfishing, construction of dams and destruction of breeding habitats.

Wading is a common practice in fly fishing. It can have a trampling effect on organisms as well as indirectly cause mortality through disturbance. Brown trout eggs hatch in April-May and the fry emerge from gravel in early June.

The purpose of this study was to experimentally evaluate the mortality rate caused by trampling on or near spawning nests, and to determine whether wading increases the risk of predation of young of the year trout by Eurasian perch. The experiments have taken place in the summer of 2025 at Kainuu Fisheries Research Station of Natural Resources Institute of Finland. Wading treatments on eggs were carried out in two riffle-pool ponds, each containing eight boxes through which water could flow. Each box contained five spawning nests, each with 25 eggs. In the last tested boxes, the eggs had hatched, and the alevins were stomped on. The wading tests on juveniles comprised four replicated trials. First temporal replicate was made on one-year-old juveniles and rest on young of year parr. One test session lasted for one week, during which the pools were waded through for 15 minutes, seven times in total. Once the experiment was complete, the pool was emptied, and the live parr were counted. The experiment used eight pools, four of which were perch pools and the rest of which were control pools without predators. Two of the perch pools and two of the standard pools were waded, and the results are compared. The results will be available by the time of the conference and discussed under a need to implement wading restrictions in fly fishing destinations.

Keywords: Fly fishing, brown trout, wading, endangered species

DRAFT

Catch me if you can: Spatiotemporal changes in pelagic recreational fishes determined from long-term catch (MRIP) data

Presenter: Bethany Wager - North Carolina State University
Co-authors: Schliep EM, Buckel JA
Email: wagerbethany@gmail.com
Presentation type: Oral presentation

Spatiotemporal shifts in migration patterns and distribution of marine fishes are occurring because of climate change. Although there have been studies examining these shifts along the US east coast, many of these studies have used trawl data that may not capture larger or faster swimming fishes. The NOAA Fisheries' Marine Recreational Information Program (MRIP) has collected catch data since 1981 and may be useful to examine climate effects on fish that have lower catchability rates in trawl surveys. We used MRIP data to assess changes in phenology and range shift signals for multiple pelagic recreational species across thermal preference gradients over the last four decades. We identified a northward range shift in species of narrow thermal preferences, and neutral or slightly southern range shifts in species of wide thermal preferences. Earlier arrival dates occurred more often for species of narrow thermal preferences. These results provide a better understanding of how climate change is impacting the phenology and distribution of important recreational fishes that are not easily captured in fishery-independent trawl surveys. By understanding current and past distributions of recreational species with MRIP data we can work towards incorporating these spatiotemporal changes into management plans for both socioeconomic and ecological benefits.

Keywords: Spatiotemporal, climate change, phenology, distributions

DRAFT

Ancient waters, living knowledge: Strengthening recreational fishing through Indigenous cultural practice and community leadership

Presenter: Corey Walker - Burnanga Indigenous Fishing Club Inc
Co-authors:
Email: burnanga.ifc@gmail.com
Presentation type: Oral presentation

Burnanga Indigenous Fishing Club Based on Yorta Yorta Country in Victoria, Burnanga Indigenous Fishing Club is a First Nations-led organisation that uses cultural fishing and river care to strengthen identity, wellbeing, and environmental stewardship. For us, fishing is more than recreation—it's a healing practice, a connection to Country, a form of knowledge-sharing, and a way to reclaim cultural space. This oral presentation highlights how Burnanga has become a national leader in Indigenous-led recreational fishing and waterway management through partnerships, advocacy, and community-driven programs.

Key Projects: Dunyak Moira – Restoring water storages into culturally significant fishing lagoons with Goulburn Valley Water, featuring fish stocking, cultural co-design, and inclusive access; Biyala Woka – A cultural water monitoring model in partnership with ARI, VEWH, VFA, CMA and CEWH, including youth engagement, the Burnanga Festival, and on-Country data collection; Comm Water – Events bringing Aboriginal families together around water, storytelling, and traditional fishing; Printing & IT – Youth-led initiative promoting digital and design skills through fishing-themed apparel and educational materials.

Major Events: Burnanga Festival; Violet Town Cultural Fishing Day; Women in Recreational Fishing Day; Family Fishing Weekends; NAIDOC Cultural Activities; Inclusive Fishing Competitions

Community Impact: Burnanga mentors Aboriginal groups across Victoria to establish their own fishing clubs, promoting self-determination, cultural pride, and intergenerational learning.

Recognition & Future Goals: Burnanga was recognised at WRFC10 for innovation in cultural fisheries. We now aim to build a Women in Fishing Network and a Youth Cultural Exchange Program, connecting First Nations communities across the globe through shared fishing and river care traditions.

Keywords: Indigenous-led initiatives, cultural fishing, river care, community well-being, ecological stewardship, cultural identity

Soft plastic fishing lures as potential source of aquatic pollution

Presenter: Marc Simon Weltersbach - Thünen Institute of Baltic Sea Fisheries
Co-authors: Lewin W-C, Sühring R, Fries E, Solomon M, Brinkmann M, Strehlow HV, Freese M
Email: simon.weltersbach@thuenen.de
Presentation type: Oral presentation

Soft plastic lures (SPLs) are widely used artificial baits in recreational angling. Anglers frequently lose SPLs during fishing, yet little is known about the environmental impacts of these lost items. Like other plastic products, SPLs may contain phthalates and other persistent additives that can leach into aquatic environments. In this study, 16 commonly used SPL models were randomly selected and analyzed for the leaching of water-soluble, persistent plastic additives, including phthalates. Additionally, a subsample of 10 SPLs was tested for estrogenic activity using luciferase reporter gene bioassays. Over a 61-day period, 10 out of 16 SPLs released the target phthalates dimethyl phthalate (DMP), diethyl phthalate (DEP), benzyl butyl phthalate (BBP), and di-n-butyl phthalate (DnBP), with median detectable concentrations ranging from 10 ng/g BBP to 1001 ng/g DMP. In total, 45 persistent, mobile, and toxic (PMT) plastic additives were detected. DEP was the most frequently detected phthalate (in 8 SPLs), followed by BBP (2 SPLs), DMP (2 SPLs), and DnBP (1 SPL). One SPL extract—despite relatively low phthalate and PMT levels—showed strong estrogenic activity in the bioassay, suggesting the presence of potent endocrine-disrupting substances not targeted by the analytical methods used. To complement the laboratory work, a mail survey was conducted in Germany to assess angler attitudes toward SPLs. Results indicated that SPL loss is common, and most respondents expressed concern about potential ecological impacts. A majority supported ingredient labeling and legal restrictions on toxic substances in SPLs. This study demonstrates that SPLs can be a source of environmental contamination and may pose human health risks. Given their widespread use in recreational angling, further investigation into SPL composition, ecological impact, and regulatory measures is warranted.

Keywords: Aquatic pollution, soft plastic lures, leaching, phthalates, PMT plastic additives, angler questionnaire

Hook selectivity and post-release survival of flatfishes in the Baltic Sea recreational fishery

Presenter: Marc Simon Weltersbach - Thünen Institute of Baltic Sea Fisheries
Co-authors: Lewin W-C, Haase K, Funk S, Ferter K, Strehlow HV
Email: simon.weltersbach@thuenen.de
Presentation type: Oral presentation

Flatfishes such as plaice (*Pleuronectes platessa*), flounder (*Platichthys flesus*), and dab (*Limanda limanda*) are important target species in European marine recreational fisheries. In the Baltic Sea, German anglers release 25% of their flatfish catches. However, little is known about post-release survival and sublethal effects of catch-and-release for these species, limiting assessments of recreational fishing mortality and sustainable management. This study aimed to assess angling gear selectivity, post-release survival, and factors influencing mortality in recreational flatfish fisheries. It also sought to develop practical recommendations for anglers and managers to reduce post-release mortality and improve fish welfare. Within a citizen science framework, 195 volunteer anglers participated in a six-month diary study using standardized rigs with small (size 2) and large (size 2/0) hooks, reporting 623 fishing days and catching 1,763 plaice, 883 dab, and 1,370 flounder. A complementary field experiment aboard a charter vessel in the western Baltic Sea tested the same hook types, along with a modified small hook featuring a swallow barrier. Net cage holding trials were conducted to determine survival 6–7 days post release (n = 1,901 fish). Results showed that hook size and type had minimal effect on overall catch rates, but larger hooks caught slightly larger fish and significantly reduced deep hooking. Deep hooking rates were very low for the modified hooks with swallow barrier. Overall post-release mortality was low (6.9%), with species-specific rates from 4.1% in flounder, 6.6% in plaice to 8.7% in dab. Mortality increased with deep hooking, small hook use, prolonged air exposure, and high water temperatures. The findings demonstrate high survival of released flatfish and support measures to improve survival, such as using hooks with gapes >13 mm. Promoting specialized hook designs and unhooking tools would further enhance post-release survival and fish welfare.

Keywords: Baltic Sea, catch-and-release, citizen science, flatfish, post-release mortality

DRAFT

Contaminant exposure of recreational fishers: Evaluating risks and benefits from catch consumption in Norway

Presenter: Martin Wiech - Institute of Marine Research
Co-authors: Lisbeth Dahl, Keno Ferter, Quang Tri Ho, Marian Kjellevold, Maria Wik Markus, Ole-Jakob Nøstbakken, Lilly Camilla Småland
Email: Martin.Wiech@hi.no
Presentation type: Oral presentation

Recreational fishers are exposed to contaminants and nutrients through the consumption of their own catches. But are they really exposed to more contaminants than the average population, and could this exposure be harmful? The easy access to seafood caught closer to shore and contaminated areas compared to people consuming commercially caught seafood, suggests that recreational fishers are more vulnerable to high contaminant exposure. In this presentation exposure estimation methods will be introduced, discussing case studies from Norway. The methods introduced could be applied on a broader scale to assess risks and benefits. Further, food security aspects regarding the consumption of seafood caught by recreational fishers will also be presented.

Consumption data collected from a food frequency questionnaire among a convenient sample of adult Norwegian recreational fishers and occurrence data on selected important contaminants and nutrients in a wide assembly of seafood items were used to assess the exposure. Results showed that recreational fishers consumed more seafood than the general population. However, only the highest consumers were at risk of exceeding the health-based guidance value for mercury, while the consumption contributed significantly to the recommended intake of omega-3 fatty acids, and somewhat also to essential micronutrients such as iodine and selenium. Findings from a case study assessing the mercury exposure in recreational nephrops fishers were similar, with only the highest seafood consumers being at risk. However, for certain high consumers of seafood items containing high levels of contaminants, such as organic pollutants in Atlantic bluefin tuna or other pelagic species, or cadmium in brown meat of crab, caution is advised.

Keywords: Contaminants, nutrients, risk-benefit, food security, food safety

The current status based on updated population dynamics of west coast steenbras, *Lithognathus aureti*, in Namibia

Presenter: Margit Wilhelm - University of Namibia
Co-authors: Veii A, Shikongo A, Nghipangelwa N, Schwamborn R
Email: mwilhelm@unam.na
Presentation type: Oral presentation

West coast steenbras *Lithognathus aureti* is heavily exploited by recreational and small-scale commercial anglers in central Namibia. Their life history strategy is a protandrous hermaphrodite, and according to anglers, their local (central Namibian, the area open to fishing) catch rates have severely depleted in the last decade/s. Despite these great concerns, no updated assessments for *L. aureti* are available since the mid-1990s. In this paper, we present updated life history parameters and an updated stock status of *L. aureti* in Namibia, based on length-frequency analysis (LFA), otolith-based length-at-age (LAA) analysis and tag-and-recapture (T&R) analysis, length-based selectivity and mortality estimation and a dynamic age-structured production model (ASPM). *Lithognathus aureti* catch and effort data recorded of the recreational fishery in Namibia from 1995 to 2017 indeed confirm that their catch rates have severely declined in central Namibia (the area open to fishing). LFA, LAA and T&R analysis combined revealed that they are extremely slow-growing and longevous, and tend to display intermittent strong and weak recruitment years. Given the overexploitation this adds to their vulnerability and trouble to recover of this local depletion. Length and gonad maturity revealed a length at sex change for the first time (males to hermaphrodites, 36-43 cm fork length, S to N), and for the second time (hermaphrodites to females, 53-50 cm fork length, S to N) with a L50 occurring around the same length as the sex change. Catch curve analysis shows a mean total mortality of around 0.34, with about half of this being fishing mortality. The ASPM displayed a current depletion level of 13-14%, calling for drastic changes to the fishing activities. We thus recommend a reduced daily bag limit and an introduction of a slot limit for the long-term sustainability of this important stock in the Namibian recreational and small-scale commercial fishery.

Keywords: Stock assessment, fishing mortality, fisheries management, growth rate, length at sex change, CPUE

DRAFT

Pursuing the magic number: Estimating species-specific post-release mortality in marine recreational fisheries through systematic review

Presenter: Alexander Winkler - Rhodes University
Co-authors: Matthew Farthing Warren Potts, Simon Weltersbach, Keno Ferter, Zachary Radford, Kieran Hyder
Email: alexwinkrsa@gmail.com
Presentation type: Oral Presentation

Most recreational fisheries are largely open access, managed through output controls (bag limits and size limits) rather than traditional input controls which are often used to regulate commercial effort. A growing conservation-oriented sentiment amongst recreational anglers has also led to many anglers voluntarily releasing their catch. In conjunction with this, the outcomes of output management controls, equate to many recreationally captured fish being caught and released. While some nations monitor the number of recreationally landed fish that are retained, little is known about the fate of released catch. It is often, however, argued that without a clear indication of PRM, stock assessment estimates for species that encounter heavy recreational fishing pressure may be incorrect. Previous attempts to review the current body of C&R literature have been successful; these studies have often focused on singling out specific drivers of C&R mortality. There has been little effort to estimate species-specific PRM, a “magic number” that fisheries managers are constantly pursuing. Due to previous review attempts on the topic focusing on the drivers of mortality, this review aimed to systematically review the literature that implicitly reported a magic number through a comprehensive analysis of globally published marine C&R mortality literature. In this study, we identified 102 unique studies that estimated this magic number in the marine realm, of which 164 unique post-release mortality estimates for 102 species across 36 families and 19 countries were found. This presentation is an attempt at summarising the findings of this review and includes recommendations on how C&R mortality studies should be conducted to most effectively estimate this important magic number.

Keywords: Marine, discard, post-release mortality, fisheries management, catch-and-release

DRAFT

Fixing a recreational fishing regulation that doesn't work: A case study of seasonal closures for black bass during the spawning period

Presenter: Joel Zhang - Carleton University
Co-authors: Philipp DP, Claussen JE, Suski CD, Nguyen VM, Young, N, LaRochelle L, Lombardo J, Cooke SJ
Email: joelzhang@cmail.carleton.ca
Presentation type: Oral presentation

Recreational fishing is an activity enjoyed by hundreds of millions of people worldwide and provide a suite of benefits that are complex and varied. Thus, the health of our recreational fisheries and the conservation of those recreationally important species is often at the forefront of management goals. Some species, such as Largemouth Bass and smallmouth bass, are heavily managed as some of the most popular recreational fishes in North America. This, along with the popularization of catch-and-release fishing for these species oftentimes leads us to believe that we are not causing changes to populations. Despite this, decades of research in eastern Ontario has shown that fishing for nesting bass during the spawning season can cause changes in population recruitment, rendering the current closed seasons largely ineffective. To combat this, freshwater protected areas known as black bass Spawning Sanctuaries are currently being tested in eastern Ontario where small areas of habitat are protected during an extended reproductive period for these species that will aim to be more enforceable and help maintain population numbers. To test the effectiveness of these sanctuaries a variety of projects are underway spanning both the ecological and human dimensions realms. We will discuss some of the historical recruitment data, its important implications for populations and fisheries-induced evolution, trends identified by expert anglers for adult populations, space use by these fishes in a protected area as well as stakeholder involvement and support and non-support for these new regulations. The entirety of these projects paints a complete picture of the potential future of Black Bass management in eastern Ontario and how we can aim to better manage these highly important species going forward.

Keywords: Protected areas, recreational fishing, black bass

DRAFT

When birds meet recreational fishers: Understanding interactions in a Protected Coastal Area of Argentina

Presenter: Francisco Zumpano - Instituto de Investigaciones Marinas y Costeras (IIMyC, CONICET-UNMDP), Mar del Plata, Argentina
Co-authors: Copelo S, Castano MV, García GO
Email: franciscozumpano@gmail.com
Presentation type: Oral presentation

The interaction between recreational fishers and birds has historically received little attention. The Mar Chiquita Coastal Lagoon (Argentina) is a site recognized under multiple conservation frameworks in which the spatial overlap between recreational fishing and birds may lead to interactions with potential ecological consequences. This study aims to address the following questions: (1) What is the spatio-temporal overlap between birds and recreational fishers? (2) Which bird species interact with fishers, and how frequently? (3) How do fishers and birds interact? and (4) What factors trigger these interactions? To answer these, 556 scans samplings and 200 behavioural observations of birds associated with fishers were conducted. A total of 1,652 fishers (22 ± 17 fishers/day), 1,925 fishing rods (25 ± 19 rods/day) and 14,152 birds (186 ± 340 birds/day) from 26 species were recorded sharing the same space. In the behavioural observations, a total of 515 associated birds were observed (5.15 ± 6.80 birds/h) corresponding to six species. A total of 1,163 non-contact interactions were recorded (11.64 ± 14.80 NCI/h) mostly flying (93%). On the other hand, 143 contact interactions were observed (1.43 ± 4.60 CI/h), of which 90% were bait stealing. Both types of interactions were affected by season, site, number of fishers, and number of baits offers. This study is the first to describe the nature of the fishers-bird interactions, quantify their frequency, and identify the behavioral triggers involved. This study provides valuable information that can inform awareness-raising strategies aimed at fishers and other coastal users.

Keywords: Fisheries, recreational fishing, anglers, conservation, coastal ecosystem, Argentina

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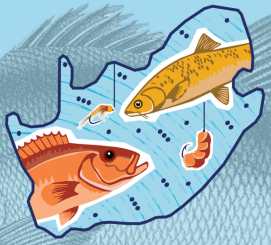

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