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PARTNERSHIPS FOR THE PRESERVATION OF RIVERS IN BRAZIL AND ITALY AS A LEGACY OF WORLD WAR II

[1,*]**Ricardo Castro Nunes de Oliveira, [2]Rosiany Possati Campos and [3]Carlos Lima Castro**

[1]Engineer-PhD in Water Resources -Centro Brasileiro de Requalificação Fluvial–Niterói, Brazil
[2]Economist–PhD in Environmental Engineering-Centro Brasileiro de Requalificação Fluvial–Niterói, Brazil
[3]Lawyer–Centro Brasileiro de Requalificação Fluvial–Niterói, Brazil

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****Corresponding author:***
Ricardo Castro Nunes de Oliveira

ABSTRACT

World War II was one of the darkest periods in human history. In particular, rivers were hit hard by bridge bombing and intensive removal of vegetation in their watersheds and banks. Defensive or attack strategies modified the river balance of sediments, banks, and sometimes even changed river courses. On the other hand, as the war moved on, some positive aspects began, such as the spirit of collaboration and brotherhood that Brazilian soldiers and Italian civilians built at that time. In the Italian provinces of Tuscany and Emilia-Romagna, this strong bond of friendship between citizens of the two nations continues until today. Revisiting the lessons of the past, this work describes this longstanding fraternity, focusing on Brazilian and Italian experiences in the preservation and recovery of river spaces. As a pilot project, we start with an overview of similar approaches that could be carried out in the Sesmaria and Panaro rivers in Brazil and Italy, respectively.

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INTRODUCTION

Water is fundamental for life and has always been a determining factor in land occupation, the development of great civilizations and growth of large cities (Oliveira and Miguez, 2011). Humans explore, try to control rivers and modify river spaces on a Holocene scale (Vandenberghe *et al.,* 2010). Technological infrastructure for multiple river uses has existed since ancient times, especially in arid zones (Haidvogl, 2018). Rivers are fundamental for human survival and are also vectors of economic development. Rivers also play an important strategic role in countries by marking borders and promoting the conquest of new spaces, and served as essential routes for the formation of some countries, such as the United States and Brazil. According to Stratford (2016), the most distinctive and important feature of North America is the river network in the middle third of the continent. In times of war, rivers form a natural barrier that still remains important. This strategic importance of rivers as an instrument of possession and control has been stressed in many from classic war manuals, such as On War (Clausewitz et al., 1984), and was painfully proven, as in the American attack on the Rápido River in Italy during World War II. (W.W.II) (e.g. Smith, 1998). During this period, control of the rivers and their valleys and the mountains that dominated them posed a huge challenge to the northward progress of Allied troops in Italy. Brazil joined the Allies in 1942 and sent soldiers to fight in Italy. In this scenario, Brazilian soldiers crossed hundreds of small streams and some of the most important Italian watersheds, such as the Arno, Serchio, Reno, and Po. In November 1944, soldiers of the Brazilian Expeditionary Force (BEF) moved from the Serchio River Valley region to the Reno River Valley and later to the Panaro River Basin where they fought their most violent battles at Mount Castello and Montese and later consolidated the ties of cooperation and friendship with the Italians that are celebrated until today. While visiting this region in May 2019, through field surveys and guided tours we learned more about the history of the BEF. This enabled us to better understand the depth and importance of cooperation, the spirit of friendship, and provided an opportunity to exchange information. In particular, we noted the possibilities to exchange experiences between Brazilian and Italian researchers in river preservation, as well as the preparation of a joint proposal for the Sesmaria River in Brazil and the Panaro River in Italy. Governance is not only about collaboration between different government levels and agencies, but also about early involvement with the community (Jeroen Rijke *et al.,* 2012).

This initiative - Partnership for preservation - intends to keep alive the bonds of fraternity generated in WWII as well as to continue the studies and meetings carried out by European and Latin American researchers in Brazil and Italy during the SERELAREFA Project.

SERELAREFA, (seeds of a Latin American river restoration network) is the acronym of an EU international cooperation project (co-funded by the EU FP7 IRSES-People 2009 program). The main objective of the SERELAREFA Project was to develop new proposals in Latin America for the environmental recovery of rivers, strengthening the exchange of technical and economic information for sustainable use of watersheds. The work in progress also fits into a context in which humanity faces new challenges generated by global warming and the need for increased resilience of cities in the face of this climate change. In addition, it aims to build a proposal for international cooperation in line with the tenets of the United Nations (UN) that freshwater ecosystems play a central role in the health of economies and societies worldwide. Preserving and protecting the world's fresh water is a key role of UN members (United Nations, 2017). In the world, rivers are under pressure and need more integration and cooperation in planning, management and the development of new synergies (e.g., Evers and Nyberg, 2013).

Initial research indicated that it was possible to find common ground and propose innovative approaches to river space management in the Sesmaria Basin in Brazil and the Panaro Basin in Italy. Experiences and technical and academic propositions were developed, strengthening the management, preservation, and recovery of these rivers. The Sesmaria Basin is well known to us from our inspections carried out for the Brazilian government, including the Federal Justice System and Federal Prosecution Service, as well as academic work. The identification of the Panaro Basin as appropriate for comparison and joint development of research was consolidated in the May 2019 visit when we identified local interest in strengthening Brazil-Italy integration. There are similarities with Sesmaria Basin, such as types of land use and occupation, with the predominance of rural activity, especially dairy farming, and possibilities for strengthening participatory basin management. Through this work, we seek to define how to use the fraternal ties created in WWII to help the development and elaboration of joint proposals between Italians and Brazilians for the preservation of river spaces, by identifying the main similarities and differences in river space management between Italy and Brazil. In this context, the differences between the two countries and the mistakes made and mutual learning are highlighted here.

BRAZIL IN WORLD WAR II

The World War II years - between 1939 and 1945 - were a period in the history of mankind in which all nations, in one form or another, participated - actively or passively. Each population made its contribution and suffered consequences (Sulla and Trota, 2015). Initially a distant observer, Brazil was gradually drawn into the conflict, despite its originally professed neutrality. At the Second Consultative Meeting of Ministers of Foreign Affairs, held in Havana in 1940, it was decided that “any attack by a non-American State against the integrity or inviolability of the territory, against the sovereignty or political independence of an American State, shall be considered as an act of aggression against the States that have signed this declaration”(Moraes, 1947). The Japanese surprise attack on Pearl Harbor in Hawaii on December 7, 1941 led Brazil, in accordance with the Havana Deliberation of July 1940, to announce on January 28, 1942 that its relations with the Axis countries (Germany, Japan and Italy) had been broken off. Shortly after the declaration of the severance of diplomatic relations, several Brazilian ships were torpedoed by German and Italian submarines in the Atlantic. In particular, between August 15 and 19, 1942, Brazilian ships were sunk off the nation’s coast, and with the arrival of dead bodies on the beaches of the state of Sergipe, the outcry of the Brazilian population reached its highest pitch. Thus, on August 22, 1942, President Getúlio Vargas declared war on the Axis. Brazilian troops were mobilized and the first Brazilian troops landed in Naples, Italy, on July 16, 1944.

Arriving in Naples, Brazilians were deployed to the Arno and Serchio river watersheds, where they undertook the first missions, such as the construction of a bridge over the Arno River. In these basins, Brazilian soldiers won their first victories and liberated from German occupation cities like Massarosa, Camaiore, Pescaglia, Borgo a Mozzano, Galicano and many others. The position of the Brazilian troops in October 1944 can be seen on the map of the IV Corps of the Fifth US Army (Figure 1).

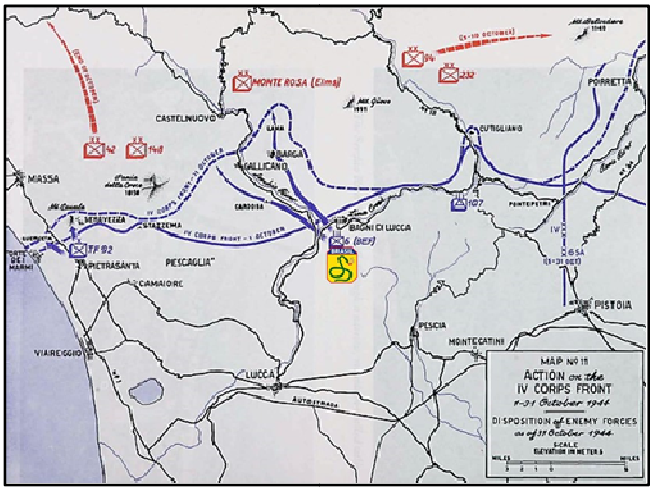

Figure 1. Map of the IV Corps of the Fifth US Army – modified- showing the BEF's area of operations in October 1944

The path taken by Brazilian soldiers in the Serchio Basin, from Vechiano to the frontline positions on October 30, 1944, led to crossing a network of streams and rivers in this basin,Autorità di Bacino del FiumeSerchio (2020) .According to Moraes (1947), at a meeting at Passo de Futa (40 km south of Bologna) on October 30, 1944, General Mark Clark decided to adjust the forces under his command to conquer the city of Bologna, and to redeploy the Brazilian division from the Serchio River Valley to the Reno River Valley. This new arrangement of forces attempted to break a three-month stalemate in which Americans and English attacked Bologna uselessly, endured severe counterattacks and suffered heavy causalities. Within the strategy outlined, it was essential to consolidate the domain of the Reno River Valley and the Italian roads in this region, in particular Roads 64 and 65, which led to Bologna. After that, it would be possible to reinforce the troops to attack Bologna and relieve the old Bologna front, where the Allied losses were alarming. It was necessary to press the adversary in other parts of the front, forcing it to withdraw some men defending the city to reinforce the threatened sectors (Moraes, 1947). However, to make this possible, it would be necessary to defeat the German troops that dominated the hills from highly fortified positions.

On November 6, through Operating Instructions No. 65 of the IV Army Corps, the BEF received new missions that resulted in attacks on Mount Castello and Castelnuovo. The first attacks against the fortified position of Mount Castello took place on November 24 and 25, 1944, followed by new attacks on November 29 and December 12, but these were unsuccessful in displacing the German soldiers from their positions. The front was stabilized during the harsh winter, which sometimes reached temperatures lower than eighteen degrees Celsius below zero, with no significant changes to the BEF front line. On February 8, 1945, at a meeting at the Fifth US Army Headquarters in Lucca, it was clarified that the IV Corps would carry out a new local offensive in the second half of February 1945. On February 16, preparations for the offensive called the Encore Plan were finalized (e.g., Moraes, 1947; USACGSC 1984; ARMY 1947), aiming to overwhelm, the Axis forces in the region between the Panaro and Reno valleys (Figure 2). In the Reno and Panaro basins, Brazilian troops suffered their greatest casualties, but achieved significant victories, finally conquering Monte Castelo on February 21, 1945. At 5:20 p.m., the enemy defense collapsed after heavy fighting and Mount Castello was under control of the Brazilian troops. After that, other victories followed, such as the takeover of Castelnuovo on March 5, 1945, also part of the Encore Plan.

On March 10, 1945, the BEF received Operations Order No. 14 of March 8 from the IV US Army Corps, which assigned a new mission and transferred the BEF to the Panaro River Basin. In this basin, the casualties were again heavy due to strong German resistance and the difficulties of destroying fortified positions in the surrounding mountains. On April 14, 1945, the Brazilian soldiers entered Montese. Finally, the city was liberated from the Nazis. Strong ties of the fraternity were created between Brazilians and Italians of the small town, and even today, every year the inhabitants of the small town celebrate their liberation by singing the Italian and Brazilian anthems, and performing civic activities with children. Probably Montese is the most vivid representation of the friendship between Brazilians and Italians, highlighting in this context the opportunities for integrated work between people from the two nations in the beautiful Panaro River Valley.

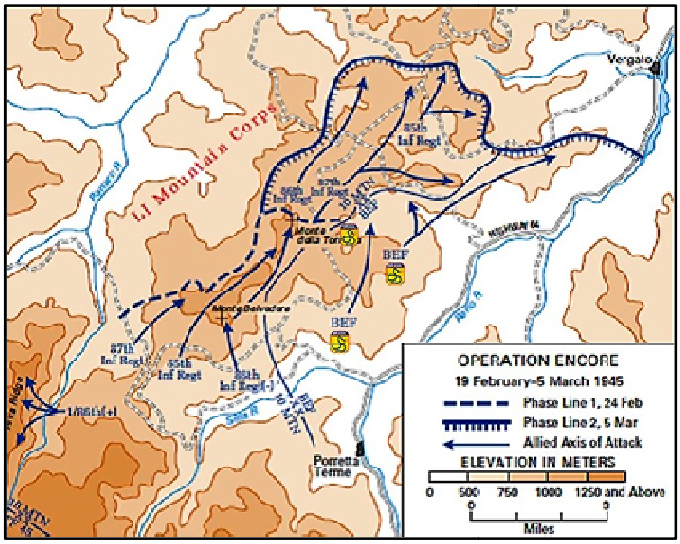

Figure 2. BEF Advance - Encore Plan. The valleys of the Reno and Panaro rivers can be observed. Source, US Army, modified

The Brazilian troop commander described in his memoirs (Moraes 1947) the landscape of the Panaro River Basin:

- The Panaro River was at the time a small watercourse flowing over a bed of pebbles. The basin in question, with an average width of 13 km, had two clear regions separated by the Maranello - Cádi Sola - Vignola – Bazzano general line: the foothill area and the Emilian Plain.
- The Apennine's hill-shaped pattern, on the Emilian slope, ensures a characteristic landscape. It offers generally uniform slopes and extensive rounded backs, only here and there interrupted by the outcrops of more compact strata or craters of landslides.
- Its valleys are deep, caused by the heavy erosion during heavy river flows.
- The Emilian Plain, in the Panaro River portion, is a true chessboard, not only in the altimetric sense but also by the layout of the roads, which are almost orthogonal. It is full of beautiful and well-tended orchards and has towns such as Bazzano, Castelfranco, Formigine and the important city of Modena.
- Bordering the Brazilian positions, Mount Montese stands out for its importance and particular meaning in the field of battle. This mountain's southeast slope abuts the town of Montese, which stretches from the orographic sequence between the S, Martino and Rivella valleys. That immense protuberance serves to block the progression of our troops toward the Panaro River and Campo Del Sole.

From this city, the Brazilian troops continued their advance through Italy until the city of Susa, where they met French troops. During this advance, the Brazilian troops freed many cities and towns through impressive victories, such as the successful siege and capture of an entire enemy division. On April 29, 1945, in the Fiume Dora Basin in the Fornovo region, 14,779 soldiers belonging to the 148th German Infantry Division surrendered, remnants of the Bersagliere Italia Division and of the Panzer Grenadier Division. Brazilian soldiers consolidated during their passage through Italy a mark of brotherhood that is currently represented by the dozens of monuments commemorating this passage. Indeed, Brazil is the country with the most commemorative monuments from participation in the Italian theater of operations during WWII.

Watersheds chosen for the pilot project

For the choice of mirror basins to studied together by Brazilian and Italian researchers, some requirements were established:

- The Brazilian basin should be well known to the authors of the proposal;
- The Italian basin should be linked to an important area where Brazilian soldiers fought in WWII;
- Brotherly relations that should be present with the inhabitants of these basins;
- The basins needed to have similar problems, such as modification of vegetation cover, land use and removal of riparian forest, to allow proposing shared solutions;
- Possibility of interacting with basin committees;
- Possibility of building on academic studies already performed to allow the adoption of methods that can be used in Brazil and Italy;
- Possibility of comparative analysis of European and Brazilian legislation on river preservation, forest cover, public access and the performance of public control entities;
- Continuation of the SERELAREFA Project's purposes.

The Sesmaria Watershed

The Sesmaria Watershed is a natural choice in Brazil for the project's propositions. In this basin, much research had been conducted by the authors, who developed innovative methods, in their doctoral theses for better management of this space. The current situation and risks to degradation were identified. Additionally, participatory management of the river space was proposed, as well as the use of payment for environmental services as an instrument for the preservation of riparian vegetation and flood mitigation.At the same time, this basin also met other requirements. It was the area of expertise of one of the authors. He worked as an engineer for the Federal Property Secretariat, acting in the supervision of field observation and extraction of sand from the Sesmaria River. Also he worked as a technical expert for the Federal Justice System in efforts to delineate the margins of this river (Brasil, 2012), and then performed inspections at the behest of the Federal Prosecution Service. Another aspect was also considered. The Sesmaria River and the Paraíba do Sul River, into which the Sesmaria River flows, were part of the discussions and field visits of the SERELAREFA Project (Nardini et al., 2014), resulting in presentations at congresses and the writing of theses and dissertations by the researchers who participated in this project (e.g., Oliveira, 2018; Campos, 2017; Campos, 2015; Jacob, 2013). Finally, it is important to mention the fraternal ties that exist between Resende, the main city in the Sesmaria River Basin, and the city of Montese in Italy. There is a neighborhood in the city of Resende named as Montese to celebrate the presence of Brazilian soldiers in this Italian city. Finally, Resende is the location of the Brazilian Army Military Academy (Academia Militar das NegrasNegras – AMAN).The basin situation is reported by (Oliveira ,2018; Campos, 2017; Campos, 2015).

The Panaro Watershed

The Panaro Watershed was chosen as a case study because in Montese, in the upper part of the basin, the Brazilians had one of their toughest battles in WWII. The memorable day of the liberation of Montese and the nearby towns is celebrated annually in Italy.

Brazilians and Italians meet to remember the past and keep alive the flame of fraternity forged in the dark period of the war. Also, the land use is similar to that of the Sesmaria River Basin. The Panaro River originates on Mount Cimone (altitude 2,165 m) in the Northern Apennines, where it is called Rio delleTagliole, in the place called Foce a Giovo, and flows into the Po near Bondeno after about 165 km. It has a drainage basin with 1,775 km2, about 2.5% of the total area of the Po Basin. The river flows northeast, down mountainous terrain. In Pievepelago, its name changes to Scoltenna and finally takes the name Panaro downstream from Montespecchio after the confluence of the Leo and Scoltenna streams, which form the upper part of the river network, originating from the Apennine Range (e.g., Gumiero et al. 2015, Castaldini and Ghinoi 2008, Autorità di Bacino del Fiume Pó(1999). The average annual precipitation is 1,017 mm and the daily discharge recorded in the 1,036 km2 catchment area is 19 m3/s, while the largest recorded flood flow is 1400 m3/s (Gumiero *et al.,* 2015). The Panaro Watershed's land use is mainly rural in its upper part, surrounding Montese, with dairy farming being economically important because of cheese production. The urban occupation is more consolidated in its lower parts, with the city of Modena standing out. Both the Sesmaria River and the Panaro River have been affected by sand and gravel mining. The Panaro River has experienced drastic changes in its morphology since the beginning of the 20th century and is now deeper and narrower, largely due to sediment mining (i.e., gravel extraction) (Gumiero et al., 2015).

Another important fact is that several studies have been conducted by researchers and experts of the Po River Basin Committee about the Panaro River Basin. These studies seek to understand the changes in the river space, the consequences of these modifications and identify measures for environmental mitigation and flood control. In this respect, they can give support to new studies and management projects. As an example, we can cite the study, by Italian researchers (Gumiero et al., 2015) that characterized typical stretches of the river corresponding to the main physiographic units of the watershed. These typical sections could be used for the development of works such as those performed by us regarding the Sesmaria River Basin.

METHODOLOGY

The epistemological basis that seeks critical-analytical study for the production of knowledge was developed based on the previous knowledge and proposals developed by authors for preservation of the Sesmaria River (Oliveira,2018; Campos, 2017). The initial knowledge was reinforced with field visits to the Sesmaria and Panaro rivers, interviews with inhabitants of these basins, meetings in Italy with specialists on the history of the BEF, visits to WW II battle sites, and bibliographic review of studies developed for both watersheds. We also observed the applicability of the Valuri method (Nardini and Pavan, 2012), which is an innovative method to identify the expected morphological adjustments based on the current situation of the river space. It was developed by the Italian Center for River Requalification (CIRF), with the support of the University of Udine and the Po River Basin Authority in Italy. The interpretive theory of the Valuri method is compatible with a hierarchical analysis of actions to be taken to protect the river space complementing the proposals already made by us for the Sesmaria River (e.g., Oliveira, 2018; Campos, 2017). The method to promote the integration between Brazilian and Italian researchers for protection of the Sesmaria and Panarorivers is presented in Table 1. Another point that needs to be highlighted in the methodology is the approach to different legislation aspects of river protection when the Italian and Brazilian laws are been analyzed. This approach is part of the General Procedures presented in Table 1. The legal approach is part of the methodology proposed and it has been developed after the travel to Italy in May 2019. A brief technical discussion about it will be presented in this paper in an innovative form. It will be the base to build a shared vision that will allow following to the project to build cooperation between Italians and Brazilians in river preservation. However, in the technical visits and interviews carried out in Italian territory, the tourist potential of the regions involved in the combat was found. The conservation of countless museums, although small but very representative, adds to the cemeteries and monuments scattered throughout Italy, which still maintains the legacy left by the Second World War. Regarding the participation of Brazil, it was possible to verify the existence of about 50 places that refer to the passage of Brazilians through Italy. It is noteworthy that in Italy Brazil is the country participating in World War II with more monuments erected and maintained by small local communities. It is possible to observe the growing number of Brazilians and other nationalities who incorporate visits to events or places representative of World War II in their tourist itineraries. Many have as a primary objective the participation in war events, while others incorporate, not always in a planned way, the visit of these places to the more traditional tourist activities.

In addition, there is an interest in tourist and cultural activities related to environmental preservation through fairs, congresses, or sports activities, such as rafting or bird watching, for example. In this context, it was possible to understand how much tourist activities can be used to support the discussions and interactions between Brazilians and Italians. In order to preserve water resources and based on studies of the Sesmaria and Panaro River basins, positive results can be achieved in the social, environmental, and economic areas. As an example of the interaction between the preservation of water resources, environmental preservation and the tourist appeal of a certain area, the main author of the article participated in an investigation carried out by the Federal Public Ministry in Brazil (MPF) on the occupation of a bird-watching area and of environmental interest by a vehicle manufacturer (Oliveira, 2012). The investigation came about because there were complaints from environmentalists and bird watchers about the assumption that the area intended for the factory was an area of ecological interest. The action resulted in the automaker signing a Term of Conduct Adjustment with the MPF in addition to other environmental preservation procedures. Thus, the work innovates by proposing joint actions for the environmental preservation of rivers and war tourism. Through the SWOT matrix, these possibilities are presented using the Sesmaria and Panaro rivers as a case study. There was a great opportunity on the Panaro River to connect the annual celebrations of the liberation of the city of Montese with tourist and environmental visits in the watershed. Brazilians, especially, can be attracted in greater numbers to events that, in addition to fostering bonds of fraternity and celebration, are the embryo of the joint task in reinforcing the preservation of rivers. Adding economic value to environmental activities is undoubtedly an important motivation for environmental preservation. Table 1 presents the main steps of the proposed methodology.

LEGAL APPROACH

Laws are at the origin of modern civilizations. In the beginning, laws were characterized by beliefs and traditions that were passed from parents to children, a way that still persists in isolated indigenous communities, such as some Amazonian tribes. Thus at the beginning, laws did not need to be written and were linked with cultural and religious aspects. According to Mannheimer (2013), when mankind began to live in large groups, it became necessary to adopt rules of coexistence that subordinated the will of the individual to the collective, Laws were developed according to the peculiarities of social and economic organization of each group. Reinforcing this statement, Smith (2014) reporting that one of the best tests of the quality of civilization at any time is the code of laws promulgated and enforced, because, like all other manifestations of social life, laws are the natural result of the body of convictions, feelings, and prejudices that make up public opinion at a given time. Moreover, much more clearly than in the case of other social phenomena, changes in public opinion with time are written in the statute books and court records.

Table 1. Main steps of the proposed method

	GENERAL PROCEDURES	MAIN STEPS	SPECIFIC ACTIVITIES
1	**First procedures** Identifying the environmental degradation of the river space and the lack of participation of society in its preservation.Understanding the legal aspects of riparian forest protection .Identifying environmental tourism opportunities in the river basin in addition to war tourism	**Establishing the context** Identifying studies and risks.Analyzing studies and risks. Identifying potential partnerships and stakeholders. Identifying legal similarities concerning between Italy and Brazil. Identifying potential tourism opportunities.	**Some questions** What studies are there about the watershed?What are the main vectors of degradation? What procedures can improve society's involvement? What procedures can improve the war tourist and environmental tourist
2	**Planning implementation** Working on the management plan, budget and timetable.	**Construction of the management plan** Assessing the legal, political and land ownership context. Identifying typical river stretches. Evaluating risks. Identifying priority areas. Holding a workshop for management plan construction.	**Some objectives to build** Performing risk analysis.Determining relevant indicators of the performance of management plan. Determining who is chosen to monitor and evaluate the management plan.
3	**Implementation** Controlling activities, team members, stakeholder involvement, timetable, and budget.	**Management PlanImplementation** Scheduling meetings and seminars. Training of multiplying agents and leaders. Plan Corrections. Control of the work schedule.	**Some actions** Making adjustments. Strengthening stakeholder cooperation. Issuing reports about watershed status.
4	**Evaluation** Ensuring plan delivery objectives.	**Management Plan Monitoring** Assessing the budget, risk control, and stakeholder involvement. Reviewing the management plan.	**Some evaluations** Identifying the weakness of the budget, risk control, and stakeholder involvement. Identifying the results of the river restoration practices.

According to Scalan (2011), both American and English laws are rooted in common law, which is based on tradition and not on a written code or collection of statutes, as is also the case of Brazil, which inherited the Portuguese tradition of the Philippine Ordinances that were completed in 1595 and issued in 1603.Martin (1991) stated that when individuals first accepted resolution of disputes in courts rather than engaging in "self-help," a big step in community and political organization was taken. Each society creates arrangements for this purpose, with the goal (and necessity) of preserving peace and order in the community. Thus, the first challenge of this work was to understand how Italian and Brazilian society made their arrangements to ensure the preservation of water resources and river space. A facilitator for meeting common ground in legislation would be the Roman origin of Brazilian law. However, the relevant aspects of the formation of countries and consequent degrees of autonomy of states and provinces lead to different views on the legal jurisdiction over rivers, their administration and the formation of basin consortia or committees. Brazil inherited from Portugal laws such as the Philippine Ordinances and Imperial Decrees, forming the basis of current Brazilian legislation. Similarly, by declaring its independence, the Brazilian State inherited from Portugal most of its territorial shape and legislation, characterized by a strong federal government that imposed its legislation on the states. On the other hand, the process of formation of Italy took place differently, through the unification (Risorgimento) of several small kingdoms and the liberation of some Alpine regions from Hapsburg rule. The complete unification of the country, however, was not completed until September 20, 1870. This process of formation of Italy and the history of power and rivalry between cities in the Middle Ages explain - in part - why the Italian regions are currently more autonomous than Brazilian states, leading to different approaches to water resource regulation and protection of riparian forests. Another differentiating fact is that there are several categories of regions in Italy. According to the European Committee of the Regions (2019), there are 15 regions with ordinary status, five regions with special autonomous status, and the Trentino-South Tyrol Region comprises the autonomous provinces of Trento and Bolzano. Today, Italy is considered a 'regionalized' country. This is very different from Brazil, where since the 1988 Constitution, the country has had a type of shared federalism, in which states have some administrative autonomy. However, this autonomy is far from the administrative and legal autonomy like that found in Italy.

Thus, it is not difficult to understand that although the two countries share common roots in Roman law, the enactment of some laws, especially those related to the preservation of water resources and river space, may present different views. It should also be considered that international agreements such as the enactment of the European Community Water Framework also affect legal benchmarks between these two countries. It should be noted that, according to Martin (1991), societies may believe it is pertinent to update laws or to modify them to face new challenges such as climate change and the effects that this may trigger on the use of and management of water resources. However, to understand these dangers and find protective legal measures it is necessary to discuss, exchange experiences and allow researchers within countries and from different countries to share information and procedures. Thus, within the concept of this work, of recalling the cooperation between Italians and Brazilians, an innovative question was raised about the main differences that Italian and Brazilian laws present for the protection of riparian forests. Perhaps from this point, and from many discussions and meetings, proposals can be elicited to improve in each country the preservation of buffer zones, management of water resources, quality of water and the role of society in protection and recovery efforts. Table 2 presents the main differences observed between Brazilian and Italian riparian legislation.

Table 2. A comparison between the legally protected vegetation along the edges of rivers in Brazil and Italy (in meters).

Countries	Width in urban areas	Width in rural areas	River source	River mouth	Public areas along the river banks	Public areas at the river mouth
Brazil	15	30 to 300	50	30 to 500	15	33
Italy	9	9 150	0	0	0	0

Some aspects of Table 2 should be the highlighted:

- The table shows the areas of permanent preservation along Brazilian rivers and how they increase as the width of the rivers increases until they reach the maximum value of 500 meters.

- The minimum width of 15 meters only applies in perfectly consolidated urban areas, as defined by Brazilian legislation (Federal Law 6,766/1979 and Federal Law 12,651/2012). If this condition is not met, the references to rural areas are adopted.
- In many places, the permanent preservation area on river banks can be increased due to other existing provisions of Brazilian environmental legislation. The minimum protected river space can be increased if rivers, for example, flow through national park buffer areas, slopes greater than 45%, in areas above 1800 m, or in private lands where the banks of rivers were declared as preservation areas by the owners when registering the land on the federal Rural Environmental Registry (CAR).
- In Brazil, federal river banks are owned by the federal government. These areas are characterized by a distance of 15 m from ordinary high water limits, and are demarcated through the method provided by Normative Orientation (ON GEAD 03) from the Federal Property Secretariat.
- At the mouth where rivers empty into the ocean, the banks are also owned by the federal government to the extent that the tidal influence significantly advances (Decree-Law 9,760 of 1946). This area is represented by a 33 m strip of land along the riverbanks. The federal government thus has domíniodireto or domíniopleno (direct domain or full domain) over this land and may grant domínioútil (useful domain) to people or companies, known as foreiros or enfiteutas, against payment of foro (annual ground rent or fee), under an arrangement called aforamento. These parties are allowed to sell their rights to other parties, provided a transfer fee called laudêmio (laudemium) is duly paid, or to lease or otherwise assign those rights. This situation derives from the idea of emphyteusis, a type of perpetual tenure under Roman law.
- In Italy, there is no singular act for riverbank protection as in Brazil. There are different laws and regulations, such as Decree 523 of 1904 and the Civil Code, that state that the river channel defined on the basis of annual floods is in the domain of the government and in many cases is confused with bankfull (e.g., Nardini, et al., 2014). In general terms, the different legal requirements can be summarized as follows: There is an area 9 m wide from bankfull where use is restricted to preserve the hydraulic cross-section and to allow maintenance works. There are even areas on the banks of some rivers that are listed in R.D. 1775 of 1933, which have a protected landscape range that is 150 m wide.

However, the good Brazilian legal framework cannot solve problems alone. It is necessary to facilitate the understanding of the laws by the population and enforce them.

TECHNICAL DISCUSSION

The first approach taken in the long process of integrating hydrological knowledge, administrative and associative experiences and practices of preservation and recovery of water resources was carried out with the observation of Italian and Brazilian legislation related to buffers preservation. This allowed one to observe the different legal approaches and to understand the feelings of these two different societies that each ended up influencing the elaboration and application of the laws and the preservation of water resources. Conversations took in Italy have shown that both Italian and Brazilian society have been shared the same feelings and concerns about the necessities to give more power to the preservation of water resources facing climate changes. It was understood that the improvement of some laws, through a comparative analysis, is an important tool that can be used in favor of these perceptions. Perhaps, a differential in this perception and concern is the still vivid Italian memories of food shortages, supply difficulties, drinking water use and land degradation resulting from World War II, which differentiates the Italian memory from the Brazilian memory. In Brazil, the majority part of society still holds in mind the feelings expressed in the Letter of Discovery forwarded in 1500 by Pero Vaz de Caminha to the King of Portugal - The waters are endless and everything that will be planted will germinate. This fact, combined with geomorphological and climatic factors such as rainfall rates, the importance of water from the defrosting, and lower urban density may be a differential for greater social mobilization in associations, media, schools and basin committees, aiming at the protection of water resources in the region of Italy visited. It should be considered, however, that the observation of this perception is quite subjective and may vary from researcher to researcher. Thus, statements and evidence still need to be constructed and understood through more field visits, interviews, and participation of researchers from both countries in basin committee events. However, on the other hand, as shown in Table 2, Brazilian legislation appears to be much more restrictive of land use at river banks and surrounding springs than the Italian one. The restrictions on agricultural, commercial, industrial and urbanization of riverbanks in Brazil may be the ones that most protect the future of rivers in the world, including the protection to advance of climate change. Although the evidence of the force of Brazilian law to be clear, it does not represent a criticism of Italian or European Community legislation for the protection of buffers. It is necessary to consider that as Martin (1991) statement, each society creates its own arrangements.

The Brazilian legislation strengthens preservation measures not achieved by Italian law such as:

- By acting on the physical protection of the banks, it minimizes soil erosion on the banks of rivers, streams, and lakes and improves the quality of water in different ways: either by acting as a filter for diffuse pollution or by shading the waters and acting at its temperature;
- Increases biodiversity by ensuring habitat for large numbers of animal species, particularly birds, mammals and reptiles. It also acts as a tool for establishing ecological corridors on river banks and linking these habitats with other protected areas such as forest parks;
- Buffer preservation guaranteed by Brazilian law also ensures the supply of energy and nutrients to the aquatic ecosystem of rivers, lakes, and streams;
- By forcing rural producers to keep riparian forests in good condition and to restore them, an important step for river restoration is enforced, facilitating future integration with broader river restoration projects.

TOURIST OPPORTUNITIES

The importance of tourism as a development factor, as well as economic and environmental sustainability, has been reported in a large number of studies. Balengerand and Cantavella-Jordá

(2002) present a study on tourism in Spain that shows the positive effects on revenues that government policies can bring, both in adapting supply and in promoting tourism. Silva and Mattos (2020) speak of the importance of strategic planning that contemplates the interaction between tourism, urban management, and water security. Other studies show the threats that can impact water availability and management in areas with strong tourist demand (Jun Li, 2018; Gössling *et al.,* 2012). Studies show that the increase in tourism also produces natural tourism products, which are more accessible and "salable" by man, and incorporate new areas such as ecological tourism, ecotourism, social tourism, and so on. For example, when analyzing tourism in the Tuscany - Italy region, Ferrari *et al.* (2018) show that a positive shock in tourism spending results in an overall positive increase in demand for agricultural and industrial products.

Specifically, when we talk about war tourism, it is possible to highlight numerous sites on the internet that indicate places of World War II to be visited, which reflect the economic appeal of this activity. In the regions of Tuscany and Emilia-Romagna, where Brazil has fought countless battles, the strength of War tourism is well represented by itineraries that promote visits on the Gothic Line, museums, and battle sites during World War II. The website The Gothic Line Association (http://www.lineagotica.eu/) was founded in 2010 by a group of academics, researchers, and enthusiasts working on the history of the Second World War in Italy. In addition, war tourism is also marked by numerous publications by researchers who speak of its cultural and economic importance. Butler and Suntikul (2013) present an analysis of the relationships between tourism and war in different places - before, in the moment, and after the war. Winter (2009) describe the processes through which tourism can engage in creating and perpetuating the memory of the Great War of 1914–18, and suggests how research can help to better understand tourists 'experiences. However, if on the one hand, you can easily find several references about war tourism, on the other hand, the same does not happen with the possibility of integrating war tourism with ecotourism or the preservation of rivers. Thus, studies corroborate the need for integration between tourism, management, and preservation of water resources. In this sense, an integration of war tourism, cultural tourism, and ecological tourism with the preservation of rivers presents itself as an innovative idea that must be improved. The work presents an analysis of the Italian-Brazilian cooperation for the preservation of rivers using the SWOT matrix that contributes to the achievement of the objectives. The analysis shows the feasibility of integrating war tourism and ecological tourism, fueling Italian-Brazilian studies that increase tourism and the recovery of rivers in the hydrographic basins of Panaro and Rio Sesmaria Rivers. It allows identifying the different scenarios providing an evaluation of basic elements for the analysis of the strengths (S), weaknesses (W), opportunities (O), and threats (T) that must be considered in the proposed project.

SWOT analysis is a tool used to perform analysis of scenarios or environments, as a basis for management and strategic planning. This analysis allows a clear and objective assessment of the current situation of the project and improves its management in the long run. The matrix highlights Strengths (S), Weaknesses (W), Opportunities (O) and Threats (T).Similar problems have been identified in the hydrographic basins of the Sesmaria and Panaro Rivers, as well as common points in basin tourism. Possibilities for increasing war or military tourism in both basins allowed the development of a single SWOT Matrix that pointed out the opportunities arising from the integration of current tourism with war tourism and ecological tourism. For the preparation of the SWOT matrix, research, surveys, and field studies already carried out in theSesmaria River Basin (Oliveira, 2018; Campos, 2017; Campos et al., 2015; Brazil, 2012) were evaluated in addition to the surveys carried out by the authors in Rio Panaro in 2019, and works on the Panaro River and the River Po watershed (Gumiero et al., 2015; Castaldini and Ghinoi, 2008; Autorità di Bacino del Fiume Pó, 1999). The research led to the establishment of guidelines that are looked at in the SWOT matrix (Table 3).

Table 3. SWOT Matrix

STRENGTHS	WEAKNESSES
A	B
OPORTUNITIES	THREATS
C	D

A – Strengths

- Predominance of rural occupation in the basin with the production of local products such as cheese, potatoes, handicrafts, organic products, and manufactured natural products benefiting the small producer.
- Strengthening the preservation of forest areas and works to recover the vegetation cover.
- Increase and maintenance of fairs and events that promote rural activity, such as the potato festival in Montese (Panaro's watershed) and the agricultural exhibition in Resende (Sesmaria's watershed).
- Awareness of the need for preservation of the hydrographic basin and the participation of organized civil society and of the Hydrographic Basin Authorities (Basin Committees) that work in this line and encourage the participation and integration of the inhabitants of the basins in the efforts of environmental recovery.
- Military presence in the basin represented by historical sites of World War II, Museums, Celebrations (Panaro's watershed), Military Academy (AMAN –Resende, Sesmaria's watershed), which are tourist attractions already explored.
- Increased interest in regional foods and wines, rural and naturalistic tourism. Brazil stands out the Itatiaia National Park, the rocky massifs of Agulhas Negras, and the tourist towns of Penedo and Mauáin the vicinity of the Sesmaria River Basin, which serves as inducers of local tourism, in particular, rural tourism.In the Panaro River basin, agritourism and rural tourism incentives also stand out, as well as natural parks, such as The River Park of Marano.
- Predominance of favorable weather conditions for tourism throughout the year in the Sesmarias River basin and, for most of the year, except for the winter period, in the Panaro River basin.

B- Weaknesses

- Presence of important urban and industrial centers in the lower part of the watershed that suffer from flooding problems that can be reduced by greater control of land use in the watershed, erosion control, and recovery of riparian forests.

- Federal, state and municipal governments do not pay proper heed the challenges to coastal areas due to climate change.
- Little integration of Brazilian Ministries of Tourism and Education to explore the history of FEB in Italy as a symbol of research integration. A crescente visita de brasileiros na Itália com a intenção de conhecer os caminhos percorridos pela FEB não tem sido objeto de apoio ou incentivo pelo Governo Brasileiro e Italiano.
- Brazilian, schools and universities do not mind to explore the partnerships constructed in the II World War to improve cooperation studies.

C- Oportunities

- Motivation for flood control actions in the lower part of the basin through the control of land use in the hydrographic basin and environmental recovery in the upper part of the basin and riparian forests, also promoting erosion control
- Encouraging environmental preservation and recovery through the implementation of payment for environmental services and environmental education.
- Integration of studies and research between Brazilian and Italian universities, such as the Polytechnic University of Milan and the Federal University of Rio de Janeiro.
- Integration of NGOs and Associations and sites that debate, develop studies and promote river preservation actions and already have experience in the basins such as the Italian Center for River Requalification (CIRF) and the Brazilian Center for River Requalification (CEBRARF).
- Strengthen historical ties with the identification of cities that can enter into sister city agreements. The cities of Montese and Resendeare suggested, opening the possibility of educational, tourist, and industrial agreements.
- Potential to develop products such as typical foods, handicrafts, and organic.

D- Threats

- Presence of important urban and industrial centers in the lower part of the river basin that suffer from flooding problems that can be reduced by greater control of land use in the river basin, erosion control, and recovery of riparian forests.
- Neglect or little institutional support in the maintenance of monuments, war sites, and museums, causing loss of the quality of war tourism.
- Increase in the use of pesticides in the basin and a decrease in the economic importance of small rural properties.
- Occurrence of climatic disasters such as major floods in Brazil, or natural disasters such as seismic activities in Italy, which can compromise local tourism.
- Conurbation of the cities of Resende and Volta Redonda that are in the process of urban expansion, generating a loss of rural areas and water quality of the Sesmaria River.

Through the analysis of the SWOT matrix, it can be seen that there many steps to be overcome to develop the integration project. However, the strengths are also considerable, which indicates the viability of this project.

Conclusion

The possibility of integrating Italian and Brazilian proposals for the preservation of watersheds was observed. The fraternal bonds built during WWII can contribute to the development of proposals for the preservation and restoration of the Sesmaria and Panaro rivers. The work presents the possibility of integrating existing proposals in Brazil and Italy with environmental, social, and economic biases with the main objective of preserving hydrographic basins. Based on the fraternal ties built during the Second World War between Brazil and Italy, the tourist potential of the regions located in the basins of the Sesmaria and Panaro rivers was glimpsed and the possibility of this tourist potential being worked together with studies of preservation of the hydrographic basins. Existing studies were found in both basins that allow the application of proposals already developed in both countries for the participatory management of the river space and the adoption of environmental incentives for the preservation and recovery of the basin, with the possibility of paying for environmental services. The work presents a comparative and pioneering analysis of the buffer legislation in force in each basin in order to broaden debates about the buffer protection legislation in Brazil and Italy. Through the SWOT matrix, one can observe the potential and opportunities, as well as the points that present the main threats that may impact the preservation of rivers and the development of the proposal presented. The need for integration between countries to improve river management is highlighted, as well as the establishment of links for the exchange of experiences between the respective basin management committees. It is believed that integration will make it possible to increase tourism and at the same time be a driver for civil society's participation in environmental preservation. In this way, the work presents an opportunity for the economic, social, and environmental development of the regions. The authors suggest that with the adaptation of the specific characteristics of each region, tourism and environmental preservation can go together meeting the needs of each hydrographic basin and thus provide an improvement in the quality of life of rural producers, riverside dwellers, and the low-income population.

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