GSJ: Volume 10, Issue 5, May 2022
ISSN 2320-9186

GSJ: Volume 10, Issue 5, May 2022, Online: ISSN 2320-9186
www.globalscientificjournal.com

THE APPLICATION OF GEOSPATIAL INTELLIGENCE IN THE FIGHT AGAINST MARITIME CRIMES AND OTHER-RELATED INCIDENTS IN NIGERIA MARITIME DOMAIN

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Abstract

The seas have a great economic potentials and prosperity for nations around the world, most especially the littoral nations. Over 90 percent of the world's trade is conducted through the sea. The maritime sector of any economy has enormous potential to drive sustainable development with huge investment opportunities in shipbuilding and inland waterways transportation. Nigeria as a littoral nation is blessed with abundant hydrocarbon resources, fishes and intact ecosystem. One of the major security challenges facing Nigeria maritime domain is the problem of maritime crimes and other related incidents such as sea piracy, crude oil theft and illegal unreported and unregulated (IUU) fishing. To effectively combat these problems there is the need for the adoption of modern strategies including the application of geospatial intelligence/technologies. Maritime crimes threaten peace and security, hinder safe navigation and deaths of victims among others. The study used both primary and secondary data as a total of 400 questionnaire were administered to respondents who were mainly drawn from the maritime industry in the study area. The collected data were analyzed and presented with the aid of charts and tables. A total number of 37 cases were identified from the study area for the period under review with Lagos state (37.83 %) recording the

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highest number of maritime crimes and other related incidents. This was closely followed by Rivers state (21.62 %). Akwa Ibom state (5.41 %) has the least record of the occurrence of maritime crimes in the study area. The paper recommends among others that the Federal Government of Nigeria should strengthen the operational capacity and the efficiency of the Nigerian Navy through the provision of more platforms for effective and sustained patrols.

Keywords: Geospatial Intelligence, Gulf of Guinea, Navy, Piracy, Remote Sensing

1. INTRODUCTION

The sea is one of the most important gifts of nature as it comprises of abundant natural resources that man can exploit for his daily economic survival. Over 90 percent of the world's trade is conducted through the sea (Laryea,2019). The maritime sector of any economy has enormous potential to drive sustainable development with huge investment opportunities in shipbuilding and repairs, offshore/floating spare parts sales and maintenance, dredging and inland waterways transportation among others (Jamoh, 2020). This makes it easy for all sorts of criminal activities to be perpetrated at any given time. The United Nations Office on Drugs and Crime (2019) defined maritime crime as activity, act or conduct which is committed wholly or partly at sea and is prohibited under applicable national and international law wherein the perpetrator(s) can be prosecuted.

The Nigerian Suppression of Piracy and Other Maritime Offences (SPOMO) Act of 2019 defined maritime crime to include 'armed robbery at sea and any other act committed by any person or group of persons or their sponsors unlawfully within the Nigerian maritime zone seizes or exercises control over any ship, aircraft, fixed or floating platform or cargo by force or threat or any other form of intimidation'. Nigeria as a littoral nation is blessed with abundant hydrocarbon resources, fishes and intact ecosystem among others. These offshore resources are largely located in the Niger Delta region of the country comprising of states like Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers.

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One of the major security challenges in these littoral states is the problem of maritime crimes and other related incidents such as sea piracy, sea robbery, drugs and human trafficking, smuggling, crude oil theft, illegal unreported and unregulated (IUU) fishing. Others are kidnapping/abduction, marine accidents and maritime pollution caused by offshore oil and gas activities by multi-national oil companies. Maritime reports revealed that pirate attacks in Nigerian maritime domain occur mostly in states like Akwa Ibom, Bayelsa, Cross River, Delta, Lagos, Ondo and River (Nnadi, *et al*., 2016). Maritime crimes disrupt safe navigation of maritime vessels, threaten the general peace and security of coastal communities and by extension the nation at large (Chijioke, 2020). Hence, the need for vessels to be more vigilant when transiting Nigerian territorial waters. Insecurity on land in Nigeria's Niger Delta region has spilled over to the nation maritime zones and other neighbouring maritime countries which are now considered among the world's most dangerous waters (Otto, 2016). Brume-Eruagbere (2017) in a study on maritime law enforcement in Nigeria: the challenges of combatting piracy and armed robbery at sea opined that sea piracy can be reduced if land-based problems are adequately addressed. Some of these crimes were violent as several people including foreign expatriates have been victims of these crimes. Crime, including maritime crimes is traceable to the formation of groups by individuals who have related interests with the sole purpose of having a strong network and this network is also projected to the nation's maritime domain (Ukoji and Okolie, 2016). The Nigeria government has been making concerted efforts through the establishment of various agencies and security outfits to deal with maritime crimes, yet maritime crimes still linger in the nation's maritime domain.

Some identified challenges of dealing with maritime crimes in Nigeria maritime domain include inadequate maritime platforms for effective and sustained patrols, lack of proper coordination and synergy among various stakeholders, ineffective methods of modern technology in gathering intelligence and improper prosecution of arrested perpetrators. Pranav (2016) noted that crime as an entity has spatial attributes such as time, location and process. Time and space cannot be underrated when the issues of human activities and movement which include maritime criminal activities are examined. As a way to curb some of the maritime crimes, Murphy (2010) asserted that shipping companies should establish best management practices to protect their vessels at sea especially when the vessels are navigating through infested piracy areas. He also suggested that captains of vessels ought to provide extra lookouts for possible pirate vessels in order for the

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vessels to send distress calls on time. Diligence prosecution of arrested maritime criminals through the Nigerian Suppression of Piracy and Other Maritime Offences (SPOMO) Act of 2019 could help reduce maritime crimes in the nation's maritime domain (Ships and Ports, 2020).

2. LITERATURE REVIEW

2.1 GEOSPATIAL INTELLIGENCE AND MARITIME SAFETY & SECURITY

The Nigerian maritime ecosystem faces a lot of criminal challenges. To effectively curb maritime crimes, the place of intelligence gathering to monitor the activities of maritime criminals is very key for the security agencies. The International Maritime Organization has commended the efforts of the Nigerian Navy and Nigeria Maritime Administration and Safety Agency (NIMASA) in their quest to address maritime security threats in the nation's maritime domain and the Gulf of Guinea (Ships and Ports, 2020). For instance, the Nigerian Navy has adopted the Falcon Eye and the Regional and Maritime Awareness Capability (RMAC) System as well as a Choke Point Management and Control Regime to combat piracy and armed robbery at sea since most of the attacks at sea originate from land. The choke point strategy involves stationing house boats in various strategic points in the creeks and estuaries in the Niger Delta area for ease of patrol while both the Falcon Eye and RMAC are systems aimed at continuous monitoring of the territorial waters (Ezeobi,2019). These systems monitor the activities of all persons conducting one activity or the other at sea including maritime criminal gangs as sea robbery, hijacking of ships, hostage-taking and killing of crew/passengers have become routine occurrences in Nigeria's coastal waters (Jimoh, 2015).

Despite the efforts by these agencies, enough still need to be done to effectively deal with all forms of maritime crimes in the nation's territorial maritime domain. This is where the effective use of geospatial intelligence/technology becomes imperative. The sea forms the resource base of food, medicines, transport and infrastructure for the continuous existence of man and this is while mapping it through the aid of geospatial technology becomes imperative (Deogawanka, 2016). Geospatial intelligence also known as GEOINT is a discipline that deals with the integration of imagery, imagery intelligence and geospatial information which also include mapping and charting (Emenari *et al*., 2014). Geospatial intelligence deals with the analysis of imagery and geospatial information to describe, assess and visually depict physical features and geographically referenced

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activities on the earth and this include the use of remote sensing techniques (Murdock, 2017, Geospatial Intelligence Basic Doctrine, Publication 1-10, Title 10 U.S. Code §467).

Clarke (2011) opined that geospatial intelligence collection platforms include drones, satellites and aircraft which include both manned and unmanned. Geospatial technologies which include geographic information system (GIS) and remote sensing are important for data gathering and validation and this includes maritime criminals operating at sea. Crime analysts used geospatial technologies to map, analyze and manage crime data. Maps that are well digitized and geo-referenced could show crime spots including maritime crime hotspots since each crime spot has a geographic location (Bala *et al*, 2015). With the aid of geospatial intelligence, maritime incidents such as marine accidents, man overboard, fire outbreaks, ship aground and medical evacuation can be addressed speedily by relevant agencies.

Geospatial intelligence combines imagery, maps, charts and digital displays into a dynamic and composite view of spatial features or activities of the earth as the discipline has evolved from the integration of imagery, imagery intelligence and geospatial information (Murrett,2006). GEOINT can create a powerful visual tool capable of integrating information from multiple sources within digital platforms by bringing out, quickly and intuitively, certain space-time relations that are complicated to obtain. Geospatial intelligence can create a picture of any specific area of interest through the use of multiple and advanced sensors to acquire useful data and this include maritime data (Mugavero *et al*, 2015). These data types can be acquired easily from both stationary and moving targets such as drones, aircraft etc., through electro-optical related sensor programs (both active and passive) and non-technical means (National Geospatial Intelligence United State, Agency, 2006). GEOINT can be used to effectively identify features of naval tactical or strategic maritime interest, provide information about maritime criminals, where their assets are located and describe the physical condition of the criminals' hideouts. Geospatial technologies like remote sensing /satellite imagery, aerial imagery, LiDAR, satellite positioning / GNSS technologies, GPS, Unmanned Aerial Vehicles / drones, Autonomous Underwater Vehicles and several other platforms are key to effective gathering of maritime data for combating maritime crimes as they are useful for maritime surveillance.

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Geospatial intelligence is one of the several types of intelligence produced to support nation's national security, along with measurement and signatures intelligence, human intelligence, open source intelligence and signals intelligence (Title 10 U.S. Code §467). It is an interdisciplinary profession that draws skills from remote sensing, GIS, data management and data visualization. This branch of knowledge supports decision-making for military (army, navy and air force) and intelligence operations among others. The products of geospatial intelligence are used to aid situational awareness such as battlespace awareness, safety of navigation and ensuring port security, maritime domain awareness with shipboard transponders providing identification information for satellite and radar tracking, natural disaster response and humanitarian relief operations (Baber, 2018).

Bacastow and Bellafiore (2009) described GEOINT as the profession that deals with the "ability to identify, collect, store and manipulate data to create geospatial knowledge through critical thinking, geospatial reasoning and analytical techniques". Many nations such as USA, Canada, United Kingdom, Australia and New Zealand among others employ GEOINT capabilities in their military, defense and intelligence operations and this include maritime operations conducted by their naval forces ((Baber, 2018). Various conflicts around the world have been solved by military strategists through the effective use of geospatial intelligence with the acquisition of imageries, analysis and interpretation of aerial photographs. Littoral nation like Nigeria can also borrow a leaf from these countries to ensure that all forms of maritime crimes are dealt with through the application of geospatial intelligence. The science of geospatial intelligence has not been used effectively to deal with maritime crimes in Nigeria and this calls for more studies to explore the emerging technologies that are associated with it. The objectives of this research therefore are to identify the various maritime crimes and weapons used by maritime criminals, analyze the effects of maritime crimes and explore ways to effectively combat these crimes in the study area. It is the believe of this research that the findings of this study will be useful to the government and security agencies in the fight against maritime crimes and other related incidents across Nigeria maritime domain and the Gulf of Guinea.

3. MATERIALS AND METHODS

3.1 STUDY AREA DESCRIPTION

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The central focus of the study is Nigeria littoral states. Nigeria is a federation with 36 states and the Federal Capital Territory located in Abuja. Nigeria is located in West Africa and the most populous black country in Africa and the world. It shares border with Benin republic to the west, Niger to the north, Chad to north-east and Cameroon to the east. To the south, it borders the Gulf of Guinea, part of the Atlantic Ocean. Nigeria has a diverse geography, with climates ranging from arid to humid equatorial (Falola *et al*, 2020). Nigeria's most diverse feature is its people with different languages that are spoken. The country has abundant natural resources, notably large deposits of petroleum and natural gas. The major drainage areas in Nigeria are the Niger-Benue basin, the Lake Chad basin and the Gulf of Guinea basin. There are over 350 ethnic nationalities in Nigeria with rich and diverse cultural heritage. Each of these ethnic groups inhabits a territory that it considers to be its own by right of first occupancy and inheritance. There are three major ethnic groups in the country and they include the Hausa-Fulani, the Yoruba, and the Igbo. In Nigeria, the dominant religions are Christianity and Islam while few practices traditional religion.

The total population of Nigeria according to the 2006 national population census is estimated at over 140 million people (National Population Commission Census of Nigeria and Nigerian National Bureau of Statistics, 2006). However, the population of Nigeria as at 2020 is estimated to be 206,139,589 people (United Nations, 2020). Nigeria is a littoral nation with a coastline of 420 nautical miles and having an Exclusive Economic Zone (EEZ) of 200 nautical miles translating to about 84,000square nautical miles. Nigeria's maritime area of interest includes the entire Gulf of Guinea (GoG), which is about 574,800 square meters and spans a total coastline of 2,874 nautical miles.

Eight of the 36 states in Nigeria, with 25 per cent of the population, share the Atlantic Ocean coastline (Jamoh, 2020). The coastline runs through eight states located in the Southern part of the country and these states are Akwa Ibom, Bayelsa, Cross Rivers, Delta, Edo, Lagos, Ondo and Rivers. These littoral states border the Atlantic Ocean with their own peculiar characteristics and culture. The large deposit of both onshore and offshore oil and gas found in Nigeria are located in these littoral states. Shipping, fishing and other economic activities are usually conducted in these littoral states as both the government and the people tap the abundant resources in these states for their economic survival. The general dynamics of the Nigerian coastline depend on large-scale

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oceanic and climatic seasonal changes. One important characteristics of the maritime domain of these states is the occurrence of different maritime crimes and other related incidents that occur from time to time. The activities of sea pirates and sea robbers in these littoral states and by extension the Gulf of Guinea have drawn the attention of the United Nations through the International Maritime Organization and International Maritime Bureau for their continuous monitoring of the activities of the maritime criminal gangs attacking vessels and hijacking/kidnapping of people around these littoral states. Figure 1.1 shows the map of the study area.

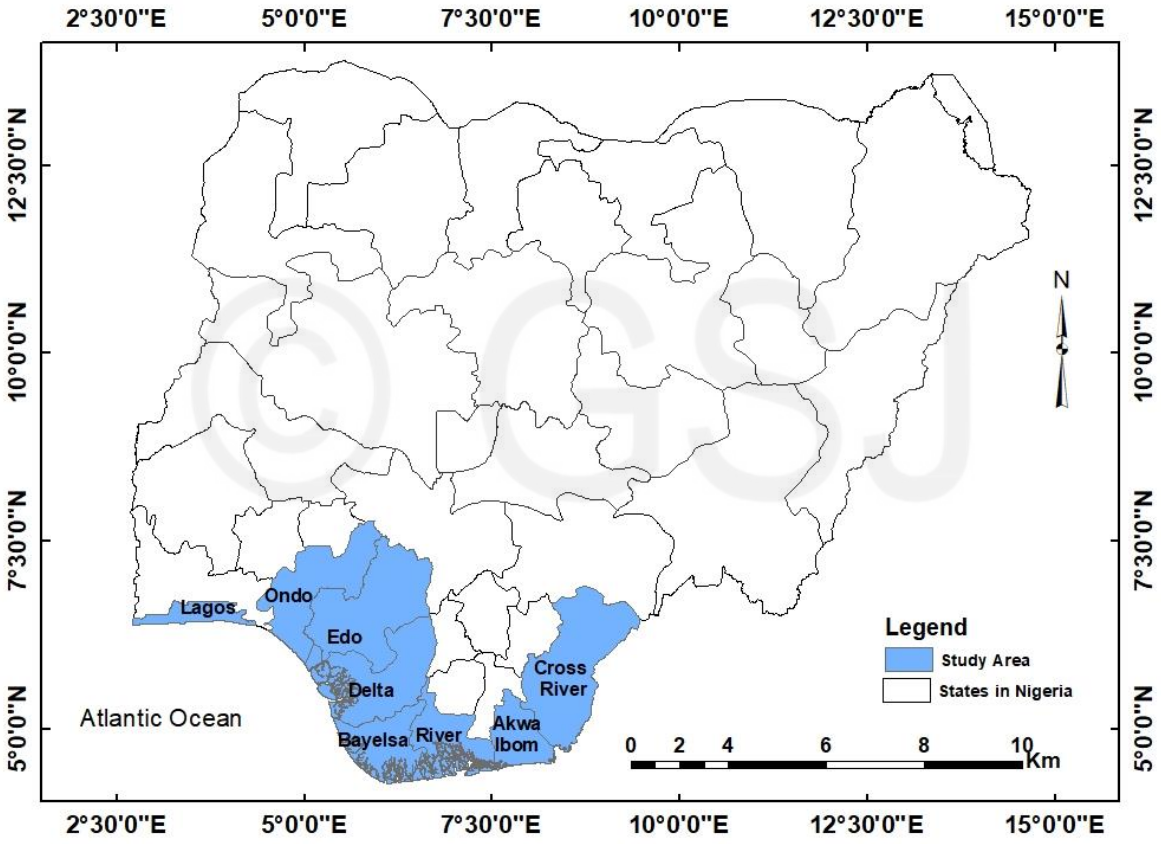

Figure 1.1 Nigeria Notable Littoral States (Study Area)
Source: Modified From Administrative Map of Nigeria

3.2 METHOD OF DATA COLLECTION

The study used both primary and secondary data. The primary data were collected through questionnaire and discussions with some principal officers of the Nigerian Navy, NIMASA and other maritime stakeholders. The secondary sources were materials gathered from books, journals,

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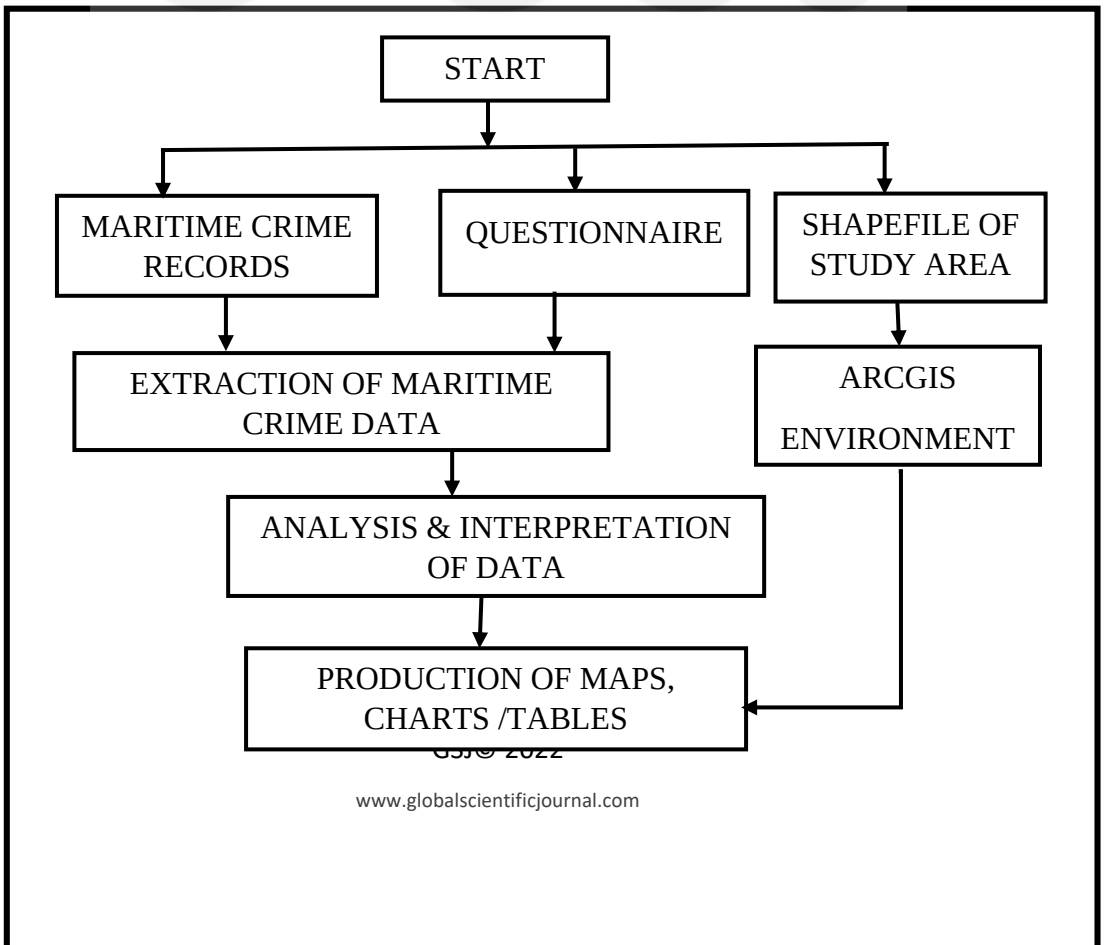
magazines, periodicals and official publications. Others include published and unpublished materials as well as information from the internet and the International Maritime Bureau. ArcGIS 10.4 version was used for the production of the various maps.

3.3 METHODOLOGY

The study adopted both quantitative and qualitative approach. The crime data covered January - December 2019 and January – July 2020. A total of 400 questionnaire were administered to respondents who were mainly drawn from the maritime industry in the study area. The study adopted the stratified random sampling techniques of the probability method. The Taro Yamane's 1967 sampling size technique was used to decide the 400 respondents used for the study with a margin error of 5% at a confidence level of 95%. The crime data extracted were subjected to statistical analysis and interpretation through the Statistical Package for the Social Sciences. The data collected include respondent's perception of the various maritime crimes committed in the study area as well as the ways they perceive the use of geospatial intelligence as a technology to fight maritime crimes in the study area. The collected data were analyzed and presented through the use of charts, tables and other statistical medium. Figure 1.2 shows the methodological flowchart for the study.



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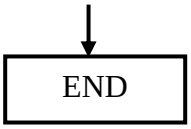

Figure 1.2 Methodological Flowchart

4. DATA ANAYSIS AND RESULT

4.1 *Identification of Various Maritime Crimes*

The study identified various forms of maritime crimes and other related incidents in the study area. Figure 1.3 shows littoral states in Nigeria where maritime crimes and other related incidents are prevalent. Some of the identified maritime crimes/incidents between 2019 and 2020 include: sea piracy, sea robbery, stowaway and drifting of vessels among others. Figures 1.4 shows the various maritime crimes and other related incidents in Nigeria maritime domain.

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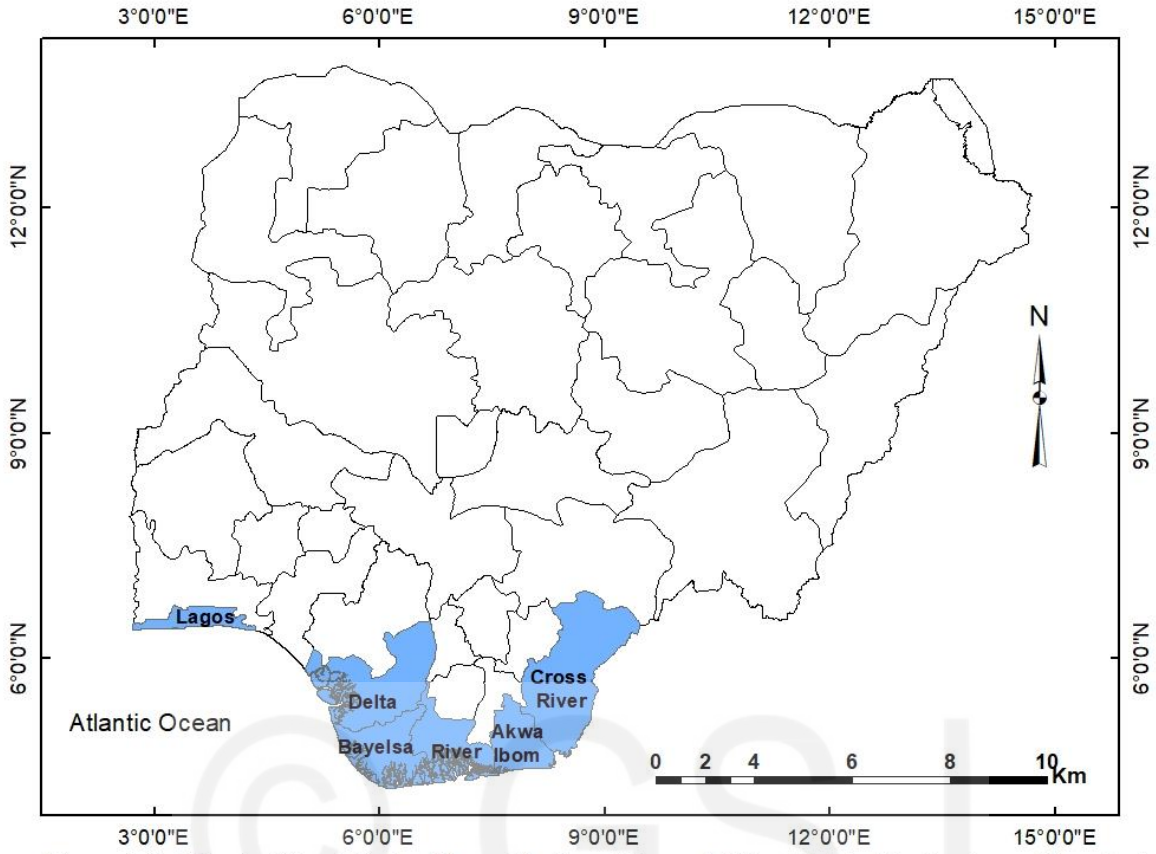

Figure 1.3 Nigeria Littoral States Where Maritime Crimes & Other Related Incidents are Prevalent
Source: Author (2020)

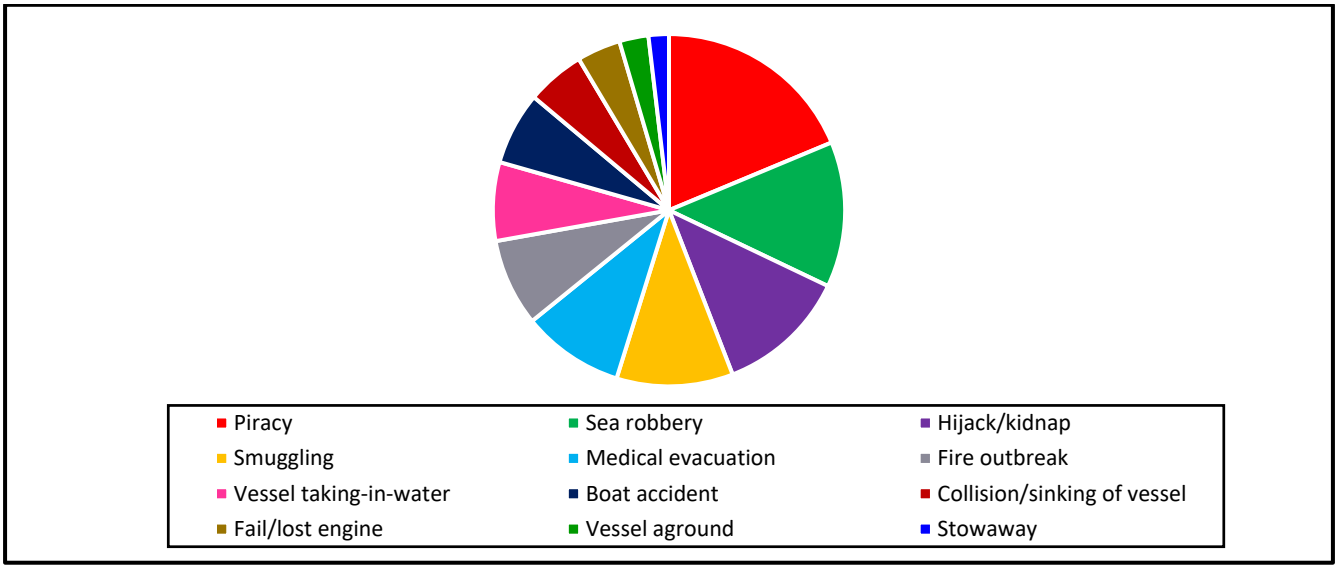

Figure 1.4 Maritime Crimes & Other Related Incidents in Nigeria Maritime Domain

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Source: Nigerian Navy/NIMASA (2019/2020)

4.2 *Weapons Used by Maritime Criminals*

Maritime criminal attacks will not be possible in the study area maritime domain without the aids of some destructive weapons and equipment. Various weapons/equipment of varying kinds and sizes are used by criminal gangs to instill fear, cause injuries on their victims and subject them to total submission at sea. The study identified guns, ropes, hoses, metal rods, dynamites and cutlasses as the common weapons/equipment used by maritime criminal elements at sea. The source of supply of this weapons/equipment is still left for the security agencies to unravel. Figure 1.5 shows the common weapons/equipment used by criminal gangs at sea.

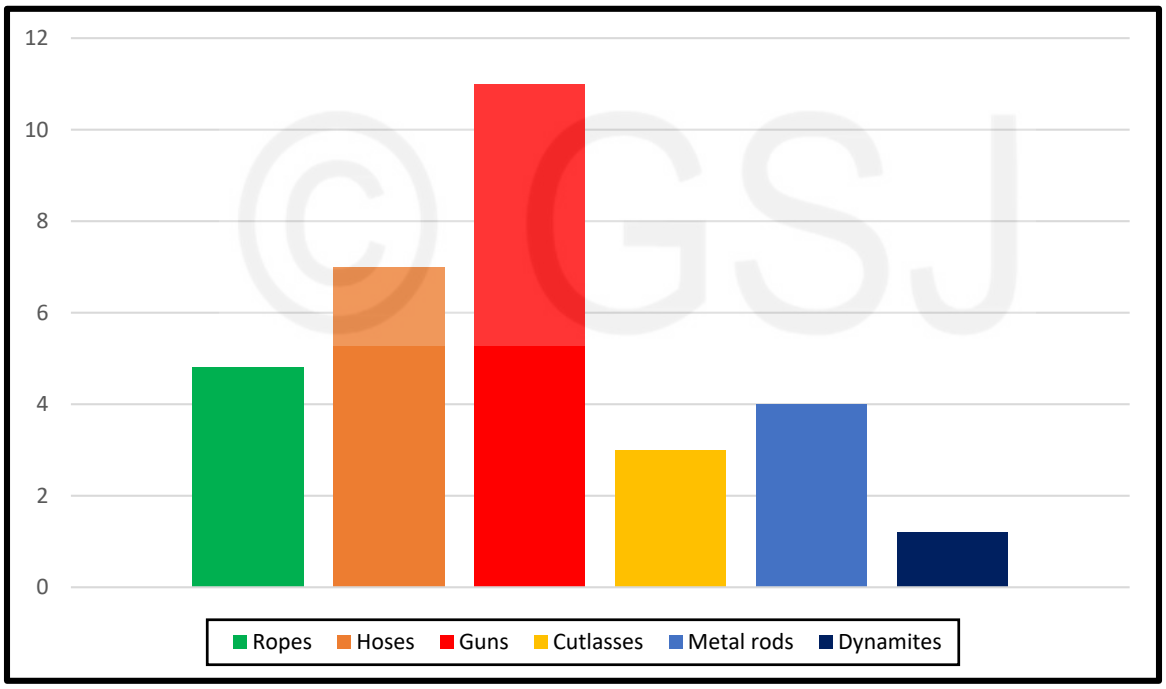

Figure 1.5 Common Weapons/Equipment Used by Criminal Gangs at Sea.
Source: Author's Fieldwork (2020)

4.3 Comparison of Maritime Crimes Between 2019 and 2020

Figure 1.6 shows the comparison of maritime incidents/crimes between 2019 and 2020. The graph reveals a slight decline of maritime incidents in the study area for the year 2020.

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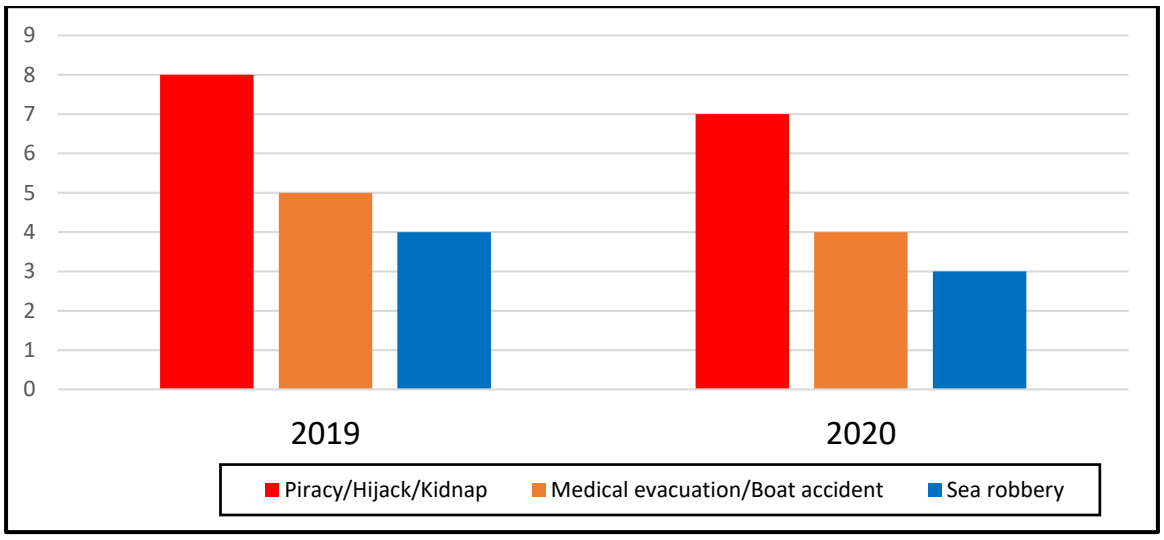

Figure 1.6 Comparison of Maritime Crimes/Incidents Between 2019 and 2020
Source: Author's Fieldwork (2020)

4.4 RESULT

4.4.1 Maritime Crimes Committed in Nigeria Littoral States

Nigeria littoral states are plaqued with various maritime crimes that have hindered the effective use of the available natural resources. The study identified various crimes committed across the littoral states as shown in figure 1.7 while table 1.1 shows the percentage distribution of the maritime crimes committed in the littoral states for the period 2019-2020. A total number of 37 cases were identified from the study area for the period under review. From table 1.1, Lagos state recorded the highest number of maritime crimes and other related incidents in the study area with 37.83 %. This was closely followed by Rivers state (21.62 %), Bayelsa state (16.22 %) and Delta state (10.81 %). From the study, Cross Rivers state (8.11 %) and Akwa Ibom state (5.41 %) have the least record of the occurrence of maritime crimes in the study area. The study identified the efforts of the Nigerian Navy, NIMASA and collaboration with other maritime stakeholders in the reduction of maritime crimes and other related incidents in the study area.

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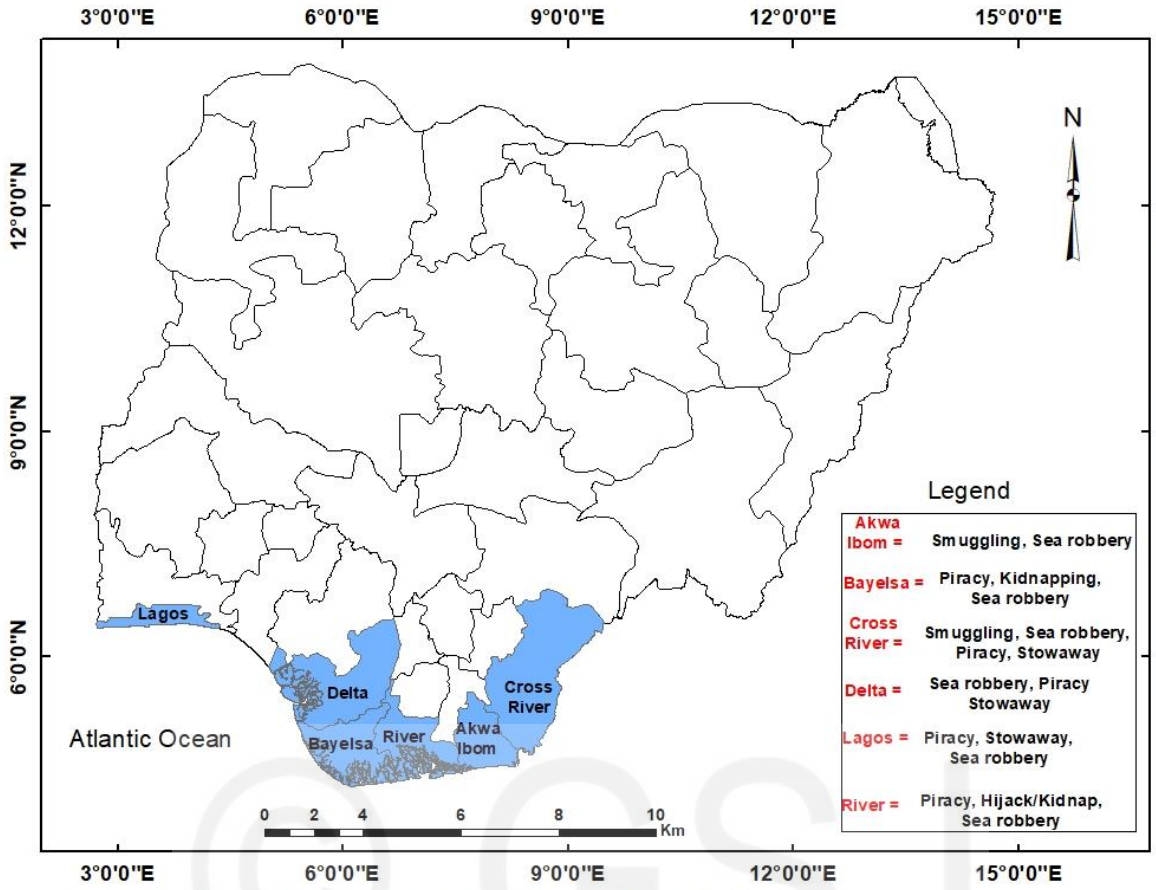

Figure 1.7 Maritime Crimes Committed in Nigeria Littoral States
Source: Author's Fieldwork (2020)

Table 1.1 Percentage Distribution of Maritime Crimes in Selected Littoral Sates for the Period 2019/2020

S/No	State	Total No of Attacks	%
1.	Rivers	8	21.62
2.	Bayelsa	6	16.22
3.	Akwa Ibom	2	5.41
4.	Lagos	14	37.83
5.	Cross Rivers	3	8.11
6.	Delta	4	10.81
	Total	37	100%

Source: Author's Fieldwork (2020)

4.4.2 *Maritime* Crimes & Other Related Incidents in Nigeria Maritime Domain

The study identified various maritime crimes and other related incidents that occurred in the maritime domain of the identified littoral states. Some of the incidents include drifting of vessels, sea robbery and medical evacuation among others (Figure 1.8).

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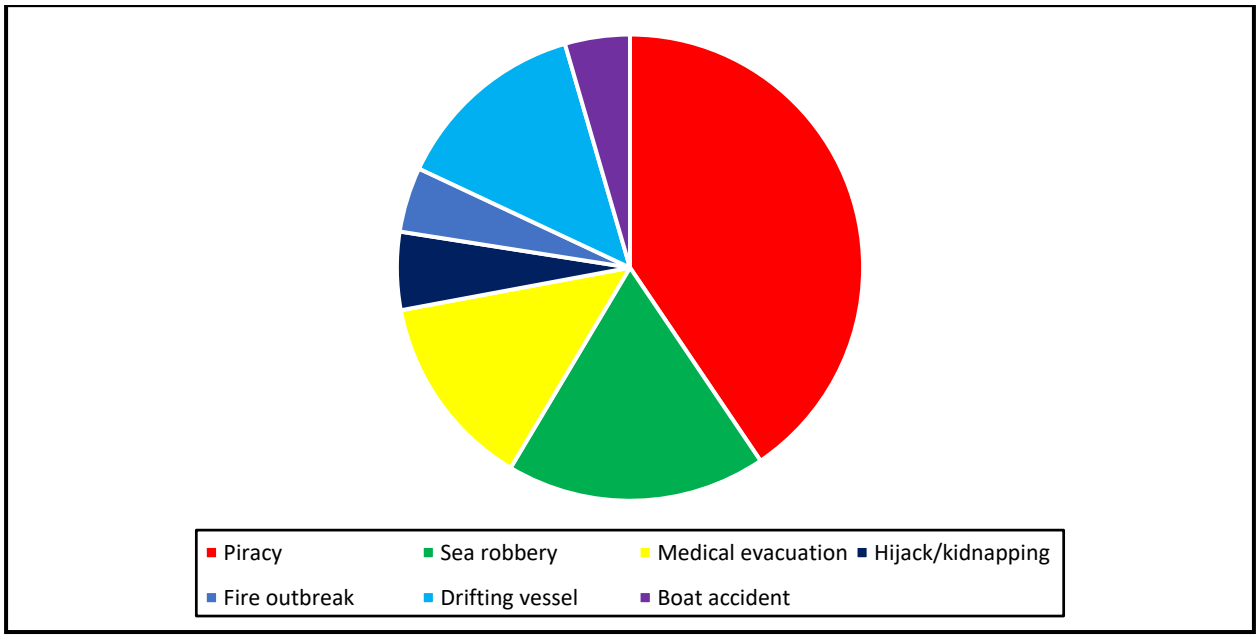

Figure 1.8 Maritime Crimes & Other Related Incidents in Nigeria Maritime Domain
Source: NIMASA (January-July 2020)

4.4.3 *Effects of Maritime Crimes*

The effects of maritime crimes on the socio-economic development of littoral states cannot be overemphasized. Maritime crimes have threatened the peace and security of coastal communities as continuous attacks of ships/crews and innocent people at sea have created a state of hopelessness and despair. The activities of illegal bunkerers and multi-national oil companies which pollute the marine ecosystem also affect the people's livelihood. Figure 1.9 shows the effects of maritime crimes in the study area.

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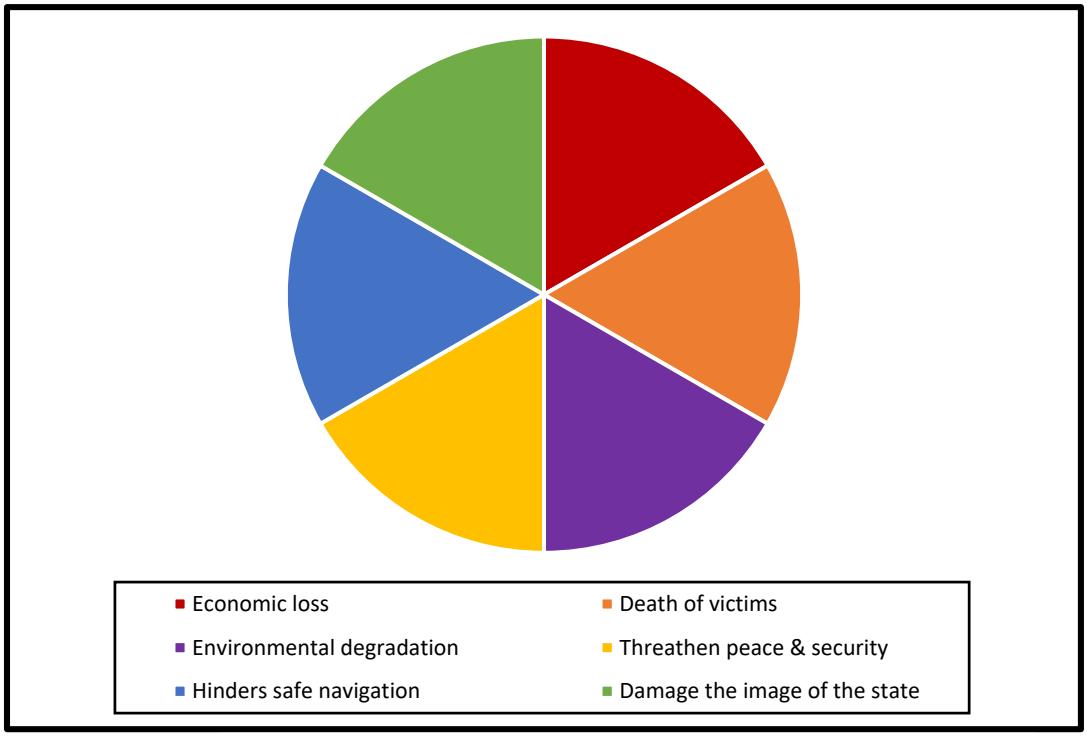

Figure 1.9 Effects of Maritime Crimes in the Study Area.
Source: Author's Fieldwork (2020)

4.4.4 *Measures to Combat Maritime Crimes*

To effectively deal with the problems associated with maritime crimes in the study area and by extension across the littoral states in Nigeria, the study thus develops the following measures: First, strengthening the operational capacity and efficiency of the Nigerian Navy including its air assets for effective and sustained patrols. This would enable the Nigerian Navy conduct continuous and sustained patrols in the maritime domain of the study area. Second, there is the need for capacity development of the Nigerian Navy hydrographic personnel in geospatial intelligence/technology. The knowledge of geospatial intelligence gained by personnel would aid the Nigerian Navy to effectively tackle all forms of maritime crimes in the study area. Third, there should be total overhaul of the Nigeria police marine department. This would help in strengthening the efforts of the Nigerian Navy and NIMASA in the fight against maritime crimes in the study area. Fourth, strengthening the synergy between the various maritime stakeholders and agencies as well as diligence prosecution of arrested offenders in accordance with the dictates of the Nigerian Suppression of Piracy and Other Maritime Offences (SPOMO) Act of 2019. Fifth, captains of

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vessels could install prime fire hoses onboard their vessels to be used against sea pirates'/sea. robbers' crafts when they get close to their vessels. Sixth, the installation of high voltage fences onboard vessels could be encouraged to scare off, shock or electrocute pirates and other maritime criminal gangs attempting to forcefully come onboard. These measures would drastically assist in the reduction of continuous attack of vessels/crews at sea. Lastly, maritime stakeholders could organize sensitization campaign from time to time on maritime safety and security and the need for mariners to be conscious of the activities of maritime criminal elements operating at sea.

5. CONCLUSION

The importance of the sea to the continuous survival of man cannot be overemphasized as the sea is made up of numerous resources. The paper examined the application of geospatial intelligence in the fight against maritime crimes and other related incidents in Nigeria maritime domain. The Nigeria maritime domain comprises of littoral states like Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Lagos Ondo and Rivers. The paper identified various maritime crimes and other related incidents in the study area like sea robbery, piracy, drifting of vessels, hijacking/kidnapping, fire outbreak and illegal unreported unregulated fishing among others. With the right application of geospatial intelligence and proper collection of intelligence and analysis on the activities of criminals operating both onshore and offshore, these crimes and incidents can be tackled effectively in the maritime domain of the study area.

Based on the findings of the present study, it is recommended that:

1. The Federal Government of Nigeria should strengthen the operational capacity and the efficiency of the Nigerian Navy including its air assets with the provision of more platforms for effective and sustained patrols. This would enable the Nigerian Navy conduct sustained patrols at sea in the maritime domain of the study area.

2. The Federal Government of Nigeria should provide more capacity development of the Nigerian Navy hydrographic personnel in geospatial intelligence/technology. The knowledge gained would aid the Nigerian Navy to effectively analyze and interpret satellite imageries and tackle all forms of maritime crimes in the study area.

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3. Captains of vessels should install prime fire hoses onboard their vessels and install high voltage fences onboard their vessels. This would scare off, shock or electrocute sea pirates and other maritime criminal gangs attempting to forcefully seize or attack their vessels.

4. The Federal Government of Nigeria should encourage more synergy between the various maritime stakeholders and agencies and this include the IMO and IMB. NIMASA should also carry out diligence prosecution of arrested offenders in accordance with the dictates of the Nigerian Suppression of Piracy and Other Maritime Offences (SPOMO) Act of 2019. This would serve as deterrent to would -be -offenders.

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GSJ: Volume 10, Issue 5, May 2022
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