International Research Journal of Advanced Engineering and Science
ISSN (Online): 2455-9024

Analysis and Design of Geographic Information System (GIS) Zonation Plan for Coastal Areas and Small Islands, Central Sulawesi Province Using UML

Moh. Adi Mukti[1], Hustinawaty[2]
[1, 2]Business Information System, Gunadarma University, Depok, West Java, Indonesia-16424
Email Adress: [1]mohadimukti @ gmail.com, [2]ninaprasetya @ gmail.com

Abstract— *Indonesia has a wealth of natural resources (SDA) so much both on land and in the sea. Reclamation is one example of resource management in the field of strength. The lack of information about water areas that already have reclamation permits sometimes makes it difficult for many parties. In addition to the community there are also investors who wants to invest in the area. Therefore this study aims to build a web-based geographic information system that presents zoning areas that already have reclamation permits using spatial data. Regional information is presented on the system using a map on Google Earth. The development in this study uses the System Development Life Cycle (SDLC) and Unified Modeling Language (UML) methods to provide a clear picture of the analysis and design of a geographic information system that will be built and it is hoped that the system will provide a supporting reference in the decision making process.*

Keywords— *Geographical Information System, Google Earth, Web Based System, SDLC, UML.*

I. INTRODUCTION

The wealths of Indonesia's marine and fishery resources is vulnerable to exploitation, which occurs when the utilization of its resources exceeds the carrying capacity of the environment. As one of the efforts to tackle exploitation of marine and fishery resources, the Indonesian government through law no. 27/2007 and UU. No.1 / 2014 concerning the Management of Coastal Areas and Small Islands encourages local governments to develop and enforce local regulations regarding the Zoning Plan for Coastal Areas and Small Islands (RZWPK) as a mechanism for managing water areas. In 2015, the Government of Indonesia reinforced its commitment to the development and finalization of the RZWP3K (Zoning Plan for Coastal Areas and Small Islands) or marine spatial planning at the regional level, through the national movement to conserve natural resources.

Space in law no. 26 of 2007 is defined as a vessel that includes land space, sea space and air space, including space in the earth as a unitary territory, where humans and other creatures live, carry out activities and maintain survival. Spatial planning and control required to create a secure, comfortable, productive and sustainable space based on the insight of the archipelago and national resilience created through harmony between the natural environment and the artificial environment, consolidate in the utilization of natural and artificial resources, likewise due respect to human resources. As well as protect spatial functions and preventing negative impacts on the environment due to spatial utilization.

II. LITERATURE REVIEW

A. Zoning

The definition of zoning according to the Indonesian dictionary is the division or management of the area into several parts, according to the function and management objectives. In this case, zoning functions to divide water areas based on the objectives and functions of marine resource management, particularly coastal areas and small islands in the waters of the Central Sulawesi Province.

B. System

Interpretation Systems According to Jogianto (2005: suggest that the system is a collection of elements that can achieve a specific goal. This system describes events and real unity is a real object, as well as places, objects, and people that really exist and occur.

Interpretation Systems According to Murdick, RG, (1991: 27) A system is an element that forms a collection or processing procedures/charts that seek a part or common goal by operating data and/or goods at a certain reference time to produce information and/or energy and/or goods.

C. Information

All kinds of definitions of information have been put forward by experts. According to Gordon B. Davis, information is data that have become an important form for the recipient and which has real value that can be felt in current decisions or future decisions. Meanwhile, according to Kenneth C. Laudon, information is data that has been in the form of useful forms and can be used for humans (Wibowo, Indra, & Jumadi, 2015).

D. Geographic Information System

Geography is the study of the earth's surface using a spatial, ecological, and a complex regional approach. Geographic Information System is a special information system that manages data that has spatial information (spatial reference) or in a more limited sense, is a computer system that has the ability to build, store, manage and display geographically referenced information, for example data that is identified according to its location in a database.

Moh. Adi Mukti and Hustinawaty, "Analysis and Design of Geographic Information System (GIS) Zonation Plan For Coastal Areas and Small Islands, Central Sulawesi Province Using UML," *International Research Journal of Advanced Engineering and Science*, Volume 5, Issue 4, pp. 11-14, 2020.

International Research Journal of Advanced Engineering and Science
ISSN (Online): 2455-9024

E. *Unified Modelling Language (UML)*

UML (Unified Modeling Language) is one of the most forceful tools in the world of object-oriented systems development. UML is an integral part of the modeling language developed by Booch, Object Modeling Technique (OMT) and Object Oriented Software Engineering (OOSE).

The Grady Booch's Booch method is well known as the Object Oriented Design method. This method produces the analysis and design process into four iterative stages, namely: indication of classes and objects, a semantic indication of the object-class relationship, interface of detailing and implementation.

The resilience of the Booch method is in its detail and wealths with notation and elements. The OMT modeling developed by Rumbaugh is based on structured analysis and entity-relationship modeling. The main stages in this methodology are analysis, system design, object design and implementation.

The OMT modeling developed by Rumbaugh is based on structured analysis and modeling of entity relationships. The main stages in this methodology are analysis, system design, object design and implementation. The advantage of this method is that it supports all OO concepts. Jacobson's OOSE method puts more emphasis on the use case. OOSE has three stages, namely creating a requirements model and analysis, design and implementation, and a test model. The advantage of this method is that it is easy to learn because it has a simple notation, but includes all stages in software engineering.

III. RESEARCH METHOD

Research methodology can be defined as the knowledge that is passed to achieve a certain understanding (Information, Mapping, & Agriculture, 2016). In this study, the methodology used is the waterfall methodology. The stages in this research can be seen in the image below.

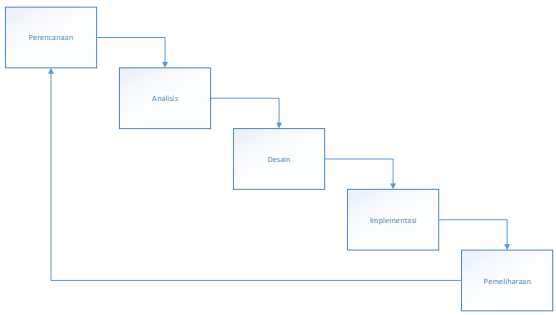

Figure 1. Waterfall

IV. DISCUSSION

1. *Use Case Diagram*

Use Case Diagrams are diagrams that graphically describe who will use the system and in what ways the user expects to interact with the system. The actors in this study were divided into two, namely users and operators.

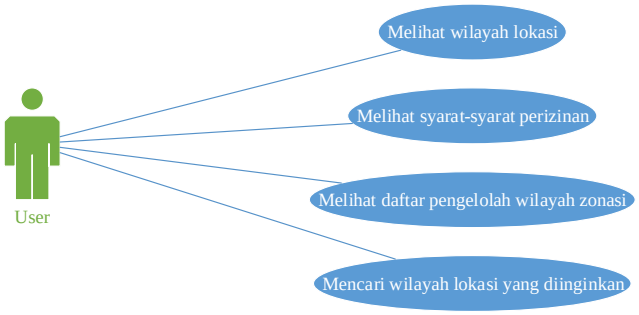

Figure 2. User use case

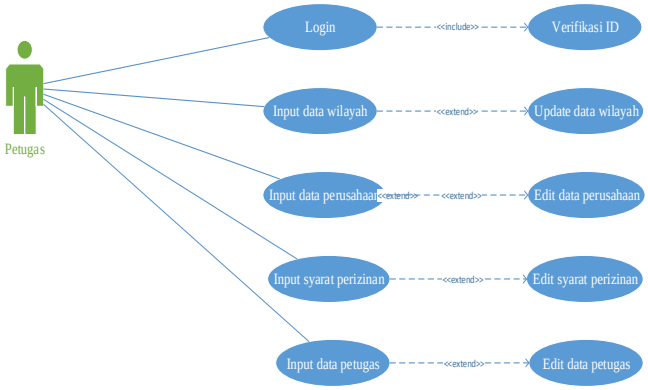

Figure 3. Operator use case

2. *Activity Diagram*

Activity Diagram is a model that identifies the workflow of a system. Activity diagrams in this research are divided into two divisions, namely users and operators.

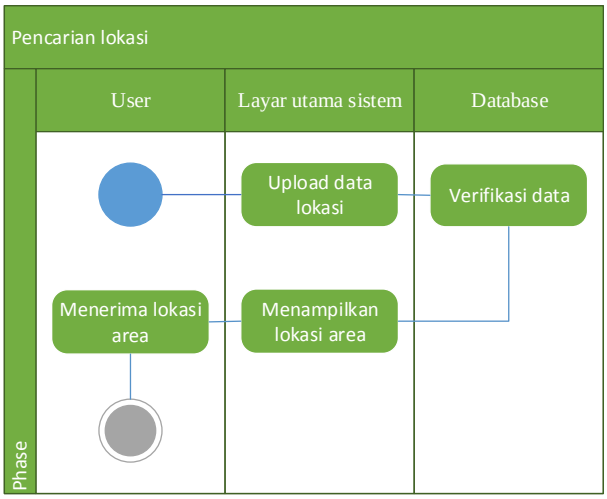

Figure 4. Activity diagram user

3. *Sequence Diagram*

Sequence diagrams are used to describe demeanor in a scenario. Sequence diagram is a model that identifies the interactions between objects and other objects in a system.

Moh. Adi Mukti and Hustinawaty, "Analysis and Design of Geographic Information System (GIS) Zonation Plan For Coastal Areas and Small Islands, Central Sulawesi Province Using UML," *International Research Journal of Advanced Engineering and Science*, Volume 5, Issue 4, pp. 11-14, 2020.

International Research Journal of Advanced Engineering and Science
ISSN (Online): 2455-9024

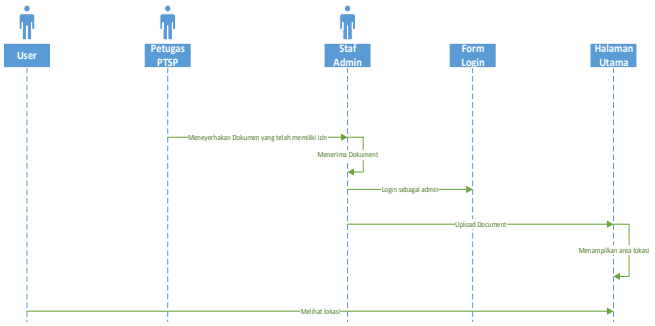

Figure 5. Sequence diagram

4. *Class Diagram*

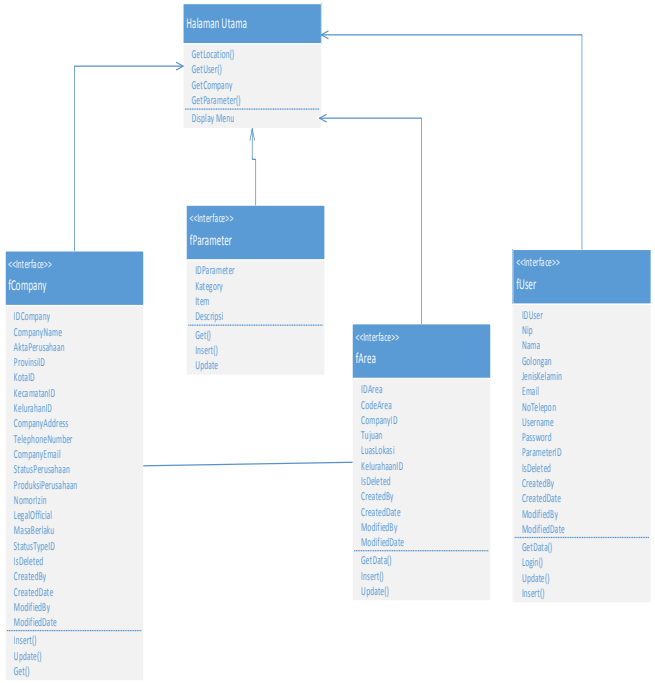

Figure 6. Class diagram

5. *Database Relations*

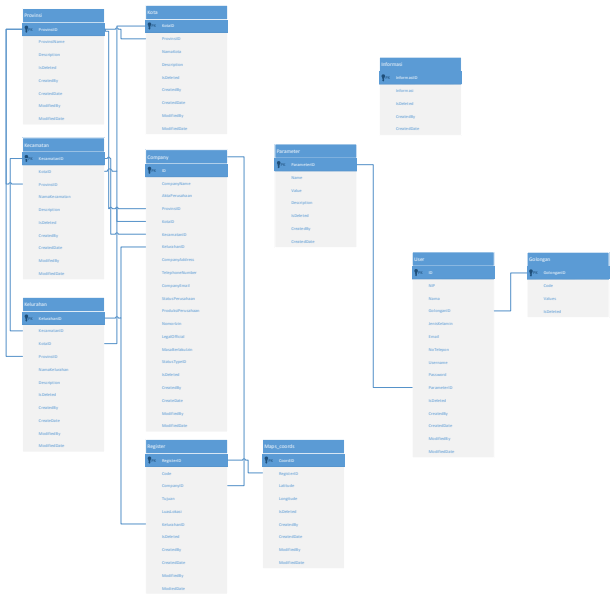

Figure 7. Database relations

6. *System View*

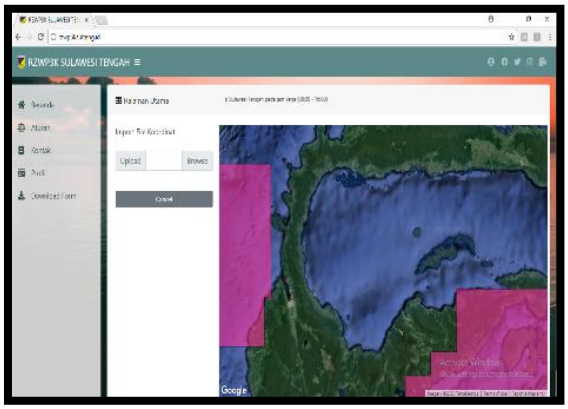

Figure 8. User main page view

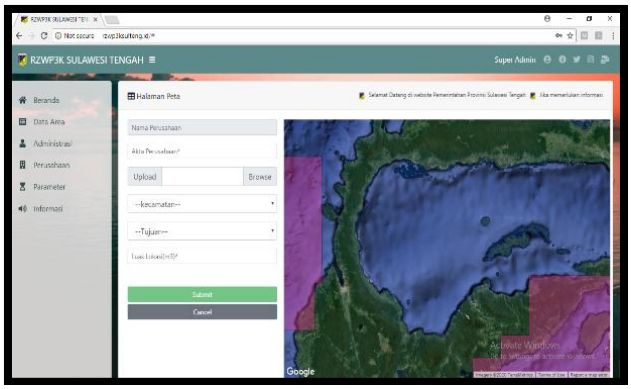

Figure 9. Operator main page view

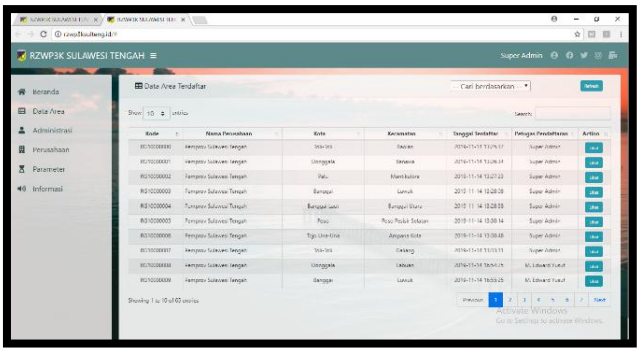

Figure 10. Detailed view of regional information

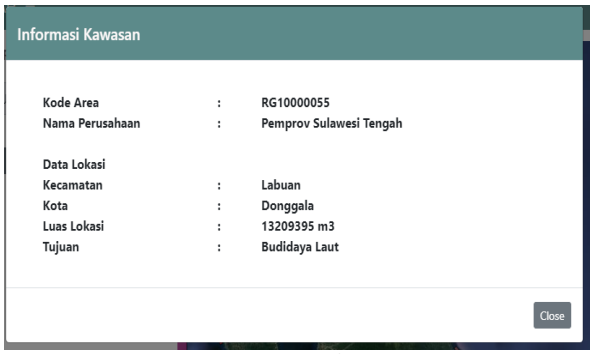

Figure 11. Area information

V. CONCLUSION AND RECOMENDATION

Conclusion

Moh. Adi Mukti and Hustinawaty, "Analysis and Design of Geographic Information System (GIS) Zonation Plan For Coastal Areas and Small Islands, Central Sulawesi Province Using UML," *International Research Journal of Advanced Engineering and Science*, Volume 5, Issue 4, pp. 11-14, 2020.

After conducting research at the Marine and Fisheries Office of Central Sulawesi Province, it can be concluded that:

1. The system design in this study used the Unified Modeling Language (UML).
2. In this study, the system design used the System Development Life Cycle (SDLC) method.
3. There are two actors in this study, namely the operator (admin) and user.
4. The information generated by the system in this study is in the form of information on the zoning area of the Central Sulawesi Province, and information on companies that receive a zoning location permit.
5. This system is essential for the development and utilization of areas, particularly the waters in Indonesia.

Recomendation

Based on this research, the researcher suggest:

1. Developing this application to the Mobile Application version.
2. Developing applications using different approaches.
3. Territorial development can be carried out not merely in one provincial water area, but also for the entire territorial waters of the Republic of Indonesia.

REFERENCES

[1] Informasi, S., Pemetaan, G., & Pertanian, L. (2016). *Komoditi Hasil Panen Kabupaten Kudus*. *10*(2), 1233–1243.
[2] Wibowo, K. M., Indra, K., & Jumadi, J. (2015). Sistem Informasi Geografis (SIG) Menentukan Lokasi Pertambangan Batu Bara di Provinsi Bengkulu Berbasis Website. *Jurnal Media Infotama*, *11*(1), 51–60. Retrieved from https://jurnal.unived.ac.id/index.php/jmi/article/view/252/231
[3] Munawar. (2018). Analisis dan perancangan sistem berorientasi objek dengan UML. Bandung : Informatika.
[4] Rolly Maulana A. (2019). Pengantar sistem informasi geografis berbasiskan open source. Bandung : Alfabeta.
[5] Riyanto, Prilnali E, Hendi I. (2019). Pengembangan aplikasi sistem informasi geografis berbasis desktop dan web. Yogyakarta : Gava Media.
[6] Feri Sulianta. (2017). Teknik perancangan arsitektur sistem informasi. Yogyakarta : Andi.
[7] Waljiyanto. (2003). Sistem basis data analisis dan pemodelan data. Yogyakarta : Graha Ilmu

Moh. Adi Mukti and Hustinawaty, “Analysis and Design of Geographic Information System (GIS) Zonation Plan For Coastal Areas and Small Islands, Central Sulawesi Province Using UML,” *International Research Journal of Advanced Engineering and Science*, Volume 5, Issue 4, pp. 11-14, 2020.