



## PARKS, PEACE, AND PARTNERSHIP: GLOBAL INITIATIVES IN TRANSBOUNDARY CONSERVATION

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# Environmental Peace-building in Peru and Bolivia: The Collaboration Framework for Lago de Titicaca

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## INTRODUCTION

The case of Lago de Titicaca, and the evolution of a “culture of cooperation” between Bolivia and Peru, is a little-known but highly successful example of how cooperation generated around the joint management of a natural resource can extend far beyond the resource itself and have positive collaborative spill-over effects in many other aspects of society – from scientific, military, congressional, and legal regulations to community-based collaboration (Map 1). An additional unique nuance of this case is the fact that it is an example that utilized a case study of joint resource management failure in another ecosystem (Aral Sea – Uzbekistan and Kazakhstan) to help justify the need for collaboration to domestic



MAP 1. LAKE TITICACA REGION (M. CROOT).

congressional bodies, mainly by highlighting the potential drastic negative consequences of maintaining the status quo, i.e., competition for the resource. These two aspects of this case study – extending the framework of the “culture of cooperation” beyond the environment and into other layers of society and utilizing an example of failure in order to galvanize domestic support – are the key lessons learned which have the potential to become accepted and widely recommended “best-practices” in the evolution of transboundary joint natural resource management.

## EVOLUTION OF COLLABORATION

The most important dynamic that the Lago de Titicaca example of environmental peace-building exemplifies is the progression through the various levels of collaboration – how each successive level of collaboration strengthens the bonds between the two countries in multiple aspects of society. As Alexander Carius notes in his article *Environmental Peacebuilding: Conditions for Success*, “the exchange of information or environmental agreements alone will not result in peace. Yet such efforts can provide the initial impetus for broader cooperation” (Carius 2007, 12). It is as though the two countries were weaving a tapestry of their historical relationship, and this environmental peace-building opportunity around the joint-management of the waters of Lago de Titicaca was interweaving new threads into that tapestry – adding strength and resiliency to the historical relationship with each additional layer of collaboration. This was a gradual evolutionary process that occurred over several decades and was made possible through the hard work of individuals from both countries at many different steps along the way. Julio Sanjines, the Bolivian co-founder of the ALT (Binational Autonomous Authority of Lago de Titicaca – the joint management agency created to coordinate the management of the water resources throughout the ecosystem) characterized the evolution of this relationship as if “Lago de Titicaca was a mirror – where two twins are looking at each other” (Sanjines 2005).

The initial cooperation was economic – by two water companies from each respective country who were intent upon assuring their businesses would be able to supply the water to La Paz, Bolivia, and to Cusco and Manchu Picchu, in Peru. Essentially, the economic incentive of wanting to maintain control of commodity supply, combined with maintaining the water level in the lake so that supply did not dwindle, helped to stimulate recognition of the business claims of the companies from both countries and the need to collaborate in order to ensure that both companies and countries would have a sufficient and sustainable water supply for now and for the future. Economic planning lengthened the time horizon and helped create the recognition that cooperation in the present, coupled with the construction of a strategic plan for the future, would help create a

situation of mutual dependency which would, in turn, contribute to minimizing the potential for conflict. As Wolf et al. (2003) note in their article *International Waters: Identifying Basins at Risk*, “Water has also proven to be a productive pathway for confidence building, cooperation, and arguably, conflict prevention. Cooperative incidents outnumbered conflicts by more than two to one from 1945–1999” (p. 66).

Economic collaboration soon evolved into a scientific collaborative project between hydrologists from both countries, initially in the form of sharing data that had been gathered independently, and then developing into a comprehensive scientific ecosystem analysis which both countries created and conducted together. It was at this point that the two militaries were drawn into the process. The navies of both countries were needed to provide the actual watercraft for the scientists to be able to conduct the study and had a unique combination of skills that made them the only resources available that could actually complete the tasks in a manner that ensured accuracy and legitimacy. Their expertise lay in intimate knowledge of the intricacies of the local shorelines and with the navigation skills needed to ensure that data could be collected at regular grid system intervals in order to complete a total ecosystem map. This new function for the military, as an implementer of scientific data collection, helped to carve out a new role in the militaries’ sphere of influence – helping protect the environment. The jointly gathered data were then analyzed by the hydrologists from both countries and used to come to an agreement in order to coordinate the amount of pollution the ecosystem could tolerate, as well as the amount and types of human water usage allowable, in order to maintain the ecological integrity and viability of the lake in a long-term sustainable manner (Sanjines 2005). The Peruvian Congress approved the measure to jointly manage the water resources of the lake almost immediately, while the Bolivian Congress clung to traditionalist arguments about national sovereignty, which resulted in rejection of the measure for almost three decades (Sanjines 2005). “In the joint Presidential Declaration of 1955, subscribed among Bolivia and Peru, both presidents stated that because both countries have an indivisible condominium on the Titicaca lake’s waters, they would be able to utilize them only by means of expressed agreement by both parts. They ordered the preparation of a

Preliminary Study for the Use of its waters to a Binational Commission” (Revollo et al. 2005, 384).

In conjunction with the process of congressional approval, an innovative strategy was conceived by the men from both countries responsible for the jointly managed scientific study of the lake. As they monitored other global water issues, they learned of an example of what not to do – the Aral Sea.

In the early 1990s, Kazakhstan and Uzbekistan competed over water resources after the fall of the Soviet Union, which had previously dictated the terms of the resource usage to each of the then republics. The dissolution of the Soviet Union created a power vacuum, which led to both countries zealously proclaiming their newfound sovereignty, and expressing that through competition over water for agricultural irrigation, instead of trying to manage the resource in a long-term and sustainable manner. As a result of that competition, about 60 per cent of the Aral Sea’s volume had been lost, its depth had declined by 14 metres, and its salt concentration had doubled, killing the commercial fishing trade.

By developing a presentation on the Aral Sea to use as an example of what not to do, in order to justify something which must be done, Sanjines was ultimately successful in 1986 at spurring the Bolivian Congress to pass the legislation. The legislation formally created the ALT (Binational Autonomous Authority of Lago de Titicaca) and led to official collaboration on the legal level, as the two countries agreed upon a course in which regulatory policy in both countries was written embodying exactly the same legal standards.

This step is important because, as Carius notes, “ecological cooperation can potentially play a role in preventing the kind of violence that erupts due to the uncontrolled exploitation of natural resources, the destruction of ecosystems or the devastation of livelihoods based on natural resources” (Caruis 2007, 6). By agreeing on the letter of the law, and coordinating the regulations to be the same, it allowed for an implementation and management process that was simplified and streamlined. Thus, use of the resource could be coordinated and managed from an ecosystem perspective, instead of a political one. In order to help facilitate the implementation of the policy, both countries took advantage of cultural similarities that

transcend political boundaries and encourage sustainable water usage as a part of their inherent respect for the environment, which goes back generations in both the Aymara and Quechua cultures. As Carius notes, this is a crucial and often overlooked step: “Broad-based stakeholder participation is an important prerequisite for transferring the positive impacts of water cooperation to wider society” (Carius 2007, 21). An often-cited example is the Friends of the Earth Middle East (FOEME) and the “Good Neighbors Water Project” between three neighbouring communities in Palestine, Israel, and Jordan (FOEME 2011). The Good Neighbors Project created a mayors network and a series of community stakeholder meetings. The results from both were published to keep the public informed of the developments and the effect their feedback had in terms of creating course corrections to improve the effectiveness of the program.

In order to encourage involvement and participation of citizens and local stakeholders in Bolivia and Peru, different channels were established depending on the degree of participation and the various levels of citizen groups involved. The ALT coordinated an information dissemination campaign utilizing various mediums (articles, publications, conferences, studies, reports, and others). Conversely, the ALT also helped to establish a community feedback mechanism in the form of local “town hall style meetings” allowing the local population to get answers to their questions and to provide input on how the programs could be more effective (Revollo et al. 2005). Through this mechanism, the culture of collaboration was able to trickle down into the community level in a conscious manner, and begin to involve ordinary citizens from both nations in the process of jointly managing the water resources upon which they all depend.

All of these actions and circumstances have generated significant momentum for a number of joint projects, including additional opportunities with international teams from the UN and private international scientific organizations and development agencies.

The evolution of environmental peace-building around the joint management of the water resources of the Lago de Titicaca bio-region is an excellent, but under-studied, example of how a framework for cooperation between two countries can be stimulated and replicated on multiple levels around an environmental issue, leading to stronger bonds between the

countries, the governments, the politicians, the militaries, and the citizens. “Developing the human, technical, and administrative capacity to generate and analyze data, to develop sustainable management plans, and to implement these plans is necessary to enable water institutions to fulfill their management tasks and to prevent water-related disputes over the long term” (Carius et al. 2004, 64).

## ECONOMIC COLLABORATION

Initial aspects of collaboration occurred around fisheries in 1935. Next came a joint commission to study human water usage and a railway feasibility study – both were conducted in 1955 (ALT 2003). In 1957, there was an agreement to complete an economic study for the “joint utilization” of the water resources (Sanjinés-Goytia 2001). Julio Sanjinés-Goytia identified this as a crucial shift in consciousness as this was the point that the recognition for the need to collaborate around this resource began to enter the consciousness of key individuals from both countries. These initial economic reasons highlighted the interconnected nature of the two countries’ relationship around this essential ecosystem and resource. Another nuance that was beginning to be understood was the potentially limited effectiveness of any decision made unilaterally, as it could only be implemented throughout part of the ecosystem while the effects would affect the ecosystem as a whole, regardless of where the political boundaries stand or who acted on their side of the lake. It was these two aspects of economic collaboration that allowed the initial formation of a “culture of cooperation,” helping to forge the foundation upon which a framework of collaboration was extended into other aspects of the two societies.

## SCIENTIFIC COLLABORATION

The prolonged rains and the massive floods of 1986, and the resulting damage (which included the relocation of entire villages, destruction of over 50,000 hectares of farmland, and the loss of 50,000 homes as entire



lake communities became internally displaced people – numbering over 150,000) served as a “flashpoint” that highlighted the human need to more effectively manage the water resources of the lake and its rivers (ALT 2003). A mechanism was needed to protect the human settlements on the lakeshore from other potential floods, as well as for maintaining water levels during years of drought, and ensuring water quality and consistency of supply. Both countries were hit hard by the flood and came to these conclusions independently. It became clear to politicians and practitioners that water is essential to human survival and that it does not recognize boundaries of sovereign nations. Water bodies form linkages across jurisdictional boundaries and the impacts of pollution and water use extend to all who share the water, regardless of national citizenship. In 1986, the Binational Autonomous Authority of Lago de Titicaca (ALT) was created as an independent, scientifically based organization which would become the mechanism by which both countries coordinated the joint management of the lake ecosystem. Both countries established the ALT through a congressional act, and they both contributed money to its initial budget and expertise in the form of scientists and political leadership (Sanjines 2005).

The initial task of the ALT was to develop the “master plan” for the management of the lake ecosystem and its rivers and flood plains. This development was significant, for it led to the creation of ecoregion maps without political boundaries. The ALT effectively reprioritized collaboration from an economic and political issue into one of overarching environmental significance. The complete scientific mapping and monitoring of the lake (depth, temperatures, rainfall) involved cooperation of the navies of both Bolivia and Peru, as well as collaborative scientific studies for specific purposes, including: water usage projections for rerouting water to cities and for irrigation of agriculture; environmental degradation of the lake (water quantity and quality) and land (erosion); biodiversity concerns in terms of both flora and fauna; and, finally, man-made impacts (the uses and demands that the humans living in the ecosystem placed on the resource). This process led to the creation of jointly designed programs for the purposes of flood mitigation and dam-building (ALT 2003), as well as international studies on climate change (Schnurrenberger and

Hiatt 2004) and applications to be named a UNESCO World Heritage Site (UNESCO 2003). The next logical stage in the process of the master plan is beginning to occur at this point in time but has yet to become as widespread as the previous stages. It includes the joint development of sustainable projects that will address flood mitigation and drought management, as well as poverty alleviation and delivery of basic water services from running water to sewage management.

## MILITARY COLLABORATION

The military collaboration aspects of the story were born out of necessity. The only reliable fleets of water craft available to complete the long-term, comprehensive study of the entire lake belonged to the navies of both Bolivia and Peru. Fortunately, they could trust the skill of the navies' crews and they could reliably collect samples at regular intervals along a grid system in order to conduct a comprehensive study. The relationships between the two navies as institutions, as well as between the men from both sides who made up these institutions, were respectful to begin with and evolved over the years of closely working together into deep interconnected bonds between the men, as well as a tighter more resilient working relationship between the institutions, where previously unconsidered possibilities became a reality. There was no longer a need for protecting and maintaining sovereign territorial integrity where the political border lay in the middle of the lake.

Under the "master plan," both countries' boats could freely cross into the other country's "waters" and it was not viewed as threatening. Over time, hydrologists from Peru spent time on the Bolivian navy ships and vice versa, slowly extending and strengthening the collaboration with each evolutionary step. Eventually, joint manoeuvres involving ships from both countries, containing scientists from both countries on each ship, led to prolonged cooperation over time, involving both navies and an intermixed group of hydrologists from each country. The necessity for military collaboration in this case is unique and cannot be anticipated to be a characteristic in other cases in other areas of the world; however, the

general concept of “out of the box” thinking to create ways to stimulate military cooperation around environmental issues is something that can be applied more widely. Being involved in this project led to the creation of in-depth personal relationships based on mutual professional respect and the building of trust – all of which was created by the bonds developed working together to complete the comprehensive scientific data gathering project and the ecosystem map (Sanjines 2005).

## CONGRESSIONAL COLLABORATION

The Committee on Foreign Relation, through resolution 2905/97-CR, approved the agreement for the creation of the Authority of Binational Lago de Titicaca to manage the establishment of rules and regulations to handle environmental decisions with economic and financial autonomy in the Lago de Titicaca system, which includes the Desaguadero River, Lake Popó, and the Coipasa water system. Resolution 2905/97-CR was signed by the Governments of Peru and Bolivia on May 29, 1996 (Revolloet al. 2005). According to Julio Sanjines, the process of congressional approval was a story of vastly different political situations. In Bolivia, it was a challenging process that took decades of testimony and lobbying, and, finally, the use of the Aral Sea catastrophe (USGS 2001) as an example of what would happen if they continued with the status quo of competition for the water resources with Peru instead of pursuing a course of collaboration. This is one of the unique aspects of this particular case, which can become a best practices tool for all people who seek to foster cooperative environmental projects.

According to UNEP data and charts (UNEP, n.d.), the demise of the Aral Sea was caused primarily by the diversion of the inflowing Amu Dar'ya and Syr Dar'ya rivers to provide irrigation water for local cropland, particularly the region's main cash crop – cotton. Under the USSR, an irrigation program was created that diverted water flowing into the Aral Sea. Due to the top-down leadership regime, strict quotas were placed on the amount of water that could be diverted, and for several decades satellite data shows that the Aral Sea was slowly shrinking. However, upon the

collapse of the USSR, top-down regulations were ignored, and newfound autonomy was exercised in the form of newly independent nations seeking to maximize their revenue and competitive advantage. Kazakhstan and Uzbekistan began to simultaneously increase the amount of water that they diverted to their cotton fields, essentially competing over the resource. In the subsequent decade, the rate of contraction of the Aral Sea was dramatically increased to the point where the resource itself has become almost unusable due to increased salinity and more highly concentrated chemical composition. In addition, a number of unanticipated spillover effects have had a dramatic impact upon the people of the region as fishing is no longer a viable livelihood, dust storms have become chemically charged due to the exposed former seabed, and young people are being faced with dramatic incidences of health problems, including typhoid fever, viral hepatitis, tuberculosis, and throat cancer, which are three times the national average in the area surrounding the Aral Sea (UNEP, n.d.).

According to Sanjines, the ALT hydrologists from both Peru and Bolivia were monitoring this and other cases around the world to see if they could glean any “best practices” that they could apply to the joint scientific studies or the technical management regime. Sanjines also mentioned that they were consciously looking for data and examples to support their case to the domestic Bolivian Congress to sign the resolution 2905/97-CR, which would create, formally mandate, and fund the ALT. He described the day when he presented the argument before the Bolivian Congress and for the first time included the Aral Sea example complete with a dramatic visual representation of the consequences of choosing competition over cooperation. In contrast, in Peru it was politically expedient to pass the legislation quickly and so the 1955 joint presidential decree was formally approved by the Peruvian Congress and signed into law in 1957 (Revollo et al. 2005). Despite the differing circumstances and the elongated timeframe, the “culture of cooperation” eventually reached the congressional level, though the other areas of cooperation continued to develop over time while waiting on the formal legal approval.

With the formal creation of the ALT, elected officials had made a significant and groundbreaking collaborative policy decision: the written regulations governing the use and management of the water resources

of the entire Lago de Titicaca system would be exactly the same in both countries. Coordinating the laws and regulations of both governments was the next step in the progression of the “culture of cooperation.” While it was done in order to ensure consistency in the interpretation and implementation of the regulations, it also set the precedent that the two countries could collaborate so closely on the political level that they could write laws that would be the same in both countries. After Bolivia finally passed the act commissioning the creation of the ALT in 1986, they committed themselves to a course that would allow the science to dictate the terms of the policy – in terms of the joint management of the water resources in the lake and the pursuit of a course of stewardship in the management of those resources. The joint ownership model not only applied to the waters of Lago de Titicaca but also to the watershed and the five rivers flowing out of the lake, as a way of ensuring integrated management of the entire water system, including floodplains, the lake, rivers, tributaries, and wetlands. This model created mechanisms to promote cooperation among different government jurisdictions and organizations, as well as communities in the entire watershed. Further, it widened the web of collaboration, and strengthened the “culture of cooperation” between Bolivia and Peru.

## CULTURAL COLLABORATION

Emmanual Adler asserts in his article “Imagined (security) communities: Cognitive regions in international relations” that “As environmental cooperation develops, and societal and political stakeholders come together in systematic negotiations, such efforts can build trust, initiate cooperative action, and encourage the creation of a common regional identity, as well as establish mutually recognized rights and expectations” (Adler 1997). Extending the “culture of cooperation” down to the community level of interaction, as well as consciously tapping into generations of indigenous knowledge of the lake ecosystem is part of the hands-on implementation of the recommendations of the “master plan.” One aspect of this indigenous knowledge is the Pachamamma creation myth: in Aymara and Quechua culture, Lago de Titicaca is the birthplace of the universe, and thus must

be treated with reverence and respect as being sacred. There are a number of rituals and ceremonies that reaffirm this myth and intertwine it in the local culture, as well as evoke a sacred duty for the people of the lake to be caretakers or stewards of the ecosystem (Sanjines 2005). This myth and these rituals are not specific to Bolivia or Peru; they are culturally specific to all who live around the lake, regardless of citizenship. It is an overarching aspect of the culture of the people who live around the lake that binds them tightly to each other and to the lake which allowed for the creation of a single plan, specific to the lake culture, to facilitate the dissemination of information and to stimulate local community involvement and feedback.

The Bolivian and Peruvian governments took advantage not only of the myth but also of the shared cultural flow of the livelihoods of the communities that live around the lake, which is neither Bolivian nor Peruvian, but unique to Lago de Titicaca. Lake communities primarily consist of fishermen, herders, farmers, and those who cater to tourists – workers who start their day before dawn so that they can leave at first light. So many of the radio programs that were developed to encourage environmental protection and the mindset of sustainable use were broadcast in the pre-dawn hours before people left to work, as well as in the evening hours when people returned from their work. The two governments cooperated to develop consistent methods of disseminating information, from a media plan that used the radio show, culturally specific posters and flyers, and the creation of a network of meetings held in the town meeting format to allow average citizens access and input into the joint-management “master plan.” In a number of different ways the “culture of cooperation” was extended down to the community level in a manner that was cognizant of the uniqueness of the local culture, and utilized this cognizance in an effective manner.

The network of town meetings was complemented by a regular meeting which was instituted with the local governors of each of the lake communities. These were more representative in nature and were used as platforms on which to develop additional complementary pieces of the strategy, as well as to adjust pieces of the strategy that may not be as effective as they had hoped. This strategy was identical on both sides of the border and effective in translating the sacred Aymara and Quechua relationship

with the lake and the surrounding land into today's modern terms. Julio Sanjines discussed what many people brought up at the town meetings and told their local governors – that they did not need training in environmental stewardship. Rather they needed development that would help lift them out of poverty and create basic services such as sewage treatment systems and basic water filtration and delivery infrastructure. As Sanjines states, “sustainable development is a new word for an ancient concept” (Sanjines 2005). The ‘lake people’ have lived for millennia as an intricate part of a unique ecosystem, building their lives in harmony with their environment. Yet poverty has stopped them short of taking advantage of the advances in technology, such as sewage treatment systems or water filtration systems. This conflict continues today, as many of the sustainable development projects are delayed or have been cancelled due to lack of government and international funding. The “culture of cooperation” has not yet reached a level that can alleviate the poverty that affects both Bolivians and Peruvians who live within the ecosystem.

## CONTINUED COLLABORATION

Carius (2007) asserts that “Water cooperation evolves into broader forms of political cooperation if it is integrated into an economic and political institutional context.” This is exactly what occurred in this case: the relationships, the mutual respect, and the framework of cooperation that developed between multiple levels of the two societies over the course of the preceding decades has established strong working and interpersonal relationships, as well as the more formal national relationship between the two countries. This has generated momentum which has progressed beyond the initial layers of cooperation into much more intricate and intertwined programs and projects that both countries are pursuing together for their mutual benefit. This is where the environmental peace-building effects become evident, as many of these programs and projects would have been highly improbable without the previously established positive working relationships that were generated throughout the process of establishing the ALT and the joint management mechanism and structure.

Case study research ground is ripe here in terms of examining through the lens of environmental peace-building the various examples of collaboration that have evolved in the wake of the experience of developing the master plan for the joint management of the waters of Lago de Titicaca. This detailed analysis would reveal the roots of the collaboration that has evolved and expose the degree to which the collaboration rippled through various layers of the two countries social and political fabric.

New programs and projects that grew out of the initial cooperation include the UNESCO World Heritage Site application process for Lago de Titicaca, which is being compiled and submitted by scientists and government officials from both countries (UNESCO 2003). Authorities are monitoring the lake for compliance with the RAMSAR convention designation which includes protecting various endangered species, such as native fish (the karachi [*Orestia* sp.] and boga [*Trichomicterus* sp.]) (ALT 2003). This is done by visiting local markets to make sure that these species are not being caught and sold, as well as by scientific studies that monitor the populations and health of both of these fish.

Both Bolivia and Peru agreed to participate in the World Water Conference and together the ALT compiled and wrote a joint World Water Assessment Program Case Study (UNESCO 2004), which highlighted the results of all the scientific data that had been gathered and assessed the health of the lake in a snapshot sense. The case study also identified challenges and opportunities for the future. The ALT is comprised of Ministry of Foreign Affairs (Peru and Bolivia); National Development Institute (INADE); Ministry of Planning and Sustainable Development; Lake Titicaca Special Project (PELT), and the Bolivian Operational Unit (UOB) (UNESCO 2004).

In conjunction with the United Nations Development Programme/Global Environment Facility (GEF/UNDP), the Autoridad Binacional Autonoma (ALT) has created a joint project on biodiversity conservation in the TDPS system (ALT 2003). This comprehensive plan looks at both flora and fauna in the entire ecosystem, from the lake to the rivers, to the surrounding land and flood plains, and at the impacts that human use has had on biodiversity. It also looks at what the two countries can do



to further collaborate to protect such endangered species as the Andean Condor and the two fish species mentioned above – the karachi and the boga.

Finally, in conjunction with the Intergovernmental Panel on Climate Change (IPCC), Lago de Titicaca and the ALT have taken part in the Global Lakes Drilling Project (in conjunction with the U.S. National Science Foundation and the International Continental Scientific Drilling Program, with technical expertise provided by DOSECC Inc.) (Schnurrenberger 2004). Lake bed core samples were taken in multiple areas around the lake to subject them to a similar analysis as ice core samples to conduct a climate change analysis of the sediments in the lake bed at different periods in time. Lago de Titicaca is a unique and valuable case as it is the highest lake in the world to be included in the program (over 3,800 metres above sea level), and it has some of the longest intact sediment because of its depth.

These programs have helped to maintain the bonds between the two countries. They have also created new ones, as people from both countries – whether scientists, government officials, local governors, or the people who live around the lake – have developed an expectation that when it comes to the lake, they must work together. So science is conducted jointly, policy is developed in lock step, the two navies help in the implementation, and the two national governments continue to pursue projects and programs around the lake that would be impossible or ineffective if implemented unilaterally. Now the framework for the “culture of cooperation” has grown so ingrained that the two countries are pursuing: international engagement for help with scientific program funding, UNESCO recognition, and sustainable development funding under the Millennium Development goals as though they were representing the Lago de Titicaca ecosystem and not their national sovereign countries of citizenship. These multiple forms of interaction between scientists, government and civil society actors create opportunities to establish and strengthen mutual trust, to provide a communications channel for feedback to reach the policy-makers, and to formally codify political cooperation.

## CONCLUSION

It is clear that the level of additional collaboration that developed between Bolivia and Peru as a result of the decision to jointly manage the resources of Lago de Titicaca is a prime example of how to extend the “culture of cooperation” framework beyond just natural resources and into other aspects of society. The results of such efforts include creating and strengthening additional bonds between the two neighbouring countries, and establishing deep interpersonal relationships between citizens from both countries within many different layers of society. Julio Sanjines describes the environmental peace-building dividends of the evolution of the “culture of cooperation” when he states: “Even though relations between the two countries were good before this project; the cooperative efforts, and coordination that have occurred have strengthened the bonds between the governments, the local community leaders, and the scientists from both countries” (Sanjines 2005). While not an example that is easily replicated in other political or regional contexts, the case of Lago de Titicaca offers up some clear lessons for the international community, and provides an example of a number of practical ways to extend collaboration over an environmental issue into many other areas of society in a meaningful and lasting way.

To paraphrase George Santayana, “if we do not learn from our mistakes then we are doomed to repeat them.” In this case, Bolivia and Peru represent the savvy recognition of a parallel case on the other side of the world from which they took key “lessons learned” about how *not* to handle the management of a shared water resource. They recognized the negative feedback loop that would be created by choosing the road of competition – which would lead to the ultimate destruction of the resource and the loss of all its benefits to both countries. In turn, they chose to navigate the twists and turns on the road of collaboration which led to the establishment of a framework for the sustainable joint management of the resource. The framework will likely perpetuate the benefits of the resource for both countries for generations to come. This logic of applying what we learn from the failure of competition over resources can be applied elsewhere

around the world and should be able to help establish cooperation as preferable to competition.

As Jared Diamond stated (2004): “The politics of sustainability are about issues of fairness, risk, human rights, animal rights, and ecological rights. They are about how much we take from our descendants and what we leave behind. We need to create a politics of the earth to protect the biosphere, and we need to reinvent politics at the ecosystem level.”

The systematic progression of the “culture of cooperation” around the joint management of the water resources in Lago de Titicaca – from economic, to scientific, to military, to congressional, to legal regulations, to community-based cultural collaboration – is an example that should be highlighted to the world as a potential roadmap to successful environmental peace-building efforts across political boundaries. The use of a parallel “story of failure,” utilized under the rubric of not repeating the mistakes of the past, can become a universal “best practice” and act as a powerful stimulant that points towards a path of collaboration instead of the path of competition. Both of these aspects of the Lago de Titicaca case study make it a valuable success story of environmental peace-building that can serve as an example of how to approach collaborative joint management of an essential natural resource. As Patricia Kmeri-Mbote states: “Successful environmental peacemaking demands that resources are managed equitably and in a sustainable manner, requiring inclusive and participatory environmental decision-making processes and the recognition of environmental resource rights for all” (Kmeri-Mbote2007).

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