



5 CHARACTERIZATION OF THE AREA OF INFLUENCE

5.4 ECOSYSTEM SERVICES

The analysis of ecosystem services aims to understand the relationship between ecosystems and humans, analyzing how the interaction and relationship of the different ecosystem elements give rise to well-being conditions in people. Along these lines, this analysis identifies and describes the ecosystem services observed for the area of influence of the Rumichaca-Pasto Divided Highway in the San Juan-Pedregal Segment, also determining the importance or dependence on these services by the local communities, the impact that the project would have on ecosystem services (impact of the project), and the level of dependency of the project on ecosystem services, in accordance with the guidelines established by Terms of Reference M-M-INA-02 Version No. 2 of 2015.

The concept of ecosystem services encompasses all the cultural, economic and ecological benefits that humans receive directly and indirectly from biodiversity, resulting from the interaction of the different elements, components, structures and functions of ecosystems, being the bridge that substantially connects human beings with their surroundings. This human being-biodiversity relationship generates well-being conditions, while the services provided somehow contribute to the development of all human activities in terms of production, extraction, settlement and consumption, as well as in the quality of life. Hence, biodiversity and ecosystems are recognized as the basis of the flow and provision of services to the human being, defining the different components of biodiversity, including ecosystems, as units providing services and welfare to the community (MEA, 2003).

With this, ecosystem services have been categorized according to the benefit relationship they bring to the human being, either by direct provision of services or by the benefit derived from interactions, relationships and ecological flows. The classification of ecosystem services is presented below (MEA, 2003):

- Provisioning Services: It groups all those services, including goods and products, directly obtained from the ecosystems as a supply for their benefit. This includes provision of water resources, wood, fiber and resins, food from agricultural activities, hunting and fishing products, mineral and energy source (oil, gas, coal) utilization, and all those elements that are supplied by human beings for their daily activities, among other supply services.
- *Regulatory services:* These cover services derived from ecosystem processes, i.e. all those resulting from the flow, interrelationships and interactions among the different components of ecosystems. Regulatory services include processes of climate regulation, maintenance of air quality, water purification, disease and pathogen control, soil fertility, and erosion control, among other processes affecting wellness conditions of the human being.
- Support services: These include all those ecological processes that underpin and support the operation
 and provisioning of other ecosystem services, and which depend directly on the existence thereof. In this
 sense, this category would group processes such as biogeochemical cycles (water cycle, and cycling of
 nutrients such as phosphorus, carbon, nitrogen, among others), soil formation processes, primary
 production (photosynthesis), and habitat support all of them essential for maintaining biodiversity,
 ecosystems and other services associated therewith.



Version 0.



Cultural services: This category encompasses all those non-material and intangible benefits received from ecosystems, whether through spiritual enrichment, cognitive development, reflection, cultural identity and aesthetic experiences. This category also includes recreation, tourism, and visual appreciation of landscapes, as a set of natural elements that provide satisfaction and environmental enjoyment.

On the other hand, as mentioned above, the importance of identifying ecosystem services lies in the strong link among quality, availability and access thereto, the conditions of well-being and satisfaction of the needs of the beneficiaries, i.e, the way that ecosystems, their functionality and structure contribute to the well-being of people. According to the MEA (2003), ecosystems, in addition to providing for basic aspects of life (water, air, land as support, food), are related to other aspects of people's livelihoods, such as livelihood strategies, health, income, migration, safety (physical, food, choice) and social relations - all of them strongly linked to well-being.

For the area of influence of the project, the identification and description of the Ecosystem Services was highly relevance, as it allowed to make a diagnosis on the set of provisioning, regulation, support and cultural services provided in such a context, apart from the fact that it allows knowing their status, threats and relationship with the project. This exercise also allowed the general approach to the different beneficiaries related to the services identified, recognizing the existing dynamics between the communities and their environment, understanding the patterns of use, management and valuation on biodiversity.

Thus, the analysis of ecosystem services presented below was made based on the methodologies proposed by Rincón-Ruiz et al. (2014), and Landsberg et al. (2013), and responds to the analysis of ecosystem services required as part of the EIS for the area of influence of the project.

5.4.1 General context of the analysis.

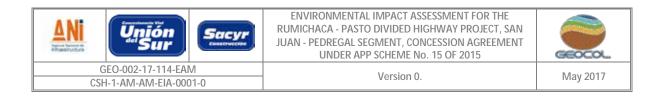
A brief description of the socioecological system is made, including the area of influence, which represents the set of spaces of use that directly and indirectly provide the ecosystem services identified. The description of the beneficiaries who use the ecosystem services differently is also presented, with a general explanation on how the analysis developed is presented.

• General description of the socioecosystem.

The socioecological context where the area of influence analyzed is immersed is characterized by being a high Andean ecosystem, where the landscape has been modified by different agricultural activities, which were historically represented by cereal crops (barley, wheat, oats, among others). With the passage of time, these productive models have been successively replaced by small-scale crops, setting up an agricultural landscape, where pasture mosaics are predominant (intended for small-scale, dual-purpose and self-consumption cattle farming) and fruit trees (papayuela, tree tomato, lulo, blackberry, etc.), potatoes, corn, beans and vegetables. These productive systems constitute the spaces of use which offer ecosystem services for provisioning purposes.

As far as the conservation spaces, hedges are maintained, which support the productive plots, as well as some strips of riparian forest and patches of secondary vegetation, which are closely related to the provision of regulation and support ecosystem services, standing out as other types of spaces for use

• Description of beneficiaries.



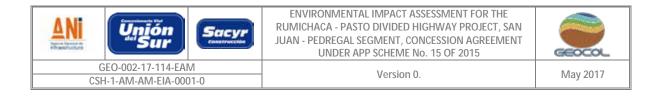
The group of beneficiaries identified for the area of influence analyzed, within the framework of the analysis of ecosystem services identified mainly correspond to:

- Rural peasant and indigenous communities: Rural population whose productive units do not exceed 5 ha, where agricultural activities are carried out for self-consumption and for local trade production, mainly towards the market squares of populated centers such as Ipiales, Iles, Imués and Pasto. Some of these peasant communities are grouped in indigenous communities (indigenous village of Aldea de María, indigenous council of Iles and Colonial Indigenous Reserve of San Juan), who have rescued some practices of the traditional system of beliefs and uses of the territory, but without significant differences in the model of rural production, customs or relationship with the territory.
- Inhabitants of urban sectors: They are related to other types of spaces for use (populated centers and settlements), so they are differentiated by rural peasant and indigenous communities in terms of their economic and subsistence activities, which are mostly related to the supply of goods and services, and trade. They are mainly settled in populated centers like Pilcuan, San Juan and Pedregal.
- Floating population: This group is represented by people who use the main and secondary roads as part of the road corridor between Ipiales and Pasto, whether as passage area, or also as a place for tourism and recreation activities, especially in the area of Pilcuan. They correspond to local, regional population, and even people from other parts of the country, neighboring countries, and foreign tourists.
- Analysis of ecosystem services (description sheet).

The following is the result of the identification of the ecosystem services in the area of influence analyzed, where the main characteristics of the ecosystem services will be described, the beneficiaries related to the service and their level of dependency thereon. Likewise, the project is presented in terms of the dependence on the service, based on information on demand, use, utilization and affectation on the natural resources according to the projected activities; as well as the potential impact thereon based on the identification of impacts assessed as severe, carried out as part of the Environmental Assessment chapter of this EIS. In this sense, the analysis will be presented by the service categories described in the introduction of this section. Likewise, at the end of the section, the general conclusions of the analysis will be presented.

5.4.1.1 Provisioning services.

As mentioned in the introduction of this section, this group of services is related to the direct provision of benefits by the ecosystems, which play the role as supply units, representing the basis of communities' livelihoods, such as water, food and physical support for everyday activities. For the area of influence analyzed, six (6) ecosystemic supply services were identified, which are described below:



• Ground water.

Table 5.1 Ground water supply.

TYPE OF	SERVICE		Pr	ovisioning	No. Con	Marth And	and the same	Ser.
ECOSYSTEM	M SERVICE			ice water use				
DESCRI	PTION	consum aquedu pipes th	ption. cts, wh at coni	Generally, this ich obtain their v nect to the dwelli	supply is provi vater from spring	y of water resour ded by the oper g heads and creek depends on mair	ation of district to by means of th	and municipal e installation of
BENEFIC		hydrolo	· ·		mmunitics and	inhabitants of urb	an costora	
		Ruiaipe				sources to commi		tic activities and
LEVEL OF DEP THE BENE		HIGH		ultural consump		lly important foi		
				RELATIONSHIP \	NITH THE PROJE	СТ		
	DEPEN	DENCY				INCID	ENCE	
HIGH	MEDIUM	LOV	N	NIL	HIGH	MEDIUM	LOW	NIL
X Image: Construct of the state The project requests the granting of collection sources on 11 points, in the surface waters of the Guáitara, Boquerón and Sapuyes rivers, and the La Humeadora, Modelores, San Francisco, El Macal, Yamurayán, San Francisco, Culantro and El Manzano streams. For collection, an estimated maximum flow rate of 1.95 L / s per					supply could in hydraulic wor occupations), Excavation Mat Earthworks (Ex Alteration of	X e impact assessme ply specific and t k Construction Construction ar rerial Managemer cavations and La the groundwate	temporary alterat activities (inclu- nd Operation on t Areas (ZODME ndfills), which co r flow network	tions due to the uding riverbed of Debris and in Spanish) and ould lead to the , Alteration of
point (0.45 L / s will be requested	for domestic us ed.	e and 1.5	L / s fo	r Industrial use)		and Alteration of mics of the water		







Physical support for the establishment of agroecosystems (crops and livestock).

Table 5.2 Physical support for the establishment of agroecosystems (crops and livestock).

TYPE OF	SERVICE		Provisioning			ANT SALA	a second		
ECOSYSTEM	M SERVICE	establis	ysical support for shment of agroeco crops and livestoc	systems					
DESCRI	PTION	where the lulo, blac	ystem service is rel e biophysical cond kberry, potato, n on) converge.	tions nece	essary for th	e establishment o	of crops (papayue	la, tree tomato,	
BENEFIC	CIARIES	Rural pea	sant and indigeno	is commu	inities				
LEVEL OF DEP THE BENE		HIGH	communities, as	they rep	ce is one of the most relevant for rural peasant and indigenous ey represent their living and livelihood means, and agricultural activities, which provide food for self-consumption and marketing.				
			RELATIONS	IP WITH	The projec	T			
	DEPEN	DENCE				INCID	ENCE		
HIGH	MEDIUM	LOW	NIL		HIGH	MEDIUM	LOW	NIL	
Х					Х				
1,409.37 ha of and plantatior agroecosystem average utilizat with a maximu projected area In this sense, th since a high pro	crop mosaics, parts, which repro- s, related to the ion volume of 5 im volume of 7, of affectation. the dependence of opportion of area rt to carry out	asture mosa esent the le food sup .2 m ³ per h 330.65 m ³ f the project to be inter	use of a maximum aics and forest cro space for use pply. Of these, nectare is estimate with respect to t ct is considered hi rvened, necessary t activities, spatia	ps The by Mat an (Exc ed, pote ne mea des h, repl as thei	erial Mana avations an ential, due t ans for vehic tined for agr aced by the	on and Operation agement Zone d Landfills) may g to the change in a cle transport. To ricultural, livestoo road network an te, leading to high 9.37 Ha.	(ZODME) and t generate changes agricultural use, t this extent, the k and forestry pro- d associated terri	he Earthworks is in soil use and curning it as the areas currently oduction will be tories, changing	

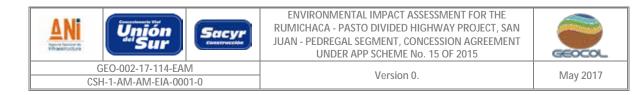




• Medicinal use of flora and fauna.

Table 5.3 Medicinal use of flora and fauna.

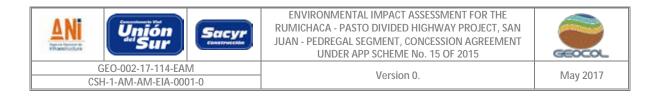
TYPE OF	SERVICE		Pr	ovisioning				N
ECOSYSTEM	M SERVICE	Medicinal use of flora and fauna						
DESCRI	PTION	Corresponds to the medicinal use of flora and fauna, although it is limited to the treatment of ailments and discomforts, since the use thereof has been reduced with the passage of tir traditional medicine has been replaced by the health service provided by the State. The foll are the most relevant medicinal species raised by the community: Medicinal flora in peridomiciliary spaces: Peppermint, lemon verbena, rosemary, mint, cham marigold. Medicinal flora in hedges or patches of natural vegetation: Chilca blanca (<i>Baccharis latifolia</i>), elder (<i>Cestrum racemosum</i>) and Black elder (<i>Sambucus nigra</i>). Other plant species: Eucalyptus (<i>Eucalyptus</i> sp.) Medicinal fauna: Fox (<i>Didelphis marsupialis</i> ; <i>Didelphis pernigra</i>)						
BENEFIC	CIARIES			and indigenous co		<u> </u>		
LEVEL OF DEP THE BENE		LOW	and is with	s linked to the symedicinal proper red with the pass	stem of beliefs an rties are used, a age of time.	used as an alterna nd traditional use although their de	of the territory.	Hence, species
				RELATIONSHIP V	VITH THE PROJEC	Т		
	DEPEN	ENDENCE INCIDENCE						
HIGH	MEDIUM	LO	V	NIL	HIGH	MEDIUM	LOW	NIL
				Х				Х
There is no d service.	ependence of t	he proje	ct on	this ecosystem	affectation is for the plants used	project activities preseen on this e are in the perido plementary source	cosystem service miciliary spaces, a	e, since most of and have spaces



• Raw material for craftwork.

Table 5.4 Raw material for craftwork.

TYPE OF	SERVICE		Pr	ovisioning				
ECOSYSTEM SERVICE Raw material for craftwork It corresponds to the use of vegetation material (leaves a								
DESCRIPTION sheep), for the currently relebring basket, furnit				e elaboration of ated to the elder re and clothing i	craftwork, whic ly people of the manufacture (po	h also includes of communities, wh	carpentry work. to keep the inheriers), which has b	This activity is ted tradition of
BENEFI	CIARIES	Rural pe	asant a	and indigenous co	ommunities.			
LEVEL OF DEP THE BENE		LOW	incom	ne, supported by	the local trade		r population uses they make. How ill involved in it.	
				RELATIONSHIP	VITH THE PROJEC	т		
	DEPEN	DENCE				INCIE	DENCE	
HIGH	MEDIUM	LOV	V	NIL	HIGH	MEDIUM	LOW	NIL
				Х				Х
There is no d service.	There is no dependence of the project on this ecosystem service.				affectation is for the plants used	oreseen on this e are in the perido	s require forest ecosystem service miciliary spaces, a es of supply for th	e, since most of and have spaces

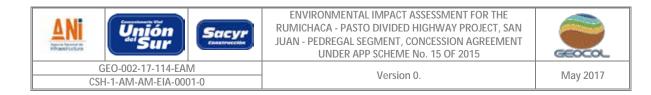


Firewood and other uses of vegetation.

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Table 5.5 Firewood and other uses of vegetation.

TYPE OF	SERVICE		Pr	ovisioning	Contraction of the local distance of the loc	the second second		C. H.C.		
ECOSYSTEM	M SERVICE	Fire		and other uses of egetation	f					
DESCRI	PTION	of using t consump	firewo otion, I	od from hedges o	s usually supplied by propane gas, beneficiaries have the alternative or some secondary vegetation patches as a fuel source for domestic oking of food. Similarly, some grasses are harvested along roadsides ic foods.					
BENEFIC	CIARIES			and indigenous co						
LEVEL OF DEP THE BENE		LOW	by th	e communities, w	of native vegetation, the use and utilization thereof has diminished who mainly use the species present in hedges, dry stakes and fallen nificantly depending on the supply and availability of the resource.					
				RELATIONSHIP V	WITH THE PROJECT					
	DEPEN	DENCE				INCIE	ENCE			
HIGH	MEDIUM	LOW	/	NIL	HIGH	MEDIUM	LOW	NIL		
Х								Х		
102.07 ha of n forest and high of 5,717,59 m ³ physical suppor the dual carria	ation of the proje atural vegetatio secondary veget . Said use shou t to carry out th geway; therefore itions the availa	n cover (E ation), wit Ild be mac e project a e, its depe	Dense h a ma de to f activiti ndenc	forest, riparian aximum volume have space and es, and to build e is considered	affectation is for the plants used	project activities preseen on this e are in the perido plementary source	cosystem service miciliary spaces, a	e, since most of and have spaces		



Construction material.

Table 5.6 Construction material.

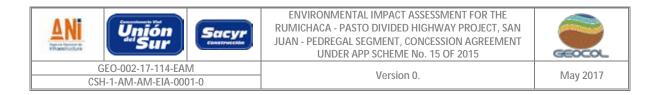
TYPE OF	SERVICE		Pr	ovisioning	ST		241	1.297
ECOSYSTE	M SERVICE	(Constru	uction material				
DESCRI	IPTION	located i	near th	e road or on the	water source bar		 e) of alluvial type llection, storage a are carried out. 	
BENEFIC	CIARIES		-	urban sectors				
LEVEL OF DEP THE BENE		LOW	Carrie in the	ed out by a small general context	group of people, of the area of inf	without represer luence.	nting a relevant eo	conomic activity
				RELATIONSHIP V	VITH THE PROJEC	т		
	DEPEN	DENCE				INCIE	DENCE	
HIGH	MEDIUM	LOV	V	NIL	HIGH	MEDIUM	LOW	NIL
		Х						Х
As part of the construction activities, permission is requested for the acquisition of materials in existing sources, through third parties, in extraction sites having he respective mining permits and / or environmental licenses granted by the entities and the competent authorities.					their respective to the condition	environmental r	at are already in egulations in forc is foreseen; so th by the project.	e and according

Source: GEOCOL CONSULTORES S.A., 2017.

5.4.1.2 Regulatory services.

These services are related to the maintenance of the cycles and dynamics of the ecosystems (soil, air, water, among others), which condition the supply and availability of provisioning services, as well as security conditions that reduce natural threats, such as mass removal, floods, droughts, and other phenomena that could occur due to the ecosystem characteristics of the area of influence. For the AoI, three (3) regulatory ecosystem services were identified, which are described below.

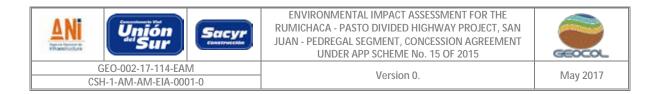
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Maintenance of air quality and climate regulation.

Table 5.7 Maintenance of air quality and climate regulation.

TYPE OF	SERVICE	REC	GULATION				
ECOSYSTE	M SERVICE		e of air quality an e regulation	d			
DESCR	IPTION	household units the above, the co of particulate ma	, as well as for pr ontribution of GH atter and pollutar nce of tree cover	oviding shadow a G related to lives at gases associate	areas for livestoc tock activity and ed to the vehicles	nermal comfort c k in pasture lands the presence of ro passing, leads to roviding an impor	s. In addition to bads as a source a positive effect
BENEFI	CIARIES	Rural peasant ar	nd indigenous cor	nmunities, inhab	itants of urban se	ectors and floating	population.
LEVEL OF DEF THE BENE	PENDENCE BY FICIARIES	MEDIUM and to the total	the beneficiaries, under the influer	since, given the nce of roads, ther	ir proximity to er e is a greater risk	ge processes is h mission sources s of developing hea on, it becomes rel	uch as vehicles, alth effects. Due
			Relationship v	VITH THE PROJEC	T		
	DEPE	NDENCE			INCI	DENCE	
HIGH	MEDIUM	LOW	NIL	HIGH	MEDIUM	LOW	NIL
		Х				Х	
activities invo equipment op	olving atmospheration, and veh	n this service is eric emissions (r iicles passing by), d storage of pol	machinery and while requiring	concrete, crush modification of	ning) during the co	and operation act onstruction phase o the Particulate N els.	may lead to the



Hydrological regulation and water purification.

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Table 5.8 Hydrological regulation and water purification.

TYPE OF	SERVICE		RE	GULATION	36.48		19 11 (PL)	All who
ECOSYSTE	M SERVICE	Hydrological regulation and water purification This service is related to the aquifer runoff, recharge and discharge process						
DESCRI	IPTION	dynamic It also ir	s that includes	influence the wat the ability of w	er cycle and the	supply of water results self-clean and be	esources in the a	rea of influence.
BENEFI	CIARIES					inhabitants of urb	oan sectors	
LEVEL OF DEP The Bene		LOW	few p condi	eople discharging tions, there have	directly on the s	otic tank to collec surface bodies of or prolonged perio re kept low.	water. Likewise,	due to the relief
				RELATIONSHIP V	VITH THE PROJEC	T		
	DEPEN	DENCE				INCIE	DENCE	
HIGH	MEDIUM	LOV	V	NIL	HIGH	MEDIUM	LOW	NIL
Х								Х
It is estimated the discharge on four (4) spots corresponding to the Boquerón River, La Humeadora Creek, Guáitara River and Sapuyes River represents 0.44 L / s each during the time of camp operation.					environmental	to be carried out regulations; there ere discharges are	efore, no water so	th the pertinent purce affectation



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• Soil retention and purification.

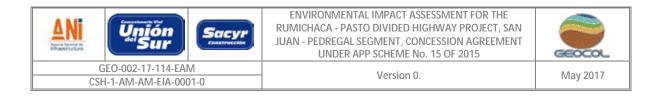
Table 5.9 Soil retention and purification.

TYPE OF	SERVICE		RE	GULATION						
ECOSYSTE	M SERVICE	Soil	retenti	on and purificatio	n					
DESCR	DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION This ecosystem service respond taking place in the soil, offerin (septic wells) and domestic sol collection by the municipality. matter and incorporating it in health conditions in the domestic					to the hich a sure, tl cycles,	e community as i are usually buriec he soil fulfills the	t receives domes because of the purpose of receiv	stic wastewater lack of garbage ving the organic	
BENEFI	CIARIES	Rural pe	asant a	and indigenous co	communities, and inhabitants of urban sectors					
	PENDENCE BY FICIARIES	HIGH	of the	e most importan	t activities	in the		gricultural activiti my. Likewise, th ain instability.		
				RELATIONSHIP V	VITH THE PI	ROJEC	т			
	DEPEN	IDENCE INCIDENCE								
HIGH	MEDIUM	LOV	V	NIL	HIGH		MEDIUM	LOW	NIL	
Х									Х	
As part of the discharge of 0.4	project, a soil	environm	ental		must comply wit erefore, no soil nade.					

Source: GEOCOL CONSULTORES S.A., 2017

5.4.1.3 Support services.

This type of services is related to the maintenance of the ecological and functional dynamics of ecosystems, from which processes such as Primary productivity, pollination, seed dispersal, regeneration and natural control of vegetation, presence of exotic species and maintenance of trophic networks, among others, take place; which together condition the characteristics of ecosystems and affect the supply, quality and availability of provisioning and regulation ecosystem services. For the area of influence analyzed, these services were grouped into one, related to the supply and maintenance of habitat, which is explained in **Table 5.10**.



Habitat supply and maintenance.

Table 5.10 Habitat supply and maintenance.

TYPE OF	SERVICE		, ,	SUPPORT			1 80	100 M	
ECOSYSTEM	M SERVICE	Habit	tat supp	oly and maintenar	nce			And and a second	
DESCRI	PTION	provisio process	oning e es of _l tivity, a	o the basis for cosystem service plant succession, mong others. It is a.	s, as it is the so pest control ar	ource for the ma id management	aintenance of tro in productive sy	phic networks, stems, primary	
BENEFIC	CIARIES	Rural pe	easant	and indigenous co	ommunities, and i	nhabitants of urb	an sectors		
LEVEL OF DEP THE BENE		HIGH	influe	ough indirectly, d ences the availabi rent beneficiaries	ity, quality and a				
				RELATIONSHIP V	WITH THE PROJECT				
	DEPEN	IDENCE				INCIE	ENCE		
HIGH	MEDIUM	LO\	N	NIL	HIGH	MEDIUM	LOW	NIL	
				Х		Х			
There is no di service.	ependence of t	he proje	ct on	this ecosystem	characteristics of structure, exter the structural alteration of ti Operation acti Management Z and availability	of ecosystem serv and availability and functional c he habitat of hy ne edaphic faun vities of the D one (ZODME), ch	ere could be mod ices, mainly due to of wildlife habitat onnectivity of w ydrobiological co a due to the Cc ebris and Excav anges in the struc the wild life a 1g and clearing.	o changes in the s, affectation of ildlife habitats, mmunities and onstruction and ration Material cture, extension	

Source: GEOCOL CONSULTORES S.A., 2017.

5.4.1.4 Cultural services.

These ecosystem services are related to the intangible benefits obtained from ecosystems, to the extent they represent historical and cultural values, as well as active and passive enjoyment and contemplation, including

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ANI Unión Sur Sur	ENVIRONMENTAL IMPACT ASSESSMENT FOR THE RUMICHACA - PASTO DIVIDED HIGHWAY PROJECT, SAN JUAN - PEDREGAL SEGMENT, CONCESSION AGREEMENT UNDER APP SCHEME No. 15 OF 2015	General
GEO-002-17-114-EAM CSH-1-AM-AM-EIA-0001-0	Version 0.	May 2017

places used for education and research, for example. As to the area of influence analyzed, three (3) cultural ecosystem services were identified, which are described below:

• Tourism and recreation.

Table 5.11 Tourism and recreation.

TYPE OF	SERVICE		CULTURAL			4	100 C
ECOSYSTE	M SERVICE		urism and recreation				
DESCRI	PTION	on the rive attract visi influence of higher am surroundin Juan, it is c	ds to the scenic and i ers, swimming pools itors and tourists fror of the project is the ibient temperature in mg municipalities, whi common to have a hig the economy related	, sports areas, ec n different places town center of P han areas such ch are highly app yh gastronomic off	ological trails and . One of the mos 'ilcuan, located a' as Pedregal, San ealing for visitors.	d other attractive t interesting place t the Guáitara riv Juan, Pasto, Ipia Also, in the urba	e elements that es in the area of ver level, with a ales, and other an center of San
BENEFI	CIARIES	Rural peas	ant and indigenous c	ommunities, inha	bitants of urban s	ectors and floatir	ng population.
LEVEL OF DEPENDENCE BY THE PENEEUCADIES HIGH Corresponds to a line involves different type			e of the local and regional economy in constant growth, which also es of actors, both in the rural and in the urban sector, becoming an which covers all other ecosystem services identified.				
			RELATIONSHIP	WITH THE PROJEC			
	DEPENDENCE					DENCE	
HIGH	MEDIUM	LOW	NIL	HIGH	MEDIUM	LOW	NIL
			X	No direct or r	bort torm impor	at on the occur	X
There is no dependence of the project on this ecosystem service.				No direct or short-term impact on the ecosystem service is foreseen by the project, although in the medium and long term it could contribute to the strengthening of tourism activity in the region, by positively influencing the infrastructure needed to increase the flow of visitors, considering the border location of the project and the offer of sites of tourist interest in the region.			

Source: GEOCOL CONSULTORES S.A., 2017.

• Enjoyment of the scenic beauty of the landscape.





Table 5.12 Scenic beauty of the landscape.

TYPE OF	SERVICE	CU	LTURAL				
ECOSYSTEI	M SERVICE	Scenic beauty of the landscape					
DESCR	IPTION	of the environme life of the comm	nt, which are use unities and give	ites with an interesting landscape associated with the scenic appeal ed as spatial and cultural references, or which are rooted in the daily rise to well-being and pleasure. Among the sites identified in the hill, the waterfall of La Humeadora and the Guáitara River.			
BENEFI	CIARIES	Rural peasant an	d indigenous con	mmunities, inhabitants of urban sectors and floating population.			
	LEVEL OF DEPENDENCE BY THE BENEFICIARIES MEDIUM It is part of the set of 9 of belonging in the te the beneficiaries.						
			RELATIONSHIP W	/ITH THE PROJEC	T		
	DEPE	NDENCE		INCIDENCE			
HIGH	MEDIUM	LOW	NIL	HIGH	MEDIUM	LOW	NIL
			Х		Х		
There is no dep	bendence of the	project on this eco	system service.	discordant eler infrastructure t therefore, the the landscape would be rela bridges and vi viaducts, const Material Mana existing infrast	project activities ments is foreseer for the constructi ecosystem servic integrity, as set of ted to the const aducts, foundation ruction and opera gement Zone (ZOI ructure in the are topsoil stripping a	a, associated with on and operation e can be affected out in the matrix. ruction of a sup on and piloting f tion of the Debris DME), demolition as to be interven	n the necessary of the project; d by changes in Such changes erstructure for or bridges and and Excavation and removal of





Cultural Identity.

.

Table 5.13 Cultural Identity.

TYPE OF	SERVICE		С	ULTURAL	S I WI	and the second		
ECOSYSTE	M SERVICE		Cult	ural Identity				
DESCRI	IPTION	Corresponds to the presence of cultural historical relevance in the territory, which are benchm in the traditional system of practices and beliefs associated with the territory. These sites inclu among others, the La Humeadora creek and waterfall, the Iscuazán hill, the Los Monos rocks the Los Lobos rocks, identified as part of the interviews and semi-structured interviews conduc on site.					se sites include, lonos rocks and	
BENEFIC	BENEFICIARIES Rural peasant and indigenous co				ommunities.			
LEVEL OF DEP THE BENE		HIGH All indigenous and peasant groups are undergoing a recovery and strengthening process in their traditional practices and beliefs' system; therefore, the presence of these relevant archaeological sites has gained relevance each day, engaging the community in terms of knowledge, rescue and conservation.					of these relevant	
				RELATIONSHIP V	VITH THE PROJEC	Т		
DEPENDENCE INCIDENCE					DENCE			
HIGH	MEDIUM	LOV	V	NIL	HIGH	MEDIUM	LOW	NIL
				Х				Х
There is no dependence of the project on this ecosystem service.					evidence, no in	ocio-cultural im tervention or al		

Source: GEOCOL CONSULTORES S.A., 2017.

5.4.2 General outcomes of the ecosystem service analysis.

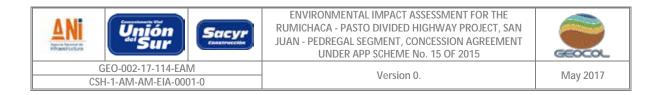
A summary table of the analysis of ecosystem services carried out for the area of influence of the project is summarized below (Table 5.14).





Table 5.14 Dependence and incidence relationships identified for ecosystem services in the area of influence of the project.

ECOSYSTEM SERVICE CATEGORY	ECOSYSTEM SERVICE	PROJECT IMPACT (HIGH, MEDIUM OR LOW)	DEPENDENCE OF COMMUNITIES (HIGH, MEDIUM, LOW)	PROJECT DEPENDENCE (HIGH, MEDIUM, LOW)
	Surface water use	Medium	High	High
	Physical support for the establishment of agroecosystems (crops and livestock)	High	High	High
Provisioning	Medicinal use of flora and fauna	Nil	Write-off	Nil
	Raw material for craftwork	Nil	Write-off	Nil
	Firewood and other uses of vegetation	Nil	Write-off	High
	Construction Materials	Nil	Write-off	Write-off
Regulation	Maintenance of air quality and climate regulation	Write-off	Medium	Write-off
	Hydrological regulation and water purification	Nil	Write-off	High
	Soil retention and purification	Nil	High	High
Support	Habitat supply and maintenance	Medium	High	Nil
Cultural	Tourism and recreation	Nil	High	Nil
	Scenic beauty of the landscape	Medium	Medium	Nil
	Cultural Identity	Nil	High	Nil



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