



SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM

Socio-Environmental
Recovery Program

Brazil

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Cover picture: Rubes Lara resettlement housing complex. (Sources: Adriana Mattoso. UEO Meio Ambiente. Fundação Florestal).

EXECUTIVE SUMMARY

This evaluation applies the Envision™ Rating System on the Serra do Mar and Atlantic Forest Mosaics System Socio-environmental Recovery Program in Brazil. Envision is a unique system that assesses the sustainability of infrastructure projects, which awards efforts to pursue sustainable values going beyond standards practices. The following assessment demonstrates the achievements of the project and aspects to improve, considering a broad range of criterion. The assessment is organized in 5 categories: Quality of life; Leadership; Resource Allocation; Natural World; and Climate and Risk.

The Serra do Mar region contains the most preserved remnants of the Atlantic Forest (Mata Atlântica) and forms a natural barrier between São Paulo and the sea. However, with highways, industrial development, and expansion of the city of São Paulo, informal settlements have emerged in landslide-prone areas and have degraded forest and water resources. The Serra do Mar and Atlantic Forest Mosaics System Socio-Environmental Recovery Program responds to these pressures by promoting the socio-environmental recovery of the mountain region and its coastal areas. The program restores forest habitat and regional drinking water resources serving 2.7 million people in the region.¹ Simultaneously, the program improves conditions for 6,400 vulnerable families^{2,3} in high geological risk areas through a voluntary resettlement program. The program is implemented through a unique collaboration between the state Housing and Environment departments. The program is strategically coordinated by a Program Management Unit in the state Economic Affairs and Planning Department. The program cost, estimated at US \$ 470.1 million, is shared between the State of São Paulo (US \$307.7) and the IDB (\$162.4).⁴ The program

began preparations in 2008 and is scheduled to conclude at the end of 2016.

The Serra do Mar program encompasses the Serra do Mar State Park with 315,000 ha over 23 municipalities, the Juréia-Itatins territory including 90,000 hectares in 5 municipalities, and Marine Protected Areas that together will protect approximately 50% of the coastal waters in the State of São Paulo. The Serra do Mar Program Atlantic Forest mosaic will improve conservation management across 90,000 ha,⁵ reclaims and reforests 80 ha of degraded areas, eradicates invasive species from 100 ha, recovers 350 ha of forest and delineates 500 ha⁶ for biodiversity enrichment.

The outstanding accomplishment of the Serra do Mar program is its simultaneous implementation of both a social and an environmental restoration plan. The program successfully navigated complex territory to achieve these twin objectives by adopting an innovative, collaborative and participatory model. The institutional cooperation at the program planning level was carried through in collaborative agreements with the municipality of Cubatão, with nongovernmental organizations, and in the social contract developed with impacted families. Building community capacity was a strategic objective to achieve program objectives, but will also provide long-lasting benefits by preparing the community as it faces new challenges. The relationships and lessons learned from this socio-environmental experiment will likely provide a model foundation for future initiatives requiring a social and environmental response, not least in adaptation to long-term climate change.

More specifically, the program set out to accomplish twin objectives by removing vulnerable families from landslide risk exposure and restoring park boundaries and consolidating forest habitat that had been eroded through opportunistic occupation. These objectives were served by a common strategy, the

¹ Estado de São Paulo and Inter-American Development Bank, "Informe de gestão ambiental e social do programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica," BR-L1241 (2009), 29–30.

² The program assists poor families with an income equivalent to 0-3 minimum salaries.

³ IDB, "Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program," BR-L1241 (2010), 6.

⁴ ESP and IDB, "Informe de gestão ambiental e social do programa," 22–23; IDB, "Loan Proposal," 5.

⁵ IDB, "Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program," BR-L1241 (2010), 2.

⁶ Ibid.

urbanization and resettlement program. To this end the housing and environmental agencies coexecuting the project assembled technical teams with social and environmental expertise who carried out geological, environmental, and social assessments in tandem. Through a dedicated public participation plan, the program built social trust and protected the negotiation and decision-making rights of families during the resettlement process. Monitoring will implement enforcement, conservation, and social strategies to secure socioeconomic achievements, heighten conservation values, and discourage future reoccupations of conservation land.

The Serra do Mar program has positively impacted quality of life in the community by purposefully improving social conditions for vulnerable families living in areas of high geological risk. The program considered individual comfort, safety, health, and mobility when planning construction and operation of park and housing infrastructure. The program built community capacity and took into account the needs of vulnerable populations.

Quality of life was improved by removing vulnerable families from geological hazards and providing access to municipal drinking water, sewage, and waste management infrastructure, as well as access to public transit, commerce, schools, and health services. Traffic in urbanized areas was made safer and more efficient by rerouting through-traffic away from residences and creating an underpass to avoid a treacherous highway crossing. The residential designs also featured extensive walkways, green areas, and recreational facilities. The resettlement project worked together with impacted families to choose housing types that accommodated needs of families, couples, singles, and seniors. The Serra do Mar State Park was made more accessible by adding paths and signage. Public lighting was provided in residential areas, and night sky restored to wildlife habitat in the park. Moreover, noise and vibration were reduced for communities relocated away from the border of the Anchieta highway. Public art and communication initiatives helped resettled families maintain local character and identity, and provided a community voice. The coastal mosaic enhances ecotourism, marine sports, and will be a source of

environmental education. The program further built community capacity by providing professional and leadership training. Two sustainable-use reserves provide a place for mixed indigenous-Afro-Euro communities to legally practice traditional forest uses and agriculture.

The Serra do Mar program demonstrated outstanding leadership and commitment to sustainability values and objectives. The program assigned clear roles and responsibilities with authority at a high organizational level, while a collaborative and participatory model supported achievement of socioeconomic objectives. The program sought out synergies with public and natural infrastructure, and showed foresight by planning long-term monitoring and anticipating conflicts with its sustainability goals.

The program strategy documents, public statements, and collaborative structure collectively demonstrate the program's commitment to sustainable solutions. The coexecution by interdepartmental housing and environmental agencies integrated social and environmental expertise and interests. A dedicated public participation program served as a mechanism for meaningful feedback and dialogue with impacted communities. The program integrated resettled and urbanized neighborhoods with municipal water, sewer, and transport systems, while building new conservation infrastructure with clear boundaries. Legally recategorizing ecological stations opened doors for a sustainable development reserve to accommodate traditional forest uses. The program found synergies linking a geomonitoring system with existing federal databases and augmented existing infrastructure by adding schools, health centers, and transit lines. The program planned ahead to prevent future reoccupation of reclaimed park areas, allocating resources for park personnel and training, buildings, marine equipment, and the georeferenced monitoring system. Environmental education is included in a social strategy to discourage future reoccupation of park land.

The Serra do Mar program gave uneven consideration to the sustainable use of resources in building and operating infrastructure. Criteria for sustainable materials, energy, and water use are applied to the

construction and operation of park buildings, but to a limited extent in the housing units. Following a sustainable certification process, the park building plans included more measurable targets and life cycle analyses, highlighting how an auditing process can benefit sustainability.

Following sustainable certification criteria, construction of park military police facilities used materials from verified sources, with efforts to purchase local materials with recycled content, certified wood, and low-energy-grade cement. Both the housing units and park bases installed solar water heating systems, achieving energy efficiency through a renewable source. However, only the park buildings incorporated energy efficiency targets and took a whole-systems approach. On the scale of their constructions, the park police bases reduce drinking water consumption by collecting rainwater for use in toilets, cleaning, and irrigation, and by adopting flow reduction mechanisms. Housing units did not have mechanisms to reduce water consumption, but were installed with individual water meters that may give residents insights into personal consumption patterns and support future initiatives to save water.

The Serra do Mar program positively impacts the natural world and stands out for increasing valuable wildlife habitat and connectivity, replacing invasive vegetation with native species, and restoring soils and surface water quality and habitat. The program reduces stormwater runoff on park building sites, and minimizes agrochemical contamination.

The program enlarges, restores, and connects wildlife habitat in the Atlantic Forest, internationally recognized for its rich biodiversity and threatened status. Also, the program restores native plant species, and plans for a Botanical Garden that will propagate native seeds, conduct research, and serve as an education center. The program also stabilizes the geology and reduces stormwater runoff of degraded park land through decompacting and subsoiling, removing impermeable surfaces, and replanting steep slopes. The resettlement program restores water

quality by eliminating sewage from surface waters, and the greater forest and coastal mosaic will protect mangroves, wetlands, and riparian habitats. Moreover, landscaping around built infrastructure buffers streams and waterways in residential areas. Park police bases further reduce stormwater runoff by increasing permeable surface area, collecting rainwater, and installing rainwater terraces. The program addresses pesticide and fertilizer contamination by reclaiming conservation areas from invasions of banana and other agrochemical-intensive monocrops and setting up reserves for sustainable agriculture.

In relation to climate change and risks, the program conservation activities capture greenhouse gases and remove harmful air pollutants from the park areas, although the footprint of net emissions has not been calculated. By connecting inland and coastal ecosystems the program increases the robustness of the Atlantic Forest in the face of climate change. The program also builds the resilience of the community by safeguarding long-term freshwater and fishing resources and damages by reducing geological hazards. The collaborative and participatory social model of the program also provides a foundation for long-term community planning.

Specifically, the program alleviates climate risk by capturing up to 100 tons of carbon per hectare annually⁷ through reforestation and conservation, while solar water heaters in park buildings and housing will further reduce greenhouse gas emissions. Similarly, reforestation of degraded areas will help reduce ground-level ozone levels, and resettlement will reduce pollutants emitted in the park overall. In residential areas, improved public transportation and redirected traffic flows may also lower air pollution. However, the program does not measure or set targets for its carbon or air pollution footprint. The program improves resilience of the community by restoring freshwater resources and promoting sustainable fishing. The program also removes families from exposure to mudslide and landslide hazards, and builds adaptive capacity through community leadership training.

⁷ IDB, "Loan Proposal," 5.

In all these ways the project presents a remarkable sustainability performance. Still, opportunities for improvement remain, mainly in topics related to resource allocation and climate change related risks. For the future, full-cycle assessments will enable the program to set targets and apply sustainability criteria consistently in its infrastructure, particularly in future residential construction, and will provide benefits through greater energy efficiency and use of renewable sources, reduced greenhouse gas and air pollutant emissions, and stormwater runoff. An auditing process for housing construction can guide materials procurement, improve synergies with neighboring or related infrastructure, and improve conservation methods. As well, greater sustainability can be achieved by adding waste recycling collection points in residential areas, and engaging the community in building rain gardens and other green infrastructure facilities. These actions will not only reduce environmental impacts but also heighten values and a sense of ownership for a sustainable community. Other opportunities include development of a pesticide and fertilizer management plan for reforestation and residential landscaping, and soil monitoring in residential areas for lead and contaminants that may put children at risk.

More broadly, the Serra do Mar program has opportunities to explore synergies with ongoing climate initiatives and to further restore hydrologic functions in the Atlantic Forest. The collaborative and participatory aspects of the program can help contribute local knowledge to ongoing vulnerability assessments and adaptation planning to face climate change. Such integration will go to support community and program preparedness for extreme weather events and also protect the program against unanticipated costs, such as the redesign of the Botanical Garden necessitated by the 2014 flooding in Água Fria, which exceeded the standards utilized for previous flood risk models.⁹ As well, the consolidated management of conservation in the Atlantic Forest mosaic opens a door for restoring natural river flow and sediment transport. The greater protection of water resources encourages synergies for watershed

management, while the program may also include an aggressive invasive species prevention and eradication plan in its monitoring plan to safeguard its work in restoring native species.

⁹ Communication from the Fundação Florestal (Forest Foundation) email correspondence, October 27, 2015.

PROJECT DESCRIPTION AND LOCATION

The Serra do Mar and Atlantic Forest Mosaics System Socio-Environmental Recovery Program is an environmental and natural disasters initiative supported by the Inter-American Development Bank (IDB); it seeks to preserve a valuable ecosystem and simultaneously improve the living conditions of families residing in high-risk areas.

The action involves a partnership between the IDB and the State of São Paulo departments of Planning & Management, Housing, and Environment. The governmental departments executed the program through their units: the Housing and Urban Development Agency (CDHU) and the Conservation Authority of the Forest Foundation (FF). The CDHU is in charge of the social investments related to resettlement and urban planning. The FF is responsible for the activities related to environmental restoration, conservation, and monitoring. Coordination among all these different entities is the task of the Program Management Unit, which was established by the state government of São Paulo and conducts the physical, technical, institutional, and financial monitoring of the program. All of these institutions collaborated with the aim of achieving an integrated development in order to ensure social and environmental sustainability with a long-term perspective. To achieve this purpose, during the program's development different societal sectors were solicited for input, including academic groups and NGOs focused on forest protection, as well as families that needed to be resettled.

The program began its preparation in earnest in 2008, and in December of 2010 a contract was signed between the IDB and the Government of the State of São Paulo with the objective of generating social and environmental benefits, as well as promoting the effective protection of biodiversity and natural water sources of the Serra do Mar mountain range, the Juréia-Itatins mosaic territory, and São Paulo's marine conservation units and their respective buffer zones. The program's total cost was estimated to be US \$ 470.1 million, with the bank committed to providing up to US \$162.4 million and US \$307.7 coming from the State of São Paulo. Activities range from the construction of housing units and structural improvements in urban areas to conservation planning, reforestation, social and ecological monitoring, and the provision of equipment for the state's environmental policy.

The program initially focused on the area in the Serra do Mar Park around Cubatão, an industrial center near the port of Santos, by assisting 7,760 families with new housing or housing upgrades and carrying out the conservation and restoration of the subsequently vacated areas of Atlantic Forest. In Cubatão, 5,350 families were resettled from areas at high risk of landslides (952 families); high technological risk, e.g., on the edges of highways or transmission lines (1,144 families), or because of illegal occupation of ecological protected areas.⁹ Since 2014, activities have expanded to urban areas north and south of Cubatão, assisting an additional 1,400 families and continuing to foster the conservation of vital ecosystems. The team is also carrying out the socio-environmental, geotechnical risk, and urbanistic studies required for potential future programs involving urbanization, resettlement, and environmental actions in the vicinity of the Serra do Mar State Park. To date, the project has provided housing for over 60% of the families (with the construction of the remaining housing units ongoing), improved water quality for over 957,000 individuals, and protected an additional 17,290 ha of the Atlantic Forest. The program is expected to conclude toward the end of 2016.

⁹ ESP and IDB. *Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241)* (Estado de São Paulo and IDB, 2009) 16, 22.

The intervention activities were planned within the entire scope of the Atlantic Forest of São Paulo, including the Serra do Mar State Park (PESM), the Juréia-Itatins territory, and the Mosaic Islands and marine protected areas of the State of São Paulo's coast. Within this area, mountains ranging as high as 2,000 meters above sea level have always been considered a geographical barrier to overcome, as they separate major urban centers like São Paulo from the sea. Serra do Mar has endured the population growth which is historically concentrated along the coast, and is today the most preserved remnant of the Atlantic Forest in the country. However, from the 1950s, construction of two major highways, Anchieta and Imigrantes, industrial development of the Cubatão district, and the expansion of the road network that connects the city of São Paulo with other cities of the region have contributed to social and environmental vulnerability within the area of intervention. The continuous development created employment opportunities, especially for a great influx of workers for the construction of infrastructure. Some of the workers settled irregularly in an environmentally sensitive area, leading to the emergence of large informal settlements in landslide-prone areas, as well as the degradation of biodiversity, particularly in the municipality of Cubatão.

For the Brazilian Government, the preservation and sustainable use of natural resources is part of the national development strategy. Consistent with this federal strategy, the Government of the State of São Paulo has implemented policies to protect natural resources and control environmental degradation in the area. Therefore, the program's main objective was to promote sustainable use and socio-environmental recovery of a group of conservation units which provide a variety of environmental services to the city of São Paulo, in addition to protecting the already threatened, biodiversity-rich ecosystem of the Atlantic Forest. Furthermore, the program seeks to improve the living conditions of vulnerable families living in informal housing developments (neighborhoods known as *bairros-cota*) located in the PESM.

The design of the program includes three major components: protection of the conservation units, social investments, and monitoring and enforcement of the conservation units. Each of these components contains specific objectives and actions. For the conservation units, which are terrestrial and marine areas with a significant role in the maintenance of biodiversity, different lines of action were implemented for their protection, as well as restoration and management of these territories. The second component corresponds to social investments, including the actions undertaken for the resettlement of communities living in risk-prone areas, as well as promoting urban consolidation through upgrading vulnerable neighborhoods in the PESM area.¹⁰ The third component focuses on the monitoring and enforcement of the conservation units in order to ensure their preservation; this involves training the Environmental Military Police (PMA) and providing them with surveillance equipment, as well as the development of a monitoring system.

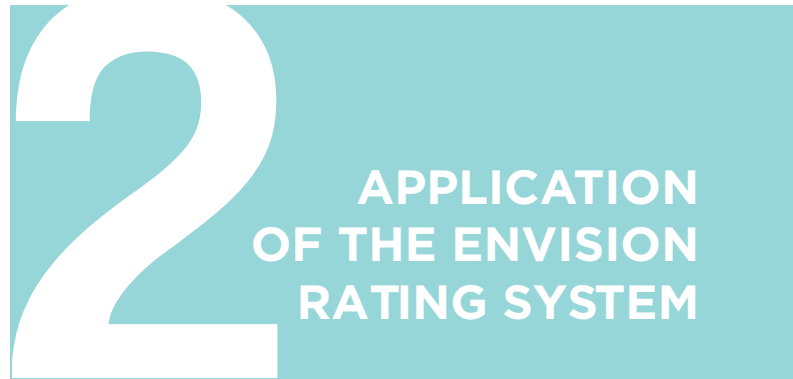
The Serra do Mar Recovery Program may inspire future actions in other regions facing similar social and environmental problems. The social intervention improved the living conditions of families in need, and the forest restoration generated benefits at both a local and regional scale. Some of the possible environmental benefits include improved carbon retention (estimated to be between 50 and 100 tC/ha), climate regulation, stabilization of rainfall periods, improved retention of rainwater runoff, and the protection of tree species that are crucial for the survival of the Atlantic Forest biome.¹¹

¹⁰ Mainly the neighborhood of Bairro Cota 200.

¹¹ IDB. *Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241)* (Inter-American Development Bank, 2010), 6.

Serra Do Mar And The Atlantic Forest Mosaics System Socio-Environmental Recovery Program

The Envision™ system is a set of guidelines that aid in optimizing the sustainability of an infrastructure project during the planning and preliminary design phases, as well as a means to quantify the relative sustainability of the project. In this case study, the infrastructure to be assessed is the Serra Do Mar And The Atlantic Forest Mosaics System Socio-Environmental Recovery Program, Brazil.



Envision consists of 60 credits¹² grouped into five categories: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Risk. Each credit pertains to a specific indicator of sustainability such as reducing energy use, preserving natural habitat, or reducing greenhouse gas emissions. Those credits are rated on a five-point scale referred to as a 'level of achievement': 'improved', 'enhanced', 'superior', 'conserving', and 'restorative'. Evaluation criteria are provided to determine if the qualifications for each level of achievement have been met for a particular credit. In each of the five categories there is a specific credit called "Innovate or exceed credit requirements". This is an opportunity to reward exceptional performance that applies innovative methods within the subjects that Envision evaluates.

The criteria for the levels of achievement vary from credit to credit, but generally an "improved" level of achievement is awarded for performance that slightly exceeds regulatory requirements. "Enhanced" and "superior" levels indicate additional gradual improvement, while "conserving" often indicates performance that achieves a net zero or neutral impact. "Restorative" is the highest level and is typically reserved for projects that produce an overall net positive impact. The Envision system weighs the relative value of each credit and level of achievement by assigning points. Credit criteria are documented in the Envision Guidance Manual, which is available to the public on the ISI¹³ and Zofnass Program¹⁴ websites.



Envision's first category, Quality of Life, pertains to potential project impacts on surrounding communities and their well-being. More specifically, it distinguishes infrastructure projects that are in line with community goals, clearly established as parts of existing community networks, and consider long-term community benefits and aspirations. Quality of Life incorporates guidance related to community capacity building and promotes infrastructure users and local members as important stakeholders in the decision-making process. The category is divided into four subcategories: Purpose, Well-being, Community, and Vulnerable Groups.

¹² Plus 3 new credits of the Vulnerable Groups subcategory

¹³ www.sustainableinfrastructure.org

¹⁴ www.zofnass.org

Purpose

The Purpose subcategory evaluates the project's impact on the community. This includes aspects such as improvements in quality of life, growth and development, and local skills and capacities. This project presents an exceptional performance by providing a holistic and meaningful contribution to the community. Although there are negative impacts as a consequence of the resettlement, for example in the breaking of social networks, substantial efforts have been made to deal with the challenges.

The program aims to improve the precariousness of households living in high-risk areas inside or near the Serra do Mar State Park by providing housing and fostering social inclusion. Additionally, the program will recover the deforested and polluted areas impacted by illegal occupation during the past several decades, which will contribute to the well-being of the population of São Paulo.¹⁵ To carry out this overall program, the community has been engaged since the planning stage. Subsequent actions have responded to the identified concerns, needs, and challenges; for example, in training residents to collectively manage the condominiums.

In relation to growth and development, the program does not aim to attract new businesses or families to the new neighborhoods. On the contrary, the program is actively working to prevent growth in this confined area in order to support a sustainable development. In this context, a large amount of the investment was used to implement training programs to pursue sustainable local development. Moreover, the location of the new housing was chosen strategically to provide residents with easier access to employment opportunities. At a broader scale, the protection of the conservation units enhance São Paulo's sustainable development, for example by contributing to cleaner air that improves health and well-being, creating extensive leisure activities for this population, or by creating new opportunities in ecotourism.

Finally, the program included a broad set of initiatives to develop the local skills and capacities of the community,¹⁷ including education to manage the new community setting, communications media, and arts. Professional training is also offered in construction, environmental management, tourism, reforestation, and landscape management. Additionally, a new center was created to stimulate local business related to food markets and handicrafts. Furthermore, a program was also launched to monitor school attendance in the resettled communities. Further actions to monitor these programs' effectiveness over the long term would be recommended

Well-being

Sustainable infrastructure projects consider individual comfort, safety, health, and mobility during construction and subsequent operation. These aspects are largely affected by noise and lighting, transportation options, signs and wayfinding to improve accessibility, and introduction of new materials and technologies. The Serra do Mar program demonstrates a remarkable performance in aspects related to public and alternative modes of transportation, mobility, and improved wayfinding and safety. While lighting and noise were improved, further actions to decrease their sources of disturbance would contribute toward this subcategory goal.

From the planning stage the program considered measures that would improve mobility and access, including public transport and pedestrian access. New housing complexes were intentionally located in areas that would facilitate access to metropolitan buses, as well as to stores, schools, and health services. The program also designed for mobility inside the complexes by including notable extensive pedestrian pathways, and constructed

¹⁵ ESP and IDB. *Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project*. 1st ed. (São Paulo: IDB and Estado de São Paulo, 2013), 17-20.

¹⁶ SARU and CDHU. *Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar* (FF IBD, CDHU, 2015), Chapter 5.1, 14-18, Chapter 5.3, 27-47.

an underpass beneath a treacherous highway crossing to provide safe passage between neighborhoods. As well, a new bike path contributes to alternative modes of transport in one resettled community and provides an initial contribution to a proposed municipal bicycle system.

Site accessibility and wayfinding were improved considering three different site typologies. First, the new housing complexes are fitted with signage and emergency routes. Second, newly urbanized areas of the park are provided with road improvements and public lighting. Finally, new trails, access points, and signage will improve park accessibility and safety within the protected area.

A significant reduction in noise and vibration was achieved for relocated communities who had previously resided on the border of the Anchieta highway. Additionally, the reclamation of previously occupied areas eliminates light pollution and restores the night sky in an environmentally sensitive area.

No health and safety challenges have been caused by the utilization of new technologies, as the program has not used any, and all construction and operation activities have been conducted in compliance with Brazilian state and municipal laws.

Further actions may be considered to improve the goals of this subcategory, such as auditing and assessing lighting needs for the project; stimulating the use of public and nonmotorized transportation and providing appropriate support facilities (e.g., additional bicycle paths and lockers); outlining more clearly identifiable and intuitive design and signage for safe access and egress above common standards; and providing evidence of noise and vibration assessments and mitigation measures, specifically related to the park buffer zone and housing construction.

Community

The Community subcategory evaluates to what extent the project respects or improves its surroundings by preserving historical and cultural assets, views, and local character, as well as by improving public spaces. The Serra do Mar program presents a remarkable context-sensitive design that enhance these features.

The essence of the program is to recover degraded tracts of the Atlantic Forest, which was designated as a Cultural Heritage by the Brazilian Federal Constitution in 1988. Additionally, the state park harbors cultural and historical assets, such as pre-Columbian rock paintings that are being preserved as part of the park's management.

The program includes robust protection, restoration, and management actions for public spaces, among which are a management plan for the Serra do Mar State Park, support for the creation of an ecological station, parks, and sustainable development reserves. In particular, the new park management will include new visitor centers and a signage system for trails, and will support environmental education of and proper use of the park by visitors. Also, the new mosaic of islands and marine protected areas will promote best practices for ecotourism and marine sports. Regarding the urban areas, the program has incorporated public spaces into the new condominiums, such as plazas, gardens, and recreational facilities. Interviews with residents demonstrate satisfaction with the design of the public areas.

The relocation component of the project has supported a significant change to the landscape of the Serra do Mar State Park by changing views that used to be of the informal occupations known as bairros-cota in the municipality of Cubatão. The Trabalho Técnico Social program's social team is in charge of developing

strategies to incorporate the community's character into the resettlement project. This was achieved by the Projeto Arte nas Cotas community art project that invites residents to share in the process of transforming the visual townscape of the housing project and promoting a community identity by colorful and original public artwork. The Projeto Arte nas Cotas program brings homeowners into collaboration with community artists to choose designs and themes that will create an identity for their newly urbanized houses and public areas. To attain higher levels of achievement in this area, the project team could develop an inventory of all landscape features and views and evaluate their general fit with the local character to be protected, in order to assist the local community to establish or enhance regulations, policies, and standards on valuable views and fit with local character.

Vulnerable Groups

The Vulnerable Groups subcategory takes into account that women and diverse groups (e.g., indigenous persons) commonly lack access to decision making, land ownership, employment, or technical training. At the same time, infrastructure can make a difference for these groups regarding jobs, capacity building, education, and accessibility, among other things. This subcategory considers aspects of the project such as the identification of specific concerns, proportion of jobs by gender, and particular patterns of mobility or safety. Within this project, several actions were taken to target these particular groups, in particular the creation of a conservation area where indigenous communities could practice traditional forest uses. Implementing actions were also taken so that families can better meet their socioeconomic needs, something that directly affects women.

Specifically, the Serra do Mar program contributed to create two sustainable-use reserves in the Juréia-Itatins mosaic, so as to give the mixed indigenous-Afro-Euro descendant Ciaçaras and Caboclas communities a place where they could legally practice their traditional forest uses and agriculture. These communities had previously been practicing traditional forest uses illegally in protected area for about 20 years. Under the auspices of the program, a new law was passed integrating Juréia-Itatins into a mosaic system of conservation units and sustainable-use reserves. Also, the Trabalho Técnico Social considers the particularities of each individual family in promoting alternatives to best meet their socioeconomic situation. This action directly affects needs and interests of women and diverse groups. Socio-communitarian organizations also organize two women's groups related to cuisine, and crafts that stimulate entrepreneurship.

Further progress is possible toward the goals of this subcategory. Regarding needs of women, the project team should first consider meetings and consultations with stakeholders and representatives from the communities. Also, the team should consider concerns and inputs from these specific meetings and propose actions for mitigation of identified problems. Additionally, an analysis should be carried out to identify whether there are particular hazards to women. In consideration of women's economic empowerment, the project could evaluate and document the proportion of women hired by the project, as well as the mix of skill levels of those employed. The project could participate in gender certification or other gender equity and supplier inclusion initiatives. Specific targets could be established by the project regarding the proportion of women in local employment, skill training, and as local suppliers. In order to address access and mobility for women, the project could identify the different patterns of mobility of woman and diverse groups, and assess the effect of the project on these patterns. Finally, the team should consider these inputs in the project design, construction, and operations.

The Leadership category evaluates project team initiatives that establish communication and collaboration strategies early on, with the ultimate objective of achieving sustainable performance. Envision rewards stakeholder engagement as well as encompassing a holistic, long-term view of the project's life cycle. Leadership is distributed into three subcategories: Collaboration, Management, and Planning.

Collaboration

Sustainable projects call for challenging ways of collaboration from a wide variety of stakeholders that require a new level of leadership and commitment from the project team, new ways of managing the project, innovative collaborative processes, as well as strong involvement of community and other key stakeholders in decision making. The Collaboration subcategory evaluates how the project performs in these matters. In this respect, the Serra do Mar recovery program provided an outstanding performance. The project increased sustainability by integrating collaboration among stakeholders at all levels. Especially the meaningful involvement of the resettled communities contributed to a significant achievement in this subcategory.

The program demonstrated a high performance as a leader by clearly stating the team's commitment to sustainability values and objectives in their strategy and management plans. In particular, the project team demonstrated understanding of sustainability by presenting an explanation of the factors and costs behind the degradation of the Atlantic Forest, and presenting the need for a socio-environmental solution and strategy. Collaboration among all governmental levels was demonstrated when the Municipality of Cubatão signed a cooperative agreement and publicly committed to the project and its sustainability goals.

The program presents a comprehensive strategy for social and environmental sustainability,¹⁷ while presenting economic considerations required by IDB.¹⁸ Roles were clearly assigned to the differing institutions involved in the project, and specific responsibilities



given to particular positions within these institutions. In addition, authority and responsibility for sustainability are at a high level of the organization.

Institutionally, the program fomented a partnership for monitoring purposes among several organizations, including CDHU, Fundação Florestal, and the Environmental Military Police (PMA), that had traditionally acted mostly separately. This institutional partnership provided the integrated socio-environmental approach that the realities on site demand. Also, community capacity-building projects formed partnerships with a wide array of experts, organizations, and businesses in developing training courses. On the other hand, incorporation of a whole-systems design process, procedures, and methodologies could have facilitated additional collaborative opportunities and maximized benefits.

Finally, the project team developed programs that established strong relationships with the affected communities and key stakeholders, setting in place mechanisms for feedback and dialogue that engaged their active participation in the resettlement plan.

Management

The Management subcategory addresses how the project pursues synergies between systems, either within the project or among larger infrastructure systems. The Serra do Mar and Atlantic Forest Mosaics Restoration Program presents remarkable

¹⁷ ESP and IDB. "Estratégia ambiental e social do programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica," BR-L1241 (2009), 15–17, 82–94

¹⁸ IDB. *Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socio environmental Recovery Program (BR-L1241)* (Inter-American Development Bank, 2010), v.

management efforts to integrate new and existing infrastructure assets and natural resources. However, it did not show evidence of exploring the possible use of unwanted by-product from nearby facilities within the area of the program.

Regarding infrastructure integration, the program restores valued natural resources and consolidates urban infrastructure through an articulated overall plan that integrates existing and new infrastructure elements. For this purpose, different sector representatives were included during the program's design process. Furthermore, the urbanization plans focused on linkages of affected populations to existing public service infrastructure and increased transport capacity, benefiting the greater community. In particular, urban design for vulnerable communities included improved access to public service infrastructures, e.g., safe housing, schools, day care, transport, public and green areas, etc. The project also improved the infrastructure of the Serra do Mar State Park and mosaic components by creating conservation units, management and visitation centers, trails, and access, and improving waste management. Resource conservation efforts extended beyond the project components by safeguarding regional water resources of Baixada Santista. As well, the program, initiated other synergies with non-built external infrastructures, for example between a planned remote monitoring system and Environment Department databases. Finally, in response to protests by the Jardim Cascqueiro neighborhood, where resettled families are straining their already inadequate public infrastructure, the program added six schools, health centers, and new transit lines, improving infrastructure for not only the new but preexisting communities.

The program did not show evidence of searching for synergy opportunities with unwanted by-products from nearby facilities. To achieve a higher rating in this topic, the program team should carry out a planned and documented search for discarded materials in nearby operations and explore the possible use of these as resources within the project. As well, dialogues should be pursued with potential nearby facility managers to develop by-product synergy possibilities.

Planning

The Planning subcategory takes a long-term view of the project by considering long-term maintenance and monitoring, regulations, and policies that may unintentionally create barriers to the implementation of sustainable infrastructure in the project's useful life. In this regard, the Serra do Mar Restoration Program stands out for incorporating a strategic long-term monitoring plan. Additionally, the program provided legal mechanisms on the municipal level to support social programs for the voluntary resettlement. To some extent the program's planning addressed durability and resiliency of the design to extend the future life of the park's buildings, but did not show evidence that these factors were considered in the construction of the housing developments.

Monitoring to prevent future reoccupation of reclaimed and restored conservation areas is a key component of the Serra do Mar program. The project strategy and bank loan proposal detail the investments that the park will put in place to maintain the conservation areas. Provisions improve inspection capacity, environmental training for the police, marine equipment, and a georeferenced remote monitoring and data system. Responsibilities are clearly allocated to the Forest Foundation and PMA. In addition, education and community participation of resettled communities are part of a strategy to discourage illegal occupation.

The Serra do Mar program also comprehensively assessed existing laws and policies, and took action to overcome conflicts obstructing sustainable land use. The implementation of an innovative forest and coastal mosaic system provided a solution to resolve illegal occupations in protected areas by providing structural reforms. As one example, the legal recategorization of the Juréia-Itatins ecological station permitted the legal possibility of creating a Sustainable Development Reserve for indigenous populations and traditional uses. Importantly, legal mechanisms were instituted at the municipal level guaranteeing the right of relocated families to participate in a public voluntary resettlement process. However, the program would assume an even greater leadership role by addressing additional structural

changes in actual standards, laws, and regulations to ensure the sustainable use of limited resources, such as water and energy, especially in the new housing complexes.

The program also documents consideration of the durability, flexibility, and resiliency of the materials and design to extend the life of its buildings. In particular, the PMA buildings included durability criteria in the choice of materials as well consideration of ease of disassembly of the structures, as for example in its choice of metal and prefabricated concrete components. Also, the future Botanical Garden is designed to better withstand high humidity by raising buildings and walkways above ground, using corrosion-resistant steel structures, roof shingles, and artificial wood. The housing units were also designed to maximize their life by adopting a diversity of layouts and incorporating flexibility in their configuration by allowing ease of interior repartitioning. It is recommended that a feasibility study be conducted to determine areas of potential long-term cost savings in regard to designing for future expansion, reconfiguration, durability, reduced maintenance, etc.

resources. Resource Allocation is divided into three subcategories: Materials, Energy, and Water.

Materials

The Materials subcategory evaluates sustainable selection and use of materials to reduce the amount of natural resources extracted and processed to carry out a project and the energy required for production and transportation. The Serra do Mar and Atlantic Forest Mosaics Program planned new housing for resettled and urbanized populations, and new facilities for PMA in charge of monitoring and control of the conservation units. For the residential buildings, the program gave no special considerations to this matter, although these houses represented the greater portion of the planned constructions. The PMA buildings, however, were certified by AQUA (Alta Qualidade Ambiental) and so followed construction and procurements criteria that accomplished many environmental considerations evaluated under this subcategory. By including an overall sustainable materials policy in all buildings, the program would have achieved a better performance in this area.

In regard to the reduction of net embodied energy, the residential constructions did not consider life cycle energy assessments. Nonetheless some considerations were made in the PMA buildings, utilizing lower-energy cement grades and materials sourced close to the construction site, which reduced the net embodied energy in their building materials. However, a documented life cycle assessment and performance criteria should be provided to evaluate achievement.

Sustainable procurement practices were not applied in the residential constructions but were adopted when designing the PMA facilities, including plans to acquire construction materials from verified sources, to obtain locally sourced materials and with recycled content, and to purchase environmentally certified wood and low-energy-grade cement. The plan for at least one PMA construction aimed to source 20% of aggregate from recycled materials.¹⁹ The PMA buildings also planned to source 30% of materials locally, within



The Resource Allocation category deals with material, energy, and water requirements during the construction and operation phases of infrastructure projects. The quantity and source of these elements as well as their impact on overall sustainability are investigated throughout this section of the Envision rating system. Envision guides teams to choose less toxic materials and promotes renewable energy

¹⁹ AQUA. Categoria 2: Escolha Integrada de Produtos, Sistemas e Processos Construtivos. QAE Fase Conceção 013 Auditada. n.d.

a 300 km range of the building site, and cement within 115 km of the site.²⁰ If the use of recycled or local materials is considered for the housing projects, it would allow the use of a considerable percentage of these resources on the overall project and reduce construction related environmental impacts.

A waste management plan that minimizes, reuses, and diverts waste from landfills is needed, both during construction and during operations. This should be a priority in the new residential areas. For the housing project construction and post-occupation, efforts over industry norms to reduce waste generation and divert waste from landfill are not provided. Under the AQUA certification, the PMA building plans identified local recycling facilities and set a goal to meet a 15% reuse target. One plan states that the builder would be required to provide 100% waste traceability.²¹ However, further reporting documentation is necessary to understand how wastes were actually sorted, minimized, and what percentage went to recycling or reuse.

Minimizing the movement of soil and excavated materials reduces transport and waste and protects topography. Excavated material from the deconstruction of the Água Fria settlements and two of the bairros-cota will be used to elevate the internal access road to the future Botanical Garden; PMA constructions also included criteria to reduce excavated materials taken off site. However, documentation is not provided on the percentage of material that was reused on site, and no special measures were taken to reduce excavated materials taken off site in the housing construction.

The project presents specific isolated actions that enable several of its components to be easily disassembled and in some cases reused at the end of the project's life. In particular, the PMA buildings included ease of disassembly and reuse as a criterion in product selection, achieving this in part by using prefabricated products like Bubbledeck slabs²² and a

target to have 50% of the construction suitable for reuse.²³ Also, housing to accommodate 1,840 resettled families planned for easily disassembled partitions to accommodate changing needs of existing and new residents.²⁴ Nevertheless, an enhanced performance in this area would require further efforts to design the housing units to enable a considerable percentage to be readily deconstructed and disassembled at the end of their useful life, to enable material and equipment reuse and upcycling.

Energy

The Energy subcategory recognizes the need to reduce and monitor energy consumption and to transition from fossil fuels toward renewable energy sources. In this regard, solar water heaters were installed in both the Serra do Mar new housing units and park monitoring bases. The bases also followed a certification process that established specific energy efficiency targets. The bases will also include photovoltaic solar panels to generate electricity. Beside the large percentage of electricity provided by hydroelectric plants, this increases the portion of operational energy that comes from renewable sources. Commissioning, monitoring, and further maintenance of the solar water heaters are recommended.

As mentioned, both the Serra do Mar new housing unit and park monitoring bases included solar water heating systems that would provide energy and cost savings to the users. Porcelain facades and designs and materials to maximize natural venting and lighting also improve energy savings in the housing units. However, no quantifications of energy reduction were provided for the housing units. In the case of the conservation monitoring bases, the AQUA certification process was followed. This process established energy efficiency targets and took a whole-systems approach, so that the lighting, ventilation, thermal, and other aspects of the building could be planned and their footprint calculated as a

²⁰ Polícia Militar Ambiental (PMA). *Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental*. 2013, 14.

²¹ AQUA. *Categoria 3: Canteiro de Obras com Baixo Impacto Ambiental*. QAE Fase Conceção 013 Auditada. n.d.

²² Loeb, Mindlin, R., and Inova. *Processo AQUA: Dossie que Fase Conceção Projeto para Nove Sede do 3º Batalhão da Polícia Militar Ambiental Guarujá*. 2013, 11-12.

²³ AQUA. *Categoria 2: Escolha Integrada de Produtos, Sistemas e Processos Construtivos*. QAE Fase Conceção 013 Auditada. n.d.

²⁴ IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System: a Social and Environmental Recovery Project*, edited by Keila Prado Costa and Maria Cristina N. Valadares Vasconcelos, 1st ed. São Paulo: 2014, 85.

whole. The AQUA audit for one building calculated a 31% reduction in energy consumption, predominantly through the use of the solar water heating system.²⁵

The use of renewable energy in Brazil is notable, with the widespread use of hydroelectric plants accounting for close to 80% of total installed capacity by 2007.²⁶ Considering this aspect as well as the implementation of solar water heaters, the Serra do Mar program includes renewable energy sources in both the construction of residential housing units and the park and mosaic visitor centers and support centers. The certification process followed at the PMA made it possible to calculate that in one building the solar water system would supply 19% of its total operational energy needs.²⁷ As well, the Botanical Garden will provide demonstrations of solar energy technologies.

The program did not show evidence of conducting either an initial commissioning or long-term monitoring of the energy systems for the residential units or for the park police buildings. Regarding ensuring efficient functioning of energy systems, a follow-up survey found that the solar water heater systems were somewhat underused. Homeowners either said they were waiting for repairs or did not understand how the system worked. The program has responded to problems found in the manufacture of the original solar heating system used, and has changed supplier. The project is recommended to engage an initial independent commissioning of the energy systems as well as to assemble the necessary information to sufficiently train the users to enable proper operation and maintenance. Furthermore, a long-term monitoring will ensure proper performance over the project's life.

Water

The Water subcategory recognizes the need to protect finite potable and freshwater, considering the effects on these resources due to a growing

population and changing climate. In this regard, Serra do Mar and Atlantic Forest Restoration Program presents a superior achievement in protecting freshwater resources for its restorative action to protect the quality and availability of freshwater sources in the Serra do Mar mountain range and coastal areas. However it is recommended that the program conducts a comprehensive water availability assessment, including the new housing complexes, to evaluate the overall impact of the program on the quantity and quality of freshwater, surface water, and groundwater resources in the area.

The program implements measures to protect the freshwater availability, quality, and quantity, estimating that the specific actions undertaken will benefit 2.7 million people, or 70% of those who rely on the Baixada Santista.²⁸ Several actions will combine to restore natural water drainage systems in the region, including: the integration of occupied areas into urban infrastructure, the addition of 16 new conservation units that extend along the entire coastline of the state and cover 50% of the State coastal waters, the protection of 90,000 ha in the new Juréia-Itatins mosaic, and restored areas and greater management in the Serra do Mar State Park.²⁹ Applying green infrastructure on a smaller scale, the construction of bases for the PMA will include steps to protect freshwater availability by incorporating green spaces and buffering areas for stormwater runoff. Toward the future, watershed restoration should be backed by a long-term monitoring system in order to track changes in water quality as a result of restorative actions and to adjust accordingly.

The project took small steps to reduce consumption of potable drinking water. In particular, the conservation support buildings for PMA were the only ones designed that considered a rainwater collection system for use as gray water in toilets, cleaning, and irrigation of green areas. The design for the PMA buildings further reduced water consumption by including designs to reduce flow in the building from

²⁵ AQUA. *Categoria 4: Gestão da Energia. QAE Fase Conceção 013 Auditada*. n.d.

²⁶ International Energy Agency: Brazil (partner country), accessed November 21, 2015, <https://www.iea.org/countries/non-membercountries/brazil/>

²⁷ AQUA. *Categoria 4: Gestão da Energia. QAE Fase Conceção 013 Auditada*. n.d.

²⁸ ESP and IDB. *Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241)*. 2009, 29-30.

²⁹ IDB. *Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241)*. 2010, 2.

bathroom facilities. These measures were estimated to reduce annual consumption of drinking water by 17% and to provide a capacity to supply 11 days of water consumption during drought.³⁰ A higher percentage of potable water reduction could be achieved and documented through additional measures.

To monitor water consumption, the new housing units include individual water meters. This positive step gives the homeowners the ability to better understand their drinking water consumption patterns, and may in the future help facilitate public incentives to reduce drinking water consumption. However, the housing units were not designed to reduce potable water consumption, a recommendation for future projects.

6

NATURAL WORLD CATEGORY

The Natural World category focuses on how infrastructure projects may impact natural systems and promotes opportunities for positive synergistic effects. Envision encourages strategies for conservation and distinguishes projects with a focus on enhancing surrounding natural systems. Natural World is subdivided into three subcategories: Siting, Land and Water, and Biodiversity.

Siting

The site selection of infrastructure can minimize harm to areas of ecological value by avoiding important habitats, wetlands, surface waters, and floodplains, and by enhancing geological stability. On a large scale, the Serra do Mar and Atlantic Forest Mosaic Restoration Program took steps to restore prime habitat and the natural geological stability and hydrologic functions of the Atlantic Forest. However, at the scale of their building constructions, limited remedial actions to buffer waterways and reduce runoff were undertaken. The program presents opportunities for improvement in regard to preserving prime farmland, selection of sites with previous construction (greyfields), and consideration of flood risk and response for the new housing units.

Specifically, the Serra do Mar program adds 16 marine protected areas, reclaims and reforests 80 ha of degraded areas, eradicates invasive species from 100 ha, and recovers 350 ha of forest.³¹ In particular, the reestablishment of permeable and vegetated surfaces will positively impact hydrologic functions by increasing infiltration of rainwater and reducing runoff, thereby reducing flooding hazards. In addition, the restoration program reduces hazardous geologic situations caused by uncontrolled land occupations on the steep slopes of the Serra do Mar State Park. The program identified and relocated at least 952 families at high risk of mud and landslides.³² The construction project also took steps to stabilize soils and minimize risk of landslides.

Regarding the construction activities, the program took care to buffer habitat and waterways. New housing units were sited closer to urban infrastructure so as to free prime habitat areas. Construction plans for Bolsão IX sited green spaces and institutional buildings to the northeast to buffer the urban area from areas of permanent protection. Also, the new park monitoring bases evaluated proximity and avoided siting on habitat

³⁰ AQUA. Categoria 5: Gestão da Água. QAE Fase Concepção 013 Auditada. n.d.

³¹ IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010, 2..

³² ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009, 22

with important animal or plant species. As well, construction designs for urbanization and resettlements took actions to clean local surface waters and remove invasive weeds, conforming buffer zones to at least a legal minimum baseline of 15 m.³³

The resettled housing was sited in geologically stable locations and geotechnical monitoring was implemented, although no considerations of underlying aquifers were presented. Also constructions were purposely not built on steep slopes that would contribute to erosion and landslides.

In at least a number of its parts, the Serra do Mar program is built on previously occupied sites but no information regarding the percentage constructed on greenfield or greyfield sites was provided. In previously occupied locations, the program constructions adopted strategies to increase soil permeability and restore vegetation. Nonetheless a clear plan and studies to preserve floodplains functions in urbanized areas were not demonstrated, and a more thorough flood assessment and flood emergency plan is particularly recommended for the housing units. Regarding farmland, the program addresses uncontrolled agriculture in protected areas by creating reserves where this activity is permitted. An assessment of soils and agricultural potential of the region is not presented.

Land and Water

The Land and Water subcategory addresses prevention of contamination from stormwater runoff and pesticides and fertilizers. In this case, the Serra do Mar program achieves a moderate performance by adopting measures to reduce stormwater runoff, clean up surface waters, and protect the Atlantic Forest from agricultural pesticides. The program would build on these accomplishments by setting stormwater retention benchmarks and targets, and by establishing agrochemical policies for its reforestation activities and the landscaping of park and housing properties.

As for stormwater, the program increased the rainwater infiltration capacity of vacated park land by decompacting soils, removing impermeable surfaces, and planting native species of vegetation.³⁴ Measurement of initial capacity or targets to improve water storage capacity to a predevelopment level were not carried out. Park support buildings installed rainwater collection systems and rainwater terraces that maintain or improve the infiltration capacity of their properties. With regard to the housing units, state approval was conditional on recovery of green areas, which would incidentally increase infiltration, but the program does not specify that this recovery incorporated specific designs to manage a measurable percentage of stormwater. Therefore, further efforts to minimize the negative impacts associated with increased runoff of impervious surfaces, such as rain gardens and barrels, tree preservation, soil amendments, rooftop gardens, and use of permeable paving are recommended.

The program will eradicate pesticide-intensive banana monocrop practices from the reclaimed areas in the park,³⁵ eliminating sources of agrochemicals. However, the program does not have a policy for use of pesticides and herbicides for its forest and native plant replanting activities. A pesticide and fertilizer management plan is needed for this forest restoration, as well as for the landscaping of green areas associated with housing and park properties. This management plan should consider plant species not requiring these chemicals and an integrated pest management approach. Also, an alternative to wood pressure-treated with pesticides, in order to increase longevity, is also recommended on playground equipment in the future Botanical Garden.

³³ M. Ré, "Análisis de los aspectos físico-urbanísticos de las áreas de reasentamiento: desarrollo de métodos y modelos de manejo y recuperación ambiental en áreas de reasentamiento en áreas protegidas del Estado de São Paulo," CDHU and IDB (2009), 28.

³⁴ ESP and IDB, "Informe de gestão ambiental e social do program," 40.

³⁵ ESP and IDB, "Estratégia ambiental e social do programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica," BR-L1241 (2009), 48.

The program takes strong action to prevent contamination and improves the quality of surface water by removing sources of untreated sewage and tying the new developments in with the municipal sewage treatment system. As a result of these actions, monitoring at the water treatment facility near Água Fria has already shown improvement in water quality. As well, the planning for the new PMA training center includes remedial actions to restore local streams and to capture and treat stormwater. The park military police monitoring marine protected areas will further participate in a voluntary program to recycle their used boat engine oil.

Biodiversity

The Biodiversity subcategory evaluates how a program minimizes negative impacts on native species and their habitats. Here the Serra do Mar program stands out for enlarging habitat area and connectivity for rare and threatened species, eradicating invasive species, and restoring soils and surface water quality and habitat. The program leaves room to expand on these accomplishments by reusing disturbed soils during construction of buildings and improving hydrological connectivity and sediment transport.

Enlarging and connecting habitats is critical for biodiversity. The Serra do Mar Program Atlantic Forest mosaic will improve conservation management across 90,000 ha,³⁶ restore 80 ha³⁷ of new habitat, and delineates 500 ha³⁸ for biodiversity enrichment. The consolidation of conservation units under the new mosaic system connects habitat and promotes species diversity from the slopes of Serra do Mar to the estuarine-lagoon region of the lower Ribeira, an area that includes a broad range of habitats, such as headwaters, swamps, lagoons, sand dunes, diverse forests, shrub-herbaceous sandbanks, and mangroves.

Invasive species, including nonindigenous or nonnative flora and fauna, can adversely affect the habitats and regions they invade. The program eradicates invasive plants from 100 ha of reclaimed park land, and also replaces invasive with native species around building sites.³⁹ Additionally, the Botanical Garden will propagate native seeds for reforestation and educate the community on the value of native plant species. The program could also put in place a multiyear management plan to prevent the reentry and spread of invasives following restoration.

Healthy ecosystems also require functioning soils and surface waters. The Serra do Mar program restores the reclaimed park soil by decompacting, plowing, and subsoiling, although the program does not document reuse of soil disturbed during constructions. In order to improve water quality, the resettlements eliminate raw sewage inputs and clean garbage from streams. The program further improves wetland habitat by consolidating marine protected areas that contain mangroves and estuarine ecosystems. However, the program leaves open opportunities to restore hydrologic flow and sediment transport within the forest mosaic, by studying existing connectivity and barriers blocking natural flows.

³⁶ IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241) (Inter-American Development Bank, 2010), 2.

³⁷ ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241) (Estado de São Paulo and IDB, 2009), 13, 15.

³⁸ Ibid.

³⁹ Ibid.

Envision aims to promote infrastructure developments that are sensitive to long-term climate disturbances. Climate and Risk focuses on avoiding direct and indirect contributions to greenhouse gas emissions, as well as promotes mitigation and adaptation actions to ensure short and long term resilience to hazards. Climate and Risk is further divided into two subcategories: Emissions and Resilience.

Emissions

The Emissions subcategory addresses how a project minimizes risks caused by emissions of greenhouse gas and harmful pollutants during all stages of its cycle. In this regard, the Serra do Mar program did not consider life cycle assessment to measure its carbon emissions. Neither was the project designed to meet air quality standards beyond the legal minimum requirements. Even though elements of the program may have a net uptake of greenhouse gases and reduce air pollutants from previously occupied areas, these effects are not monitored or measured against targets or total program performance.

A first step to reduce a carbon footprint is to consider full life cycle carbon assessment of all carbon-equivalent gases emitted. The assessment includes carbon emissions generated for the key materials used in the project, from their extraction, refinement, manufacture, and transportation to emissions released in use after their incorporation in the completed project. However, the Serra do Mar program did not consider such an analysis of the net carbon footprint of its components. The IDB estimates that the protection of 400,000 ha of ecologically viable forest in the long term will result in a carbon retention of between 50 and 100 tC/ha.⁴⁰ The use of solar water heaters in the constructed new housing will also reduce carbon emissions. However, the emissions and reductions from the construction and operation of the residential units and urbanized areas are not calculated, and further carbon saving opportunities were not explored.

An infrastructure project can protect human health and property by reducing its emissions of harmful



air pollutants. The reduction of six criteria pollutants are evaluated: particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, lead, and noxious odors. The Serra do Mar Program did not set air quality standards beyond the legal minimum or implement strategies to reduce harmful air emissions. Nevertheless, the program does include elements that may reduce harmful air pollutants following urbanization and resettlement, for example through improved access to public transportation and redirected traffic flows. As well, reforestation of degraded areas will also likely reduce ground-level ozone levels. However, as the program does not specifically aim to reduce emissions, no measure of these potential reductions of air pollutants are provided.

Resilience

The Resilience subcategory evaluates adaptive capacity to long-term change and related hazards, with particular concern for climate change. In this respect, the Serra do Mar program improves long-term resilience by restoring freshwater resources and increasing robustness of its ecosystems. The program further reduces exposure to hazards of mudslides from extreme weather events through the resettlement of vulnerable families, and also minimizes the risk of landslide by stabilizing degraded slopes through reforestation. However, the program needs to integrate a comprehensive climate vulnerability assessment, prepare and implement a climate adaptation plan, and review community dependency on resources that may become scarce or expensive.

⁴⁰ IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socio-environmental Recovery Program (BR-L1241) (Inter-American Development Bank, 2010), 5.

Projects can increase resiliency by assessing vulnerabilities and resource needs that may provoke future traps. To this end, the Serra do Mar program needs to perform a climate impact assessment and adaptation plan calculating expected flood elevations or sea rise, and inventorying vulnerable structures. Such a climate impact plan will help communities anticipate extreme weather events, such as the 2014 flooding that has required a redesign of the Botanical Garden.⁴¹ In regard to avoiding long-term resource traps, the program considers freshwater and fishing resources and responds to make them more robust, by restoring water quality and promoting sustainable fishing. However, a comprehensive survey should be conducted of possible resources constraints and vulnerabilities that the community may face in future.

Changing climate conditions require adaptability in the long and short term. In this respect, the program increases the resilience of the Atlantic Forest by restoring freshwater resources and connecting habitats. The program also minimizes mudslide dangers by relocating vulnerable families and stabilizing land. However, it does not consider the climate change threat and how to help communities adapt to sea level rise or prepare for extreme weather events.

Finally, a project can reduce localized heat accumulation and manage microclimates that may occur around hard surfaces, increasing the use of surfaces with a high ability to reject solar heat as well as vegetation and shading. The program has considered measures that reduce the heat island effect on the future Botanical Garden by including green roofs in its building design. The program could consider to a larger extent the above-mentioned measures, such as incorporating shading by means or trees or structures.

⁴¹ UEP Fundação Florestal, email correspondence, Communication from the Fundação Florestal regarding the flooding in 2014 (October 27, 2015).

APPENDIX A: PROJECT PICTURES AND DRAWINGS



Figure 2: Protected areas and municipalities in the Socio-environmental Recovery Program of Serra do Mar

Sources: ESP, and IDB. *Informe de Gestão Ambiental e Social do Programa.*: Banco Interamericano de Desenvolvimento & Governo do Estado de São Paulo (2009), 78.

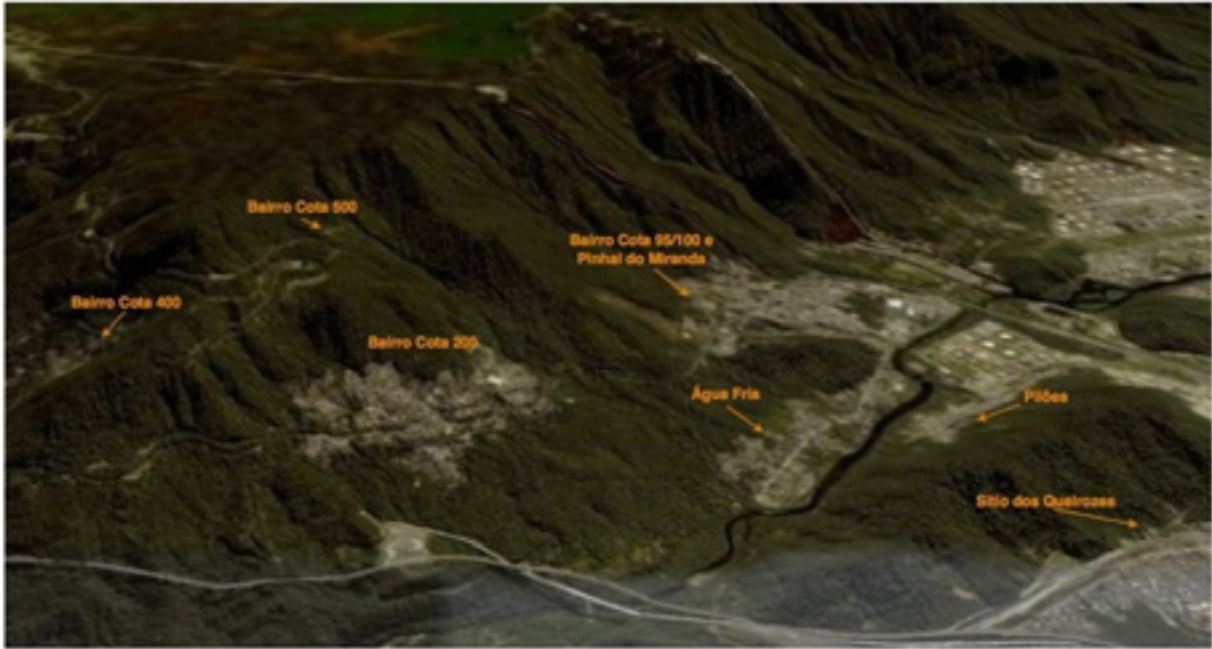


Figure 3: Illegal settlements in the Serra do Mar State Park relocated in the first phase of Program.

Sources: ESP and IDB. *Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241)* (Estado de São Paulo and IDB, 2009), 79.



Figure 4: Resettlement and urbanization areas.

Sources: IDB, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 8

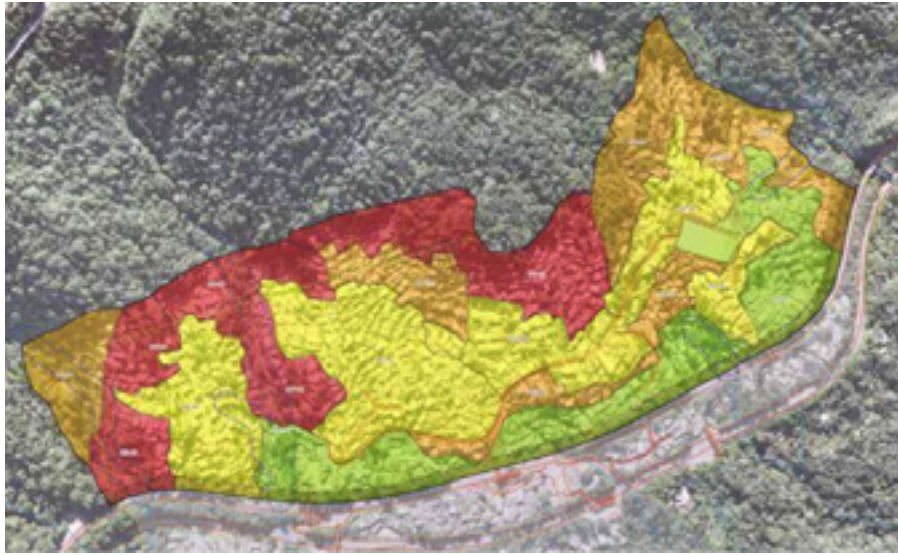


Figure 5: Geological Risk Assessment. The IPT (Technological Research Institute for the State of São Paulo) identified areas of low, medium, high, and very high risk areas for geological hazards.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System* (KPMO Cultura e Arte, 2014), 20.



Figure 6: Water resources and the Serra do Mar State Park. The Atlantic Forest provides drinking water for the region.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 22.



Figure 7: Access in a Bairro Cota settlement in Serra do Mar State Park pre-resettlement and urbanization program.

Sources: Chucre, Fernando. *Programa de Recuperação Socioambiental da Serra do Mar*, (2011), 30.



Figure 8: Hillside Bairro Cota settlement in Serra do Mar State Park pre-resettlement and urbanization program.

Sources: Chucre, Fernando. *Programa de Recuperação Socioambiental da Serra do Mar*, (2011), 30.



Figure 9: Drainage in a Bairro Cota settlement in Serra do Mar State Park pre-resettlement and urbanization program.

Sources: Chucre, Fernando. *Programa de Recuperação Socioambiental da Serra do Mar*, (2011), 30.



Figure 10: Water supply in a Bairro Cota settlement in Serra do Mar State Park pre-resettlement and urbanization program.

Sources: Chucre, Fernando. *Programa de Recuperação Socioambiental da Serra do Mar*, (2011), 30.



Figure 11: Community Agent Leadership Training.
Sources: SARU and CDHU. *Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar.* (2015), 29.



Figure 12: Meeting with Residents of Bairros-Cota. Presentation of urbanization and resettlement projects.
Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System.* (KPMO Cultura e Arte, 2014), 53.



Figure 13: Nesdel entrepreneur and artisan training project
Sources: SARU and CDHU. *Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar.* (2015), 36.



Figure 14: Civil Construction professional capacity training project.
Sources: SARU and CDHU. *Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar.* (2015), 37.



Figure 15: Solar water heaters. New housing reduced energy consumption and costs by providing houses with solar powered water heating.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 81.



Figure 16: Maintaining open spaces and views.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 46.



Figure 17: Minimizing light pollution. The resettlement program restored night sky in wildlife areas and provided lighting in public areas of the new developments.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 54.



Figure 18: The Atlantic Forest is internationally recognized for its unique species and rich biodiversity. However, 10% of its invertebrates are threatened, including 42 bird, 21 mammal, four amphibian, and three reptile species.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 33.



Figure 19: Traditional forest use.

Sources: Chucre, Fernando. 2011. *Programa de recuperação socioambiental da Serra do Mar*, 22.



Figure 20: Seedlings for restoring degraded areas .

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System: a Social and Environmental Recovery Project*. (KPMO Cultura e Arte, 2014), 98.



Figure 21: Reforestation in Cota 400. To the left, pictures are from 2012. To the right, pictures from 2014

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 96.



Figure 22: The Serra do Mar program developed management plans for newly created Marine Protected Areas.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 115,116.

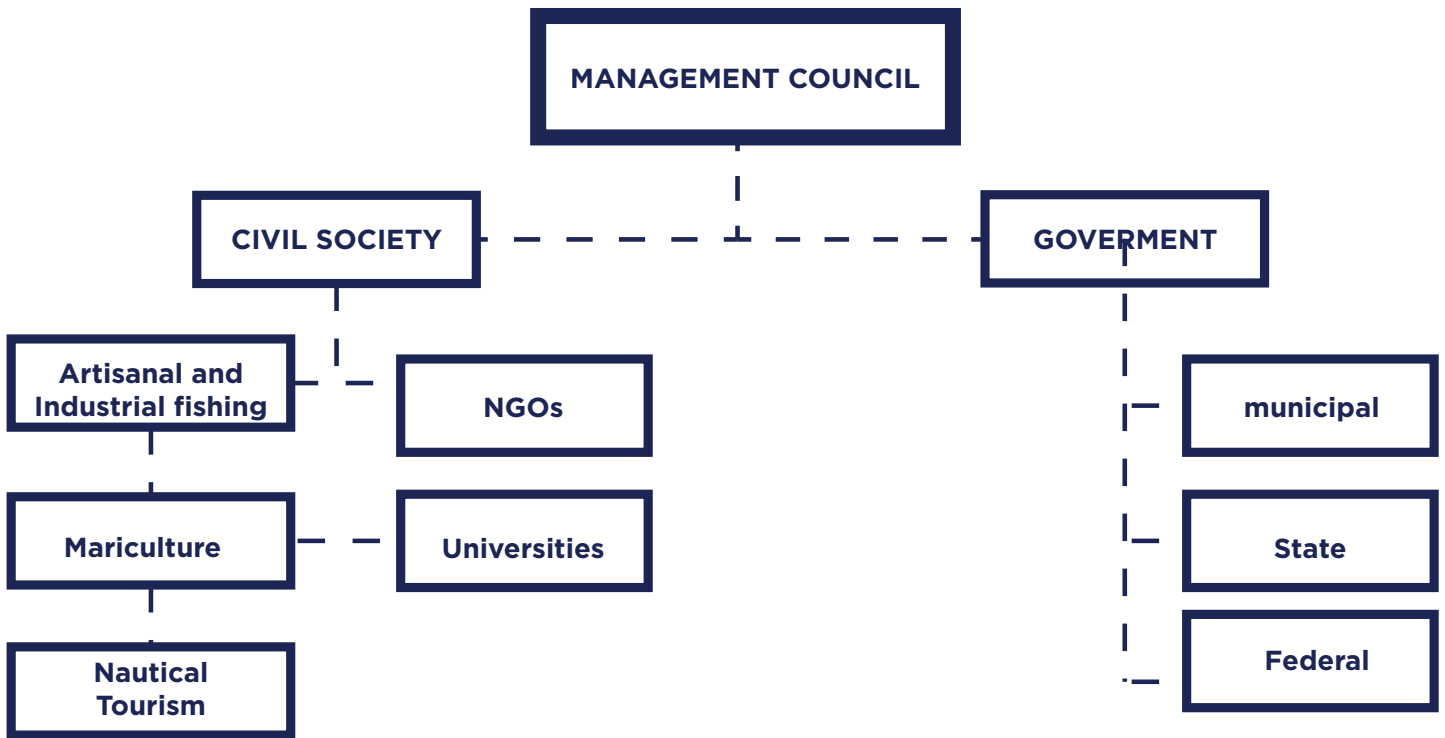


Figure 23: A collaborative management structure for a Marine Protected Area Management Council.

From: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 120.



Figure 24: Monitoring to prevent reoccupation of conservation areas was an integral component of the program management plan.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System*. (KPMO Cultura e Arte, 2014), 124.



Figure 25: 1st Battalion of the Environmental Police.

Sources: IBD, FF, CDHU, and ESP. *Serra do Mar and the Atlantic Forest Mosaic System.* (KPMO Cultura e Arte, 2014), 129.



Figure 26: Cota Viva Environmental Education Project. Raising conservation values and appreciation of the Serra do Mar State Park and Atlantic Forest Mosaics is a crucial part of the monitoring strategy to prevent future reoccupation of the conservation units.

Sources: SARU and CDHU. *Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar.* (2015), 40.

APPENDIX B: ENVISION POINTS TABLE⁴²

QUALITY OF LIFE	PURPOSE	Description	MEJORA	AUMENTA	SUPERIOR	CONSERVA	RESTAURAR
QUALITY OF LIFE	PURPOSE	QL 1.1 Improve community quality of life	2	5	10	20	25
		QL 1.2 Stimulate sustainable growth and development	1	2	5	13	16
		QL 1.3 Develop local skills and capabilities	1	2	5	12	15
		QL 2.1 Enhance public health and safety	2	--	--	16	
	WELLBEING	QL 2.2 Minimize noise and vibration	1	--	--	8	11
		QL 2.3 Minimize light pollution	1	2	4	8	11
		QL 2.4 Improve community mobility and access	1	4	7	14	
		QL 2.5 Encourage alternative modes of transportation	1	3	6	12	15
	COMMUNITY	QL 2.6 Improve site accessibility, safety and wayfinding	--	3	6	12	15
		QL 3.1 Preserve historic and cultural resources	1	--	7	13	16
QL 3.2 Preserve views and local character		1	3	6	11	14	
VULNERABLE GROUPS	QL 3.3 Enhance public space	1	3	6	11	13	
	QL 4.1 Identify and address the needs of women and diverse communities*	1	2	3	4		
	QL 4.2 Stimulate and promote women's economic empowerment	1	2	3	4		
	QL 4.3 Improve access and mobility of women and diverse communities*	1	2	3	4	5	

Maximum QL Points: **194"**

LEADERSHIP	COLLABORATION	Description	MEJORA	AUMENTA	SUPERIOR	CONSERVA	RESTAURAR
LEADERSHIP	COLLABORATION	LD 1.1 Provide effective leadership and commitment	2	4	9	17	
		LD 1.2 Establish a sustainability management system	1	4	7	14	
		LD 1.3 Foster collaboration and teamwork	1	4	8	15	
		LD 1.4 Provide for stakeholder involvement	1	5	9	14	
	MANAGEMENT	LD 2.1 Pursue by-product synergy opportunities	1	3	6	12	15
		LD 2.2 Improve infrastructure integration	1	3	7	13	16
		LD 3.1 Plan for long-term monitoring and maintenance	1	3	--	10	
	PLANNING	LD 3.2 Address conflicting regulations and policies	1	2	4	8	
		LD 3.3 Extend useful life	1	3	6	12	

Maximum LD Points: **121"**

RESOURCE ALLOCATION	MATERIALS	Description	MEJORA	AUMENTA	SUPERIOR	CONSERVA	RESTAURAR
RESOURCE ALLOCATION	MATERIALS	RA 1.1 Reduce net embodied energy	2	6	12	18	
		RA 1.2 Support sustainable procurement practices	2	3	6	9	
		RA 1.3 Use recycled materials	2	5	11	14	
		RA 1.4 Use regional materials	3	6	9	10	
		RA 1.5 Divert waste from landfills	3	6	8	11	
		RA 1.6 Reduce excavated materials taken off site	2	4	5	6	
	ENERGY	RA 1.7 Provide for deconstruction recycling	1	4	8	12	
		RA 2.1 Reduce energy consumption	3	7	12	18	
		RA 2.2 Use renewable energy	4	6	13	16	20
	WATER	RA 2.3 Commission and monitor energy systems	--	3	--	11	
		RA 3.1 Protect fresh water availability	2	4	9	17	21
		RA 3.2 Reduce potable water consumption	4	9	13	17	21
		RA 3.3 Monitor water systems	1	3	6	11	

Maximum RA Points: **182"**

NATURAL WORLD	SITING	Description	MEJORA	AUMENTA	SUPERIOR	CONSERVA	RESTAURAR
NATURAL WORLD	SITING	NW 1.1 Preserve prime habitat	--	--	9	14	18
		NW 1.2 Protect wetlands and surface water	1	4	9	14	18
		NW 1.3 Preserve prime farmland	--	--	6	12	15
		NW 1.4 Avoid adverse geology	1	2	3	5	
		NW 1.5 Preserve floodplain functions	2	5	8	14	
		NW 1.6 Avoid unsuitable development on steep slopes	1	--	4	6	
		NW 1.7 Preserve greenfields	3	6	10	15	23
	LAND & WATER	NW 2.1 Manage stormwater	--	4	9	17	21
		NW 2.2 Reduce pesticide and fertilizer impacts	1	2	5	9	
		NW 2.3 Prevent surface and groundwater contamination	1	4	9	14	18
	BIODIVERSITY	NW 3.1 Preserve species biodiversity	2	--	--	13	16
		NW 3.2 Control invasive species	--	--	5	9	11
		NW 3.3 Restore disturbed soils	--	--	--	8	10
		NW 3.4 Maintain wetland and surface water functions	3	6	9	15	19

Maximum NW Points: **203"**

CLIMATE & RISK	EMISSIONS	Description	MEJORA	AUMENTA	SUPERIOR	CONSERVA	RESTAURAR
CLIMATE & RISK	EMISSIONS	CR 1.1 Reduce greenhouse gas emissions	4	7	13	18	25
		CR 1.2 Reduce air pollutant emissions	2	6	--	12	15
	RESILIENCE	CR 2.1 Assess climate threat	--	--	--	15	
		CR 2.2 Avoid traps and vulnerabilities	2	6	12	16	20
		CR 2.3 Prepare for long-term adaptability	--	--	--	16	20
		CR 2.4 Prepare for short-term hazards	3	--	10	17	21
		CR 2.5 Manage heat islands effects	1	2	4	6	

Maximum CR Points: **122"**

Maximum TOTAL Points: **822"**

*Indigenous or afro-descendant peoples
 **Not every credit has a restorative level. Therefore totals include the maximum possible points for each credit whether conserving or restorative.

APPENDIX C: GRAPHS

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM PROGRAMA DE RECUPERACION SOCIO AMBIENTAL SERRA DO MAR

			I	E	S	C	R*
CALIDAD DE VIDA	PURPOSE PROPÓSITO	QL1.1 Improve Community Quality of life QL1.1 Mejorar la Calidad de Vida de la Comunidad					
		QL1.2 Stimulate Sustainable Growth & Development QL1.2 Estimular el desarrollo y el crecimiento sostenible					
		QL1.3 Develop Local Skills And Capabilities QL1.3 Desarrollar Capacidades y Habilidades Locales					
QUALITY OF LIFE	COMMUNITY COMUNIDAD	QL2.1 Enhance Public Health And Safety QL2.1 Mejorar la Salud Pública y Seguridad					
		QL2.2 Minimize Noise and Vibration QL 2.2 Minimizar Ruidos y Vibraciones					
		QL2.3 Minimize Light Pollution QL 2.3 Minimizar Contaminación Lumínica					
		QL2.4 Improve Community Mobility and Access QL2.4 Mejorar el acceso y la movilidad de la Comunidad					
		QL2.5 Encourage Alternative Modes of Transportation QL2.5 Fomentar modos alternativos de transporte					
		QL2.6 Improve Site Accessibility, Safety & Wayfinding QL2.6 Mejorar la accesibilidad, seguridad y señalización					
WELLBEING BIENESTAR	VULNERABLE GRUPOS VULNERABLES	QL3.1 Preserve Historic And Cultural Resources QL3.1 Preservar los recursos históricos y culturales					
		QL3.2 Preserve Views And Local Character QL3.2 Preservar las vistas y el carácter local					
		QL3.3 Enhance Public Space QL3.3 Mejorar el espacio público					
QUALITY OF LIFE	VULNERABLE GRUPOS VULNERABLES	QL4.1 Identify and address the needs of minorities QL4.1 Identificar y considerar las necesidades de minorías					
		QL4.2 Stimulate and promote women's empowerment QL4.2 Estimular y promover el empoderamiento femenino					
		QL4.3 Improve access and mobility of minorities QL4.3 Mejorar el acceso y movilidad de minorías					
		QL0.0 Innovate or Exceed Credit Requirements QL0.0 Créditos innovadores o que exceden los requerimientos					

* **I**MPROVE **E**NHANCED **S**UPERIOR **C**ONSERVING **R**ESTORATIVE
MEJORA AUMENTA SUPERIOR CONSERVA RESTAURA

Figure 27: Quality of Life category_ Summary of results

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
PROGRAMA DE RECUPERACION SOCIO AMBIENTAL SERRA DO MAR

			I	E	S	C	R*
LIDERAZGO	COLLABORATION COLABORACIÓN	LD1.1 Provide Effective Leadership And Commitment LD1.1 Proporcionar compromiso y liderazgo efectivo					
		LD1.2 Establish a Sustainability Management System LD1.2 Establecer un sistema de gestión de la sostenibilidad					
		LD1.3 Foster Collaboration and Teamwork LD1.3 Promover colaboración y trabajo en equipo					
		LD1.4 Provide For Stakeholder Involvement LD1.4 Fomentar la participación de las partes interesadas					
LEADERSHIP	MANAGEMENT GESTIÓN	LD 2.1 Pursue By-Products Synergy Opportunities LD 2.1 Buscar oportunidades de sinergia derivada					
		LD2.2 Improve Infrastructure Integration LD 2.2 Mejorar la integración de infraestructuras					
		LD3.1 Plan For Long-Term Monitoring & Maintenance LD3.1 Planificar el monitoreo y mantenimiento a largo plazo					
LEADERSHIP	PLANNING PLANIFICACIÓN	LD3.2 Address Conflicting Regulations & Policies LD3.2 Lidar con reglamentos y políticas en conflicto					
		LD3.3 Extend Useful Life LD3.3 Extender la vida útil					
		QL0.0 Innovate or Exceed Credit Requirements QL0.0 Créditos innovadores o que exceden los requerimientos					

* **I**MPROVE **E**NHANCED **S**UPERIOR **C**ONSERVING **R**ESTORATIVE
 MEJORA AUMENTA SUPERIOR CONSERVA RESTAURA

Figure 28: Leadership category_ Summary of results

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
PROGRAMA DE RECUPERACION SOCIO AMBIENTAL SERRA DO MAR

			I	E	S	C	R*
ASIGNACIÓN DE RECURSOS	MATERIALS MATERIALES	RA1.1 Reduce Net Embodied Energy RA1.1 Reducir energía neta incorporada					
		RA1.2 Support Sustainable Procurement Practices RA1.2 Apoyar prácticas de adquisición sustentable					
		RA1.3 Used Recycled Materials RA1.3 Utilizar materiales reciclados					
		RA1.4 Use Regional Materials RA1.4 Utilizar materiales de la región					
		RA1.5 Divert Waste From Landfills RA1.5 Disminuir la disposición final en rellenos sanitarios					
		RA1.6 Reduce Excavated Materials Taken Off Site RA1.6 Reducir los materiales de excavación sacados del local del proyecto					
		RA1.7 Provide for Deconstruction & Recycling RA1.7 Prever condiciones para la remoción de la construcción y el reciclaje					
RESOURCE ALLOCATION	ENERGY ENERGÍA	RA2.1 Reduce Energy Consumption RA2.1 Reducir el consumo de energía					
		RA2.2 Use Renewable Energy RA2.2 Usar energías renovables					
		RA2.3 Commission & Monitor Energy Systems RA2.3 Puesta en servicio y monitoreo de sistemas energéticos					
RESOURCE ALLOCATION	WATER AGUA	RA3.1 Protect Fresh Water Availability RA3.1 Proteger la disponibilidad de agua dulce					
		RA3.2 Reduce Potable Water Consumption RA3.2 Reducir el consumo de agua potable					
		RA3.3 Monitor Water Systems RA3.3 Monitorear sistemas de provisión de agua					
		QL0.0 Innovate or Exceed Credit Requirements QL0.0 Créditos innovadores o que exceden los requerimientos					

* **I**MPROVE **E**NHANCED **S**UPERIOR **C**ONSERVING **R**ESTORATIVE
 MEJORA AUMENTA SUPERIOR CONSERVA RESTAURA

Figure 29: Resource Allocation category_ Summary of results

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
PROGRAMA DE RECUPERACION SOCIO AMBIENTAL SERRA DO MAR

			I	E	S	C	R*
MUNDO NATURAL	SITING EMPLAZAMIENTO	NW1.1 Preserve Prime Habitat NW1.1 Preservar hábitats de alta calidad					
		NW1.2 Preserve Wetlands and Surface Water NW1.2 Preservar humedales y aguas superficiales					
		NW1.3 Preserve Prime Farmland NW1.3 Preservar tierras agrícolas de alta calidad					
		NW1.4 Avoid Adverse Geology NW1.4 Evitar zonas de geología adversa					
		NW1.5 Preserve Floodplain functions NW1.5 Preservar funciones de llanura aluvial					
		NW1.6 Avoid Unsuitable Development in Steep Slopes NW1.6 Evitar la ocupación inadecuada en pendientes pronunciadas					
		NW1.7 Preserve Greenfields NW1.7 Preservar áreas sin ocupación					
NATURAL WORLD	LAND+WATER IMPACTOS EN EL AGUA Y SUELO	NW2.1 Manage Stormwater NW2.1 Gestión de aguas pluviales					
		NW2.2 Reduce Pesticides and Fertilizer Impacts NW2.2 Reducir el impacto de fertilizantes y plaguicidas					
		NW2.3 Prevent Surface and Groundwater Contamination NW2.3 Prevenir la contaminación de aguas superficiales y profundas					
	BIODIVERSITY BIODIVERSIDAD	NW3.1 Preserve Species Biodiversity NW3.1 Preservar la biodiversidad					
NW3.2 Control Invasive Species NW3.2 Control de especies invasivas							
NW3.3 Restore Disturbed Soils NW3.3 Restaurar suelos alterados							
NW3.4 Maintain Wetland and Surface Water Functions NW3.4 Preservar los humedales y las funciones de aguas superficiales							
		QL0.0 Innovate or Exceed Credit Requirements QL0.0 Créditos innovadores o que exceden los requerimientos					

* **I**MPROVE **E**NHANCED **S**UPERIOR **C**ONSERVING **R**ESTORATIVE
 MEJORA AUMENTA SUPERIOR CONSERVA RESTAURA

Figure 30: Natural World category_ Summary of results

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
PROGRAMA DE RECUPERACION SOCIO AMBIENTAL SERRA DO MAR

		I	E	S	C	R*
CLIMATE AND RISK	MATERIALS MATERIALES	CR1.1 Reduce Greenhouse Gas Emissions CR1.1 Reducir las emisiones de Gases de Efecto Invernadero (GEI)				
		CR1.2 Reduce Air Pollutant Emissions CR1.2 Reducir las emisiones contaminantes del aire				
CLIMATE AND RISK	ENERGY ENERGÍA	CR2.1 Assess Climate Threat CR2.1 Evaluar amenazas relacionadas al Cambio Climático				
		CR2.2 Avoid Traps and Vulnerabilities CR2.2 Evitar situaciones de riesgo y vulnerabilidad				
		CR2.3 Prepare for Long-Term Adaptability CR2.3 Establecer estrategias de adaptación de largo plazo, frente al cambio climático				
		CR2.4 Prepare for Short-Term Adaptability CR2.4 Preparación frente a riesgos de corto plazo				
		CR2.5 Manage Heat Island Effects CR2.5 Administrar el efecto Isla de Calor				
		QL0.0 Innovate or Exceed Credit Requirements QL0.0 Créditos innovadores o que exceden los requerimientos				

* **I**MPROVE **E**NHANCED **S**UPERIOR **C**ONSERVING **R**ESTORATIVE
 MEJORA AUMENTA SUPERIOR CONSERVA RESTAURA

Figure 31: Climate & Risk category_ Summary of results

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM				PT.	PERFORMANCE
1	PURPOSE	QL1.1 Improve community quality of life	25	Restorative	
2		QL1.2 Stimulate sustainable growth and development	16	Restorative	
3		QL1.3 Develop local skills and capabilities	15	Restorative	
4	COMMUNITY	QL2.1 Enhance public health and safety	0	No score	
5		QL2.2 Minimize noise and vibration	1	Improved	
6		QL2.3 Minimize light pollution	1	Improved	
7		QL2.4 Improve community mobility and access	14	Conserving	
8		QL2.5 Encourage alternatives modes of transportation	6	Superior	
9		QL2.6 Improve site accessibility, safety and wayfinding	6	Superior	
10	WELLBEING	QL3.1 Preserve historic and cultural resources	13	Conserving	
11		QL3.2 Preserve views and local character	6	Superior	
12		QL3.3 Enhance public space	13	Restorative	
13	VULNERABLE GROUPS	QL4.1 Identify and address the needs of women and diverse communities*	3	Superior	
14		QL4.2 Stimulate and promote women's economic empowerment	1	Improved	
15		QL 4.3 Improve access and mobility of women and diverse communities*	0	No score	
QL0.0 Innovate or Exceed Credit Requirements			8		
QL			128		

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM				PT.	PERFORMANCE
16	LEADERSHIP	COLLABORATION	LD 1.1 Provide effective leadership and commitment	17	Conserving
17			LD 1.2 Establish a sustainability management system	14	Conserving
18			LD 1.3 Foster collaboration and teamwork	8	Superior
19			LD 1.4 Provide for stakeholder involvement	14	Conserving
20	LEADERSHIP	MNGMNT.	LD 2.1 Pursue by-product synergy opportunities	0	No score
21			LD 2.2 Improve infrastructure integration	16	Restorative
22	LEADERSHIP	PLANNING	LD 3.1 Plan for long-term monitoring and maintenance	10	Conserving
23			LD 3.2 Address conflicting regulations and policies	2	Enhanced
24			LD 3.3 Extend useful life	3	Enhanced
LDO.0 Innovate Or Exceed Credit Requirements			6		
LD			90		

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM			PT.	PERFORMANCE	
25	RESOURCE ALLOCATION	MATERIALS	RA 1.1 Reduce net embodied energy	2	Improved
26			RA 1.2 Support sustainable procurement practices	2	Improved
27			RA 1.3 Use recycled materials	0	No score
28			RA 1.4 Use regional materials	0	No score
29			RA 1.5 Divert waste from landfills	0	No score
30			RA 1.6 Reduce excavated materials taken off site	2	Improved
30			RA 1.7 Provide for deconstruction recycling	1	Improved
31	ENERGY	RA 2.1 Reduce energy consumption	7	Enhanced	
32		RA 2.2 Use renewable energy	13	Superior	
34		RA 2.3 Commission and monitor energy systems	0	No score	
35	WATER	RA 3.1 Protect fresh water availability	9	Superior	
36		RA 3.2 Reduce potable water consumption	0	No score	
37		RA 3.3 Monitor water systems	0	No score	
		RA0.0 Innovate Or Exceed Credit Requirements	0		
RA			36		

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM			PT.	PERFORMANCE	
38	NATURAL WORLD	SITING	NW 1.1 Preserve prime habitat	18	Restorative
39			NW 1.2 Protect wetlands and surface water	4	Enhanced
40			NW 1.3 Preserve prime farmland	0	No score
41			NW 1.4 Avoid adverse geology	3	Superior
42			NW 1.5 Preserve floodplain functions	5	Enhanced
43			NW 1.6 Avoid unsuitable development on steep slopes	6	Conserving
44			NW 1.7 Preserve greenfields	0	No score
45		LAND & WATER	NW 2.1 Manage stormwater	4	Enhanced
46			NW 2.2 Reduce pesticide and fertilizer impacts	1	Improved
47			NW 2.3 Prevent surface and groundwater contamination	14	Conserving
48		BIODIVERSITY	NW 3.1 Preserve species biodiversity	16	Restorative
49			NW 3.2 Control invasive species	5	Superior
50			NW 3.3 Restore disturbed soils	8	Conserving
51			NW 3.4 Maintain wetland and surface water functions	6	Enhanced
		NW0.0 Innovate Or Exceed Credit Requirements	9		
NW			99		

SERRA DO MAR AND ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM			PT.	PERFORMANCE	
52	CLIMATE	EMISSIONS	CR 1.1 Reduce greenhouse gas emissions	0	No score
53			CR 1.2 Reduce air pollutant emissions	0	No score
54		RESILIENCE	CR 2.1 Assess climate threat	0	No score
55			CR 2.2 Avoid traps and vulnerabilities	2	No score
56			CR 2.3 Prepare for long-term adaptability	0	No score
57			CR 2.4 Prepare for short-term hazards	21	Conserving
58			CR 2.5 Manage heat islands effects	1	No score
			CR0.0 Innovate Or Exceed Credit Requirements	0	N/A
CR			24		
Total Points			377		

CATEGORY I, PEOPLE AND LEADERSHIP

SUB CATEGORY: QUALITY OF LIFE

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
GL1.1 IMPROVE COMMUNITY QUALITY OF LIFE	25	Restorative
		<p>The approach to the measurement of quality of life related to this program can be seen as being two-fold. Most directly, it aims to improve the precariousness of households living in high-risk areas inside, or in close proximity to the Serra do Mar State Park. Secondly, it will recover the deforested and polluted areas impacted by the illegal occupations that took place over the past 50 years. The recovery of degraded ecosystem services (e.g. water supply and climate balance) is also vital to the wellbeing of the population of São Paulo.</p> <p>Program preparation started in 2008 with an assessment of the families living in areas at high risk for natural disasters. Initially, the program focused on more than 5,000 families in precarious living conditions; since 2014, activities have expanded to about 1,400 families and continue to foster the conservation of vital ecosystems. The social component of the program provided them with the necessary social support in order to resettle, which included training to develop their skills and capacities in order to collectively manage the condominiums. The strong social program undertaken minimized the adverse impacts of the resettlement of families living in risk prone areas in Serra do Mar State Park also enabled a sustainable recovery of the ecosystem.</p> <p>The success of the program is supported by a study carried out by University of São Paulo on the Rubens Lara complex, the largest housing development built by the program (1,840 units). The results demonstrate that the majority of those resettled approved and are satisfied with their relocation, in that 65% of the interviewees claimed that their lives had since improved. Negative impacts of the relocation which were shown in this study include the breakdown of social networks that used to provide childcare, and other types of family support.</p>
	Source	<ul style="list-style-type: none"> - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project. 1st ed. (São Paulo: IDB and Estado de São Paulo, 2013), 17-20. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241) (2009), 40. - Simões, N., and de Carvalho, R. March. Análise de Impactos Socioeconômicos e Culturais. Relatório 5: Programa De Recuperação Socioambiental Da Serra Do Mar (BR-L1241). (CDHU and IDB, 2008). - Cavalheiro, D. and Abiko, A. "Evaluating slum (favela) resettlements: The case of the Serra do Mar Project, São Paulo, Brazil". Habitat International Brazil (2015), 340-348. - CDHU. (n.d). "Avaliação De Satisfação (Form)." - CDHU. "Questionario Agentes Comunitarios (Form)." (2010). - Gerência de Suporte. "Instrumental De Caracterização Agentes Comunitários (Data Sheet)." (n.d.) - Superintendência de Ações de Recuperação Urbana (SARU). Balanço Das Reuniões De Urbanização e Eleição De Representantes Territoriais. Programa de Recuperação Socioambiental da Serra do Mar (2010). - CDHU. "Reuniões Nucleo Operacional Urbanização." (n.d.) - CDHU, Cobrape, and Engevix. "Reuniões Pactuação Eleição Representantes" (2010).
Recommendations	<p>The program achieved the maximum level of performance, fostering a community renaissance in the area of intervention. Nonetheless, in order to strengthen the social networks of the families who were resettled and are now living in the housing complexes, it is recommended to provide collaborative programs that foster the building of strong social networks among the new neighbors.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL1.2 STIMULATE SUSTAINABLE GROWTH & DEVELOPMENT	16	Restorative	
			<p>The program does not aim to attract new businesses nor families to the new neighborhoods. On the contrary, the program is actively working to prevent growth in this constrained area in order to support sustainable development of this community. To do so, strengthening the social fabric of communities after relocation was the major objective of the support program. A large amount of the investment was allocated to capacity building processes to enable residents to pursue sustainable local development. Moreover, the location of the newly developed housing complexes has been chosen strategically, in order to provide residents with easier access to possible places of employment.</p> <p>Also, local jobs were created during the construction of the works, for example from January, 2010 to September, 2015, 1,374 jobs were generated at Barrio Cota, with 1,031 being selected from the local community. The socio-economic assessment that was conducted during the planning phase identified the potential for negative impacts on community employment due to the weakened links with the existing informal market. Community members reported that employers are more amenable to recruit people living in the housing complexes than in the informal settlements, this change has been especially helpful to women seeking employment. This assessment also estimated the impacts of the program on the livelihoods of traditional populations whose activities are now considered illegal inside the park, and proposes strategies to mitigate the lost sources of income by promoting local employment generation for traditional communities. Furthermore, the Cubatão Botanical Garden, which is to be inaugurated in 2016 in the reclaimed park land in Água Fria, is estimated to create 55 new jobs; 30 of which will be taken by community members from informal settlements.</p> <p>Finally, the conservation and monitoring of the protected conservation units enhances Sao Paulo sustainable economic development. For example, creating new ecotourism opportunities, recovering environmental livability, and providing extensive leisure activities for this population.</p>
			<p>Source</p> <ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project. 1st ed. São Paulo: 2013. - Cavalheiro, D. and Abiko, A. "Evaluating slum (favela) resettlements: The case of the Serra do Mar Project, São Paulo, Brazil". Habitat International, Brazil, 2015.
		<p>Recommendations</p> <p>The program achieved the highest in this credit, for providing a developmental rebirth for the community. Nevertheless, it is recommended to keep a continuous monitoring of the socio-economic conditions in order to ensure the sustained growth and development of the community.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL1.3 DEVELOP LOCAL SKILLS AND CAPABILITIES		15	Restorative
			<p>The program has provided a broad range of capacity building programs, including: a continuing education program for urbanization community agents, elected by the affected communities; professional training in construction, tailored to female residents; urban arts intervention workshops for promoting art education; and community outreach workshops to promote training in different communications media, delivering certificates to 75 residents who were trained. The capacity building component also aims to stimulate participatory entrepreneurship, mainly done through the Solidary Economy and Local Development Center (NESDEL), organized by a group of women in coordination with other programs managed by the CDHU. The program involves two groups, one related to food, and the other one to handcrafts. Moreover a program to monitor school attendance at the resettlement communities, and actions to improve the school's structure were developed. Subsidies were also provided for students enrolled in formal education.</p> <p>The Cota Viva project, a joint initiative of the CDHU and the Forest Foundation (FF), held at the newly built Environmental School, hosted a series of actions to form the Environmental Community Agents; it offered educational activities and technical training on reforestation and landscape management that qualifies residents to work in forest restoration activities in the Serra do Mar state park, and in public green spaces in Cubatão. Moreover, a new program on community tourism has been launched in partnership with the São Paulo State University (UNESP-São Vicente Campus). In all, the above mentioned social projects offer many different training opportunities: between March 2010 and August 2015, 885 certifications were issued in community communication, art education, socio-environmental education, solidarity economy, community tourism, and community participation and organization. The programs mentioned have contributed diverse opportunities to build and develop local capacity, and at the same time promoted residents' citizenship and social inclusion through income generating activities.</p>
	Source		<ul style="list-style-type: none"> - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project. 1st ed. São Paulo: 2013. - Cavalheiro, D. and Abiko, A. "Evaluating slum (favela) resettlements: The case of the Serra do Mar Project, São Paulo, Brazil". Habitat International. 2015. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do - Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015.
Recommendations		<p>The highest level of achievement was accomplished for this credit. Looking towards the future, further studies could be developed to measure the impacts of the initiatives and their contribution to enhancing long-term competitiveness of the involved community. Further actions to monitor their effectiveness over the long term would be recommended.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
0	No Score	
QL2.1 ENHANCE PUBLIC HEALTH AND SAFETY		<p>This credit takes into account health and safety implications of using new materials and technologies, above and beyond meeting existing regulations and requirements. All construction activities were, and are being conducted in compliance with Brazilian state and municipal laws, with the appropriate health and safety methodologies and protocols having been instituted. Because the program has not included the use of new materials, technologies or methodologies, no additional standards or protocols were developed to manage health and safety of workers in construction sites. Furthermore, the siting of the housing complexes on stable areas reduced exposures to risks associated with landslides, floods, and the pollution of water bodies. Additionally, infrastructure for water supply, sewage, and waste management prevents the spread of water-related diseases.</p>
	Source	<ul style="list-style-type: none"> - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project. 1st ed. São Paulo: 2013. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009. - Decreto Nº 9.297 de 19 de Dezembro de 2008, in Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas
	Recommendations	<p>A comprehensive detailed risk assessment is recommended in order to identify health and safety measures beyond the ones specified by laws and regulations, specifically for developing methodologies and techniques. By providing systematic documentation of significant risks, changes can be instituted, and appropriate measures can be integrated into construction and operational practices.</p>

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL2.2 MINIMIZE NOISE AND VIBRATION	1	Improved	
		<p>The construction of large housing complexes and urban infrastructure causes great noise disturbance and vibration, due to the use of machinery and transportation of materials. The program assigned to the contracted construction companies the responsibility to comply with local regulations regarding noise and vibration, according to the Law 8.666 (06/21/1993). The Environmental and Social Assessment of the program, affirms that the execution of the works will be done during specific timeframes in order to minimize noise impact. For the purpose of this evaluation, evidence of baseline studies of existing levels of noise and prediction of levels based of design have not been found so far. Neither, assessments or studies about noise interference with the park buffer zone were provided. Nevertheless, it should be noticed that for the communities relocated who were previously residing in the border of Anchieta highway, a significant reduction in noise and vibration was achieved since all the new housing developments were placed away from the road for safety and health purposes. Nonetheless, no comparative study between previous and current noise levels was provided to quantify the improvement.</p>	
	Source	<p>- ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.</p>	
	Recommendations	<p>To enhance this credit goal, a comparative study between existing and predicted noise levels during operation should be provided in order to explore possible mitigation measures, when applicable. Besides, a set of recommendations could be provided to ensure that noise generated by the communities living in the park buffer zone do not interfere with fauna habitats, ultimately creating more respectful environments.</p>	
QL2.3 MINIMIZE LIGHT POLLUTION	1	Improved	
		<p>Excessive lighting at night can block out stars, disturb nocturnal wildlife, and interrupt human sleep patterns. Reduced light pollution allows communities to see stars in the night sky, has beneficial health implications, and saves energy. This credit considers whether planners assessed lighting needs and designed to reduce light energy requirements, and reduce light pollution in sensitive areas. An indirect consequence of the actions taken to resettle the communities living in the Serra do Mar State Park was eliminating light pollution in the park, thus restoring the night sky to an environmentally sensitive area. In the new settlement and urbanized developments, lighting zones were established based on public needs and required regulations.</p>	
	Source	<p>- ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.</p>	
	Recommendations	<p>Due to excessive glare, light at night is of concern for several reasons as it creates disturbance to nocturnal animals and sensitive environments, including natural reserves, and interferes with human sleep patterns. In order to enhance this credit's goal, overall lightning needs should be assessed. Also, the project may contemplate further actions to reduce light spillage at night, such as high barriers, and planted trees and shrubbery.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL2.4 IMPROVE COMMUNITY MOBILITY AND ACCESS		14	Conserving
			<p>According to the program plan, the management team coordinated with decision-makers to address mobility issues, such as providing additional bus stops for the residents of the housing complexes; increasing the number of metropolitan busses; and increasing the connecting roads between Jardim Casqueiro, where the new neighborhoods are located, and the center of Cubatao. Moreover, the new housing complexes were intentionally constructed in central areas of Cubatao in order to facilitate community mobility and access to public transportation, commercial services, schools, and healthcare services. In addition, apartments in the new housing units in Cubatão were each provided garage space on the building’s lower level. Also, public walkways were planned to include handrails and ramps, and sufficient width to accommodate wheelchairs. Additionally, the design of the intervention areas created a hierarchical road system, diverting traffic flow to larger access roads that are fed by mid-sized collector roads. Therefore, smaller local roads discourage through traffic and are only used by the residents within the urbanized and resettled communities. It is worth mentioning that prior to relocation, some communities lived along a major highway connecting São Paulo to the port of Santos; with intense truck and car traffic, serious risks were posed to both community members, who constantly crossed the road as pedestrians, as well as to road users. In these communities, most residents found it difficult to get to work because of the frequent roadwork and heavy rains that impeded the highway. This difficulty has been considerably minimized after moving to the new housing complexes.</p>
	Source		<ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009.
Recommendations		<p>The project has been awarded the highest level of achievement since it is not possible to receive a Restorative level for this credit. Therefore no recommendations are provided.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL2.5 ENCOURAGE ALTERNATIVE MODES OF TRANSPORTATION		6	Superior
			<p>This credit evaluates how the completed project has been integrated into the existing public transportation network, as well as how the program encourages the access to nonmotorized transportation; for example by utilizing multimodal transportation facilities. In this program, the new housing site is strategically chosen to offer easy access to public bus lines that connect the site to urban centers. Additionally, circulation within the housing complexes favors walkways that promote integration with closest neighborhoods and a local bikepath that will also support a proposed municipal bike system.</p> <p>Regarding public transportation, in particular the social and environmental strategy of the Program delivered in 2009 includes improvements, as demonstrated by actions implemented in three new districts by partner institutions of the program. Specifically these actions include: metropolitan transportation with the Metropolitan Company of Urban Transport of São Paulo to ensure the stimulation of new demand; improving roads for more efficient connections between the housing project and central areas; finally, widening the Viaduct to connect the Casqueiro Garden and the center of Cubatao. The bus stops are located around the condominium perimeter, and connect the site with the central areas of Cubatão.</p> <p>While not explicitly being an alternative transportation project, the project design includes an integral system of local roads with pedestrian walkways. With reference to non-motorized modes of transportation, the new resettlement area and urban zone were designed to include pedestrian areas that will be 1.20 m wide and include ramps and stairs fitted with handrails. These walkways are significantly featured in the urbanization plans for the Cota 200, which will include approximately 1.9 km of urban roads and 3.5 km of pedestrian lanes; they are also in the plans for the in Cota 100/95 which will have a 1.2 km road area, and 2.9 km of pedestrian paths. Moreover, a variety of services (grocery stores, medical services, and schools) are within walking distance and/or served by busses. The Rubens Larahousing unit includes a bicycle path on its southern end that represents the initial interconnection of a bike path that will run through the neighborhood and integrated into a bicycle system proposed by the municipality. On the other hand, a social survey of impacted households found that between 2011 and 2013, the number of families with bicycles increased from 52.6% to 91.6%, indicating an increased use of this alternative mode of transportation.</p>
	Source		<ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IBD, FF, CDHU, and ESP. Serra do Mar and the Atlantic Forest Mosaic System: a Social and Environmental Recovery Project, edited by Keila Prado Costa and Maria Cristina N. Valadares Vasconcelos. 1st ed. São Paulo: 2014. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009. - Consórcio Diagonal Villagua. Segunda Tomada do Levantamento Social nos Condomínios do Programa de Recuperação Socioambiental da Serra do Mar. Projeto: CDHU-Condomínios. 2013.
Recommendations		<p>The project has been awarded the highest level of achievement since it is not possible to receive a Restorative level for this credit. Therefore no recommendations are provided.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL2.6 IMPROVE SITE ACCESSIBILITY, SAFETY & WAYFINDING	6	Superior	
			<p>Overall, the program provides additional safety and security for different users by providing signage, improving accessibility through road creation, and providing emergency routes where necessary. A higher level of achievement would be reached if the efforts to enhance signance design would exceed beyond Brazilian laws and regulations.</p> <p>Given the many interventions that are part of the program, the evaluation of this criteria was applied to the three typologies of sites: the new housing complexes; the alienated areas of the park that benefited from urbanization improvements; and the areas of the Serra do Mar Mosaics System which was opened for public use. Firstly, the housing complexes are fitted with necessary signage and emergency routes within the condominiums, and installations for the fire brigade and police are provided in accordance with Brazilian regulations. Also, road safety and access were planned in tandem, in order to eliminate unsafe use of shortcuts through the local streets by traffic. Additionally, in relation to the newly urbanized areas of the park, improvements have been made with regards to accessibility, including wayfinding, impermeabilization, public lighting, widening streets for garbage collection, and signage. Finally, with the removal of irregular settlements, the State Park of Serra do Mar will create new tracks and install further signage to promote efficient information, as well as users accessibility and safety in the protected area. Further consideration was given to increased access to the Serra do Mar State Park, so as to encourage public interaction with the park, and promote its conservation.</p>
			<p>Source</p> <p>- ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.</p>
		<p>Recommendations</p> <p>Increasingly clear, identifiable signage for safe access, entry and exit points, above the common standards and regulations, are required to attain higher levels of achievement for this credit.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL3.1 PRESERVE HISTORIC AND CULTURAL RESOURCES		13	Conserving
			<p>The essence of the Serra do Mar program is to recover degraded tracts of the Atlantic Forest, a biome that is highly endangered, considering that only 7.6% of original forest coverage remains. This area has been well assessed, and is recognized as a natural, historical, and cultural heritage site. In 1988, the Atlantic Forest was designated as a “Cultural Heritage” under the Brazilian Federal Constitution (Chapter VI, Article 225), and years later it was declared a “Biosphere Reserve” by UNESCO. The state park harbors cultural and historical assets that include pre-Columbian rock paintings, monuments, stone pathways from colonial times, and mills that embody the history of industrialization in Brazil. The design for the botanical garden will also commemorate the history and culture of the Pilões and Água Fria communities that were devastated by flooding in 2014, by keeping seven of the old houses of the original settlements. These historical and cultural sites are being preserved as part of the park management program. The program, through its “Trabalho Técnico Social” (TTS), has also worked to enhance the communities’ (intangible) cultural resources. Also, the community-based course on tourism addresses the historical and cultural dimensions of the target area and its surroundings.</p>
	Source		<ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241. 2009. - FF. Anexo I: Memorial Descritivo. Projecto Básico de Implantação e Arquitetura do Jardim Botânico em Cubatão. Estudo Preliminar. 2015. - SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015.
Recommendations		<p>To attain a higher level of achievement, evidence should be provided of efforts to enhance or restore existing historical and cultural resources, done in collaboration with cultural or historical preservationists.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
GL3.2 PRESERVE VIEWS AND LOCAL CHARACTER	6	Superior	
			<p>This credit aims to assess the design of the project in avoiding negative impacts on community views and in maintaining local character. Since 2009, the activities of the social program within the Serra do Mar State Park have supported a significant change to the landscape of the state of Sao Paulo. Specifically, these changes are due to the modification of the views from the Serra do Mar from its main access routes. These views used to be of the informal occupations, known as Bairros-Cota, in the municipality of Cubatão. With regard to urban areas, the Trabalho Técnico Social (TTS) is responsible for evaluating pre-resettlement strategies that aim to incorporate the community’s character into the project design. In addition, the project made a considerable effort to work with the community to enhance local character traits. This was achieved by the Projeto Arte nas Cotas community art project that invited the residents of the project in the process of transforming the visual townscape of the project and promoting a community identity by colorful and original public artwork. The Projeto Arte nas Cotas program brings homeowners in collaboration with community artists to choose designs and themes that will create an identity for their newly urbanized houses and public areas. The CDHU project is specifically designed for families from the impacted Cotas, and provides technical artisan skills for interested members of the community, and thereby capacity to continue and self-determine the identity it portrays on its housing and public and spaces. In order to obtain higher level of achievement, as part of the stakeholder consultation process, the project team should submit an inventory and plans for how views will be protected and enhanced beyond mandatory regulation.</p>
		Source	<ul style="list-style-type: none"> - Cavalheiro, D. and Abiko, A. “Evaluating slum (favela) resettlements: The case of the Serra do Mar Project, São Paulo, Brazil”. Habitat International, Brazil. 2015. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015. - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project. 1st ed. São Paulo: 2013. - SARU and CDHU. Trabalho Tecnico Social: Projeto de Recuperacao Socioambiental da Serra do Mar (Presentation). 2015.
	Recommendations	<p>In order to reach higher levels of achievement, the project team should develop an inventory of all landscape features and views, and evaluate their general fit with the local character to be protected; this should be done with stakeholder consultation. Subsequently, the project team should demonstrate how the final project design considers each of the identified views, natural landscape features, and elements of local character. Furthermore, the project team could meet with local officials and decision-makers, regarding views, natural landscape features, and elements of local character traits. Finally, it could be possible to aid the local community in developing local policies regarding views and incorporation with the local character.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL3.3 ENHANCE PUBLIC SPACE	13	Restorative	
			<p>The Serra do Mar Program includes protection, restoration, and management actions for public spaces. These actions can be divided into three lines of work: the first is the management plan for improving the state park’s public use; the second is support for the creation and implementation of the Jureia-Itatins Mosaic, thus contributing to the consolidation of the ecological station, parks, and the sustainable development reserves that have been created, and improving the existing infrastructure for public use; the third and final is in support for the operation of the new mosaic of islands and marine protected areas, which includes a project for the implementation of best practices in ecotourism and marine sports. Other infrastructure projects include the implementation of visitor centers and support bases within the park, the implementation of a signage system for trails, and the improvement of communications with the public through exhibitions, leaflets, and posters, among others, and thus contributing to environmental education and proper use for visitors.</p> <p>Regarding the urban areas, the program has incorporated public spaces into the new condominiums, such as plazas, gardens and recreational facilities. Interviews with residents indicate satisfaction with the design of the public areas, but also indicate frustration with the municipality, which has been shy to assume responsibilities over the maintenance of those public spaces, relying instead on the state’s presence while the program is still under execution.</p>
		Source	<ul style="list-style-type: none"> - Cavaleiro, D. and Abiko, A. “Evaluating slum (favela) resettlements: The case of the Serra do Mar Project, São Paulo, Brazil.” Habitat International. 2015. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.
	Recommendations	<p>In partnership with resident representatives, the team should create a more thorough long-term plan to enhance and maintain the public spaces relevant to the relocated communities.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL 4.1- IDENTIFY AND ADDRESS THE NEEDS OF WOMEN AND DIVERSE COMMUNITIES (INDIGENOUS OR AFRO-DESCENDANT PEOPLES)		3	Superior
			<p>This credit evaluates to what extent the project improves the quality of life of women and diverse groups living in the communities surrounding the project and mitigate potential negative project impacts. Also, the credit looks at how the project addresses gender or social disparities, and local concerns in these regards. This project presented specific actions to consider these groups. Although, gender sensitive policies are still missing. Also, further meetings with representatives and stakeholders from these groups and evidence showing the extent to which their inputs were identified and addressed would further contribute to this credit's goal.</p> <p>The Serra do Mar project created two sustainable-use reserves in the Juréia-Itatins mosaic, so as to give the Ciaçaras and Caboclas communities a place where they could legally practice their traditional uses for the forest and agriculture. This group consists of about 80 families of mixed indigenous-Afro-Euro descent, who had previously been practicing traditional forest uses illegally in the the strictly protected ecological station area of of Juréia-Itatins for about 20 years. Under the auspices of the program, a new law was passed integrating the Juréia-Itatins into a mosaic system of conservation units and sustainable-use reserves. The Ciaçaras and Caboclas families can now continue traditional uses for the park, but now in a legal manner. This demonstrates an institutionalization into the program strategy to contain urban areas and regularize land use and conservation in the Serra do Mar region.</p> <p>In this program, the Trabalho Técnico Social (TTS), which promotes socio-community strengthening, emancipatory practices, and participation actions, considers women and diverse communities in several ways. First, it considers the particularities of each individual family and their respective needs, promoting alternatives to best meet their socioeconomic situation and consider the different needs and interests of women and diverse groups. Also, some actions of socio-communitarian organizations (working towards community social cohesion and wellbeing) and local development initiatives focus on women. One salient example is in the Nesdel socio-communitarian organization, which has two production groups: "Entrepreneurs Serra do Mar," which stimulates women's entrepreneurship and cultural appreciation of the local cuisine, and "Fabricoteiras" which sells local collective production of crafts at fairs and events.</p>
	Source		- SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015.
Recommendations		Trabalho Técnico Social (TTS) demonstrates considerations towards women and diverse groups. Nevertheless, it is possible to enhance these considerations by implementing supplementary practices such as by considering meetings and consultations with stakeholders and representatives from these groups, as well as community leaders, and decision makers to contemplate concerns and inputs and identify if there are particular hazards and risks to women. Regarding future sustainability evaluations, documentation, minutes, and evidence showing the extent of these actions to address needs of women and diverse groups will be taken into account.	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
GL4.2 - STIMULATE AND PROMOTE WOMEN'S ECONOMIC EMPOWERMENT	1	Improved	
			<p>The aim of this credit is to evaluate the extent to which local women are hired by the project activities across a variety of skill levels, as well as how they are targeted for income-generating opportunities and education. Overall, this program follows industry norms and regulations in this regard. It is worth mentioning that a number of women-based groups are created by the socio-communitarian organizations related to cuisine and crafts. Nevertheless, no evidence of gender considerations regarding the number of jobs created by the project during the design, construction and operations phases is provided. Also, no information is found on education programs connected to the three stages of the project's development.</p>
	Source		<ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015.
Recommendations			<p>The project team should evaluate and document the proportion of women who were hired during the design, construction, and operations of the project, as well as the mix of skill levels for these positions. Also, the project may participate in gender certification or other national, corporate, or industry gender equity and supplier inclusion initiatives. Moreover, specific targets may be established by the project team regarding the proportion of women in local employment, skills training, and of local suppliers.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
QL4.3 - IMPROVE ACCESS AND MOBILITY OF WOMEN AND DIVERSE COMMUNITIES (INDIGENOUS OR AFRO-DESCENDANT PEOPLES)	0	No Score
		Patterns of mobility, as well as the needs and concerns of safety and security that affect the infrastructure project may present gender disparities. This credit addresses how these differences are taken into consideration in the design, construction, and operations of the project. Overall, the program follows industry norms and standards in this regard, with no specific consideration is given to this particular matter. It is worth mentioning that the program provides considerations such as bus stops in central, well lit areas that will benefit women, as well as children and their caregivers. Although, the program was designed with these considerations from the beginning, no documentation was provided to evaluate how the design was adapted to respond to the needs of women that were voiced by the community.
	Source	- Annette Bettina Killmer (IDB), correspondence, September 15, 2015.
	Recommendations	The project team may identify the different patterns of mobility of woman and diverse groups, and assess the effect of the project on these patterns. Subsequently, the team should consider these inputs in the project design. For future sustainability evaluations, meeting minutes, and other evidences demonstrating the extent of these actions will be taken into account to further this credit's goal.
GLO.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	8	The social component of the project involves the resettlement and urbanization of approximately 7,760 families living informally in the Serra do Mar State Park. In particular, a resettlement plan has been developed for 6,400 families in Cubatão and the other 22 municipalities attached to the park, and about 2,400 families benefited by urbanization of populated areas that had been informally occupied. Most of the relocated residents have begun to experience life in condominiums for the first time. Therefore, they are not accustomed to the financial and maintenance responsibilities that they are expected to bear. In order to deal with the new challenges that these residents needs to confront, in the regular meetings between the affected community and project team, residents elected representatives known as "community agents." Subsequently, professional training to manage their new residential environment and govern their new social life. Specifically, of all the elected agents (totaling 200) attended a six-month course for urbanization community agents. The aim of this course was to reinforce the representation and participation of the community, and also to encourage their ability to transform the neighborhood by providing the means by which to identify problems, propose solutions, and involve the whole population in the urbanization process. The six months course was divided into modules on the following subjects: urbanization and community advocacy and leadership; memory, citizenship, and community communication; social Inclusion and human promotion; environmental transformation and sustainable local development. Ultimately, all of the participants received certificates. This work methodology that was executed within the program had already been structured and improved upon over the years by the Housing and Urban Development Company (CDHU), which is a partner of the project. This exercise represents an innovative action undertaken by the project awarded throughout this credit.
	Source	- ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project. 1st ed. São Paulo: 2013.

SUB CATEGORY: LEADERSHIP

Score

**SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS
SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM**

LD1.1 PROVIDE EFFECTIVE LEADERSHIP AND COMMITMENT

17	Conserving
	<p>Project owners identify environmental restoration and socio-economic rehabilitation in the Atlantic Forest Mosaics as central goals in their strategy and management plans. The program demonstrates a high level of commitment to sustainability by establishing it as a core value in goals and procedures. The policies, activities, and performance support their understanding of the issues and problems associated with sustainability. The project explicitly recognizes the need for action to enhance sustainability and achieves the highest rating for providing effective leadership and commitment. The documentation provided, such as the Strategy for Environmental and Social Assessment and the Environmental Management Report, outlines a three component structure based on conservation, social investment, and consolidation and monitoring. Additionally, the Secretary of Housing and Municipality of Cubatão signed a Protocol of Cooperation to reduce risks caused by unsustainable use of the Serra do Mar region. The Municipal Prefecture further committed to the sustainable relocation process in a public decree that is annexed to the Resettlement Plan. Moreover, the project demonstrates an understanding of the issues and problems associated with sustainability in the risk management plans and the strategy and management documents that outline enforcement and socio-economic measures to deter future occupations. The resettlement team stated its commitment to follow IDB guidelines to minimize the need for unnecessary relocations, ensure equitable and adequate compensation, and support a sustainable resettlement plan.</p>
Source	<ul style="list-style-type: none"> - Estado de São Paulo (ESP), Secretaria do Meio Ambiente e Secretaria da Habitação. PRRU - Plano de Reassentamento e Requalificação Urbana para os Núcleos de Ocupação Irregular do Programa de Recuperação Socioambiental da Serra do Mar em Cubatão. 2009. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A Social and Environmental Recovery Project, 1st Ed. São Paulo: 2013) - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009. - SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015.
Recommendations	<p>It is recommended to include a commitment to the principles of sustainable construction policy in the overall strategy document, specifically in regards to the housing complexes in order to promote a change in affordability standards.</p>

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
LD1.2 ESTABLISH A SUSTAINABILITY MANAGEMENT SYSTEM		14	Conserving
	Source		<p>The program created a sustainability management scheme that achieved remarkable performance through clear lines of authority and a structure that met the scope of its ambitions, prioritizing sustainability and integrating measures for robustness. Roles were institutionalized through loan terms, legislation, and working arrangements formalized through cooperative agreements between the executors. Main roles are identified in the Environmental and Social Project Management report. The Environment Department (SMA) and Housing Department (SH) co-executed the project through the Forest Foundation (FF), which implemented the Conservation and Monitoring program components. Then specific roles within the executor staff were formalized in this report - for example, at the state level: the State Secretary of Economy and Planning is the administrative level to support the Programme Coordination Unit (PCU), headed by a general coordinator appointed by the Governor, who is responsible for coordinating the program and articulating the actions of the co-executor. As another example: at the FF decisions and approvals relevant to the project are undertaken by the FF's Executive Board. The documents show that authority and responsibility for sustainability are at high levels in the project team organization and their authority to affect change is sufficient. In addition, control provisions were backed by state law and institutional measures.</p> <ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010.
	Recommendations		<p>Organizational policies, authorities, and mechanisms are fully in place to manage the scope, scale and complexity of the project and improve sustainability performance. Considering that the program achieved the highest level of performance, there are no recommendations for improvement.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
LD1.3 FOSTER COLLABORATION AND TEAMWORK	8	Superior
	Source	<p>The project owners approach the program as a socio-environmental system and recognize the importance of collaboration to achieve objectives. Institutionally, the program formed a partnership between three organizations (CDHU, Fundação Florestal and Policia Militar Ambiental) that had traditionally acted separately. Without this inter-institutional collaboration, the program could not provide the integrated socio-environmental approach that the realities on-site demand. The Housing and Environment Departments through jointly developed project models, methodologies, and pilot projects, consolidated land and relocated occupants. The strategy document includes plans for a cooperative agreement with the Municipality of Cubatão to collaborate in the planning and implementation of resettlements. The Resettlement Plan (PRRU) adopts a consultative and collaborative approach, gathering and adjusting project criteria and actions based on input from relocated families and stakeholders. The socio-economic Capacity Program Plan included local stakeholders, experts, and specialized agencies in the development of training courses. Public participation activities by the Technical Social Workers (TTS) demonstrated partnerships with a wide array of community businesses and organizations. Additionally, direct collaboration between the Environment Department and the Military Environmental Police in the monitoring component is part of the project strategy. Although monitoring is often engaged in a later stage of a project, in this case the monitoring team was integrated in the planning stage. Moreover, collaboration agreements with NGO stakeholders in managing the Marine mosaics are included. Even though the importance of risk and reward sharing is recognized, it is not explicitly incorporated in the owner’s contracts with the design team.</p> <p>- Annette Bettina Killmer (IDB), email correspondence, October 4, 2015. de Carvalho, Rene, and Ré, M. Programas de Capacitação da População Beneficiaria do Programa Recuperação Socioambiental da Serra do Mar. Relatório 3 Propuesta de programa de capacitación (BR-T1117). 2009. - ESP, SMA and SH. PRRU - Plano de Reassentamento e Requalificação Urbana para os Núcleos de Ocupação Irregular do Programa de Recuperação Socioambiental da Serra do Mar em Cubatão. 2009. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015.</p>
	Recommendations	<p>The adoption of whole systems design processes, procedures, and methodologies into the overall delivery process is recommended. The multidisciplinary team should work together early in the planning and design stages to understand how their design assumptions and decision affect the work of others. This helps to find ways to improve sustainability performance and commensurate goals with technical feasibility and costs. This includes members of the project team who are traditionally involved later in the project (e.g. constructor, commissioning agent). Also, include risk and reward sharing as part of the contract between the project owner and the project team is recommended.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
LD1.4 PROVIDE FOR STAKEHOLDER INVOLVEMENT	14	Conserving
		<p>The project team developed meaningful programs that successfully established relationships with key stakeholders, setting in place mechanisms for feedback and dialogue that encourage trust with the communities and engaged their active participation in the resettlement program. The exemplary social program conducted through Trabalho Técnico Social (TTS) is centered on close personal attention at the family level and a collaborative spirit that prioritizes community participation and cohesion, backed by systematic quantitative and qualitative monitoring. The Superintendência de Ações de Recuperação Urbana (SARU), part of the CDHU, assumed the specific role of working with the impacted families and navigating local socio-political contexts to strengthen community education, participation and engagement. Social mapping, investigation of quality of life and economic activities, and identification of community leaders laid the groundwork for a strategy centered on a pact between the government, project team and the impacted communities. Between Dec. 2010 and Feb. 2011, SARU held 41 meetings with 1,800 residents and provided training and coordination for the election of community representatives. As well, between 2010 and 2015, the Training of Urban Community Agents and the Núcleo Operacional de Urbanização (NOU) held 498 activities with participation from 1859 urban community agents, leaders and residents. Agreements with the community were reached through a process of dialogue and negotiation. This two-way exchange, receiving and giving information, increased the credibility of the project within the community. The project team further maintained a presence in the community by setting up 11 Technical Support Offices in the field, facilitating communication between the project team and community members. The NOU activities and other social community development projects (COM COM, Arte nas Cotas, NESDEL, Cota Viva and the Community Tourism course) have made stakeholder involvement and community engagement possible by providing a wide range of incentives and opportunities.</p>
	Source	<ul style="list-style-type: none"> - Annette Bettina Killmer (IDB), email correspondence, October 4, 2015. - Bonono, M. D. Primeira etapa do trabalho: Conhecimento da comunidade local. 2008. - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project, 1st Ed. São Paulo: 2013. - SARU and CDHU. Trabalho Técnico Social: Projeto de Recuperação Socioambiental da Serra do Mar. 2015.
Recommendations	<p>The program integrated solid and credible programs for obtaining stakeholder and community feedback. Therefore, further recommendations are not provided.</p>	

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
LD2.1 PURSUE BY-PRODUCT SYNERGY OPPORTUNITIES	0	No Score	
	Source		<p>By-product synergy involves identifying unwanted by-products or discarded materials and resources from nearby facilities and using these products during the construction or operation of the project. The project did not show evidence of searching unwanted by-products in nearby operations or candidate facilities for such opportunities. The availability of excess resources and/or energy remains unclear and no contact with managers of nearby facilities to this end is presented. It is possible that these opportunities were explored downstream, in municipal contracts, but this is not specified in the project design or management documents.</p> <p>- ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009.</p>
	Recommendations		<p>The project would achieve a higher score if it assessed the potential for using unwanted by-products or discarded materials from nearby facilities. For example, synergistic opportunities might have been found using by-products from the nearby construction of the new park or housing infrastructures.</p>
LD2.2 IMPROVE INFRASTRUCTURE INTEGRATION	16	Restorative	
			<p>The Serra do Mar Park and Atlantic Forest Mosaics program undertook an ambitious plan to integrate, in a comprehensive way, urban and environmental assets that were deeply connected. The project restores valued natural resources and consolidates urban infrastructure through an articulated overall plan that integrates existing and new infrastructure elements. For this purpose, different sector representatives were included during the program’s design process, such as the resettled communities, non-governmental organizations aiming to protect the forest, or study groups in quality of life.</p> <p>The voluntary relocation program regularized land use and integrated families from high risk areas into safe housing with access to public service infrastructure (e.g., transport, schools, libraries, community centers, day care, public and green areas, commercial and residential centers). Specifically, the selected location of new housing offices offered easy access to central areas of Cubatão. The project sought other synergies with non-built external infrastructures. For example, the new remote georeferenced monitoring system interfaced with the existing state environmental data systems. Also, in response to protests from the Jardim Cascqueiro neighborhood association, in which resettled families strain an already inadequate public infrastructure, the program took measures to improve deficits by adding schools, health centers, new transit lines and increased transport capacity. In addition, The program restored 350 ha, improved boundaries and legal status of conservation units in the Park of Serra do Mar and Atlantic Forest Mosaic, and constructed park management and visitation centers, trails, access points, and improved waste management.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
Source		<ul style="list-style-type: none"> - de Carvalho, R., and Ré, M. Programas de Capacitação da População Beneficiária do Programa Recuperação Socioambiental da Serra do Mar (Reference: Relatório 3 Propuesta de Programa de Capacitación. Programa de Recuperação Socioambiental da Serra do Mar (BR-T1117). 2009. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009.
	Recommendations	<p>The program obtained the highest level of achievement in this credit. In light of its significant efforts in integrating the existing and new infrastructure elements, natural resources, regional forest and urban assets within the social, urban and environmental framework, there are no recommendations for improvement.</p>
LD3.1 PLAN FOR LONG-TERM MONITORING & MAINTENANCE	10	Conserving
		<p>The Serra do Mar and Atlantic Forest Mosaics Restoration Program put in place a clear and comprehensive long-term monitoring and maintenance plan and allocated sufficient institutional resources for its maintenance. Specifically, the monitoring program provides diverse measures to prevent illegal re-occupations of conservation areas in the future and includes follow-up socioeconomic and environmental education programs to maintain the sustainability of the resettlement process. Monitoring to prevent illegal re-occupation of the Serra do Mar Park and Mosaics is a main component of the management plan. Investments (USD \$41 million out of a project total of USD \$470.1 million) aim to increase monitoring capacity by adding environmental and military police personnel, new management centers, trails and access points, boats, and a georeferenced monitoring system. In addition, restoration of Conservation Units and formalization of their boundary areas will lead to enhanced controls and therefore potential maintenance. This precise boundary definition will also help to "freeze" the irregular occupation around the perimeter of the Serra do Mar Park, by the municipalities of Ubatuba and Sao Sebastião. The Forest Foundation, Botanical Institute, and Coordination of Biodiversity and Natural Resources will oversee the monitoring and coordinate its implementation by the Military Police in Guaruja. Also, education programs and community participation in Conselhos Consultivos dos Parques aim to increase social awareness of the value of the park and deter future occupations. Regarding the urban areas, a two-year social work plan managed by the Municipality of Cubatão will provide services to minimize the risk of mal-adaptation within the resettled population, enhancing resettlement maintenance.</p>

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
	Source		<ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IDB. “Plano de Aquisições (PA) - 18 Meses: Contrato de Empréstimo: 2376/OC-BR.” In Programa “Recuperação Socioambiental da Serra do Mar e Sistema de Mosaicos da Mata Atlântica”. 2015. - IDB. “Propuesta de Desarrollo de la Operación.” In Programa de Recapueración Socio-Ambiental de la Serra do Mar y del Sistema de Mosaicos de la Mata Atlántica (BR-L1241). 2010. - PLT Self-Assessment. September 15, 2009.
	Recommendations		<p>The program achieved the highest level for this credit due to the comprehensiveness and detail of its plans and commitment of institutional resources to fund the activities. Consequently, there are no recommendations for improvement.</p>
LD3.2 ADDRESS CONFLICTING REGULATIONS & POLICIES	2	Enhanced	
			<p>This credit rewards projects that identify and change standards and policies that may unintentionally run counter sustainability goals and practices. The Strategy Document systematically assessed relevant institutional and legal frameworks and IDB policies, and identified areas of conflict and measures for resolution. The program also provided legal mechanisms on the municipal level to support social programs for the voluntary resettlement. Federal Brazilian Law governs the protection and use of the Atlantic Forest Biome (Lei Federal de 22 December, 2006) and grants the State expropriation authority to protect land and water resources. The implementation of an innovative mosaic system offered a solution to resolving illegal occupations around protected areas by providing structural reforms to address land-use disputes. Although a forced resettlement was a legal option, the program chose a voluntary resettlement model, avoiding social conflict and legal disputes. Importantly, legal mechanisms were instituted at the municipal level to guarantee the right of the relocated families to participate in the resettlement process. Additionally, the Federal Constitution and IDB policies require minimizing social impacts and indemnities to compensate for resettlements. However, under the Federal City Law, municipalities have authority over execution and guidelines for resettlements and urban regularization. The program further minimized the potential of legal conflicts arising from merging institutional interests by entering into a Protocol of Cooperation with the Municipality of Cubatão to implement the urbanization and resettlement component of the program..</p>

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
	Source		<ul style="list-style-type: none"> - Ré, Magdalena. “Decreto No. 9.927 de 19.12.2008 Prefeitura Municipal de Cubatão.” In Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento. 2009. - ESP and IDB. Estratégias Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socio environmental Recovery Program (BR-L1241). 2010.
	Recommendations		Beyond the resettlement program and the resolution of land-use conflicts, the project would assume an even greater leadership role if it took its assessment one step further to address additional structural changes in actual standards, laws, and regulations to ensure more sustainable use of limited resources, such as water and energy, especially in the new housing complexes. For example the use of greywater for certain purposes should be evaluated accompanied with the study of possible regulations that could hinder this sustainable practice.
LD3.3 EXTEND USEFUL LIFE		3	Enhanced
			This credit considers whether the project’s design allows for extending its useful life by adding flexibility to the completed design, enabling easy reconfiguration and refurbishment, or enhancing durability and resiliency. Extending the useful life of a project reduces the energy, water, and materials required for rebuild. Within this project, the Environmental Military Police (PMA) buildings considered durability, estimating a useful life of 50 to 100 years, and included durability criteria in material selection. The PMA buildings also considered ease of disassembly in their choice of metal and prefabricated concrete components, as well as window glass and frames, and doors and bathroom dividers. Also, the planned construction for the botanical garden extends the useful life of the building from the high humidity of its surroundings by raising structures and walkways above ground, using metal and artificial wood structures, pressure-treated wood, corrosion-resistant steel, and steel roofing shingles. The housing units were also designed to maximize the life of the housing by adopting a diversity of layouts and incorporating flexibility into their configuration by allowing easy repartitioning. The program anticipates that these measures, and similar ones for adaptable public spaces, will ensure conditions for the longevity of the housing units and public spaces.
	Source		<ul style="list-style-type: none"> - AQUA. “Categoria 2: Escolha Integrada de Produtos, Sistemas e Processos Construtivos.” QAE Fase Concepção 013 Auditada. n.d. Fundação Florestal (FF). Anexo I: Memorial Descritivo. Projecto Básico de Implantação e Arquitetura do Jardim Botânico em Cubatão. Estudo Preliminar. 2015. - IBD, FF, CDHU, and ESP. Serra do Mar and the Atlantic Forest Mosaic System: a Social and Environmental Recovery Project, edited by Keila Prado Costa and Maria Cristina N. Valadares Vasconcelos, 1st ed. São Paulo: 2014.

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM	
	Recommendations	<p>Considering that the new housing complexes comprise the largest amount of construction related to the program, it is recommended to integrate more durable materials and resilient design to extend their useful life. Strategies to guide future expansions of the housing units by owners could be design drivers that allow for the adaptation of units according to individual family needs. Moreover, conducting a feasibility study to determine areas of potential long-term cost savings in regards to designing for future expansion, reconfiguration, durability, reduced maintenance, etc, is recommended.</p>	
QLO.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	6	<p>The program is awarded innovation credits for its management plan which reinforced its commitment and leadership to achieve socio-environmental recovery in the Serra do Mar region. The joint execution of its strategy by the Housing and Urban Development Agency and the Forestry Foundation was further strengthened by a Program Management Unit (PMU), attached to a third institutional partner, the State Economic Affairs and Planning Department (SEP). Through the PMU, the SEP provided strategic coordination between the public housing and environmental interests of its co-executors. Leading strategic planning, the PMU consolidated work and procurement plans, monitored and evaluated the reports of the two agencies, and as well as independent audit reports and financial oversight. This integration of social and environmental interests was further strengthened by creation of program executing units in the co-executing agencies. This interagency coordination was further supported by including partnerships on the municipal level with the City of Cubatão, through social pilot programs and activities with a range of social and environmental technical groups, and a participatory component that created robustness across interests and levels of activities.</p>	
	Source	<p>ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socio environmental Recovery Program (BR-L1241). 2010.</p>	
	Recommendations	<p>The program is recommended to reflect upon the lessons of this model and devise a strategy whereby the agencies can continue to collaborate to promote socio-environmental objectives following the course of the program. This management structure provides a model which infrastructure programs can implement to advance socio-economic solutions in many other arenas.</p>	
	90		

CATEGORY II: CLIMATE AND ENVIRONMENT

SUB CATEGORY: RESOURCE ALLOCATION

Score

SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM

RA1.1 REDUCE NET EMBODIED ENERGY	2	Improved
		<p>The PMA environmental certification process mentions a life cycle assessment (LCA), however there is a lack of information describing how this LCA modeled embedded net energy, what strategies the project took or how much of a reduction in net embodied energy was achieved in the overall program. Additionally, there is no information addressing intent or effort to reduce net embodied energy in the housing construction for the resettlement and urbanization component. Nevertheless, considering the large scale and multiple components of the program, some strategies to reduce the net embodied energy can be found. First, Military Environmental Police (PMA) buildings were constructed to meet AQUA (Alta Qualidade Ambiental) certification for sustainable construction, the criteria for which requires selection of products and processes that reduce net embodied energy. Second, the environmental construction plan for the 3rd Battalion PMA headquarters specifies the use of cement grades CPIII and CPIV, which are produced with less energy than other types of cement. The construction plan also sourced cements near to the construction site, further reducing net energy consumed.</p>
	Source	<ul style="list-style-type: none"> - Centro de Tecnologia de Edificações (CTE). Gestão Ambiental do Empreendimento. 2014. - Loeb, Rodrigo Mindlin, and Inova. Relatório Técnico de Sustentabilidade: Projeto Executivo Projeto Para Nova Sede do 3º Batalhão da Polícia Militar Ambiental Guarujá-São Paulo. 2013.
Recommendations	<p>It is recommended to assess and adopt measures reducing net embedded energy in the housing complexes, which are the main constructed component of the program. It is also recommended to show how the PMA constructions assessed and calculated their net embedded energy reductions. Ideally the overall project plan and strategy should commit from the top down to reduce net embedded energy.</p>	
RA1.2 SUPPORT SUSTAINABLE PROCUREMENT PRACTICES	2	Improved
		<p>Design plans, the life cycle assessment model, and calculations of sustainable purchases as a percentage of total percentages are needed to evaluate the extent to which the overall program considered materials and equipment from sustainable suppliers. The program does not document the adoption of sustainable procurement practices for the construction of housing in the resettlement and urbanization program. Notwithstanding, sustainable procurement practices are included in the environmental construction of Environmental Military Police (PMA) buildings. Architecture reports for PMA constructions followed the AQUA (Alta Qualidade Ambiental) certification criteria for sustainable construction. Category 2 of the AQUA process applies a life cycle assessment and selection of products, systems and construction processes that maximize social and environmental adaptability, quality, performance, and ease of upkeep and reuse. Environmental plans for one PMA building aimed to acquire 80% of construction materials from verified sources, obtain 30% of all materials within 300 km, reach a 20% content of recycled content, purchase environmentally-certified wood and cement with a lower embodied energy content, and increase durability through reinforced concrete and a metallic exterior suited to high humidity. Therefore, in the case of this building a well-defined program for sustainable procurement is put into place, but this represents a small percentage within the overall construction.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
Source		<ul style="list-style-type: none"> - AQUA. Categoria 2: Escolha Integrada de Produtos, Sistemas e Processos Construtivos. QAE Fase Concepção 013 Auditada. n.d. - Loeb, Rodrigo Mindlin, and Inova. Relatório Técnico de Sustentabilidade: Projeto Executivo Projeto Para Nova Sede do 3º Batalhão da Polícia Militar Ambiental Guarujá-São Paulo. 2013. - Luciano & Associados Arquitetura. Projeto do Centro de Treinamento do Comando de Policiamento Ambiental Vila Guarani - São Paulo (Presentation). n.d.
		<p>The project needs to show that sustainable procurement guidelines were applied to the resettlement component, which represents the most significant amount of new construction. Prepare a procurement plan that includes materials weight, cost or volume, manufacturer/supplier, sustainability documentation, third party certifications, and efforts to ascertain supplier integrity.</p>
RA1.3 USED RECYCLED MATERIALS	0	No Score
		<p>The aim of this credit is to reduce the use of virgin materials and promote the use of materials with recycled content. To this end, no information is provided on the use of recycled materials for the housing constructions in the resettlement and urbanization component of the project, which constitutes the higher amount of materials utilized for construction within the program. Nonetheless, the Military Environmental Police (PMA) headquarters and training center were built to meet AQUA (Alta Qualidade Ambiental) certification for sustainable construction, a process developed by the Fundação Vanzolin. An AQUA summary for one PMA building specifies that 20% of aggregate used was to be sourced from recycled materials. More detailed inventories of location, weight, and volume of reused structures or materials as well as information on their quality and performance criteria are needed to assess the level of achievement.</p>
Source		<ul style="list-style-type: none"> - AQUA. Categoria 2: Escolha Integrada de Produtos, Sistemas e Processos Construtivos. QAE Fase Concepção 013 Auditada. n.d.
Recommendations		<p>Ideally the overall program strategy should commit to maximize the use of recycled materials in all new construction. It is recommended to provide information demonstrating that recycled products were used for the residential constructions, and to quantify and inventory the use of recycled materials in all constructions indicating type, percentage of recycled content by weight or volume, performance and quality criteria.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA1.4 USE REGIONAL MATERIALS	0	No Score
		This credits seeks to evaluate the use of regional materials to minimize transportation costs and impacts. For the program, no information is provided on the use of regional materials in relation to the housing constructions, which are part of the resettlement and urbanization component of the project. Only the Military Environmental Police (PMA) headquarters and training center were built to meet AQUA (Alta Qualidade Ambiental) certification for sustainable construction, a process developed by the Fundação Vanzolin. An AQUA audit summary for one of these PMA buildings informs that 30% of materials are to be sourced from locations within 300 km of the building site. One report for a 3rd Battalion construction specifies that cements and other construction materials were sourced within 115 km of the site.
	Source	- Policia Militar Ambiental. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
	Recommendations	Ideally the overall project plan and strategy should commit to a policy that minimizes transportation costs and impacts in all of its components. It is recommended to demonstrate that regional materials were used during the residential construction of the resettlement and urbanization component by providing an inventory with information on the regional sourcing of materials used, including plants and soils.
RA1.5 DIVERT WASTE FROM LANDFILLS	0	No Score
		Recycling and reuse are encouraged by reducing the amount of waste. In this case, no information is provided on recycling or waste management for the housing constructions in the resettlement and urbanization component of the project. Moreover, considering that more than 5,000 families live in the complexes already finished, a waste management plan is an important measure to undertake. The environmental management plan for the PMA buildings identified local recycling facilities and a goal of low-impact construction and recycling. An initial review determined potential to meet a 15% materials reuse target. The plan says that the bidding criteria would require the builder to provide 100% traceability assurance and a process for selection and hiring of carriers and destinations for all types of waste generated. However, the project should quantify the amount of materials sent for recycling. A clearer waste management plan and reporting system to minimize waste during construction and operations is required to evaluate the percentage diverted towards recycling or reuse.
	Source	- AQUA. Categoria 3: Canteiro de Obras com Baixo Impacto Ambiental. QAE Fase Conceção 013 Auditada. n.d. - Policia Militar Ambiental. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA1.6 REDUCE EXCAVATED MATERIALS TAKEN OFF SITE	0	No Score
		<p>Minimizing the movement of soils and excavated materials off site can reduce the environmental impacts of construction by reducing transport that emits greenhouse gases and changes site topography. To avoid unnecessary transport, planners can look for opportunities to minimize grading and retain soil on site. This credit rewards the retaining of suitable materials for reuse on site. The Serra do Mar program did not calculate the percentage of excavated materials reused on site. Nonetheless, the program will reuse excavated materials from the deconstruction of the Água Fria settlements and the bairros Cota 400 and 95/100 to elevate the internal access road to the future Botanical Garden. Additionally, the Military Environmental Police (PMA) constructions included criteria to reduce excavated materials taken off site in preliminary management plans. However, design documents, estimates of excavated materials to be taken off site, and percentages of reduction or beneficial reuse of excavated materials are needed to evaluate what was planned or achieved.</p>
	Source	<ul style="list-style-type: none"> - PMA, FF, and Luciani & Associados. Termo de Referência para Obra de Construção do 1º Batalhão da Polícia Militar Ambiental do Estado de São Paulo. 2014. - Muratore, J. R. TdR, Termo de Referência: Contratação de Serviços de Projeto Executiva de Arquitetura, Urbanismo e Complementares do Jardim Botânico em Cubatão no PESM - Itutinga/Pilões. São Paulo: 2015. - UEP Fundação Florestal, email correspondence, October 27, 2015.
Recommendations	<p>Ideally the overall program strategy should adopt a policy to reuse excavated materials and reduce the amount taken off site. It is recommended to demonstrate that the reuse of excavation materials was considered for the housing constructions and to show that design documents estimated quantities of excavated material taken off site and balanced cut and fill operations.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA1.7 PROVIDE FOR DECONSTRUCTION & RECYCLING	1	Improved
		<p>Future recycling and reuse by considering in the design the easy and efficient disassembly or deconstruction of the buildings at the end of their useful life should be considered. The project presents specific actions that enable several components to be easily disassembled and in some cases reused. Nevertheless, further efforts are required to design the housing units in a way that, at the end of their useful life, a considerable percentage can be readily disassembled to enable materials and equipment reuse and upcycling in order to be awarded in this credit.</p> <p>In particular, the Rubens Lara resettlement community (designed to accommodate 1,840 families) followed Universal Design guidelines and adopted internal partitions that could be removed or repositioned without impacting the structure of the building or its utility infrastructure. Materials chosen included drywall technology, a material typically not used in Brazilian social housing. This flexibility will make the living accommodation adaptable and flexible for changing needs and future owners.</p> <p>The Military Environmental Police (PMA) constructions were certified by AQUA (Alta Qualidade Ambiental) whereby sustainable construction criteria included the ease of disassembly and reuse in product selection. This was achieved in part by using prefabricated products like Bubbledeck slabs and a target to have 50% of the construction suitable for reuse. However, it is not clear how the project team expanded on this intent to use recyclable materials or design them into the construction plans. General percentages of materials likely to be recycled by weight, volume, or cost are missing, as well as the extent to which the design incorporated disassembly and recycling of components.</p>
	Source	<ul style="list-style-type: none"> - Centro de Tecnologia de Edificações (CTE). Gestão Ambiental do Empreendimento. 2014. - AQUA. Categoria 2: Escolha Integrada de Produtos, Sistemas e Processos Construtivos. QAE Fase Conceção 013 Auditada. n.d. - IBD, FF, CDHU, and ESP. Serra do Mar and the Atlantic Forest Mosaic System: a Social and Environmental Recovery Project, edited by Keila Prado Costa and Maria Cristina N. Valadares Vasconcelos, 1st ed. São Paulo: 2014. - Loeb, Mindlin, R., and Inova. Processo AQUA: Dossie que Fase Conceção Projeto para Nove Sede do 3 Balhão da Polícia Militar Ambiental Guarujá. 2013. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
Recommendations	<p>The program strategy would ideally identify deconstruction and recycling as a general policy. This should be demonstrated with plans and measures taken to provide for deconstruction and recycling in housing constructions for resettlement and urbanization. It is recommended to show that arrangements were made to identify and keep track of components and prefabricated units designed for disassembly and/or deconstruction.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA2.1 REDUCE ENERGY CONSUMPTION	7	Enhanced
		<p>Reducing energy consumption through planning and design reduces greenhouse gas emissions and conserves energy resources. The Serra do Mar program receives credit for taking the energy savings of both its residential and environmental military police (PMA) buildings into consideration, primarily utilizing solar powered water heating systems.</p> <p>The Serra do Mar program has installed plans to install solar water heaters in new housing units, providing greater energy efficiency than gas or electricity. Also, new housing units in the Rubens Lara development (1,840 families) have porcelain coatings on their facades and are designed to maximize natural lighting and ventilation, providing better thermal performance. Unfortunately, no documentation is available to quantify the energy savings from a benchmark residential unit. Further, the support centers for the PMA and park visitor centers are designed to exceed benchmark standards of energy consumption according to AQUA energy efficiency criteria. As an example, a new PMA headquarters was designed for a 30.74% reduction in energy consumption compared to the benchmark. Energy efficiency design included natural ventilation, natural and fluorescent lighting, manual light controls and automatic light timers for spaces greater than 250 m2, directional shading, a solar hot water heating system, and use of evaporators to accommodate simultaneous demands for hot and cold water. The future botanical garden will also save energy by using natural and low energy consuming lighting, green roofs, natural ventilation and passive solar design.</p>
	Source	<ul style="list-style-type: none"> - AQUA. Categoria 4: Gestão da Energia. QAE Fase Concepção 013 Auditada. n.d. - IBD, FF, CDHU, and ESP. Serra do Mar and the Atlantic Forest Mosaic System: a Social and Environmental Recovery Project, edited by Keila Prado Costa and Maria Cristina N. Valadares Vasconcelos, 1st ed. São Paulo: 2014. - Luciani & Associados Arquitetura. Análise do Local do Empreendimento e Definição do Perfil da Qualidade Ambiental do 1º BPAmb Casa Verede. n.d. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - FF. Anexo I: Memorial Descritivo. Projecto Básico de Implantação e Arquitetura do Jardim Botânico em Cubatão. Estudo Preliminar. 2015. - Muratore, J. R. TdR, Termo de Referência: Contratação de Serviços de Projeto Executiva de Arquitetura, Urbanismo e Complementares do Jardim Botânico em Cubatão no PESH - Itutinga/Pilões. São Paulo: 2015. - Luciani & Associados Arquitetura. Projeto do Centro de Treinamento do Comando de Policiamento Ambiental Vila Guarani - São Paulo (Presentation). n.d. - PMA, FF, and Luciani & Associados. Termo de Referência para Obra de Construção do 1º Batalhão da Polícia Militar Ambiental do Estado de São Paulo. 2014. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
Recommendations	<p>While commending the energy efficiency gains through the use of solar water heating, the energy consumption footprint of the program might have been further reduced by applying a whole system design for energy efficient residential constructions.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA.2.2 USE RENEWABLE ENERGY	13	Superior
		<p>Incorporating renewable energy into the construction and operation of a project provides a cleaner energy source that reduces dependence on fossil fuels. In this regard, the Serra do Mar program included renewable energy sources in both the construction of residential housing units and the park and mosaic visitor centers and support centers. Solar energy to heat water was planned for 1,556 housing units in Cubatão, Santos and São Vicente. Unfortunately, there are no estimations of the annual percentage of renewable to total energy use for the housing units. By contrast, the PMA buildings, including visitor centers and support centers, use a solar water system to heat water to supplement internal use, and incorporate solar photovoltaic panels for internal use that will have permission and capability to export electricity to the electrical grid. The AQUA audit for the 1st Battalion headquarters calculated that renewable energy would supply 19% of the energy needs for the operation of the building, based on estimated annual energy use and annual output of the solar system. The terms of reference for one PMA building provided for a geothermal heat exchanger for evaporation from its air conditioning unit to boost the solar water heating system. Selection of energy was due to local availability: planners for the 3rd Battalion support center explained that wind energy was not viable due to low average wind velocities. Across Brazil, the use of renewable energy is quite high considering the widespread use of hydroelectricity. At a country level almost 45% of primary energy demand is met by renewable energy, and large hydropower plants provide 80% of domestic energy generation. It is also worth noting that the future botanical garden will provide public demonstrations on solar and renewable energy technology.</p>
	Source	<ul style="list-style-type: none"> - AQUA. Categoria 4: Gestão da Energia. QAE Fase Concepção 013 Auditada. n.d. - ESP, SMA and SH. PRRU - Plano de Reassentamento e Requalificação Urbana para os Núcleos de Ocupação Irregular do Programa de Recuperação Socioambiental da Serra do Mar em Cubatão. 2009. - International Energy Agency: Brazil (partner country). Accessed November 21, 2015 at https://www.iea.org/countries/non-membercountries/brazil/. - FF. Anexo I: Memorial Descritivo. Projecto Básico de Implantação e Arquitetura do Jardim Botânico em Cubatão. Estudo Preliminar. 2015. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. - PMA, FF, and Luciani & Associados. Termo de Referência para Obra de Construção do 1º Batalhão da Polícia Militar Ambiental do Estado de São Paulo. 2014. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
Recommendations	<p>The use of solar water heating systems in the residences and park buildings shows improvement over benchmark standards, however a systematic evaluation of renewable energy sources in the planning of construction and during building operations could possibly have advanced to a higher achievement level.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
0	No Score	
RA 2.3 COMMISSION & MONITOR ENERGY SYSTEMS		<p>This section looks at how the program ensured the efficient functioning, commissioning, and monitoring of its energy systems. The program did not show that it conducted or will conduct either a one-time commissioning or long-term monitoring of the energy systems for the residential units or the park police buildings. Along these lines, follow-up social surveys found that initially one-quarter of the surveyed residents had trouble understanding how to use the solar water heater system. The program has responded to problems found in the manufacture of the original solar heating system used, and has changed its supplier. These issues indicate the benefits of commissioning, monitoring and identifying human elements that can be responded to by training.</p>
	Source	<ul style="list-style-type: none"> - Consórcio Diagonal Villagua. Segunda Tomada do Levantamento Social nos Condomínios do Programa de Recuperação Socioambiental da Serra do Mar. Projeto: CDHU-Condomínios. São Vicente: 2013. - Humberto Shmith (CDHU), email correspondence, November 3, 2015.
	Recommendations	<p>An independent first-time commissioning and long-term monitoring of an energy system can ensure proper functioning and prevent degradation and energy losses over time. An initial commissioning of the project's solar heating elements could possibly have identified some of the problems with the equipment earlier on, leading to earlier repair and higher user satisfaction. In addition, both initial and long-term maintenance and monitoring are recommended to include the training of homeowners to ensure full and proper use of energy systems.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA3.1 PROTECT FRESH WATER AVAILABILITY	9	Superior
		<p>This credit addresses the project’s impact on the quantity and quality of valuable freshwater resources. In this regard, the Serra do Mar and Atlantic Forests Restoration Program protects natural drinking water sources for the São Paulo metropolitan area and Baixada Santista. The program restores Atlantic Forest and removes illegal settlements that have caused significant erosion and pollution of freshwater sources in the past. In this way, the program has a significant (and already measureable) impact on freshwater quality in the Rio Cubatao, and it is expected to have similar positive impacts in other project areas and should also have an impact on water quantity in the region. The program estimates that its specific actions will benefit the 2.7 million people in the Baixada Santista who rely on the Serra do Mar mountain range as their source of drinking water. Towards this goal, the project initiated a process to legally restructure land use and priority conservation areas, restoring and stabilizing degraded areas. The creation of 16 coastal conservation units that extend the entire coastline of the state and cover 50% of the Atlantic Forest, the protection of 90,000 hectares in the new Jureia-Itatins Mosaic, the Botanical Garden, and the improved monitoring and management in the Serra do Mar State Park will all combine to restore natural forest drainage systems - protecting and rehabilitating freshwater resources. In addition to the changes in the natural environment, the urbanization plans will improve water availability for resettled and urbanized populations by tying them into urban public water infrastructure. Planning for the conservation support buildings for the Military Environmental Police also took steps to protect fresh water availability by building conservation support centers that collect and use rainwater for sanitation grey water and irrigation, and by incorporating green spaces and buffering areas for stormwater runoff. However, information about the impact of the new the housing projects on fresh-water availability was not provided and opportunities for water reuse or managing runoff to recharge local groundwater and surface water supplies were not considered. Therefore, the overall impact of the program on replenishing water volume at the source for a net positive impact was not quantified in the documentation provided.</p>
	Source	<ul style="list-style-type: none"> - ESP, SMA and SH. PRRU - Plano de Reassentamento e Requalificação Urbana para os Núcleos de Ocupação Irregular do Programa de Recuperação Socioambiental da Serra do Mar em Cubatão. 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
Recommendations	<p>The program clearly contributes to restoring the native ecosystem conditions; nonetheless, a comprehensive water availability assessment will contribute to quantifying the long-term positive impacts in water ecosystems in the area of intervention. In the future, watershed restoration should be backed by a long-term monitoring system in order to track changes in the water quality as a result of restorative actions and to adjust accordingly.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA3.2 REDUCE POTABLE WATER CONSUMPTION	0	No Score
		<p>Recognizing that water is becoming a scarce resource, this credit looks at how the project team reduced potable water consumption by encouraging the use of greywater, recycled water, and stormwater. The Serra do Mar and Atlantic Mosaics Restoration Program had mixed results that hovered around but did not rise a sufficient level above the benchmark of at least 25% potable water use reduction in order to earn achievement in this credit.</p> <p>In regards to the housing constructions, the program took a positive step by installing individual water meters in the new residences. Individual water meters will give people knowledge of their drinking water consumption patterns and may at some point facilitate public incentives to reduce drinking water consumption. However, the housing units do not appear to have received equipment or designs that would reduce potable water use beyond industry norms.</p> <p>The conservation support buildings for the Military Environmental Police (PMA), on the other hand, took steps to reduce potable water consumption by collecting, treating, and using rainwater as grey water in toilets, and for cleaning and irrigating green areas. The PMA buildings further reduced water by including designs to reduce flow from toilets and bath facilities. Estimates of annual consumption of potable drinking water and collected rainwater were estimated in an AQUA audit to achieve a 17% reduction in potable water consumption with a capacity to supply water for 11 days during drought. Also noteworthy, the environmental education program will treat rainwater for drinking as part of its demonstration, and the visitor center will use treated wastewater for the greywater system.</p>
	Source	<ul style="list-style-type: none"> - AQUA. Categoria 5: Gestão da Água. QAE Fase Concepção 013 Auditada. n.d. - ESP, SMA and SH. PRRU - Plano de Reassentamento e Requalificação Urbana para os Núcleos de Ocupação Irregular do Programa de Recuperação Socioambiental da Serra do Mar em Cubatão. 2009. - FF. Anexo I: Memorial Descritivo. Projecto Básico de Implantação e Arquitetura do Jardim Botânico em Cubatão. Estudo Preliminar. 2015. - Luciani & Associados Arquitetura. Projeto do Centro de Treinamento do Comando de Policiamento Ambiental Vila Guarani - São Paulo (Presentation). n.d. - Muratore, J. R. TdR, Termo de Referência: Contratação de Serviços de Projeto Executiva de Arquitetura, Urbanismo e Complementares do Jardim Botânico em Cubatão no PESM - Itutinga/Pilões. São Paulo: 2015. - PMA, FF, and Luciani & Associados. Termo de Referência para Obra de Construção do 1º Batalhão da Polícia Militar Ambiental do Estado de São Paulo. 2014. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
Recommendations	<p>The program would achieve greater reductions in potable water consumption by assessing the overall water needs of its buildings and incorporating a holistic strategy to minimize potable water use. The project could also consider incentives for the urbanized and resettled families to reduce potable water use, perhaps as a pilot for a wider water reduction incentive program in Cubatão.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
RA3.3 MONITOR WATER SYSTEMS	9	Superior
		Monitoring water systems provides opportunities to detect system failures as well as opportunities to make adjustments to optimize the system. In this regard, the Serra do Mar program provided individual water monitors in its housing units connected to the city's potable water system. Program documentation does not address monitoring the water systems in the newly constructed or renovated residential or park buildings to improve efficiency or to find ways to decrease consumption. Water systems in the housing units are monitored under the municipal water system of Cubatao and are not in the scope of the Serra do Mar program.
	Source	- ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.
	Recommendations	Commissioning an independent monitoring authority to check for leaks, failures, and opportunities for reducing consumption, among others, in the housing unit water system is recommended
QLO.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	0	N/A

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SUB CATEGORY: NATURAL WORLD

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
NW1.1 PRESERVE PRIME HABITAT	18	Restorative
		<p>This credit addresses the measures taken by a project to avoid, develop, or restore critical habitats for wildlife biodiversity. The Serra do Mar and Atlantic Forest Mosaics Restoration program attains the highest level of achievement for increasing the area of protected prime forest and coastal habitat and taking measures to restore habitat connectivity within the region.</p> <p>The Atlantic Forest has been badly damaged by human activities, and only 7% of its original cover remains well preserved, according to the Ministry of Environment (SMA). The area is listed as one of the planet's most threatened biotic systems and considered a global hotspot by Conservation International due to its importance and threatened status. The Atlantic Forest is considered a Biosphere Reserve by UNESCO and has been enacted as a Cultural Heritage Site in the Brazilian Federal Constitution.</p> <p>The Serra do Mar program now encompasses the Serra do Mar State Park (315,000 ha over 23 municipalities), the Juréia-Itatins territory (90,000 hectares in 5 municipalities), and protected coastal areas that together will protect close to 50% of the coastline of the State of São Paulo. Specifically, the program increases the area of protected prime habitat by adding 16 marine protected areas along the entire coastline of the state. In the Serra do Mar State Park, the program plans include vacating 80 ha of degraded areas via resettlements, eradication of invasive species from 100 ha and replacement with native species, recovery of 350 ha of forest, and creation of the Cubatao Botanical Garden on formerly occupied land.</p> <p>Also, the site assessments of the new park monitoring bases evaluated proximity and avoided siting on important habitat areas. Construction for the resettled families was located closer to urban infrastructure so as to free prime habitat areas.</p>
	Source	<ul style="list-style-type: none"> - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project, 1st ed. São Paulo: 2013. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. n.d.
Recommendations	<p>The program attains the highest level of achievement for the restoration of 90 ha and protection of 50% of the coastal areas of the state of São Paulo. Therefore no further recommendations are provided.</p>	

		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
NW1.2 PRESERVE WETLANDS AND SURFACE WATER	Score	
	4	Enhanced
		<p>This credit considers efforts to protect and buffer wetlands and surface water from development, and gives recognition for enhancement and restoration measures. The level of achievement is measured by the size of the natural buffer zone established around all wetlands, shorelines, and water bodies. The conservation actions of the Serra do Mar Restoration program, on a landscape scale, will restore buffers zones along surface waters and wetlands by removing illegal development and planting native vegetation along shorelines in conservation areas. In the Serra do Mar Park, restored natural buffers may exceed 100 m, particularly in the Água Fria zone along the Rio Cubatão. The Environmental Military Police (PMA) headquarters plan includes actions to clean the Quarai and Jaguaribe streams, plant a municipal nursery along their shores, and increase green and permeable buffers. Resettlement and urbanization plans also include measures to remove invasive plants and add native vegetation along drainage canals and river shoreline. However, in residential developments, the program did not show that it increased buffer size along water courses beyond the legal minimum, maintaining green strips of at least 15 m (49 feet) along shorelines according to the legislation for Permanently Protected Areas in urban areas, although in some cases larger buffers were applied at 30 m (98 feet).</p>
	Source	<ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Killmer, Annette (IBD), email correspondence, November 12, 2015. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009.
	Recommendations	<p>In addition to the conservation units, the program should establish a larger vegetation and soil protection buffer area for water courses in the new housing complexes and other related urbanized areas. A minimum buffer of 30 meters (100 feet) is recommended to adequately protect wetlands and surface waters.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
NW1.3 PRESERVE PRIME FARMLAND	0	No Score
		<p>This credit addresses the need for projects to protect high quality farmland that is important for local rural communities and food resources. In this regard, the Serra do Mar Restoration Program did not consider prime farmland. Instead the program focused on conserving the natural forest ecosystem from unsustainable agricultural practices, such as harmful banana monocultures introduced in the region. To this end, the program created special Sustainable Development Reserves where small-scale agriculture would be permitted in the mosaic system, while eradicating undesirable agriculture from other areas.</p>
	Source	- ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.
Recommendations	While the program clearly viewed uncontrolled agriculture as a challenge to its conservation goals, an assessment of soils and the agricultural potential of the Serra do Mar region is recommended to better protect such areas as a valuable resource.	
NW1.4 AVOID ADVERSE GEOLOGY	3	Superior
		<p>This credit rewards projects that avoid both development on adverse geological formations and siting over sensitive aquifers to protect groundwater resources. In this respect, the Serra do Mar Program set out to reduce hazards and restore the stability of degraded geological formations, although with less of a focus on underlying aquifers in its planning.</p> <p>Responding to geological degradation and hazards caused by uncontrolled land occupations on steep slopes in the Serra do Mar State Park, the voluntary resettlement program relocated families at high risk of mud- and landslides, estimating that 952 families were living in areas of high geological risk. Geological attributes were identified and incorporated into analyses of the degraded areas. The project established plans and designs to reduce the risk of damage firstly by relocating families to stable areas and secondly by dismantling the occupied areas located in precarious geological situations. To minimize the risk of landslides during deconstruction, preventive measures were adopted that included employing a dense surface drainage system, directing drainage into existing water streams to prevent the increased risk of landslide, redirecting underwater seepage, collecting and treating sewage, and stabilizing slopes with a combination of measures including planting vegetation. Nevertheless, the construction of the resettled housing did not consider underlying aquifers, although the PMA buildings avoided impacts in their site analyses. In addition to these provisions, the construction design for the resettlement and urbanized areas will have superficial drainage systems, slopes, and geotechnical monitoring, according to the resettlement plan.</p>

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
Source		<ul style="list-style-type: none"> - ESP, SMA and SH. PRRU - Plano de Reassentamento e Requalificação Urbana para os Núcleos de Ocupação Irregular do Programa de Recuperação Socioambiental da Serra do Mar em Cubatão. 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Pereira-Silva, F.L. Primeiro produto: Indicação de áreas degradadas no limite do Jardim Botânico de Cubatão. 2008.
	Recommendations	<p>In order to reach a higher level of achievement, evidences that the housing project site was located to not have negative impact on aquifers and preserve high-quality groundwater resources are required.</p>
NW1.5 PRESERVE FLOODPLAIN FUNCTIONS	5	Enhanced
		<p>This credit seeks to avoid affecting the functions of floodplains for waterways of all sizes as well as to remove infrastructure frequently damaged by floods. Siting its activities in the watershed of the Ribeira Valley, the Serra do Mar program maintained and restored floodplain functions on a regional scale. At a smaller scale, the program adopted strategies to increase the permeability and mitigate the flood risk of its buildings, although a clear plan and supporting studies to avoid siting on floodplains was not demonstrated in its construction, particularly for its housing units.</p> <p>On a broad scale the actions taken in the Serra do Mar - consolidating conservation areas, reclaiming and reforesting previously occupied areas, and increasing permeable and vegetated surfaces - will increase the infiltration of rainwater, reduce runoff, and gradually restore the environmental and geologic functions.</p> <p>The construction certification of the housing units in Cubatão resettlements was conditional on the appropriate buffering of waterways. However, there were no estimates of the project's effect on floodplain infiltration capacity, or evidence of a flood emergency plan. On the other hand, park support bases were built according to AQUA sustainable construction certification criteria to avoid contributing to flooding hazards. The AQUA certification included calculations of permeable surfaces and flows.</p>
		<ul style="list-style-type: none"> - AQUA. Categoría 1: Relação do Edifício e seu Entorno. QAE Fase Conceção 013 Auditada. n.d. - AQUA. Categoría 5: Gestão da Água. QAE Fase Conceção 013 Auditada. n.d. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. - Luciani & Associados Arquitetura. Projeto do Centro de Treinamento do Comando de Policiamento Ambiental Vila Guarani - São Paulo (Presentation). n.d. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.

		Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
			For a higher level of achievement in this credit a flood risk assessment and emergency response for the urbanized and resettled areas is necessary. Moreover, evidence of enhancing riparian and aquatic habitat to support threatened and endangered species in the all area included in the program is recommended.
NW1.6 AVOID UNSUITABLE DEVELOPMENT ON STEEP SLOPES	6	Conserving	
			This credit recognizes efforts made to protect steep slopes from inappropriate development that would contribute to erosion, landslides, and other natural hazards. The Serra do Mar program stands out for removing developments from steep slopes of the Serra do Mar range that were causing geological hazards to the environment and human safety, while showing great care to minimize the risk of its operations. The construction of the housing units was on areas away from steep slopes. Urbanized areas of the consolidated occupied areas were stabilized. The pledge for the contractor, which would build the 1st Battalion park base, specifies the maximum inclination of slopes on the site. The contract further specifies that slopes should be planted with grass to prevent their erosion.
	Source		- ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - PMA, FF, and Luciani & Associados. Termo de Referência para Obra de Construção do 1º Batalhão da Polícia Militar Ambiental do Estado de São Paulo. 2014
	Recommendations		The Serra do Mar program is fully designed to mitigate hazards from unsuitable development on steep slopes, attaining the highest level of achievement for this credit with no recommendations for further improvement.
NW1.7 PRESERVE GREENFIELDS	0	No Score	
			This credit looks at how a project conserved undeveloped land by locating on underutilized, abandoned or previously developed sites (“greyfields”), or cleaned up and redeveloped contaminated properties (“brownfields”). At least 25% of the project should be located on a greyfield site for minimum achievement. The Serra do Mar Program did not show a consistent decision process based on the preservation of greenfields; however, it did take action to remediate and improve the permeability of, and restore vegetation to, new locations that had previously been occupied. The resettlement of one of the housing units (Bolsa IX area) was on a lot that had previously been used as a staging area for part of the construction of the Imigrantes Highway. As a result, the land was adversely impacted and largely devoid of vegetation. Another base was built on a partially paved and previously occupied site. But the construction of the 3rd battalion base was on an unpaved and previously unoccupied lot in the Public Use zone of Guarujá

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
Source		<ul style="list-style-type: none"> - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
Recommendations		<p>In order to reach a higher level of achievement, the percentage of housing and other construction located on greyfields should be higher and accompanying evidence should be provided. However, land dedicated to current agricultural use, forestry use, or use as a preserved natural area does not qualify as a greyfield, even if it contains pre-existing paving construction, or altered landscape.</p>
4	Enhanced	
NW2.1 MANAGE STORMWATER		<p>This credit addresses the need to minimize impact on the quantity and quality of stormwater runoff by maintaining or restoring infiltration and evapotranspiration capacity on the area of intervention. In regards to runoff, the Serra do Mar Program takes steps to increase stormwater retention capacity in reclaimed degraded land and on construction sites of the park support buildings and housing units. However, while the program carried out measures to reduce stormwater runoff, it did not prepare a comprehensive stormwater plan with measurable targets. In the Serra do Mar State Park, the program increases the rainwater storage and infiltration capacity of the formerly occupied degraded land by decompacting soils, removing impermeable surfaces, and planting native species of vegetation. However, without a stormwater management plan calculating initial and post-operation capacities, the program cannot measure improvements in storage and infiltration capacity or compare them to a pre-development target.</p> <p>On the level of their construction, the park monitoring buildings will maintain or improve the infiltration capacity of their properties through various measures such as collecting rainwater in roof cisterns (for treatment and use as greywater in the building) and planting rain garden terraces. These park buildings conform to AQUA sustainable construction criteria and calculated impermeable surface and rainwater flow to compare initial and post-construction runoff flow. Results were site specific and varied: one park base reduced the post-construction estimated flow by more than half, while another increased overall. With regard to the housing units, state approval was conditional on the recovery of green areas, which would incidentally increase infiltration, but the program does not specify that this recovery incorporated specific designs to manage a measurable percentage of stormwater.</p>
		<ul style="list-style-type: none"> - AQUA. "Categoria 1: Relação do Edifício e seu Entorno." QAE Fase Concepção 013 Auditada. n.d. - AQUA. "Categoria 5: Gestão da Água." QAE Fase Concepção 013 Auditada. n.d. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socio environmental Recovery Program (BR-L1241). 2010.

Score	SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM	
	<p>It is recommended to document initial, final post-development, and target water storage goals for new constructions, and to adopt plans that continue to achieve greater water storage capacity for areas of intervention. New development plans could include additional efforts to minimize the negative impacts associated with increased runoff of impervious surfaces, such as rain gardens and barrels, tree preservation, soil amendments, rooftop gardens, and the use of permeable paving.</p>	
NW2.2 REDUCE PESTICIDES AND FERTILIZER IMPACTS	1	Improved
		<p>This credit recognizes the reduction of nonpoint source pollution by reducing the use and release of toxic, persistent, and bioaccumulative pesticides and fertilizers, with consideration for the selection of self-sufficient plant species and integrated pest management techniques. By creating conservation units and regularizing land usage, the program reduces the agricultural use of pesticides and fertilizers in the Atlantic Forest. Specifically, the eradication of pesticide intensive agriculture, such as banana and manioc monocrops from the Serra do Mar reclaimed lands, will remove important sources of pesticides and fertilizers polluting the Ribeira River watershed (Bacia do Rio). However according to the information provided, the program does not address how pesticides or fertilizers will be minimized to reduce their impacts on activities to revegetate and reforest degraded and vacated land. Similarly, pesticide and fertilizer considerations are not addressed for green areas related to the housing units or park support buildings. The playground equipment in the future botanical garden is currently planned to be fabricated using wood pressure treated with pesticides to increase longevity, but that may leach pesticides over time and also represent a risk of child exposure.</p>
	Source	<ul style="list-style-type: none"> - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - FF. Anexo I: Memorial Descritivo. Projecto Básico de Implantação e Arquitetura do Jardim Botânico em Cubatão. Estudo Preliminar. 2015.
Recommendations	<p>Adopting a management plan to minimize and manage the use of pesticide and fertilizer, the program would provide greater protection for surface water and groundwater against contamination. Such a plan would consider operational policies, runoff controls, selection of agrochemicals with lower toxicity, selection of plant species not requiring agrochemicals, and landscaping that avoids or integrates pest management approaches. The program should consider the health risks of using pesticide-treated wood for playground equipment and consider a safer alternative material.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
NW3.1 PRESERVE SPECIES BIODIVERSITY	14	Conserving
		<p>This credit considers efforts made to monitor and prevent pollutants from contaminating surface and groundwater. In this regard, the Serra do Mar program prevents future contamination of surface waters and restores water quality in specific areas. The program removed raw sewage inputs into surface waters by tying urbanized and resettled populations into municipal wastewater treatment systems. The vacating of park land also removes other sources of contamination. As a result, monitoring at the water treatment plant near Água Fria has already shown improvement in water quality. The creation of new conservation units and the consolidated management of the mosaics and the Serra do Mar State Park will further restore and protect surface and groundwater against future contamination. For example, the plans for the PMA training center include remedial actions to restore the headwaters and waterways of the Água Espriada and Cordeiro streams, incorporate infrastructure to sanitize rainwater, and remove sewage and garbage sources in their watersheds.</p>
	Source	<ul style="list-style-type: none"> - AQUA. “Categoria 5: Gestão da Água.” QAE Fase Concepção 013 Auditada. n.d. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Killmer, Annette (IBD), email correspondence, October 28, 2015. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
Recommendations	<p>Beyond the actions implemented, a systemic view of water courses is recommended. Attention should be given to prevent contamination of surface and groundwater by identifying sources of pollution and collecting polluting substances for recycling or treatment from vulnerable aquifers. Further education of communities to avoid direct dumping of untreated sewage and other contaminants into rivers and streams is encouraged.</p>	
	16	Restorative
		<p>This credit rewards the preservation and restoration of species and habitats relevant to maintain biodiversity. Here, the Serra do Mar Restoration Program positively impacts habitats of rare species and rich biodiversity by enlarging protected areas and increasing wildlife corridors. Specifically, the program restores regional biological connectivity through the creation of the Jureia-Itatins mosaic, which is important because of its central position in relation to the Serra do Mar and Jurupará state parks and the Cananéia-Iguape-Peruíbe protected areas. The new mosaic system consolidates protected habitats keeping flow between species populations intact. This consolidation will cover a diversity of ecosystems from the slopes of Serra do Mar to the estuarine-lagoon region of the lower Ribeira, covering headwater sources, swamps, lagoons, sand dunes, diverse forests, shrub-herbaceous sandbanks, and mangroves. Along with restoring regional connectivity, the program specifically aims to enrich biodiversity in 500 ha of formerly occupied land in the Serra do Mar state park. Reforestation activities will refer to the state list of threatened species and conform to criteria of the Institute of Botany, IUCN and Convention of Biodiversity. Additionally, the siting process for park support buildings required an inventory of local plant and animal species to ensure that threatened or important species would not be harmed.</p>

		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
	Source	<ul style="list-style-type: none"> - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. - Luciani & Associados Arquitetura. Projeto do Centro de Treinamento do Comando de Policiamento Ambiental Vila Guarani - São Paulo (Presentation). n.d. - PMA. Sistema de Gestão do Empreendimento: 3º Batalhão de Polícia Militar Ambiental. 2013.
	Recommendations	<p>The program earns the highest level of achievement for increasing habitat and biological connectivity. Therefore, no further recommendations are provided.</p>
NW 3.2 CONTROL INVASIVE SPECIES	5	Superior
		<p>This credit considers the degree to which invasive species have been reduced or eliminated. The Serra do Mar program emphasizes the strategy of planting native species, beginning with pioneer species in the degraded areas and only using locally appropriate and non-invasive plants in its reforestation activities. However, the program does not demonstrate a full scale strategy to eradicate existing invasions of non-native species. Specifically, the program will eradicate invasive plant species from 200 ha in the Serra do Mar Park. The Botanical Garden of Cubatao will establish eight collections of native vegetation species and serve as an important center for regional ecological study. The Botanical Garden will create a nursery to propagate native tree seedlings for the replanting of degraded areas in the Serra do Mar State Park and other areas of the Atlantic Forest. The Botanical Garden will further provide educational activities and exhibitions for the community to raise awareness of the value of native plant species. In addition, the park support buildings included an inventory of native species in their landscaping, and the resettlement housing will eradicate invasive plants and replace them with native species.</p>
	Source	<ul style="list-style-type: none"> - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Luciani & Associados Arquitetura. Projeto do Centro de Treinamento do Comando de Policiamento Ambiental Vila Guarani - São Paulo (Presentation). n.d. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009.

		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
NW3.3 RESTORE DISTURBED SOILS	Score	
	Recommendations	A multi-year management plan and overall strategy to prevent invasive flora and fauna (and to monitor and remove those that emerge) is recommended to complement the planting of native vegetation in the housing units, park buildings and vacated, degraded areas in the Serra do Mar park.
	8	Conserving
	Source	<p>This credit evaluates the reuse and restoration of soils disturbed during construction or previous development in support of healthy ecological communities. The Serra do Mar project shows mixed results in this credit as it takes action to restore soils degraded from previous occupation by informal housing in the vacated park land, but does not show evidence of considerations to restore the soils disturbed for its constructions, such as the new housing complexes and PMA buildings. In restoring the park lands degraded from previous occupations, the Serra do Mar program considers the physical, chemical, and microbiological characteristics of the soil to improve its agronomic conditions. The program strategy to restore the land includes plowing, harrowing, and subsoiling (decompacting the subsoil layer while maintaining surface integrity). However, the program did not test for soil contaminants in the housing units, including one that had been used prior as a staging area to support highway construction.</p> <p>- ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.</p>
Recommendations	It is recommended that the program include soil restoration activities for all areas of construction, especially in the large housing projects, and document soil reuse calculating the relative amount of disturbed soils restored. Sampling for contaminants in soil, such as lead, that put children at risk is also warranted.	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
NW3.4 MAINTAIN WETLAND AND SURFACE WATER FUNCTIONS	6	Enhanced
		<p>This credit addresses the success of the project in protecting or restoring surface water functions, taking into account hydrologic connectivity, quality, habitat, and sediment transport. The Serra do Mar program enhanced wetland and surface water functions through its work cleaning water quality and restoring habitat, although it did not take actions to impact hydrologic connections or enable sediment transport. With regards to water quality, the resettlement project will end outflows of raw sewage into waterways because the urbanized zones and new housing units will be tied in with the municipal sewage treatment system. The environmental military police 1st Battalion park support base plans include actions to clean the Quarai and Jaguaribe streams. Surface water and wetland habitat is protected by consolidating the management of 19 marine protected areas that contain mangroves and estuarine habitats. Resettlement and urbanization plans also include measures to plant native vegetation along drainage canals and river shoreline.</p>
	Source	<ul style="list-style-type: none"> - PMA, FF, and Luciani & Associados. Termo de Referência para Obra de Construção do 1º Batalhão da Polícia Militar Ambiental do Estado de São Paulo. 2014. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - ESP and IDB. Estratégia Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009.
Recommendations	<p>As part of the consolidation of conservation units, the Serra do Mar program may have opportunities to enhance connectivity and sediment transport between streams and rivers and their downstream estuaries. It is recommended to take a first step by studying existing connectivity and barriers blocking natural flows.</p>	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
GLO.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	9	<p>The program earns recognition for its innovative ecosystem approach, protecting prime habitat and biodiversity while considering humans as integral to the ecological landscape. Sustainable and equitable solutions achieved by the program will in turn increase the robustness of its conservation measures. Ecologically, the program increases prime habitat area and restores and maintains natural connectivity of the landscape, encompassing marine protected areas along the coast of the State of São Paulo, 90,000 ha in the new Juréia-Itatins mosaic, and 315,000 ha in Serra do Mar State Park. The program adds 16 marine protected areas, recovers 350 ha of forest, and vacates 80 ha of degraded lands for recovery. From the human perspective, the conservation measures provide security by protecting drinking water resources and removing geological hazards. As well, the program addresses social values and behaviors. The construction of paths, visitor centers, and the Botanical Garden will increase public access to the Serra do Mar State Park and promote its values. The Cota Viva project trains local environmental agents by providing technical and environmental education. These social and educational efforts will improve ecological stewardship and heighten social pressure against future illegal land occupations, in addition to developing local skills and capacity. Further, the program ecosystem approach respects cultural diversity and needs. While eliminating intrusions of agrochemical intensive agriculture, the program legitimized traditional forest uses by mixed indigenous-Afro-Euro communities, accomplished through the legal recategorization of the Juréia-Itatins ecological station and creation of sustainable development reserves. The program anticipates the protected coastal Areas will support local economies through ecotourism and marine sports. Additionally, the Marine Protected Areas management plans will engage local fishers in sustainable practices, integrating protection of natural resources important for local economies with nature conservation. On a large scale, the conservation program will benefit the overall São Paulo region through improved drinking water quality and carbon sequestration.</p>
	Source	<ul style="list-style-type: none"> - ESP and IDB. Cartilha: Serra do Mar and the Atlantic Forest Mosaics System: A social and environmental recovery project, 1st ed. São Paulo: 2013. - IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010. - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.
	99	

SUB CATEGORY: CLIMATE & RISK

Score

**SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS
SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM**

CR1.1 REDUCE GREENHOUSE GAS EMISSIONS	0	No Score
		<p>This credit rates a project according to whether it conducted and used a comprehensive life cycle carbon analysis to anticipate net greenhouse gas emissions during the project. The Serra do Mar program's investment in the conservation of the Atlantic Forest is anticipated to result in a 400,000 ha mass of ecologically viable forest that will result in carbon retention estimated to be between 50 tC/ha and 100 t/ha in the long term. In this respect, the IDB considers that the program will provide an important carbon negative impact through carbon sequestration. However, the net carbon footprint of the program remains unclear as the program has not conducted a life cycle assessment of the greenhouse gas emissions of all of its components. Such an assessment would calculate the net balance between carbon sequestration of reforestation activities and emissions caused by the extraction, processing, and transportation of materials for construction and operation. Additionally, the buildings were not designed to meet specific reductions in its greenhouse gas emissions based on such a life cycle carbon assessment.</p>
	Source	- IDB. Loan Proposal. Serra do Mar and Atlantic Forest Mosaics System Socioenvironmental Recovery Program (BR-L1241). 2010.
	Recommendations	<p>The project has opportunities to demonstrate the carbon sequestration benefits of its reforestation activities. However, these should be calculated by conducting a full carbon life cycle analysis to determine the entire carbon footprint of the program and set reduction targets.</p>
CR1.2 REDUCE AIR POLLUTANT EMISSIONS	0	No Score
		<p>This credit assesses the degree to which the project reduces the emission of six criteria air pollutants: particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, lead, and noxious odors. In this case, the program receives no score as it did not design to meet air quality standards beyond the legal minimum requirements. To fulfill this credit, meeting California Ambient Air Quality Standards for all project activities is awarded because these standards are more stringent than others, addressing additional pollutants beyond the six common air pollutants. Further, the program did not design its components along any particular air quality management strategies and, as a result, does not measurably reduce air pollutant emissions against particular targets. Nonetheless, the Serra do Mar program does include elements that will presumably reduce emissions of air pollutants, e.g. by providing access to public transportation, more efficient traffic design, and solar water heaters in buildings. Additionally, reforestation of degraded areas should also help reduce ground-level ozone levels.</p>
	Source	- Ré, M. Análisis de los Aspectos Físico-Urbanísticos de las Áreas de Reasentamiento: Desarrollo de Métodos y Modelos de Manejo y Recuperación Ambiental en Áreas de Reasentamiento en Áreas Protegidas del Estado de São Paulo. 2009.

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
CR2.1 ASSESS CLIMATE THREAT	Recommendations	It is recommended to adopt international air quality standards that will minimize emissions beyond existing benchmarks, and to implement mitigation measures and install monitoring systems to measure progress in reducing emissions. This will especially benefit the health of children living in the housing units and urbanized zones.
	0	No Score
		This credit addresses whether a project developed a comprehensive climate impact assessment and adaptation plan, taking steps to prepare for climate variation and natural hazards. The plan should include the following components: vulnerability assessment, risk assessment, and an adaptation assessment. No score is given as the Serra do Mar Program did not conduct a climate impact assessment that would include calculation of expected changes in flood elevations or sea rise, among other types of impacts related to climate change. Neither did the program address a strategy in collaboration with the local emergency management department to better prepare communities for anticipated climate changes. As a result, structures in flood risk areas remain uninventoried and community response plans, undeveloped. It should be pointed out that the need for such a climate impact and adaptation plan has been highlighted by severe flooding of the Agua Fria occupied zone in 2014, which has required the redesign of the future of Botanical Garden.
	Source	<ul style="list-style-type: none"> - ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009. - UEP Fundação Florestal, email correspondence, October 27, 2015.
	Recommendations	The program should perform a comprehensive climate vulnerability and adaptation assessment to better prepare for the kind of vulnerabilities experienced in the 2014 flooding. The active public participation component of the Serra do Mar program provides a good basis to work with communities and incorporate local knowledge in mapping vulnerabilities and identifying solutions.

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
CR2.2 AVOID TRAPS AND VULNERABILITIES	2	Improved
		This credit recognizes the degree to which the project assesses potential traps and vulnerabilities that could create long-term costs and risks for the affected communities. In this regard, the program considers regional demands and responds to make freshwater resources more robust by restoring water quality. Additionally, the program identifies resource constraints affecting coastal communities from unsustainable fishing or tourist activities and responds by working to set up coastal sustainable fishing and tourism activities. However, in general the program did not review with community decision makers and stakeholders a comprehensive list of resource demands and supplies, infrastructure traps, long-term risks and alternatives. Towards the future, it is especially important to understand community vulnerabilities and resource dependencies in the case of the housing projects that are part of the social investment component of the program.
	Source	- ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.
	Recommendations	It is recommended to work with the municipalities in the mosaic system and identify community resources that could become scarce and expensive. This planning should consider not only long-term costs of resources affected by climate change, but also the projected population growth in the region.
CR2.3 PREPARE FOR LONG-TERM ADAPTABILITY	0	No Score
		This credit evaluates the efforts made by a project to build community resilience and adaptability to long-term climate change. In this regard, certain aspects of the Serra do Mar program design will increase community resilience, although the program does not specifically incorporate adaptive measures to weather patterns or sea level rise. Specifically, as the project management document points out, the connection of Atlantic forest and ocean protected areas will form a continuous ecosystem whose size is more suitable to face climate change impacts. The program will also increase the resilience of freshwater resources by protecting water quality and habitat. However, the program does not plan for sea level rise in the coastal mosaic, nor does it identify what areas of the Atlantic Forest may serve as climate refuges for important species in the advent of rising temperatures or changing weather patterns. Notably, the program lays an adaptive groundwork by establishing public participatory processes and a collaborative management structure for its coastal mosaic. Nonetheless, regarding the potential impacts of climate change, no considerations were made in relation to the site selection of the housing projects. Specific considerations of alternative water, energy, and materials supplies or design resiliency to changing environmental conditions should be part of the housing design.

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
CR2.4 PREPARE FOR SHORT-TERM HAZARDS	Source	- ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.
	Recommendations	The program should work with communities to prepare for long-term climate change impacts addressing natural and human communities. Particularly recommended is a review of low lying coastal communities vulnerable to sea-level rise and of the resettlement and urbanization zones to flooding.
	21	Restorative
	Source	- ESP and IDB. Informe de Gestão Ambiental e Social do Programa. Programa de Recuperação Socioambiental da Serra do Mar e do Sistema de Mosaicos da Mata Atlântica (BR-L1241). 2009.
Recommendations	A short-term hazard assessment and preparation plan involving the community is recommended. Hazard planning would include responses to flooding in urbanized and resettlement areas, restoring wetlands around rivers, and habitat changes to minimize the risk of wildfires due to drought.	

Score		SERRA DO MAR AND THE ATLANTIC FOREST MOSAICS SYSTEM SOCIO-ENVIRONMENTAL RECOVERY PROGRAM
CR2.5 MANAGE HEAT ISLAND EFFECTS	1	Improved
		Heat islands are areas that are significantly warmer than surrounding rural areas because of materials that accumulate heat and a lack of vegetation. Minimizing heat island effects can improve the microclimate, reduce energy consumption for air conditioning, and avoid contributing to larger climate change impacts. This credit estimates the percentage of surface area that reduces heat island effects by having a solar reflective index (SRI) criteria of 29 or higher. The Serra do Mar program has taken some innovative measures to reduce solar heat absorption in the design of the botanical garden by incorporating green roofs. The program anticipates that the use of grass turf on the roof will keep the interior 15°C cooler through evapotranspiration and will also provide additional benefits by helping to retain runoff. The use of green roofs in the botanical garden will further provide a showcase to educate the public about heat island effects and the benefits of green roof technology. Additional actions taken by the program to include green spaces in residential zones and reforest degraded park areas will likely help to minimize localized heat accumulation. However, the program does not calculate net solar reflectance against a minimum SRI criteria or show that it deliberately plans to manage heat island effects in its other constructions.
	Source	- FF. Anexo I: Memorial Descritivo. Projecto Básico de Implantação e Arquitetura do Jardim Botânico em Cubatão. Estudo Preliminar. 2015.
	Recommendations	It is recommended that the program incorporate designs to manage heat island effects and avoid surface heating through shading with a SRI 29 or higher. This can be achieved through increased vegetation, incorporating shade panels that meet SRI requirements or trees that give shade within 5 years of planting.
GLO.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	0	N/A
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OVERALL

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DOCUMENTATION PROVIDED

General Information

AQUA. Categoria 1: Relação do Edifício e seu Entorno. Categorias de Avaliação-Certificação Aqua. (n.d.)

AQUA. Categoria 2: Escolha Integrada de Produtos, Sistemas e Processos Construtivos. Categorias de Avaliação-Certificação Aqua. (n.d.)

AQUA. Categoria 3: Canteiro de Obras com Baixo Impacto Ambiental. Categorias de Avaliação-Certificação Aqua. (n.d.)

AQUA. Categoria 4: Gestão da Energia. Categorias de Avaliação-Certificação Aqua. (n.d.)

AQUA. Categoria 5: Gestão da Água. Categorias de Avaliação-Certificação Aqua. (n.d.)

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