

**Report on**  
**Sustainable  
Development**

**GOAL 15**



**LIFE ON LAND**

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.



Shiv Nadar Institution of Eminence is built on a sprawling green campus spread over 300 acres and is located in a rural-urban landscape. Almost from two sides, the campus is surrounded by agricultural land and on one side by wetlands of Bil Akbarur, while NH 91 is situated on the front side. Although the surrounding landscape is rapidly transforming due to urbanization, the campus, with its unique location, has made every effort to conserve and grow its rich flora and fauna with thriving ecological diversity. This is the university's unique biodiversity story.

**Sustainable Development Goal 15** highlights that ten million hectares of forest are destroyed every year and around 40,000 species are documented to be at risk of extinction over the coming decades. Sadly, biodiversity also was neglected in Covid-19 recovery spending. According to the Global Risks Report presented at the World Economic Forum 2023, *biodiversity loss is the fourth most severe global risk over the next ten years, behind climate action failure, climate change adaptation, and extreme weather.*

At Shiv Nadar IoE, we continue to work very closely with the targets stated in SDG Goal 15 as far as possible. In this sense, our SDG report becomes even more significant in response to the Global Risks Report of 2023.

## 1 Teaching and Learning

The university campus is an exciting [living lab to study, research, and document](#) diverse flora and fauna for faculty, researchers, and students.

The university offers several courses allowing students to study biodiversity at the global level and practice it in their local environment. For undergraduate students, many compulsory courses are offered regularly such as Environmental Studies (CCC 704); Biodiversity: Assessment & Conservation (CCC 706); Environmental Impact Assessment (CCC 406). Besides, the department of Life Sciences offers a course on Ecology and Environmental Science (BIO104). Plant Sciences I (BIO 102), Plant Sciences II (BIO 105).



## Learning Activities

The university, in collaboration with [The Habitat Trust \(THT\)](#), organizes short webinars and sessions on various themes. [Synergence 2022](#) was a special session on biodiversity, discussing the uniqueness of Indian flora and fauna. The Trust has a particular focus on lesser-known species and habitats of India that are threatened, often neglected and in urgent need of conservation.

**Young Thinkers Forum** brings together specially curated programs on a range of themes such as a three-day certificate program for school students from grades 7-12. The [Young Thinkers Forum on Biodiversity and Sustainability Program](#) was a huge success that introduced participants to concepts of biodiversity, ecology, growing



micro-greens, composting, recycling, and sustainable living.

The **Young Environmentalist Program** is specially curated for grades 7-12 school students. It enables participants to engage in various themes such as biodiversity, ecology, growing micro-greens, composting recycling, and sustainable living.

## 2 Research

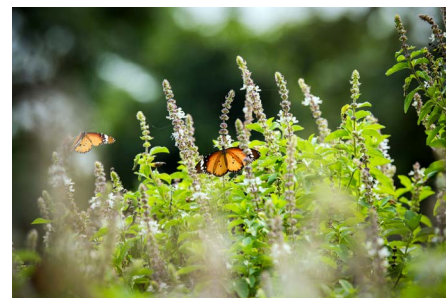
At the university, we have recorded 227 vascular plant species belonging to 175 genera and 62 families, of which several species are new records for the state of Uttar Pradesh. The campus is also rich in faunal diversity, characterized by a mixture of wetlands and terrestrial

### Books

**Jyoti K Sharma, Manish Bhardwaj, Ahmad Masood Khan, Amber Habib, and Aravind Kumar. 2022.** *Birds of Our Courtyard: A Pictorial Handbook of Birds of Shiv Nadar University Campus.* Shiv Nadar University. 416 pages.

**Manish Bhardwaj, Jyoti K Sharma, Amber Habib, and Ahmad Masood Khan 2021.** *Butterflies of Shiv Nadar University Campus: A Pictorial Handbook.* Shiv Nadar University. 93 pages.

species, mammals, aves, reptiles, amphibians, fishes, molluscs, annelids, and insects, including 53 butterfly species. These findings and discoveries are published in books for posterity to facilitate research. This section highlights a selection of research by the faculty.



### Book chapters

**Pandey PC, Tripathi AK and Sharma JK 2021.** An Evaluation of GPS Opportunity in Market for Precision Agriculture. In: GPS and GNSS Technology in Geosciences, George P. Petropoulos & Prashant K. Srivastava (Eds.), pp. 337-349. Elsevier. ISBN: 978-0-12-818617-6.

**Tripathi AK, Pandey PC, Sharma JK, Srivastava PK and Triantakonstantis D 2022.** Climate change and its impact on forest of Indian Himalayan Region: A review. In: *Climate Change: Impacts, Responses and Sustainability in the Indian Himalaya*, Seema Rani and Rajesh Kumar (Eds). Springer Nature. ISBN: 978-3-030-92781-3. DOI: 10.1007/978-3-030-92782-0\_10.

**Maurya NK, Tripathi AK, Chauhan A and Pandey PC 2022.** Recent Advancement and Role of Drones in Forest monitoring: Research and Practices. In: *Advances in Remote Sensing for*

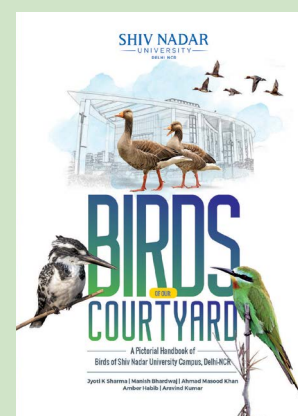
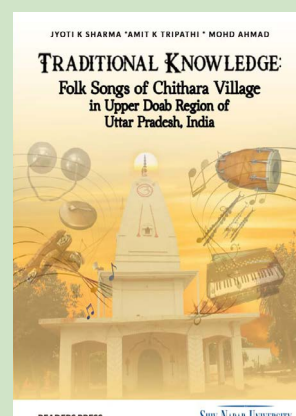
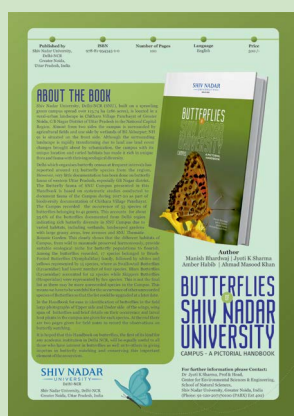
*Forest Monitoring*, Prem C. Pandey and Paul Arellano (Eds). Wiley. ISBN: 978-1-119-78812-6.

### Journal publications

**Sidharthan, Arya, Neelesh Dahanukar, Remya Lathika Sundar, Kutty Ranjeet, and Rajeev Raghavan.** "Beyond waterfalls and dams: Riverscape genetics of two endemic mountain loaches in the Western Ghats biodiversity hotspot." *River Research and Applications* 38, no. 1 (2022): 152-159.

**Sethi, Deepa, and Richa Priyadarshini.** "Isolation, Propagation, and Identification of Bacterial Species with Hydrocarbon Metabolizing Properties from Aquatic Habitats." *Journal of Visualized Experiments: Jove* 178 (2021).

**Tripathi, A.K., Sharma, J.K. and Ahmad, M. (2021).** Preponderance of Alien Species in Delhi NCR of Western Uttar Pradesh: Possible Impacts on the Ecosystem. *Tropical Plant Research* 8(1): 50–62.





### 3 University Operations

#### Botanic Garden on Campus

In response to [target 15.1 of the Goal](#), we spent a year nurturing a piece of land and eco-restore it with careful planning. Today we have created an extremely rich [biodiversity thematic botanic garden](#)<sup>1</sup> on 10.4 acres of land that, in turn, has 12 theme gardens with about 805 taxa (plant species including varieties). About one-fourth of the area adjacent to the boundary is part of the Bil Akbarpur wetlands, where the natural population of *Equisetum*<sup>2</sup> is conserved, thus making it possible to contribute to [target 15.5 of the Goal](#).

#### The thematic botanic garden has 12 theme gardens:

Medicinal Plant Gardens
Ferns and Fern-Allies Garden (Fern House)
RET Plant Gardens
Palm Gardens
Gymnosperms Garden
Ficus Garden
Hydrophytes Garden
Butterfly Garden
Bamboo Garden
Fruit Plant Garden
Spices, Condiments and Herbs Garden
Xerophytes Garden

The botanic garden is the first of its kind in northern India, conceptualized and established to increase awareness about various plants and conserve them in their unique germplasm for education and research. It has about 3000 plants in the main garden and 12 theme gardens belonging to 805 taxa (691 plant species, 2 subspecies and 112 varieties including hybrid and cultivated varieties). About 40 rare and economically valuable plant species are planted along the path and between the theme gardens to increase plant diversity and conserve germplasms.

#### Landscaping the Campus

The university has beautifully landscaped gardens, tree avenues, and sprawling grassy areas developed and planned by a horticulture architect. The university takes pride in the extensive horticultural work, and tree plantation drive carried out during the past few years, increasing the tree cover and overall greenery on campus. In response to target 15.2

of the Goal, we have the following ground cover to date:

PARTICULARS	TOTAL QUANTITY
Trees/Palms	13169
Shrubs	167736
Ground Covers	297963
Grass	339439 sqm.

In an effort to conserve the wild native species present on campus to maintain the healthy ecosystem of the campus and prevent the growth of invasive species, the University Biodiversity core team comprising faculty and trained local farmers, every effort is made to enhance knowledge of and preserve the biodiversity of the area. During the development processes, it is ensured that every aspect of [biodiversity](#) is taken into consideration and so every measure is taken to not remove old or native trees planted previously.

#### Date Palm Grove

A unique feature of the Shiv Nadar IoE campus is that it is dotted with

<sup>1</sup>Thematic botanic garden consists of vulnerable, cultivated and wild plants of economic importance grouped together based on their uses or taxonomic groups.

<sup>2</sup>*Equisetum* is one of the oldest living genera of vascular plants and is the sole living representative of a large and ancient group of Equisetales. A natural population of *Equisetum ramosissimum*, a living fossil species is being conserved in the wetland part of the garden.

several date palm trees, either individually or in groups. [The largest date palm grove, also known as the Sacred Grove](#), comprises more than **900 individual dates palm trees and covers an area of 0.75 hectares.**

According to the elders<sup>3</sup> of the Chithera village, the trees are 300-400 years old. The area has relics from Mughal invaders. Some say nomads from the West camped in the wetlands and the date palm seeds they left along their camping trail later grew into date palm trees spread across North India, including the university campus and the surrounding areas. Forming a unique ecosystem, the date palm grove plays an essential role as keystone species, providing shelter, habitat, and food to several wild plants and animals. Some plant species found in the Sacred Grove include Vasaca, Ratti, and Sandpaper plants that are no longer found outside west UP.

### The Campus Lake

The campus lake is part of the Dadri wetlands, also called the Bil Akbarpur wildlife habitat. The lake had almost dried up when the university was founded. Its immediate revival has allowed many fish and aquatic plants to thrive, such as Nitella, Chara, and other phytoplanktons, which provide food for winged visitors. On the lakes'

fringes, *Alternanthera philoxeroides* grows gregariously throughout the year, encroaching on the water body and offering a good insect population to feed the birds.

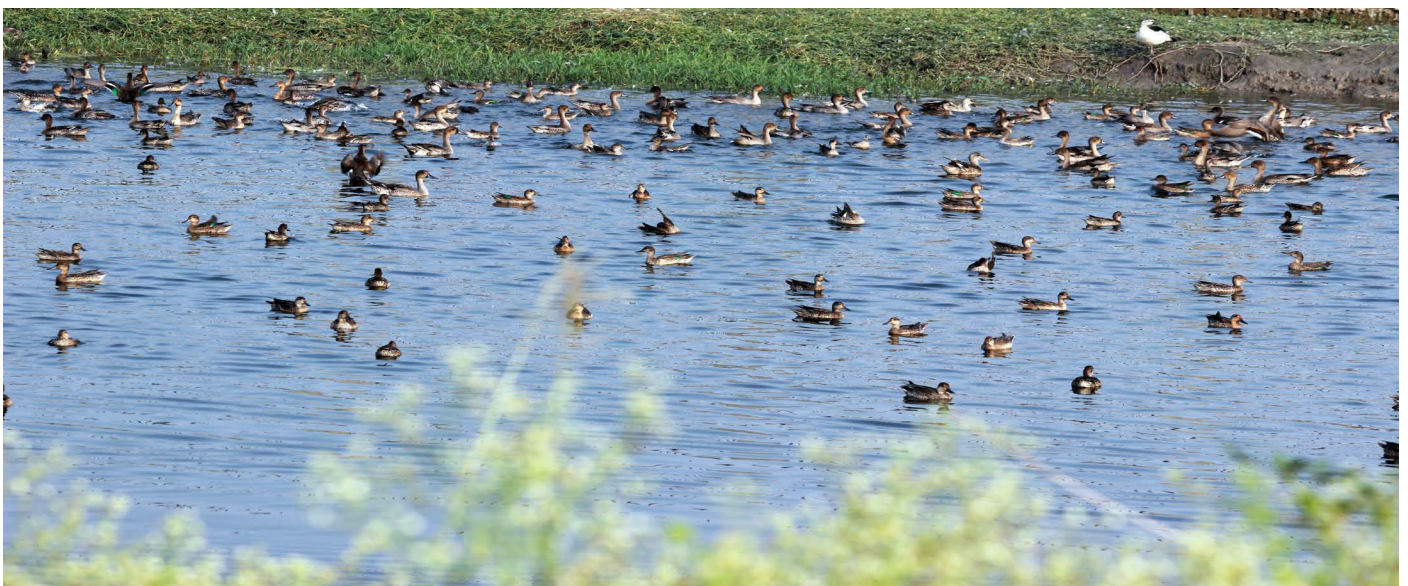
The lake is home to many species of birds, which are endangered, near threatened, or vulnerable in the IUCN category, including the common Pochard, Sarus Crane, Woolly-necked Stork, Ferruginous Duck, Painted Stork, Black-headed Ibis, Black-necked Stork, Oriental Darter, Alexandrine Parakeet, and Egyptian Vulture.

In 2018, the university faculty made an exciting discovery in the lake. They isolated the bacterial strains *Exiguobacterium sibiricum* strain DR11 and *Exiguobacterium undae* strain DR14, which can degrade plastic, especially polystyrene. These bacteria have great potential in arsenic removal from wastewater and biodegradation of polystyrene from waste. All efforts are being taken to preserve the lake and its natural ecosystem. During summers, the lake is supported by external water to preserve life underwater, and the [water is conserved and rejuvenated](#) through rainwater harvesting.

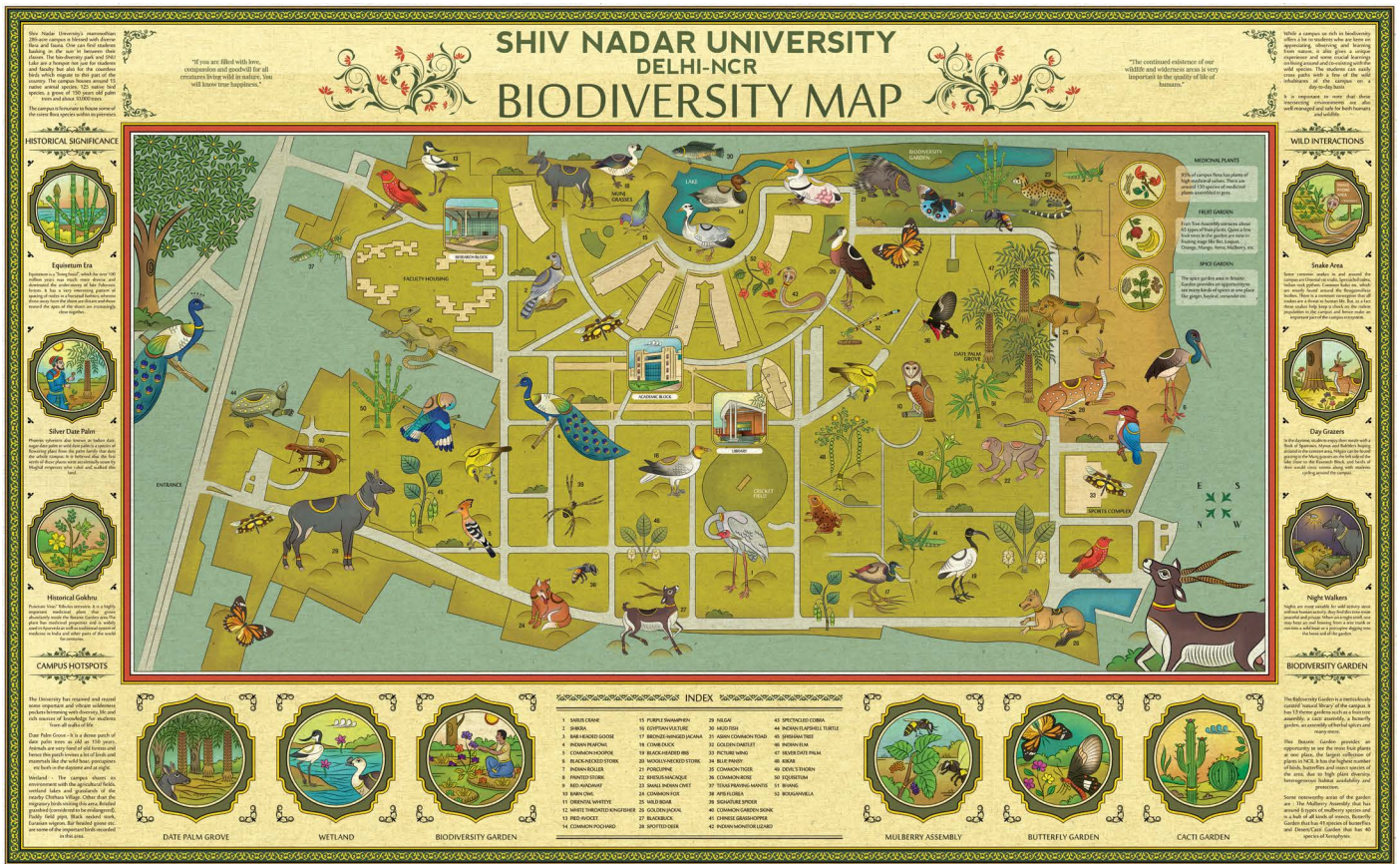
## Story of Hemraj, a trained local gardener



A visit to university's botanic garden provides the chance to sight fruit plants, including almonds, apples, avocados, dragon fruit, peach, plum, loquat, orange malta, and walnut. The dedicated faculty team has trained local gardeners to work on this botanical land. Hemraj is the local primary gardener who, with his local knowledge, has enthusiastically learned the systematic science behind this project and has taken care of 700 plant species since its inception. Aware of all the plants names in Hindi and English, Hemraj's knowledge of the garden is a treat to those who come for a tour of the garden. Fondly, everyone refers to him as the wind beneath the wings of the garden.



<sup>3</sup>A village elder is person having authority because of age and experience.



True to its existence on the campus, the university named its first newsletter after one of the prominent resident birds, the Whistling Teal.

## 4 Partnerships

### Biodiversity Map of Campus

A team of faculty, staff, and students has created [unique map](#) to visually communicate the rich flora and fauna of campus using a traditional art form. The map is conceptualized by Dr. Bahar Dutt and created by artist Sudarshan Shaw, using folk art. It was made after several visits to the campus with rich, engaging conversations and interviews with students, key faculty, and local workers. Created using Mughal-style art, the map depicts the university's faunal diversity, including ten species of mammals, 65 species of birds, nine species of reptiles, five species of amphibians, and 27 species of butterflies in and

around the campus. The map is installed all over the campus to educate and create a sense of pride in the [university's ecosystem](#), which is more than the built environment.

### The School of Humanities and Social Sciences, in collaboration with The Habitat Trust (THT)

#### 1. Conservation of Alluvial Grasslands in the Dudhwa – Pilibhit Landscape

The alluvial grasslands of India are one of India's most threatened ecosystems. The Terai alluvial grasslands are one of the country's most biodiverse regions. Other than Assam, Uttar Pradesh has one of the largest belts of Terai grasslands. Unfortunately, because Uttar Pradesh has the highest human population in India, land pressure has taken away most of these amazing grasslands in the form of agriculture. With the severe loss of grasslands throughout the state, most of these grasslands now exist only in the Protected Areas (PA) of the Dudhwa and Pilibhit Tiger Reserves, as well

as the river banks that flow around these areas. The communities living around this area depend highly on these grasslands. Shiv Nadar IoE, in collaboration with THT, aims to look at the impact of communities on these habitats and work towards developing economic interventions that will help reduce the dependence of these communities on the forests



Meeting the colorful cultural personalities of the Dudhwa-Pilibhit landscape

and nudge a positive mindset toward the forests and its denizens for long-term conservation.

## 2. Conservation of Rocky Outcrops

The Konkan region of Maharashtra has mid-elevation lateritic plateaus between the Sahyadris and the coastal plain. Apart from India, such lateritic plateaus are a highly restricted ecosystem found only in Brazil and Australia. These rocky outcrops are home to a wide range of endemic plants, amphibians, and a multitude of other taxa and historical petroglyphs. Because of private ownership, outcrops face significant challenges due to laterite mining, mango, and cashew plantations and are under threat of being sold off. A team from SHSS, in collaboration with THT, has conducted a pilot study to assess the prospects of



The culture of oral tradition

developing economic opportunities for the communities, which will help them retain the rocky outcrops and contribute to their conservation.

## Biodiversity Project Sparks a Folk Culture Revival

In 2015, Dr. Jyoti Sharma, Professor, School of Natural Sciences and his team proposed to study the area's biodiversity around the university. Since 2016, a three-member team has meticulously researched and documented the flora and fauna of Chithera village, which neighbours the campus. The study followed the rules set out as part of The Biological

Diversity Act 2002, which mandates that every local body must create and maintain a People's Biodiversity Register (BPR). The project aims to develop a model biodiversity register for Chithera Panchayat, where none exists. Still in progress, BPR project has resulted in multiple publications, including [Traditional Knowledge: Folk Songs of Upper Doab Region of Uttar Pradesh, India](#), which is a collection of 332 songs that are passed on for generations through the oral tradition many of which are closely related to the theme of biodiversity. The work on Biodiversity Register is continuing.

## UNLEASH Hack at Shiv Nadar IoE – A Network of Changemakers

The first in-person UNLEASH Hack was held at Shiv Nadar IoE, bringing more than 50 talents to find solutions for SDG15: Life on Land. Twelve teams from Delhi NCR and Chennai campus explored creative solutions to the challenges. The two winners, *Compos: A smart business model of gamification and incentivizing food and agricultural waste and converting it to organic compost*; and *Eco Heal: An integrated tech solution of assessing the right water level for*

*farming with specially designed sensors connected via a mobile app, thereby controlling over-irrigation, excessive water usage, and soil erosion* went on to participate in [UNLEASH 2022](#)<sup>5</sup>.

This was a global SDG platform convened in Mysuru, India, that brought together +1200 participants from across the world to participate in a global hackathon on the thematic area 'Source' (mountains and glaciers) and 'Sink' (land) of terrestrial ecosystems.

## ESG for Future Proofing

The University hosted a three-day program on [ESG for future-proofing](#). ESG experts designed the program to equip senior working professionals with key concepts from some of the most influential thought leaders. At the end of three enriching days, the participants gained the



UNLEASH Hack - A Network of Change Makers

<sup>5</sup>UNLEASH is a youth-led, collaborative action that was developed in partnership between the Global Innovation Lab and the HCL Group. The participants had the chance to consider how the SDGs worked together and offer solutions for SDG 14 and 15.

requisite skills and knowledge of ESG integration into business goals and enhanced their effectiveness in existing leadership roles.

### Adoption of green area in collaboration with local agency

Shiv Nadar Institution of Eminence signed a Memorandum of Understanding (MoU) with the Greater Noida Industrial Development Authority (GNIDA) on June 2, 2019. Under this MoU, the University has agreed to [adopt the](#)

[green area](#) on behalf of GNIDA. This area is called Veer Savarkar Chowk.

Since then, we have developed and maintained the green area, cultivating flower beds, trees, shrubs, and community gardens. Besides, we have regularly maintained the area by raking leaves, picking up litter, removing graffiti, pulling weeds, and bearing the total cost of this maintenance.

To date, we have planted 160 trees, 1107 shrubs, and 575 sqm of grass with a survival rate of 95%.





Shiv Nadar Institution of Eminence is fully committed to the UN Sustainable Development Goals (SDGs). We have embraced a four-pronged strategy for SDGs through **teaching, research, our core institutional practices, and partnerships.**

**SHIV NADAR**

INSTITUTION OF EMINENCE DEEMED TO BE  
UNIVERSITY  
DELHI NCR

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