



Fishing non-compliance and culture

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ARTICLE INFO

Keywords:

Non-compliance
Fisheries regulation
Illegal fishing
Recreational fishing
Environmental crime
Western Australia

ABSTRACT

Lacking human and financial resources to monitor every catch, regulatory agencies promote cooperative compliance among recreational and commercial fishers alike, via accessible information campaigns and user-friendly guides. However, it appears that a section of the fishing community is resistant to educational initiatives and continue to breach licence conditions and fisheries regulations. Fishing non-compliers engage in opportunistic activities, which individually may not be significant, however in aggregate, could potentially be a major economic and environmental threat to Australian fisheries. In most legal frameworks, breaches of licence conditions and fishing regulations have real and significant penalties which are designed to dissuade potential offenders. Therefore, to ensure these legal frameworks are effective, understanding drivers for non-compliance, and fishers' attitudes towards these civil and criminal penalty regimes, are important. This paper critically analyses results from primary survey data collected from a cross-section of West Australian recreational and commercial fishers about perceptions of sanctions for fisheries infringements. The research applies criminological theory to interpret the rationale contributing to a 'culture' of non-compliance among some fishers. It concludes that greater use of sanctions can play a role in encouraging a 'culture' favouring compliance.

1. Introduction

Recreational fishing [1] is a cherished pastime worldwide that is an important part of the fabric of many societies. Although recreational fishers are generally prohibited from engaging in commercial fishing, the cumulative effect of the recreational sector may have the potential to negatively impact on fish stocks leading to measures to restrict recreational catches [2]. Laws and regulations to restrict fishing catches in Australian jurisdictions are therefore aimed at sustainably managing both commercial and recreational fisheries. To sustainably manage fish stocks these laws adopt a range of mechanisms including licences to fish or for fishing vessels, effort and gear restrictions, special and temporal closures, restrictions on sale and supply of fish and fish products, bag and possession limits, management regimes for specific fisheries, protected species and reserve areas, as well as penalties for breaches. Similar approaches to fisheries management occur across the world, although the specific legal systems may differ. The restrictions are often underpinned by stock assessments, which rely in part on reported commercial catches and surveyed recreational users. However, given the three-dimensional nature of the marine environment and the high mobility of fish, assumptions and estimates have to be relied upon in

some fisheries [3]. Although management settings are usually conservative to allow for some margin of error, high levels of non-compliance can invalidate assumptions about catch and effort and so undermine achievement of sustainable management goals. Non-compliance may negatively impact the reputation of the regulator and its (in)ability to manage recreational and commercial fisheries equitably. Therefore, to maintain sustainable, equitable fisheries, it is essential to make efforts to encourage compliance with regulator rules and regulations, and to deter a culture of behaviour that normalises fishers' engagement in non-compliance.

Research from other jurisdictions around the globe has analysed fishers' perceptions and attitudes towards compliance. Many of these studies seek to understand non-compliance from an economic, social, and ecological perspective. For example, Bloomfield et. al studied the perceptions of fish abundance and compliance in no-trawl areas in the United Kingdom and found that while fishers were aware of local no-take areas, non-compliance was common [4]. A Tanzanian study considering the perceptions of non-compliant fishing and marine ecosystem health found a strong culture in support of breaking fishing rules [5]. A Spanish study looking at incentives and sanctions found that greater value was placed on penalising default than rewarding

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compliance [6]. A south-eastern African study concluded that greater transparency with fishers about costs and benefits would increase compliance with selected fisheries regulations [7]. While the specific mechanisms in place to set catch limits, manage quotas and monitor and enforce regulations differ between nations, collectively, the results from these studies show that while fishers are aware of the law a culture of non-compliance is common, but of variable extent and impact.

Recent criminologically-focused research provides a useful backdrop, including Brazilian research that investigated trust in scientists as a predictor for reportedly common and overt fisheries noncompliance in one rural fishing community [8]; and Scandinavian research that considered the quality of compliance, which found “few fishers who willingly and knowingly were committed to uphold regulation; instead, feelings of alienation and therefore a reluctance to engage with regulation and authorities seem engrained and common *modus operandi* for this group even in a fishery with relatively high compliance” [9].

This is further supported by research that found fishers valued involvement in government decision-making, which enhanced the likelihood of regulatory success [10]. Unpacking motivations for non-compliance, such as these, are useful to inform policymakers and government agencies tasked with deterring non-compliance. To contribute to the criminologically-focused literature in the field, this study critically analyses the perceptions of non-compliance from a criminological perspective to understand whether there exists a real or perceived culture of non-compliance among some fishers.

Within this context, this research explores the fisheries landscape in Western Australia (WA) as a case study. The WA Government developed and adopted, simplified fisheries legislation to safeguard ‘aquatic resources and enable responsible fishing development in a dynamic environment’ [11]. Through the implementation of this legislation, the *Aquatic Resources Management Act 2016* (WA), the government fisheries agency seeks to provide ‘effective, efficient, and integrated fisheries and aquatic resource management...based on the principles of ecologically sustainable development’ [12].

As part of a desire to use administrative law rather than criminal sanctions, the fisheries regulator surveyed fishers to determine attitudes towards breaches of the law and the level of sanctions that could be imposed. This inclusive approach is consistent with good governance principles broadly, and particularly in relation to public participation [13]. In addition, the approach is also reflected in the new Act itself which notes that objectives are to be achieved by “encouraging members of the public to actively participate in decisions about the management and conservation of aquatic resources and aquatic ecosystems” [14] and “ensuring that the interests of different sectors of the community that use aquatic resources or aquatic ecosystems are identified and considered” [15]. Given the context of pre-existing sanctions, the survey sought to achieve several goals: to reiterate and educate participants while also gauging perceptions of the use of penalties ranging from time-limited licence bans, permanent licence revocation and no action. The results provide insights that can inform law- and policymakers in enhancing fisheries regulatory regimes, in this jurisdiction and beyond.

Seeking to understand whether there exists a real or perceived culture of noncompliance among some West Australian fishers, this research paper considers three issues: (1) whether a normalised ‘culture’ of non-compliance exists among some fishers; (2) understanding whether perceptions of the imposition of sanctions for non-compliance with regulations are consistent with shaping a culture of compliance; and (3) whether sanctions can assist in normalising a culture of complaint fishers. The inferences and conclusions drawn from the survey are included in this paper. Through the exploration of the culture associated with non-compliance among recreational fishers in the WA case study and conclude that imposing harsher sanctions should have a positive effect on strengthening the culture to more strongly supporting sustainability and equity.

2. Understanding the nature and extent of non-compliance

2.1. Failure to comply

Unpacking the reasons for non-compliance in the fisheries space is complex but applying criminological theory can be valuable. Anomie or strain theory helps to understand human behaviour. Merton’s version of anomie finds that when people do not conform to mainstream social standards, they may take an opportunity to offend [16]. The opportunity to offend is supported by the lack of adequate mechanisms in place to monitor and enforce cultural norms, however the desire and willingness to offend is paramount. Understanding why people fail to comply in the marine setting is useful in developing the appropriate protections and controls. The vastness of the marine environment makes it a particularly challenging place to scrutinise non-compliance, and breaches of fisheries regulations are difficult to monitor and enforce where there is little evidence at the site an offence has been committed. In this context it is critical to focus on underlying drivers of non-compliance to enhance the likelihood of regulatory success.

Several other criminological theories can be applied in seeking to understand the precursors to criminal activity. In 2004, Smith and Anderson reviewed non-compliance in the marine environment against several criminological theories and made some noteworthy findings [17]. One of their conclusions found that attitudes towards the law, and compliance with it, are key [18]. The failure to accept the legitimacy of regulations impacts on compliance [19]. A 2020 study that usefully synthesized non-compliance theories across criminology, economy, and psychology, finding a multidisciplinary approach is beneficial in understanding motivations towards (non-)compliance [20]. These are pertinent to this research that draws on survey data of cultural norms towards sanctions – what level they should be set at and when they should apply.

2.2. The necessity of compliance

Laws, rules, and regulations set a framework for compliance and consequences for non-compliance. Earlier research identifies the importance of good management of recreational and commercial fisheries, involving both top-down laws and regulations and mechanisms to encourage a culture of compliance [21]. Public recognition of good management practices can build trust and confidence in these frameworks, and more specifically can lead to third party certification, which in turn can have socio-economic benefits. An example can be seen in WA’s Peel-Harvey Blue Swimmer Crab fishery which received the world’s first combined commercial and recreational Marine Stewardship Council (MSC) certification [22]. Standards for fisheries sustainability are reviewed regularly and require a high threshold to be met and maintained for the catch method and supply chain of the fishery [23]. The holistic approach safeguards jobs, guards against fish stocks depletion, and protects the marine environment [24]. Maintaining this certification requires ongoing management by government, good stewardship from fishers and support from the community. Clearly, non-compliance with the law undermines the efficacy of the management practices.

2.3. Non-compliance by regulators

As noted previously, establishing a culture of compliance requires top-down standard-setting but must include bottom-up approaches, involving the community as well [25]. Nonetheless, effective guidance and leadership from government authorities is usually essential, and community expectations (as well as the rule of law) require regulators to adhere to the law. Where non-compliance is endorsed by regulators compliance culture is weakened. Indeed, “whenever greater power and discretion is granted to one or more individuals, it is essential that it is offset by a proportionate increase in the oversight of them” [26].

Situations where a regulator has acted contrary to his or her role are not uncommon [27] and have been demonstrated in Australia. For example, in March 2007, the WA Corruption and Crime Commission (CCC) began investigating alleged associations between a small number of WA Department of Fisheries' officers and illegal fishers. Although the matter involved alleged inappropriate activities of only a few Departmental officers, it implicated the then Acting Chief Executive Officer [28]. This defied community expectations that these should have been the very people with greatest responsibility to ensure legal and sustainable fisheries. The findings of the CCC investigation imply that non-compliance was accepted and endorsed in some areas of the Department at that time. Experienced Fisheries and Marine Officers were prepared to divulge information that could undermine investigations into non-compliance [29], and the Acting Chief Executive Officer, contrary to specific expert advice, provided information to a person who was in fact the subject of the investigation [30]. This case study highlights two important lessons: first, the culture of non-compliance can be normalised and therefore it becomes difficult to separate legitimate and illegitimate activity. Second, that culture can distort legitimate behaviour even within the regulating body. While this case is more than a decade old, the intervention by the CCC, created by a referral from a senior Departmental official, would have sent a clear signal to fishers, deterred any officers contemplating misconduct, and reinforced the internal Departmental commitment to compliance and good governance [31]. It is, however, just one example and jurisdictions throughout the world have struggled with similar challenges and responses [32].

3. Disentangling the influence of culture among non-compliers

3.1. Background

To understand perceptions of compliance within both recreational and commercial fisheries, an anonymous survey is a suitable mechanism commonly used in criminological research [33]. The online survey conducted by the then-WA Department of Fisheries (renamed as the Department of Primary Industries and Regional Development (DPIRD)) (the Department) informed participants that the purpose was to understand community perceptions in order to guide transparent and consistent application of sanctions against commercial and recreational fishers who repeat offend and/or commit serious fisheries offences. The survey was developed in consultation with the community and peak bodies, including the WA Fishing Industry Council (WAFIC) [34] and Recfishwest [35], with the intention of guiding a subsequent thorough and proper community consultation process to develop a contemporary ministerial policy guideline.

The background to the survey included the then-current legislation, the *Fish Resource Management Act 1994* (WA) (FRMA), which contained relevant penalty provisions. These included breaches of a prohibition on fishing, taking of a protected fish (including a recreationally protected fish), exceeding bag and possession limits, and breach of a management plan or managed fishery licence; with sanctions often limited to fines for first or subsequent offences [36]. Section 223 FRMA allowed a court to impose an additional penalty of cancelling or suspending any authorisation (i.e. a fishing licence) where the offender had been convicted of an offence. In addition, under section 224 FRMA an authorisation could be suspended for one year if the holder was convicted of three prescribed offences in a 10-year period. The subsequent *Aquatic Resource Management Act 2016* (WA) (ARMA) provides for broader powers to vary, suspend, refuse to renew, cancel, and/or require the surrender of, authorisations [37]. Authorisations can be suspended, not renewed, or cancelled for any breach of the Act or if the holder is considered "no longer a fit and proper person" to hold the authorisation [38]. Section 209 ARMA also contains a provision in relation to automatic suspension of an authorisation if three offences are committed in a 10-year period [39]. This new provision applies to recreational fishers similar to the

prior legislation but does not extend to commercial fishers.

3.2. Method

This research draws on data derived from the online survey conducted by the Department via Survey Monkey. The survey was developed to assist the Department understand the public's perceptions on compliance. The Department's survey was advertised via their online magazine, *Catch!*. That edition was emailed to 84,904 opt-in subscribers and was available via the WA Department of Fisheries website [40]. The survey was also advertised by stakeholders, the WAFIC and Recfishwest, via their websites and digital communication channels. Of the subscribers, 30,900 opened the newsletter of whom 3816 opened the survey. The survey ran for a period of 6 weeks [41] and generated responses from 945 participants, representing a participation rate of 24.7 % of *Catch!* subscribers who opened the survey. Most respondents participated within the week following the survey's release. The second peak response period emerged at the start of the following month, consistent with the timing of online communication disseminated by the WAFIC and Recfishwest.

3.3. Results

The survey comprised 14 questions; 12 multiple choice, and two open text questions (see Appendix A). Almost all participants responded to each question, many questions enabled multiple responses. Among the 945 respondents, the majority identified primarily as recreational fishers ($n = 929$), followed by commercial fishers ($n = 131$), see Table 1.³

Of the respondents who identified as recreational, 933 people identified that in the past five years, they engaged in fishing from a boat with a line ($n = 869$), 646 engaged in rock lobster fishing, and 599 engaged in fishing activity that does not require a licence (e.g. line fishing from shore). A smaller proportion of participants engaged in abalone fishing ($n = 162$), freshwater angling ($n = 159$), netting ($n = 142$), and marron fishing ($n = 105$), see Table 2 [42].

3.3.1. Attitudes towards sanctions for recreational fishers' non-compliance

Attitudes reported in this study are shaped by participant perceptions about the likelihood of detection, acknowledging that participant bias may exist. The Department may issue fines; pursue licence suspension, cancellation, or may refuse to grant a new fishing licence for those who are convicted of a serious fisheries offence; or indeed have the matter decided by a court [43]. To assess the perceptions of these sanctions, the survey asked participants what sanctions should be imposed for serious offences such as interfering with other people's fishing gear, selling fish

Table 1
Respondent fisher categories (multiple selections could be chosen).

Fisher categories	N
Recreational fishers	929
Commercial fishers	131
Fishing charters industry	68
Conservation and environmental sector	51
Retail, wholesale, and processing fishing sector	16
Aquaculture/pearling industry	15
Customary fishers	15
Non-fishers	11
Other (please specify)	8

³ In response to Q1, 'Select the fishery related group (or groups - you can select more than one) you identify with', some respondents selected more than one option and therefore the total values for recreational and commercial participants exceed the 945 participants.

Table 2

WA fisheries engaged in within the 5 years prior (multiple selections could be chosen).

Recreational fishing type	N
Line fishing from a boat	869
Rock lobster fishing	646
Fishing activity that does not require a licence (e.g. line fishing from shore)	599
Abalone fishing	162
Freshwater angling	159
Netting	142
Marron fishing	105

illegally, or taking large quantities of fish over the bag limit. Most participants ($n = 594$, 62.9 %) responded that sanctions should be issued across all licence categories, and restrictions placed on a person's ability to obtain a future licence if one is not held at the time, see Table 3. Only 13 participants (1.4 %) thought no sanctions should be applied. While it is unsurprising that participants agree that sanctions should apply, almost 63 % of participants believed that these sanctions should apply across all categories. This may indicate a low tolerance for those who engage in serious offences and a common belief that illegal activity in one fishery should attract sanctions that apply more widely to all future fishing activity.

Breaking down the sanctions further (see Fig. 1), shows perceptions for the categories of non-compliance.

In a situation when a person is convicted of illegally selling recreationally, or illegally caught fish, the largest response category ($n = 254$, 26.9 %) believed a permanent licence revocation should apply. However, at the aggregate level, almost half ($n = 446$, 47.2 %) responded that a minimum suspension of between two and five years should be imposed, followed by a minimum 12-month suspension ($n = 163$, 16.2 %), see Fig. 1. This could be taken to mean that at least 27 % of survey participants do not engage in non-compliance given their support of permanent licence suspensions for those who fail to comply. Alternatively, it could indicate that most respondents do not believe that they will be caught, so the penalty is irrelevant. Two thirds of the respondents believed a relatively short suspension should apply; therefore, it could be interpreted that it is foreseeable that some participants may on-sell their catch [44]. This interpretation is consistent with other research findings generalising that when increased sanctions are applied fairly, there is also an increase in compliance, or induced expectations of cooperation [45]. Some fishers may be unaware of the illegality of on-selling their catch, or deem it to be a minor offence, and so are transferring their views of penalties that result from other perceived low level illegal activity, such as traffic offences and shoplifting.

Almost half of the participants ($n = 447$, 47.3 %) responded that recreational fishers convicted of interfering with other people's fishing gear (i.e. pulling another person's rock lobster pots without their knowledge and stealing their catch or pots) should have their licence revoked permanently. While a seven year sanction ($n = 43$, 4.5 %) was less popular than a five year sanction ($n = 211$, 22.3 %), see Fig. 1. The

Table 3

Perceptions of sanctions for convicted serious fisheries offences (such as interfering with other people's fishing gear, selling fish illegally or taking large quantities of fish over the bag limit).

Sanctions	N	%
No action	13	1.4 %
Sanction related to that licence category only (e.g. - for a rock lobster offence, only suspend a person's rock lobster licence and not their fishing from a boat licence)	130	13.8 %
Sanction across all licenced categories (e.g. - for a rock lobster offence, suspend a person's rock lobster, fishing from a boat, abalone, and marron licence)	208	22.0 %
Sanction across all licenced categories, and restrict a person's ability to obtain a future licence if one is not held at the time	594	62.9 %

survey responses show a very low tolerance for those who interfere with other fishers' equipment. Furthermore, while the response rate from this group was low, commercial fishers are likely to also favour harsh penalties for gear interference by recreational fishers as it poses a serious threat to commercial profitability. As such, unsurprisingly, higher sanctions are perceived as most appropriate. Perhaps those engaging in criminal activity would be unlikely to openly show support for penalties being waived for offences they commit. While interesting, therefore, the result that only nine (0.95 %) participants did not believe any action should be taken against those people, cannot be taken to indicate that less than one percent of the WA recreational fisheries population may engage in these activities. Instead, it is plausible that a far greater population may engage in interfering with fishing gear. Future research is needed to critically analyse infringements and offences data to expose trends in the nature and extent of fisheries offences.

If a person is convicted of exceeding the bag limit or possession limit of fish by more than two times the limit, the majority of participants responded that a two year penalty was appropriate ($n = 289$, 30.6 %), followed by a five year penalty ($n = 238$, 25.2 %), see Fig. 1. Less than 1.5 % believed no action should be taken.⁴ It could be concluded from the responses to this question, assuming responses reflect reality, that a fairly high majority of recreational fishers may exceed the bag limit by a small margin given that a sanction of two years was considered most favourably. In contrast, this was not the case for those who exceed the bag limit well beyond two times the limit. There may be different perceptions among recreational fishers particularly rock lobster fishers, between those who dive and those who fish via pots. The legislation allows some time, for those who fish via pots, to sort and throw back catch to meet the bag limit. Divers do not have this time to separate their catch once they surface. At least one WA case has involved the fisheries regulator taking action against a recreational fisher for attempting to sort his catch on deck [46]. The law requires divers to surface with their acceptable bag limit, having sorted and released the catch as they dive. This inequity between divers and pot fishers was raised as part of the legal case.

The next survey question asked participants what they perceived to be the most appropriate sanction if a person is convicted of exceeding the bag limit or possession limit of fish by more than five times the limit. The majority of participants believed a permanent licence revocation was appropriate ($n = 499$, 52.8 %), followed by a penalty of five years ($n = 232$, 24.5 %), see Fig. 1. Less than two percent believed a ban of six months or less was appropriate. Only 14 participants (1.48 %) believed no action should be taken. While it may be inferred that those who believe no action should be taken are in fact engaging in some non-compliance, follow up surveys would need to interrogate this issue to determine any relevance.

Next, survey participants were asked their opinion on the most appropriate sanction if a person obstructs a Fisheries Officer doing his/her job (e.g., refusing to allow him/her to inspect catch or board a boat) [47], see Fig. 2.

As shown in Fig. 2, the majority of participants believed a five year licence ban was the most appropriate ($n = 223$, 23.6 %), followed by a two year ban ($n = 192$, 23.3 %) and a 12 month sanction ($n = 179$, 18.9 %). Twenty-seven (2.9 %) participants did not believe that any sanction should apply. Further, if a person assaults a Fisheries Officer doing his/her job, participants overwhelmingly supported the application of a permanent licence revocation ($n = 664$, 70.3 %), followed by a five year sanction ($n = 116$, 12.3 %) and a two year sanction ($n = 66$, 7 %), see Fig. 2. However, 17 (1.8 %) participants believed no action should be taken. Based on the survey results, the majority of respondents viewed the role of the Fisheries Officer as an integral part of the sustainable

⁴ Without open text responses, it is unclear whether these respondents considered that no action should be taken across for one, multiple or, all breach categories.

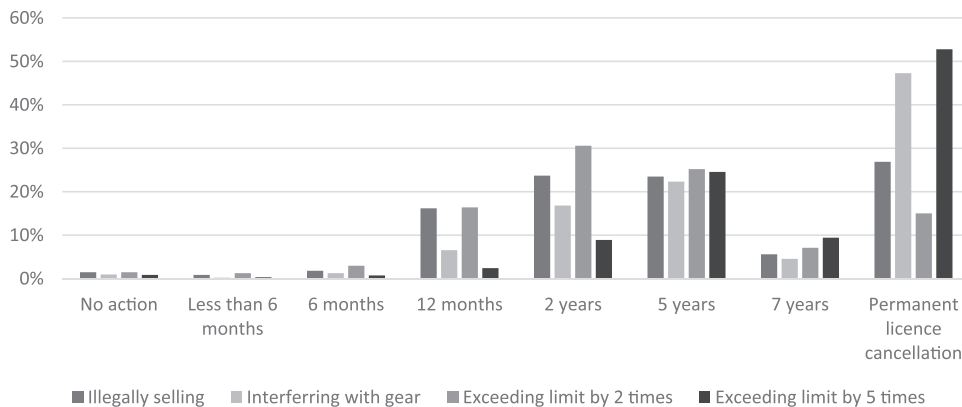


Fig. 1. Perceived licence sanctions for recreational fishers convicted of non-compliance, (months and years).

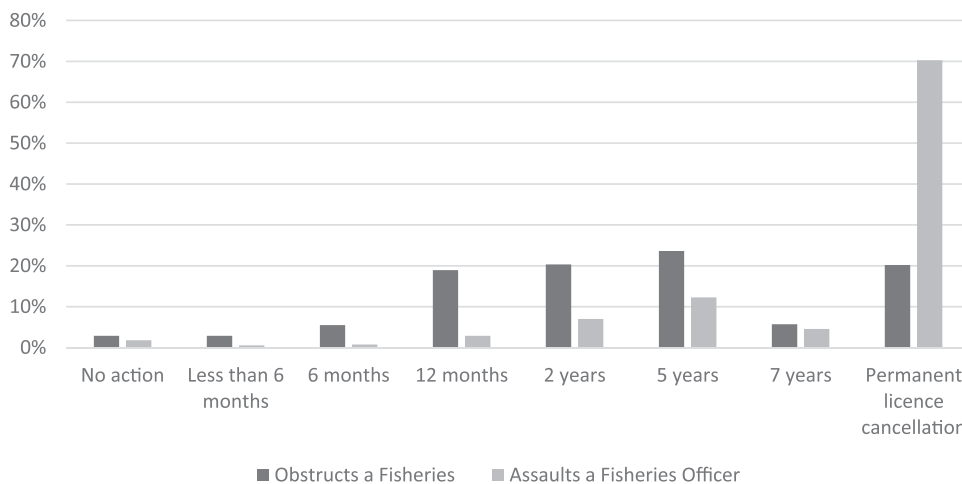


Fig. 2. Perceived licence sanctions for fishers who prevent a Fisheries Officer from undertaking their role, (months and years).

management of WA fisheries, only a limited number did not. It may be inferred that there is a potential tendency towards a culture of non-compliance among those respondents.

3.3.2. Perceptions of commercial fishers' non-compliance

Given that most survey respondents were recreational fishers, it would be unsurprising to find less tolerant respondent perceptions about non-compliant activities by commercial fishers. Traditionally the sectors are highly competitive [48]. However, this was not the case as respondents were equally as likely to believe penalties should apply for

those who fail to adhere to fisheries regulations as the commercial industry is more closely regulated, therefore overall the opportunity for non-compliance may be lower. However, commercial fishers are often more aware of when and where fisheries may be illegally exploited with limited chances of detection, and can test this by offending in a way that will attract only small sanctions. As such, encouraging a strong culture of compliance among both commercial and recreational fishers is equally important.

Three survey questions asked respondents specifically about perceptions of compliance in the commercial fisheries setting. In the



Fig. 3. Perceived licence sanctions for non-compliant commercial fishers, (months and years).

situation of a commercial fisher deliberately exceeding the quota of fish their licence allows them to catch and sell (e.g., rock lobster, abalone), respondents favoured sanctions towards the harsher end of the scale. Responses were fairly evenly spread, however, with the majority ($n = 255$, 27 %) supporting a permanent ban, followed by a five year ban ($n = 217$, 23 %) and a two year ban ($n = 191$, 20.2 %), see Fig. 3. Separating responses from commercial fishers, taking into account the low percentage of participants who identified as such, a two year suspension ($n = 34$, 26 %) was preferred for commercial non-compliers, followed closely by permanent suspension ($n = 32$, 24.4 %). Fairly consistent with the previous result, 245 participants (25.9 %) responded that if a commercial fisher deliberately provides false official information (such as catch data) to the Department, a permanent sanction should apply. Almost equal numbers of participants believed two and five year sanctions should be imposed ($n = 199$, 21.1 %; and $n = 198$, 21 %, respectively), see Fig. 3. Finally, if a commercial fisher consistently fails to submit official information to the Department, 262 (27.7 %) participants believed that permanent revocation of a licence should apply. Almost equal numbers of participants believed five or two year sanctions should be imposed ($n = 191$, 20.2 %; and $n = 189$, 20 %, respectively). Nearly two percent ($n = 17$) of participants did not believe any action should be taken against wrongdoers. Across all three questions relating to commercial fishing, respondent perceptions were less harsh than expected, particularly given the proportion of respondents who identified as recreational fishers. However, penalties applied to commercial fishers engaging in illegal activity could devastate their livelihood.

4. Discussion: sanctions as a means of strengthening a culture of compliance

Sanctions are common mechanisms to alter and control behaviour in society. In particular, in the environmental space, command and control regulation, whereby laws set clear standards and penalties for breaches, is well established and plays a valuable role even in the context of more contemporary approaches such as market-based mechanisms [49]. Given that classical deterrence theorists believe humans are rational, a relatively simple theory of crime emerges whereby, “[p]eople will engage in criminal behavior when it brings them pleasure (generates rewards) and carries little risk of pain” [50]. Indeed, the philosophy of deterrence theory hinges on three principles of justice, namely *certainty*, *severity*, and *celerity* [51]. Further, deterrence theory can be further categorised into two concepts: specific and general deterrence [52]. As such, rational humans will assess risk and possible consequences before choosing to commit an offence [53]. Based on this rationale, the relative risk of sanctions being applied to fisheries infringements requires them to be utilised by government agencies; in that way the culture of compliance is strengthened among individuals and the public more generally. Not only are these fishing sanctions required, but the survey results (see Figs. 1–3) also reveal that they are expected by the fishing public in WA across recreational and commercial fisheries. A greater focus on communicating fines imposed and offences against non-compliers generates a sense of public shaming [54], therefore having a greater general deterrence impact [55]. In the United States, the National Oceanic and Atmospheric Administration (NOAA) applies administrative law outcomes tailored to each particular case, rather than, or in addition to, fines [56]. Some of these mechanisms use public shaming as educational tools and have been shown to be more effective. Some examples include public service videos, and advertisements in newspapers or trade publications taken out by violators who explain to peers the infringing behaviour, to help others benefit from those mistakes [57]. Other outcomes may include community service in a task related to the violation; installation and use of vessel monitoring systems where it is not otherwise required; sale of vessels; and permanent surrender of vessel licence [58]. Any combination of these mechanisms could have greater scope to achieve both specific and general

deterrence, yet while communication of sentencing outcomes in WA is commonplace, reluctance exists to the introduction of public shaming in other areas of the law across Australia [59].

From the survey results (see Figs. 1–3), the Department could ascertain that there is strong support for the use of sanctions for breaches of licence conditions across a range of offences. In the future, the data may guide formal consultations with the community and peak interest groups to formulate policy and amend legislation. This community-based approach is supported by a previous study which found that fishers valued involvement in government decision-making [60], another tool to encourage compliance when fishery (re)certification is sought [61]. Greater community involvement in adjusting offence and penalty provisions and developing strategies to increase monitoring and enforcement of fisheries regulations, may, therefore, have a positive effect on the culture of compliance.

Consistent with deterrence theory, in addition to increasing penalties, strengthened monitoring and enforcement is required if improved compliance is to be assured. While deterrence involving certainty, severity, and celerity does not guarantee compliance, greater community participation, awareness and recognition of fisheries limits and applicable sanctions, for both recreational and commercial fisheries, is likely to lead to improvements in compliance. Therefore, both top-down and bottom-up approaches are needed.

5. Conclusion

Due to the great size of many inshore marine areas, including in WA, it is not feasible to physically monitor all catches at all locations. As such, fisheries agencies rely on a culture of compliance to encourage adherence to legislation. However, studies in other parts of the world have demonstrated that while fishers are aware of relevant regulations, a culture of non-compliance is common, to varying extents and with a diversity of impacts [62]. This research has explored the WA context to add to the growing body of literature by behavioural scientists and resource economists on non-compliance in recreational fishing.

This research concludes that non-compliance exists within an enabling culture. Further, data captured from the WA survey confirmed that there is strong support for sanctions to encourage compliance by both recreational and commercial fishers. This is a useful empirical finding that adds to existing knowledge on measures to strengthen compliance. There is, however, a lack of research that considers fishers' perceptions towards applicable penalties across a broad cross-section of fisheries. The survey also supported findings that the fishing community perceives fisheries infringers should be harshly sanctioned, including via a permanent licence revocation of the specific fishery, and all other recreational and/or commercial fisheries. While this may be an unsurprising result among commercial fishery wrongdoers, the survey result was similar with respect to recreational fishers. The government fisheries agency draws on good practice research findings, including the results of this survey to improve community awareness of required licences, limits, and gear and equipment usage to minimise non-compliance and improve compliance culture through enhanced education communication across a range of fisheries [63]. More empirical research is needed to provide insights into drivers and motivators of legislative breaches to inform further actions to enhance compliance. Furthermore, based on criminological theory, methods to increase awareness of sanctions for breaches by recreational and commercial fishers, through measures such as public shaming, may have an increased impact on specific and general deterrence among fishers [64]. Further exploration of how this might be tailored to the WA context across a variety of fisheries may prove valuable.

In summary, this research indicates a link between culture and non-compliance in fishing. These conclusions are aligned with other developed countries where large percentages of the population engage in regular recreational fishing. The case study adds to greater understanding of non-compliance in this sub-sector and demonstrates the need

for active engagement with the issues to ensure long-term sustainability of inshore fish stocks.

Funding

No funding is associated with this research. The research was conducted thanks to in-kind agreements between the Government of Western Australia's Department of Primary Industries and Regional Development and the University of Western Australia.

Conflict of Interest

The author has no competing conflicts of interests to declare.

Data availability

The authors do not have permission to share data.

Acknowledgement

The author acknowledges the extremely valuable feedback provided by Dr Erika Techera, Professor at the University of Western Australia; and Dr Timothy Green, Nigel Schofield and John Looby (retired) of the Government of Western Australia's Department of Primary Industries and Regional Development on earlier versions of this manuscript. Without access to the aggregate survey data collected by the Department and their support to analyse the results, this article would not have been possible. The author would also like to express gratitude to the editors and reviewers for their incredibly helpful suggestions on previous versions of this manuscript.

Appendix A. Survey questions

Q1 Select the fishery related group (or groups - you can select more than one) you identify with.

Q2 If you identify as a recreational fisher, list the fishing activities you have participated in over the last 5 years in Western Australia.

Q3 The Department of Fisheries has the ability to seek suspension, cancellation or alternatively may refuse to grant a new fishing licence for those convicted of serious fisheries offences (such as interfering with other people's fishing gear, selling fish illegally or taking large quantities of fish over the bag limit). If a person is convicted of a serious offence, what do you believe is an appropriate licence sanction (in addition to any other fines or penalties imposed).

Q4 If a person is convicted of illegally selling recreational or illegally caught fish, what is the minimum period their fishing licence should be suspended for (or not granted).

Q5 If a person is convicted of interfering with other people's fishing gear (i.e. pulling another person's rock lobster pots without their knowledge and stealing their catch or pots), what is the minimum period their fishing licence should be suspended for (or not granted).

Q6 If a person is convicted of exceeding the bag limit or possession limit of fish by more than 2 times the limit (eg, a person has taken at least 11 fish for a species with a bag limit of 5), what is the minimum period their fishing licence should be suspended for (or not granted).

Q7 If a person is convicted of exceeding the bag limit or possession limit of fish by more than 5 times the limit (eg, a person has taken at least 26 fish for a species with a bag limit of 5), what is the minimum period their fishing licence should be suspended for (or not granted).

Q8 If a commercial fisher deliberately exceeds the quota of fish their licence allows them to catch and sell (eg, rock lobster, abalone), what is the minimum period their commercial fishing licence should be suspended for (or not granted).

Q9 If a commercial fisher deliberately provides false official information (such as catch data) to the Department, what is the minimum period their licence should be suspended for (or not granted).

Q10 If a commercial fisher consistently fails to submit official information to the Department, what is the minimum period their fishing licence should be suspended for (or not granted).

Q11 If a person obstructs a Fisheries Officer doing their job (eg, refusing to allow them to inspect catch or board a boat), what is the minimum period their fishing licence should be suspended for (or not granted).

Q12 If a person assaults a Fisheries Officer doing their job, what is the minimum period their fishing licence should be suspended for (or not granted).

Q13 Are there any other types of fishing offences that the Department of Fisheries should consider applying licence suspensions (or not granting) and cancellations for?

Q14 Do you have any further comment on the use of licence sanctions?

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