

A scenic view of a dense forest under a clear blue sky, framed by tree branches in the foreground. The forest is lush and green, with a variety of tree species. The sky is a clear, bright blue. The foreground shows the dark green leaves and branches of trees, some with small red flowers or fruits. The overall scene is peaceful and natural.

2019 Annual Report

Katalapi Park Foundation

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Photographs

The photograph on page 7 is by Tomás Lepe, the one on page 11 is by Patrick Hayes.

Katalapi Park is named for the beautiful fern, frequent along some of the trails in the forest, whose scientific name is *Blechnum magellanicum*. The name *Kätalapi* originated with the indigenous people of Chile's southern zone. The Katalapi fern is the only tree fern in continental Chile. Normally, its rhizome forms a trunk up to 1.5 m high, which differentiates it from the similar and abundant "Cow's rib" fern (*Blechnum chilensis*).

The two types of fern do not compete for habitat, since *Blechnum chilensis* prefers more sunlight. The Katalapi fern is native to Chile and Argentina, growing in Chile from the Maule region to the southernmost islands of the Magallanes region. It is found in damp, partially shady places, from sea level to altitudes of approximately 2,000 m.



Katalapi Park Foundation

The Katalapi Park Foundation (FPK) was created in 2017 on the initiative of Elisa Corcuera Vliegenthart in order to administer the park of the same name and work to ensure the permanence of the protected area. FPK became operational during 2018; the first complete year of operations was 2019. FPK seeks to maintain and develop Katalapi Park as a conservation area which facilitates the development of outdoor environmental education and scientific research.



Three members of the Corcuera-Vliegenthart family in 2017: Ana María, Elisa and Luis.

Letter from the President

I am pleased to present the first annual report of the Katalapi Park Foundation, and share with you the main activities carried out during 2019.

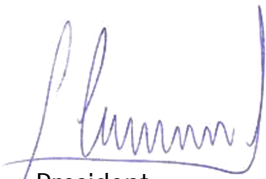
In the 25 years since Katalapi Park was created, it has showcased nature's tremendous recuperative power. In a relatively short time and in a relatively small space, it has shown that is possible to create a refuge for a large number of species of fungi, flora and fauna, including several with officially protected conservation status.

During these same years, we have also seen considerable social, economic and environmental progress in Chile, and significant advances in conservation, where institutionality has been strengthened, notably with the 2010 founding of the not-for-profit association "Así Conserva Chile".

At the same time, as a society today we face tremendous socio-environmental challenges. Nature's capacity to sustain and withstand the increasing demands of human societies is more precarious every day. According to the Global Footprint Network, in May, 2019 — earlier than the global average— Chile exhausted its natural resources "budget" for the whole year.

In 2019 we made progress in various aspects of the Foundation, professionalizing the executive management, successfully holding a variety of courses and workshops for the general public, welcoming visits by schoolchildren with educational programs linked to the curriculum, and supporting scientific research into different aspects of the temperate rainforest.

Looking towards the future, our main challenge is to diversify our sources of financial support to ensure the continuity of Katalapi Park and its worthy contributions to society and to nature. In order to achieve this, we are seeking to develop strategic alliances with different sectors of society.



President
Katalapi Park Foundation

Mission

The mission of the Katalapi Park Foundation is to develop and promote research and education which improves peoples' understanding and attitudes towards the environment, and promotes its conservation.

Vision

Katalapi Park is a model for environmental education and conservation, and participates effectively in the formulation and implementation of policies relating to education, conservation and sustainable development.

The Katalapi Park Center for Research and Education is a protected private area created by the Corcuera Vliegenthart family, owners and directors of the park since 1994. It is located in the Pichiquillaibe sector of the municipality of Puerto Montt, at kilometer 18.5 of the Southern Highway. It contains 69 acres of native forest, most of it certified by the National Forestry Service. The Center was created in order to support scientific research related to Chile's temperate forest and at the same time, to teach people of all ages to know, value and love nature. In this way, we promote conservation within and outside the park.

After nearly 30 years of recuperation from grazing by cows, logging and coppicing, Katalapi Park is an inspiration and source of information for other private Chilean conservation initiatives and for the general public. The park is located in the transition zone of the "Biosphere Reserve of the Temperate Rainforest of the Austral Andes" declared by UNESCO in 2007 due to the importance of its rich biodiversity. As part of the mitigation zone of the Alerce Andino National Park, an area of rapid residential and real estate development, the existence of the Park increases the biological connectivity in the area. It is an example of an ecosystem in the full flush of recovery, especially relevant because it is representative of the native forest at a low altitude (sea level), one of the most degraded ecosystems in this part of the region due to historic human interventions. The vegetative formation predominant in Katalapi Park corresponds to valdivian temperate rainforest with north patagonian influence, mainly composed of species of *Nothofagus*, *Mirtaceae* and evergreen shrubs.

The most significant waterway is the Tepual River, located in the lower part of the park, which functions as a natural boundary along a large stretch of the park limits. The river begins with the channeling of rain and humidity in the Quillaibe mountain range a little less than 2 miles to the northeast of Katalapi Park. There are also two streams which cross the entire park. The first is the "Katalapi" stream, which emanates from the Pichiquillaibe hills and is an affluent of the "Chapito pond" initially and then feeds into the Tepual river. This stream also serves as a natural boundary in part of the park. The second stream, "Shrimps", arises from a little well fed by underground waters which, like the Katalapi stream, drains into the Chapito Pond. Also noteworthy are some 20 little wells formed by underground water, which create the conditions for an important number of insects and amphibians, functioning as miniature bogs.



The Hylorina sylvatica frog in Katalapi

Board of Directors

The Board of Directors is responsible for proposing the annual work plan and verifying compliance. There are 5 directors, whose 3-year term runs from 2017 to 2020.

- President: Luis Corcuera Pérez
- Vice president: Ana María Vliegenthart Arntz
- Secretary: León A. Bravo Ramírez
- Treasurer: Gloria Oyarzo Almonacid
- Director: Ángela Sierra Almeida

Personnel

- Executive Director: Samantha Sparks
- Coordinator for School Visits: Gloria Oyarzo Almonacid
- Park ranger: Ricardo Hernández Barría
- Head of Domestic Services: Amelina Santana Vidal

Sections

The Foundation's work is guided by three sections whose members are as follows:

- **Environmental Education:** Ana M. Vliegenthart (Coordinator), Jason Angress, Gloria Oyarzo, Ángela Sierra, Carola Valencia, Samantha Sparks.
- **Scientific Research:** Alfredo Saldaña (Coordinator, U. de Concepción), León Bravo (U. de La Frontera), Luisa Bascuñán (U. de Concepción), Verónica Briceño (ANU, Australia), Luis Corcuera (Parque Katalapi), Alex Fajardo (CIEP), Heraldo Norambuena, Frida Piper (CIEP), Pedro Victoriano (U. de Concepción), Alejandra Zúñiga (U. Austral de Chile).
- **Conservation:** Susana Paula (Coordinator, U. Austral de Chile), Luis J. Corcuera (Parque Katalapi).



Administration

In 2019 FPK's administration was professionalized with the hiring in January of an executive director with a Master's degree in Social Science from the University of Stockholm and experience in financial analysis. Among other accomplishments, a thorough accounting system was established and the Foundation took charge of all the activities carried out in the park. A system of evaluation was implemented for courses for the general public which revealed a high degree of satisfaction among participants (average grade 6.6 out of 7). Moreover, 94% of course participants affirmed that the topic of the course was "new or somewhat new" for them, making it possible to conclude that FPK is contributing to increased knowledge of issues relating to the natural patrimony of the Lakes Region of Chile.

Public Relations

We published a trimestral bulletin in English and Spanish starting with a special edition in January to announce the course and workshop calendar for the year.

An important project was the creation of a new website, under the supervision of Luis Corcuera. The new site offers a modern design and easy navigation; it also makes it easier to maintain statistics about visits to the site and the items most interesting to visitors. On average, monthly visits to the website were a striking 36,687.

Publicity about the activities of the park continued thanks to Gloria Oyarzo's work with social media.

During the year, members and collaborators of the Foundation gave four talks in external forums about the work of the park. In July, 2019, Anita Vliegenthart took part in a panel discussion during the XII Winter School for Environmental Education, organized by the regional committee for environmental education, which took place at the Osorno campus of the Universidad de Los Lagos. In August, Anita presented at the seminar "Environmental Education in Times of Urgency," at the Universidad de la Frontera. Also in August, Luis Corcuera gave a talk about Katalapi Park at the general meeting of the organization LTSER-Chile (Long Term Socioecological Research group for Chile) at the Fray Jorge National Park.

In December, Samantha Sparks took part in a panel discussion about outdoor environmental education during the first Congress on Education for Sustainable Development organized by the Universidad Católica at the Villarica campus.

Participation in Networks

FPK became a member of the executive committee Regional Committee of Environmental Education for the Los Lagos Region in May, 2019. Previously, the Foundation had been a member of the general assembly of the committee. As an executive committee member, FPK hosted a stand on amphibians at the IX "Patatour Eco Educativo" in November, for schools with environmental certification from the MMA.

The Foundation is also a member of the national “Environmental Networks,” an initiative of the Environment Ministry created in 2017 to respond to the growing demand from the citizenry regarding the environment and outdoor environmental education.

FPK maintained its active participation in the association Así Conserva Chile, the national organization for privately protected areas.

Infrastructure and Trails



Park ranger Ricardo Hernández is responsible for maintaining and creating trails in the park, as well as building furniture, benches and other infrastructure which makes it possible to carry out the activities of the foundation.

During the year, two new trails were created: Exploradores (1.9 miles) y Paraguines (0.2 miles), specially designed for preschoolers. These trails were partially financed by the Native Forest Fund of the National Park Service, which also financed signposts.

Finally, a new woodshed and a closet for teaching materials were built.

Professional development

Two members of the Environmental Education group, Samantha Sparks and Jason Angress, were selected for a training session by the Beetles Leadership Institute of the University of California at Berkeley, to learn their Learning Cycle methodology applied to teaching science outdoors. Subsequently, Samantha and Jason held a training session for FPK facilitators at Katalapi Park.

Third-Party Events

During the year, we received 2 visits organized by third-parties, which took advantage of the park infrastructure to hold events related to conservation.

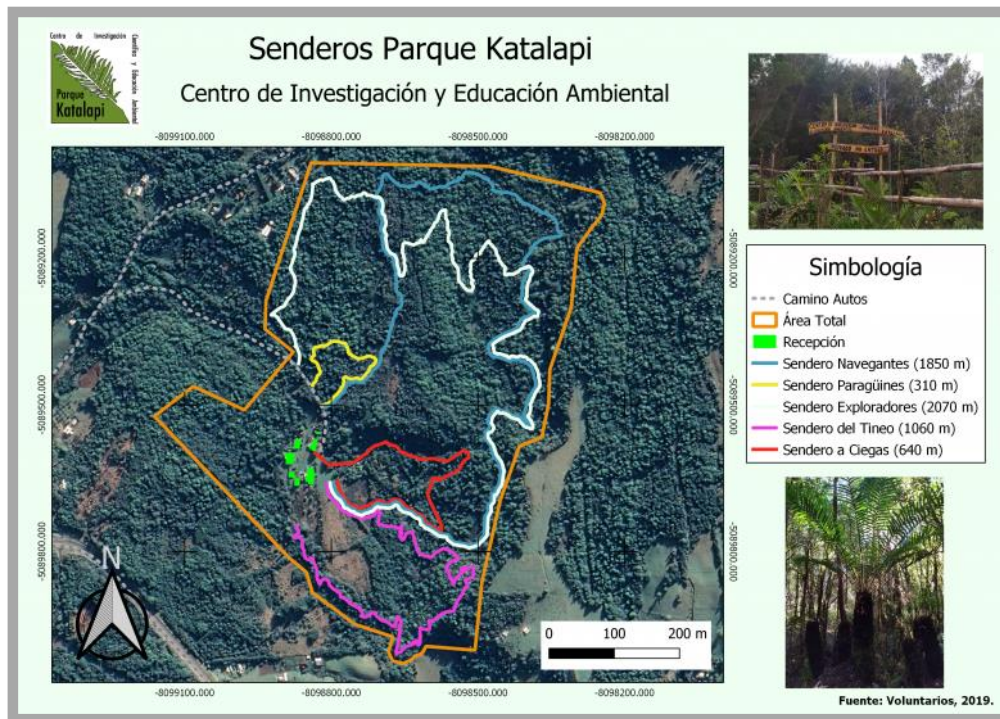
- In August, Conaf held a workshop for its personal from the regions of Los Lagos, Aysén and Magallanes to analyze and prioritize actions for interventions based on the local park rangers’ knowledge and experience.
- In July, we hosted the fifth workshop of the project for the “Establishment of Harmonized Standards for



Private Conservation Initiatives and the Use of Legal Conservation Contracts in Chile,” organized by Así Conserva Chile and financed by the state agency CORFO. Representatives of 20 organizations attended.

New Trail Map

Volunteers from the universities Universidad de Chile and Universidad de Los Lagos took time during the national holiday week in September to create a digital map of the park, leaving us with a very useful resource.



The network of trails for exploration, education and research, totaling over 4 miles.



Environmental Education

Creating a space to develop environmental education in Chile was one of the principal impulses behind the 1994 acquisition of the land that is now the park. Today, Katalapi is recognized nationally and even internationally for its expertise and leadership in this field. Different types of educational activities are carried out in the park: school visits, workshops and courses without prerequisites for the general public, and design and implementation of teaching resources. These experiences in nature-based environmental education are the raw material for occasional academic papers by members of the FPK team.

Courses for the general public

FPK organizes 3-day residential workshops and courses for adults on different topics related to nature-based education and the temperate rainforest. During 2019, we held 10 workshops and courses with a total of 186 participants, a slight increase over the previous year.

2019 Calendar of residential courses for the general public

Workshop: Formation of Facilitators of Outdoor Environmental Education (three alternative dates)	4 – 6 April, 2019 10 – 12 October, 2019 7 - 9 November, 2019
Propagation of Native Plants for Restoration	12 – 14 April, 2019
Inquiry Cycles for Environmental Education	25 – 27 April, 2019
Forest Ecology for Everyone	2 – 4 May, 2019
Workshop: Advanced Formation of Facilitators of Outdoor Environmental Education	9 – 11 May, 2019
Introduction to Medicinal Plants of Chile for Everyone	8 – 10 agosto, 2019
Nature Inside and Out: Methodologies for Connection	5 – 7 septiembre, 2019
Bioacoustics of Birds	3 – 5 octubre, 2019
Chilean Flora for Everyone	25 – 27 octubre, 2019

The workshop Formation of Facilitators of Nature-based Environmental Education was the first workshop held at the Park, in 2010. It is still the most popular, held 3 times during 2019 with participants from all over Chile and even abroad. Through this workshop, FPK is contributing to the formation of park rangers and professionals from other environmental education organizations.

School field trips

During the year, we received 9 half- or full-day visits from pre-kinder and elementary school classes from 5 different schools, all from the Los Lagos region.

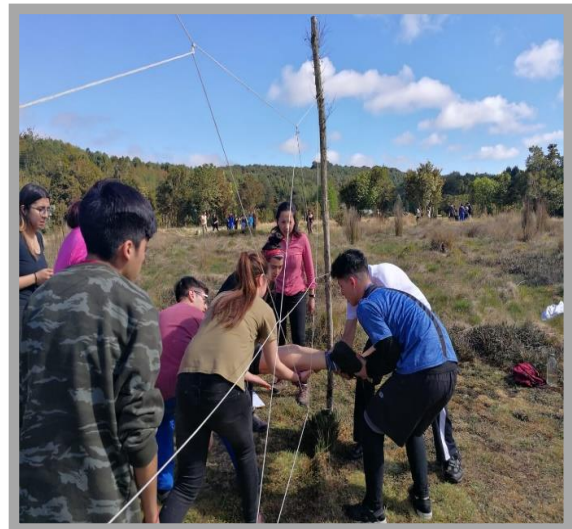
Residential camps

Three residential camps were held during the year. In January, we received a group of 16 students from North America through the educational agency Wildlands. During their 3-day stay in Katalapi, the students, almost all of them Environmental Science majors, took part in educational activities, roamed the park trails and planted cuttings of alerce (*Fitzroya cupressoides*).

In November 2019, we held a 3-day camp for junior and senior year students of the Colegio Santa Luisa of Concepción. Focused on the cycle of organic matter, the program for the camp was also aimed at developing social-emotional learning abilities with an emphasis on leadership, teamwork and empathy. The same month, 23 students from the School for Field Studies stayed at the park for 3 days whilst they received an introduction to the ecosystems of Patagonia.



Students exploring along trail



Team-building exercise during residential camp

Publications

In January, an article by Anita Vliegthart, Elisa Corcuera and Montserrat Quezada, “Educación Ambiental para la Conservación de la Biodiversidad” was published as a chapter in the book, *Metodologías Aplicadas para la Conservación de la Biodiversidad en Chile*, Serie Ciencias Ambientales nro. 1, Universidad de Chile, Santiago. Pérez Quezada J, Rodrigo P. (Eds). "Significant experiences in contact with nature in the early stages of life develop values that last for a lifetime," the authors affirm.

In December, Samantha Sparks, Luis Corcuera and Ana M. Vliegthart published an article entitled “Education and Nature: A Pending Debt” in the journal *Saberes Educativos* 4:41-47 of the Universidad de Chile.



Scientific Research

The richness of the biodiversity in Katalapi Park combined with a infrastructure adequate for receiving researchers, has made the park ideal for the production of scientific knowledge. The research conducted at the park usually involves establishing baselines of flora and fauna, the study of plant eco-physiology, photosynthetic dynamics and the environmental response of the forest to climate change, among other topics.

In January, more than 30 scientists from 9 different countries came together in Katalapi Park for the XIV International Colloquium on Plant Ecophysiology. This is an event held annually in the park which has garnered importance due to the high level of participants, making it possible to develop international research projects, international internships for Chilean students and professors, and numerous joint publications mainly on the South American temperate rainforest.

For the tenth consecutive year, we also hosted the international graduate course on Plant Ecophysiology, made possible with the collaboration and support of the Universidad de Concepción. This year the course focused on the ecophysiology of the rhizosphere; that is, how roots function within their environment and their interactions with other soil organisms.



Laboratory work during the international course on Plant Ecophysiology, January 2019

Research Projects

During the year, 3 research projects were carried out: Francisco Fortunbel of the Universidad Católica de Valparaíso worked on a program of trap cameras to track the monito del monte (*Dromiciops gliroides*); Alex Fajardo of the Centro de Investigación de Ecosistemas de la Patagonia (CIEP) researched tree height as a factor in species distribution; and Alejandra Flores of the Universidad de Concepción-Los Ángeles, continued her study of the filmy ferns (Hymenophyllaceae family). Moreover, under the sponsorship of Dr. León Bravo (Universidad de la Frontera), Dr. Enrique Ostria Gallardo of the Centro de Estudios Avanzados de Zonas Áridas (CEAZA) finished his post-doctoral project on regulatory mechanisms of genes involved in the desiccation of filmy ferns. Dr. León Bravo also supervised the doctoral thesis of Ana Fallard (UFRO) on genetic regulation of desiccation tolerance in *Hymenophyllum caudiculatum*.

Katalapi Park maintains a station to generate climate data, supervised by Dr. Alfredo Saldaña of the Universidad de Concepción, which has been collecting data since 2003.

As in 2018, a trap camera program continued, with the veterinary doctor Carola Valencia Soto and a student of veterinary medicine of the Universidad San Sebastián, Puerto Montt campus, continued with their project to continue monitoring stray dogs from entering the forest.

In 2019, a study was published on the micro-algae by Doctor Mariela González and her collaborators at the Universidad de Concepción (Gayana Botánica 76, 189-207).

A list of all the research carried out to date on the flora and fauna of Katalapi Park is available through this link: <https://www.parquekatalapi.cl/publicaciones-cientificas-sobre-la-flora-y-fauna-de-katalapi.html>

Agreements

Two agreements were ratified in FPK's name with universities. These facilitate student research in the Park:

- Katalapi Park's designation as a Biological Station of the Universidad de Concepción, under the faculty of Natural Sciences and Oceanography (an agreement in place since 2014).
- A framework agreement with the Universidad de la Frontera, signed for the first time in 2017.



Conservation

Photo by Patrick Hayes

Between 1900 and 1994, what is now Katalapi Park was used by settlers and small scale land-owners for subsistence agriculture and as a source of wood for construction material and firewood. Nevertheless, the logging was gradual and there was never clear-cutting over large areas, which meant there was always some refuge for animals, and trees capable of seeding regeneration of the forest. However, eventually logging took place over the entire parcel, and today, very few trees from the original primary forest still stand. Nevertheless, the sequential nature of the logging that occurred enabled regrowth of all the species that would be expected in this type of forest (coihues, arrayanes, ulmos, melís, tineos, etc.). The same, broadly, can be said for its fauna.

Since 1994, the land was fenced to prevent the entry of cattle from neighboring parcels, and there has been no new logging of native species. This has allowed for the recovery of the forest, especially the understory. In parallel, restoration projects have been carried out, planting certain species such as the Chiloé coihue (*Nothofagus nitida*) and ulmo (*Eucryphia cordifolia*) in areas where these were absent. At the same time, some thinning has been done to allow for adequate growth of some Mirtaceas.

There has been a gradual and notable increase in the sighting of birds and small mammals in the park. The “Chapito” pond, which had been badly damaged by cattle, has been restored and today amphibians, birds and large numbers of diverse insects are frequently seen in and around it.



Black-crowned night heron (Nycticorax nycticorax) in the Chapito pond

Milestones of Conservation in Katalapi

Filmy ferns

The forest of Katalapi Park is the only place in Chile where all the species of filmy ferns (genus Hymenophyllum) known to exist in continental Chile have been identified (Parra et al, 2012 Gayana Botánica 69: 384: 387). Five of the species in this genus are listed as Vulnerable, while there is insufficient data to evaluate the conservation status of 8 other species. The future of these epiphyte ferns depends upon conservation of the temperate rainforest.



Monito del Monte (Dromiciops gliroides).

This animal plays an important role in seed dispersal, and thus in maintaining biodiversity.

The monito del monte is a tree-dwelling marsupial which has a long ecological and evolutionary history with the temperate rainforests.

However, this very special species is threatened by habitat destruction.

We were very happy when scientific research during 2018-2019 revealed a significant presence of the monito del monte in Katalapi Park.



Microalgae

A scientific study published in 2019 identified 80 different taxa of microalgae in different bodies of water in Katalapi Park.

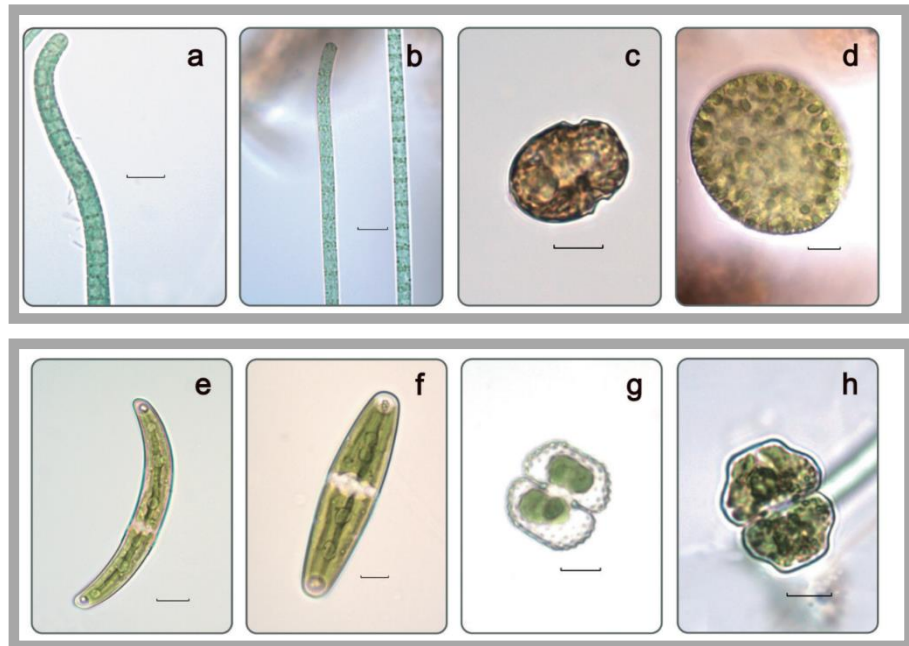
Of these 80 taxa, 24 were first-time identifications in Chile that have only been described in the Park.

The study of microalgae was carried out by a scientific team led by Doctor Mariela González Sierra of the Universidad de Concepción.

Microalgae are a diverse group of organisms, the majority microscopic and photosynthetic, simple in

form, which inhabit a variety of aquatic environments, both fresh and salt water, where they tolerate a wide range of physical-chemical parameters. They represent the first step in the food web and generate a large part of the oxygen in the biosphere – about 50%. They are fundamental to life in aquatic environments and on land.

The study in Katalapi found a preponderance of green algae of the Desmidiaceae family (47 species), followed by blue-green algae (14), photosynthetic euglenids (12), other green algae (5), and dinoflagellates and Raphidophyceae with one taxon for each group. In addition to contributing to the taxonomic knowledge of microalgae in Chile, the study demonstrates the role of bodies of water even as small as those in this private park, as reservoirs for a diversity of microalgae.



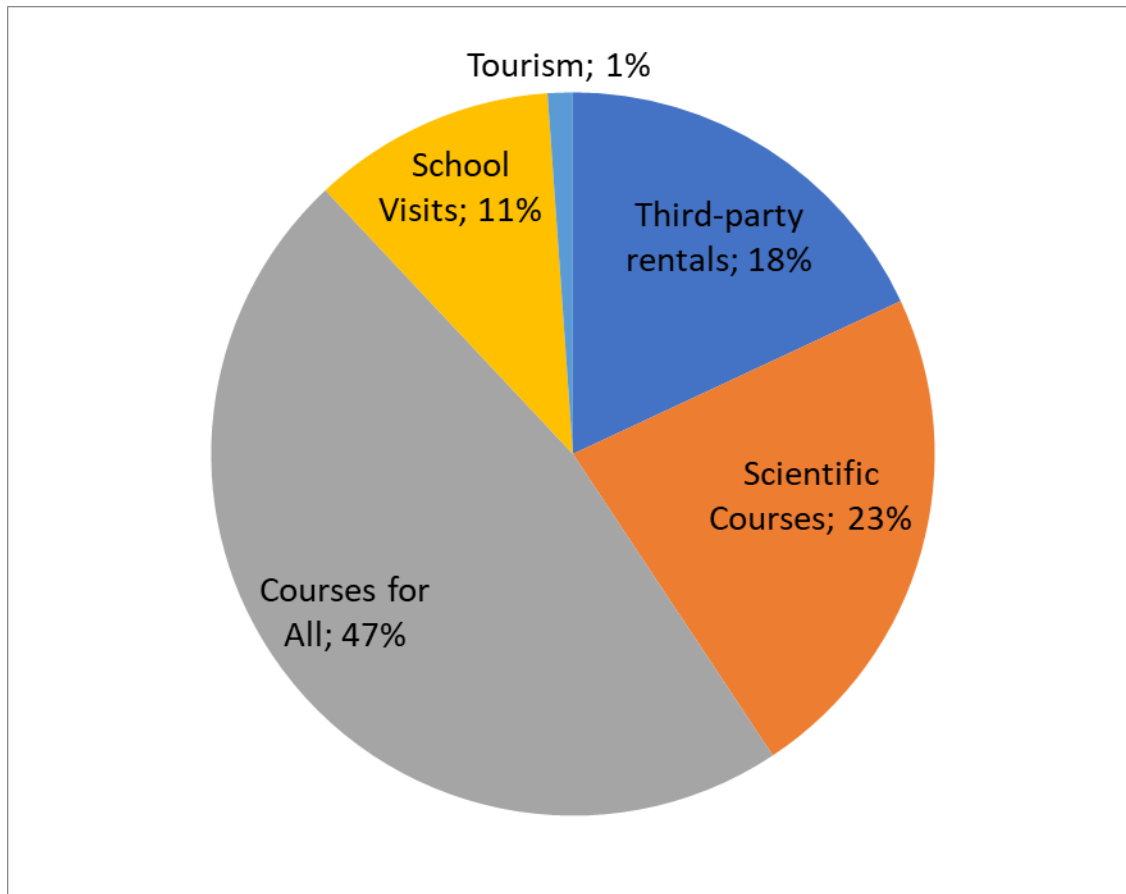
(a) *Planktothrix* cf. *clathrata*; (b) *Planktothrix* cf. *suspensa*; (c) *Parvodinium* sp.; (d) *Vacuolaria virescens*; (e) *Closterium jenneri*; (f) *Closterium navicula*; (g) *Cosmarium* aff. *bipunctatum*; (h) *Cosmarium pseudoretusum*. Source: González et al (2019) *Gayana Botánica* 76, 189 - 207.



Finances

The main source of income of the Foundation are registration fees for the different courses and workshops that are held in Katalapi Park: about 70%, divided between workshops and courses for the general public (47%) and scientific courses and events (23%). Renting the park infrastructure for third-party events related to conservation contributes 18% and school visits accounted for 11%. Tourism is not a significant source of income for the Foundation.

2019 Income



A major challenge is to diversify the Foundation's sources of income, ideally with donations making up approximately one third of the budget.

With respect to expenses, almost two-thirds of the total is due to salaries and wages for facilitators, professors and personnel. Inputs, mainly for courses and workshops, make up about one-fifth of total expenses.

It is important to emphasize that the Foundation, and thus Katalapi Park, are able to function due to volunteer work at the executive level. Without this it would be impossible to realize the activities that create income. The value of this volunteer work is at least Ch\$2,600,000 (approximately US\$3,500/month).

Expenses 2019

