
	MODIFICATION OF ENVIRONMENTAL LICENSE FOR THE PROJECT OF CONSTRUCTION AND OPERATION OF A SOLID BULK CARGOES PORT TERMINAL IN THE MUNICIPALITY OF TURBO		
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CHARACTERIZATION OF THE INFLUENCE AREA

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5. CHARACTERIZATION OF THE INFLUENCE AREA ECOSYSTEM SERVICES

This chapter aims to identify the components and processes of the ecosystems in which greater pressure will be exercised for the development of the project. Thus, more information to adopt environmental management measures that contribute to the construction of scenarios, in which is feasible to develop the project in a sustainable manner, will be considered.

In accordance with the terms of reference for the preparation of this study, this chapter will refer to ecosystem services, defined by the Millennium Ecosystem Assessment to be the benefits that human populations derive, directly or indirectly, from processes and functions of ecosystems (UNEP-WCMC, 2011)¹.

The loss of biodiversity and the deterioration of ecosystem services contribute (directly or indirectly) to deteriorate aspects of human well-being such as health, food security, vulnerability and, even, the freedom of populations²

Within the multiple studies of ecosystem services and their different approaches to link human well-being, there is a consensus to use the scheme presented in Figure No. 5.1, which outlines how ecosystem services are generated by their functions, which in turn are supported by biophysical components and "support" services and where the different functions of ecosystems are intermediate between processes and services and can be defined as the "Capacity of the ecosystems to provide goods and services that satisfy the human needs, directly and indirectly".³



Also, the use of the good or service provides benefits that can be valued in economic terms⁴.

¹ UNEP-WCMC. 2011. Developing ecosystem service indicators: experiences and lessons learned from sub-global assessments and other initiatives. Secretariat of the convention on biological diversity, Montreal, Canada. Technical series no. 58, 118 pp

² Ibid.

³ De Groot, R.S., Alkernade, R., Braat, L., Hein, L., Willemsen, L. 2010a. Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. Ecological Complexity, 7: 260-272.

⁴ IDEAM, 2011. Contributions from the IDEAM for the definition and application of the National Ecological Structure. Institute of Hydrology, Meteorology and Environmental Studies –IDEAM-. Bogotá D.C., Colombia. 43 p.

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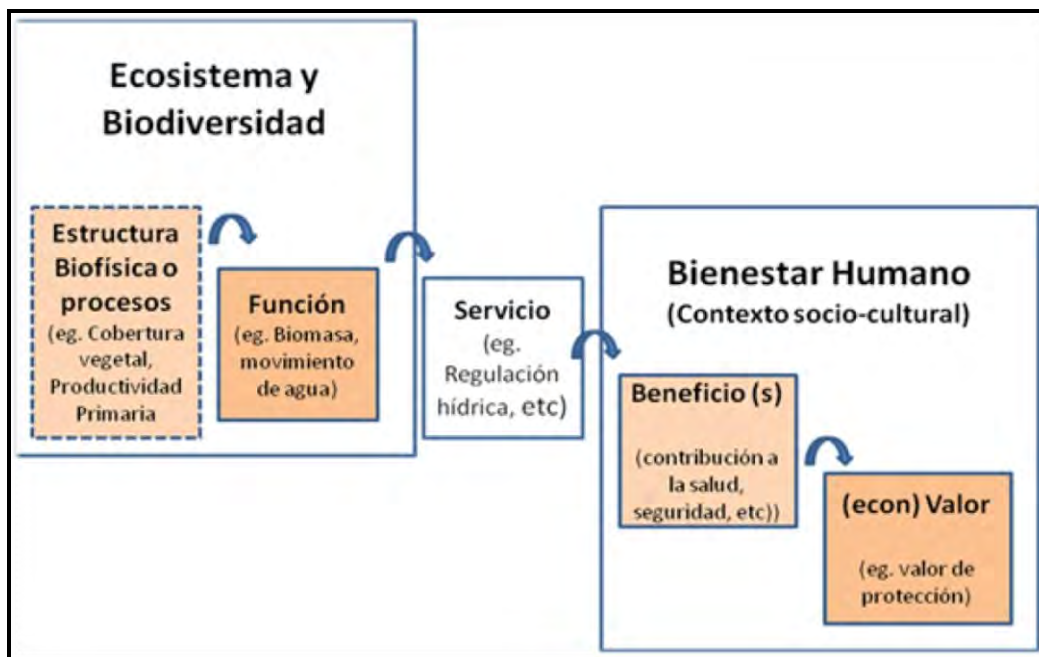


Figure No. 5.1 Framework for the integrated assessment of ecosystem services and landscape
Source: De Groot, et al., 2010 as cited in IDEAM 2011.

5.4.1 Classification of ecosystem services

The growing interest in ecosystem services becomes the focus of the global initiative known as the Millennium Ecosystem Assessment⁵, which aimed to show the links between changes in ecosystems and human well-being.

This evaluation began in 2002 and the initiative involved around 1,300 experts from 95 countries, as well as representatives of different sectors of society⁶. Ecosystem services are the conceptual link between ecosystems, their components and processes and the benefits that societies derive from ecosystems⁷.



There are several definitions of "ecosystem services". In a colloquial way it is said that services are the benefits that societies obtain from ecosystems⁸. However, this

⁵ Ibid.

⁶ SPANISH ASSOCIATION OF TERRESTRIAL ECOLOGY. Ecosystems. Services offered by tropical forests. P 136.

⁷ Boyd & Banzhaf, 2007. As cited in SPANISH ASSOCIATION OF TERRESTRIAL ECOLOGY. Ecosystems. Services offered by tropical forests. P.136

⁸ MEA 2003. As cited in SPANISH ASSOCIATION OF TERRESTRIAL ECOLOGY. Ecosystems. Services offered by tropical forests. P.136

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definition is not very precise and is aimed at the general public. A more technical⁹ definition corresponds to: *"Ecosystem services are the components of ecosystems that are consumed directly, that are enjoyed, or that contribute, through interactions between them, to generate adequate conditions for human well-being"*.

According to the MEA (2005)¹⁰, ecosystem services can be classified into four groups: provisioning, regulation, cultural services and support services, necessary to maintain the provision of other services. All services are interrelated to a large extent.

For this project, the ecosystem services of the provisioning, regulation and cultural categories will be evaluated (Figure No. 5.2).



Figure No. 5.2 Ecosystem services evaluated
Source: Prepared by Aqua & Terra Consultores Asociados S.A.S.2015



- **Provisioning**

Provisioning services are the products that people obtain from ecosystems, such as food, fresh water, fuel, wood, fiber, genetic resources, natural medicines and others.

- **Regulation**

9 Quijas et al. 2010. As cited in SPANISH ASSOCIATION OF TERRESTRIAL ECOLOGY. Ecosystems. Services offered by tropical forests. P.136

10 SPANISH ASSOCIATION OF TERRESTRIAL ECOLOGY. Op cit. P. 137.

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Associated with the benefits obtained from the regulation of ecosystem processes. This includes air quality, climate and water regulation (floods), erosion control, risk mitigation, biological control, waste management; All the ecological processes that have regulatory capacity.

- **Cultural**

These are the non-material benefits obtained through recreational, aesthetic, cognitive development, reflection and spiritual MEA experiences (2005)¹¹.

These services are strongly linked to human values and behavior, so the assessment of this service is highly subjective.

As an example: Cultural diversity, spiritual and religious values, social relations, sense of belonging and degree of synergy existing in the community.

5.4.2 *Identification of existing Ecosystem Services in the corregimiento of Nueva Colonia and the El Canal settlement*

From a systemic approach it is necessary to understand how different social actors¹² perceive, value and use ecosystem services in the area under study, according to their perception of coverage and access to certain services. The above, allows to know its relationship with the ecosystem.



To determine the importance or dependence that the community has on the ecosystem that provides services, semi-structured interviews were conducted with the main social actors of the smaller territorial units of the present project.

Therefore, the representatives of the grassroots groups of the communities of Nueva Colonia and the El Canal settlement were asked to respond to a semi-structured interview and complement the exercise with the qualification in the high, medium and low ranks.

Questions were raised about the knowledge that the inhabitants had about ecosystem services and which of these they identify in their community and the degree of dependence of the community in relation to the identified ecosystem services.

¹¹ SPANISH ASSOCIATION OF TERRESTRIAL ECOLOGY. Op cit. P. 137.

¹² Individual, group, organization or institution that acts in representation of their interests with the purpose of realizing them. Each actor in a local space, has a certain position, amount of power and capacity of opportunity to obtain its objectives, within a context of complex relationships and systems of interactions.

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They were asked to graphically show the services identified and to qualify in the categories of good, regular and moderate, in addition to evaluating the scope in the religious and cultural matter of their community. Finally, to present suggestions for enrichment in environmental education.

In Annex 5.3.5.1, the results of the interviews conducted by the representatives of the community of Nueva Colonia and el Canal are presented. In the same way, questions were asked to the environmental team in charge of carrying out the characterization, so that they responded from the knowledge of the communities of Nueva Colonia and el Canal obtained in the field work.

Next, the conclusions obtained according to the classification of ecosystem services are presented: Provisioning, Regulation and Cultural.

- *Ecosystem provisioning services in Nueva Colonia and El Canal*

The interviews were conducted with several representatives of the community action board and the Prodesarrollo organization and a representative of the fishermen of the corregimiento of Nueva Colonia, municipality of Turbo.

According to the ecosystem provisioning services, those identified by the community and by the team of professionals of the environmental component of the project are listed below.



Community representatives more easily identified those ecosystem goods and services they use for living and that provide them with direct uses. Those that do not generate direct use were the least identified by the people. This shows the underutilization and lack of conservation and care of the ecosystem.

Ecosystem provisioning services were identified as those related to food production, through water, wood, medicinal plants, livestock, artisanal fisheries, meat and skins, with an emphasis on agriculture. With low proportion in ecosystem services of natural ingredients and fiber.

Next, the Ecosystem Provisioning Services identified by the different actors are listed in Table No. 5.1.

Table No. 5.1 Provisioning services in the corregimiento Nueva Colonia and el Canal



Actors	Foods	Water	Medicinal	Timber	Ornamental
PRODESARROLLO	Banana, mango, plum, papaya, cashew, anohon, borojo	Domestic use, Livestock sector and agriculture,	Aloe, lemon balm, peppermint, lemongrass, calendula,	Oak, cativo, Balsa, teak, acacia, gmelina, wild	Totumo, palm trees.

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Actors	Foods	Water	Medicinal	Timber	Ornamental
	guava, poultry and beef and pork, fish and seafood	cattle, irrigation of banana plantations	nettle, eucalyptus, rosa mirilla, caraño, matarraton, anamú, elder, among others	cashew, ceiba	
J.A.C. (Junta de acción Comunal de Nueva Colonia) [Community Action Board of Nueva Colonia]	Vegetables, banana, corozo, guava, lemon, mamoncillo, different poultry meats, beef and pork, fish and seafood	Domestic use, Livestock sector and agriculture, cattle, irrigation of banana plantations	Aloe, lemongrass, lemon balm, calendula, almond, anamú, among others.	Roble, cativo, Balsa, wild cashew, ceiba,	Totumo, palm trees.
Fisherman's representative	Banana, guava, coconut, several species of fish and shellfish among them: Bass, Oarfish, Beardfish, Anchovy, Mojarra, Corbinata, horse mackerel, among others.	Domestic use, Livestock sector and agriculture, cattle, irrigation of banana plantations	Aromatic plants	Oak, ceiba and mangle	Palm trees
Environmental team of the company Aqua & Terra.	Anon, mango, plum, orange, mamoncillo, salt, pangana, guanábana, poultry, meats (beef and pork) Different species of fish	Domestic use, crop irrigation, human consumption, cattle	Lemongrass, chiminango, aromatic plants	Roble, cativo, Balsa, mangle, wild cashew, Niguito,	Palm trees

Source: Prepared by Aqua & Terra Consultores Asociados S.A.S.2015

The identified Ecosystem Provisioning Services are described below:

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- Water provision and regulation

Hydrological processes have been identified as essential ecosystem services, not substitutable for both human well-being and for the maintenance of biodiversity¹³. The economy of many sectors, such as agriculture, industry and tourism, depend on this resource¹⁴.

The IDEAM points out that water is a "vital element, structures the natural environment and is decisive in the dynamics of social and productive processes" and the scarcity of this service is a condition that affects food production, human health and economic development.



Both the community and the environmental team agreed that this service is important and vital. From the community perspective, they consider it necessary in domestic, livestock, agricultural and, after treatment, for human consumption. In addition, they pointed out that thanks to the León River and the Bahía Colombia, they can count on fishing for both consumption and commercialization (Photo No. 5.1).



Photo No. 5.1 Fishing activity in the area of influence
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

¹³ Pert *et al.*, 2010. As cited in IDEAM, 2011. IDEAM, 2011. Contributions from the IDEAM for the definition and application of the National Ecological Structure. Instituto de Hidrología, Meteorología y Estudios Ambientales –IDEAM- [Institute of Hydrology, Meteorology and Environmental Studies]. Bogotá D.C., Colombia. 10 p.

¹⁴ IDEAM, 2011. Op. cit. p10.

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- Food Provision

➤ Food derived from agriculture:

With regard to the provision of food, it should be noted that a high percentage of land use is destined for the agricultural sector, with permanent banana crops, an activity that stands out in the region due to its high commercialization.

The representatives of the community stated that the majority of their lands were occupied by banana crops, but that they also cultivated products such as: avocado, mango, papaya, borojo, pineapple, plum, chili, corn, cassava, and rice. The previous crops have very variable production levels (Photo No. 5.2).



Photo No. 5.2 Crops of fruit trees
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

➤ Food derived from livestock:

A secondary economic-food activity is the provision of food derived from livestock breeding in pastures, enclosures or areas with vegetation cover. Beef or bovine cattle were found in the area of influence and, in a lesser proportion, pigs, as well as poultry (Photo No. 5.3).



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Photo No. 5.3 Cattle evidenced in the area of influence
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

➤ Food derived from fishing:

Because of the location of Nueva Colonia and El Canal, geographically close to the river León and the Gulf of Nueva Colombia, fishing of artisanal nature stands out. The production is destined mainly to the family sustenance and others commercialize it in the wharf of Nueva Colonia. Among the species reported by fishermen in the area are: bass, oarfish, beardfish, mojarra, anchovy, corvinata, horse mackerel, among others (Photo No. 5.4).



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Photo No. 5.4 Producto de la faena de pesca realizada por pescador de Nueva Colonia
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- Provision of medicinal, timber and ornamental plants

The provision of medicinal plants is related to the cultivation of aromatic plants such as: aloe, paico, peppermint, cedron, citronella, rosemary, lemongrass, nettle, calendula, among others. The use of these plants is directed to the treatment of pain, as well as anti-inflammatory, healing as well as for the treatment of stomach discomforts and to a lesser extent they are used as ornamental plants.

In timber species, the area is characterized by the existence of the species of cativo, forming communities of cativales which were affected by the agricultural frontiers, until diminishing the number of individuals in the area. The mangrove is used for construction, likewise it is being removed from the ground to occupy it with pastures for livestock (Photo No. 5.5).



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Photo No. 5.5 Use of mangrove species
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- *Regulatory ecosystem services in Nueva Colonia and El Canal*



The Gulf of Urabá is an important ecosystem in the regional life and prints a particularity to Turbo, for what it represents for the daily life of its inhabitants in terms of the variety of trades that are generated: braceros, boatmen, merchants, fishermen. This other range of jobs gives Turbo a relatively greater autonomy than the other municipalities of the axis, to seek alternative income, outside the rural area¹⁵.

The little regulation of the flows, due to the absence of adequate vegetal cover, has caused that the great avenues of water flood the low lands when prolonged precipitations occur in the high part of basin¹⁶.

Following with the methodology of interviewing the representatives of the community and the professionals who participated in the environmental characterization of the project and its influence area, in accordance with the regulatory ecosystem services and the direct observation and perception given by the inhabitant communities of the area, the following were identified as regulatory services: air quality, climate regulation, water cleaning, waste treatment and soil productivity.

¹⁵ POT TURBO. Antioquia 2000 BOOK 2. Integrated diagnostics part 2. P.14

¹⁶ Ibid.

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Next, the regulatory ecosystem services identified by the different actors are listed in Table No. 5. 2..

Table No. 5.2 Regulatory services in Nueva Colonia Township

Actors	Air regulation	climate regulation	soil productivity
PRODESARROLLO	According to the interviews conducted, the representatives said that the air quality of their village is excellent, or good, because there are many areas with vegetation, also, they speak of other reasons such as the absence of factories and the remoteness of the industrial zones	One of the strengths that stood out in his region, were the constant rains, which allowed fertile land for crops	It is a territory that stood out because its land is suitable not only for the cultivation of bananas, but also for pastures and therefore the raising of livestock.
J.A.C. (Community Action Board of Nueva Colonia)	The representatives of the community action boards of the township, agreed that the air quality is good, because of the existence of trees, but said that many crops use fumigations which contaminates not only the products but the air.	In this issue they said that they feel in advantage in relation to other regions of the country, that the climate is humid and the rains are never absent	They have a land suitable for agriculture and livestock. Having the river nearby is an advantage for them because it makes it easier for them to have water for their animals and their crops.
Fishermen representative	The representative of the fishermen said that in their community the air quality is very good, there is little pollution.	For them, heavy rains sometimes interrupt fishing. Although the weather is usually considered good	They consider that the soil is good because it is close to the León River.
Environmental team of the company Aqua & Terra	The environmental team considers that the quality of the air is good, due to the presence of forest cover, which allows the capture of CO2 and the release of oxygen, reduce pollution.	Due to the presence of forests, its humid climate and the presence of wetlands, these components allow climate regulation which is specific to the region.	In the project area, characteristic floodplain soils are presented, limiting agricultural activities, being productive and with greater use for pastures, which adapt to flooding problems. It should be noted that in the region there are areas that do not present this type of problem which allows it to develop intensive agriculture

Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

The following is a description of the regulatory ecosystem services identified:

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- - Regulation of the air in Nueva Colonia township

The regulation of air is related to the high presence of vegetation that fulfills the function of mitigating the effects of pollution generated by the emission of carbon dioxide, which produces the constant circulation of vehicles that pollute the environment (Photo No. 5.6).

There is an additional impact on air quality, due to the existence of banana or plantain crops, which require the use of agrochemical inputs for fertilization and fumigation.



Photo No. 5.6 Way to Nueva Colonia, natural tunnel of trees
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- - Climate regulation in Nueva Colonia Township

The climate regulation in the project area and the influence area, according to the opinion of the interviewees, is considered good in general terms, its climate is humid and tropical, which facilitates agricultural production and livestock.

In the case of the El Canal community, which does not have an aqueduct, it uses rainwater for the provision of domestic use. In the fishing activities, the rain allows the river to maintain a good flow which facilitates the proliferation of fish, although they consider that when there are heavy rains they must interrupt the programmed tasks (Photo No. 5.7).



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Photo No. 5.7 Climatic conditions presented during one of the monitoring of fishing activities
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- Soil productivity in Nueva Colonia township

Regarding the productivity of the soil, the representatives of the community said that the soil is suitable depending on the sectors, since many of them are flooded, which does not allow a greater use, nor the construction of houses. The environmental team states that the land where the project is located, in general is a land suitable for pasture and livestock.

They highlighted that, in most of the territory of the Urabá region, including the township of Nueva Colonia, the land is mostly dedicated to banana crops, an activity in which a significant number of inhabitants are working. (Photo No. 5.8).



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Photo No. 5.8 Productive systems identified in the influence area..
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.



- *Cultural ecosystem services in Nueva Colonia township and El Canal*

The people interviewed for the evacuation of cultural ecosystem services were all over 20 years old, and with several years of living in the community.

Both Nueva Colonia township and the El Canal settlement are multicultural communities, since they are inhabited by families from both the Atlantic Coast (Cartagena and Guajira), as well as by natives from the interior of the country, especially Medellín. The foregoing demonstrates an openness of the city to foreigners and a cultural exchange.

They also state that the people who decided to settle in the territory did so because they found employment sources, especially in the banana plantations, as they mentioned that the landscape is very pleasant and although the population was affected by the violence, many decided not to the lands of Urabá Antioqueño.

When talking about the cultural issue, they argued that fishing is an activity that was carried out by tradition, especially the inhabitants of the El Canal settlement and the inhabitants of Nueva Colonia that were located near the jetty. They also stated that since they were children they were taken by their parents to carry out fishing

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activities. In addition, they demonstrated to know the different fishing gears and the species that produce more in the area.



Nueva Colonia is recognized mainly for its banana zone, but being strategically located near the canal and having a place of embarkation and disembarkation, it allows it to have diversity in economic and commercial activity. The interviewees concluded that in Nueva Colonia they have a work culture.

With regard to the spiritual and religious theme, a large number of temple buildings are highlighted, where they congregate at least twice a week to celebrate the liturgical and religious acts. Mostly of Protestant religion and in less proportion Catholics.

The following cultural ecosystem services are listed in Table No. 5.3, as identified by the different actors.

Table No. 5.3 cultural services identified in Nueva Colonia township and El Canal

Actors	Leadership style and community participation	Spiritual and religious heritage	Fishing As art and traditional craft
PRODESARROLLO	The community is united and committed when they carry out community projects. They have a high sense of leadership and a sense of belonging to their village.	All interviewees expressed their high belief and practice of religious activities, even within their community meetings you never need to start them with a prayer	Fishing in Nueva Colonia and the Canal are considered inherited activities, living near the León river and Bahía Colombia, allows the inhabitants to find in this environment the sustenance to live, relating to the art of fishing and turning the exits from very early hours of the day the departure for several days to perform their tasks. Many of them are shared by several members of the family.
J.A.C. (Community Action Board of Nueva Colonia)	The representatives of the Community Action Board, said that despite being a group legally constituted and recognized by the community in general, not all the members of the Board participate in community actions.	They stated that it is a very spiritual and religious township-	The fishing activity in the same way they observe it as a traditional and cultural activity, but that has been replaced by the cultivation of banana.
Fishermen representative	The fishing guild is not so united; the trade is done more at the family level or by business. He	In the religious theme he considers that they are a God-fearing people. Who attend as a family the	Everything they learn from the trade of fishing activity is by tradition of their families. Their grandparents and

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Actors	Leadership style and community participation	Spiritual and religious heritage	Fishing As art and traditional craft
	considers that they need a greater sense of belonging and organization.	activities carried out by the church	parents carried out this activity, teaching and doing the tasks with their families. That's why not only the task is performed by men, but also by women and children.
Environmental team of the company Aqua & Terra	For the environmental team, it is important to highlight the great collaboration and participation provided by the communities. Found empowered leaders of the processes, with assistance and participation in the activities carried out, being highly proactive and with a sense of belonging.	One of the characteristics observed in the visit is to find a large number of churches, and to the representatives of the community requesting that in each meeting a prayer in action of Grace be previously performed. This exercise was taken into account and the participants were involved to carry it out together.	The proximity of the community to the León river, the presence of the jetty in Nueva Colonia and the fishing activity as a traditional activity. They allowed to recognize that this community is highly dependent on fishing. Which is not only related to the tasks, but in the manufacture of the elements to be used such as trammel, canoes, hooks, etc.

Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

The following cultural ecosystem services identified are described:



- Leadership style and community participation

The presence of grassroots groups in the Nueva Colonia Township evidences a great sense of belonging and community commitment with the Township (Photo No. 5.9).

The existence of organizations that are present in Nueva Colonia, as is the case of PRODESARROLLO, is self-recognized, as mentioned in the zonal Plan. *"A group of leaders, representatives of the living forces of the township. United to train us and arrange ways to positively analyze our current condition, and thus generate ideas that facilitate our own development. Walking together and with the same level of commitment towards a promising north that guarantees the improvement of our quality of life"*¹⁷.

The committee formed by PRODESARROLLO in new Colonia, is made up of strategic actors of the community, linking public and private entities that have been making social intervention in the township. Through the implementation of a strategic

¹⁷ HOUSE OF GOVERNMENT MAYOR OF TURBO. PRODESARROLLO COMMITTEE. SOCIAL FOUNDATION UNIBAN - FUNDAUNIBAN. Zonal Development Plan. Nueva Colonia 2005 - 2015.

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alliance that allows positioning and developing an integral diagnosis, allowing to guarantee the collective construction and sustainable development of the region.

The PRODESARROLLO Committee visualizes the execution of the development plan as a strategy, as expressed in the following way: "*The Development Plan of the New Colonia Township, represents one of the most significant products within the process of community empowerment, while it constitutes one of the fundamental pillars towards the concretion of the civic institutionalism that our community pursues*"¹⁸.

A Common Zonal Plan that is based on the strengthening of teamwork and the construction of the social fabric, as fundamental axes to achieve a democratization of local, sub-regional, regional, departmental and national development management.

The process is promoted from the organization, in favor of the generation of programs and projects aimed at satisfying basic and fundamental needs, improving social relations, habitat, income and in general the quality of life.¹⁹



According to the above, we can say that Nueva Colonia has a high degree of leadership and social and community commitment.



Photo No. 5.9 Participation of Leader in Impact Evaluation Workshop.
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

¹⁸ Ibid.

¹⁹ Ibid.

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- **Spiritual and religious patrimony in Nueva Colonia township**

In the town of Nueva Colonia, a great spiritual and religious heritage is perceived, based on the complementarity of two aspects: the material or the cultural.

For the material aspect, the presence of 12 churches or religious centers, indicates a demand for a spiritual guide that in turn is sustained over time, by the collective action of the parishioners. Periodic attendance at places of religious or spiritual gathering demonstrates the positive correlation between the church as an institution and the settlers of Nueva Colonia.

Additionally, a great diversity of religious alternatives can be observed, identifying Catholic, Christian, Evangelical and Adventist churches, each with its own headquarters, where believers attend (Photo No. 5.10).

As for the cultural aspect, the inhabitants of Nueva Colonia have internalized the religious doctrine and are a constituent part of their daily life. For example, during the socialization meetings held, prior to the start of the activity, a space was requested from the community to raise a prayer. This way of initiating a meeting related to the project, shows the importance of the religious and spiritual aspects in everyday life and the decision making of the community.

Due to the multicultural conformation of the inhabitants of Nueva Colonia, coming from the Atlantic, Pacific and Antioquia regions, the presented heterogeneity prevents a single cultural tendency and that is why, its religious and spiritual manifestations are so varied (Photo No. 5.10).





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Photo No. 5.10 Christian Church of Nueva Colonia.

Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- Fishing as art and traditional craft

The pier of the artificial canal of Nueva Colonia, with a length of 2.4 ha. With more than 40 years of being formed initially by the company of Madera del Darién to transport its products and today the embarcadero of the banana companies (Uniban and Banacol), it is also used as an exit route for the smaller vessels departing from Nueva Colonia to the León River, which flows into the Gulf of Urabá in the Caribbean Sea (Bahía Colombia).

The pier of Nueva Colonia is the place where, from very early morning hours, fishermen from the Township de Nueva Colonia and the Canal come to start their fishing operations.



The fishing activity is of artisanal type, as evidenced in the boats, fishing gear used and forms of capture, with boats or canoes, some with paddle when they decide short distances and others with motor, to carry out their activities in open sea in search for the best place to obtain a good production.

The most used fishing gear is trammel, an element that is manufactured by themselves. It was possible to observe family groups that carried out this activity, considering it as they express it, a family service (Photo No. 5.11).

Approximately 70 fishermen leave and arrive at the pier daily and their products are sold in the same place. Many of the fishermen do the activity for their subsistence and do not have fishing elements, for which they pay to have access to some boats and carry out their work.

Of the 70 fishermen, only 34 of them are associated in an organization called APEANCO, they have their license issued by AUNAP, which recognizes them as fishermen. The rest of these people, perform the activity independently and eventually.

It is important to note that the greatest economic activity of Nueva Colonia is its connection as a day laborer in the banana industry and when they become unemployed they find a way of subsistence in fishing.

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Due to the above and in accordance with their sense of belonging and cultural roots, the fishermen of Nueva Colonia and El Canal consider that it is part of the culture of the coastal regions.



Photo No. 5.11 Members of a Nueva Colonia family in fishing activity
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.



5.4.3 *Level of impacts and Dependency of ECOSYSTEM SERVICES*

In order to determine the level of impact and Dependency of the ECOSYSTEM SERVICES in relation to the project of the Port of Bahía Colombia of Urabá and the communities of Nueva Colonia and El Canal, the representatives of the community and the environmental team qualified within the matrix of impacts and Dependency of the ECOSYSTEM SERVICES the high, medium or low ranges.

- **Levels of dependency of the communities with the ECOSYSTEM SERVICES of the communities of Nueva Colonia and the Canal**

In order to determine the importance of ECOSYSTEM SERVICES, by the local and regional communities, the criteria described below were considered:

- ✓ **High Dependency:** Community livelihoods depend directly on the ecosystem service
- ✓ **Medium Dependency:** The community benefits from the ecosystem service, but its subsistence does not depend directly on it
- ✓ **Low Dependency:** The community benefits from the ecosystem service, but its subsistence does not depend directly or indirectly on it; There are multiple options for the use of the ecosystem service, but they do not know it or they use it.

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5.4.4 Levels of Project impacts on ECOSYSTEM SERVICES

The level of impacts was determined with the environmental team, made up of professionals from different disciplines, performing the proper evaluation of the ECOSYSTEM SERVICES evidenced in the influence area of the Puerto Bahía Colombia Project in Urabá.

- Levels of Dependency that the project exercises on ECOSYSTEM SERVICES



- ✓ **High Dependency:** The activities that make up the project, directly require the ecosystem service defined in the matrix of impacts and Dependency
- ✓ **Medium Dependency:** Some secondary activities related to the project depend directly on the ecosystem service, but can be replaced by an alternative input.
- ✓ **Low Dependency:** The activities carried out in the project, whether primary or secondary, do not have direct Dependency on the ecosystem service.

In accordance with the criteria established in the terms of reference, the matrix of Impacts and Dependency of the ECOSYSTEM SERVICES, in the categories of supply, regulation and culture, was used as a tool for this project.

Below is the matrix of impacts and dependencies of the ECOSYSTEM SERVICES, evaluated by representatives of the community and by the environmental team (Table No. 5.4).

Table No. 5.4 Impacts and Dependency of ECOSYSTEM SERVICES

CATEGORY OF ECOSYSTEM SERVICES	ECOSYSTEM SERVICES	IMPACT OF THE PROJECT (high, medium or low)	DEPENDENCY OF COMMUNITIES (high, medium and low)	DEPENDENCY OF THE PROJECT (high, medium and low)
Provisioning	Water	Medium	High	Medium
	Sand and rock	Low	Low	Medium
	Wood	Low	Medium	Low
	Fibers and resin	N/A	Low	N/A
	Biomass	N/A	Low	N/A
	Meat and skins	N/A	Medium	N/A
	Medicinal plants	N/A	Medium	N/A
	Natural ingredients	N/A	Low	N/A
	artisanal fishing	Medio	High	N/A
	Cattle raising	Low	Medium	N/A
Farming	Medio	High	N/A	

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CATEGORY OF ECOSYSTEM SERVICES	ECOSYSTEM SERVICES	IMPACT OF THE PROJECT (high, medium or low)	DEPENDENCY OF COMMUNITIES (high, medium and low)	DEPENDENCY OF THE PROJECT (high, medium and low)
	Another service identified	N/A	N/A	N/A
Regulation	Erosion control	Low	Low	Medium
	Climate regulation (Regional and local)	Low	Medium	Low
	Water purification ecosystems	Low	Low	N/A
	Carbon storage and capture	Low	Low	N/A
	Salinity / alkalinity	Low	Low	N/A
	Acidity	N/A	N/A	N/A
	Another service identified	N/A	N/A	N/A
Cultural	Spiritual and religious	N/A	Media	N/A
	Fishing as an art or traditional craft	Medium	Medium	Low

Source: Aqua & Terra Consultores Asociados S.A.S., 2015.



5.4.5 ECOSYSTEM SERVICES according to the impact of the project

The environmental team analyzed the ECOSYSTEM SERVICES identified in the area of the project and influence, in smaller communities in the categories of supply, regulation and culture.

A rating was granted according to the degree of impact of the project on the ECOSYSTEM SERVICES, taking into account the scale of assessment proposed in Resolution 0112 of January 28, 2015, Terms of Reference for the Preparation of the Environmental Impact Study - EIA in projects of construction or expansion and operation of deep seaports, in its item 5.4 ECOSYSTEM SERVICES.

To this end, a semi-structured interview was designed, which was applied both to community leaders and to the professionals in charge of identifying the ECOSYSTEM SERVICES.

In the information collection tool implemented for the group of professionals, it was sought, through the recognition of their disciplinary expertise, the preparation of a panorama through which the main ECOSYSTEM SERVICES of the area of influence was pointed out, the degree of Dependency on relationship with local anthropic needs and environmental education needs.

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On the other hand, the interviews carried out with the community leaders included a knowledge of the context, the ECOSYSTEM SERVICES that the community has, the degree of Dependency, the quality and the needs in environmental matters.

Based on the above, we proceeded to make a valuation scale that is presented below (Figure No. 5.3):



Figure No. 5.3 Price scale
Source: Aqua & Terra Consultores Asociados S.A.S., 2015

According to the analysis made by the environmental team, regarding the supply ECOSYSTEM SERVICES, the following impacts generated by the project were found (Figure No. 5.4). There is a medium impact for water components, artisanal fisheries and agriculture. For its part, a low impact was identified for sand and rock, wood and livestock.

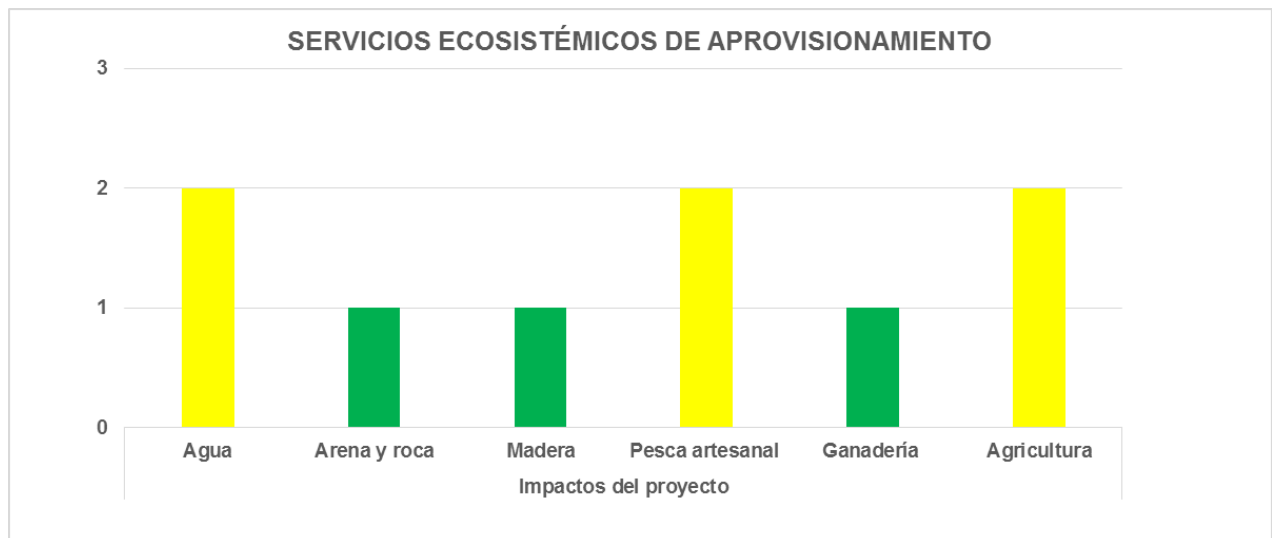




Figure No. 5.4 Impacts of the project on the supply ECOSYSTEM SERVICES
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

For the regulation category, a low impact was found for the ECOSYSTEM SERVICES of erosion control, climate regulation (regional and local), water purification ecosystems, storage and carbon capture and salinity / alkalinity.

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Finally, for the category of ECOSYSTEM SERVICES associated with culture, there was an average impact on fishing as an art or traditional craft.

Next, the analysis of each one of the impacts of the ECOSYSTEM SERVICES is presented:



- *Impact of the project on the Procurement ECOSYSTEM SERVICES*

In relation to seawater, an average impact will be presented, due to the alteration of water quality and sediments, during dredging activities and the driving of piles.

With respect to the fluvial dock that is licensed according to resolution 0032 of January 25, 2012, it will be 100m long and 12m wide in such a way as to allow the operation of cranes with a current effective draft of not less than 2m in waters from the river. This activity was classified as low impact, because the piles will be on land and will not affect the water resource. In the dismantling stage of the quay, alterations to the water source may occur, due to the generation of debris and particulate material.

It was possible to conclude that the Dependency of the project is average in relation to the continental water and will not be more affected during the construction phase of the project, due to the fact that direct activities will not be carried out on the León river and the Nueva Colonia canal; Although during the construction stage there will be discharges to the bodies of water, these will not generate a high impact, because the discharges will be treated in compliance with environmental regulations.

In relation to artisanal fishing activities, it can be seen that the fishing grounds identified by INVEMAR are outside the project area, being the closest to 2.6 km from the dump (See Figure No. 5.5)

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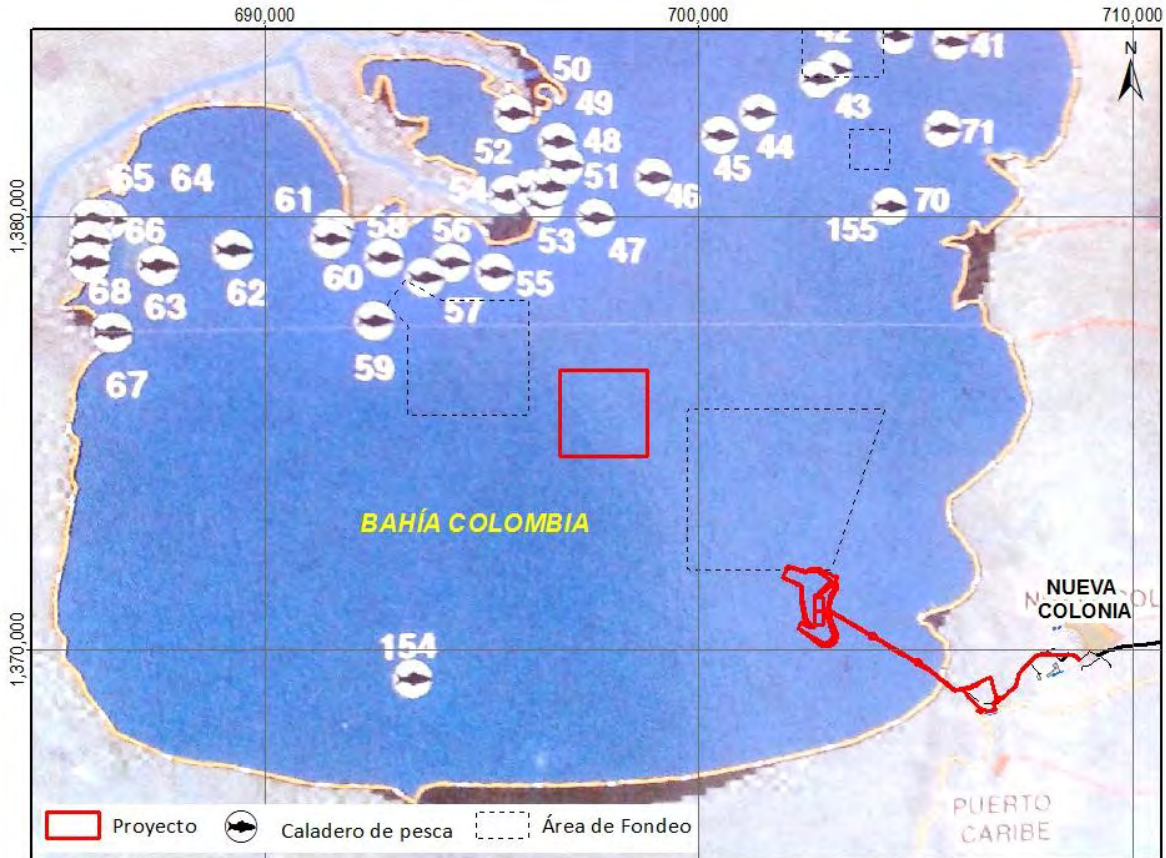




Figure No. 5.5 Fishing grounds of the Gulf of Urabá reported by INVEMAR and polygons of the project
Source: Institute of Marine and Coastal Research INVEMAR

Additionally, it was possible to corroborate in the monitoring of fishing that the tasks are carried out mostly in the upper sectors of Bahía Colombia; Additionally, during fishery monitoring, there was a low presence of fishermen in the project area. However, signaling measures must be taken in relation to fishing routes, on the river León, used by the transit of some fishermen, especially from Nueva Colonia. (See Figures 5.25, 5.26 and 5.27 in the item of Georeference of vessels in the area of maritime influence of the project that is in chapter 5.3.4 Economic component of the socio-economic characterization document of the present Environmental Impact Study and map MOD_LA_PTO_ANT_43_Pesca.

Agriculture was related as an average impact, because the project will improve the commercialization conditions of the products, which are the first line of economy of the region, without affecting the areas dedicated to this activity.

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In relation to the supply of sand and rock, this will be impacted in a smaller proportion, qualifying with a low impact, during the construction phase of the project, because the materials for its construction will be acquired in authorized quarries, and these are not found in the area of influence of the project.

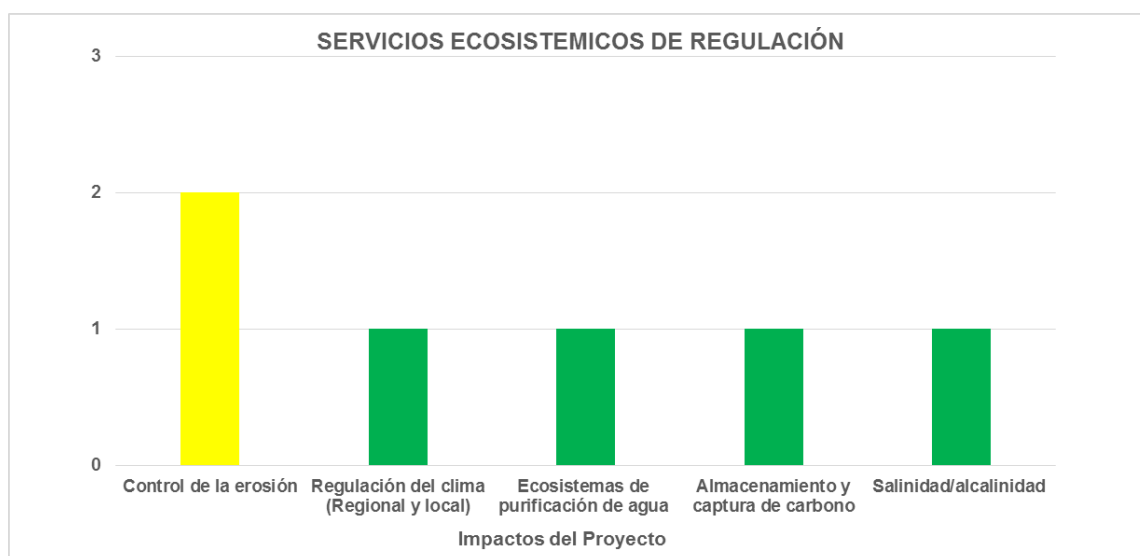
In the case of livestock, it was classified as low, taking into account two factors: First, because it is considered as an economic activity on a smaller scale; and secondly, due to the specifications of the project, the economic activity will not be affected.

- *Impact of the project on regulatory ECOSYSTEM SERVICES*

In accordance with the characterization made in the area of intervention of the project, it was determined that in the construction and operation stage, the current conditions of the existing ECOSYSTEM SERVICES are not being modified.

The Bahía Colombia de Urabá Project plans to execute an environmental management and monitoring plan, (See • File PS-05 Program to strengthen and manage fishing activities, which are included in the plans and programs of the present EIA). The file considers activities for the prevention, mitigation, correction and compensation of the impacts that may be generated.

Faced with the conservation of water resources, it has contemplated, among other measures, the management of rainwater and wastewater, during the construction and operation phases of the port project (Figure No. 5.6).





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Figure No. 5.6. Impacts of the Project to the Regulation ECOSYSTEM SERVICES.
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.



- *Impact of the project on ECOSYSTEM SERVICES Cultural*

According to the surveys conducted, it was determined that the project will not affect the religious and spiritual aspect of the communities that are within the influence area of the project.

According to what was evidenced, fishing is considered as a traditional activity carried out by the inhabitants of the Canal and Nueva Colonia, in which they participate as a family, using the Nueva Colonia jetty as a starting and finishing point and transiting the Canal. of Nueva Colonia and the route of the León River, moving to the marine zone in Bahía Colombia (Figure No. 5.7).



Figure No. 5.7. Impacts of the project on the ECOSYSTEM SERVICES Cultural in Nueva Colonia and the Canal
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

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5.4.6 ECOSYSTEM SERVICES according to the dependency of the communities

For the evaluation of the ECOSYSTEM SERVICES, in accordance with the dependency of the communities, the representatives of the communities of Nueva Colonia and El Canal were asked to evaluate the ECOSYSTEM SERVICES according to what is defined in Table No. 5.1. According to the qualification granted, they stated that the highest or highest Dependency was on water, fishing and agriculture.

As an average rating, they granted to the Dependency on wood, meat and skins, medicinal plants, livestock, climate regulation, and cultural service, both in religious practices and traditional fishing activities.

- *Dependency on the communities of the ECOSYSTEM SERVICES Procurement*



The representatives of the main existing base groups in Nueva Colonia and the Canal, recognized the importance and Dependency they have on the ECOSYSTEM SERVICES, highlighting especially water, fishing and agriculture as the main services that the community depends on.

Nueva Colonia and El Canal are located near the Canal de Nueva Colonia and the León River, which makes them a strategic place, which generates high Dependency on communities, especially those engaged in fishing.

Fishing is an activity that has some inhabitants of Nueva Colonia and El Canal, grouped in a fishing association called APEANCO (Association of Fishermen and Farmers of Nueva Colonia), which has 34 members who are duly registered and registered with AUNAP (National Authority of Aquaculture and Fishing). The inhabitants of El Canal, mostly are engaged in fishing. However, they are not yet grouped or registered with AUNAP.

The fishery is developed as an artisanal activity and is carried out in small boats on which they plan several days' work. The product is used for their consumption and many of them sell it in the pier of Nueva Colonia. (Expand information in the Monitoring Item to the artisanal fishing activity in the smaller Territorial units of the socio-economic characterization chapter of this EIA).

Agriculture is the most representative economic activity in the region, which links the majority of the economically active population. For what they consider as high Dependency, for the benefits received by this ecosystem service.

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The communities reported having an average dependency on wood, considering teak and Melina as an important forest resource.

In reference to livestock, it is also considered as a medium dependency, although the conditions of the land favor the establishment of livestock areas.

The services presented by the consumption of meat and skins, as well as the use of medicinal plants, the community gave them a value of average dependency, attributing them essential within their communities.

The community considered that ECOSYSTEM SERVICES such as natural ingredients, fiber and resin, sand and rocks are not relevant, so they qualified them with low dependency (Figure No. 5.8).

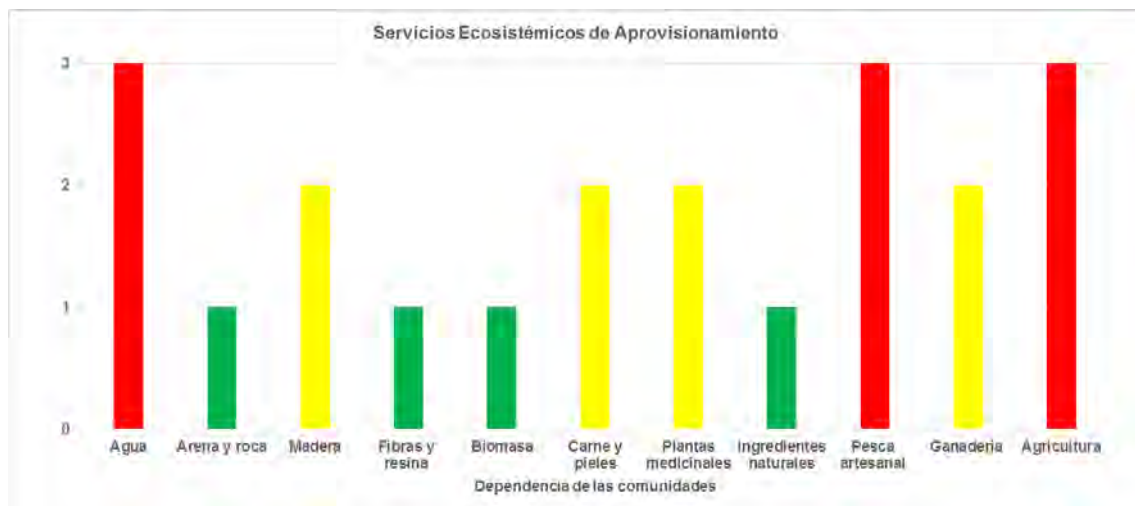




Figure No. 5.8 Dependency of the communities of the ecosystem services of provisioning
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- *Dependency on the ECOSYSTEM SERVICES regulatory communities*

The communities of the township of Nueva Colonia and the settlement El Canal, are not clear about the importance of this service, qualifying as low dependency the majority of them. They only highlighted as moderately dependent the existing climate in their region, which they attribute as responsible for the high productivity of their agricultural and livestock economy.

The communities do not value the forest reserve of the León and Suriquí river wetlands, cutting the mangroves to use the land for livestock. (Figure No. 5.9)

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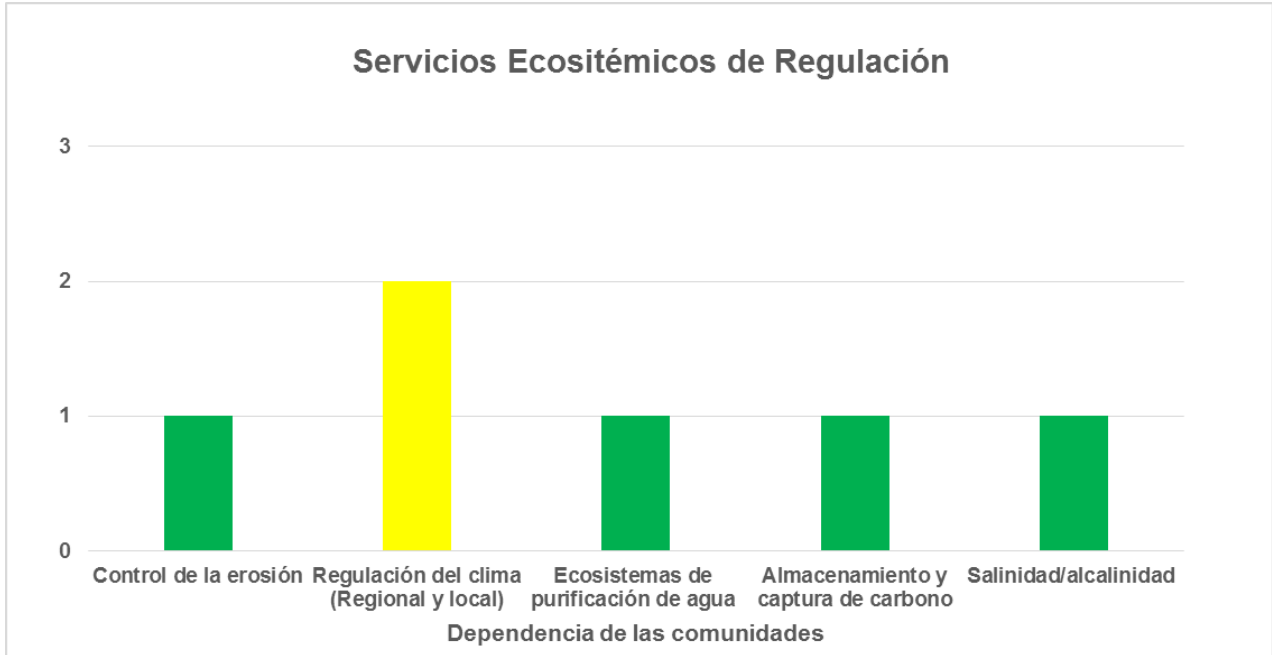




Figure No. 5.9 Dependency of the regulatory ECOSYSTEM SERVICES communities
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- *Dependency of the communities of the ECOSYSTEM SERVICES Cultural*

The township of Nueva Colonia and the El Canal settlement are relatively young communities. However, it has had a high growth in its population from various regions of the country, which makes it a multicultural community, without a clear definition of a cultural identity. Religion is a common denominator of the inhabitants, who congregate to carry out their religious practices. Another characteristic of the inhabitants, especially those of El Canal, is the dedication to the activity of artisanal fishing as an art or traditional craft (Figure No. 5.10)

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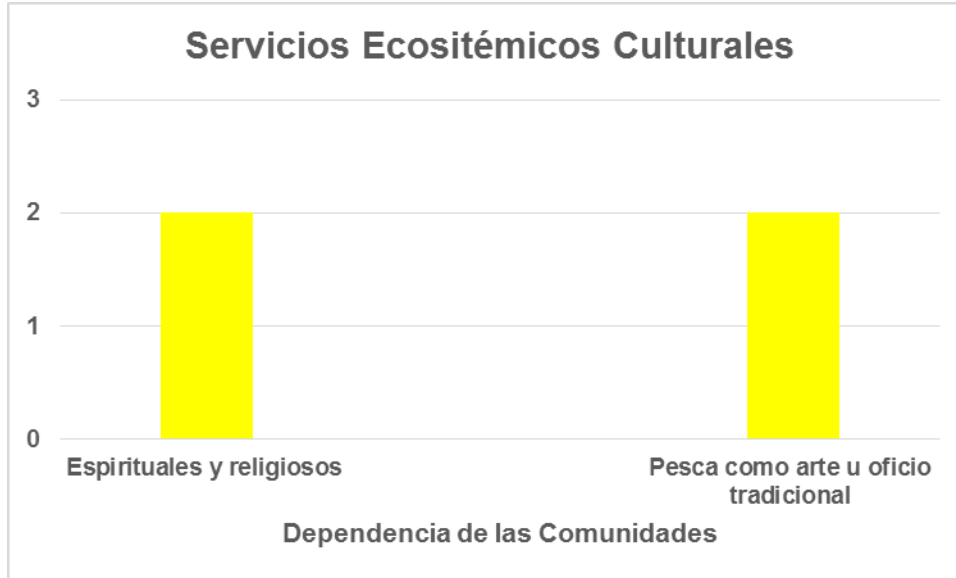


Figure No. 5.10 Dependency of the communities of the cultural ECOSYSTEM SERVICES

Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

5.4.7 ECOSYSTEM SERVICES according to the Dependency of the Project

To determine the degree of Dependency of the project in relation to ECOSYSTEM SERVICES, the environmental team relied on the project's own needs and the services required during the construction and operation phases.



Dependency of the supply ECOSYSTEM SERVICES project

The project of the Port of Bahía Colombia of Urabá, has a moderate Dependency on water, sand and rock supply services (Grava).

It is important to note that the stone materials used in the project, such as gravel and sand, will be acquired from sources of existing materials near the project, which must comply with current environmental license and mining title.

With respect to water collection, 1.5 L / s is projected during the construction and operation phases. Making a comparison with the mean flow of the Leon River, which is 40,000 L / s, with a percentage of the project by 0.004%, it is obtained that the project's Dependency on this service is medium.

The ecosystem service of water supply will be used for the following activities in the construction and operation stage:

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- Concrete manufacturing for civil works
- Maintenance of construction equipment
- The construction of the viaduct, pier and jetty
- Construction of the terminal on land with all the necessary adjustments for the port operation
- Construction of temporary facilities with the adaptation of the services required for the personnel linked to the project
- Adequacy of roads
- Operation and maintenance of infrastructure and facilities associated with the operation of the terminal.
- Pavement placement activities (affirmed, granular subbase, granular bases, and stabilized.
- Permanently in the care of the works of urbanism and landscaping (Green areas)

In the case of wood, it presents a low Dependency, because it will only be used in the construction stage, for the elaboration of signage and enclosure elements, guaranteeing that all the resources used comply with the proper quality specifications (Figure No. 5.11).

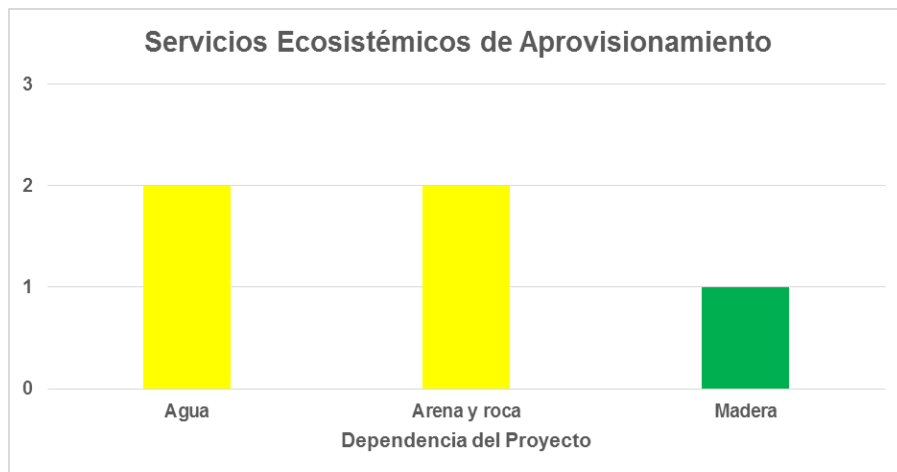




Figure No. 5.11 Dependency of the Procurement ECOSYSTEM SERVICES Project
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- *Dependency of the regulatory ECOSYSTEM SERVICES project.*

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The climate plays an important role during the phases of the Bahía Colombia de Urabá project, given that the climatic conditions can affect the activities developed or the infrastructure, by flood events of the river or activation of erosive processes.

According to the studies carried out, it is important for the operation of the project that there are no lateral erosions that affect the geotechnical stability of the area.

With regard to climate regulation that occurs in the Gulf of Urabá, the Dependency is high. Taking into account the following factors that may affect the port operation:

- In case of severe thunderstorms, they can suspend port activities of loading and unloading.
- Strong winds that affect the normal functioning of activities
- High rainfall can cause flooding in the area of the operation facilities of the terminal on land

According to the review, a degree of Dependency was not identified in relation to the other ECOSYSTEM SERVICES (Figure No. 5.12).

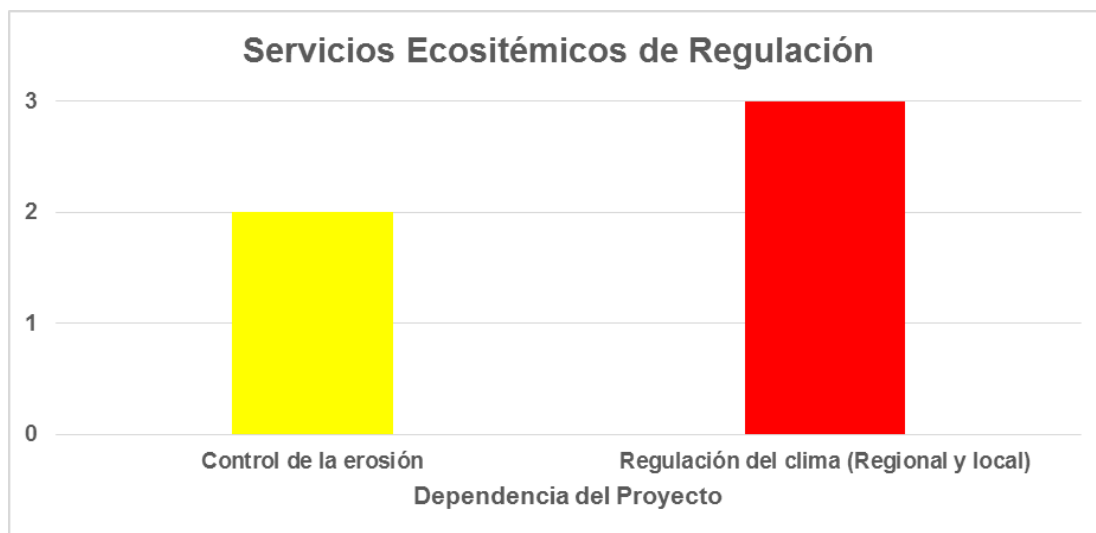




Figure No. 5.12 Dependency of the ECOSYSTEM SERVICES regulation project
Source: Aqua & Terra Consultores Asociados S.A.S., 2015.

- *Project dependency of ECOSYSTEM SERVICES Cultural*

In accordance with what has been mentioned about the cultural ECOSYSTEM SERVICES identified in the communities of Nueva Colonia and El Canal settlement,

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the project will not depend on whether or not religious or spiritual activities are practiced.

Regarding the development of artisanal fishing as a traditional economic activity, it will not affect port activities, because the routes of the vessels and the maneuvers carried out in the area delimited for the project and controlled by the Maritime Directorate (DIMAR) are considered., in the Gulf of Urabá.

In order to establish a good relationship with fishermen in the area, who travel near the project, a strengthening and monitoring program is planned to prevent, mitigate, correct and compensate, the possible impacts that may be generated.