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Towards Comprehensive Policy Integration for the Sustainability of Small Islands: A Landscape-Scale Planning Approach for the Galápagos Islands

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Abstract: Accomplishing and implementing sustainable development goals in the context of insular socio-ecological systems requires effective policy integration—i.e., the integration of policy actors across multiple sectors and levels of government to improve policy outcomes. However, achieving policy integration entails significant challenges because it is highly context-dependent. This study investigates policy integration within the complex socio-ecological context of the Galápagos Islands in Ecuador. The paper analyses Galápagos legal and planning documents to evaluate the extent to which they support comprehensive policy integration. The analysis found that recently adopted institutional arrangements have strengthened government institutions at the provincial level, and started to consider concepts relating to socio-ecological and land–sea management. Nevertheless, key policy actors and pressing issues remain unattended, due to policy inconsistencies, institutional arrangements limitations, and fragmented approaches to conservation and development control between provincial and local governments. Insights are presented to improve the comprehensiveness of policy integration in Galápagos based on a landscape-scale planning approach.

Keywords: socio-ecological systems; islands; conservation; World Heritage Site; institutional arrangements; policy integration; landscape planning

1. Introduction

This paper discusses the need for more effective policy integration to accomplish sustainable goals within the context of small islands' landscapes. Small islands—populated and/or unpopulated islands without both full political autonomy and independence [1]—are of paramount importance for socio-ecological wellbeing because they host countless interdependent land–marine ecosystems of outstanding landscape qualities, and of highly rare and endemic biodiversity [2–5]. The one-off environment of every small island is the result of the delicately balanced, complex, constantly evolving, and mutually modifying processes between the relatively few living organisms that attempt to colonize it and its unique geophysical characteristics (e.g., location, geographical origin, degree of isolation, availability of resources, and scale) [2,3].

In parallel, while humans inhabiting small islands have adapted to their conditions and influenced the generation of complex socio-ecological systems, they are their primary active drivers of change [6–8]. In particular, the highly-specialized islands' socio-ecological systems seem unable to cope with the rapid changes generated by ever intensifying and conflicting land–sea uses (e.g., tourism, fishing, agriculture, urban development) [1,9–11]. These generate dynamic and often unforeseen consequences that could potentially result in severe environmental issues, such as the introduction of invasive alien

species, habitat destruction, pollution, and the depletion of natural resources [6,12]. Subsequently, these could drive the loss of islands' native biodiversity, jeopardizing the long-term provisioning of ecosystems services upon which human wellbeing depends [4,11,13].

Additionally, small islands' local governments and communities have minimum to no influence over many of the drivers of land-sea uses, such as the political agendas of higher levels of governance, and the globalized market demands for job opportunities, tourism destination, and fishing products [1,14]. Small islands' socio-ecological systems are also under threat from natural hazards and the worsening impacts of human-driven climate change [11,14]. Furthermore, small islands' remoteness, unstable political landscape, limited institutional and organizational capacity, and insufficient economic resources (local, national and international) constitute major obstacles for addressing the cross-cutting issues affecting them and for receiving much needed technical and financial assistance [1,11,14–16].

To ensure the sustainability of islands' socio-ecological systems, multiple international policy frameworks have developed a broad range of goals and tools. Several of these frameworks have focused on increasing the protection status and improving the sustainable management of islands' social, cultural, and ecological iconic features (See [17–20]). Others have opted to promote the sustainable development of small islands developing states (i.e., 37 United Nations' members and 20 associated island states) (See [21–23]). These endeavors have led to the formulation of multinational to subnational institutional arrangements for the protection of many World Heritage Sites [24], biodiversity hotspots [20], and marine protected areas [25]. Additionally, they have been instrumental in the preparation of several international initiatives for sustainable development (see [26–28]).

Nevertheless, these frameworks remain tainted by significant shortfalls that diminish their capacity to trigger the institutional, organizational, and cultural change that is necessary to deal with the complex, rapid, and ever-changing island contexts [28–32]. For instance, the poor legally-binding nature, gaps, and duplication of these arrangements, limit their enforcement and implementation, particularly at national and subnational levels [28–31]. More importantly, the success or failure of policy measures is ultimately context-dependent. This means that policies are facilitated or inhibited by a raft of national and subnational political factors (e.g., institutional, organizational, financial, management, socio-cultural, environmental) that need to be appropriately considered [33,34]. Additionally, divided approaches within and between social and ecological sciences, science and policy sectors, government and non-government actors, and local/traditional and technical knowledge have constrained the generation and sharing of knowledge that informs policymaking processes [1,11,28,35–38]. Such compartmentalized approaches result in a poor understanding of the temporal and spatial implications [35,36] that policies may inflict on socio-ecological [39,40] and land-marine [41,42] systems.

Accomplishing sustainable development goals in socio-ecological systems requires the timely and collaborative work of a broad range of policy actors (e.g., individuals, social groups, governments, non-government organizations) with a stake and knowledge on the matter across multiple sectors and levels of governance. These must come together to recognize interdependencies between sectors, solve sectoral disputes, define common short- to long-term goals, and determine the most appropriate way to achieve them [33,43]. To this end, both ecological and social theory have advocated for more effective policy integration as a suitable means to raise awareness about cross-sectoral interdependency, build and expand links between sectors and levels of governance, and improve policy outcomes through the vertical and horizontal articulation of policy frameworks [33,35,36,43–46]. Thus, policy integration necessitates the comprehensive consideration of interdependent policy actors and issues, and the spatial and temporal dimensions through which these develop across [35,36]. Planning at the landscape scale has emerged as a potentially suitable approach to both deal with the dynamic temporal and spatial dimensions of places and bring together multiple interrelated sectors through participative planning and policymaking processes [38,41,47–50]. In addition to all these considerations, achieving sustainable development goals in small islands requires balancing the protection of the broad range of

threatened socio-ecological features that define each small island's insularity (e.g., biodiversity, identity, coastal/sea lifestyle) with the immense input of technical and financial resources that these require to accomplish sustainable goals [1,51,52]. In this sense, the main differences with other socio-ecological systems are the small room for error that small islands leave to planning, due to their fragile functioning, unique conditions, and the latent anthropogenic and natural threats these face [11,14].

This paper brings together the concepts of landscape-scale planning, small islands' sustainability and policy integration to advancing the conservation of socio-ecological systems in the context of the Galápagos Islands. Applying the landscape-scale planning approach, the paper aims to glean insights to contribute to the improvement of the Galápagos' institutional arrangements (expressed through the legal and planning frameworks) so that these are better positioned to accomplish sustainability-related goals.

Galápagos Islands offer a suitable case study because it represents a large number of small islands that are increasingly gaining more political autonomy. Achieving sustainable development goals through policy integration in this complex social-ecological system requires balancing the conservation of Galápagos' unique ecosystem with the pressures that population growth, fishing, tourism, and all anthropogenic activities associated with these, exercised over the limited natural resources. Moreover, in contrast with the large scholarly attention given to the ecological and biological aspects of Galápagos, literature addressing socio-ecological and policy issues in this archipelago is relatively scarce. There is a small number of studies that focus on very specific issues, such as the governance/management of the Galápagos Marine Reserve [53–55], environmental conservation [53,56,57], waste management [57,58], water supply [59,60], tourism [61,62], fishing [63], and socio-ecological interactions [64–67]. Furthermore, these present a well-defined provincial scope. As a result, interdependent issues are partially analyzed, and little to no attention is given to broader national context and to the links and differences between the three Galápagos' municipalities. This study contributes to filling these gaps in knowledge by investigating the institutional arrangements from international, national to local levels, and assessing the role these arrangements play in Galápagos' provincial and local policymaking.

To this end, the paper is structured in four parts. The first part includes a literature review on social and ecological theory focused on policy integration and island sustainability-related issues. Based on this literature review, an analytical framework is then proposed around four commonly agreed parameters for effective policy integration to achieving improved conservation in the context of small islands' socio-ecological systems. The second part describes the research approach, including case study description and data collection and analysis. Applying the analytical framework developed in part one, the third part presents results. Lastly, the forth part discusses and provides insights to advancing policy integration for sustainability of socio-ecological systems based on a landscape-scale planning approach.

2. Materials and Methods

The analytical framework applied in this study brings together the concepts of policy integration, sustainability and landscape-scale planning. The framework was used to carry out a document analysis of international, national, and regional legal and planning documents to distil insights for facilitating the accomplishment of sustainable development goals in the Galápagos Islands through effective policy integration facilitated by a landscape-scale planning approach.

2.1. Analytical Framework

2.1.1. Unpacking the Concept of Policy Integration

There is a large body of literature that attempts to define the concept of policy integration and related terms. For example, Underdal's [35] seminal work defined policy integration as the "extent to which a policy recognizes its consequences as decision premises, aggregates them into an overall

evaluation, and penetrates all policy levels and all government agencies involved in its execution” (p. 162). More recently, Shannon and Schmidt [43] described policy integration as an activity to facilitate, strengthen, and expand links between policy actors, organizations, and networks across sectoral boundaries. Related terms, such as policy coordination [68,69] and policy coherence [70,71], refer to the collaborative work between private and public actors to formulate policies that avoid gaps, duplication, or contradiction. Others, such as intersectoral cooperation [72] or cross-sectoral policy cooperation [73], indicate the collaboration between government and non-government policy actors through activities that assist in the identification of issues, definition of goals, and the implementation of policies and programs.

In parallel, Stead and Meijers [33] provided a useful differentiation between the concepts of policy cooperation, coordination, and integration. Based on inputs and outputs to the policy cycle, Stead and Meijers arranged these concepts as consecutive stages that respectively denote higher levels of collaboration in policymaking. In the first stage, policy cooperation implies the collaborative work between policy actors working within their respective sectoral boundaries and following sectoral goals to produce more efficient sectoral policies [33]. In the second stage, policy coordination requires the definition of common goals to address cross-cutting issues. Although the outcome remains to be more efficient sectoral policies, these policies are adjusted to be mutually enforcing and consistent to each other [33]. Lastly, in the third stage, policy integration entails transcending sectoral boundaries for the definition of common goals to address cross-cutting issues through joint or cross-sectoral policies [33]. Furthermore, the characteristics of these consecutive stages present great similarities to those of multidisciplinary, interdisciplinary, and transdisciplinary scientific research [74,75].

A range of positive outcomes usually associated with policy integration are relevant to small islands context. For example, policy integration endeavors may facilitate the formulation of articulated and/or joint policies to address cross-cutting issues [33,35,43]. It may also help to split the cost of policy formulation and implementation among policy actors [33,35], and increase compliance with legal and policy frameworks [76]. Additionally, policy integration processes may lead to progressively improving the capacity of policy actors to deal with more complex issues, trade-offs and uncertainty [70,77]. This may improve the resilience of socio-ecological systems [77–79], and help develop local stewardship for the implementation, monitoring, and evaluation of policy measures [29,53].

Nevertheless, achieving effective policy integration is not a straightforward process. In particular, formulating articulated and/or joint policies requires greater commitment and more resources (time, effort, funding) from policy actors [33,35,43]. Policy integration demands a more comprehensive understanding and assessment of the issues that trigger the policy cycle, and of the cross-sectoral consequences of policy decisions [35,36]. More importantly, because policy integration implies shifting sectoral aspirations towards the common good, it entails some degree of cultural change that might be perceived as a loss of decision-making power, autonomy, and identity [32,33]. Overcoming such perceptions requires offering stakeholders the prospect of short- to long-term benefits, incentives, and compensations [33,35]. However, the benefits of policy integration initiatives often unfold in the mid- to long-term, and their initial costs might only be accepted when their benefits clearly outweigh short-term losses [35,36]. Furthermore, policy measures and their respective outcomes are unlikely to be replicated, or succeed, outside their original socio-political context [33,70].

The initial and perhaps most direct path to trigger effective policy integration is to robustly define principles, guidelines, and policy goals, and include these into the legal framework to be followed, to enable compliance by all government agencies or policy actors involved [35,36]. Although legal and institutional measures might change certain procedures, long-lasting cultural change can only occur when these changes are internalized through the first-hand experience and ownership/stewardship of policy actors over policymaking processes [35]. This requires creating arenas for stakeholders’ dialogue, knowledge and information sharing, and conflict resolution [35,36]. Consequently, it is crucial to have flexible institutional arrangements to allow changes to occur in the policymaking process in the light of new information and lessons [35,36].

2.1.2. Analytical Framework: Landscape-Scale Planning, Small Islands Sustainability, and Policy Integration

The analytical framework underpinning this paper is based on the synergistic relationship between the concepts of landscape-scale planning, sustainability, and policy integration. Planning at the landscape scale has emerged as a potentially suitable approach to address the wicked issues confronted by socio-ecological systems, including their long-term sustainability and resilience [80]. In particular, this planning approach recognizes landscapes as being the result of dynamic interactions between natural and human components [47]. The landscape scale encompasses a spatial, temporal, and modification dimensions, which are a result of such interactions [47]. The spatial dimension includes distinct physical units defined by a national, regional, or local unit. The temporal dimension involves past, present, and future features of the landscape. It also takes into account the ongoing relationship humans have with the landscape, including the effect of their actions on the landscape features and implications for future generations. The modification dimension encompasses the human-driven changes that affected the landscape and its features (e.g., urbanization, deforestation, land rehabilitation). Landscape-scale planning focuses on maintaining the functionality of the landscape by taking into consideration all three dimensions [47,48,81,82]. Hence, the main objective of a landscape-scale planning approach is to maintain, restore, and enhance socio-ecological structures and processes that support, and define, the landscape [81].

The three dimensions that characterize a landscape offer a suitable lens from which sustainability issues confronting small islands can be addressed, because they can also account for their dynamic internal and external interdependences. For example, sustainability—defined as the accomplishment of the broadly accepted sustainable development goals [83] and conservation targets [19]—in small islands depends on embedded trade-offs between maintaining islands' insularity and ensuring socio-economic wellbeing of their residents [1]. On the one hand, the sustainability of small islands' socio-ecological systems requires maintaining their insularity, which comprises biological isolation (e.g., avoiding and controlling the introduction of invasive alien species) [2,3] and cultural processes (e.g., cultural identity, coastal/sea lifestyle) [52,84]. This necessarily implies certain restrictions and ceilings to the type and intensity of activities affecting their socio-ecological systems, including locals' and visitors' access to certain island features [1,2,52]. On the other hand, local socio-economic welfare, a cornerstone in sustainability, requires access to external resources (e.g., technical, financial, goods, services) from mainland and global sources [11,85]. However, small islands' interaction with external resources (e.g., foreign ecosystems, cultures, markets) could jeopardize the integrity of their ecological processes and change local culture [1,52,66,86]. Baldacchino [51] refers to this dichotomy as the "openness-closeness" or "global-local" small islands dilemma. Furthermore, as intergovernmental organizations, non-governmental organizations, and scholars continue to lean towards the sustainable use of small islands' biodiversity through tourism-compatible conservation, it becomes urgent to build local technical and organizational capacity for managing tourism, socio-economic growth, and conservation according to their own perceptions and aspirations [1,11,14,51,52,87].

Thus, policy integration in the context of small islands needs to take into account these delicate relationships involving internal and external processes, so as to enhance, and not compromise, their socio-ecological systems. In this context, planning at the landscape-scale has enormous potential for policy integration seeking small islands' sustainability, because it is a planning approach that can consider both the relationship between external and internal, and within internal processes affecting their fragile socio-ecological systems.

While there is no agreed definition of what policy integration is, or how it can be effectively achieved, scholars usually concur with Underdal's propositions, and identify three main criteria that underpin policy integration:

- Comprehensiveness—the extent to which the scope of policy premises match that of policy consequences in terms of spatial and temporal dimensions, and interdependent issues and stakeholders [35,36];

- Aggregation—the extent to which the overall wellbeing of the system as a whole is considered as a premise for the evaluation of policy alternatives and decision making [35]; and
- Consistency—the extent to which a policy framework involves all policy actors across sectors and levels of government for the implementation, monitoring, and evaluation of policies to avoid duplications, contradictions, and gaps [35,36,68].

While the three criteria have clear alignment with the concept of landscape-scale planning, to enable an in-depth document analysis and manage the paper length, the analytical framework presented in this paper further explores this potential only for the comprehensiveness criterion. The paper also acknowledges that other analyses focused on the other two criteria are also important and should be the subject of future studies. The comprehensiveness criterion comprises four parameters that are well aligned with the abovementioned concept of landscape—that is, spatial scale, temporal scale, interdependent stakeholders, and interconnected issues (see Figure 1).

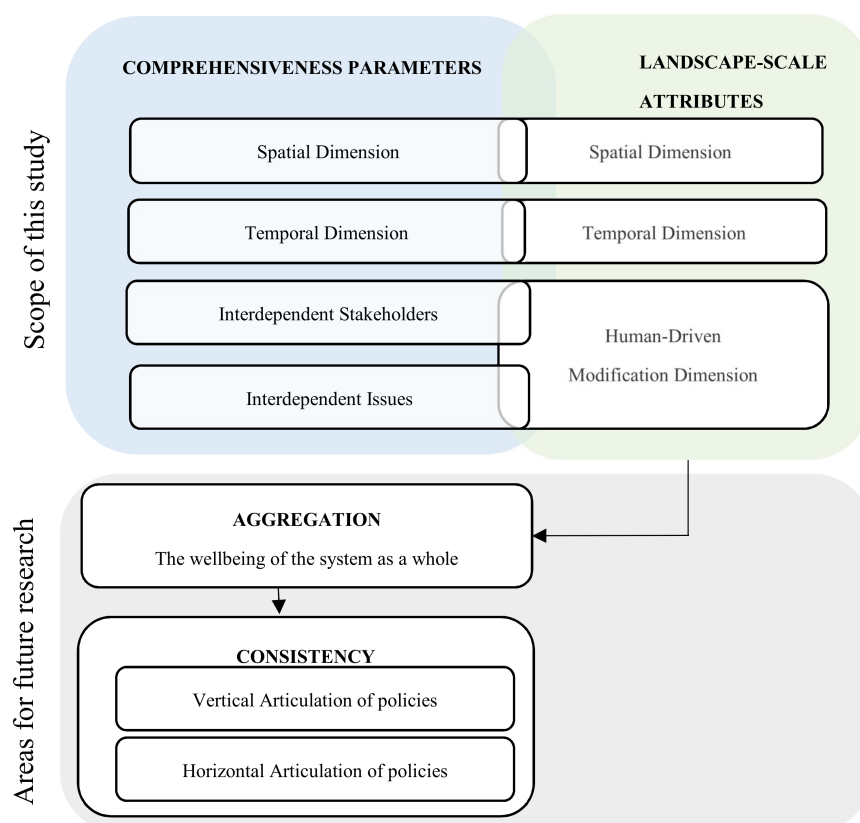


Figure 1. Alignment between policy integration comprehensiveness criterion and landscape-scale attributes.

Firstly, a comprehensive spatial scale for policy integration involves defining the jurisdictional areas policies will apply to, along with the areas of their inherent outcomes and related socio-ecological effects [35,36]. The spatial dimension of a landscape contains the hierarchical social and ecological interactions that define it. Hence, it is the basic and functional spatial unit (e.g., a single island). Moreover, due to the landscape spatial scale focusing on functionality, a landscape can be connected with others to form larger ones (e.g., an archipelago) [47,88]. Thus, a landscape-scale planning approach aligns with the comprehensive spatial scale element of policy integration, because the landscape scale encompasses the whole area where policy consequences unfold. When policy consequences trespass the spatial jurisdiction where policies are formulated, a landscape-scale planning approach can bring together these jurisdictions to the same governance level; therefore, taking the decision making to its higher level to deal with such policy consequences. This enables the flexibility to allocate

decision-making power at the level of governance where it is most effective [47,88], which is largely recommended in policy integration theory [35,36].

Secondly, a comprehensive timeframe for policy integration comprises the consequences of policy measures in the short- to long-term [35]. This is particularly important as prolonged consequences in the mid- and long-term affect larger areas, and involve more stakeholders and issues [35,36]. Additionally, the definition of an appropriate timeframe for PI implies the right timing between the socio-ecological processes, the generation of scientific knowledge, and socio-ecological matters, that inform policymaking processes [36]. Similarly, the landscape temporal dimension encompasses both past socio-ecological interactions and aspirations for the future [47,89]. This means that people inhabiting a landscape with an understanding of its past, larger temporal dimension in mind are more likely to project long-term goals/aspirations [89]. This attitude could enable the long-term and sustained planning that is needed to accomplish sustainability in socio-ecological systems.

Finally, both the comprehensive consideration of interdependent stakeholders and issues for policy integration align with the landscape human-driven modification dimension. Because people shape the landscape through everyday interaction, it is of crucial importance that perceptions and aspirations of landscape users inform decision making [35,36]. People's participation is a determining factor of the effectiveness and efficiency with which policies are formulated, implemented, monitored, and evaluated [47,90–92]. However, people's interactions with the landscape are underpinned by their evolving, dynamic, and often conflicting value systems [88,89,93–95]. Thus, the landscape and its features are never fixed, but constantly evolving [88,95], uncertain, and complex [47,88,96]. The comprehensive consideration of interdependent issues involves the combination of perceptions, and local and technical knowledge that can facilitate the identification and addressing of issues [35,36]. By acknowledging the dynamic and ever-changing interaction between people and the landscape, the landscape-scale planning approach adopts a flexible and inclusive attitude towards planning that is conducive to comprehensive policy integration, by facilitating collaborative [97] and values-led planning [93,98–100]. Thus, it can also modify top-down/centralized decision-making processes [47].

2.2. Methodology

This study adopts a case study approach [101] focused on the Galápagos Islands to investigate, through document analysis, the extent to which policy integration is facilitated in Galápagos' current institutional arrangements. The selection of documents included in the analysis was guided both by their influence on, and support for, the Special Regime of Galápagos (see Appendix A Table A1). The Special Regime of Galápagos is a unique institutional arrangement within Ecuador (applies only to the Galápagos province) that seeks the conservation of the Galápagos Islands as a World Heritage Site. Thus, documents were interrogated through content analysis [102] to

- Understand the context of the case study
- Map institutional arrangements, and
- Explore the structure, scope, goals and policies of the planning instruments.

Based on the results, the analytical framework is applied to determine the extent to which Galápagos institutional arrangements, expressed through the legal and planning frameworks, meet the four parameters of the comprehensiveness criterion of policy integration (spatial scale, timeframe, interdependent stakeholders and issues). Then, the study discusses the feasibility of considering the spatial, temporal, and human-driven modification dimensions of a landscape-scale planning approach to advance the parameters of the comprehensiveness criterion of criterion of policy integration. Subsequently, recommendations to trigger the implementation of a landscape-scale planning approach in Galápagos are suggested, along with relevance for other small island systems.

2.3. Case Study: The Galápagos Province

Galápagos is one of the 24 Ecuadorian provinces, and is located approximately 1000 km to the west of the Ecuadorian mainland on the Pacific Ocean. The territory of the Galápagos province includes protected areas and human settlements (see Figure 2). The protected areas comprise the territories of the Galápagos National Park and the Galápagos Marine Reserve. The Galápagos National Park covers 97% of the combined land surface of all the islands, islets, and rocks that form the Galápagos Archipelago, except for the human settlement areas. The Galápagos Marine Reserve covers the totality of internal waters between islands and a 60 nautical mile buffer around the baseline of the islands. The human settlements comprise three urban and five rural areas in the islands of San Cristobal, Santa Cruz, Isabela, and Floreana which cover the remaining 3% of Galápagos' land surface, and host an estimated population of approximately 30,000 people [103].

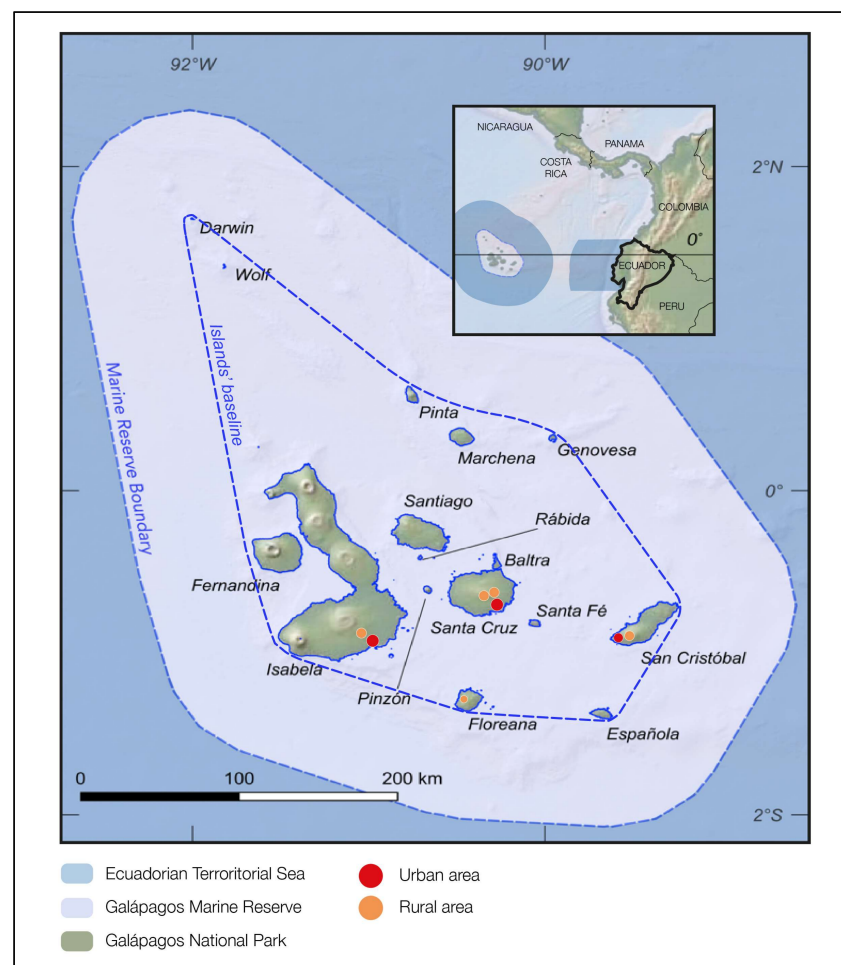


Figure 2. Map of the Galápagos province—modified from [104] (p. 734).

Galápagos Archipelago is worldwide known for its unique and highly endemic wildlife, leading to the designation of Galápagos National Park as a World Heritage Site in 1978 [105]. Later in 2001, the Galápagos Marine Reserve was included in the World Heritage Site designation [105]. Additionally, Galápagos was declared a Biosphere Reserve by the UNESCO in 1984, and the south wetlands of Isabela Island were recognized as a RAMSAR Site in 2002 [106]. These designations compel the conservation of the Galápagos' unique ecosystem by targeting sustainability in all anthropogenic activities that take place in the islands. However, the Galápagos' socio-ecological system is currently under great and increasing pressure from tourism, fishing, unplanned development, and a raft of interconnected social,

economic, and environmental problems derived from these activities (see Table 1). The Special Regime of Galápagos was therefore enacted in 1998 to ensure the protection of Galápagos' socio-ecological system and associated wellbeing of Galápagos' residents [102].

Table 1. Galápagos Islands' pressing issues.

Themes	Interdependent Issues
Tourism Galápagos is experiencing an accelerating growth in the number of visitors since the late 1960s [7,103]. The number of tourists arriving to the islands every year went from a couple of thousands in 1969 [7] to over 220,000 in 2015 [103].	<ol style="list-style-type: none"> 1. Encourages the migration of Ecuadorians and foreigners who seek to profit from tourism and its associated economic activities [7,62,103,107]. 2. Contributes to intensifying the pressure over Galápagos' limited resources (i.e., land, freshwater, livestock, scenery) generating a cascade of complex socio-ecological issues [7,103]. 3. Increases the demand for goods and services (e.g., food, fuel, commodities) from the mainland to support tourism-related activities [103]. 4. Increases the risk of introduction of invasive alien species due to more cargo ships and planes arriving to the islands [103]. 5. Intensifies the intersectoral competition for greater access to the Galápagos National Park and Galápagos Marine Reserve causing claims for a more equitable distribution of tourism revenue across local communities [108,109]. 6. Encourages associations and companies of cruise ships, land-based accommodation and food services, cabotage, terrestrial transport, and ecotourism guidance in every island to compete for visitors, which has a direct impact on the urban development of the islands [64,103].
Fishing Since the 1980s, fisheries quickly intensified driven by the demand of international markets for lobster and sea cucumber, particularly from Asia [7,29,64].	<ol style="list-style-type: none"> 1. Caused the collapse of sea cucumber fishery in the 1990s [7,64] and have endangered the Galápagos' red lobster [110]. 2. Encourages the illegal fishing of sharks within the Galápagos Marine Reserve by residents and large foreign vessels alike [7,29,64]. 3. Triggers opposition to conservation and tourism amid claims of displacement, inequity, lack of livelihood alternatives, and insufficient technical and financial support by environmental agencies [7,54,64]. 4. In several occasions, fishermen's discontentment with conservation measures resulted in strikes and violence. Such measures managed to directly influence the sacking and appointing of Galápagos National Park Service' directives [105]. 5. Contributes to seasonal immigration and population growth [7], and as in the tourism sector, different fishing associations were formed in every island [103].
Conservation/Governance Galápagos presents a historical lack of institutional/organizational/technical capacity when implementing and enforcing policy frameworks and institutional arrangements [7,54]. Also, there is great instability in authority positions [105].	<ol style="list-style-type: none"> 1. Causes struggles between government agencies and the fishing and tourism sectors, damaging relationships and trust [56,105,111]. 2. Results in poor public participation/engagement in policymaking (cantonal assemblies: non-governmental structures for public participation remain inactive) [103]. 3. Jeopardizes continuity and generates uncertainty and mistrust [105].
Human settlements Institutional arrangements [112,113] limit municipalities and rural parishes resources and capacity, compared with provincial governments and national ministries, but are left to deal with the consequences of population growth.	<ol style="list-style-type: none"> 1. The growing number of residents and visitors accentuate issues within the human settlements, such as the deficit of freshwater in most of Galápagos inhabited islands [59], and the pressing need for appropriate systems to treat wastewater [57] and dispose of solid waste [58]. 2. There is uncontrolled/unplanned urban development [103,105]. 3. Land use and development plans are not implemented or followed.

3. Results

3.1. Institutional Arrangements for Galápagos

Understanding Galápagos' institutional arrangements requires an in-depth analysis of the extensive and intricate hierarchy of laws and planning instruments governing the archipelago. Firstly, Article 242 of the 2008 Ecuadorian Constitution [113] establishes that the State's territory is subdivided into regions (a recently created level of governance), provinces, cantons (municipalities), and parishes. Secondly, the hierarchy and articulation of all the planning instruments from national to parish levels is set by the National Secretariat of Planning and Development (SENPLADES) [114,115] (see Figure 3b). Additionally, the Organic Code for Territorial Organization, Autonomy and Development (COOTAD), and the Organic Code for Planning and Public Finances (COPFP) establish that in order to access

Central Government funding, all GADs must formulate plans for the development and territorial organization under the methodology and planning template of the SENPLADES [112,114,116]. Furthermore, Article 280 of the Constitution demands all GADs' planning instruments to be aligned with the objectives and policies of the National Plan for the Good Living (PNBV) [113].

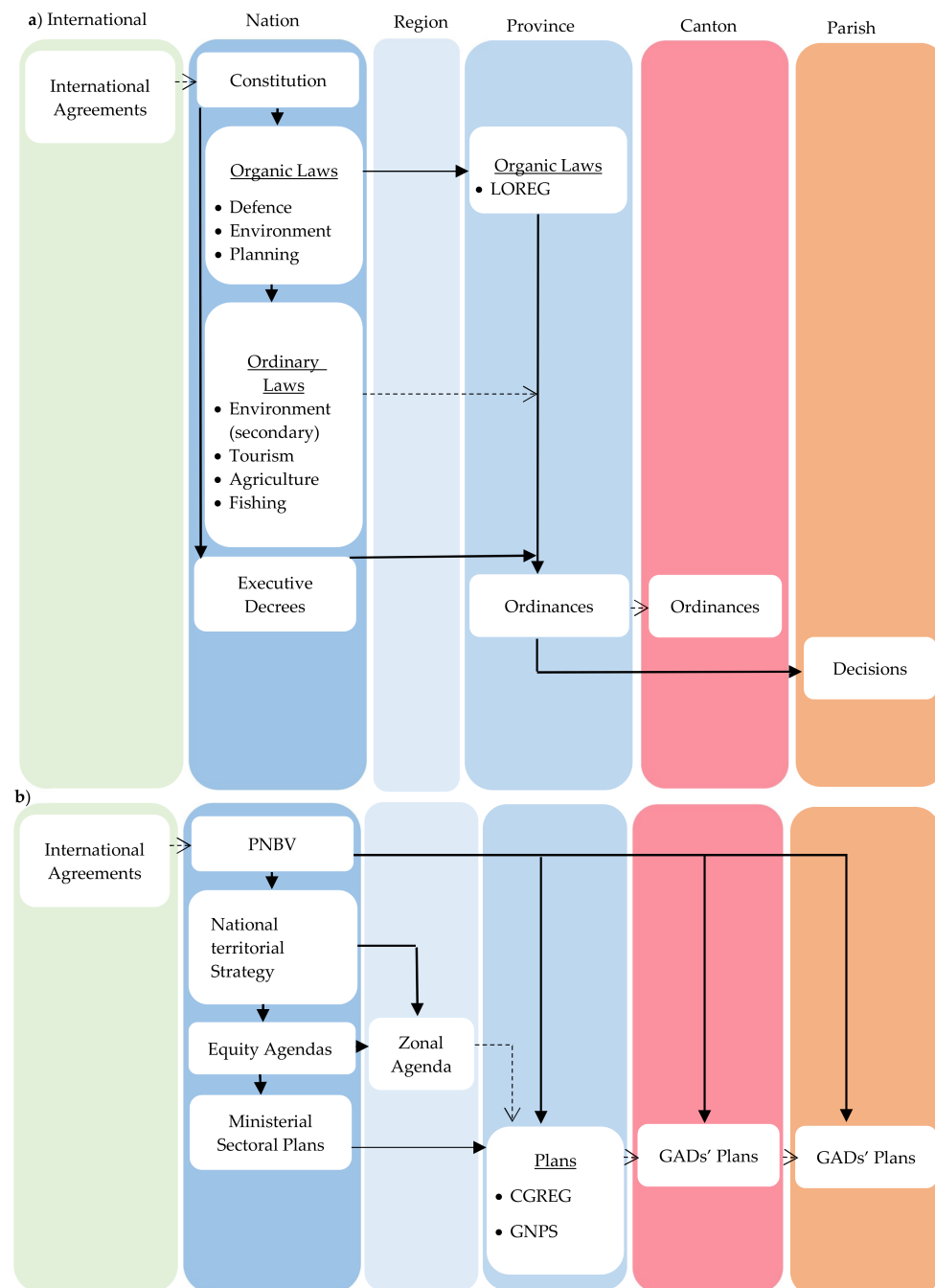


Figure 3. (a) Legal framework for the province of Galápagos; (b) policy framework for the province of Galápagos. Laws and planning instruments are hierarchically arranged from top to bottom and from left to right. Continuous lines show direct influence over other legislation while dashed lines show indirect influence. Acronyms: PNBV—National Plan for the Good Living; LOREG—Organic Law for the Special Regime of Galápagos; CGREG—Government Council for the Special Regime of Galápagos; GAD—Decentralized Autonomous Government; GNPS—Galápagos National Park Service.

To assist in the implementation and adaptation of the National Plan for the Good Living to lower territorial levels there are national ministerial and regional planning instruments. These include the zonal agendas, which are part of the National Territorial Strategy (included in the PNBV), and have provisions for the development and territorial organization (land use/spatial planning) of adjacent provinces that are functionally linked through social, economic, and ecological processes [117,118]. Additionally, as stipulated in the Constitution and the COOTAD, zonal agendas intend to assist provinces with their responsibility to form regional GADs [112,113]. Under the current provisions, Galápagos belongs to Zone Five, together with the provinces of Guayas (except for the cantons of Guayaquil, Samborondon, and Durán), Los Ríos, Santa Elena, and Bolívar [117]. Nevertheless, as shown in Figure 3a,b, no regional GADs have been formed thus far. Hence, there is no government agency currently in charge of the formulation of regional norms or the implementation of Zonal Agenda 5.

3.2. The Galápagos Special Regime (GSR)

The GSR was first established under the Article 239 of the Ecuadorian Constitution of 1998 [119], and later ratified under Articles 242 and 258 of the Ecuadorian Constitution of 2008 [113] to ensure the conservation and sustainable management of Galápagos. Additionally, the 2008 Constitution stipulates that the Special Regime of Galápagos is to be governed under the Organic Law for the Special Regime of the Province of Galápagos (LOREG), and in alignment with the national and subnational legislation and planning instruments [113]. Under Articles 4–8, the LOREG establishes that the Government Council for the Special Regime of Galápagos (CGREG) and its Technical Secretariat are the institutions in charge of planning and policy implementation at a provincial level. However, decision making takes place at the meetings of the CGREG Plenary Board.

Under Article 10 of the LOREG, the CGREG Plenary Board consists of The President of Ecuador, who is represented by an appointed minister as head of the CGREG (who also chairs the Plenary Board); the ministries of Environment—represented by the Galápagos National Park Service, Tourism, Agriculture, and the SENPLADES; the municipal GADs of San Cristobal, Santa Cruz, Isabela; and one representative from the five Galápagos' perishes GADs (see Figure 4). While only CGREG Plenary Board members have decision-making power, there are other institutions that provide technical assistance and advice. Some of the most important ones includes the Ministries of Transport and Infrastructure, Health, and Education, the Ecuadorian Navy, the Charles Darwin Foundation, and NGOs, such as Conservation International and Galápagos Conservancy. Additionally, any individual or group can participate in the meetings and debates of the CGREG Plenary Board and GADs (without voting power), requesting the empty chair mechanism (a public participation mechanism established under Article 101 of the Constitution).

Furthermore, the *Regulations for the Implementation of the LOREG* (draft) [120] and the Galápagos' Territorial Organization and Sustainable Development Plan [103], respectively establish two means for public participation: the Consultative Management Board for the stakeholders involved with the Galápagos Marine Reserve, and the Cantonal Assemblies for stakeholders involved with urban and rural areas. However, these are not operational to date.

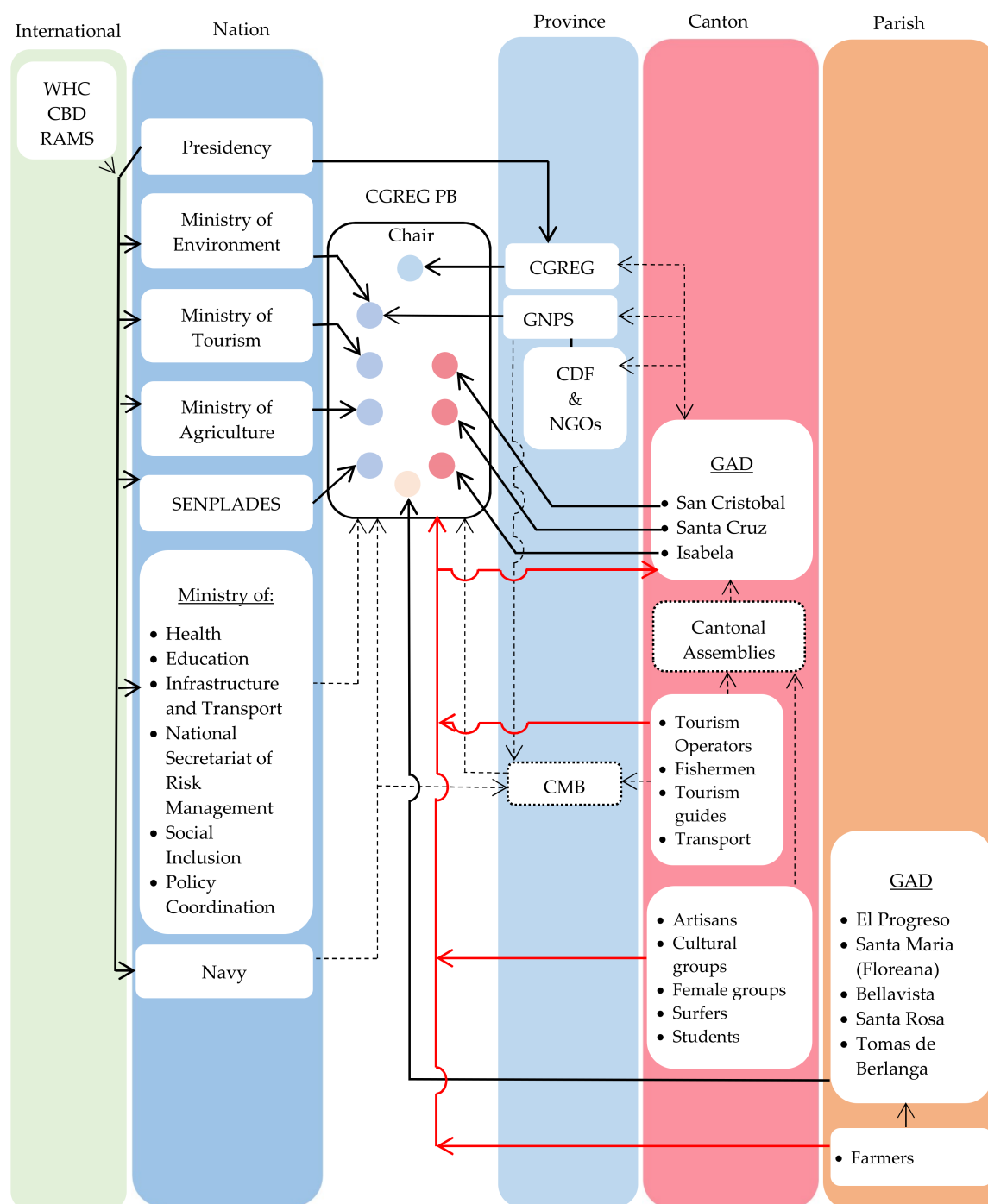


Figure 4. Institutional arrangements and stakeholder interactions in the Province of Galápagos [103,113,120,121]. Thicker lines show strong interactions, while thinner lines show weak interactions. Continuous lines show permanent/established interactions, while dashed lines show intermittent interactions or inoperative links. Red lines show public participation access in CGREG or GADs meetings through the empty chair mechanism. Acronyms: WHC—World Heritage Centre; CBD—Convention on Biological Diversity; CGREG PB—Government Council for the Special Regime of Galápagos Plenary Board; GNPS—Galápagos National Park Service; CDF—Charles Darwin Foundation; CMB—Consultative Management Board; GAD—Decentralized Autonomous Government.

Other important aspects of the LOREG 2015 include the provisions of (i) Articles 33 and 34, that subject all the government agencies and GADs' planning instruments to the CGREG's Sustainable

Development Plan; (ii) Articles 35–49, that establish four residential status (permanent resident, temporary resident, tourist, and transient) and the criteria for their respective eligibility, rights, and restrictions; (iii) Articles 50–78, that set the parameters for regulating socio-economic activities (e.g., tourism, fishing, agriculture, and craftsmanship) in the islands, which convey preferential rights to permanent residents; and, (iv) Articles 85–113, that define the jurisdictions for the institutions in charge of the governance and management of the Galápagos Marine Reserve, Galápagos National Park, Galápagos' province, Galápagos' urban and rural areas, and Ecuadorian Territorial Sea.

Under articles in section IV, the management of the Galápagos National Park and Galápagos Marine Reserve corresponds to the Ministry of Environment and its branches, including the Galápagos National Park Service and the Galápagos' Biosecurity Agency under environmental laws. Similarly, the regulation of fishing, tourism, agriculture, freight, and interisland cabotage fall over the corresponding ministries and secretariats, according to organic and ordinary laws. Additionally, the jurisdictions/responsibilities over the different territorial levels is aligned with the provisions established in the Constitution 2008 (see Appendix B, Table A2). Nevertheless, the regulation and control of immigration are the responsibility of the CGREG and its Technical Secretariat. Furthermore, the CGREG Plenary Board—informed by the corresponding ministry, secretariat, or GAD—is the only entity allowed to grant sea or land-based licenses for tourism. Finally, while each agency oversees the application of administrative sanctions according to provisions of the LOREG and other environmental and civil laws, enforcing these laws and ensuring Galápagos' safety is the responsibility of the Ecuadorian Navy for the Galápagos Marine Reserve and Ecuadorian Territorial Sea, and of the Police and the Ecuadorian Army for land areas.

4. Assessment of Comprehensiveness of Policy Integration

Galápagos' institutional arrangements show evidence of endeavors of a landscape-scale approach that could facilitate some degree of policy integration. These include the notions behind the formation of regions (even when these remain unformed), and more importantly, the establishment of the CGREG and the CGREG Plenary Board. On the one hand, the CGREG Plenary Board has the potential to become a suitable arena for parishes, cantons, provincial and national stakeholders representing multiple sectors to assess common issues, debate alternatives, define goals, and formulate policies and plans to achieve them. On the other hand, the CGREG has been conveyed the authority to implement and enforce the CGREG Plenary Board's decisions. As result of these arrangements, important decisions have been made, and measures implemented to increase immigration and biosecurity controls. Additionally, the CGREG Plenary Board has distributed the funds from the tourists' entrance fee to Galápagos in the following manner: 50% for the Galápagos National Park Service and Galápagos' Biosecurity Agency, 25% for the three municipal GADs, 20% for the CGREG, and 5% for the five parishes GADs [122]. Lastly, both legal and policy frameworks support and encourage decision making and public engagement at all territorial levels (at least in a rhetorical manner). Nonetheless, there are some significant shortfalls that need to be addressed if effective policy integration for the sustainability of Galápagos is to be achieved, as discussed next.

4.1. Comprehensive Spatial Scale

The jurisdictions of the territories, and their respective institutional arrangements for decision making, follow political divisions that do not represent comprehensive functional socio-ecological structures and processes. For example, Galápagos depends on the Ecuadorian mainland for the provisioning of goods and entry of tourists through the routes that connect the maritime ports and airports in the archipelago with Quito (in Pichincha Province) and Guayaquil (in Guayas Province). These are the only entry points of cargo and people to the islands [103,123]. However, being Metropolitan Districts, Guayaquil and Quito constitute administrative zones in their own, Zone 8 and 9, respectively [117]. Hence, in addition to the absent regional GAD to administrate Zone 5, spatial comprehensiveness is constrained because administrative ties, including official and regular

collaboration, need to be established with Quito and Guayaquil. To magnify this problem, due to no regions having been officially formed to date, Article 4 of the Organic Law to reform the COOTAD states that provinces which have not been organized into regions by 2028 will be incorporated into regions under the initiative of the Presidency and the approval of the National Assembly [124]. Moreover, in case a Central Government-driven regionalization supersedes the current zonal division of the National Territorial Strategy, there could be an institutional mismatch that further exacerbates the current governance/administrative inconsistencies. This gap could have severe impacts in the governance and management of the islands, and in the integration of Galápagos' aspirations with the rest of Ecuador.

Additionally, the Galápagos Marine Reserve with the GADs' coastal areas are linked by a broad range of socio-ecological processes (e.g., transportation, tourism, fishing, recreation, sewage treatment, species migration, and hunting patterns) [103,123,125]. Nevertheless, these are scarcely addressed by the CGREG and GADs' planning instruments. Programs to protect iconic species and places (e.g., sea lions, mangroves, beaches, jetties) do little to cover the full extent of the land–sea permeability that occurs through the GADs' coastal areas [123]. On the one hand, GADs' measures for construction, transportation, noise regulation, and even street lighting, could have an impact on nearby marine areas. On the other hand, Galápagos National Park Service, Ministry of Tourism, and Navy's measures to regulate maritime activities could have a socio-economic and cultural impact on urban areas. However, provisions to respond to, or alleviate, such impacts are missing from current planning instruments. The only provisions for an integrated land–sea management are included in the Galápagos National Park Service's Management Plan, but these are limited to the protected areas of the Galápagos National Park and the Galápagos Marine Reserve. Moreover, there are no permanent mechanisms for establishing the collaboration between the GADs and the Galápagos National Park Service outside the CGREG Plenary Board. Instead, their collaboration takes place through specific programs and projects whose budget and monitoring are not always specified in the planning instruments. Additionally, the Navy, which is a key stakeholder in the regulation and control of maritime activities, is not a member of the CGREG Plenary Board.

More importantly, there are also socio-economic processes (e.g., transportation, commerce, fishing, tourism, political) linking the urban and rural areas of the four inhabited islands that are not considered in the GADs' plans. On the contrary, each municipal GAD presents its own approach to urban development. Moreover, GADs seem to be engaged in an open competition to become the most popular destination for tourists within Galápagos. The same competition is also reflected in the attitudes of fishing associations and companies, tourism operators, artisans, and transport operators that exist in each island. Subsequently, these island-constrained objectives make the development of a common front for addressing cross-cutting issues affecting Galápagos highly unlikely. Additionally, they may hinder the implementation of the CGREG Plenary Board policies and programs.

4.2. Comprehensive Temporal Scale

From a temporal scale perspective, one of the main barriers for effective policy integration in Galápagos comes from the mismatch between the short-term lifespan of the planning instruments and their unrealistically ambitious long-term goals. Following the SENPLADES planning methodology, the CGREG and GADs' planning instruments try to adjust to the four-year period of democratically elected authorities [114,115]. This relatively short-term planning period, together with a potential new government with different agendas every four years, obstruct the monitoring of policy measures over time, and jeopardize the accomplishment of long-term goals, such as sustainability, equity, and social justice. Almost all planning instruments relevant to Galápagos aim to achieve sustainable development on their own right over a four-year timeframe. This is a recurrent trend among ministerial, provincial, cantonal, and even parishes' plans. There is also a lack of scaled down goals and targets (e.g., achieve 60% of occupation in accommodation services or increase the share of tourism-related profit that stays in the Galápagos territory), with goals broadly focused on achieving sustainable ecotourism.

Only the Santa Cruz GAD plan surpasses a four-year timeframe. Additionally, except for the Galápagos National Park Service Management Plan, the CGREG, and GADs' planning instruments present little to no evidence of the assessment of policy consequences, or of provisions for their articulation in subsequent plans.

There is also bad timing between legal and policy frameworks. Laws and ministerial plans (including ministers) are often changed under the directives of new Presidents and National Assemblies that renew every four years. However, there is a two-year lag between the election of national authorities and GAD authorities. This lag is translated into the planning instruments that remain aligned to previous plans for half of their lifespan. In Galápagos' case, the lifespan of most of the GADs' planning instruments in this analysis is from 2012 to 2016. Thus, these were formulated before the enactment of the LOREG 2015, and the formulation of the CGREG Sustainable Development Plan (2015–2020). A content analysis of the latter revealed that its objectives and policies were not informed by the planning instruments at lower territorial levels. Alternatively, the CGREG plan implements a top-down approach that should be reflected in the GADs' plans, relieving the current ones for the term 2016–2019. Nevertheless, this information is not available to date on the GADs' websites or through the CGREG's reports. Moreover, the Galápagos National Park Service Management Plan (2014–2017) and the Santa Cruz GAD plan (2012–2027), to date, have not been reviewed after the LOREG and CGREG plan were established.

Finally, the planning cycle is happening at a faster rate than the generation of technical and scientific information/knowledge. The Galápagos' short-term plans are implementing some drastic measures attempting to solve immediate problems regarding infrastructure and the provisioning of services. For instance, Santa Cruz GAD and CGREG's plans present provisions to consolidate urban areas through incentives to develop empty lots [103,126]. In Santa Cruz, this has resulted in new development areas in El Mirador sector that nearly doubled the area of the existing settlement [103]. Also, all the territorial organization plans present provisions to create more tourism-related infrastructure, which is clearly polarized around the coastline of urban areas [103,126–128]. These will have a long-lasting impact on Galápagos' socio-ecological system that will not have yet unfolded by the time new policies are implemented.

4.3. Comprehensive Stakeholder Interdependence

There are two main factors influencing public engagement in Galápagos: (i) previous troubled relationships between government agencies and local fishing and tourism sectors; and (ii) legacy of past struggles that resulted in inefficient governance and planning structures. In 1998, when the first LOREG was enacted, it contained provisions for public engagement in policymaking. A key attribute included in this law was the creation of two platforms for the participative management of the Galápagos Marine Reserve. Firstly, the Participative Management Board (JMP—Spanish acronym) in charge of management decisions at provincial level was integrated by the Galápagos National Park Service, Navy, fishing and tourism guides associations, the Charles Darwin Foundation, and other representatives of ministries and social groups. Secondly, the Authority of Inter-institutional Management (AIM—Spanish acronym) was in charge of ratifying and enforcing the decisions of the JMP from a ministerial level [53,129]. Although these platforms achieved relative success in terms of policy actors' participation [53], the enforcement of the decisions was less effective, due to the limited capacity of government agencies [54,105]. The unsolved conflicts between conservationist and fishing sectors hindered agreements and the implementation of management plans for the Galápagos Marine Reserve and Galápagos National Park [7,52,64,66] (see Appendix C, Table A3 for a chronology of anthropogenic activities in Galápagos). Ultimately, these factors were determinants in the inclusion of Galápagos in the list of Endangered World Heritage Sites from 2007 to 2010 [105]. Consequently, government agencies were restructured and entrusted with more decision-making power [130], and the recently enacted LOREG 2015 set new institutional arrangements for the governance and management of Galápagos.

Under these measures, Galápagos' institutional arrangements present a clear top-down approach that has restricted the direct participation of key stakeholders. While there are approximately 70 stakeholders comprising government, civil groups, and NGOs [103], only nine of these have decision-making power through the CGREG Plenary Board (five are appointed ministers, and four are democratically elected representatives of the urban and rural areas). Although provisions to grant citizens the right to participate in policymaking and planning at all levels of government are specified in the Constitution (Articles 95–101) [119], there are no clearly defined mechanisms for its implementation. For instance, the CMB and the cantonal assemblies are not operational. Moreover, even when these become operational their resolutions will not be legally binding.

To aggravate the situation, not all stakeholders can afford the costs involved in participating in the CGREG Plenary Board. Additionally, the absence of an open platform to enable the communication between civil groups with government agencies in each island, and between civil groups across the islands, has contributed to the development of island-specific planning approaches. Another important fact is that planning instruments do not show evidence of public participation. The only two exceptions found in this analysis are the Bio-Agriculture Plan of Ministry of Agriculture [131] and Isabela GAD Strategic Tourism Plan [132]. These plans documented public participation and have objectives and policies that are more consistent with the local socio-economic and socio-ecological contexts. Notably, these plans do not follow the SENPLADES planning methodology.

4.4. Comprehensive Issues Interdependence

The way in which spatial scales, policy timeframes, and stakeholders are considered plays a determinant role in the amount of interdependent issues that can be addressed under Galápagos institutional arrangements. Firstly, the Zonal Agendas-related administrative constraints represent a major obstacle to address pressing issues affecting the islands. These include the shortage of food, the lack of infrastructure to implement quarantine measures, and the need to maintain and improve both the regulation and monitoring of tourists and residents entering and exiting the islands [103]. Secondly, the policies and programs in the GADs' planning instruments respond to pressing local issues, mainly related to the provisioning of basic services (e.g., drinking water, sanitation, waste management, urban development and housing). Conversely, provincial plans are focused on improving governance and institutional strengthening. This means that core sustainability-related issues, such as climate change adaptation, education, capacity building, and public health, are not considered by planning instruments. The limited range of issues considered in these instruments leads to a limited number of stakeholders being engaged in the process. There is also no common front to address the common goals for inter-island connectivity and cross-cutting issues, because planning instruments are predominantly locally oriented and lack long-term, strategic focus.

Finally, Galápagos' public institutions have struggled with adapting the few sustainable goals set at national level to the local socio-ecological context of the archipelago. Thus, the same broadly defined national-level goals are repeated throughout provincial, cantonal, and parishes plans. This is because fundamental sustainability-related concepts such as conservation, ecosystem services, eco-tourism, public participation, and island culture may not be clearly understood by local and even national policy actors. For instance, the narratives of most planning instruments use the term conservation as a synonymous for preservation. In this sense, the conservation of Galápagos is seen as the *non-intervention* of nature. Under this premise, the only acceptable economic alternative left is a utopian view of eco-tourism that only brings economic benefits to the locals and has no side effects. Similarly, the understanding of public participation is limited to informing stakeholders of decisions. This hinders debates, consultation, and even monitoring of how effective these policies might be. Additionally, the few provisions for culture only consider artistic expressions diminishing the role of identity or sense of place. One of the main problems with these poorly understood concepts is their failure to recognize change. Acknowledging and preparing for the changes embedded in socio-ecological processes is crucial for islands' sustainability, especially because islands are affected by

global trends in climate and market demands over which they have no control [1,14]. Hence, without multidisciplinary teams that facilitate the understanding and the incorporation of such concepts into planning and policy implementation, it is unlikely that the long-term sustainable goals of the PNBV and ministerial plans will result in policies, programs, and projects that effectively contribute towards Galápagos' sustainability.

5. Discussion

Achieving sustainable development goals require orchestrated efforts from multiple sectors, institutions, and stakeholders [14,85,111]. In the case of small islands, such as Galápagos, sustainability can only be achieved by comprehensive policy integration efforts that seek to manage integrated land and sea issues, taking a socio-ecological system perspective that brings together government levels and society. This requires a unifying platform that accommodates spatial and temporal scales, interconnected stakeholders, and interdependent issues in an articulated and functional manner. A landscape-scale planning approach could provide such unifying platform because the landscape is a dynamic unit with physical (spatial and temporal) dimensions and changing socio-ecological interactions [48].

Applying a landscape-scale planning approach to facilitate policy integration for the conservation of Galápagos implies a careful consideration of the elements underpinning its socio-ecological processes and how these unfold across time and space. It is also important that future decision making is informed by a better understanding of how policy measures affect these processes, as this is critical for enhancing its sustainability [36,37].

In regard to the spatial dimension, this study found that Galápagos institutional arrangements are driving territorial compartmentalization rather than much necessary integration to solve the raft of complex internal and external issues affecting its conservation. Under a landscape-scale planning approach, such fragmentation in the Islands' governance and management could be overcome with the creation of critical partnerships entrusted with official and permanent channels of communication. For example, a partnership between the CGREG and the Metropolitan Districts of Quito and Guayaquil could be created to ensure locally relevant issues affecting the Islands are not overshadowed by other pressing issues affecting these metropolitan areas. A partnership between the Galápagos National Park Service, the Navy and the GADs could improve the management of land-sea areas, especially considering that both the Islands' tourism attractions and socio-ecological systems are highly dependent on a healthy marine environment. A partnership between stakeholders in each and across islands could improve collaboration and equal distribution of opportunities and income across different sectors and social groups, as opposed to the current competition that is leading to the depletion of the Islands' natural resources and fragile ecosystems. These partnerships need to be supported by well-funded programs to improve Galápagos' institutional and social capacity, and enable inclusive stakeholder participation. An existing example of partnership of this nature is the long-term agreement between the Charles Darwin Foundation (international NGO) and the Galápagos National Park Service to undertake scientific research and provide technical assistance that informs decision making [123]. Furthermore, the multidisciplinary research carried out by the Charles Darwin Foundation could be extrapolated to set guidelines for multidisciplinary work between government institutions and with non-governmental groups/associations. Ultimately, this has the potential to lay the foundation for future interdisciplinary approaches.

Additionally, by considering the temporal dimension, a landscape-scale planning approach would ensure Galápagos' current and future planning instruments are focused on long-term goals that guide objectives and programs adjusted to their short-term lifespan. Furthermore, these plans would also incorporate provisions for ongoing follow-up, monitoring, and update to deal with the ever-changing character of landscapes, and incorporation of best available knowledge to inform the Islands' management of their fragile socio-ecological systems. Finally, the issues to be addressed through these plans would be informed by a raft of stakeholders and the partnerships formed by

these. The collaborative planning character of a landscape-scale planning approach could also facilitate the creation of arenas for deliberation to overcome past struggles and conflicts. However, effective implementation of all these measures entails changes in the socio-political structure and culture. In particular, stakeholders from all territorial levels and across all sectors must be aware that there are pros and cons embedded in conservation, tourism, fishing, and development. More importantly, they need to play a greater role in making collective and well-informed decisions to enhance the sustainability of the Islands' socio-ecological systems.

Lastly, through the consideration of the human-driven modification dimension, the collaborative planning character of a landscape-scale planning approach could also be instrumental in addressing one of the most pressing needs in the Galápagos Islands, namely building local capacity (both institutional and social) to better manage its socio-ecological systems [54,103,123]. Currently, skills shortage in the Islands is being addressed by hiring professionals from the mainland enabled through regulations set by the LOREG which grant them temporary residency status. In the best-case scenario, these professionals are likely to contribute to form multidisciplinary teams to implement the above-listed opportunities both effectively and efficiently. Nevertheless, they are likely to compete with permanent residents for jobs, bring in a different set of values relating to lifestyle and culture, and increase the demand for already scarce resources (e.g., water, food, housing) [103]. Their temporary residency status only allows them to work under yearly renewed contracts that determine the type of work they can do. Furthermore, temporary residents and their family members are not allowed to buy land in the Islands. These restrictions narrow the range of professionals that could be attracted to work in Galápagos, diminishing their longer-term commitment with the Islands' issues, and creating a social divide between temporary and permanent residents. A collaborative landscape-scale planning approach could ensure temporary skilled migration programs had long-lasting capacity building benefits for Galápagos by facilitating the development of a nourishing interaction between temporary and permanent residents. This does not preclude the need for educational and training programs specially targeted at permanent residents to prepare them for highly skilled jobs in the mid- to long-term future. Additionally, it would create opportunities for both groups to deliberate about, and better understand, the impacts of such programs on Galapagan culture, identity, and lifestyle (insularity), so as to not compromise these.

The same reasoning can be applied to the benefits and problems associated with activities relating to the tourism, urban development, and conservation sectors, hence enabling stakeholders to define the boundaries of their insularity and make the necessary decisions to balance it with the achievement of their well-being based on a sound socio-ecological system, which is the main premise of sustainability, and must be the first and foremost objective of policy integration. Nevertheless, measures to achieve this objective are missing from current Galápagos institutional arrangements and planning instruments. By focusing on the everyday interactions that occur between stakeholders in a landscape, it is possible to understand people's perspectives, concerns, aspirations, and value systems, and use these as valid inputs to inform decision making. This is perhaps the main contribution a landscape-scale planning approach could bring to the sustainability of Galápagos and other islands facing similar issues.

In this context, there is potential/need for adopting a landscape-scale planning approach because it may facilitate the interconnected processes of (i) building Galápagos' social and institutional capacity to deal with ongoing social and environmental change; (ii) recognizing, restoring, maintaining, and enhancing Galápagos' socio-ecological processes; and, (iii) facilitating the development of sustainable communities in the Archipelago.

Under the current institutional arrangements, Galápagos presents a top-down approach to planning, policymaking and governance. In order to achieve the effective implementation of a landscape-scale planning approach this study suggests that the Consultative Management Board and cantonal assemblies become operational, and assign funds to facilitate the participation of stakeholders in the CGREG Plenary Board meetings. In addition, it is suggested allocating funding for permanent platforms dedicated to facilitate the communication between non-government stakeholders

across islands. Finally, it suggests the development of programs focused on amending bad historical relationships among stakeholders and training/educating stakeholders on landscape planning topics. These include, for example, the concept of landscape, implications of landscape-scale planning, sustainability, ecosystem services, and resilience, to name a few. Furthermore, particular attention should be paid to improving the understanding of the levels and implications of public participation in planning [133]. These small but necessary steps could be incorporated in Galápagos planning instruments as early as possible, and become part of planning platforms of future sectional elections for cantons (equivalent to municipalities) and parishes. Subsequently, these steps could trigger the implementation of a landscape-scale planning approach that improves the consideration of the four parameters of the comprehensiveness criterion of policy integration. Ultimately, more effective policy integration accompanied with progressive and sustained local capacity building could facilitate the accomplishment of long-term sustainable development goals.

Lastly, the recommendations suggested in this article are the result of an in-depth context-based analysis of the Galápagos Islands case study. Transferring these findings and applying the methods of this study to other small island or mainland contexts would necessarily require a thorough evaluation of their respective legal and planning frameworks and socio-ecological context. In each case, all these local factors will determine the most effective path to implement a landscape planning approach to improve policy integration. Furthermore, the premises to achieve sustainability might differ from place to place.

6. Conclusions

The Galápagos Islands' case study outlined three main themes regarding the sustainability of small islands. Firstly, small islands are functionally linked to larger mainland systems. Therefore, planning, policymaking, and governance arrangements must necessarily take these links into consideration. Secondly, in order to ensure that the perceptions and aspirations of small islands' inhabitants inform decision making, there is a pressing need for increased local technical and organizational capacity. This entails enabling small islands' communities to be aware and prepared for the changes embedded in any given path chosen to ensure the conservation of their insularity and to secure their welfare. Finally, this study illustrated that a landscape-scale planning approach could potentially improve the consideration of the policy integration criteria. However, the insights presented here are based on findings from the document analysis covering legal and planning instruments, and limited to the parameters of comprehensiveness criterion of policy integration. Future studies on the contributions of a landscape-scale planning approach to the remaining policy integration criteria (aggregation and consistency) could improve the understanding of its full potential or feasibility for addressing small islands sustainability-related issues. Moreover, further studies could focus on knowing more about the perspectives and aspirations of non-government and community-based organizations whose livelihood depend on sound ecosystem services, including, but not limited to, fishing groups, tourism services operators, tourist guides, and cultural groups in small islands.

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Appendix A

Table A1. List of analyzed documents.

Territorial Level	Laws	Planning Instruments/Tools
Nation	<ul style="list-style-type: none"> • Ecuadorian Constitution 1998 [112] • Ecuadorian Constitution 2008 [113] • COOTAD 2012 [116] • Organic Law to reform the COOTAD 2016 [124] • COPFP 2012 [116] • Organic Code of Environment [134] • Unified Text of Secondary Environmental Legislation: Book VII [135] • Law of Tourism [136] 	<ul style="list-style-type: none"> • PNBV (2013–2017) [118] National Territorial Strategy (included in the PNBV) • Strategic Plan for the National System of Protected Areas [137] • SENPLADES Guidelines for Territorial Organization and Development Plans [114] • SENPLADES Guidelines for Institutional Plans [115]
Region		<ul style="list-style-type: none"> • Zonal Agenda 5 (included in the PNBV)
Province	<ul style="list-style-type: none"> • LOREG 1998 [129] • LOREG 2015 [121] • Regulations for the Implementation of the LOREG 2015 (draft) [120] 	<ul style="list-style-type: none"> • CGREG Sustainable Development Plan (2015–2020) [103] • Galápagos National Park Service Management Plan 2014 [123] • Bio-agriculture Plan (Ministry of Agriculture) [131] • Tourism Plan (Ministry of Tourism) • SENPLADES Guidelines for Galápagos [138]
Canton (Municipalities)		<ul style="list-style-type: none"> • San Cristobal GAD Plan for Territorial Organization and Development [128] • Santa Cruz GAD Plan for Territorial Organization and Development [126] • Isabela GAD Plan for Territorial Organization and Development [127] • Isabela GAD Plan for Tourism [132]
Parish		<ul style="list-style-type: none"> • Bellavista GAD Plan for Territorial Organization and Development [139] • Santa Rosa GAD Plan for Territorial Organization and Development [140] • El Progreso GAD Plan for Territorial Organization and Development [141] • Santa Maria (Floreana) GAD Plan for Territorial Organization and Development [142] • Tomas de Berlanga GAD Plan for Territorial Organization and Development [143]

Appendix B

Table A2. Responsibilities of territorial levels according to the Ecuadorian Constitution (Articles 260–269) [113].

Function	Territorial Level				
	State	Region	Province	Canton	Parish
National defense, internal security, public order	X				
International relationships	X				
Immigration	X				
National planning (strategic)	X				
Formulation of public policies on economy, taxation, customs, designation of the Attorney General, monetary, foreign trade, and indebtedness, education, health, social security, and housing (public policies are formulated by the respective Ministry or National Secretariat)	X				
Natural resources and protected areas	X				
Natural disasters management	X				
Implementation of International treaties	X				
Management of radio spectrum and communications	X				
Management of energy resources (biosecurity and forestry included)	X				
Management of public companies	X				
Development and land use planning		X	X	X	X
Watershed management		X	X		
Transport planning		X	X	X	
Plan, build and maintain road network (urban areas excluded)		X	X		X
Plan, build and maintain street networks in urban areas				X	
Grant legal personality, register and control social organizations		X			
Policy formulation for research, innovation, and technology transfer		X			
Encourage productivity		X	X		
Ensure food security		X			
Encourage international cooperation		X	X	X	X
Issue regional norms		X			
Environmental management			X		
Management of the irrigation system			X		
Support agriculture			X		
Issue provincial ordinances			X		
Control and regulation of public transport				X	
Provide public services such as water supply, waste management, sewerage and others established by the respective law				X	
Plan, build and maintain health and education infrastructure as well as public spaces				X	
Protection of the architectural heritage				X	
Develop and manage of the urban and rural real estate cadastre.				X	
Regulate and control the use of beaches, river and lake banks				X	
Ensure public access to beaches, lakes and rivers				X	
Management of quarry				X	
Management of firemen department				X	
Issue cantonal ordinances				X	
Plan, build and maintain public infrastructure and public spaces					X
Encourage community-based productive activities					X
Manage the provisioning of public services conferred by other levels of government					X
Encourage social organization					X
Sign agreements and issue resolutions					X

Appendix C

Table A3. Chronology of anthropogenic activities in The Galápagos Islands based on the stages defined in [7].

Stage	Year	Main Events
Pre-Hispanic	Prior to 1492	Galápagos were not inhabited by humans when discovered by the Spaniards. However, there is archeological evidence that indigenous tribes visited Galápagos before. Nevertheless, the origin of the indigenous artifacts found in the islands has not been determined [144].
Extractive Exploitation	1535	Galápagos Islands are discovered by accident when Panama's Bishop was travelling from Panama to Lima [145].
	Following Centuries	Whalers and buccaneers introduced alien species and depleted native species, particularly the giant tortoises [146].
	1832	The Ecuadorian Government claimed the archipelago to be part of its territory [106].
Colonization	1832–1837	The first colonization tried to establish a penal colony [144].
	1835	British Scientist Charles Darwin visits the Galápagos Islands and studies the very specialized physiological adaptations of finches and giant tortoises across the islands [7].
	1859	Darwin publishes his findings on the book "The Origin of Species by Means of Natural Selection" proving the evolutionary theory [7].
	1869–1878	The second colonization tried to start agricultural activities and commerce in Floreana Island [144].
	1879–1904	A third colonization attempt takes place in San Cristobal Island where Manuel J. Cobos tried to establish a sugar mill. After this, colonization in San Cristobal, Santa Cruz, Floreana and Isabela continues steadily [144]. During the first half of the 20th Century, the main economic activity was agriculture [64].
	1926–1929	Norwegian colonies are established in Floreana and Santa Cruz islands [144].
	1929–1934	A small German colony is established in Floreana [144].
	1936	The Archipelago of Galápagos is declared as Protected Area amid requests from the international scientific community to protect their scientific value. Nevertheless, there were no official institutions assigned to the implementation of such measure [64,106].
	1942–1947	The United States establish a military base in Baltra Islands to protect the Panama Channel [144].
	1946–1959	A penal colony is established in Isabela [144].
	1947–1958	Naturalist Lack and Eibl-Eibesfeldt encouraged the study the ecological system of Galápagos and demanded more effective protection of the islands [147].
	1950s	Fishing becomes the main economic activity in Galápagos attracting a new wave of colonizers and shifting resident from agriculture to the seas [64].
	1959	Creation of the Charles Darwin Research Station in Belgium, and the Charles Darwin Foundation and the Galápagos National Park in Ecuador. However, the Boundaries of the Galápagos National Park were not defined [147]

Table A3. Cont.

Stage	Year	Main Events
Wilderness Conservation	1960	The Galápagos National Park Service and Charles Darwin Foundation started a joint work to protect native species on the islands [64].
	1969	First forms of organized tours started [7].
	1973	Creation of the Galápagos Province; the boundaries of the Galápagos National Park were fully defined; the first body of rangers became operative; the first plan for the management of the terrestrial area was created [64].
	1974	The first management plan for the Galápagos National Park was formulated and included provisions to protect a 12 nautical mile buffer around the coastline of the islands [64].
	1978	Galápagos Islands were declared as one of the original eight a World Heritage Sites [105].
	1980s	Tourism displaced fishing and agriculture and assumed the role of economic drivers in Galápagos [7,62,64]. Conflicts between the fishing sector and the tourism and conservation sectors begin [64].
	1984	Woods Hole Oceanographic Institute wrote a report advocating for protection of marine areas within a 15 nautical miles buffer around the islands [7]. UNESCO declares Galápagos as Biosphere Reserve [106].
	1986	The report of the Woods Hole Oceanographic Institute resulted in the creation of the Galápagos Marine Resource Reserve (GMRR), a 15-nautical miles buffer around the islands. Nevertheless, the GMRR did not have a protected area status [64].
	1990s	During this decade, struggles between fishermen and the Galápagos National Park Service resulted sever conflicts and even violent actions [64,105].
	1994	The Ecuadorian Government unsuccessfully request the addition of the marine reserve to the World Heritage Site [105].
Conservation-Development	1998	The First Organic Law for the Special Regime of the Galápagos Province (LOREG) is passed; the Galápagos Marine Reserve, a 40 nautical miles wide buffer around the baseline of the islands, is created; The Galápagos National Institute (INGALA) is created to assume the planning and management of the islands [129].
	1999	First management plan for the Galápagos Marine Reserve was approved [7].
	2001	The Galápagos Marine Reserve is included as a World Heritage Site [105].
	2002	Isabela's south wetlands are declared RAMSAR Site [106].
	2003	First regional (provincial) plan for the Galápagos National Park was introduced [7].
	2000s	Because of political instability, lack of institutional capacity and coordination the LOREG (1998) was not fully enforced and plans were not implemented. Consequently, conflicts between the Galápagos National Park Service and the fishing sector continued. Also, Galápagos experienced an unprecedented tourism growth causing population growth and increasing the pressure on natural resources [7,52,64,66].
	2007	Galápagos Islands are placed on the Endangered World Heritage Sites List due to failures to control the introduction of invasive alien species, and to regulate immigration and the increasing tourism activities [105].
	2008	The new Ecuadorian Constitution creates the Galápagos Government Council (GGC) to replace the INGALA as the planning and management authority in the Galápagos Province [113].
	2007–2010	Several measures are implemented to address the requirements of the World Heritage Committee and Galápagos Islands are removed from the Endangered World Heritage Sites List [105].
	2014	The first plan for the joint management of the Galápagos National Park and Galápagos Marine Reserve is introduced [123].
	2015	A new Organic Law for the Special Regime of the Galápagos Province is passed [121]. The LOREG (2015) triggers the elaboration of new regulations and plans for the conservation of the Galápagos Islands.

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