Integrative Fisheries Crime Prevention Model in North Natuna Sea

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Abstract—**Fisheries Crime is a method of crime that includes all value chains of fisheries activities. It is defined as crime in the entire fisheries sector, from fishing to processing.** *Purpose-***This research studies the topic of social reaction by finding a proper fisheries crime prevention model that can be effectively implemented in North Natuna Sea and finding the causes of the crime.** *Methods-***The approach chosen by the researcher is a qualitative approach that focuses on identifying, observing, and interpreting a cause in depth on the signs of crime, causes, and general characteristics of perpetrators.**

Index Terms—**Fisheries crime, Indonesia, integrative crime prevention model, north Natuna sea**

I. INTRODUCTION

With a sea area exceeding 2.7 million km^2, Indonesia is the largest archipelago in the world [1]. With an increase in potential fish resources of 12.54 million tons/year in 2017 [2] and continuing to increase until 2019, Indonesia's seas attract many fishermen who obtain these resources illegally. From 2015 to the end of 2019, there were 608 illegal fishing vessels arrested by the Ministry of Maritime Affairs and Fisheries (MMAF) [3].

The North Natuna Sea or South China Sea is part of Indonesia's Exclusive Economic Zone (EEZ), an area designated as a Fisheries Management Area (FMA) of the Republic of Indonesia. FMA is a fisheries management area for fishing, fish farming, conservation, research, and fisheries development which includes inland waters, archipelagic waters, territorial sea, additional zones, and Indonesia's exclusive economic zone with an EEZ of 2.7 million km^2, FMA is divided into 11 (eleven) fisheries management areas. Based on the results of the National Commission for the Assessment of Fish Resources (Komnas KAJISKAN) study conducted in 2016, the total potential of fish resources in FMA 711 which covers Natuna Sea, Karimata Strait and North Natuna Sea is 1,143,341 tons/year. This large amount of potential is one of the attractions for foreign fishing vessels to carry out illegal activities to reap profits that cause a reduction in fish stocks. In this region, there is also a conflict of international relations in the fishing area in the Gulf of Thailand which is adjacent to FMA 711 since the 1980s.

The practice of fish theft or fisheries crime by foreign fishing fleets in the exclusive economic zone area is the most detrimental to the state [4]. The losses suffered by Indonesia are calculated with a total economic loss value of 2.98 trillion [5]. This loss has an impact on various sectors, both in the economic, environmental, social and sovereignty sectors and the presence of illegal foreign fishing vessels can harm Indonesia economically because the source of state revenue or foreign exchange from capture fisheries resources is lost due to theft by illegal foreign fishing vessels [5].

This fisheries crime contains the elements of a crime. These elements include the existence of real consequences, this crime is prohibited in law and the existence of intentional mens rea committed by the perpetrator [6]. Fisheries Crime is defined as crime in the entire fisheries sector, from fishing to processing, along the supply chain, including food fraud at the consumer level. It also refers to crimes that facilitate activities such as extortion, conspiracy, and bribery [7].

The government needs to pay more attention to the rampant fisheries crime activities in the EEZ region. The extensive waters of Natuna and the large potential of capture fisheries resources make Natuna waters prone to illegal fishing activities. Therefore, this research will examine the topic of social reaction by finding a suitable prevention model that can be effectively implemented in FMA 711.

II. REVIEW OF PREVIOUS RESEARCH

To establish the foundation and identify gaps in the existing best practices and methodologies, the author made literature review on several publications. The research entitled The Dimensions of a Transnational Crime Problem: The Case of IUU Fishing [8] contains a detailed description of the problem of IUU fishing, including the methods used, the dimensions of the problem as it exists in various parts of the world, the relationship between illegal and quasi licensed fishing operators and transnational organized crime, including the economic, social, and environmental impacts of IUU fishing. This article also explores and analyzes the various conditions and elements of IUU fishing activities, including economic drivers and the influence of public corruption. The theory used is Passas' theory, also known as Criminogenic Asymmetries

Preventing Illegal, Unreported and Unregulated (IUU) Fishing: A situational approach examines the relationship between local situational factors and illegal fishing in 53 countries [9]. The method used is to collect data on variables and discuss how these variables have been operationalized. The theories used are Rationale Choice Theory and Situational Crime Prevention. The results show that all 'constraint' factors, except the presence of legal fishing vessels, and all 'facilitator' factors can significantly predict the level of illegal fishing.

The research entitled Why is illegal fishing occurring in the Persian Gulf? A case study from the Hormozgan province of Iran [10], uses the Grounded Theory method to discover what factors influence the occurrence of illegal fishing. The results of this study identified that culture plays a role in illegal

fishing. In addition, economic and other conditions also influence the occurrence of illegal fishing activities such as the ability of individuals to find jobs and fisheries management issues in the country.

A corporate-crime perspective on fisheries: liability rules and non-compliance [11], contain an analysis of how the allocation of responsibility between fishing companies and crew members affects quota violations and the ability to design socially efficient fisheries policies. The principal-agent theory is being used to investigate the relationship between companies and their employees in the context of fishing vessels that illegally surpass catch quotas.

Blue Water Crime: Deterrence, Legitimacy, and Compliance in Fisheries [12] adds limitations and states that legitimacy and crime have an impact on a person's compliance behavior. The influence of individuals in their decision to comply with a regulation. The theory used is the compliance theory model. Then in Fisheries law enforcement-A survey of the economic literature using law enforcement economic literature used to analyze how the government should choose the level of law enforcement and quantify penalties to maximize social welfare functions.

Fishers' compliance motivations: A case study of the Sultanate of Oman [13], aims to investigate the factors that potentially influence fishers to make the decision to comply or not. Using two distinct and exclusive theories known as the aggression approach or utilitarian approach and the normative approach. This case study explores fishers' views on potential non-compliance factors and examines the extent to which they influence their compliance behavior in the fisheries sector.

Where do "Undocumented" Fish Land? An Empirical Assessment of Port Characteristics for IUU Fishing [14], identified the importance of ports of convenience as facilitators of illegal fishing activities. The results of this analysis show that IUU fishing vessels are more likely to visit ports that facilitate the concealment ability of the vessel and its activities due to the higher daily general level and traffic of fishing vessels and the larger size of the port.

Conservation Criminology: Modeling Offender Target Selection for Illegal Fishing in Marine Protected Areas [15], which aims to examine offender target selection through analysis of travel patterns from the offender's home to the location of the offense from a travel to crime perspective with a particular focus on the concept of distance decay. It is argued that the opportunity to commit a crime is the main condition for why a crime occurs. For environmental criminology, the opportunity to commit a crime is created when the offender and his target in a certain time and place occurs due to the absence of surveillance.

Criminology scholars agree that the objects of criminological research are crime, criminals, deviant behavior, deviant offenders, victims of crime, social reactions to evil behavior and deviant behavior [16]. One of the theories that will be used to conduct this fisheries crime research is the Criminogenic Asymmetries theory [8] introduced by Passas. This theory identifies inequalities at the political, cultural, economic, and legal levels. Passas argues that asymmetries are criminogenic, creating the need for illegal goods and services.

The situational crime prevention framework [17] relies on 25 prevention techniques. These techniques capture the assumptions of rational choice theory about the criminal nature of offenders. The key to crime prevention is to focus on the specific opportunities and situational dynamics that make crime possible [17]. This implies that only certain locations are more prone to crime than others, and crimes occur during certain periods of time [18]. The situational crime prevention model will be used as a reference for integrative fisheries crime prevention model in this research.

Fisheries crime in this study is also examined from several theories such as rational choice theory which focuses on explaining criminal activities, the impact on the environment and when the crime occurs. Although rational choice theory is widely used for predatory crimes, it will be used to identify perpetrators' motivation for fisheries crime.

Based on preceding research, no research has been found on the fisheries crime prevention model in North Natuna Sea, therefore this research will examine the topic of social reactions by finding a suitable integrative prevention model that can be applied effectively and investigate the causes of fisheries crime in North Natuna Sea.

III. CONCEPT AND TERMS: FISHERIES CRIME

Fisheries Crime is a relatively new concept, the understanding of its nature and content is constantly evolving and being refined. There is no legal definition of "fisheries crime", but it is now generally accepted in international forums that fisheries crime covers a wide range of serious offenses committed along the entire fisheries value chain.

Overfishing, caused by failed management and conservation efforts, facilitated by corruption, and reinforced by marine resource crime, has led to serious depletion of fish stocks. The effects of overfishing on fishing communities that depend on fishing for a living or as a valuable food source can contribute to fishers' vulnerability to criminal activities [19].

Fisheries Crime must be differentiated from Illegal, Unreported and Unregulated Fishing (IUUF). Where most of IUU fishing is an environmental crime. The concept of IUU Fishing is a concept that emerged in FAO's soft law to address non-compliance with fisheries management regulations, especially for vessels sailing under flags of convenience[1]. In other words, IUU fishing covers activities that are not necessarily illegal. The concept of IUU fishing is also problematic in that it only focuses on activities conducted by fishing vessels. From a criminal perspective, this focus is too narrow as the definition does not cover crimes from upstream to downstream of illegal fishing activities such as money laundering, corruption, falsification of documents or possession of stolen goods [19].

The concept of fisheries crime is a brand new one. Fisheries crime encompasses a wide range of serious violations of the entire fisheries value chain. Fisheries crime occurs both at sea and on land, in other words fisheries crime does not only include fishing, sea diversion and landing of catches but includes preparation for fishing including transportation and trade of the fish itself [20].

Fisheries crimes that often occur are divided into several

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[1] Flag of Convenience is a country that provides ease of regulation and taxation matters that are usually used by companies whose business is engaged in shipping goods by sea, production, or services (OECD, 2001)

stages, namely, the preparation stage, the fishing operation stage and the stage of processing and selling the catch [21]. In the preparation stage, some illegal activities such as changing the flag of the ship continuously, falsifying documents, building working relationships with corrupted officers, preparing techniques and networks for smuggling catches. In the fishing stage, the illegal activities are slavery, identity forgery, loading vessels with crew members, officers, and prohibited fishing gear, supplying vessels at unguarded ports, obstructing and evading arrest by the authorities, disposing of navigation equipment on board and other evidence on board, and diversion of unrecorded cargo at sea. And the final stage is the processing and sale of the catch, some illegal activities in this stage such as mixing illegally caught fish with legal fish, falsifying customs, health and other documents, bribing officers, money laundering and falsifying fish labels [7].

IV. PROBLEMS IN THE NORTH NATUNA SEA

The North Natuna Sea also known as the South China Sea, which is part of Indonesia's Exclusive Economic Zone (EEZ), is an area designated as a Fisheries Management Area (FMA) of the Republic of Indonesia. FMA is a fisheries management area for fishing, fish farming, conservation, research, and fisheries development that includes inland waters, archipelagic waters, territorial sea, additional zones, and Indonesia's exclusive economic zone with an EEZ of 2.7 million km2, FMA is divided into 11 (eleven) fisheries management areas.

With an ocean area reaching 99.24 percent of its total area, the fish resources of the Natuna Sea, based on the identification study of the potential marine and fishery resources of Riau Islands Province in 2011, amounted to 504,212.85 tons per year or about 50 percent of the potential of FMA 711 of 1,059,000 tons per year with the allowable catch (80 percent of the sustainable potential) reaching 403,370 tons [5]. Based on the results of the study of the National Commission for the Assessment of Fish Resources conducted in 2016, the total potential of fish resources in FMA 711 [2] is 1,143,341 tons/year [3] This large amount of potential is one of the attractions for foreign fishing vessels to carry out illegal activities to reap profits.

In this region there have also been conflicts over international fishing grounds in the Gulf of Thailand adjacent to FMA 711 since the 1980s. There have been serious fisheries conflicts between Thailand and its three Gulf of Thailand neighbors Malaysia, Cambodia, and Vietnam [22]. Thailand fishes in two of its EEZs, the Andaman Sea and the Gulf of Thailand. Fishing in these EEZs increased from 400,000-ton fish in 1950 to a peak of 2.6 million tons in 1987 and began to gradually decline to 1.7 million tons in 2014 [23].

The depletion of fish stocks is caused by about 30% overfishing, and more than 60% legal fishing, and the capacity of remaining fish stocks worldwide is less than 10% [24]. The depletion of fish stocks is caused by massive exploitation and ineffective fisheries management. This has led to an increase in the types of fisheries crime and needs special attention with concrete problem solving.

Fisheries crime is transboundary in nature and is linked to other crimes such as money laundering, document forgery, tax evasion, forced labor and human trafficking [21]. The global involvement of the fishing industry is the most relevant form of transboundary and organized crime such as environmental crime, corruption, hijacking, and other security-related crimes. Other crimes such as drug smuggling are also prevalent using fishing vessels.

Due to the prevalence of fisheries crime in the EEZ, the government needs to pay more attention to this issue as it is a crime that needs to be taken seriously. Fishing licenses are essential to limit the types of fish that can be caught, the number of catch quotas, the use of fishing gear, the fishing grounds, and other requirements in relation to the presence of observers or satellite monitoring installed on the vessel [19]. The extensive waters of Natuna and the large potential of capture fisheries resources make Natuna waters prone to fisheries crime activities.

Fig. 1. North Natuna sea.

V. METHODS

The approach chosen by the researcher is a qualitative approach that focuses on identifying, observing, and interpreting a cause in depth to the symptoms of crime, causes, and general characteristics of fisheries crime perpetrators. The researcher made a systematic, factual, and accurate description of the facts, characteristics and relationships of the phenomena studied on fisheries crimes committed with the perpetrators to find the causes of fisheries crimes.

Interviews with perpetrators were conducted to find out why fisheries crimes are often committed and continue to occur in the North Natuna region. The perpetrators interviewed in this study were 20 foreign nationals who were detained by the Ministry of Maritime Affairs and Fisheries at Batam Detention Center. This location was determined based on the highest number of foreign fishing vessel crew members detained throughout Indonesia. Apart from finding the cause, this interview was also conducted to form the basis of a preliminary prevention model and then Delphi method was carried out to form the integrative prevention model. The Delphi method is an iterative process used to collect and distill the judgments of experts using a series of questionnaires interspersed with feedback [25].

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[2] Natuna Sea, North Natuna Sea / South China Sea including the waters of the Karimata Strait is included in the management area known as FMA 711 as stipulated in the Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number Per.01 /Minister of Marine Affairs and Fisheries of the Republic of Indonesia

[3] Decree of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number78/Kepmen-Kp/2016 Regarding Fisheries Management Plan of the Republic of Indonesia State Fisheries Management Area 711

The researcher created a preliminary model based on the situational crime prevention model which includes several key issues, namely, a) making it harder to commit a crime, b) increasing the risk of being caught or detected, c) reducing the benefits of crime, d) limiting the factors that assist crime, and e) eliminating the reasons why crimes are committed [26].

Then Delphi was used to confirm the preliminary prevention model formed using various sources, after the interviews with perpetrators were completed. The researcher interviewed several experts with specific expertise who are in the ranks of government in the relevant Ministries and Institutions as well as other law enforcement agencies to get a comprehensive and applicable picture of this prevention model.

The experts within governmental agencies and other institutions are as follows:

- Violation Handling Division within Ministry of Marine Affairs and Fisheries, to identify the effectiveness of fines against perpetrators, necessity to apply imprisonment against the perpetrators and the effectiveness of scuttling vessels and confiscation for the state.
- Fleet Monitoring and Operations Division within Ministry of Marine Affairs and Fisheries, to identify the number of surveillance vessel allocations in northern Natuna, available technology to support for monitoring and number of operating days and placement of surveillance vessels at certain coordinate points.
- INTERPOL Global Fisheries Enforcement Team, to identify cooperation in fisheries crime investigation and benchmarking of regional models for tackling fisheries crime.
- Territorial Law and Treaties Division, Ministry of Foreign Affairs, to identify status on establishment of maritime boundaries with other countries and bilateral and multilateral cooperation in handling fisheries crime.
- Cooperation Division, Indonesia Cost Guard, to identify existing coordination between law enforcement at sea and technology to support monitoring.
- Indonesian Navy, to identify support to other law enforcement at sea.
- Commission for the Conservation of Antarctic Marine Living Resources, to identify coordination of border patrols, cooperation model for tackling fisheries crime and prosecution of fisheries crime.

VI. Data Sources

Data sources are divided into two parts, namely primary data obtained from research by interviewing perpetrators and supported by secondary data from the Directorate General of Surveillance for Marine Resources and Fisheries, Ministry of Marine Affairs and Fisheries of the Republic of Indonesia on the number of violations by foreign fishing vessel, and data on the minutes of examination including court decisions.

The collected data is organized systematically. Examination of the data has undergone an editing process which includes clarity of meaning of answers, suitability of answers, relevance, and uniformity of data. Verification of the data obtained, both primary and secondary data, has been revisited to determine the validity of the data. Subsequently, conclusions are obtained to complete the research and achieve the objectives of this study. The qualitative data analysis process begins with reviewing all available data from various sources, interviews, observations that have been written in field notes, personal documents, official documents, and photographic images. The next step is data reduction, unit arrangement, categorization and the last is data interpretation.

The author conducts a combination of theories (integrative) between criminogenic asymmetry to determine the background of the perpetrator of the crime with the theory of rational choice used to identify why someone commits a fisheries crime. Subsequently, situational crime prevention will be used as a reference to find an effective model to be used as an integrative fisheries crime prevention model.

Interviews were conducted with 13 (thirteen) ship masters and 7 (seven) crew members. From the results of interviews, the causes of fisheries crimes that often occur in the North Natuna were found. The interviews focused on five pillars, a) the efforts made in committing the crime, b) the risk of being detected by law enforcement, c) the benefits gained from fisheries crime, d) conditions that provide opportunities to commit crimes, and e) reasons to neutralize the crimes committed.

VII. Limitations

The research comes with its own set of challenges, between April 4-14, 2021, at the Batam Detention Center, the following obstacles were encountered:

- Language barrier. The interviews were conducted with the help of a Batam-based translator who regularly works with investigators at the PSDKP detention center in Batam.
- Permission to visit the detention center. The access to the detention center was only granted a few days after coordination with the Ministry of Marine Affairs and Fisheries in Jakarta. This access was an obstacle that caused a delay of several days in the field before interviews could be conducted.
- Distance traveled and COVID 19 pandemic. The distance traveled by airplane from Jakarta to Batam during the pandemic has its own obstacles. This research was assisted by a research assistant while the researcher conducted interviews with the perpetrators using the video call application.
- Time constraints of resource persons and related officials. This obstacle was found mainly because the research was conducted during the pandemic. Researchers were unable to directly visit relevant officials as many officials were working from home during the pandemic.

VIII. Unveiling Fisheries Crime Trends in The North Natuna Sea[4]

Interviews were conducted with the masters who employ crew members ranging from 5 to 27 people per vessel. The ages of the perpetrators interviewed ranged from 32 - 55 years old with educational backgrounds at the elementary school level. Of the 20 informants, 13 were ship masters and 7 were crew members. 14 of them are married and 5 are single and 1 has two wives, with the number of children from 1 to 5 children. As known from the data on the characteristics of

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[4] Author's research, 2021

the perpetrators, the education level of all perpetrators is elementary school. This tends to encourage offenders to commit crimes. From several studies on a person's social status, based on formal data, people with low education, low income and or employment levels are more likely to be involved in crime than people in middle or upper status [27].

Fishing occupation was chosen solely to earn a better life with high wages. Criminal behavior based on purely economic factors, arguing that crime is the result of rational calculations of the perpetrator driven by the desire to accumulate personal wealth [8] tends to be seen in this study. In addition to economic conditions, other things that influence the occurrence of illegal fishing activities are the inability of individuals to find work and fisheries management problems in the country. This job was chosen because it has become a habit or tradition that has been done for generations.

The phenomenon of fisheries crime continues to be rampant in the North Natuna Sea, in interviews conducted, there are several efforts made by the perpetrators in committing this crime.

In committing crimes, the vessels used vary in size from 30 Gross Tons (GT) to 100 GT which are equipped with a communication link, compass, and Global Positioning System (GPS). In addition, each vessel is supported by crew members who have their own duties. The number of crews varies from 5 people to 27 people in each ship, depending on the size of the ship, with additional costs incurred to go to sea is around IDR 100 million - 300 million which includes fuel, rations, and loan money for each crew member's family before leaving for sea with a loan range of IDR 5 million per crew member. Although there have been many incidents at sea between Indonesian surveillance vessels and other countries' surveillance vessel, all masters and crew members reported that there was no coast guard escort or other escort by Flag State officials when they were fishing in Indonesian territory. In committing fisheries crimes, the perpetrators make no effort to avoid surveillance vessels and they tend to surrender when they are detected. When an arrest is made by a surveillance ship, they feel frightened and do not dare to fight or elude the surveillance ship. This is because their vessels are unable to match the speed of the surveillance vessels to escape or trick and avoid the patrol vessels.

Efforts to help other perpetrators are made by the captured vessel and when arrested, the master of the captured vessel will immediately inform other vessels around the waters and the ship owner using a special code. The fines imposed on ship masters by the Indonesian government are considered quite high because they cannot afford to pay them, but when compared to other countries, many perpetrators do not dare to enter other countries in the region because they are often treated badly, and the fines are much higher.

The amount of money earned is around IDR 4-5 million per month for each crew member and IDR 5-12 million per month for each ship master. The proceeds were also divided between the master and the owner and there is also a consignment system between the ship owner and the ship master, the distribution of the proceeds is 60% for the owner and 40% for the master. The effort to commit the crime in terms of capital support for this crime is quite high. Depending on the size of the vessel, the capital spent to build a vessel varies from IDR 300 million to IDR 3 billion. Not all masters or crew members know how much a vessel costs, with 90% of respondents saying that they had no idea how much the cost of vessel, as the price of the vessel was only known by the ship owner.

The most common type of fish taken is bigeye fish or sardines, with specialization in bigeye fish. Selar Bentong (*Selar crumenophthalmus*) is one of the dominant small pelagic fish species caught in Natuna sea. The selection of this fish is not only based on the high price of a particular species but also because of the large volume of fish available in North Natuna Sea. In committing this crime, the instruction to fish in Indonesian waters was given by the master of the vessel and by the owner of the vessel. The decision to choose this fishing ground was driven by the abundance of fish in North Natuna Sea. Indonesian patrol vessels in the fishing grounds are sometimes invisible and absent from the location. Fifty percent of respondents said that patrol vessels may be present at the fishing ground site. The length of time at sea ranges from one to two months. Some of the vessels make mid-sea transfers with motherships, then the motherships take the catch to ports of convenience, and the fishing vessels return to sea.

The catch is sold at the local market in port of convenience, which is an important gateway for smuggling illegally caught fish. After informing for meeting point in the middle of the sea, the mother vessel usually comes to the transshipment point within two to three days. The catch is sold on the local market at the nearest port of convenience. Illegal fishing vessels are more likely to visit ports with facilitating concealment capabilities of the vessel and its activities due to higher daily general levels and traffic of fishing vessels and larger port sizes. Illegal fishing vessels have a better chance of concealing their illegal activities in large ports or ports with high vessel traffic [14].

Some of the reasons given for entering Indonesian territory include no understanding how to read a compass, not realizing that they were already in Indonesian territory, still being mistaken for being in Malaysian territory and just following a large ship to enter Indonesian territory. However, there are also reasons given such as abundance of fish, and they enter Indonesian territory consciously to catch a lot of fish.

IX. The Causes Of Fisheries Crime In North Natuna Sea

The research reveals, in summary, the causes of fisheries crime in the North Natuna Sea are as follows:

- *Low Education and Economic Factors*: The perpetrators of fisheries crime in this region typically have low levels of education, often at the elementary school level. This lower education tends to encourage individuals to engage in criminal activities. Economic motivations play a significant role, as individuals are driven by the desire to accumulate personal wealth. The high wages associated with fisheries crime attract them to this profession.
- *Habit and Tradition*: Fishing as an occupation in this region has been chosen because it has become a long-standing tradition, passed down through generations. It is a way of life for many individuals and families.
- *Lack of Enforcement*: Perpetrators believe that there is a lack of effective enforcement or absence of patrol boats in North Natuna Sea.
- *Coordination amongst Perpetrators*: Perpetrators have established methods of effective communication and coordination to assist each other when arrests occur.

They use special codes and quickly inform other vessels in nearby waters and ship owners when one of their vessels is captured.
- *Financial Incentives*: The potential earnings from fisheries crime are significant, with crew members earning at least around IDR 4-5 million per month, and ship masters earning IDR 5-12 million per month and more. The proceeds are shared between the master and the owner, with a distribution of 60% for the owner and 40% for the master.
- *Abundance of Resources*: The decision to fish in North Natuna Sea is driven by the abundance of fish in these waters. Perpetrators are motivated by the prospect of large catches.
- *Proximity to Ports of Convenience*: The catch is sold at local markets in ports of convenience, which are important gateways for smuggling illegally caught fish. The risk a country faces from illegal fishing is related to its proximity to such ports.

X. PRELIMINARY PREVENTION MODEL

Based on causes of fisheries crime, the researcher establishes preliminary crime prevention model. This prevention model is based on Situational Crime Prevention (SCP) to prevent crime. In the integrative prevention model developed by the author, not only by placing physical barriers and increasing the risk of being caught, but the author also forms a prevention model that includes reducing the profits of crime and eliminating the reasons for committing crime.

A. Complicating Criminal Efforts

The mode of operation is to enter the Indonesian Sea Territory to commit fisheries crimes and transfer cargo at sea and send the illegal catch to the nearest port of convenience. After that, the fishing vessel immediately commits another fisheries crime. It is important to address the issue of port of convenience, the number of internationally attractive species found within a country's EEZ, and access to a port of convenience makes a country more vulnerable to illegal fishing [14]. Coordinated enforcement patrols [28] with other countries can also be an effective prevention model.

B. Increasing the Risk of Being Caught

This study found that when arrested, offenders tend to surrender and do not try to escape because their vessels cannot match the speed of the surveillance vessel. However, if the perpetrator's vessel can match the speed of the surveillance vessel, it is certain that the perpetrator will flee when arrested by the surveillance vessel. It was also found that there is no or infrequent presence of surveillance vessels in illegal catch areas. One of the major drivers of illegal fishing in some countries is the poor capacity of governments to effectively monitor the activities of vessels because of a lack of the necessary patrol and monitoring assets [29].

C. Reducing the Profits of Crime

To reduce the profits from the proceeds of crime, things that have been done by the Indonesian Government such as confiscation of ships by the state to be destroyed are effective actions. Vessels that are confiscated and destroyed can certainly not be reused by the perpetrator. Responses to organized crime such as prosecution and asset freezing, or

confiscation have been widely adopted by several countries. Asset forfeiture is a way to tackle organized crime by limiting the proceeds of crime. [30].

D. Eliminating the Reasons for Crimes Committed

Settling the border issue is an important prevention model for the Indonesian Government to implement immediately. Maritime borders are a major problem for coastal states because the borders of two countries cannot be identified during fishing activities [31].
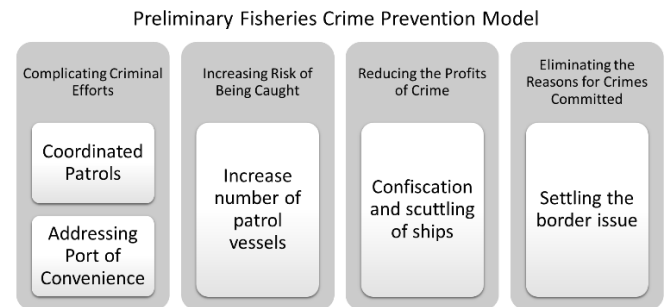

Fig. 2. Preliminary fisheries crime prevention model.

After forming the preliminary model based on interviews with perpetrators to find the causes of fisheries crime and forming an initial prevention model based on the SCP model and other relevant references, the author refined the model by interviewing experts in their respective field.

XI. DISCUSSIONS

In the research, it was found that some of the vessels transfer cargo in the middle of the sea with a collecting vessel that is also owned by the same vessel owner, and then the collecting vessel brings the catch to the nearest port of convenience. Therefore, several measures are needed for the prevention model in the issue of complicating efforts at the time of the crime, specifically: 1) coordinated patrols, 2) effective information exchange using proven models, 3) addressing port of convenience issues and 4) targeting transshipment at sea and 5) strengthening agency coordination between law enforcement agencies at sea.

The research found that Indonesian surveillance/law enforcement vessels are sometimes invisible or even absent from fishing grounds. This has led to the frequent occurrence of fisheries crimes in the North Natuna Sea. From the interviews, it can be concluded that several actions are needed for the prevention model in the issue of increasing the risk of being caught when crimes are committed, specifically: 1) increasing surveillance capacity with modern technology such as the use of radar and satellites, 2) increasing the number of patrol vessels, 3) air surveillance, 4) appropriate deployment of surveillance vessels, and 5) increasing the number of patrol days at sea.

There are several measures that can reduce the profits made from fisheries crime. In terms of the value of a single vessel, sinking or destroying a vessel based on a court decision is an effective measure. Another expert highlighted the importance of witnesses against falsifying the identity of the perpetrator. From the interviews conducted with the experts, it can be concluded that several measures are needed for the prevention model in the issue of complicating efforts at the

time of the crime, specifically: 1) confiscation and destruction of fisheries crime vessels, 2) maximizing fines, and 3) data collection of fisheries crime recidivists with biometric data collection.

One new suggestion made by the experts was to limit the factors that aid crime by educating ship owners and masters about the boundaries because some of the reasons given for entering Indonesian territory include not knowing that they are already in Indonesian territory.

From the interviews, it can be concluded that several actions are needed for the prevention model in the issue of eliminating the reasons for crimes committed, specifically by 1) promoting the MoU of the Common Guidelines, 2) resolving state borders, 3) promoting dialogue at the ASEAN level, and 4) supporting and encouraging binding legal instruments to combat fisheries crime.

The second round of interviews with the experts was conducted to support the preliminary model. In this second round of Delphi, experts endorsed some of the prevention techniques identified in the first round. In this second round, the experts emphasized the importance of the following prevention models:

- Use of Technology to support security at sea. The use of technology to support security and surveillance at sea is one of the important things to do to facilitate the supervision of security at sea.
- Aerial surveillance. One of the prevention measures that can be used is aerial surveillance. Aerial surveillance is carried out to increase efforts in conducting inspections of violating ships.
- Strengthening agency coordination between law enforcement agencies at sea. Coordination is considered important to be carried out, coordination between related agencies is needed to carry out preventive actions against fisheries crimes.
- Effective Information Exchange using proven models. In terms of supporting coordination in the field, information exchange is an important necessity.
- Targeting the transfer of cargo or transshipment in North Natuna. This can be done by scrutinizing cargo, ship documents and personal documents and seaworthiness.
- Maritime Border settlement. The border settlement needs to be done. But at present, Indonesia's border with several bordering countries has not been completed. Fishermen must be careful with incomplete borders because violence and conflict will arise.
- Coordinated patrols with other countries. One effective way is to increase coordinated patrols with multiple patrol vessels and specifically targeting one fishing ground.
- Increase surveillance capacity. Not only with the Navy but also involving Fisheries Authority and Coast Guard that integrate with each other. In addition, it also involves an integrated monitoring system. So, it can easily find out what ships are passing through and make it easier for patrol ships to reach the target.
- Increasing the number of patrol boats, and
- Fines imposed must be high to create a deterrent effect, and it is also necessary to identify recidivists.

XII. INTEGRATIVE PREVENTION MODEL

After conducted two rounds of interviews with the experts, the author assembles the prevention model into the following preventive measures:

- Strengthening inter-agency coordination with activities in the form of a) coordinated patrols with neighboring countries, b) overcoming port of convenience problems, c) effective information exchange using proven models, d) targeting transshipment in the North Natuna Sea, and e) strengthening agency coordination between law enforcement agencies at sea.
- Improving the use of technology with activities such as increasing surveillance capacity with modern technology such as radar and the use of satellites and improving surveillance, a) increasing the number of patrol boats, b) aerial surveillance, c) appropriate placement of surveillance vessels, d) increasing the number of patrol days at sea, e) increasing defense equipment, f) using confiscated vessels as undercover vessels to assist surveillance, g) empowering local fishermen to assist surveillance.
- Reinforcing rules and regulations with activities in the form of, a) confiscation of vessels, b) maximum fines, c) collection of biometric data for data collection of recidivists, d) education to perpetrators on border issues, and e) collection of data and information.
- Maritime border settlement with activities such as, a) promoting the MoU of the Common Guidelines, b) border settlement with priority countries, c) promoting dialogue at the ASEAN level, and d) supporting and encouraging binding legal instruments to combat fisheries crime.

The integrative prevention model reflects a comprehensive understanding of the factors contributing to fisheries crime in the region. It combines physical deterrence with addressing economic incentives, reducing benefits, and resolving territorial issues. The model's effectiveness is strengthened by incorporating insights from both perpetrators and experts, ensuring a holistic approach that encompasses various aspects of prevention. The integrative prevention model is depicted below.
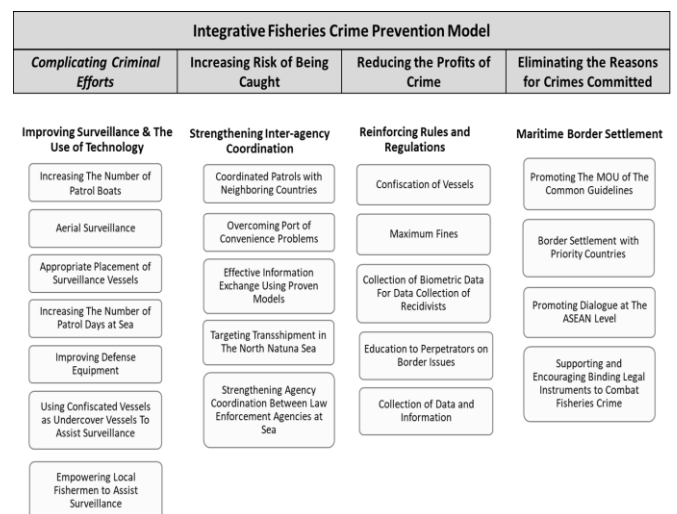

Fig. 3. Integrative fisheries crime prevention model in north natuna sea.

XIII. CONCLUSION

In conclusion, the author conducts an integrative theory between criminogenic asymmetry to determine the background of the perpetrator with the theory of rational choice to identify why someone commits fisheries crime. Consequently, the research findings have led to the development of an integrative prevention model based on Situational Crime Prevention (SCP) principles to effectively address fisheries crime. This model incorporates multifaceted strategies that go beyond physical barriers and increase risk to encompass reducing the benefits of crime and eliminating the underlying motivations for criminal behavior. The model addresses various dimensions of prevention, tailored to the specific challenges posed by fisheries crime in the North Natuna Sea.

The prevention model recognizes the complexity of criminal efforts involved in illegal fishing activities. It suggests coordinated patrols with neighboring countries to enhance surveillance and deterrence. Addressing the issue of "ports of convenience" is highlighted as a crucial aspect, necessitating discussions and agreements at international forums. By limiting the availability of such ports, the model disrupts the logistical support for fisheries crimes.

The model emphasizes enhancing the risk of detection and apprehension. It suggests a multi-pronged approach, including increasing the number of patrol vessels, leveraging modern technology like radar and satellites for surveillance, and conducting aerial surveillance. This serves to make illegal activities riskier and increase the likelihood of capture.

To counter the financial incentives for fisheries crime, the model proposes actions such as the confiscation and destruction of vessels involved in criminal activities. Additionally, measures like maximizing fines and collecting biometric data of recidivists are highlighted to curtail the profitability of these crimes.

The integrative prevention model also underscores the importance of settling maritime border issues to eliminate the ambiguity that criminals exploit. It suggests diplomatic efforts, dialogue, and legal instruments to address border disputes and clarify jurisdictional boundaries. Education is also identified as a tool to inform ship owners and masters about legal fishing grounds.

XIV. EXTENSION OF STUDY

This model serves as a roadmap to identify further measures and methods for stakeholders, policy makers, and law enforcement agencies to collaboratively combat fisheries crime in the North Natuna Sea. By implementing the proposed strategies, it is possible to disrupt criminal activities, enhance enforcement capabilities, and safeguard the marine resources and economic interests of the region.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FINDINGS

This research found several causes of fisheries crime, such as low education level and economic factors, habit and tradition, lack of enforcement, coordination amongst perpetrators, financial incentives, abundance of resources and proximity to port of convenience. The researcher concluded the integrative prevention model with measures that can be used to tackling fisheries crime, which is improving surveillance and the use of technology, strengthening inter-agency coordination, reinforcing rules and regulations, and resolving maritime border issues.

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