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Analysis Opportunities for Fishing Locations with Using GIS Applications around the Southern Region Sea of Thousand Island

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Abstract— Along with technological developments in the utilization of technology is very rarely used, in this case in determining the right location for searching fish. The islands of research are located in the southern region of the thousand islands, which is the closest location to Jakarta. Southern Thousand Island there are 3 big islands, Tidung island, Pari island, and Untung Jawa island. With the utilization of this technology become one of good strategy to be used in support of economy of society in that area that is by looking for location of strategic fishing potency, assisted by Geographic Information System that can be used to find the location. By doing geometric process and image processing, there are potential areas in this area, and to see the benefit of GIS application to look for potential fishing potential location. GIS can be used to search potential fishing.

Keywords— Thousand Island, GIS, Geometric Process, Image Processing, Potential Fishing.

I. INTRODUCTION

Thousand Island is a group of small islands stretching from the bay of Jakarta to Sebira Island. Many clusters of islands that are part of the thousand islands make this district save a lot of natural potential and tourism in every corner of the island. Each island has its own peculiarities and attractions that make the local and foreign tourists interested to visit and enjoy the beauty that is stored in the islands. One of the islands close to Jakarta is South Seribu Island, Tidung Island, Pari Island, and Untung Jawa island. The southern Thousand Islands only focus on the tourism sector only, while this area can be focused on the fish search sector, the location not far from Jakarta is a strategic and potential area in the search for fish and in this case, can encourage the economy of the people in the area. One of the strategies implemented, with a variety of applications that can help various needs ranging from simple to complex systems, in addition to the required technical skills and every selection of each decision to find the location of potential fishing in the area by using Geographic Information System.

A. Research Problems

Based on the background described above, then the outline of the problem is:

1) How to determine the location of fishing potential using Geographic Information System?
2) How does the GIS application stage look for potential fishing potential locations?

B. Limitation of Research

In this issue for the discussion is not too broad, then the boundary problem is as follows:

1) This research is located in the waters of South Thousand Islands
2) This research uses BMKG satellite
3) Not to discuss the type of fish that is acquired and tourism in Southern Thousand Islands.
4) Duration research from 1 March - 31 March 2018.

C. Purpose and Objectives

1) Determine the location of fishing by using Geographic information system
2) Determine the stages in GIS applications to explore potential fish potentials.
3) Determine the benefits of GIS applications to explore potential fishing opportunities.

The benefit of this research is to find and find fish in the area of the Southern Thousand Islands.

II. THEORY FUNDAMENTAL

A. Geographic Information System

GIS (Geographic Information System) is a computer-based spatial information system that has a basic function for storing, manipulating, and presenting all forms of spatial information. GIS is also an information management tool that takes place on earth and spatial reacts. Geographic Information System is not just a computer system for making maps, but also an analytical tool. The advantage of the analysis tool is to provide the possibility to identify spatial relationships among geographic data features in map form.

B. Relationship of GIS Application and Potential Fishing

A common problem faced is the presence of dynamic fishing areas, constantly changing / shifting following the movement of fish. Naturally, the fish will choose the appropriate habitat, while the habitat is strongly influenced by oceanic oceanography condition. Thus, the potential fishing area is strongly influenced by marine oceanography factor. Fishing activities will be more effective and efficient if fish catching areas can be predicted before the fishing fleet departs from the base. One way to know the potential areas of fishing is through the study of fishing areas and their relation to the phenomenon of oceanography on an ongoing basis, and every effort is made to develop multi-agency partnerships with state, federal, and local government agencies in addition to private sector and non-profit organizations to share GIS database development costs. GIS coordination at the "executive" level of these organizations translates into focused data collection efforts, cooperative data base development arrangements, and data exchange. These relationship goals are for searching potential and get opportunity to develop the catch fishing to improve the economic sailor profession.

C. Catch Fishing

Based on Indonesian Law (Act) no. 32 of 2004 Article 10 paragraph 2 that the authority of the region in the sea territory, as referred to Article 3, covers: (1) the exploration, exploitation, conservation and management of marine resources within the territorial sea; (2) arrangement of administrative interest; (3) spatial arrangements; (4) law enforcement of regulations issued by the regions or those delegated by authorities; and (5) enforcement of state security and sovereignty. In article 10, paragraph 3, it is explained that the authority of the district and municipal areas in the sea territory, as referred to in paragraph 2, is as far as one-third of the sea boundary of the province. Development of Catch Fishing is closely linked to the process of utilizing natural resources, human resources and available funding resources. Based on the nature of its natural resources, the development of catch fishing business is highly dependent on the availability of fishing resources in waters. Fluctuations in fishing business activities ultimately affect the fishermen operating around them.

D. Development of Catch Fishing

Catch fishing as one of the sub-sectors of the fishing business is divided into 2 aspects one of which is the catching in the sea, that is all fishing activities conducted in the sea and river estuaries, lagoons and so on influenced tidal, all fishing activities conducted by fishermen of marine fisheries declared as catching in the sea. Fishing, according to Law No. 31 of 2004 on Fishing, which is an activity aimed at obtaining fish in waters that are not cultivated by fishing gear or any means, including activities that use vessels to load, transport, store, cooling, handling, processing and or preserving it. The development of this type of fishing technology in Indonesia needs to be directed to support the general development goals of fishing, the requirements that must be met are:

1) Provide many job opportunities;
2) Ensuring adequate income for workers or fishermen;
3) Guaranteeing high production quantities to provide protein;

4) Obtaining fish species export commodities or fish species that can be exported;
5) Do not damage the sustainability of fish resources.

Intensification to increase production in the field of fishing basically is the application of modern technology on facilities and techniques in use, including fishing equipment, boats or ships and other aids that are adjusted to the conditions of each place. But not all modernization can result in increased production and increase net income (net income) fishermen. Therefore, introduction of new fishing techniques should be preceded by intensive research and experiments with convincing results. Development of Catch Fishing cannot be driven continuously without looking at the limits of existing resource capabilities or the carrying capacity. In fishing that have developed rapidly control efforts are needed so that the sustainability of resources and fishing activities can be guaranteed existence.

III. METHODOLOGY

A. Research Technique

In this research using 2 data, which is:

1) Primary Data:
   This research uses data from interviews of 10 people who work as fishermen who are local residents in the southern thousand island
2) Secondary Data:
   This research uses books and journals to support the completeness of the data needed to assist in conducting research

B. Potential Fishing Potential Determination Process

This research is conducted based on the following stages:

1) Geometric Correction Process:

Geometric Correction (Rectification) is the image transformation of remote sensing results so that the image has the properties of the map in shape, scale and projection. This geometry correction is necessary because at the time of recording, the geometric image also shifts, because the satellite orbit is very high and the field of view is very small. Image geometric errors can occur due to the position and orbit as well as the attitude of the sensors when the satellite senses the earth, curvature and rounds of the earth are sensed. As a result of these geometric errors, the pixel position of the sensory data of the satellites does not match the actual position (latitude and longitude). To improve the position that is not in accordance with the geographic coordinates is done geometric correction by combining the reference map file that has been provided.

2) Image Processing Process:

In this process, image processing is done in analyzing the appearance of the image to determine the potential point of fishing. Analysis of potential fishing points is done using ER-Mapper software. This process includes:

a) RGB settings
b) Separation between clouds, land and sea
c) Merging of cloud files and Temperature files
d) Sea Surface (SST)
e) Giving a formula on the temperature image
f) Cloud Masking and Filtering
g) Chlorophyll-a Citra Processing
h) Contour SPL Creation
i) Determination of Location of Potential Fishing Zone (ZPPI)

IV. RESULT AND CALCULATION

A. Potential Catch Fishing

Based on the interview from local fisherman, from 9 to 10 interviewers on march 2018 they assume to get potential fish around 3 km until 5 km, because their area is a deepest from southern island coast and evidenced by the presence of many coral reefs that live in the area so the fish can live in the coral as a habitat. The coordinate from southern pari island around - -5.856135, 106.629210 until -5.857590, 106.630848.

B. Determination of Fish Potential Zone

The determination for potential fishing based on interview about coordinate shown on the figure 1.

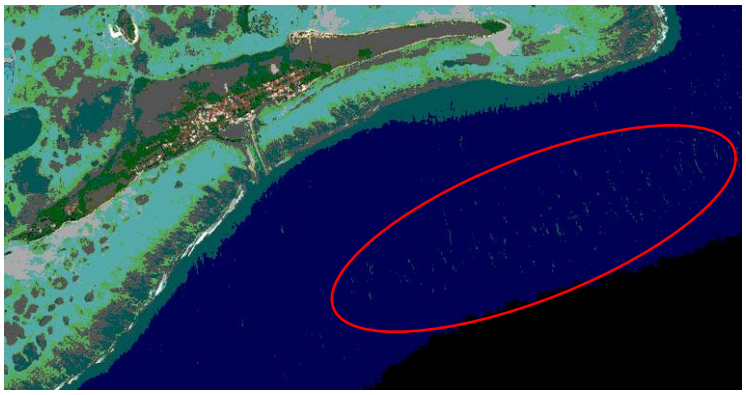

Figure 1 Determination Fish Potential Zone

As the result from image processing, shown the green dots inside the red circle. The green dots show many corals live in that area, the coral as a home for fishes, so this area for determination of potential zone for fishing.

V. CONCLUSION

Determination of fishing point location obtained based on experience of local people who work as fishermen, and the location obtained within 3-5 km south of pari island close to DKI Jakarta, the fishermen have a response that many coral reefs are the home of the fish. Proved with the results of image processing that shows the presence of green dots located in the south of the island of pari. Green dots are coral reefs located in the south area.

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