

## **Report on the Laguna Merin Field Visit 8-12 November 2003**

Representatives of PROBIDES, IBAMA, CIESIN, and the US State Department (see Annex A for participants list) conducted a field visit at Laguna Merin from 8-12 November 2003. The objectives of the workshop and field visit were twofold:

1. Develop a research plan (including time line and division of responsibilities) that demonstrates the utility of remote sensing imagery in conjunction with field-based studies; and
2. Begin field work by conducting a transect around the lake and stopping at areas of potential conservation interest

This is a brief report of the workshop and reconnaissance mission. The workshop began on Saturday, 8 November at IBAMA's Taim Ecological Reserve, located on the eastern side of the lake.

### Saturday, 8 November

The morning program featured a field trip to one of the coastal observation stations that IBAMA runs. The trip there and back was through pastureland and part of a 33,000 hectare pine and eucalyptus plantation. The plantation extends to the coast, and is on land owned by a large timber concern. Once at the coast we traveled approximately 3 km south to the station. There we saw the infrastructure available for protecting the eastern edge of the reserve. On the way back we took a boat trip across the northern edge of the Taim reserve, where we saw herds of capivara (*Hydrochoerus hydrochaeris*), a mammal about the size of a pig with brown hair. These are very common at Taim. We also saw our first bird life; a partial list of birds spotted over the six-day field visit around Laguna Merin can be found in Annex B.

After lunch, we began the workshop. Alex de Sherbinin from CIESIN identified the main objectives of the six-day field visit, and framed the Laguna Merin study in terms of the larger study of remote sensing tools for ecosystem management treaties. In addition to the primary objectives listed above, he suggested that participants begin thinking about some of the following issues:

- What mechanisms might be put in place for a transboundary management of the lake & wetlands? (Biosphere Reserve status? Transboundary protected area?)
- What is the potential for ecotourism?
- Can rice cultivation be put on a more sustainable path?
- How do we gain support of local communities so that they become allies of conservation?

He also listed the most significant environmental issues around the Laguna (from published reports, mostly by PROBIDES) and encouraged participants to list some of their own. The revised list can be found in Box 1.

### **Box 1. Threats to Conservation at Laguna Merín**

- Coastal tourism expansion, uncontrolled development
- Pine and Eucalyptus plantations
- Important for migratory birds
- Threatened/endemic species: Butia Palm, fish of the genus *Cynolebias*, Pampas Deer, Saffron-Cowled Blackbird, etc.
- Poaching (both hunting and fishing)
- Loss of restinga ecosystems
- Weak economy
- In Uruguay, lack of ability to enforce laws (*fiscalización*)
- Insufficient enforcement on Brazilian side
- Pollution of lake waters with agrottoxins (limited monitoring of this)
- Declining fisheries (it was noted that IBAMA has data on this)
- Residuals of rice and wood production

He also listed the major management recommendations produced by PROBIDES:

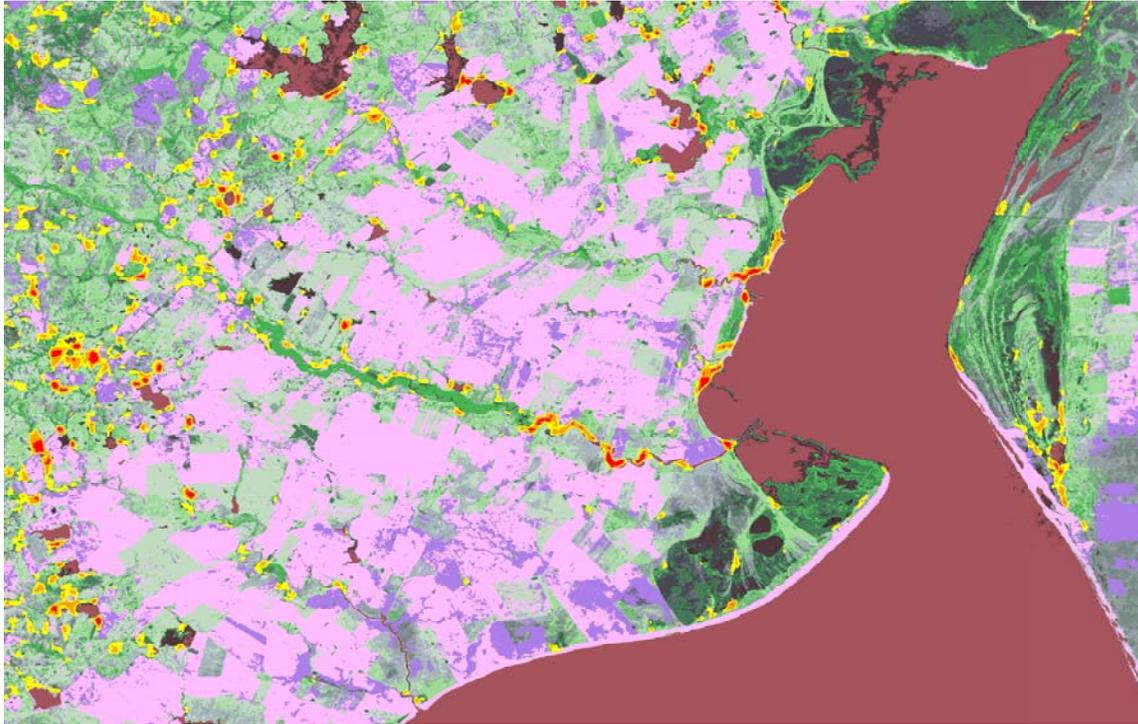
1. Create a clear environmental regulatory framework, with consistent policies, and adequate enforcement
2. Create corridors and increase the area under protected status, along with private reserves
3. Emphasize wise use and traditional extraction techniques for natural resources
4. Identification of new reserves based on tenure, species richness, and presence of endangered or endemic species
5. Mitigate impacts of rice cultivation on water quality and soil productivity (introduce new techniques)
6. Conservation accords with willing farmers
7. Promote ecotourism
8. Create monitoring systems, especially for nesting areas

For the remainder, he presented the major conclusions of prior meetings and discussions (including an October 2002 workshop in Brasilia, an April 2003 meeting at Taím, and a teleconferencde in July 2003), briefly touched on the issue of social monitoring as proposed by the Biosphere Reserve Integrated Monitoring (BRIM), and presented the methodology for biodiversity hotspot identification carried out by Richard Podolsky using *Diversidad*. There was quite a bit of interest in the poster-sized map of “hotspots” that he brought with him to the workshop (see Figure 1).

Following his presentation, Valdir Steinke presented the results of his unsupervised land cover classification using Landsat imagery and described the work that he did using Modis imagery for defining a potential study area. This was presented as a poster at the wetlands conference in Argentina (September 2003).

## Figure 1. Diversidad Image of Laguna Merin

In this image of the northern end of Lake Merin, Diversidad hotspots have been overlaid on to the thematic vegetation map. Yellow corresponds with regions where potential diversity was between 75 and 79 percent, orange regions are where potential diversity was between 80 and 84 percent, and red regions are those with potential diversity values are equal to or greater than 85 percent.



John Mickelson described the remote sensing imagery that he has already obtained for the study region, including a large number of Landsat scenes for dates from 1987 to the present which he obtained for free. He then posed the following questions: What land cover classification system do we want to use? What spatial scale are we going to look at? Where is the “good stuff” in terms of biodiversity? Should we look at land cover change over the past decade? He suggested that the first step is to *map* (what is where?), then to *manage*, and finally to *model* (understanding the likely future patterns). In terms of what is impacting the system, he said there are natural changes (climate, seasons, water budget) and there are man-made changes (rice culture, water use, effluents). We will want to separate these out.

### Sunday, 9 November

Early Sunday morning a sub-group went to another IBAMA station on the banks of Laguna Mangeira. There they saw large herds of capivara.

After breakfast, there was another meeting of the entire group. This was largely focused on how to conduct the ground reconnaissance (transect) and where to stop on our route to Rio Jaguarao (known as Rio Branco in Uruguay). There was some additional discussion

on potential data sources – including an IBGE basemap at the scale of 1:250,000, EMBRAPA maps of soils and areas of rice cultivation, a JICA study of hydrography, and the Comisión Mixta Laguna Merín (a bilateral commission for the LM basin). There is a land use map for 1996-97 produced by PROBIDES on the Uruguayan side, as well as a vegetation classification in their *Plan Director* which is based on the biogeography of Latin America, a commonly used classification system in South America. It was also proposed to approach the Instituto de Arroz in Brazil for data. After this meeting, Alicia Torres departed for Rocha, Uruguay, but Gonzalo Picasso of PROBIDES continued on with us for the complete tour of the lake.



Capivara herds (*Hydrochoerus hydrochaeris*)

The team departed Taím around noon, and drove north. Because the ferry was out of service, we drove north to Pelotas through very flat territory (mostly rice and some cattle), stopping for lunch, then proceeded south from there on a route that paralleled the western edge of the lake at a distance of about 20km from the shoreline. The terrain south of Pelotas was gently rolling, with fields of rice and soybeans. We stopped at several Diversidad hotspots, which were largely located along the banks of rivers (riperian corridors), descending into two to look at the vegetation formations. These were the only fragments of original vegetation left. John Mickelson got his GPS and Landsat imagery properly coordinated on his palm computer so that we literally traveled through the Landsat imagery (in this case a mosaic from 2000), observing our progress from above. This enabled us to do some ground truthing and to obtain a few sample points.

We arrived in Jaguarão at about 5:30 p.m. and agreed that we should look into the possibility of renting a boat to take us up and down the Rio Jaguarão. That evening Ignacio Porzecanski of PROBIDES joined us.



The Team (left to right): Valdir Steinke, Alicia Torres, John Mickelson, Gonzalo Picasso, Ignacio Porzecanski, Gislaine Disconzi, Alex de Sherbinin, Marcondes (driver), and Sergio Arraes Monteiro

### Monday, 10 November

Having located a willing boat owner, after preparations we departed at about 10:30 a.m. for a trip up river to one of the larger hotspots on the Diversidad map. We arrived at the hotspot and spent about 30 minutes on the ground looking around a wooded area backed by a marsh. The vegetative cover was about 4-6 meters high, and was bisected by trails and cattle paths and abutted by pasturelands. After that we went down river, past Jaguarão, and onwards towards the mouth of the river, stopping once for lunch. The riverbanks in this area were heavily transformed in places (mostly cattle and some infrastructure such as a slaughterhouse and several pumping stations for irrigated rice), but there were large wetland areas supporting rich avifauna, mostly shallow deltaic areas, the remnants of riverbeds and ox bows. When we reached the lake the winds picked up and we rode the swells to Rio Branco, about 30 km south of Jaguarao on the lake.



Trip on the Jaguarão River

After this outing, we returned to Jaguarão for border crossing formalities, then made our way south, paralleling the LM coast but about 30 km inland. The landscape here is gently rolling and dissected by occasional watercourses. The farms were larger than in Brazil, reflecting the lower population density in Uruguay (only 12 persons per sq. km.). As it was late, we made no stops along the way. We arrived in Treinta y Tres at about 7 p.m.

### Tuesday, 11 November

We departed from Treinta y Tres at about 8:30 a.m., joined by Carlos Marcos Prigioni, an ornithologist associated with PROBIDES who resides in that town. Carlos brought us first to a farm located along the Rio Cebollatí. Our intent was to visit some wetlands located on the farm, but heavy rain and muddy roads impeded our progress. We did however see quite a large number of water birds at a reservoir created for rice cultivation. Ignacio pointed out that these reservoirs represent important feeding grounds for the birds, and that not all the biodiversity is located along the river or in the wetlands. After the farm visit we made our way to Enrique Martinez (a.k.a. La Charqueada), which is on the banks of the Cebollatí. We made arrangements to hire a boat and set off to visit Isla del Padre, one of the sites of a rapid ecological assessment (REA) conducted by PROBIDES. This trip was most rewarding, both for the number and variety of avifauna spotted, and for the expertise and enthusiasm that Carlos brought to the birdwatching. We stopped at one point down the river to examine the undergrowth. In contrast to the gallery forests along the Jaguarão, these forests were almost impenetrable. Prigioni pointed out that these are actually remnants of the southernmost extension of the Mata Atlantica (eastern rainforest), which is found along the entire eastern seaboard of South America from Bahia, Brazil to Uruguay. These highly rich systems are entirely in the hands of private landholders, and only exist because they are too low lying and frequently flooded to cultivate.



Dense vegetation on the banks of the Rio Cebollatí

After making a complete tour of Isla del Padre, we headed back up river to La Charqueada. After lunch, and a brief interview on local radio, we took a ferry across the river and continued through Cebollati town, following a south-southeasterly course. We made another stop at Estero de Pelotas, a large marsh that was also included in an earlier REA. There we found a crab-eating fox that had been run over by a car. We made our way south of the LM through extremely low-lying farm fields (frequently flooded), passing over one of the tributaries, and eventually to a hotel on the Atlantic coast south of the border town of Chuy (where we dropped off Carlos Prigioni). We spent two or three hours that evening brainstorming the broad outlines of our work plan.

### Wednesday, 12 November

On Wednesday morning Alicia Torres rejoined us. Alex de Sherbinin presented a summary of the major activities discussed the night before in the form of a work plan with a division of labor, approximate estimates of time and resources required, and the time frame in which the tasks should be completed. This was debated and slightly modified, but largely accepted as an accurate reflection of the major ideas put forth (see Annex C for the complete work plan). Representatives of each of the three organizations signed copies of the work plan as an indication of commitment to the activities. Alicia Torres asked if the social monitoring aspect was going to be left off. Alex responded that he would like to include it, and there may yet be a possibility for doing so, but that at present the work plan is pretty heavily loaded with activities.

After lunch, we made a short visit to Bañados de los Indios, a site where PROBIDES has promoted ecotourism by including it on one of eight road tours of the Biosphere Reserve. The site includes a duck blind and a nearby eco-farm. In this area we spotted our first domesticated Emus (*Rhea Americana*), and ostrich like bird native to South America.

After this visit the PROBIDES team headed south to Rochas, and the remainder of the team crossed the border at Chuy and headed north to Porto Alegre, stopping briefly at Taím, and once again for churrasco at a truck stop.

### Thursday, 13 November

On Thursday morning we had a highly interesting meeting with Dr. Joao Oldair Menegheti of the Department of Zoology at the Universidade Federale de Rio Grande do Sul and Joao Carlos P. Dotto of the Fundacao Estadual de Protecao Ambiental Henrique Luis Roessler. Dr. Menegheti described in detail the waterfowl counts that he has been leading since 1988, including the different techniques used. High quality (comparable) counts with the use of airplanes and helicopters have been obtained since 1995. The team had many questions for him about his work in and around the LM. He was asked if the focal area chosen (Banado del Rey and surrounding areas) for the Brazilian fieldwork was a good one. He said that it would make a good site – particularly because it is still under threat from landholders who during dry years encroach upon the wetland area. It was suggested that he join the ground survey team in February and July if at all possible.

He suggested that IBAMA convene an invitation-only workshop of the major researchers working on LM to amass as much information about the lake as possible. Gislaine Disconzi thought this would be an excellent idea, and Valdir Steinke said he would follow up on this.

This meeting concluded the workshop and fieldwork. It was an incredibly enriching week and highly successful in terms of team-building and jointly witnessing many of the major conservation issues around the lake.

### **Annex A. Participant List**

1. Valdir A. Steinke, IBAMA Remote Sensing Center (CSR)
2. Sergio Arraes Monteiro, IBAMA Rio Grande do Sul Regional Office
3. Amauri de Sena Motta, IBAMA, Estação Ecologica do Taim (for 11/8-9)
4. Alex de Sherbinin, CIESIN, Columbia University
5. John Mickelson, CIESIN, Columbia University
6. Gonzalo Picasso, PROBIDES
7. Alicia Torres, PROBIDES (for 11/8-9 and 11/12)
8. Ignacio Porzecanski, PROBIDES liaison to CIESIN (from 11/10-12)
9. Carlos Mario Prigioni, PROBIDES (for 11/11)
10. Gislaine Disconzi, U.S. State Department

Regrets: Frank Rivera, U.S. Fish and Wildlife Service

## Annex B. Birds Spotted

This list was extracted from a more complete list compiled by Gislaïne Disconzi of all those bird species found on both sides of Laguna Merin.

<b>Scientific name</b>	<b>Brazilian name</b>	<b>Uruguayan name</b>	<b>English name</b>
Cygnus melanocoryphus	Cisne-de-pescoço-preto	Cisne de cuello negro	Black-necked swan
Coscoroba coscoroba	Capororoca	Ganso blanco	Coscoroba
Ciconia maguari	Maguari/João Grande	Ciguena común	Maguari stork
Platalea ajaja	Colhereiro/Ajaja	Espatúla rosada	Roseate spoonbill
Tachybaptus dominicus	Mergulhão	?	Least grebe
Podiceps major	Mergulhão-grande	Maca grande	Great grebe
Podilymbus podiceps	Mergulhão-caçador		
Phalacrocorax brasiliensis	Biguá	Viguá comun	Olivaceous cormorant
Anhinga anhinga	Biguatinga	Viguá vibora	American anhinga
Butorides striatus	Socozinho	Garcita azulada	Striated heron
Ardeia cocoi	Garca moura/Socó-grande	Garza mora	White-necked heron
Egretta alba	Garça-branca-grande	Garza blanca grande	Great egret
Egretta tula	Garça-branca-pequena	Garza blanca chica	Snowy egret
Bubulcus ibis	Garça-vaqueira	Garza bueyera	Cattle egret
Butorides striatus	Socozinho	Garcita azulada	Striated heron
Nycticorax nycticorax	Socó-dorminhoco/Guacurú/Savacu	Garza bruja	Black-crowned night-heron
Mesembrinidys cayennensis	Maçarico-real	Bandurria mora	Green ibis
Theristicus caudatus	Curicaca	Bandurria amarilla	Buff-necked ibis
Rhea americana	Ema	Inhamdu	Great rhea

## **Annex C. Work Plan Laguna Merín Case Study**

### **Objectives**

1. Demonstrate the utility of remote sensing for identification of areas with high biodiversity, and for management of the ecosystem and monitoring of important habitats in the bi-national context.
2. Underline the value (and communicate that value to local residents) of the ecosystems surrounding Laguna Merín through more in-depth field study (Spanish dictum: “Para valorizar, hay que conocer”)

### **Final Products**

1. A bi-national GIS of the area surrounding Laguna Merin (LM)
2. A scientific report based on the remote sensing analysis and the field work, with a focus on two specific zones on both sides of the lake
3. Dissemination of a shorter version of the report to the public

### **Components**

1. An analysis of land cover change between 1987 and 2002, and of seasonal hydrological changes within one year (2002)

What: Focus on one Landsat scene for both years (p222-r83), covering the southern “bi-national” portion of LM, and do a land cover change matrix and a map identifying the most recent habitat losses. Take the same year (2002) and study temporal change in water levels and land cover at 2-4 different points in time. [Utilization of Aster data? Modis for water pollution?]

Who: CIESIN (intertemporal) and IBAMA (land use change 92-02)

Resources required: Landsat scenes (free?); 1 month for IBAMA, 1 month for CIESIN

When: Before April 2004

2. Develop a bi-national Laguna Merin base map

What: Begin with the GIS developed by PROBIDES, and making use of existing data sets developed on the Brazilian side, develop a generalized land use classification (based on the unsupervised classification of the 2000 Landsat image) and basic infrastructure map (roads, canals) for both sides of Laguna Merin. The area covered will include the entire basin (watershed).

Who: IBAMA & PROBIDES

Resources required: 2 person weeks for PROBIDES, and 2 person weeks for IBAMA

When: Before February 2004

3. A field study focusing on two zones measuring 1600 km<sup>2</sup> on both sides of LM

What: There will be 40 x 40 km field study sites on each side of the LM with *bañados*, rice, tree plantations, and coastal strips (see Figure 2). They will be studied at two time periods, summer and winter, and a rapid assessment of biodiversity (birds, reptiles, amphibians, mammals, and plants) will be conducted. Aerial photography or high-resolution satellite imagery will be obtained for both sites in February, timed to coincide with the first field visit. There will be studied at two time periods, summer and winter, a minimum of two rapid ecological assessment (REA) sites, which will be identified in each square on the basis of the RS imagery and the aerial photography.

Who: Bi-national team of four (drawn from PROBIDES and IBAMA), including flora, avifauna, mammal, and amphibian specialists (if possible).

Resources required: Six person weeks for both IBAMA and PROBIDES. (2 weeks field study x 2 persons = 4 person weeks, plus 2 person weeks for writing up results in a short report); \$8,000-9,000 for IKONOS/Quickbird and for aerial photography (using some funds from CIESIN and some from IBAMA)

When: Aerial photography and Quickbird imagery in late January or early February 2004. Field studies in February and July. Finish the field reports in September 2004.

4. Technical report synthesizing the remote sensing and field studies

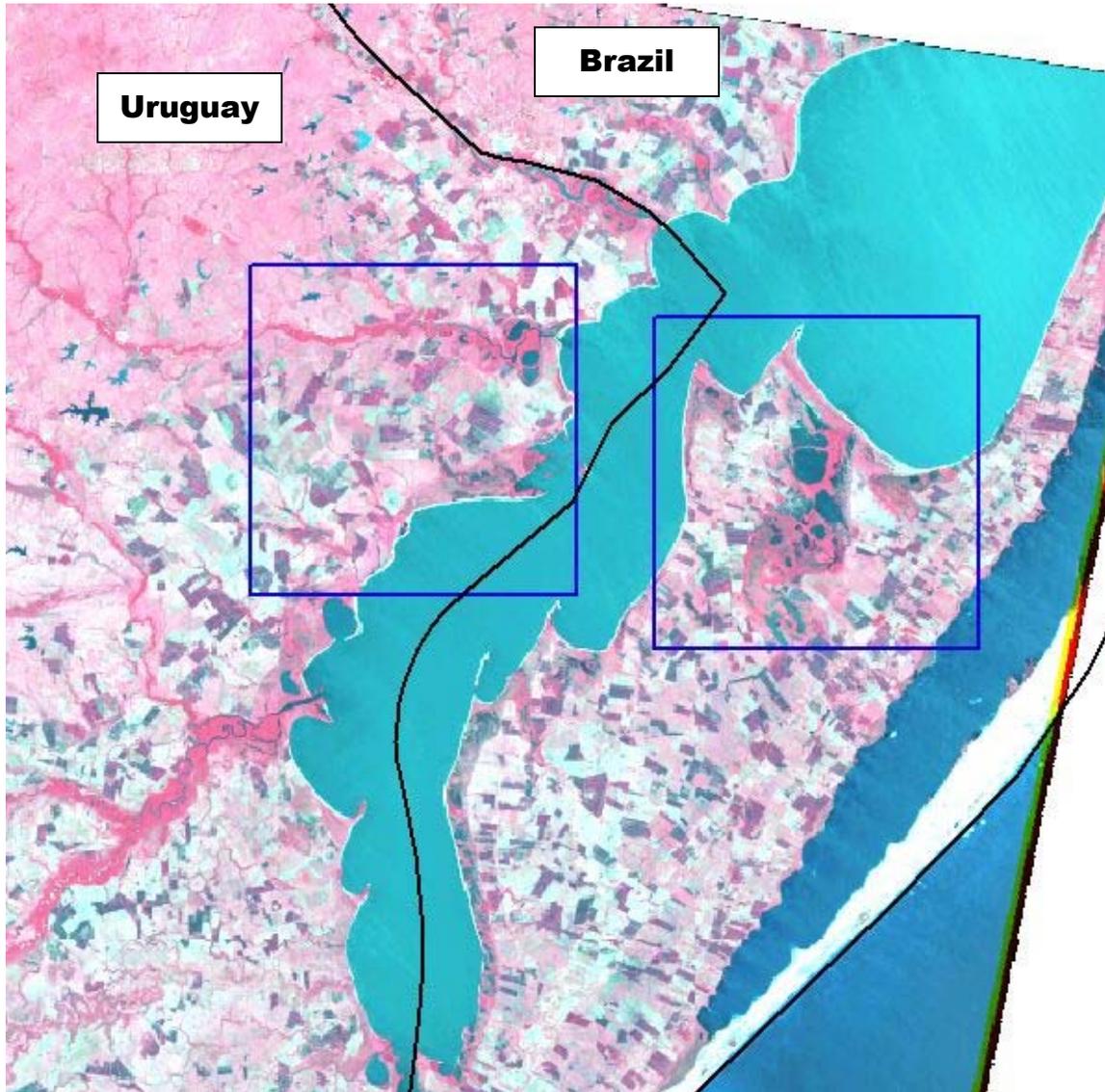
What: A consolidated report in English, Spanish and Portuguese detailing the results of the study. The audience will largely be scientists, and it will serve as a back up for the report to the general public.

Who: IBAMA, PROBIDES & CIESIN – The field teams will furnish technical reports for the two study areas. CIESIN, IBAMA/CSR, & PROBIDES will work together on the remote sensing part.

Resources required: 4 person weeks (largely CIESIN), plus translation (\$1000 for reports in Spanish and Portuguese)

When: October-November 2004.

**Figure 2. Map of Approximate Areas of the Two Zones Measuring 1600 km<sup>2</sup>**



5. Website and non-technical report in Spanish and Portuguese

What: Disseminate a short, illustrated report summarizing the findings, and encouraging the public to take responsibility for preservation of remaining habitats. Identify flagship species emblematic of LM [patula rosada?] and suggest concrete ways the people can get involved through annual bird counts, friends of wildlife clubs, etc.

Who: IBAMA, PROBIDES & CIESIN. The website will be developed and hosted by PROBIDES.

Resources: two person weeks (largely CIESIN) for the report; two person weeks for the website (PROBIDES)

When: Begin website in January 2004 (general presentation of the project); Complete website with reports, etc., in December 2004.

6. Meetings with stakeholders (including farmers, local government officials, and youth) to inform them of the results, solicit their thoughts and feedback, and to motivate them to be allies of biodiversity conservation

What: Two meetings on each side of the LM (Brazil: Sta Victoria y Porto Alegre; Uruguay: Treinta y Tres and Montevideo)

Who: IBAMA, PROBIDES, and CIESIN

Resources: Three person weeks (1 person weeks PROBIDES, 1 person weeks IBAMA, 1 person week CIESIN)

When: November 2004

7. A workshop associated with a conference of parties or a scientific panel of one of the ecosystem-oriented multilateral environmental agreements.

What: One-day workshop in which we present and discuss the results to the international community.

Who: CIESIN, IBAMA, PROBIDES

Resources: 1 person week each for CIEISIN, IBAMA and PROBIDES.

When: Early 2005

The partners agree to carry out the work described above. Furthermore, it is agreed that the three partners will share all the data jointly.

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Alex de Sherbinin, CIESIN

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Alicia Torres, PROBIDES

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Valdir Steinke y  
Sergio Monteiro, IBAMA

Date: 12 November 2003