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### ENVIRONMENTAL MANAGEMENT ZONING OF THE PROJECT

B	14/10/2015	Environmental management zoning	Janeth Viviana Pérez, July Bibiana Salazar, Isabel Panesso, Andrea Fontecha	Esteban Rendón	María Andrea Patiño
B	23/10/2015	Environmental management zoning	Viviana Pérez	María Andrea Patiño	María Andrea Patiño
			[Signature]	[ Signature ]	[ Signature ]
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### ENVIRONMENTAL MANAGEMENT ZONING OF THE PROJECT

#### CAP 9-ENVIRONMENTAL MANAGEMENT ZONING OF THE PROJECT

[Medellín], 2015

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<b>Name of the map</b>	<b>Theme</b>
MOD_LA_PTO_ANT_52_ZM_Abiotico	Management zoning - Abiotic environment
MOD_LA_PTO_ANT_53_ZM_Biotico	Management zoning - Biotic environment
MOD_LA_PTO_ANT_54_ZM_Social	Management zoning - Socioeconomic environment
MOD_LA_PTO_ANT_55_ZManejo	Activity management zoning

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## 9. ENVIRONMENTAL MANAGEMENT ZONING

The environmental management zoning was developed from the environmental zoning, which was based on the environmental characterization of the project's area of influence taking into account the impacts evaluation made.

The purpose of management zoning is to guarantee the rational use of available natural resources, in harmony with the conservation and protection of fragile and / or special ecological systems or those that provide environmental services, such as biodiversity areas.

By means of the environmental zoning reclassification according to the environmental restrictions, the environmental management zoning map was obtained, under a contrasting scale of sensitivity values and restrictions (Figure No. 9.1); reaching an ordering scheme of the project area, where the global impacts of the project are reflected. In other words, it is the general prospective image of the project area.

The established management areas were obtained using the geographic information system tool, grouping the restrictions in exclusion areas, intervention areas with restrictions and intervention areas.

### **Environmental sensitivity**



100	90	80	70	60	50	40	20	0
VERY HIGH		HIGH		MODERATE		LOW		VERY LOW

### **Environmental Management Zoning**

100	90	80	70	60	50	40	20	0
EXCLUSION		INTERVENTION WITH RESTRICTIONS				INTERVENTION WITHOUT RESTRICTIONS		

Figure No. 9.1 Environmental management zoning valuation range  
Source: Delgado, 2013<sup>1</sup>

<sup>1</sup> DELGADO RIVERA, Felix Abraham. Zonificación ambiental de áreas de interés petrolero, guía metodológica. Bogotá. 2013. 27 p.

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## 9.1 Environmental management zoning - abiotic environment

The restrictions identified in the abiotic environment are grouped in the management area with high, medium and low restrictions (Figure No. 9.2 and map MOD\_LA\_PTO\_ANT\_52\_ZM\_Abiotico). According to the environmental zoning and environmental restrictions in the project's area of influence, exclusion areas were not identified for this environment. Next, the identified areas are presented:

### 9.1.1 Intervention areas with restrictions

Under this category, it refers to the areas that can be intervened by the different activities of the project, with special management and restrictions according to them, for the case of the abiotic environment, the three categories were identified:

- *High*



This region has an area of 1.1 ha corresponding to 0.1% of the area of abiotic influence, which corresponds to the area with the greatest susceptibility to lateral erosion identified on the right bank of the channel downstream of the mouth of the Nueva Colonia Canal to the León River, which in turn this area was rated with medium stability; these areas are more vulnerable areas that require special handling measures and restrictions during the construction of the project, as they are areas with resistance floors of the compact and low compact material, according to the analysis of the results of the material of the perforations made for a Depth between 0 and 40 m.

- *Medium*

This region has an area of 599.1 ha corresponding to 48.4% of the area of abiotic influence, under this category are areas slightly more intervened, with a medium environmental sensitivity, such as areas susceptible to natural phenomena, breakage and floods, medium to unstable geotechnical stability, land use conflict due to overuse, areas with confined and semi-confined aquifers, which are areas that allow the intervention of project activities with management measures according to the activity and the area to be intervened, such as geotechnical stability works, for having soils with characteristics of very soft material, compact and not very compact and management measures to reduce the possible contamination by infiltration of pollutants.

- *Low*

This region has an area of 637.4 ha corresponding to 51.5% of the abiotic area of influence, representing the highest percentage, which includes more intervened areas with a low environmental sensitivity, which includes marine areas and a

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smaller proportion of land area, being these areas intervened either by natural factors and by the economic activities of the area. These areas can be intervened with management measures according to their status and the activities that have been planned for the execution and operation of the project.

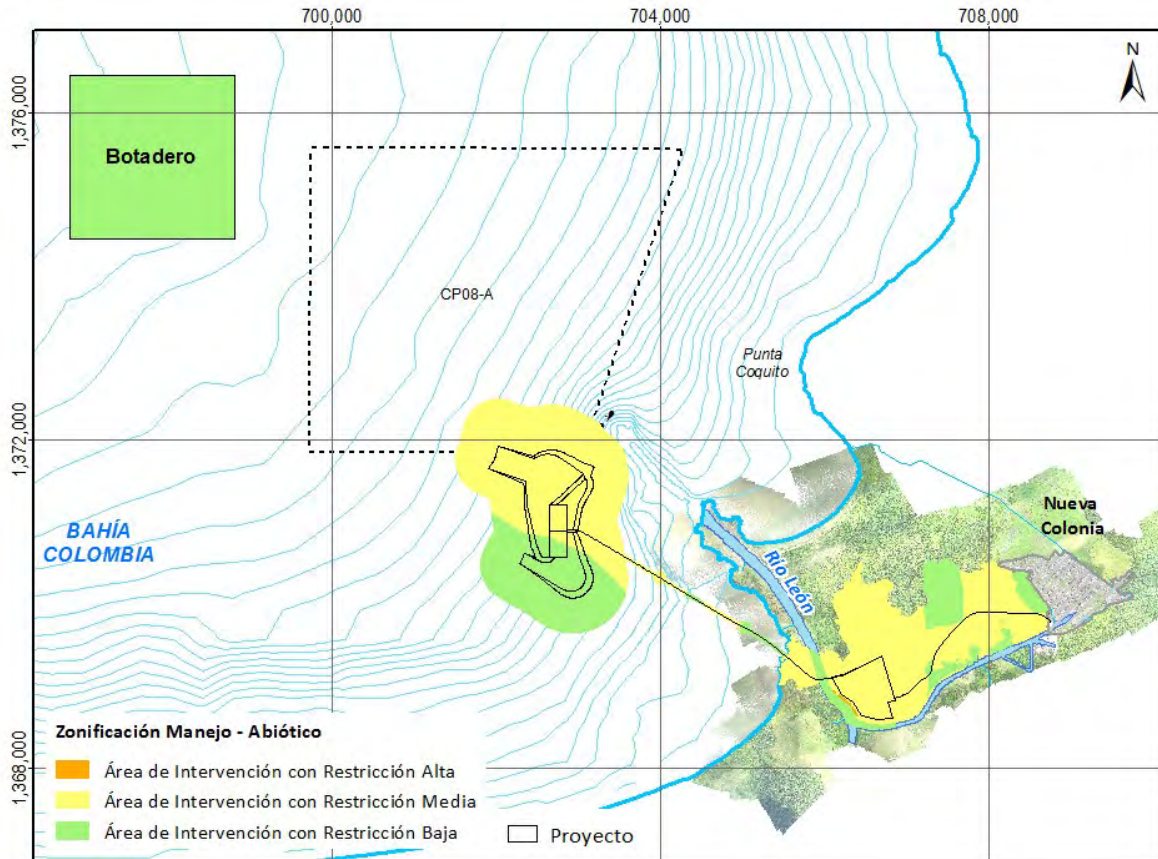




Figure No. 9.2 Environmental management zoning for the abiotic environment  
Source: Aqua & Terra Consultores Asociados S.A.S., 2015

## 9.2 Environmental management zoning - Biotic environment

The restrictions identified in the biotic environment are grouped in the following management areas (Figure No. 9.3 and map MOD\_LA\_PTO\_ANT\_53\_ZM\_Biotico):

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### 9.2.1 Exclusion areas

This area, according to the definition of the TDR, corresponds to the areas that cannot be intervened by the project activities and this criterion is related to legal criteria, vulnerability and environmental functionality and special regime areas.

In this regard, the area corresponds to 11.9 ha (1% of the area of biotic influence), this area belongs to the mangroves of the Protective Forest Reserve of the Wetlands of the León and Suriquí Rivers, and to a small strip of riparian forest.

However, according to the defined criteria, this area corresponds to an exclusion zone, the mangrove zone belonging to this reserve has permission to be exploited according to the Reserve Subtraction Agreement No. 100-02-02-01-0004- 2001 of March 17 of 2011 issued by CORPOURABÁ.

### 9.2.2 Intervention areas with restrictions

These areas make reference that they can be intervened by the different activities of the project with special management and restrictions according to these, for the case of the biotic environment, the three categories were identified:

- *High*



This region has an area of 225.6 ha corresponding to 18.2% of the biotic area of influence, which includes the secondary vegetation of the mangrove zone, the palm tree vegetal cover and riparian forests; these areas require special management measures and restrictions because they are areas of ecological importance.

- *Medium*

This region has an area of 952.5 ha, corresponding to 77% of the biotic area of influence, representing the highest percentage, which includes slightly more intervened areas, with medium environmental sensitivity, which allows the intervention of project activities with special handling measures according to the activity and the area to intervene.

- *Low*

This region has an area of 47.6 ha corresponding to 3.8% of the biotic area of influence, which includes more intervened areas with a low environmental sensitivity, due to anthropic intervention and the use established in the POT. These areas can be intervened with management measures according to their status and activity.

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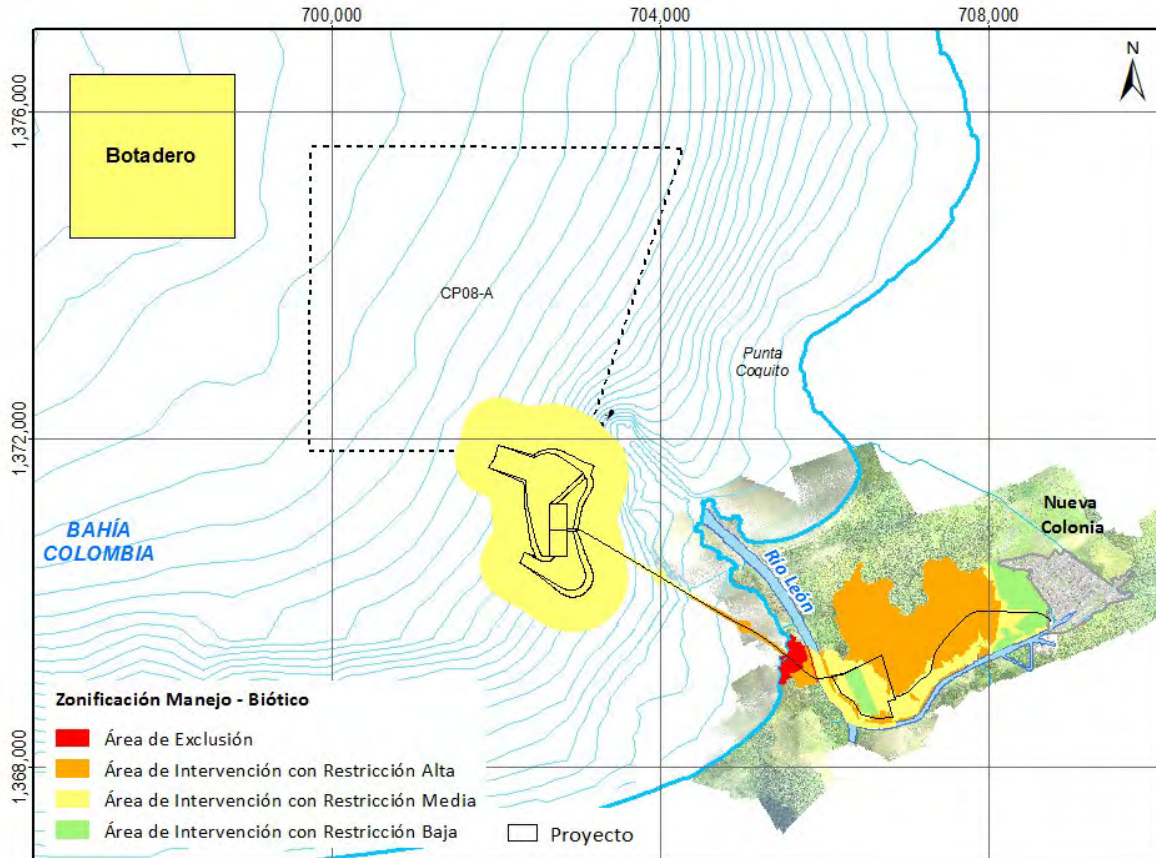


Figure No. 9.3 Environmental management zoning for the biotic environment  
Source: Aqua & Terra Consultores Asociados S.A.S., 2015



### 9.3 Environmental management zoning - socioeconomic environment

The restrictions identified in the socioeconomic environment are grouped into the following management areas (Figure No. 9.4 and map MOD\_LA\_PTO\_ANT\_54\_ZM\_Social). It should be noted that, within the area of influence, exclusion and intervention areas with high restriction are not identified. What allows the project to carry out its activities with the respective required measures.

#### 9.3.1 Intervention area

This region has an area of 833.8 ha corresponding to 81.7% of the total area evaluated, considering the area of influence that can be intervened by the project



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given that a low level is reported, due to the different possibilities to perform navigation activities, so it is reported that the project's area is only occasionally used as a transit route for smaller vessels.

Within the study that was conducted there are no declarations of archaeological potential, nor historical records with reports of archaeological findings or shipwrecks presented in the maritime zone. In relation to the terrestrial area, the study area is characterized by its swampy conditions, the product of sedimentation processes, making the presence of archaeological remains unlikely.

### 9.3.2 *Intervention areas with restrictions*

These areas make reference to the fact that they can be intervened by the different activities of the project, with special management and restrictions according to these, for the case of the socioeconomic environment two categories were identified:



- *Medium*

This region has an area of 75,5 ha, corresponding to 7,4% of the socioeconomic area of influence, which includes the area in which human settlements are located in the region due to the population's living standards and the development of economic activities. Therefore, it is considered that this area presents a medium restriction, which allows the project's intervention with management measures according to the activities.

- *Low*

This zone has an area of 111.9 ha, corresponding to 11.0% represented in marine areas, is established as a low restriction area which allows the project to intervene with the respective management measures according to the activities. It was defined, in relation to the development of artisanal fishing activities that are occasionally carried out within the project's area.

In addition to the transit of minor vessels reported in the area, to carry out fishing operations in the delta of the Leon river and fishing grounds identified in areas distant from the project. It is important to note that there are no fishing grounds within the intervention area and that a low number of fishing operations are reported.

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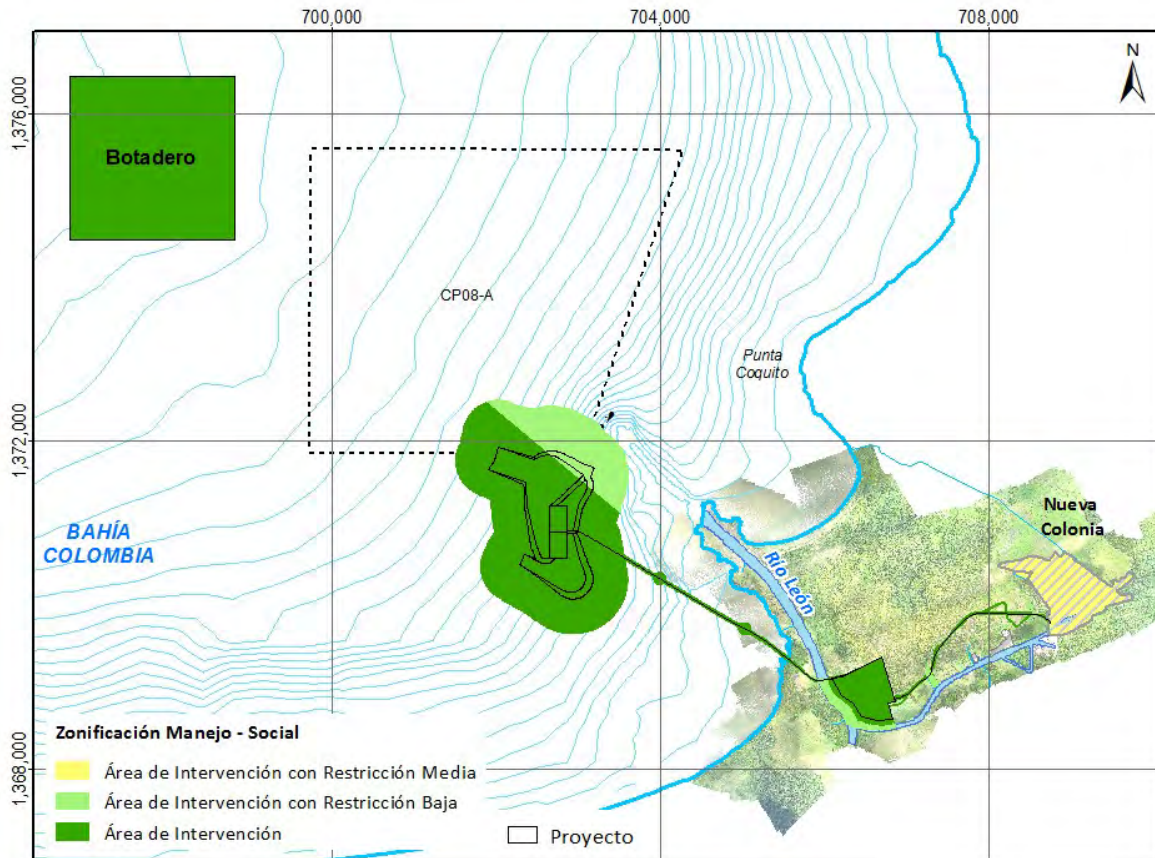




Figure No. 9.4 Environmental management zoning for the socioeconomic environment  
Source: Aqua & Terra Consultores Asociados S.A.S., 2015

## 9.4 Environmental management zoning results

Once the sum of the maps of each mean in Figure No. 9.5 and map MOD\_LA\_PTO\_ANT\_55\_Zmanejo is presented, the final environmental management zoning is presented. Where the intervention areas with restriction and intervention areas are identified. Intervention areas

In the intervention areas, the project activities can be developed with management measures in accordance with them. This area corresponds to 75.8 ha, of the project's area of influence, corresponding to Nueva Colonia.

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#### 9.4.1 *Intervention areas with restrictions*

- *High*



The intervention area with high restriction, identified in the project's area of influence, is equivalent to 52,3 it has represented the 4%, these areas can be intervened with special management measures according to their status and the activities to be developed. For the case corresponds to the area of the Protective Forest Reserve of the Wetlands of the León and Suriquí Rivers and riparian vegetation.

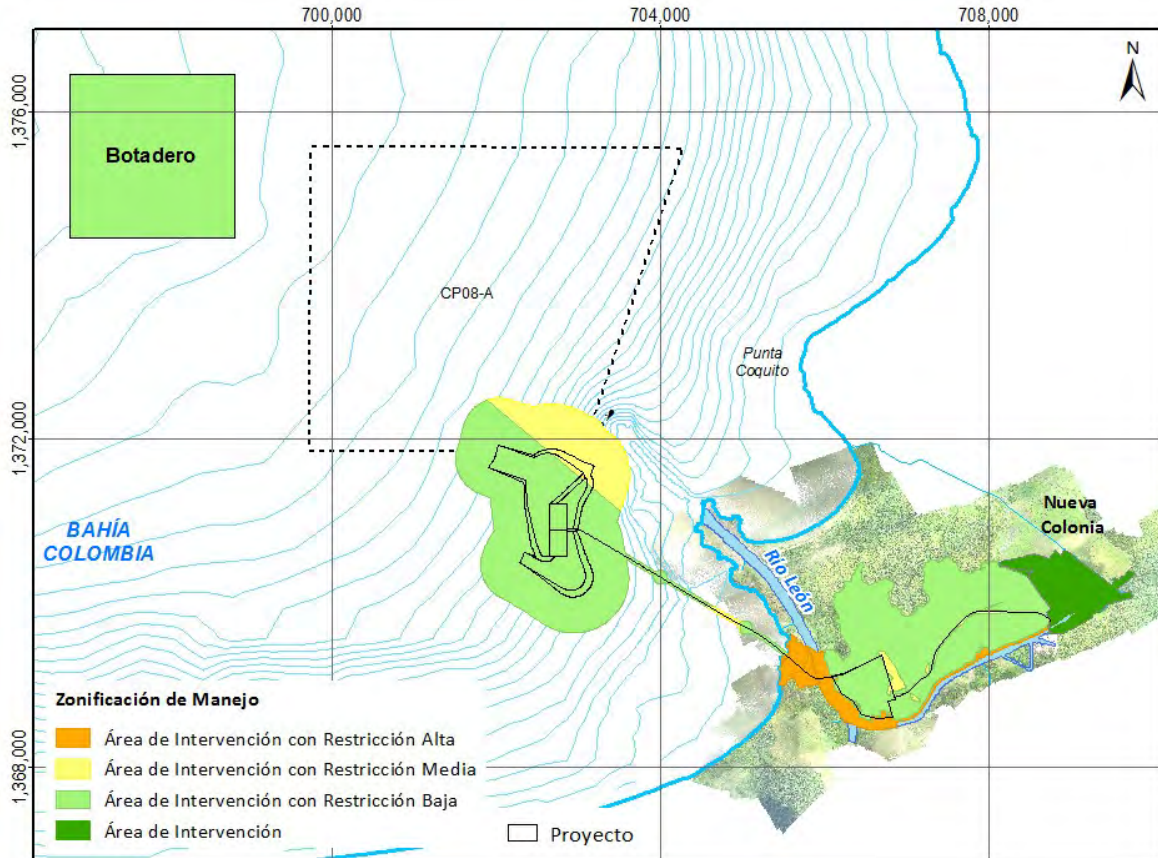
- *Medium*

The intervention area with medium restriction, identified in the project's area of influence, is equivalent to 110.9, it has represented the 8.4%, these areas can be intervened with special management measures according to their status and the activities to be developed.

- *Low*

The intervention area with low restriction, identified in the project's area of influence, is equivalent to 1074.3 it has represented the 81.8%, these areas can be intervened with management measures according to their status and the activities to be developed.

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**MANAGEMENT ZONING**  
Intervention area with high Restriction  
Intervention area with medium Restriction  
Intervention area with low Restriction  
Intervention area

Figure No. 9.5 Environmental management zoning  
Source: Aqua & Terra Consultores Asociados S.A.S., 2015