

LAKE FÚQUENE COLOMBIA

HUMAN SUSTAINABLE DEVELOPMENT AND LAKE CONSERVATION.

An Overview of Living Lakes - Fundación Humedales Partnership 2000 to 2005

PRESENTATION

The integration of highland (2.500 meter above sea level) Andean Lake Fúquene (3000 Ha.) into the international Living Lakes network (2001) prompted Colombian environmental NGO Fundación Humedales to define a site intervention strategy and program, envisaging the 2001-2005 period. First, a conceptual framework was developed, based upon the ecosystem approach adopted by the parties of the Convention of Biological Diversity (CDB). This was complemented with a local community participation strategy, and an institutional partnership for long-term intervention. Components of the program are: (i) scientific research and environmental monitoring; (ii) biodiversity conservation and promotion of a protected area status for the ecosystem; (iii) natural resources management; (iv) public awareness and environmental education; and (v) promotion of sustainable rural development. A description of the



Fuquene Lake

processes and outcomes of each program's component is herein presented, as well as a discussion on the scope and limitations of the work provided for discussion. Finally, future perspectives for attaining the desired field impacts are outlined.

(i) Scientific research and environmental monitoring.

Birds. Since 2003 monthly systematic bird counts are being carried out at the lake, with emphasis on migratory and endemic species. A general annual Christmas bird count is taking place since 2001. A quantitative assessment of endemic aquatic species populations was carried out during 2002. Overall ca. 86 aquatic bird species have been reported in the lake and surrounding marshes, of which 26 are migrants, 60 are residents of which 3 are endemic species, and the rest are rare, occasional or vagrants in the area. Results confirm that Lake Fúquene complex, including the Cucunubá and Palacio lagoons currently harbors the largest and healthiest populations of 3 endemic bird forms globally threatened: *Rallus semiplumbeus* (Bogotá rail), *Cistothorus apolinari* (Bogotá's Marsh Wren), *Gallinula melanops bogotensis* (Spot-Flanked Gallinule), and 2 endemic populations threatened due to habitat loss: *Ixobrychus exilis bogotensis* (Least Bittern), and *Agelaius icterocephalus bogotensis* (Yellow Hooded Blackbird). Bird concentrations at the Lake during the year make it also an irreplaceable regional wildlife refuge, and the most outstanding remnant of the wetlands of Bogotá area (Colombian Eastern Cordillera, between 2500 and 3000 m altitude) a centre of diversity and endemism of the freshwater biota of northern South America. The extensive wetlands formed during Pliocene and late Pleistocene are currently deeply affected by human interventions. Its massive area reduction and environmental degradation lead during the 20th century to

the extinction of the Andean Grebe *Podiceps andinus* and the endemic Tota catfish, *Rhizosomichthys totae*. Currently Lake Fúquene complex has been recognized by the conservation and scientific communities (Birdlife International and Humboldt Institute) as an Important Bird Area IBA. Currently biodiversity inventories are being carried out for aquatic plant species and macro-invertebrates.

Fish populations and assemblages. Research is being carried out in order to learn the status of fish populations, especially of those endemic to the region *Eremophilus mutisii* (local name: capitán, a kind of catfish) *Grundulus bogotensis* (small characid, local name: guapucha), as well as the status of introduced alien species *Cyprinus carpio* (carp) and goldfish (*Carassius auratus*). A complementary study of this kind is being developed for the singular endemic freshwater crab (*Neoestrangeeria macropa*). Abundance, basic demographics and population dynamic data is being structured for the comprehension of the ecological interaction in this mixed (native and alien) aquatic ecosystem



Agelaius icterocephalus bogotensis



Eremophilus mutisii

Wetland and Lake Habitats and vegetation. A detailed habitat mapping process was completed, based upon the use of satellite imagery (Quick Bird July 2003) and ground truth. A habitat description model was developed. Based on an adaptation of the widely used Cowardin classification proposal, a habitat description system was applied for creating a 1:10.000 scale habitat map of the lake-wetland complex. The palustrine (marshes), lacustrine (open water) and riparian system were mapped, and related to environmental conditions such as water depth, hydrological regimes and species dominance. Currently, several permanent vegetation plots are being established on each of the habitat's components, for long term monitoring. The habitat map enables to interpret historic changes that have occurred in the area (i.e. disappearance of the natural features of the riparian system, extension of the reed march bed, and transformation of open water habitats due to invasion of alien species); and will be used for the long term monitoring of the ecological condition of the lake. Currently, a scientific based and participatory biodiversity monitoring plan is being devised.

(ii) Biodiversity conservation and promotion of legal protection for the area

Endangered species management plans. Based upon scientific data, and a detailed analysis of threats, currently species management plans are being developed for birds, fishes, macro-invertebrate and aquatic plants. Species-oriented plans will be then integrated to habitat management schemes. Simultaneously, a demonstrative riparian forest restoration process has been initiated in a 1Ha. plot at



Reed harvesting process

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the lake's shore. Since this forest disappeared long ago, and no living relicts remain, species composition was inferred through expert judgment, from palynological data available at the site, being this the first exercise of this kind to be carried out on a regional basis.

Protected Area management status for the ecosystem

A proposal for inclusion of Lake Fúquene in the List of Wetlands of International importance (RAMSAR) was developed, and is currently being considered by the National Ramsar Authority. The Colombian government is also considering the adequate protected area categories to be applied for the watershed, the lakes and critical habitats. A proposal for internal zoning of the potential protected area is being developed, as a part of the biodiversity conservation strategy proposed by Fundación Humedales, and currently under review.

(iii) Natural resources management.

Participatory management plans for lake fisheries.

A fisheries management plan is being presented to the environmental authority (CAR). A community organization scheme for fisheries management is being developed for the Rural Development Authority (INCODER). Basic studies include type and intensity of human use of the species, number of users, catch assessment surveys including catches, fishery outcomes, and economic value. The participatory research approach is an input for strengthening peoples organizations, needed for the implementation of resources management plans.

Reed beds and habitat management. A general inventory of reed harvesting processes has been concluded. A management plan for reed harvesting is being developed. Reed is used for elaborating handicrafts. Since reed beds are critical habitats for endangered bird species, as well as keystone economic sites for local human communities, reed management schemes that are compatible with the conservation of wildlife are being devised. A reed fire prevention education campaign is being developed along lake shores, since uncontrolled fires have been identified as the main threat for the survival of marsh dwelling birds.

(iv) Environmental education and Public awareness

Focusing on the comprehension of ecologic change processes, as well as on the valuation of natural resources and environmental services, didactic material on Birds and Fishes have been produced. The latter (a video, a flashcard game and a promotional poster) enabled to start big educational campaigns at local schools. Currently, work on the matter is being carried out at the educational centers located in the 4 municipalities adjacent to the aquatic ecosystems. On the other hand, with RAMSAR and the Global Nature Fund –GNF– educative material on RAMSAR subject are being produced for all Latin America.

In order to promote citizen participation on lake preservation matters, divulgation campaigns are being developed for 14 municipalities of the region. At the same time are carried out participative chats with local actors such as fishermen, artisans and cattle farmers. These processes will be strengthened by the adaptation of the information centre, currently taking place. Additionally, concrete actions on conservation are being carried out at local level, such as



Plans for fisheries

Organic agriculture activities

Chats with local actors



Cistothorus apolinari



Bird watching

Educational campaigns

the promotion of non-consumptive uses of birds (bird-watching tourism), by training local young inhabitants in bird identification.

(v) Promotion of sustainable rural development.

Aquatic plants: Feasibility studies for the use of aquatic weeds (invasive alien species) for fiber and organic manure developed. Some feasibility studies have been carried out to determine how compost making can contribute to solving the problem of infestation of alien species and to generate socioeconomic benefits too. The implementation of this project is under evaluation and it has high possibilities to be developed.

Ecotourism: Since perspectives for Lake Fúquene are wide, a project to foment ecotourism activities is being currently devised. This project seeks to involve local population on the service supply, by offering activities of environmental education, guided recreation, carrying out and supporting conservation activities, etcetera. Ecotourism activities are planned to be starting in 2006.

Renewable energy: In order to contribute to natural resources conservation and also improve the life conditions of local populations, a proposal for local implementation of Integral Solar Units has been developed, coupled with the development of greenhouse organic agriculture facilities.

Perspectives for the Future.

The regional environmental authority CAR has initiated a new management phase at lake, that includes the reversion to public property of invaded lands, the renewal of water management facilities, the definition of a protected area status for the lake, and the integration of a multi-valued approach for ecosystem management. Fundación Humedales is currently reviewing its role, having in mind the new management scenario that has been established for the lake. Our future role will focus on: **1)** Expanding and deepening public awareness on the lake's problems and opportunities through specialized modules of environmental education and training, and the consolidation of an information centre for the lake. **2)** Definition and implementation of a multi-scaled participatory biodiversity monitoring program; including training sessions for members of the local communities in order to implement follow-up protocols for habitats, endangered species populations, natural resources, and ecological tensors. **3)** Promotion of the participation of local communities in natural resources and habitat management. **4)** Development of participatory ecotourism, and sustainable production systems.

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