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From value recognition to effective implementation: the main problems and strengthening paths of law enforcement to combat IUU fishing

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As a cornerstone institutional arrangement for marine fishery resource conservation, the legal efficacy of IUU fishing prohibitions is fundamentally contingent upon the standardized enforcement capacities of fishery law enforcement personnel. This study investigates the institutional disjuncture between statutory prohibitions against illegal fishing and their practical implementation. Empirical evidence derived from 526 structured questionnaires and 195(37.1% of the 526) in-depth interviews with enforcement officers across four coastal provinces(Nearly 30% of coastal provinces in China)reveals structural contradictions within the current enforcement framework: On the one hand, cognitive dissonance regarding the ecological value of fishing bans among certain officers has precipitated deficient value internalization. On the other, skepticism about the legitimacy of legal norms has engendered multiple enforcement anomalies—including but not limited to selective enforcement, passive evidence collection, sentencing disparity, and administrative-criminal procedure linkage barriers. These institutional implementation defects substantially constrain marine ecological governance efficacy. To address this institutional predicament, a systematic governance framework is proposed: Value dimension : Establish sustainable value-shaping mechanisms through capacity-building programs to foster long-term ecological consciousness; Regulatory dimension : Develop precision-engineered administrative-criminal linkage protocols to ensure coherent legal implementation; Operational dimension : Forge a three-dimensional governance architecture integrating administrative enforcement, criminal justice, and public interest litigation to construct a comprehensive “administrative-criminal-civil” liability regime. Through synergistic advancement in value recognition reconstruction, regulatory execution reinforcement, and innovative governance practices, this tripartite approach projects to enhance IUU fishing enforcement efficacy, thereby institutionalizing sustainable utilization of marine fishery resources.

KEYWORDS

IUU fishing, fishery law enforcement, value recognition, normative recognition, norm implementation

1 Introduction

During the course of their research on this subject, the authors came across a set of data: In 2024, maritime law enforcement agencies at all levels under China Coast Guard handled over 960 fishery administrative cases and solved more than 540 IUU fishing cases involving aquatic products (China Coast Guard Investigated Over 960 Administrative Cases in Fisheries Nationwide During, 2024). The Zhoushan Marine Procuratorial White Paper (2024) indicates that IUU fishing cases continue to rise year after year despite repeated prohibition efforts (Zhoushan Marine Procuratorial Work White Paper, 2022). This study aims to investigate the core contradiction in marine fisheries law enforcement: although specific fishing practices are legally designated as “illegal” to achieve ecological conservation goals, the relevant regulations fail to be effectively implemented in practice. The research focuses on three critical dimensions: The extent to which enforcement personnel recognize the ecological conservation value of “prohibiting IUU fishing”; the degree to which enforcement personnel approve of the relevant legal norms themselves; the completeness of legal norm implementation during actual enforcement processes. By analyzing these three interrelated dimensions, this study seeks to uncover the root causes of the disconnect between legal regulations and enforcement practices.

We referenced Donald Van Meter and Carl Van Horn’s (Van Meter and Van Horn, 1975) Meter-Horn policy implementation system model. According to their 1975 article “Policy Implementation Process: A Conceptual Framework” (Van Meter and Van Horn, 1975), they believe that the process of policy implementation is influenced by internal and external factors within the system, mainly including policy objectives, policy resources, the intentions of implementer (the value orientation, behavioral ability, and spiritual outlook), the characteristics and integration of executing agencies, execution methods (the interactive approach between the executors and the target groups, including communication, coordination, and coercion), and system environment (political, economical, cultural, social conditions, etc.). They pointed out that goal consensus has a greater impact on policy than policy changes, and the value orientation of policy implementers is crucial to policy implementation. We applied the model and identified the following three aspects of law enforcement for prohibiting IUU fishing: value and norm recognition among law enforcement personnel, and practical implementation by law enforcement personnel.

The value recognition refers to the internal consensus of certain values among members or organizations in social activities, through which they form their own value positioning and orientation in

social practice, and thus determine their ideals, beliefs, and pursuits (Van Meter and Van Horn, 1975). The value recognition is the foundation of the norm recognition, and Hart pointed out that “Legitimacy is the belief in the rightness of the system or its rules ... its source lies in shared beliefs and values” (Hart, 1994). The legitimacy of law and its consequent compliance/enforcement ultimately depend on the extent to which it aligns with the shared beliefs and norms (i.e., values) of the societal group. When law is grounded in values collectively recognized by community members, it becomes most readily internalized and voluntarily observed, minimizing the need for coercive enforcement. Conversely, laws divorced from societal values struggle to attain genuine obedience (Tamanaha, 2001). The norm recognition refers to a conscious form of law enforcement personnel accepting the legal norms of marine fisheries. It is a phenomenon in which law enforcement personnel recognize and voluntarily abide by the legal norms of marine fisheries based on their value recognition. Weber’s typology of authority posits that domination based on legal-rational authority characterizes modern societies. The legitimacy of such domination rests upon people’s trust and faith in the rule-based system itself (i.e., the law), perceived as a procedurally established and justified order. This faith inherently entails endorsement of values embodied in the rules, such as rationality and procedural justice. The efficacy of law enforcement depends on this broadly accepted belief in legitimacy (Weber, 1978). The practical implementation refers to the actual execution of marine fishery laws and regulations by law enforcement personnel on the basis of value recognition and norm recognition, transforming them from legal provisions into practice. Tyler contends that “People comply because they believe it is right to do so ... based on their moral values”, “The key argument of the normative perspective is that legitimacy and moral values are central...” (Tyler, 2006). The alignment between law and social norms/values holds profound implications for the cultivation of legal consciousness and the efficacy of law implementation (Nielsen, 2017). Value recognition solves the problem of goal consensus, norm identification solves the problem of normative acceptability, and practical implementation solves the problem of the ultimate realization of values and norms. To effectively implement laws and regulations, attention must be given to values, norms, and practices (Figure 1).

A review of the literature reveals a comparative scarcity of empirical research concerning law enforcement officers’ Value Recognition, Norm Recognition, Regulatory Compliance, and the interrelationships among these three factors. This empirical study investigates the etiology of enforcement dilemmas surrounding IUU fishing and proposes corresponding countermeasures.

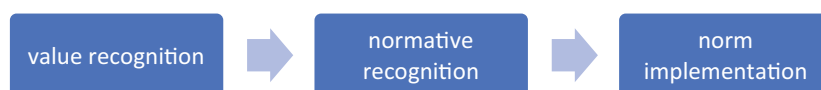


FIGURE 1
Three important links for effective implementation of laws and regulations.

Employing a mixed-methods approach encompassing questionnaire surveys (administered to 526 marine fisheries enforcement officers across coastal Provinces A, B, C, and D) and semi-structured in-depth interviews (conducted with 195 officers), integrated with big-data case analysis from China Judgments Online, and CNKI databases, the research systematically examines three dimensions: Officers' cognition of the ecological value underpinning fishing prohibitions; Their comprehension and endorsement of relevant legal norms; Behavioral patterns manifest in actual enforcement operations. Through this tripartite "Values-Norms-Practices" analytical framework, the study aims to: Accurately delineate the authentic landscape of contemporary enforcement realities; Diagnose systemic impediments to regulatory implementation (e.g., cognitive biases, institutional inertia, operational constraints); Formulate actionable recommendations for institutional refinement—including enforcement protocol optimization, compliance incentive mechanisms, and monitoring infrastructure enhancements—ultimately facilitating the transition of marine ecological conservation legislation from textual provisions to tangible implementation.

2 Literature review

2.1 The public attributes of marine fishery resources

Fishing is among the most traditional ways that humans utilize the ocean. Regarding access to the world's marine resources, freedom in marine fishing was a basic consensus among early humans. The basis for this consensus originated from the perception that "the ocean is public," and the resulting understanding was that "all the resources in the ocean are public resources." Therefore, many scholars have acknowledged that marine fishery resources have the attribute of being public resources. In 1954, the Canadian scholar H. Scott Gordon (1954) published the article "*The Economic Theory of Common Property Resources: Fisheries*". The core idea of the full text was that fishery resources were overfished or overutilized because of the public property rights status of fishery resources. Consequently, fishery resources have no exclusivity, and their development and utilization will inevitably enter a disorderly state, ultimately leading to the loss of "potential benefits and ... low efficiency in the use of funds and the utilization of fishery resources" (Gordon, 1954). Furthermore, in 1968, Garrett Hardin proposed the concept of the "tragedy of the commons" in a *Science* article. Danish economist Jens Warming's specialized single study on fisheries drew upon the concept, promoting research on the economics of public fishery resources. Consequently, a fundamental consensus emerged that given the public nature of marine fishery resources and their inherent lack of strong exclusivity, the absence of government management will inevitably result in overfishing or even predatory fishing. In 2012, Tom Tietenberg's (Tietenberg, 2012) *Economics of Natural Resources* further analyzed the tragedy of commons in the fishery context. He

argued that the commonality of fishery resources has led to low efficiency in fishery management, giving rise to "free riding" and a "collective action dilemma" in the exploitation of fishery resources (Tietenberg, 2012). To address these problems, he proposed the principles and methods of decentralized management and autonomous governance of fishery resources (Tietenberg, 2012).

2.2 Two methods to restrict the fishing of marine fishery resources

Due to the public nature of marine fishery resources, if not managed, there will inevitably be the consequence of overfishing of marine fishery resources until there are no fish left to catch. Therefore, the action to protect marine fishery resources begins with restricting the fishing of marine fishery resources.

The above mentioned research revealed the following two management methods for marine fishery resources: setting property rights on public marine fishery resources and implementing government management. The first method entails establishing a fishery property rights system, namely the Individual Transferable Quota (ITQ) system. The system's core objective is to privatize the marine waters under each country's jurisdiction of each country and determine property rights of marine fisheries (Bromley, 1991). Many scholars believe that this system can effectively limit investment in marine fisheries production capacity and better handle the relationship between the government and fishers. Therefore, this system is considered to be a revolutionary institutional design for addressing the tragedy of the commons in marine fishery resource management. Some countries, such as Iceland, have adopted this system. More specifically, in 1990, Iceland enacted the Fisheries Management Act, which implemented an ITQ system, marking a transformative change in the history of marine fisheries management (Moloney and Pearse, 1979).

However, this approach is insufficient to fully overcome the issues arising from market failure as IUU fishing has persisted in large quantities. The main reason for the unsustainability of fishery resources is the disorderly competition among fisher themselves, as the disorderly competition exceeds the optimal value of catch, and the regeneration of the fishery cannot keep up with the disorderly competition behavior (Gordon, 1954). Hence, government management is highly significant. Some countries have recognized the market failure problem and have initiated the implementation of appropriate marine fishery management policies. For instance, in 1983, European countries began formulating the Common Fisheries Policy, encompassing ITQ systems, fishery access policies, fishery resource enhancement policies, and the European Union's (EU) unified managed fishery license system, among others. Japanese fisheries are jointly managed by the central and local government. The central government is responsible for inshore and oceanic fisheries and local government is responsible for the management of coastal fishing grounds. Similarly, Canada has promulgated the "Coastal Fisheries Protection Act," for protecting and regulating

fishing and conserving protected species of fish. It includes acts such as those stipulating the powers and quantity of domestic and foreign fishing vessels, and fishing quotas.

These countries' marine fishery resource management policies can be classified as active and conservative. Active policies are constructive. They include stock enhancement and release, artificial fishing islands, marine ranches, and the establishment of marine protected areas to safeguard the diversity of marine fishery resources (Yates et al., 2015), and other actions that can better facilitate the ecological restoration of marine fishery resources. Conservative policies tend to prohibit destructive and polluting actions by, for example, establishing no-fishing zones and periods, setting fishing quotas, regulating fishing vessels' powers and quantity, and implementing other rules to prevent destructive behaviors towards marine fishery resources. Some scholars have contended that the conservative policies implemented in the early stages, such as fishing bans and fishery access policies, have had limited efficacy because they are overly rigid and directly conflict with fishers' interests. This command and control policy approach has not garnered fishers' recognition and active participation in policy implementation. Some researchers have asserted that the fishery policies implemented since 1950 have not compelled fishery producers to bear the corresponding social costs (Pontecorvo, 2008). A crucial reason is ineffective or non-implementation of the policies.

Government management of marine fishery resources has the following two main objectives: to control the volume of fishery catches to achieve sustainable fishing and to ensure the maximization of fishers' income (King, 2007). However, these two goals conflict and are not easily balanced. The government is in a dilemma, on the one hand, it needs to achieve sustainable development and promote intergenerational equity by limiting fishing quotas, and on the other hand, Lower TAC options are forecast to lead to the functional exclusion of many rights holders and reduction in employment (Eggers et al., 2024). Therefore, due to the goals of economic development, increasing employment, and increasing people's income, the government has to turn a "blind eye" to behaviors that violate management policies to a certain extent. For fishery management policies to be effective, a suitable equilibrium point between satisfying fishers' overall interests and protecting the marine fishery ecology must be found and continually balanced.

2.3 From fishing restrictions to targeting IUU fishing

It is a difficult choice for a nation to limit its own fishing volume and control its own offshore fishing volume. Given the existence of an international consensus and national control, fishing activities have been regulated in the framework of international conventions, regional agreements, and domestic laws and regulations. The ocean has transitioned from free to restricted fishing, constituting a new common value judgment. These conditions have given rise to the concept of IUU fishing (Gumy and Grainger, 2010). In 2001, the

Food and Agriculture Organization (FAO) of the United Nations issued the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU or IUU Fishing International Action Plan), which defines the IUU fishing (Allison, 2011). Over the past few decades, IUU fishing has been regarded as a threat to global marine sustainability, coastal countries' livelihoods and national security, as well as the fishing communities' safety and human rights (Auld et al., 2023). IUU fishing activities are amongst the most serious and persisting global concerns that negatively impact the environment, economy, and livelihood. Numerous native fishers are affected by IUU fishing and lose their economic balance in their life and strive for daily needs (Kuemlangan et al., 2023).

Scholars have primarily attributed IUU fishing to the public nature of fishery resources and fishers' pursuit of economic interests. Results showed that countries tend to have more IUU fishing when their institutions are imbalanced towards the economy, where there is a larger proportion of youth and males, and when development is lower (Santos and Lynch, 2023). According to Gordon (1954), the main reason for the unsustainability of fishery resources is disorderly competition among fishers, which has exceeded the optimal catch volume and rendered fishery regeneration unable to keep pace with the disordered competitive behavior. In the background of the IUU fishing is a big black market in the dark side, which strengthens the behavior of illegal fishing (Shanthi et al., 2022). Kuperan and Sutinen (1998) constructed a competition model and inferred various factors influencing IUU fishing. The results indicated that the fundamental reason fishers engaging in IUU fishing was to maximize the utilization of their limited fishing quotas while minimizing the cost of crime. If IUU fishing income surpasses that from legal fishing activities, fishers will be incentivized to undertake criminal activities (Kuperan and Sutinen, 1998). Charles et al. (1999) constructed a model and discovered that reduced fishery resources and the absence of government regulations led fishers to implement IUU fishing. Agnew and Barnes (2004) identified inadequate supervision by the fishery administration department as a significant cause of illegal acts. Additionally, the substantial economic interests at stake and fishers' personal factors induced IUU fishing (Schmidt, 2005). Schmidt (2005) warned that IUU fishing will persist if it continues to provide an attractive income. An interesting example is why fishers in North Africa frequently use illegal small mesh fishing nets? The economic rationale for this is to save fuel costs and the illegal sale of undersized fish (Kastoryano and Vollaard, 2023). fisher who overfish their quotas are free riders who enrich themselves on behalf of the common resource pool. Free riders reap the benefit from overfishing, while the costs, due to overfished and declining fish stocks, are shared with all other fisher. As fisher who comply with the quota regime do not know if all fisher behave the same way, the effect on their own legal conduct remains uncertain. fisher that comply with the law are thus not guaranteed a future reward, despite adhering to the rules. Hence, in a situation of legal fisher who know that other fisher conduct IUU fishing, this may contribute to a system coercion, which lowers the fisher's morale

and incentives to follow the rules and lead also legal fisher towards overfishing. Illegal overfishing by “a few” free riders, can therefore contribute to increased illegal activities undermining the entire management system (Standal and Hersoug, 2023).

Literature on reducing IUU fishing suggests strengthening international cooperation, government management and intensifying law enforcement and crackdown efforts as primary measures. Firstly, many researchers believe that international cooperation in combating IUU fishing should be strengthened. FAO deemed IUU fishing as the main obstacle to achieving sustainable fisheries (Broweleit, 2009). IUU fishing has emerged as a policy issue over the past two decades, prompting various countries to enhance supervision of high seas fishing (Garcia et al., 2021). The specialized agency established by the United Nations to respond to IUU fishing (a temporary working group composed of personnel from the International Maritime Organization (IMO), FAO, and the International Labor Organization (ILO)) has developed numerous international documents (Auld et al., 2023). FAO adopted the Voluntary Guidelines for Flag State Performance (Guidelines) in 2013, but it is a “soft law”, which implies that the implementation may hinge on individual countries’ political will (Tsung-Han et al., 2020). Therefore, the Guidelines’ effectiveness and efficiency are highly questionable (Tsung-Han et al., 2020). Some scholars have perceived flaws in the FAO’s definition of IUU fishing and pointed out that it does not meet developing countries’ needs (Zhu and Tang, 2024). Even with the relevant international documents, the latest research has shown that there are three regions (Asia, the Caribbean and Central America, and the Middle East) that do not prioritize combating IUU fishing (Hosch et al., 2022). The article takes Asia as an example and points out that increasing national income is an important reason for reducing the crackdown on IUU fishing. Andrea and John (Zhu and Tang, 2024) identified the main reasons for the policy implementation predicament as the limited international fishery legal provisions and individual countries’ high degree of autonomy and discretion, which have resulted in substantial differences in national-level policies, legal frameworks, and practices. Hence, FAO pointed out the primary reason for the persistence of IUU fishing has been the widespread failure of flag state control (Broweleit, 2009). Additionally, international fishery law fails to provide regulatory and law enforcement solutions to curb organized criminal groups’ participation in IUU fishing ultimately rendering the policy to combat illegal fishing ineffective (Wang and Chang, 2019). Some scholars have suggested the establishment of an international convention to combat transnational and organized IUU fishing. This will require regional cooperation, and each country will have to monitor the convention’s implementation (Liu, 2017). Ioannis et al. (2019) suggested involving local fishery communities in formulating international policies to address illegal fishing activities.

Secondly, many researchers highly emphasize the government’s role in managing marine fishery resources. Government control can compel individuals contemplating illegal fishing to consider the legal consequences, thereby protecting fishery resources from depletion. Gordon (1954) emphasized the need to restrain free competition among fishers and develop fisheries through orderly

government management. Agnew et al.’s (Agnew et al., 2009) regression analysis of IUU fishing rates and control levels of relevant countries found that countries that exerted higher control had lower IUU fishing rates, with the two factors being strongly positively correlated. The World Bank collected fishery resource sample data from numerous countries and found that the greater the investment in supervision, the lower the frequency of illegal fishing activities in a given country (Sumaila et al., 2006). In order to inform policy makers of management and regulatory reform plans to combat IUU fishing, it is necessary to collect a large amount of fishery data and conduct in-depth assessments of the full costs and benefits of different policy scenarios. Low-quality fisheries data and models inherently make policy setting less accurate, and frustrate efforts to achieve effective management. The higher resolution information will be key in supporting effective fisheries management decision making and monitoring, control and surveillance at national scales (Temple et al., 2022). Some scholars have also proposed measures from the perspective of controlling fishing vessels. John (Fawcett and Robinson, 2000) and Christopher (2009) highlighted that the utilization of global marine fishery resources is characterized by high fishing intensity and a large number of vessels among coastal fishers, resulting in significant fishery management challenges. Dess and Lumpkin (Dess and Lumpkin, 1999) proposed reforming the EU’s fisheries to significantly reduce the number of fishing vessels. Some scholars have also proposed that the government should focus on improving the transparency of the supply chain of marine fishery resources. Over the last two decades, efforts to combat IUU fishing have led to an expansion of initiatives to enhance transparency across the seafood industry through international agreements, national government regulations, and voluntary private initiatives (Virdin et al., 2022).

2.4 Strengthening fisheries legislation and law enforcement

Fishing regulations should protect the marine environment, but their enforcement is challenging (Kastoryano and Vollaard, 2023). Separating fishery law enforcement and management through a clearer division of labor could better promote the sustainable development of marine fisheries (Frances, 2013). Strengthening government law enforcement to make IUU activities unprofitable is the first measure to combat IUU fishing (Le Gallic and Cox, 2006). On the contrary, the lack of government enforcement can lead to IUU fishing (Charles et al., 1999). The basis for government marine fisheries law enforcement is the legislation of marine fisheries. Candance and Camille (Candance, 2012) studied marine fishery protection law enforcement in the United States and Japan and proposed reasonable marine fishery legislation as a means of regulating inappropriate behaviors in the fishery sector. The current legislation is broad, but even so, it has not managed to curb the growing level of IUU fishing and, consequently, incidental fishing (Constantino et al., 2022). The inadequate supervision and enforcement by the fisheries department are also important

reasons for the occurrence of illegal activities (Agnew and Barnes, 2004). Beatrice (Greenberg and Herrmann, 1994) analyzed the status of Vietnam's fishery resource development and observed that Vietnamese fishery law enforcement lacks systematic standards and corresponding legal policy implementation procedures. Furthermore, the division of labor among fishery law departments is ambiguous, and law enforcement work is chaotic (Ibrahim, 2021). The implementation of the Seafood Import Monitoring Program (SIMP) in the United States requires the provision of species regulatory documents when importing seafood, which has shown a combative effect on IUU fishing (Sumaila et al., 2006). To combat IUU overfishing the introduction of new automatic catch monitoring technologies onboard fishing vessels is considered a key strategy by the Norwegian Directorate of Fisheries (Standal and Hersoug, 2023). China actively promotes digital maritime law enforcement and has conducted thorough exploration across policy, technology, and legal domains. By coupling law and technology, China's digital maritime law enforcement has innovatively established a three-dimensional enforcement model of "online + offline" at sea. It utilizes artificial intelligence to assist in maritime law enforcement decision-making, employs big data sharing for collaborative maritime law enforcement, and advances maritime compliance enforcement by digital technology (Wang W, 2024). Decisive law enforcement and active coordination among Indonesian law enforcement authorities, as well as fisher involvement, are factors for successful reduction and control of IUU fishing practices through the Indonesian Ocean Policy (IOP) in Indonesia (Khan and Jiang, 2024). But the problem is also very obvious, Indonesia has numerous maritime laws and regulations, and lacks a comprehensive maritime law enforcement agency (Dirhamsyah et al., 2022). We ultimately aim to demonstrate that the options used to combat IUU fishing set out in national fisheries legislation are not limited to a single type of enforcement approach. Indeed, most States seem to follow a dual enforcement approach, which includes provisions enabling the use of both administrative and criminal processes and sanctions to enforce against IUU fishing and fishing related activities (Kuemlangan et al., 2023).

Existing studies have amassed considerable insights into combating IUU fishing, and the proposed legal governance pathways have been conspicuously delineated. From the international community's perspective, with sustainable development as the objective, individual countries must actively fulfill their commitments, obligations, and responsibilities towards conventions and guidelines to achieve sustainable fishing. From the domestic perspective, each country should, according to its interests, intensify regulations and law enforcement, control its marine fishery resources, delineate and manage effective property rights over marine fishery resources, and form a comprehensive set of mutually reinforcing "nurturing" and "protection" mechanisms. However, some countries have weakened their efforts to combat IUU fishing to a certain extent due to considerations of national economy and people's income, which is also the reason why FAO refers to the failure of legal state control.

From the perspective of value recognition, the international community and governments of various countries have formed a

value recognition for protecting marine fishery resources and achieving sustainable development. From the perspective of normative recognition, the recognition of the international conventions, treaties, domestic legal obligations and norms is relatively high, however, the current research—is deficient in studies on marine fishery law enforcement personnel regardless of whether it pertains to the international community's recognition of the value of protecting marine fishery resources and achieving sustainable development or the normative recognition of domestic laws and regulations formulated to implement their commitments and obligations to combat IUU fishing—How these law enforcement personnel perceive the value of banning illegal fishing, how they approach the norms against illegal fishing, and how they specifically execute the norms demand in-depth and meticulous research in the legal sociology domain. Such research can determine whether problems related to value recognition, self-regulation, or policy implementation exist among law enforcement personnel, thereby facilitating the more effective promotion of these essential human resources to undertake law enforcement actions with firmness and accuracy.

3 Materials and methods

Marine fishery constitutes a significant global governance domain (Zhu and Tang, 2024). Effectively protecting marine fishery resources and combating IUU fishing necessitate effective implementation by law enforcement personnel as opposed to allowing relevant laws and regulations to idle. Ultimately, the rule of law hinges on human implementation. Therefore, clarifying law enforcement personnel's value and norm recognition and normative practice is crucial. From February 2024 to June 2024, we adopted legal sociology's investigative research methodology, which entailed conducting questionnaire surveys and research on law enforcement personnel. The following sections elaborate on the methodology.

3.1 Respondents and questionnaire context

We selected 526 marine fishery law enforcement personnel from the marine fishery administrative departments of the following four coastal provinces: A, B, C, and D. This study selected four provinces as analytical samples predicated on six methodological considerations: ①Sample Representativeness : Within the macro-context of China's 14 coastal provincial administrations (100% coastal coverage), four typological provinces were scientifically identified, achieving 28.6% spatial sampling coverage. ②Economic Significance : Strategic weight of marine economy output in provincial GDP was prioritized. ③Enforcement Capacity : Institutional scale and resource allocation of maritime fishery law enforcement units underwent systematic assessment. ④Developmental Distinctiveness : Innovation-driven practices and paradigmatic models in marine sectors were analyzed. ⑤Resource Endowment : Spatiotemporal distribution of coastline and fishery resources were comprehensively measured.

TABLE 1 Respondents' characteristics.

Serial number	Geographical distribution	Department	Number of personnel	Percentage of department	Gender/Number		Age/Number	
1	Province A	Agricultural Comprehensive Administrative Law Enforcement Detachment	147	57.9%	Male	98	22-30	45
					Female	49	31-40	39
							41-55	63
2	Province B	Integrated Marine Law Enforcement Detachment	99	49.1%	Male	67	25-30	29
					Female	32	31-40	32
							41-55	38
3	Province C	Marine Development Authority	126	36.5%	Male	105	24-30	41
					Female	21	31-40	48
							41-55	37
4	Province D	Marine Fisheries Agency	154	73.3%	Male	121	22-30	55
					Female	33	31-40	63
							41-55	36
Total			526		Male	391	22-30	170
					Female	135	31-40	174
							41-55	182

©Spatial Equilibrium : Stratified sampling ensured equitable representation across four major coastal economic zones—Eastern (Yangtze River Delta), Southern (Pearl River Delta), Northern (Bohai Rim), and Western (Beibu Gulf). Through this hexa-dimensional framework, Provinces A, B, C, and D were selected. Based on the requirements of the surveyed department, this article replaces the surveyed province with letters.

With the assistance of relevant departments, we administered anonymous questionnaires to the sampled personnel. The questionnaire targets are both provincial-level (such as the Marine Fisheries Law Enforcement Corps in province D) and prefecture level municipal marine fisheries law enforcement personnel (such as law enforcement teams in provinces A and B, and the Marine Development Bureau in province C). The target audience of the questionnaires are all on the front line of law enforcement. The questionnaire is anonymous in order to reduce the concerns of the respondents and express their inner thoughts more truthfully. Considering that some personnel are indeed unwilling to participate in the questionnaire, special instructions were made before distributing the questionnaire. Law enforcement personnel who are unwilling to fill out the questionnaire can give up submitting it to the designated mailbox. All those who submitted the questionnaire are willing to participate in this survey. Table 1 describes the respondents' characteristics. It should be noted that in these four coastal provinces, there are different names of law enforcement units responsible for marine fisheries law enforcement, so the distribution of law enforcement personnel in Table 1 is also different. Although the department names are different, they all have the function of marine

fisheries law enforcement. Table 2 describes the questionnaire's principal contents and response scenarios.

To ensure the research sample comprehensively reflects cognitive differences among law enforcement personnel with varying levels of experience regarding IUU fishing enforcement, this study adopted a stratified sampling principle in participant selection. Specifically, enforcement officers were categorized into three representative experience tiers based on years of service: under 10 years (representing new-generation enforcement personnel), 10–20 years (core enforcement professionals), and over 20 years (senior enforcement experts). This stratified approach effectively captures value recognition toward enforcement norms, institutional cognition, and practical understanding among officers at distinct career stages. Concurrently, considering the male-dominated gender composition prevalent in fisheries enforcement teams, the research team—with assistance from enforcement agencies—ensured appropriate female representation through targeted sampling. This strategy aligns the sample's demographic characteristics with actual enforcement workforce profiles. Such sampling design guarantees both hierarchical richness and representativeness in research data while effectively controlling potential confounding effects from enforcement experience variables on study outcomes.

Table 2 outlines a survey questionnaire comprising five core questions. Its primary objective is to systematically examine law enforcement officers' perceptions and execution of IUU fishing governance initiatives. The questionnaire content are structured around three critical dimensions: ① Value Recognition: Assessing

TABLE 2 Principal questionnaire items and response counts.

Item	Questions	Answers	Number of answers	Percentage
1	The degree of recognition of the significance of the prohibition of IUU fishing	Strongly agree	139	26.4%
		Agree	207	39.6%
		Generally agree	98	18.6%
		Generally disagree	56	10.6%
		Disagree	14	2.7%
		Strongly disagree	12	2.1%
2	The degree of recognition of the significance of relevant policies such as fishing bans and moratoriums	Strongly agree	127	24.1%
		Agree	198	37.6%
		Generally agree	106	20.2%
		Generally disagree	54	10.3%
		Disagree	26	4.9%
		Strongly disagree	15	2.9%
3	Familiarity with laws and regulations prohibiting IUU fishing	Very familiar	51	9.7%
		More familiar	139	26.4%
		Generally familiar	175	33.3%
		Generally unfamiliar	106	20.2%
		Less familiar	37	7%
		Very unfamiliar	18	3.4%
4	The degree of agreement with laws and regulations prohibiting IUU fishing	Strongly agree	128	24.3%
		Agree	141	26.8%
		Generally agree	154	29.3%
		Generally disagree	62	11.8%
		Disagree	30	5.7%
		Strongly disagree	11	2.1%
5	Whether laws and regulations prohibiting IUU fishing are in place	Very spot on	43	8.2%
		Relatively in place	97	18.4%
		Generally in place	158	30%
		Generally not in place	134	25.5%
		Relatively inadequate	49	9.3%
		Very inadequate	45	8.6%

officers' level of endorsement regarding the value of prohibiting IUU fishing and implementing fishing bans/moratorium policies;② Regulation Recognition: Evaluating officers' familiarity with, and degree of acceptance towards, the relevant laws and regulations prohibiting IUU fishing;③ Implementation Self-Assessment: Measuring officers' objective evaluation of the effectiveness of their own enforcement actions in applying these laws and regulations. These three dimensions strictly adhere to the analytical framework of "Value Recognition →norm Recognition→norm Implementation" establishing a logically progressive research pathway. To ensure data authenticity, the

questionnaire employs a dual-safeguard mechanism: anonymous submission on a voluntary basis. This assurance is explicitly stated within the question prompts.

3.2 Interviewees and interview context

To ensure the interviews' efficacy, we refrained from random selection in favor of demarcating two groups. The first group was selected from among the law enforcement personnel who responded "Generally agree" or above to questionnaire items 1, 2,

and 4. We applied two inclusion criteria to this subsample: (i) law enforcement personnel above the third level chief clerk in their respective departments. Generally, within the Chinese system, according to the “Parallel Regulations on Civil Servant Positions and Ranks” issued by the Central Committee of the Communist Party of China in 2019, serving as a third level chief clerk requires serving as a second level clerk for 2 years, a first level clerk for 2 years, and a fourth level chief clerk for 2 years or more, with at least 6 years of practical experience. These people usually held certain leadership positions and had a comprehensive understanding and grasp of the entire law enforcement activity given their role as its operational backbone. and (ii) participated in marine fishery law enforcement work for over 3 years. Therefore, even if they held a position below the third level chief clerk level, they should have a relatively comprehensive understanding of their department’s law enforcement work. The second group comprised a portion of the personnel who responded “Generally disagree” or below to items 1, 2, and 4. We interviewed them to understand the reasons for their disagreement. All questionnaires were numbered, and we planned a seating arrangement for the respondents. This allows us to refer to ascertain the questionnaire numbers and interviewees who expressed disagreement. However, the above-stated design was kept confidential from the surveyed units, questionnaire respondents, and interviewees to obtain genuine and reliable answers and effectively safeguard the rights and interests of the respondents and interviewees.

To encourage the interviewees to respond truthfully and unreservedly, the prompt given in the interview are: This research solemnly commits to upholding two core ethical principles during the interview phase: First, the Principle of Confidentiality: The research team will implement anonymized coding for all participants, ensuring that any personally identifiable information obtained during interviews receives legally binding confidential protection. Second, the Principle of Protection: The entire research process strictly complies with the Personal Information Protection Law and other relevant regulations, establishing a secure disclosure environment that enables respondents to provide truthful and comprehensive responses without reservation. We assigned their numbers in accordance with research conventions. The 30 interviewees from Province A were sequentially numbered A1–A30 (Percentage of respondents is 20.4%), 20 interviewees from Province B were B1–B20 (Percentage of respondents is 20.2%), 27 interviewees from Province C were C1–C27 (Percentage of respondents is 21.4%), and 34 interviewees from Province D were D1–D34 (Percentage of respondents is 21.1%).

The second group of interviewees are who answered questions 1, 2, 4 in the questionnaire with a general disagreement or below accounted for 16% (84) and were assigned E1–E84. This category of interviewees encompassed a diverse range of personnel including those with many years of experience, those who recently transferred from other positions to a law enforcement position, those with 1–2 years of work experience, and those at the section level and above. A total of 195 interviewees accounted for 37.1% of the full sample.

Based on the research design, respondents in Group 1 and Group 2 must jointly address the following questions: ①What

impact do you think IUU fishing has on the marine ecology? ②What do you think are the main reasons for IUU fishing currently? ③What challenges do you think the current ban on IUU fishing is facing? ④What measures do you think should be taken to strengthen law enforcement to combat IUU fishing? And the respondents in Group 2 are required to individually respond to the following specific questions: ⑤Do you agree with the significance and value of prohibiting IUU fishing? ⑥What are the main reasons for your disagreement?

4 Results: value misalignment and poor norm recognition do exist

4.1 Questionnaire results: regulatory gaps from value misalignment

The designations of the marine fishery law enforcement departments in the four coastal provinces are not entirely uniform. However, one of the primary responsibilities of these departments is managing IUU activities in marine fishery. As shown in Table 2, item 1 pertains to the degree of recognition of the significance of prohibiting IUU fishing. This question examined law enforcement personnel’s overall value recognition. The majority of the respondents (84.6%) indicated “generally agree or higher” (refers to generally agree, agree, and strongly agree. This abbreviated form is consistently used hereafter), with the remaining 15.4% indicating general disagreement or below. The proportions of agreement and disagreement were similar for items 2 and 4. Item 2 pertains to the degree of recognition of the significance of relevant policies such as fishing bans and fishing moratoriums. This question focused on law enforcement personnel’s degree of policy recognition. The majority (81.9%) indicated generally agree or higher, whereas 18.1% indicated general disagreement or below. Item 4 pertains to the degree of recognition of the laws and regulations against IUU fishing. This question aimed to ascertain law enforcement personnel’s degree of recognition of the specific provisions of relevant laws and regulations. The majority (80.4%) indicated generally agree or higher and 19.6% indicated general disagreement or below. The maximum deviation of the responses indicating general agreement or higher and general disagreement or lower for the three questions was 4.2%. Hence, they verified each other and showed a high degree of consistency. Therefore, we determined that the average overall general disagreement or below was 17.7%. For items 1, 2, and 4, the average overall agreement rate (refers to the calculation of the average of the agreement rates for items 1, 2, and 4 after summarizing them) was 82.3%, which is the root of the support for IUU fishing enforcement actions in practice. This could be the result of law enforcement personnel’s accumulated years of legal experience and education. This result may also reflect mainstream value recognition. However, 17.7% disagreed, implying a high possibility of deviations in law enforcement.

The following is an adaptation from real cases. Hypothetical fact: Law enforcement personnel have seized 3 kg of illegally caught fishery products.

Scenario 1: Those with high recognition of the value of prohibiting IUU fishing (i.e., those who expressed general agreement) do not hesitate to implement law enforcement measures and may even extend the investigation by transferring the case to the public security organs as a criminal case requiring further investigation.

Scenario 2: Those with low recognition of the value of prohibiting IUU fishing (i.e., those who expressed general disagreement) show the mentality of “downplaying major issues and minimizing minor ones,” by imposing simple penalties, settling with a one-time fine, and refraining from extending the investigation by failing to transfer the case to the public security organs.

The aforementioned scenarios occur in real law enforcement activities. Some law enforcement personnel have an insufficient understanding of the social harmfulness of IUU fishing and therefore have weak recognition of the value of banning it. Variance in value recognition leads law enforcement personnel to adopt different action plans, resulting in varied and sometimes unjust outcomes for administrative counterparts. This necessitates research exploring the reasons some law enforcement personnel lack value recognition and identifying solutions.

Item 3 pertains to the degree of familiarity with anti-illegal fishing laws and regulations. Its primary function was to lay the groundwork for item 5, which asked whether the laws and regulations are being implemented effectively. Law enforcement personnel need a relatively good understanding of and familiarity with anti-illegal fishing laws and regulations to provide a clear answer as to whether the laws and regulations have been implemented effectively. In response to item 3, 69.4% of the sampled law enforcement personnel indicated general familiarity or above, whereas 30.6% indicated general unfamiliarity or below. In response to item 5, 56.6% characterized policy implementation as generally effective or above, and 43.4% described it as generally ineffective. The responses to items 3 and 5 provided us with important clues towards devising a solution to improve law enforcement personnel's literacy. We also identified a new research direction to explore the reasons a significant portion of law enforcement personnel believe that anti-illegal fishing laws and regulations are being ineffectively implemented. We considered these survey results when designing the interviews.

4.2 Interview results: origins of value misalignment

Given the questionnaire survey results, we used the interviews to delve deeper into the reasons for some law enforcement personnel's value non-recognition and perceptions of ineffective policy implementation. We formulated six interview questions encompassing three aspects: understanding the significance of banning IUU fishing, understanding the reasons for IUU fishing and the main problems IUU fishing bans encounter and devising strategies to strengthen law enforcement to combat IUU fishing,

and exploring the reasons for non-recognition of the significance of banning IUU fishing (applicable to Group 2 interviewees only).

First, regarding understanding the significance of banning IUU fishing, the interviewees' top four viewpoints were that IUU fishing has significantly harmed the fishery economy's long-term development (95.5%), accelerated the depletion of fishery resources (90.1%), damaged the marine ecology (83.7%), and precipitated a continuous sharp decline in marine biological resources (80.2%), among others. Interviewees presented these as justifications for banning IUU fishing. They perceived the prohibition of IUU fishing to be beneficial to promoting long-term fishery development and supporting fishers' livelihoods (95.5%), protecting future generations' interests (90.1%), safeguarding the marine fishery ecology (83.7%), and preserving the diversity of marine biological resources (80.2%). The results revealed a clear tendency. Between safeguarding the marine ecology and protecting the fishery economy and fishers' livelihoods, law enforcement personnel tended to prioritize the latter. In their analysis of the advantages and disadvantages of banning IUU fishing, their first point was that IUU fishing is detrimental to the fishery economy whereas banning it supports economic development and fishers' livelihoods. This value system implies that economic interests, not protecting the marine fishery ecology, is the fundamental purpose of banning IUU fishing.

Furthermore, it reflects anthropocentrism (Beever, 2018) rather than harmonious coexistence between humans (Sikandar et al., 2024) and nature or the view of humans and nature as a community of life (Wang C, 2024). Anthropocentrism is a doctrine that places humans at the center of things, emphasizing the subjectivity of human interests and value judgments. It holds that human interests should be placed in the highest position as the basis for value and moral evaluation. Law enforcement personnel with these values approaches issues in a matter that deviates from the basic principles of the Environmental Protection Law and the Marine Environmental Protection Law, among others that advocate prioritizing environmental protection. The viewpoint they should adhere to is the value of harmonious coexistence between humans and nature, and that humans and nature are a community of life. This value system emphasizes that humans should not excessively dominate or ignore nature. They should place themselves on an equal footing with nature and strive to eliminate self-centered concepts. When human interests conflict with nature conservation, the interests of both should be equally balanced.

The interviewees' showed a high degree of consistency when discussing the reasons people fish illegally. They generally postulated that IUU fishing is driven by economic interests. Some said that the more restrictive the fishing and moratorium periods, the higher the price of fish and thus the more fishing vessels that fish illegally. In other words, the more stringent the fishing ban, the more expensive the fish. Regarding the main problems IUU fishing bans encounter, responses focused on two dilemmas: the difficulty of investigating IUU fishing cases and obtaining evidence and the challenge of punishing perpetrators given that some people fish illegally as a livelihood. Regarding measures to strengthen anti-

illegal fishing law enforcement, interviewees suggested improving fishery legislation, reinforcing the connection between administrative law enforcement and criminal justice, and imposing stricter criminal penalties. Section 5 analyzes this content in more detail.

Finally, the interviewees were prompted to discuss their degree of recognition of the significance of prohibiting IUU fishing and, in cases of low or no value recognition, the reasons for that. To achieve the research objectives, we focused on law enforcement personnel who disagreed with questionnaire item 1. First, we confirmed each interviewee's response to item 1 and ensured that there were no discrepancies between their questionnaire and interview answers. The interview content highlighted three points. First, 52.4% of respondents explained their dissent by pointing out that some coastal areas have, under pressure from higher authorities, vigorously promoted the prohibition of IUU fishing while neglecting fishers' livelihood difficulties, resulting in a conflict between the long-term protection of marine fishery resources and fishers' immediate survival. The interviewees sympathized with the fishers. In-depth analysis revealed that the state attaches great importance to prohibiting IUU fishing even though it has persisted despite repeated bans, partly due to the conflict the interviewees pointed out. Evidently, law enforcement do not actually object to the policies and legal provisions prohibiting IUU fishing; rather, they have compassion for the perceived injustice of local governments' failure to balance environmental protection and economic survival by effectively resettling fishers. Moreover, 35.7% of the interviewees expressed serious doubt about whether law enforcement can achieve the desired governance effects given the perception of relatively ineffective law enforcement and governance. If that were untrue, would IUU fishing continue despite repeated bans? Section 5 further analyzes these reasons for disagreement.

5 Discussion under the “value recognition-norm enforcement” analysis framework

5.1 Value misalignment drives IUU fishing persistence

Almost all the law enforcement officers we interviewed characterized IUU fishing as economically motivated. We reviewed the Ministry of Agriculture and Rural Affairs of China's National Fishery Economic Statistics Bulletin for the period 2019–2023 and observed a corroborating phenomenon (Tables 3–5).

Table 5 shows that from 2019 to 2023, China's fishery output value has been on the rise, and this total output value mainly includes fishing output value, aquaculture output value, and aquatic seedling output value in the “Bulletin”. The fishing output value (including marine and freshwater fishing) increased from 251.411 billion yuan in 2019 to 289.396 billion yuan in 2023, an increase of 15.1%. The output value of aquaculture increased from 976.189

billion yuan in 2019 to 1306.34 billion yuan in 2023, an increase of 33.8%. The reasons for the increase in fishery output value are comprehensive, including changes in residents' consumption habits (seafood consumption gradually becoming the main component of residents' dining tables), the rise in the domestic freshwater fish market due to Japan's nuclear contaminated water discharge into the sea, and rapid growth in aquaculture production.

It must be noted that China's “three no” (no vessel name and vessel number, no vessel certificate, no port of registry) fishing vessels have not increased the total output value of the fishing industry. In fact, the “three no” fishing vessels are illegal and non compliant, and their illegal catches are not included in official fishery output statistics and are not reflected in the Bulletin. These fishing vessels overfish due to lack of regulation, cause damage to fishery resources and thus affect the sustainable development of fishery output value.

Table 4 shows that in the five years from 2019 to 2023, the total amount of China's aquatic products showed an upward trend. Among them, the domestic marine fishing output was affected by the COVID-19, but it recovered in 2023 after the epidemic ended. The output of pelagic fisheries fell in 2021 because of the epidemic, but the output rose in 2022 and remain stable for two consecutive years.

Table 5 shows that during the five-year period from 2019 to 2023, the total number of Chinese fishing vessels decreased from 731200 to 496500, a decrease of 234700 vessels, but the total tonnage increased from 10.4024 million tons to 10.575 million tons, an increase of 172600 tons. More specifically, a private think tank published a research report indicating that the number of Chinese marine fishing vessels decreased from 297,800 to 217,800 between 2013 and 2020, showing a 3.16% decrease rate compared to 2018 (Huajing Industry Research Institute, 2022). Another statistic indicated that given the continuous deepening of special joint law enforcement actions to supervise fishing vessels, coupled with the China Fishery Administration Bright Sword series of special law enforcement actions, the number of marine fishing vessels significantly decreased over 2 years and was predicted to remain at approximately 20,6000 in 2022 (Zhiyan Consulting, 2023). Conversely, according to commercial statistical analysis institutions' research reports, ocean fishing motorized fishing vessels' total tonnage increased from 7.294 million to 7.917 million tons between 2014 and 2019 (Forward looking Industry Research Institute).

Tables 3–5 show a year-by-year upward trend in China's fishery economy's total output value as well as in the fishery and marine fishing output values for the period 2019–2023. However, during the same period, the number of China-owned fishing vessels gradually decreased, but their tonnage steadily increased, resulting in a higher marine fishing volume.

Why does the phenomenon of “declining numbers of fishing vessels, yet increasing vessel tonnage and rising marine catches” occur? This seemingly contradictory but intrinsically linked development trend reveals a profound governance dilemma and developmental paradox: Local governments, caught between the

TABLE 3 China's overall fishery economic output 2019–2023 (in billions of yuan).

Year	Fishery economy's total output value	Fishery output value	Fishing output value	Aquaculture output value	Aquatic seedling output value
2019	26406.50	12934.49	2514.11	9761.89	658.49
2020	27543.47	13517.24	2601.14	10223.35	692.74
2021	29689.73	15158.63	2640.28	11775.45	742.9
2022	30873.14	15267.49	2765.61	12501.87	843.45
2023	32669.96	15957.35	2893.96	13063.4	879.39

dual pressures of promoting marine economic growth and safeguarding fishermen's livelihoods, often face a value conflict with fisheries resource conservation regulations.

Specifically, when local finances exhibit a path dependence on the fisheries economy and fishing communities remain heavily reliant on traditional fishing operations, the strict enforcement of closed fishing seasons and moratorium systems inevitably encounters practical resistance. Concurrently, fishermen, adapting to policy constraints, are enhancing per-unit productivity through vessel upsizing and equipment modernization. This “quality-over-quantity” transformation in production methods objectively drives gains in fishing efficiency.

More critically, enforcement agencies, operating under a “development-first” orientation, must balance multiple pressures: accommodating local economic development needs, meeting ecological protection assessment targets, and maintaining stability within the fishing community. This complex situation leads to fluctuating enforcement standards, resulting in a differential regulatory model that exhibits relative leniency towards small-scale subsistence fishing boats while imposing stricter penalties on commercial operations.

Although seemingly rational, this categorization approach in practice inadvertently stimulates irrational expansion in vessel tonnage, exacerbates the long-term risk of resource depletion, and carries the significant potential to create a vicious cycle of “lax regulation → expanded production capacity → resource degradation”.

5.2 Poor norm recognition from weak frameworks and inefficient governance

This section examines the root causes of ineffective enforcement governance against IUU fishing. Interviews indicate that insufficient enforcement efficacy has substantially undermined law enforcement officers' recognition of current laws and regulations prohibiting illegal fishing. Through in-depth interviews with frontline enforcement personnel, three critical issues within the legal penalty mechanism targeting illegal fishing have been identified: Firstly, there is inadequate coordination between administrative, criminal, and civil liability frameworks. Secondly, significant structural gaps exist in the institutional design of the legal

accountability system. Ultimately, these institutional deficiencies create compound effects, propelling enforcement practices into a cycle of inefficiency.

First, regulatory penalties are disproportionately weighted toward administrative and criminal sanctions over civil remedies. Under current law, illegal fishing is predominantly addressed through administrative law enforcement and criminal justice channels.

Regarding administrative law enforcement, the introduction of the China Fishery Administration Bright Sword series of special law enforcement actions states that the marine summer fishing ban aims to ensure that marine fishing vessels take all their days off ([The News Office of the Ministry of Agriculture and Rural Affairs, 2022](#)). Specific measures include strengthening the dynamic management of registered port fishing vessels, strict management of special licensed fishing, real-time monitoring through technologically-enabled supervision, the normalization of joint law enforcement involving multiple departments, and rewarding reports of major IUU activities. The Bright Sword 2021 special law enforcement action investigated and processed 47,000 illegal and irregular cases, achieving a 12.2% year-on-year increase. Additionally, 15,000 “three no” ships related to marine fishing were banned, achieving a 39.1% year-on-year increase. Similarly, the Bright Sword 2022 special law enforcement action investigated and processed 52,000 cases of illegal and irregular activities, banned 19,000 “three no” fishing vessels, cleared 80,200 extinct nets, and organized and executed 6,400 centralized dismantling and destruction activities. Continuing the trend, the Bright Sword 2023 special law enforcement action investigated and processed 66,000 illegal and irregular cases, banned 18,000 “three no” fishing vessels, cleared 837,000 pieces (tops) of illegal nets, confiscated 5,021 sets of electric fishing equipment, and organized and executed 6,084 centralized destruction activities. Consequently, administrative law enforcement has incurred huge enforcement costs, which begs the question of whether these numerous enforcement cases are indicative of effective governance. We cannot draw a direct conclusion yet.

Regarding criminal justice, we found that China Judgments Online featured few updated cases as of August 22, 2024. At the time, we retrieved 1,335 documents using the keywords “sea area,” “crime of illegal fishing of aquatic products,” and “criminal first

TABLE 4 Production of Aquatic Products in China from 2019 to 2023 (10000 tons).

Year	Total output of aquatic products	Fishing yield	Breeding yield	Domestic marine fishing output	Production of offshore fishing industry
2019	6480.36	1401.29	5079.07	1000.15	217.02
2020	6549.02	1324.82	5224.20	947.41	231.66
2021	6690.29	1295.89	5394.41	951.46	224.65
2022	6865.91	1300.45	5565.46	950.85	232.98
2023	7116.17	1306.56	5809.61	957.49	232.23

instance procedure.” Compared to the 40,000–60,000 cases administrative law enforcement processes per annum, the criminal prosecution by judicial authorities is indeed inferior. So why haven’t a large number of administrative cases entered the judicial process? From the interview, it can be seen that there are four reasons: firstly, some law enforcement personnels are negligent in transferring cases, and a large number of administrative cases are simplified; secondly, some law enforcement personnel do not have clear and accurate grasp of the transfer standards for criminal cases, and do not know that the cases should be transferred for criminal prosecution; Thirdly, the public security and judicial organs have strict control over the cases transferred, especially the judicial organs, which adhere to the value orientation of “legality of crime and punishment” and “modesty of criminal law”, are not to make judgments related to illegal fishing and other related crimes; The fourth issue is that the execution linkage system is not smooth enough, which is also a problem mentioned by more than 70% of law enforcement personnels. The forward linkage (referring to the transfer of cases from administrative organs to judicial organs) is not smooth, causing law enforcement personnels to “dare not transfer when they want to transfer cases”, and the reverse linkage (referring to the transfer of cases from judicial organs to administrative organs) is not smooth. Judicial organs do not prosecute or sentence innocent, resulting in the dilemma of law enforcement personnels— “dare not punish when they want to punish”.

In recent years, the use of public interest litigation as a legal means to combat IUU fishing has increased. The integration of the new development concept into the Civil Code of the People’s Republic of China, the establishment of green principles, the addition of ecological damage liability to the tort section, the

establishment of punitive damages for causing ecological damage, and the introduction of an ecological environment restoration liability system to civil liability have driven environmental civil public interest litigation, allowing marine environmental public interest litigation to gradually enter the public domain. However, due to factors such as institutional reform, institutional integration, conceptual changes, and the talent pool, marine environment public interest litigation is still in its infancy compared to traditional administrative law enforcement and criminal justice in terms of case volume and social influence. For example, in a search of China Judgments Online, we retrieved only 73 documents using the keywords “sea area” and “public interest litigation.” The scale of cases indicates a significant imbalance in the proportion of civil liability penalties compared to administrative and criminal ones. The procuratorial organs’ authorization to initiate marine ecological environment public interest litigation under general civil litigation theory has caused institutional tension, necessitating further examination and theoretical-level resolution (Wang and Chang, 2021).

Second, the legal liability system needs to be improved. According to the Several Opinions of the State Council on Promoting the Sustainable and Healthy Development of Marine Fisheries (2013) and the Guiding Opinions of the Ministry of Agriculture and Rural Affairs on Strengthening the Conservation of Aquatic Living Resources (2022), marine fishing bans aim to promote the sustainable and healthy development of marine fisheries by strengthening marine living resource conservation. In this context, the action is prohibition, and the purpose is to nurture. Nurturing includes two aspects: natural recuperation and artificial proliferation. Of these, the former focuses on non-action, whereas the latter focuses on action. Notably, traditional administrative law enforcement and criminal justice rely on various regulations and prohibitions to urge fishing operators to do less or nothing to achieve the natural restoration of marine living resources, which entails leaving them as undisturbed as possible within a state-specified time and area. From a scientific and practical perspective, the natural recuperation mode conforms to natural laws, but the functions and effects of artificial proliferation have been largely ignored. Although Article 28 of Chapter 4 “Enhancement and Protection of Fishery Resources” of the 2013 revision of the Fisheries Law newly stipulates that the fishery administrative department of the people’s government at or above the county level has the right to collect fishery resource enhancement and protection fees from beneficiary units and

TABLE 5 Number and tonnage of China-owned fishing vessels 2019–2023.

Year	Total number of fishing boats (10,000)	Total tonnage (10,000 tons)
2019	73.12	1040.24
2020	56.33	1005.93
2021	52.08	1001.58
2022	51.10	1031.33
2023	49.65	1057.50

individuals specifically for the purpose of enhancing and protecting fishery resources, whether the administrative fee is used for artificial enhancement projects only is unclear. Based on the historical evolution of the legal provisions and the overall interpretation of the chapter articles, this clause is usually understood as coordinating proliferation and protection. Even the literal interpretation that the fees go towards fishery resource proliferation and protection does not clearly indicate the use of the funds. Administrative law enforcement and judicial practice also collect fines and penalties, and there is no room in top-level design for the use of these two types of funds for artificial breeding and the restoration of fishery resources.

The establishment of ecological restoration responsibility in the Civil Code clarifies for the first time in law that an infringer who damages the ecological environment is the first person responsible for ecological restoration. This fills the institutional gap in comprehensive ecological environment protection. The drawback is that compared to the systematization and standardization of administrative and criminal responsibilities, there are still many legal, institutional, and practical issues to be resolved regarding constructing a civil liability system to ascribe ecological environment restoration responsibility. Correspondingly, the marine fisheries ecological restoration responsibility system needs to be improved. For example, the connection and distinction between criminal incidental civil litigation and criminal incidental civil public interest litigation for the crime of IUU fishing of aquatic products; the distinction between and coexistence of administrative penalties, fines, and civil liability for ecological restoration; and the coordination and connection between people's procuratorates and administrative functional departments regarding filing public interest litigation all require more refined and systematic research at the theoretical and practical levels.

5.3 Value-norm misalignment result in selective enforcement

Survey data confirms a positive correlation between value disapproval and norm non-compliance. Enforcement personnel rejecting core tenets of the IUU fishing ban exhibit poor regulatory alignment due to systemic flaws and governance inefficiencies. This normative disconnect in turn drives enforcement evasion and selective law application.

Typically, enforcement personnel justify enforcement evasion and selective law application through two primary explanations. First, they cite evidentiary collection challenges as justification. Such investigative difficulties are not novel—illegal fishing operations consistently employ highly coordinated and covert methods. During interviews, officers acknowledged that updating technical equipment and adopting more technologically advanced evidence-gathering protocols could substantially resolve these challenges. However, constrained by funding limitations, and crucially, as some personnel explicitly stated, even with upgraded tools, officers may still invoke evidentiary obstacles when intending to evade

enforcement duties. This fundamentally underscores the primacy of value alignment and normative acceptance.

6 Suggestions for strengthening and deepening the enforcement of IUU fishing in marine fisheries

6.1 Value recognition: cornerstone of IUU fishing enforcement

Marine fishery resources are facing an unsustainable dilemma caused by human overfishing. Human activities since the turn of the millennium have significantly impacted the marine ecological environment through pollution, changes in the ecological environment, and technological innovation; consequently, many fisheries are in an unsustainable state (Garcia et al., 2000). According to the FAO 2024 report, the total catch of aquatic animals in marine areas in 2022 was 79.7 million tons, representing a 0.7% decrease from 2021 and a 5.5% decline from the 2018 peak of 84.4 million tons (Alessi, 2002). In 2021, the proportion of fish populations that numbered within biologically sustainable limits decreased to 62.3%, which was 2.3% lower than the 2019 level and far from the 1974 figure of 90%. The World Wide Fund for Nature pessimistically pointed out that “we have broken through the limits of the ocean” (Garcia et al., 2021). Indeed, the desertification of marine fishery resources in China's offshore areas, such as the Zhoushan Fishing Ground, the Yellow Sea, and the Bohai Fishing Ground, as well as various coastal fishing grounds in the South China Sea where there are no fish to catch and the number of available species has sharply decreased, has also attracted widespread and highly anxious attention.

The above data and other reflections of the stark reality reinforce the call for marine fishery resource management. The seas and the human population comprise a community of life, and we can no longer view marine fishery resources through the lens of anthropocentric superiority nor can we approach IUU fishing with a local protectionism mentality. Prioritizing protecting the marine ecological environment should not be an empty legal statement; effectively transforming the protective intent into values that are widely held among law enforcement personnel is crucial. Prioritizing protection requires prioritizing economic development, fishers' livelihoods, and other factors. Only when law enforcement officers truly value and prioritize marine fishery resource protection will the policies and laws prohibiting IUU fishing be recognized, sufficiently motivating proactive marine fishery law enforcement actions.

From a reverse perspective, where fisheries management agencies lack social or broader economic sustainability objectives and are thus refractory to acknowledge the importance of the sector in the overall management of domestic fisheries. Fishery management agencies bear the historic and long-term social responsibility. They must clearly recognize that through their management and enforcement activities, the goal is to better

safeguard resources so that people can use them sustainably to maintain or improve their livelihoods (Sander et al., 2014). We should make some law enforcement officers who sympathize with IUU fishing realize that pursuing a sustainable natural resource system through law enforcement means the best guarantee for the poor to sustainably utilize their living resources (Sander et al., 2014).

The common approaches of construction of value identity are to input values through various activities. But the problem is that the knowing of values does not equate to the recognition of values. To truly enable law enforcement personnel to have a profound understanding of the priority value of marine fishery resource protection, it is necessary to make them truly realize the significant significance of marine fishery resource protection from the bottom of their hearts - that is, to achieve sustainable development for future generations and achieve fairness and justice between generations. This kind of sustainable development and intergenerational equity needs to be conveyed to law enforcement personnel through various types and forms of education and training, to help them realize that they are thinking entirely from the perspective of long-term and fundamental interests, and that they demonstrate a more ultimate sense of “human care”, which is far more meaningful and important than the short-term “human care” shown by law enforcement personnel to lawbreakers.

The shaping of values is a long-term process, in which there should be a positive value list clearly displayed in various eye-catching slogans, textbooks, and other forms in front of all law enforcement personnel. At the same time, a reverse warning education activity should be formed to criticize the short-sighted law enforcement behaviors in the shaping of values. Only by taking the dual approach can we expect a law enforcement officer to form a value identity.

6.2 Administrative-criminal nexus: key to IUU regulatory compliance

IUU fishing entails the dual criminal acts of administrative and criminal violations. Therefore, prevention requires the institutional linkage of fishery administrative law enforcement departments with public security and procuratorial departments. The daily work of fishery law enforcement and public security departments differs in terms of law enforcement concepts, evidence collection procedures, and evidence proof standards. The procuratorial department's requirements add another layer to the complexity. This can easily lead to problems such as non-standard evidence collection, loss of evidence, and delayed evidence transfer. After completing their enforcement actions, fishery law enforcement personnel must fix, preserve, and transfer evidence, review IUU activities, and determine whether those activities are suspected crimes. These responsibilities comprise a considerable workload. Unsurprisingly, fishery law enforcement personnel do not approach transferring cases with enthusiasm. Consequently, some cases that should be

transferred to criminal justice are simplified, preventing the achievement of the appropriate legal governance effect.

Strengthening the linkages among executing bodies to combat IUU fishing requires refining the cooperation mechanism of fishery administrative law enforcement departments, public security organs, and procuratorates. Three departments operate within the cooperation mechanism: agriculture and rural areas (fisheries and fishery administration), public security, and the procuratorate. Departmental personnel must clarify each department's cooperative role and coordinate various tasks such as clue transfer, case reporting, information sharing, service promotion, communication and exchange, and collaborative case handling. They must also normalize case reporting. While handling cases or performing other duties, fishery law enforcement departments should promptly report important case developments and clues to the relevant agencies to ensure the standardization and effectiveness of execution connections.

Establishing a bidirectional connection mechanism is also necessary for efficient operation. Specialized departments resolve professional matters, and judicial authorities resolve legal issues. When fishery law enforcement departments discover clues or receive relevant reports, they should promptly notify the public security organs. In turn, the public security organs should actively intervene in the investigation after receiving reports or case-related clues. Fishery law enforcement departments should assist public security organs with conducting investigations by providing technical support for inspections. Public security organs should provide the necessary technical support for case investigation and handling techniques as well as for evidence fixation and preservation. The forward linkage (referring to the transfer of cases from administrative organs to judicial organs) is quite common in current judicial practice, but the reverse connection has the institutional problems. For cases where the procuratorial organs have made a non prosecution decision, transferring it to the fishery law enforcement department for administrative purposes can not only fill the gap left by the non prosecution decision, but also avoid the social perception of injustice that may arise among the public. Specifically, the administrative prosecution department of the procuratorial organ should take the lead in reverse coordination, establish cross departmental meeting minutes and unified law enforcement standards through communication with the fishery administration department, formulate prosecutorial suggestions, and effectively implement administrative penalties after non prosecution.

6.3 Effective governance: innovative integration of IUU enforcement and litigation

As previously mentioned, public interest litigation has emerged as a new mode of investigating legal responsibility for IUU fishing. In March 2018, the People's Procuratorate of Guannan County, Lianyungang City, Jiangsu Province, filed a public prosecution

against 18 suspects, including Rongcheng Weibo Fisheries Co., Ltd., and He Yanqing, on suspicion of IUU fishing for aquatic products. A criminal incidental civil public interest litigation was filed simultaneously, requesting that the court order 46 defendants and Rongcheng Weibo Fisheries Co., Ltd., to assume liability for damage to the marine ecological environment, repair the marine ecology through proliferation and release, and pay labor compensation or ecological restoration up to 130 million yuan. This became China's first environmental public interest litigation case-related to marine ecology. In September 2019, the People's Procuratorate of Wenchang City, Hainan Province, filed a maritime administrative public interest lawsuit with the Haikou Maritime Court claiming that the Wenchang Agriculture and Rural Bureau had not fulfilled its statutory duties. The claimant won the judgment, and the case became the first maritime administrative public interest lawsuit in Hainan Province.

From the perspective of the existing institutional system, the public interest litigation system for marine ecological environment protection should have two parts: civil and administrative. Therefore, public interest litigation on marine fishery resources and the marine ecological environment should reflect those parts. The public interest litigation system for marine fishery ecological environment has filled the institutional gaps in the comprehensive management and energy-efficiency improvement of IUU fishing in the marine fishery industry by introducing the people's procuratorate's supervision of administrative organs' performance and appointing replacement agents. The public power coordination and supervision operation system of "administrative management + judicial support + external supervision" has also improved. The practice of fishery administrative organs or people's procuratorates filing public interest lawsuits related to the marine fishery ecological environment can improve marine fishery ecological protection in four ways. First, it effectively enriches and expands the means and methods of fishery administrative management, thus forming a complete "criminal + administrative + civil" legal liability system. Second, compared to the harsh nature of criminal accountability and administrative punishment, public interest litigation is perceived as humbler and is thus easier for fishers to accept. This decreased tension reduces conflict between law enforcement and fishers. Third, the power scope of comprehensive fisheries management has expanded, and the judiciary's and procuratorates' powers have been integrated into the fisheries law enforcement and supervision system. Fourth, public interest litigation combines monetary and behavioral punishment. Although public interest litigation imposes lighter responsibilities on lawbreakers than the criminal and administrative alternatives, the former's punishment of violators is more specific, and the judgments' demonstrative and guidance effects remain significant.

The co-governance model allows the establishment of a cooperation mechanism between fishery law enforcement and public interest litigation with procuratorial agencies. This mechanism can consider the following contents: firstly, establish a work coordination group, regularly hold work consultations, report work situations to each other, jointly analyze and judge the

characteristics of IUU cases in the field of marine fisheries, fully play their respective functions and roles, focus on IUU activities in the field of marine fisheries, increase cooperation efforts for IUU activities in the field of marine fisheries with serious circumstances, adverse effects, and refusal to rectify, and jointly discuss and judge those involving other administrative agencies or units through joint meetings, roundtable meetings, and other forms.

The second is to establish a special action mechanism for rectification and assistance in handling cases, strengthen law enforcement and judicial linkage, and jointly carry out special rectification actions in areas where IUU activities are frequent, key river basins, and sensitive areas in the field of marine fisheries, to jointly maintain the order of marine fisheries and improve the level of governance. When handling public interest litigation cases, the procuratorial organs should strengthen communication and coordination with the fishery law enforcement agencies. During the investigation and evidence collection process, the procuratorial organs should lawfully consult, retrieve, and copy law enforcement case files, collect documentary evidence, physical evidence, electronic data, and other evidence. The fishery law enforcement agencies should cooperate and assist, and if professional technical support is needed, they should provide or assist in providing professional opinions or technical support.

The third is to establish a mechanism for sharing case information and transferring case clues, and to share administrative law enforcement information, public interest litigation case information, and other data in the field of marine fisheries. Fishery law enforcement agencies should promptly refer any IUU issues discovered during the enforcement process, involving multiple administrative agencies, or clues that are still insufficient to compensate for the loss of national interests or social public interests after enforcement to the procuratorial organs. When the procuratorial organs discover clues of IUU fishing issues in the field of marine fisheries during the handling of public interest litigation cases, they can hold talks and consultations with the fishery law enforcement agencies to jointly promote solutions. The results of clue processing should be communicated to each other.

The fourth is to establish a mechanism for reporting cases and major situations. During the process of handling public interest litigation cases, the procuratorial organs shall promptly report the basic situation of the case, as well as the facts and reasons for the decision made, to the fishery law enforcement organs. The fishery law enforcement organs shall, in accordance with the needs of the procuratorial organs to carry out legal supervision work, promptly report the situation of the cases handled to the procuratorial organs.

The fifth is to establish a mechanism for business exchange and cooperation, broaden communication channels, and invite each other's staff to participate in job training and business exchanges related to administrative law enforcement in the field of marine fisheries organized by both parties. According to work needs, procuratorial organs may hire law enforcement personnel from fishery law enforcement organs as specially invited prosecutor assistants, and fishery law enforcement organs may hire case

handling officers from procuratorial organs as legal education lecturers to provide legal advice and participate in marine fishery legal education work.

Introducing public interest litigation to combat IUU fishing was an institutional innovation engendered by practical needs, but avoiding political impulses and preventing procuratorial organs from grabbing orders are necessary safeguards. Article 89 of the Marine Environmental Protection Law alongside the Supreme People's Court's and the Supreme People's Procuratorate's judicial interpretations have jointly established a system for initiating public interest litigation in the marine environment, with the administrative department of marine environmental supervision and management as the main body and the people's procuratorate as the auxiliary body. This system has doubled the responsibilities and powers of the administrative and prosecutorial organs in the field of marine environment public interest litigation. On the one hand, the law grants administrative agencies the authority to flexibly apply civil litigation methods and choose whether to increase marine environmental infringers' liability. On the other hand, it potentially gives administrative agencies priority as the handlers of marine environmental violation cases. Given that administrative inaction had become a legal prerequisite for procuratorial agencies' intervention, establishing an authoritative order for public interest litigation was necessary. The involvement of too many departments or the excessive dispersion of diverse forces can lead to scattered and divergent views, interests, and resources (Agnew and Barnes, 2004), but easily determining the competent department's supervisory authority has rendered management more effective, allowing for better utilization of the public interest litigation system's advantages.

7 Conclusion

This study differs from previous research by focusing on a previously overlooked issue in marine fisheries law enforcement: the attitudes and psychological factors of enforcement personnel as key determinants in combating IUU fishing through legal regulations. This distinguishes the present study from traditional marine fisheries research, which predominantly emphasizes legal and technical aspects.

Adopting a socio-legal and policy implementation theory perspective, this paper analyzes fisheries law enforcement by introducing a valuable human-centric lens. Specifically, it draws upon the Meter-Horn policy implementation framework, which highlights the role of implementers' values in shaping the effectiveness of laws and policies.

The central objective of this study is to assess the degree of value and normative acceptance among China's marine fisheries enforcement personnel and to evaluate how such acceptance influences practical implementation. A mixed-methods research design was employed, combining quantitative survey data from 526 respondents across four coastal provinces with qualitative interviews involving 195 participants.

The study reveals a divergence in enforcement authorities' attitudes toward illegal fishing. A small but notable proportion of enforcement personnel (17.7%) still demonstrate low value recognition, presenting

challenges for consistent law enforcement. These officers tend to prioritize economic stability and express sympathy toward fishermen, resulting in value-based compromises during enforcement actions. The authors critique this outlook and advocate for a normative shift towards ecological justice and intergenerational equity.

The study highlights the need to pay close attention to how subjective factors (values, beliefs) profoundly influence the outcomes of objective law and policy implementation. It proposes a three-pronged approach: first, strengthening legal awareness training and ecological education for enforcement personnel to reinforce value recognition; second, improving the current legal framework by establishing a multi-agency enforcement system to facilitate criminal case transfers and enhance normative compliance; third, optimizing the legal implementation system to create a more efficient and coordinated governance mechanism that improves policy enforcement effectiveness.

This research has certain limitations. Its focus remains confined to enforcement agencies, excluding perspectives from fishermen, NGOs, or judicial bodies. Future studies could achieve a more comprehensive understanding of enforcement dynamics by incorporating these voices. Three promising directions for further research include: (1) conducting cross-national comparisons between China's enforcement practices and those of other jurisdictions; (2) developing longitudinal studies to track the evolution of enforcement values over time; and (3) integrating behavioral economics models to explain implementation inertia. Sustained investigation along these lines could yield enhanced theoretical guidance for China and other nations.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding author.

Author contributions

LC: Writing – original draft, Investigation, Funding acquisition, Writing – review & editing, Data curation, Conceptualization, Project administration, Methodology. YH: Data curation, Writing – original draft, Writing – review & editing, Conceptualization, Formal Analysis, Investigation, Methodology.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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