

n a fast growing city, the place of nature is very challenging. On one hand, it forms the core framework based on which the city develops while on the other hand, it faces serious challenges in the realm of urban development. The research document attempts to construct a perspective to recognize the role and value of nature in making our cities more livable. On the way, the educational work delves on the natural history, relationship of nature with culture and lists and maps ecologically significant areas (both natural and manmade) in the city. The knowledge of the natural context will enable citizens to observe and analyze present day development opportunities and concerns in a much more sensitive and balanced manner in which conservation of city's natural resources holds equal value.

JOURNEY SO FAR

The narrative surveys the changing relationship of different cultures with nature over twelve centuries. In a fast-growing metropolis it is helpful to know the natural context while we analyze the opportunities for the conservation of natural resources.

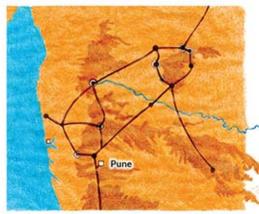
MAPPING NATURE

The map lists ecologically significant areas, both natural and manmade - forests, river, parks, lakes and water bodies in the city. The historic character of the city comes through in the many well-conserved heritage precincts.

This is a living project. No knowledge is exhaustive. We would appreciate readers' contributions about these themes and environmental concerns of the city. We encourage them to write to landscapefoundationindia@gmail.com We would be happy to include suggestions in future editions of the research.

THE REGION

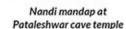
Pune lies in the Maaval region of Maharashtra, the hilly transition zone between the Sahyadris (Western Ghats) and Desh (Deccan Plateau). It differs from both owing to its unique topography and climate. A number of rivers originate in the Sahyadris and flow eastwards including Mula-Mutha, on whose confluence Pune is situated.



Trade routes in ancient Western Maharashtra

Being made up of Deccan trap or volcanic Basalt stone of the plateau, the region is rough and rugged, but lends itself to agriculture in patches made fertile by the rivers. Being nearer to the origin, the rivers in Pune region have better and assured supply of water compared to those on the Desh that dry up in the hot summer months. The region enjoys moderate climate, pleasant and dry throughout the year, except for the months of April and May that are hot and dry. Rainfall is moderate and lasts from June to September.

Strategically located on the trade route that connected the western coastal region and the Plateau through a number of passes and the Ghats, the region has enjoyed a prominent place on the economic and cultural map of the Deccan since ancient times. It is known for its numerous rock cut caves and temples (Karla, Bedsa), places of pilgrimage (Junnar, Bhimashankar), hill forts (kille) and mountain passes (khinds) which stand witness to both warfare and trade that have played a significant role in the history of Pune.



TOPOGRAPHY | SOILS | CLIMATE | GROUND WATER HYDROLOGY OF PUNE REGION TOPOGRAPHY TYPES OF SOILS ELEVATION Deep Black Medium Black 600 - 1500 m 450 - 600 m Shallow Black Red Loamy **CLIMATE CONDITIONS** GROUND WATER HYDROLOGY GROUND WATER POTENTIAL Annual Temperatures - 26°C Annual Rainfall - 500 mm <1 Regions generally with Limited ground wate</p> RAINFALL ZONES Very High (2800 - 4000) 1-5 Aquifiers with Intergranular Porosity and Fractures High (1400 - 2800) 5-25 Aquifiers with Intergranular Porosity and Fractures Medium (500 - 1400) 600 ---- Water table contour (m.a. msl.) Low (Below 500) STAGES OF EVOLUTION OF CITY PRE PESHWA PERIOD POST INDEPENDENCE PERIOD PRESENT TIME PESHWA PERIOD COLONIAL PERIOD

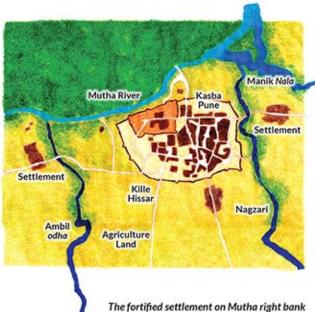
JOURNEY SO FAR

THE RIVER SIDE SETTLEMENT

The early settlement of Punaka was situated on the right bank of the Mutha river, that was prone to flooding. The settlement grew along the Nagzari stream on which it depended for water. Ruled by different dynasties in succession, Punakavishaya was a region with small hamlets that depended on fishing and agriculture for sustenance. These combined to form a walled settlement that later expanded in to the fortified garrison town known as Kasba Pune. The town continued to grow eastwards on a narrow tract of land bounded by the streams of Nagzari, Ambil odha and Manik naala. While the fields and farmlands lay outside the walled city towards the east, the left bank of the Mutha was uninhabited and occupied by jungles. The city was depopulated and repopulated over the years due to natural and political causes.

Ruled by different dynasties - Chalukyas, Rashtrakutas, Western Chalukyas and the Yadavas in succession, the region was an important religious place. Early references speak of Nageshwar mandir and a reservoir of water with medicinal properties located near the Nagzari. There were other well known temples like Narayaneshwar and Punyeshwar (from which Pune may have derived its name) along the river, some of which were demolished by the armies of Allaudin Khilji in the 13th century. Pune was also known for the rock cut Pataleshwar cave temple that lay on the other side of the Mutha, amidst dense jungles populated with wild

The settlement was brought together by Arab Sardar Barya inside a walled 'Kille Hissar' around the 13th century. Around the 14th century Kasba Pune was expanded and enclosed by the Pandhari kot (white wall) to include the three hamlets of Kasarli, Kumbharli and Punewadi within its boundary.



Being in the rain shadow region, the area was prone to frequently occurring droughts and famines. This affected the agricultural productivity, especially in 14th and 15th centuries and led to depopulation and repopulation over the years. Frequent nvasions by armies like the Nizam shahis and the Mughals also played a role. It is believed that

the fort wall and the surrounding country were razed and laid waste in 1630 CE.

In 1640 CE, under Shivaji Raje Bhosale, then administrator of the Pune jagir, agriculture was re established, and the menace of wild animals in the surrounding jungles was eliminated to create a safer settlement. The defense strategy was planned in accordance to the natural landscapes of narrow passes, steep cliffs and dense jungles. The many hill forts that dotted the region including Shivneri to the north (where he was born) Kondhana /Sinhagad to the south (captured in 1670), and Purandar to the southeast offered good protection to the Marathas. Pune flourished and expanded as people from the rural hinterlands started migrating towards the city. After the demise of Shivaji Raje and the subsequent encampment by the Mughal army, decay set in. Surrounding hills were deforested and laid bare by the invading armies causing great deterioration that took a

number of years to reverse.



View of Pune region

LANDSCAPE RESTRUCTURED

Increased agricultural productivity as also the stability acquired under the Peshwa rule led to expansion. Pune grew into a vibrant city enriched by culture and nature. Temples, ghats and gardens dotted the urban fabric. The city continued to grow on the right bank of Mutha but it was also connected to the other bank by the Lakdi Pul during in the later years of the Peshwa rule. The topography of Pune was majorly restructured during the Peshwa times. Existing nalas were diverted and lakes created, freeing a large tract of land from the danger of flooding. This prompted growth alongside the river edge and also towards the east. An important feature of this era was the large scale waterworks undertaken at Katrai to meet the water requirements of the growing River Mutha, Nagzar city. An underground system was constructed that and Ambil odha forming

aqueducts, wells and tanks. Under Nanasaheb Peshwe, the entire topography of the region was altered. The Ambil odha was diverted and a lake created at the foot of the Parvati hill. The city that was restricted to a narrow strip between the streams now started spreading southwards along the Mutha's right bank beyond the Shaniwar wada, the Peshwa seat of power. Smaller lakes were also created as was Hirabaug, a pleasure garden near the Parvati lake. The hill temple of Parvati and the temple and ghats on the Mutha were an

integral part of the urban fabric as were the numerous orchards and gardens (Belbaug, Tulsibaug).

The left bank of the Mutha was still covered with dense vegetation and it is believed to have been a hunting ground for the Peshwa.

After the defeat of the Peshwa army at the Battle of Panipat, a bridge was constructed across the river (Lakdi Pul) for facilitating the return of the defeated army from the rear side. Two lakes were built at Katraj, eight miles south of the kasba to meet the water needs of the growing population. Water was desilted in an upper lake before being stored in the lower lake. Masonry dams were built and an underground aqueduct system was

created (1755) that supplied water to the tanks (houds) and wells (ucchwas) in the peths as also the gardens and orchards.

Many Sardars of the Peshwa court also built aqueducts sourced from Katraj as well as Kondhwa to supply water to their peths in Pune. The efficiency of this water system meant that the citizens were not completely dependent on the streams and the river for drinking water leading to their neglect and pollution. The open drain system in the peths discharged into the Ganda nala that was dug near the Mutha (1782) causing pollution of the river water and banks. The barren stretch on the river bank near the Omkareshwar temple was a cremation ground where last rites were performed for the ruling and noble class.

During the reign of Sawai Madhav Rao II, a menagerie was created at the foot of the Parvati hills that housed different species of birds, reptiles, fish and other animals including lion, rhinoceros and antelopes.



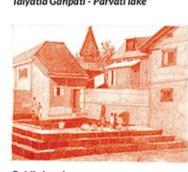
Typical street and paar



The peths and aqueduct system during Peshwa period



Talyatla Ganpati - Parvati lake



Public houd

CROSSING NATURAL BOUNDARIES

The Colonial period saw the city crossing rivers and nalas that had uptil now defined its boundaries. Two Cantonment areas were created to accommodate the British soldiers and officers, one on the north near the Mula and another one to the east of the old city. A new character of landscape with wide tree lined avenues and large open spaces was introduced in these areas, very different from the existing one. The natural green barriers of fields and farmlands that lay between the old city and the Cantonments were soon filled up by development. A number of bridges were built and development spread to the left bank of the river Mutha. Dams were constructed over the Mutha which became the chief source of water for the city. The traditional aqueduct system fell into a state of disrepair.

Starting from the residency set up on the small land near the Sangam, the British gradually expanded their footprint in Pune. After the defeat of the Peshwa Bajirao II (1817), the flat plain of Khadki that lay in the bend of the Mula river was converted into the Cantonment area. The villages of Wanowrie and Ghorpadi to the east of the old city were annexed to set up another Cantonment area. Large spaces were created for parade grounds, firing ranges and also spaces like gymkhanas, clubs and race course for

recreation of the army personnel. Residential areas had wide tree lined roads and bungalows with their private gardens, resembling the cottages of the English countryside. The botanical gardens in

The old city and cantonments during Colonial period

The establishment of the Municipality (1850s) and introduction of the GIP Railway line (1858) were important events that changed the city forever. The city crossed over the river Mutha with forests on the left bank across cleared for new development. Important educational Institutions (Deccan College, Fergusson College) with extensive grounds and open spaces were set up. The Colonial period also saw a

the East Cantonment (Empress

gardens) and Aundh set up in

the city.

this period introduced a lot of

exotic varieties of vegetation to

major reconstruction of the city's water system. For the first time in the city's history, in 1878 CE,

drinking water was tapped from the Mutha River by the creation of a dam and reservoir at Khadakwasala, twenty miles upstream to the southwest. The Mutha was also bunded downstream after the Sangam to provide water to the Cantonment areas. A new bridge and garden were constructed (Bund Garden) for recreation.

A 400 acre parkland was created on the area between the Chatushringi hill and Khadki, to house the residence of the Governor of Bombay (today, the University campus). Ornamental terrace gardens surrounded the building, while the rest of the area was developed along the lines of the 19th century English landscape gardens, complete with undulating land, small streams and deciduous trees (Patangi), specially planted to create the effect of change of seasons like in England. The extensive grounds were maintained with water from the Pashan Lake created a few miles away to the northwest of this area. It was fed by the Ram nadi that originated in the western hills.

Main building of University

RURAL BECOMES URBAN

The later years of the British rule and the period post Independence saw rapid urbanization and industrialization that lead to a loss of hinterlands and a change in the ecological character of the city and its surroundings. It was during this period that Pune truly became a city straddling both banks of the river. Empty and barren areas on the left bank across the Lakdi Pul up to the Chatushringi hills was brought under development. This area was less dense compared to the old city and included a number of large educational campuses. New roads were built and new *peths* also came up to the southeast where there were once fields and farmlands. The Pune Municipal Corporation established in 1950 extended the city limits to almost thrice its size to include a number of villages along the fringes.

The city developed in a planned way after the Town planning Act (1915) came into force. The villages of Erandwane and Bhamburda on the Mutha left bank were brought within city limits. Residential colonies were developed in the stretch of land up to Ganesh Khind that was formerly empty and barren. The hillocks of Parvati, Vetal tekdi and Hanuman tekdi that earlier were the boundaries of development now came within the urban fold. The open spaces and gardens within the existing peths gave way to new development. The Parvati lake that had deteriorated was filled up and turned into a garden (Saras Baug). One part was set aside as an open playing ground (Sanas Maidan) and one as a small zoo (Peshwe Park) in the memory of the Peshwa's menagerie. The pleasure garden and mansion at Hirabag turned into the town hall.

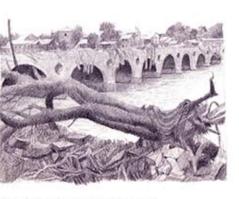
Large scale migration due to partition (1947) led to extension of the city towards north across the Pavana river (Pimpri) New industrial areas set up there and also within the existing city (Erandavne, Khadki, Hadapsar, Yerawada) The 1950s and 60s also saw the creation of large campuses on and near the western hills (NDA, NCL). The University of Pune was set up at the erstwhile Governor's residence (1949). These large campuses with their rich vegetation added to the character of the urban landscape and gave the city its name - Oxford of the East.

The Pune Municipal Corporation came in to being in 1950 by amalgamation of the suburbs (limits expanded from 44 sq.km to 139 sq.km), but the two Cantonment areas retained their separate identity. New neighbourhoods that developed at Deccan Gymkhana, Koregaon Park and Bund garden followed the grid pattern of Cantonment as against the organic layouts of the old peths.

A major event that left its mark on the city was the Panshet flood of 1961. Incessant rains caused the otherwise dry Mutha to flood, leading to bursting of Panshet dam built upstream of Khadakwasla. The Mutha rose, inundating both the banks and causing great damage to life and property. The river that had been an important part of the socio cultural life of the city, supporting recreation, religious as well as cultural activities, now became the cause of much disruption and change. The old city along the banks of the Mutha crumbled. Colonies were set up to the south (Navi Peth, Sahakar Nagar) and left bank (Kothrud) to rehabilitate those affected by this disaster. After this devastating event, the city broke its compact form and spread rapidly outwards, forever

changing its relationship with the Mutha.

The establishment of industries and extension of the city towards Pimpri, included in its fabric the sleepy villages on the banks of the Pawana. The area earlier known as a pilgrimage place (Moraya Gosavi temple Chinchwad) became the Auto capital of the country (1970s and 80s). The surge in the use of vehicles that followed changed forever the 'City of bicycles known for its guiet lanes and tree lined roads in to a city of vehicles and flyovers. Industries also came up in various areas of the city that then started filling up with unplanned development causing much deterioration of the natural ecological character.



by Panshet floods in 1961

Saras Baug with Parvati Hill in the background

DEVELOPMENT VERSUS ECOLOGY

The city expanded radially, engulfing the hinterlands within its folds. The quiet 'pensioner's paradise' that enjoyed pleasant climate all the year round became an educational hub - the 'Oxford of the East' and later a bustling industrial and manufacturing hub as well as home to the rapidly expanding IT industry. Rapid and ecologically insensitive development led to a deterioration of natural heritage. Change became visible within the city limits, tree lined avenues making way for flyovers, and low rise low density green suburbs transforming into high density neighbourhoods. The Cantonments, however, retained their greenery amidst the dense concrete jungle all around. The city turned its back towards its rivers that were polluted due to domestic and industrial waste. The hills and lakes that were once away from the city were engulfed by development. Though nature in the city has degraded over the years, a number of movements initiated by the citizens and NGOs have brought about a change in perspective, creating awareness about preservation of natural heritage.

The expansion of Pune took a new leap towards the west and the northeast, post the construction of the NH4 Mumbai Bangalore highway (1998) rise in importance of the Lohagaon airport post 2005 (first established as an airfield in 1939) The city expanded radially along all the main roads (leading towards Mumbai, Kolhapur, Solapur and Ahmednagar) eating up the farmlands along the fringes. The hills became vulnerable to encroachment due to the growing pressure of development.

Channelization of the river within the city limits altered the river's natural flow virtually separating the city and the river in all respects. Construction activity and dumping of garbage and sewage resulted in higher pollution levels and a drastic dip in riparian biodiversity.

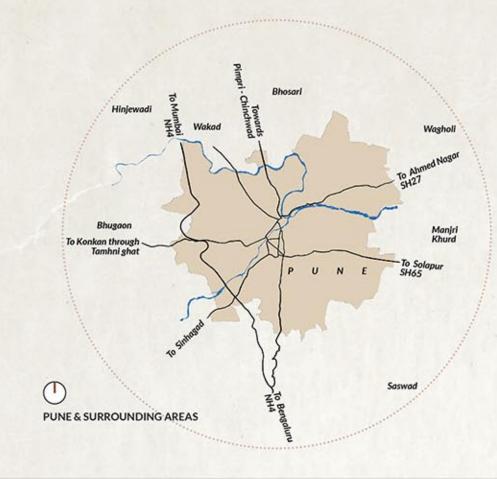
The streams that were important parts of the river system and functioned as wildlife corridors were either blocked, degraded, built over or channelised, disturbing the natural hydrological pattern. This disrupted the natural movement of small animals, reptiles, amphibians and burrowing animals.

and quality of its urban living.



river within city limits

The citizens environmental activism has played an important role in making sustainable efforts towards conservation of natural resources. The City Development Plan 2041 proposed by the Pune Municipal Corporation includes a number of initiatives that work towards this objective. Restoration and development of the natural water system including development of green buffers along river edges, watershed development, afforestation on hilly areas and linking of Urban Green corridors are to be undertaken to enhance both biodiversity parks and micro climate. Many proposed biodiversity Parks are to function as mini-ecosystems and native biodiversity reserves, the largest one being at Baner-Pashan. The city is trying to re establish its relationship with nature in a positive way. The region around is also changing rapidly, offering new nuclei of development. Pune city and region is moving towards a new phase of development where nature is being looked at as a valuable asset, defining the character



PARKS/OPEN SPACES

P2-Golf Course

OTHER GREENS

CANTONMENT AREA

- L.F.L. (River Low Flood line)

- H.F.L. (River High Flood line)

Heritage and Rare Trees

Ecological Hotspots

S.T.P (Sewage Treatment Plant)

Proposed B.D.P. (Biodiversity park)

GEOLOGICAL FEATURES

Bird corridor

C Birding spots

a Ropi Lava

Natural Cavity

C Stone Quarry

Onion Weathering

Rocks and Potholes

Mid Channel Bar

Mid Stream Island

TRANSPORT NODES

Pass (khind)

Amphitheatre

AGRICULTURAL LAND

tree cover

P1-Okayama Friendship Garden

P3-Rajiv Gandhi Zoological Park

Natural edges of rivers/lakes which have

P4-Hadapsar Gliding Centre

A HILLS

Mixed deciduous forest

Land under afforestation Scrubland

Changes due to human intervention H1-Mhatoba Hill

H2-F.C (Hanuman) Hill H3-Chaturshrungi Hill H4-Bavdhan Hill

H5-Parvati Hill H6-Yerawadeshwar Hill H7-Warie Hill H8-Kondhwa Hill

H9-Wanowrie Hill 1 H10-Wanowrie Hill 2 H11-University Hill

 River with natural edge River with walled channel

WATER BODIES

Streams (naala/odha) Quarry pond/lake/Reservoir L1-Warje Quarry pond

L2-University Quarry pond

L3-Vishrantwadi lake

Irrigation canal

INSTITUTIONAL GREENS I-1-College of Engineering, Pune

1-2-I.L.S. Law College, Symbiosis College of Arts and Commerce, Agharkar Institute, B.M.C.C. and M.M.C.C. 1-3-Mahatma Phule Krishi Vidyapeeth

I-4-B.J. Medical College 1-5-A.I.S.S.M.S I-6-Pune Municipal Corporation 1-7-Vaikuntha Shashanbhoomi

I-8-Hadapsar Cemetery I-9-Khadki War Cemetery

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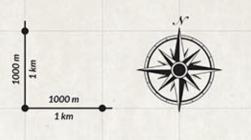
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MAPPING NATURE

HILLS

A number of hills and hillocks that are eastern off shoots of the Western Ghats are located in and around Pune. The region supports a mixed deciduous forest dominated by Tectona grandis (teak) trees. However, only a few remnants of this forest exist in the city today, one notable stretch being the N.D.A hill.



Tectona grandis trees forest on N.D.A. Hill

Due to long periods of deforestation and stresses caused by anthropogenic activities such as fire, grazing and lopping, the vegetation on most hills has reduced to open grassland and scrub land. In many places, hills have been cut into by roads or slopes have been blanketed by slums and other construction. Many of these hills come under the jurisdiction of the Forest Department and are partially protected and afforested. As a result, many hills that were open lands dominated by grasses now have a tree cover. However, this planting is mostly a monoculture of non-native species like Gliricidia sepium (undirmari), Leucaena leucocephala (subabhul), etc. Although it helps modify microclimate, the tree cover does not support biodiversity and is also a deterrent to undergrowth vegetation. As a result, the planting cannot evolve into an indigenous, mixed deciduous forest type. Furthermore, these exotic species are invasive and a threat



Scrub land

VETAL HILL COMPLEX

The Vetal hill top is the highest point in the city. Although a large part of the hill complex supports a monoculture, different portions of the hill complex support a variety of native vegetation. Two native tree species, Acacia chundra (laal khair) and Boswellia serrata (salai) are dominant on the slopes near MIT college. These slopes also support diverse, seasonal herbaceous vegetation like Heteropogon contortus (black speargrass), Chrysopogon fulvus (dongari gavat), Themeda quadrivalvis (kusali), etc. The slopes near Patrakarnagar and Pashan road have a higher density of the non-native varieties like Dalbergia melanoxylon (patangi), Gliricidia sepium (undirmari) and Leucaena leucocephala (subabhul) with weeds like Lantana camara (ghaneri). The complex is a popular roosting and nesting site for birds like Rock Eagle Owl, Spotted Owlet, Oriental Honey Buzzard, Marsh Harrier, etc. A redundant stone quarry, supports a wetland habitat almost throughout the year.

PARVATI PACHGAON HILL COMPLEX Declared as a Reserved Forest, this hill complex supports a mixture of native vegetation and monoculture. Cochlospermum religiosum (sonsavar), a rare and beautiful flowering tree, is spotted here as are endemic birds like Shaheen Falcon, Rock Bush Quail and Nilgiri Wood Pigeon (on Taljai hill). Parvati hill boasts of a Plumeria (chaffa) and a Ficus religiosa (peepal), both of which are believed to be three centuries old.



GREEN SPACES -

camara (ghaneri).

SAVITRIBAI PHULE PUNE

INSTITUTIONAL GREENS

Man-made landscapes such as institutions,

parks and cantonment areas collectively

sequestrate carbon and reduce heat

island effect for the city. They also

sustain a variety of small living beings

landscape character is defined by the

vast number of institutional campuses

present in the city that have a mature

Azadirachta indica (neem) are common:

often interspersed with garden exotics

like Polyalthia longifolia (ashok), Delonix

regia (gulmohar) etc. A considerable land

is left untended which, in places, has been

covered by invasive species like Parthenium

hysterophorus (congress grass) and Lantana

UNIVERSITY (S.P.P.U.) This campus has

exotic Dalbergia melanoxylon (patangi) but

it also hosts a variety of rare and heritage

for many communal birds. Post monsoon,

the pond in the abandoned stone quarry

behind the main building is animated with

billed Ducks, Dabbling Ducks and Common

a variety of fauna such as dragonflies,

Moorhens. Aquatic plant species like

present in abundance

Hydrilla, Typha, Spirorgyra, etc, are also

aquatic beetles, soft-shell turtles, Spot-

native trees and is a favourite roosting site

large areas under the dominance of the

tree cover. Ficus benghalensis (banyan) and

and support various food chains. Pune's

Pond in stone quarry on Vetal Hill

KHANDOBA HILL is home to an old and majestic Ficus benghalensis (banyan) tree. Ficus trees are particularly important for biodiversity owing to the number of species they support and are known as 'one tree ecosystems.'

The increasing awareness about the importance of planting native flora has significantly influenced some of Pune's recent plantation and restoration projects.



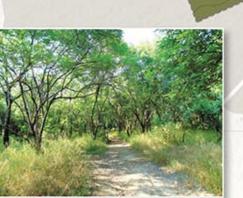
Parvati Hil

species that include a wide range of flowering varieties like Lavendula, Spermacoce, Pentanema indicum, Cynotis, Indigofera cordifolia, Rostellularia, etc. Community driven plantation of native trees like Bauhinia racemosa (apta), Dalbergia sisoo (shisam), Cassia fistula (bahava), Gmelina arborea (shivan), Semecarpus anacardium (bibba) and varieties of Ficus along with water management initiatives have helped revive this hill that was once reduced to a scrubland. Baner hill is now part of a proposed Biodiversity Park and is a prime example of citizen driven conservation of hills. Another example is Smritivan, where people plant and adopt trees in the memory of their loved ones. Since its inception in 1987, a variety of tree species from the mixed deciduous forest type have been planted here.

BANER HILL is home to herbaceous

CHANDANI CHOWK

The junction lies at the intersection of N.D.A. hill and Vetal hill complex. This was once a single, continuous hill range and an important ecological corridor. The four lane highway that cut through its neck created two separate hills and obstructed the movement of foraging animals and reptiles between them. Before it was isolated, hyenas, jackals and fourhorned antelopes were often spotted on Vetal hill, Passes such as Dukkar khind, Balbharati khind or the one at Sus road are similar examples of snipping of ecological corridors that have left behind isolated hillocks.



RIVERS AND STREAMS Pune lies in the watershed of the Mula and Mutha rivers and as they pass through the city, their network of natural streams and rivulets form a dendritic drainage pattern, owing to the bowl shaped topography of the land. These rivers, along with streams like Ram nadi, Ambil odha, Nagzari and Bhairoba naala function as wind corridors and linear open spaces within the dense urban sprawl. Their riparian edges, soil conditions and related flora and fauna are Khadakw an important ecological entity.

These banks have supported an ecologically rich riparian zone in the past, however only some stretches of the rivers still have their natural edge intact and are good habitats (Mula river in the Khadki Cantonment, the Mula-Mutha confluence, the mid-stream island Naik bet and the area extending eastward thereafter). However, Prosopis juliflora and other invasive species are fairly common here. One important tree species of riparian zone, Salix tetrasperma (walunj), is seen near Garware College. Also spotted on the Mutha edge are Marsh Harrier, a winter migratory bird and the top predator in a wetland ecosystem, and the Black Crowned Night

Stream with natural edge

sewage water.

LAKES

Stilt, Pond Heron, Wagtails and Cormorants

are common here as they feed on worms,

insects and certain fish that flourish in

Majority of Pune's lakes are man-made

reservoirs across streams or are the hollows

of abandoned stone quarries. Though few

in number, they are an important natural



Dalbergia melanoxylon trees forest in SPPU

PUBLIC PARKS, OPEN SPACES Oriented towards human recreation, most parks often have showy exotic plant species and lawn carpets, thinning out the

EMPRESS BOTANICAL GARDEN



Empress Botanical Garden

OSHO NAALA PARK

Once a wasteland and a polluted stream, this park was developed as a result of a pioneering stream revival project undertaken in 1985. The water quality was improved by implementing biological filtration methods that included blocking solid and floating waste from entering the water, altering the flow of the stream to enable oxygenation and introducing plant and fish species that help in water purification. Soil, boulders and debris was brought in to mould the land surrounding the stream. Today, this park has a mature tree cover and a healthy undergrowth and is a habitat for various birds, insects reptiles and small mammals.



etc.) form green grids within the city as each individual house is enclosed by greenery on the margins. Tall trees, thickshrubbery, crevices in plaster and every other nook and cranny help sustain ants, spiders, geckos, bees, termites and many other players of urban ecology. The micesnake-mongoose food-chain exists here. Some neighbourhoods also function as bird corridors. The large and handsome Samanea saman (Rain tree), originally from Central America, is a common avenue tree found in several neighbourhoods in Pune. Its dome-shaped canopy has proved essential in providing a temporary relief from the scorching sun during the summer

CANTONMENT AREA AND

BUNGLOW NEIGHBOURHOODS

Thinly populated and thickly vegetated,

protected ecological reserves for many

neighbourhoods (Koregaon Park, Prabhat

road, Sahakarnagar, Sadhu Vasvani Nagar,

birds and animals. Similarly, bungalow

the cantonment areas are the green

lungs of the city and function as



Pune Airport





religiosum (Sonsavar,

is common on Taljai hil

(Walunj) found on Mutha's edge between Vitthalwadi and Deccan

Holoptelia integrifolia

sized, native tree

(Waval) fruit. It is a large

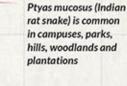


(Asian common toad

Notopterum notopteru (Chalat) fish is found









commonly seen reptile Lissemys punctată

(Indian flap-shell turtle) is

seen in all water bodies-

lakes, wetlands, streams

and rivers



(Red pierrot)





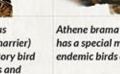
(Tailed jay)



Painted stork is spotted



Circus aeruginosus



(Eurasian marsh harrier) is a winter migratory bird of wetlands, lakes and

Cynopterus brachyotis (Short Nosed Fruit Bat) is seen in the city

parks and campuses







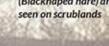
Once an abandoned stone quarry, it is now a relatively good wetland ecosystem due to active conservation efforts by local residents.





Pashan Lake









Spread over 39 acres, this botanical garden

with its dense tree canopy and collection of old and rare species of flora is a good example of a man-made urban foresta Diverse birds, butterflies and insects are spotted here along with towering Albizia procera (kinhai) trees, one of which is considered to be the tallest (100 ft.) in the city. It also hosts the majestic, century-old Bauhinia vahlii (kanchanvel) liana and the Derris trifoliate (karanjvel) climber.

MES Abasaheb

Garware College









Institute of Bank













Built as a reservoir on Ram nadi, it was once a famous abode of native flora and fauna. However, pollution through the source stream and other inlets has led to large scale eutrophication and slow deterioration over the years. Construction on sensitive water edges for lake beautification projects has destroyed many natural habitats and

Channelization of Ambil odha

PASHAN LAKE

The channelised and constructed stretches element as they regulate microclimate,

environmentally degraded. Birds like Egret, to the city's biodiversity.

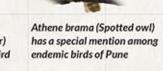
of these rivers and streams are polluted and support a wetland ecosystem and contribute

sighting spot for both local and migratory birds like the Pheasant-tailed Jacana, Bronzewinged Jacana, Common Coot, Spot-billed Duck, Northern Shoveller, Common Pochard,









(squirrel) is the most commone mammal in

(Blacknaped hare) are

