MMR BIODIVERSITY PROJECT –

FINAL REPORT

A Project by Yuhina EcoMedia

Sponsored by MMR-EIS

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Final Stage Report:

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Avifauna and Mammal Special section - Inventory Notes & Observations

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Biodiversity in the Urban Context

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The MMR Biodiversity Project

The growth of human population, intensification of resource availability and development of infrastructure has concentrated high densities of humans in relatively small spatial spreads to form urban zones. Urban spaces are growing across the world over the last two centuries creating new land use types, dominated by intensive human activities and densely packed human populations. However, neither are urban spaces simplified homogenous spaces characterised by intensive anthropogenic influence alone and nor is the process of urbanisation a uni-dimensional process.

Urbanisation is often cited as a major reason for loss of native biodiversity and its replacement with nonnative vegetation across the world (McKinney, 2002; Sanderson et al., 2002). While urbanization does have an intense effect on native biodiversity and dramatic transformation of biophysical processes, there is also a growing recognition that urban areas are heterogeneous with variations and transitions in the synthesis of social, political, economic, biophysical processes at different scales (Cadenasso, Pickett, & Schwarz, 2007).

This has helped reconfigure the idea of urban areas as a patchwork of diverse ecosystems shaped by socio-political factors and with different ecological potential that support biodiversity (Rosenzweig, 2003; Western, 2001). This recognition of heterogeneity, along with the growing concerns over environmental change, has resulted in a spurt of research activity since the early 1990s on the ecological dynamics of urban spaces, reflected in a diversity of methodological rigour, empirical research and theoretical developments to conceptualise urban ecology (Pickett et al., 2008).

Urban ecosystems are serving as key sites where scholars across disciplines are finding a common ground to explicitly integrate the dynamics of social-ecological and political processes (Francis, Lorimer, & Raco, 2011). These approaches are breaking new ground in understanding the dynamics of the urbanization process and also of ecological change. It does not provide a justification for wanton habitat destruction but it provides a pragmatic framework to reconcile together different interests and lines of thought to explore possibilities of ecologically sensitive planning of urban development and renewal. It is in this context, that this report is framed by integrating humans and natural systems at a fine scale to document correlations between socio-political land use change and their biophysical impacts in the Mumbai Metropolitan Region (MMR).

The Mumbai Metropolitan Region:

The Mumbai Metropolitan Region (MMR) serves as the focus for this study and report. It covers 4,355 square kilometers, including the city of Greater Mumbai, 08 Municipal Corporations and 09 Municipal Councils, with an estimated population of 17.81m people (MMRDA, 2010). The Mumbai Metropolitan Region Development Authority serves as the apex body to regulate and coordinate the activities of all these organisations, and also for planning and administering the island city and its environs.

The growth of urban spaces comes at the cost of natural habitats and rural landscapes (Sanderson et al., 2002) but it also provides new opportunities and ecological niches (Rosenzweig, 2003). Careful planning is required to balance these tradeoffs between different interests and agents of change. This **tension** is inherent in the MMRDA's approach and articulated in various reports and documents on the need to plan infrastructural development

as well as manage the spatial spread of urban growth in the MMR, while also balancing its ecological integrity (see for instance the MMRDA Regional Plans).

This report serves as a building block to this vision for the MMR, by documenting different factors of the region's key biological diversity, while also providing a commentary on how they respond to changes. For instance, certain species continue to thrive in the current land use patterns in the MMR by exploiting niches, while other more specialised species have retreated in response to the same processes of change. In this report we seek to document these changes through an inventorised distribution of different aspects of the biodiversity of the MMR to get an insight into the dynamic inter-linkages of ecological and social change.

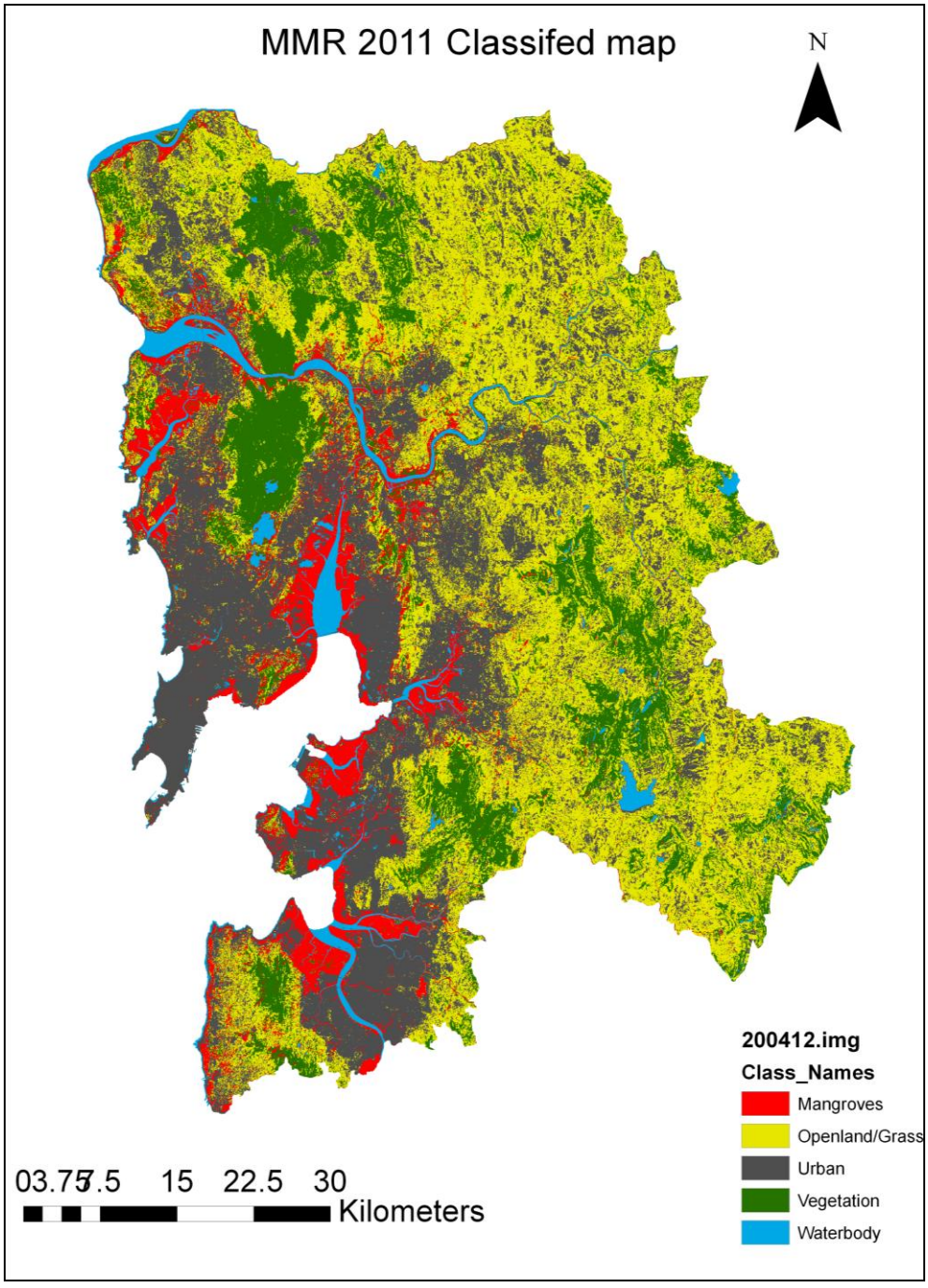
In this report, we first provide an inventory of the spatial distribution of different taxonomic groups across the MMR, which have been collated through a variety of methods (See methodology section). We then use key indicators species as case studies to conceptually link land use change and ecological impact. However, we have only used birds as key indicator species for several reasons:
1) they are relatively easier to spot as compared to reptiles, mammals and insects,
2) they are mobile and physical obstacles of any sort do not serve as barriers, and
3) despite their mobility they are sensitive to specific ecological changes in their habitats, which vary across specific species.

Thus, the key indicator species have been specifically chosen to represent ecological generalists and specialists, to provide a more nuanced understanding into the ecology of land use. The insights gained from these key species provide a commentary on the ecological and social dimensions of the political economic changes that shape land use in the MMR. It thus requires a mix of political and ecological planning to manage the change taking place and the tradeoffs being negotiated in the MMR between different interests.

The MMR Landscape:

The MMR is located at a crossroad of two major biogeographical zones and includes a complex matrix of habitats and ecosystems. This includes the Western Ghats and the Malabar coastal zones and comprise of forests, including mangroves, open grass and scrub, fresh

water and riparian ecosystems and a diversity of human dominated spaces ranging from rural agro-pastoral landscapes to core urban built-up zones. The MMR thus comprises of a spectrum of habitats from intensely human-dominated spaces at one end and tracts of native ecosystems at the other, linked together in a dynamic matrix of heterogenic complexity.



MMR Habitat Distribution

Habitat classification scheme:

As mentioned earlier, this report is based on a non-dualistic epistemology of nature and society. Thus, different land use patterns are regarded as habitats with differing ecological potential ranging from the human-dominated simplified urban ecosystems to intact stands of old growth forest landscapes with their rich biodiversity (Rosenzweig, 2003; Western, 2001). Thus, biogeographical, historical, socio-cultural, political and economic factors provide additional layers of meaning to the physical landscapes, and their ecology, of the MMR.
This report uses this habitat classification scheme adapted from the one adopted by the World Conservation Union (IUCN, 2012; Salafsky et al., 2008), and correlated with the classification scheme used in the MMRDA Regional Plan of 2011.

This habitat scheme provides a conceptual model to integrate different ecological processes and dynamics into this analysis. However, it is important to add that each of these habitats include internal variations and micro-habitats that are important for different species. For instance, there are various types of forests and an assortment of coastal ecosystems. Similarly, as observed with several taxonomic groups, the peripheral areas where two habitats intersect are areas with a rich diversity of species specific to each habitat and also generalists. The classification has been narrowed to a broad conceptual scheme for this analysis and is defined as:

- Forest
- Grass and Scrub
- Agriculture and Plantations
- Coastal Wetlands (Creeks, Estuaries, Mangroves)
- Freshwater Wetlands (Lakes, ponds, rivers)
- Urban Parks/Gardens/Avenues

The MMR landscape is marked by heterogeneity of habitats and altitudinal variations from sea-level to 803 msl at Panorama point in the northern fringes of the Matheran range.
A series of low hill ranges dot the MMR landscape, and most of these run north-south parallel to the coast and the Western Ghats, whose western limits form the eastern limits of the MMR. The major hill ranges in the MMR include Matheran range that extends nearly 25 kms from near Karjat north toward Badlapur, the Khargarh hills cover a similar area from

Belapur in the south to Mumbra in the north, the Alibaug Hills, Chirner – Karnala hills, the hills along the west coast from SGNP north to Tungareshwar and Kaman ranges. Besides, there are a series of isolated, lower hills, the most notable in Greater Mumbai being the isolated massif of Trombay that rises to nearly 300 mt asl, adjacent to Thane Creek. Another isolated hill system are the forested twin hills on Elephant Island that rise to 150 mt asl.

These hills and hill ranges across the MMR are separated by low lying plains or the lowlands that are primarily alluvial in nature and contain numerous densely populated urban sprawls. The lowlands are also marked by several small rivers, pockets of grass and scrub landscapes and numerous estuaries and mangrove creeks and are dotted with many freshwater bodies, which include natural ponds and lakes as well as artificial reservoirs.

As part of the inventorisation that forms the central purpose of this project, a review of different habitat types was also carried out. This analysis focused on habitat quality, assessed the extent of healthy habitat and species diversity across the different taxonomic groups that were explored during the project field-work. These have been presented in the different sub-sections, with a discussion on its implications for that specific grouping. The Habitat Break-up and Biodiversity for the MMR is presented in detail in **Annexure 1 (**below**).**

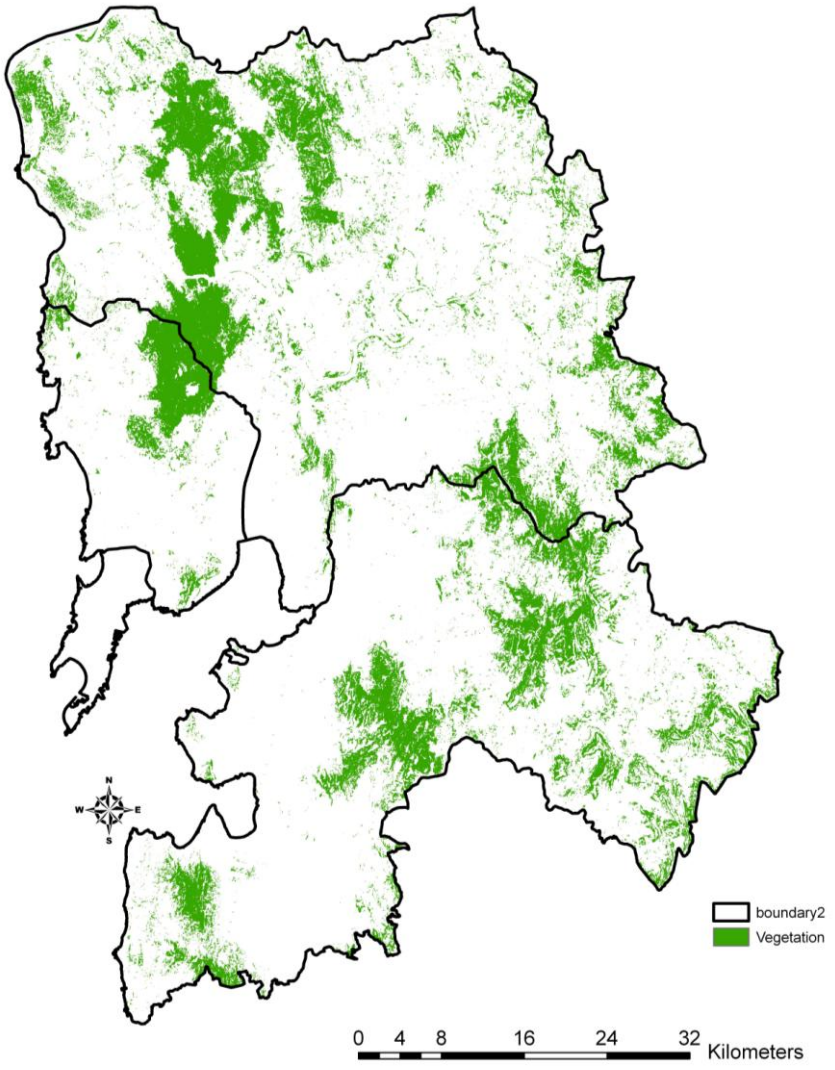
Annexure I

Habitat Type	Flora	Avi-fauna	Mammals	Reptiles	Amphi-bians	Fish - FW	Marine Fauna	Butterflies
Forests	1040	169	52	52	12	0	0	135
Grass - Scrub - Cultivation	614	176	40	40	4	0	0	90
Wetlands - Freshwater	90	115	7	4	11	88	0	NA
Wetlands - Coast & Creek	301	122	10	10	5	0	200	40
Urban Built-up Areas	761	84	18	16	4	0	0	100
Hilly (> 250 mt msl)	918	175	22	43	10	3	0	57

It must be added that in the context of these categories, though the areas of the hill ranges have been enumerated separately for biodiversity, these have not been treated as a separate habitat but a distinct ecological unit within different habitats. Since these hill ranges include a mix of habitat types, they are also discussed under different habitat categories including forests, grass and scrub covered slopes and plateaus, freshwater bodies and agriculture.

FORESTS:

The forest habitat across the MMR is dominated by the southern mixed-deciduous forest type, with a lesser extent of dry-deciduous, semi-evergreen and evergreen types of forest (Champion & Seth, 1968). The mangrove forests along the numerous creeks have been classified under wetlands because all of these grow along creeks and estuaries.



MMR Forest Vegetation map

A mix of forest types are seen from sea-level to the upper slopes of the hill ranges. Of all habitats in the MMR, the forests are one of the few that retain viable parts of their original spatial spread and ecological diversity. Certain segments of these forests scored the highest habitat quality ranking for any habitat in the MMR. The three Protected Areas in the MMR – Sanjay Gandhi National Park (SGNP), Tungareshwar Wildlife Sanctuary (TWLS) and Karnala Bird Sanctuary (KBS) are also predominantly forested sites, while the reasonably well forested Matheran range is the only site declared as an eco-sensitive zone.

There is also good forest cover on the twin hills on Elephanta Island while there are pockets of reserve forests that are excluded from the protected area framework but receive a level of protection under the state forest department. Together, the forest habitats encompass an area of 1,143 Sq km or 25.8% of the total area under the MMR, as outlined in MMRDA Regional Plan of 2011. However, the ground reality is markedly different as is the overall quality of much of theforest patches outside the protected areas that in fact account for barely 200 sq km of forest habitat in the MMR.

Quantitative data on the disturbance levels and composition and structure of the vegetation are some of the factors used to categorise habitat zones into various Grades as per certain gradation parameters used for Habitat Evaluation **(pgs ….)**. We found very few sites even in the best protected forest zones of the MMR qualify for the highest gradation, with only some pockets in the upper half of TWLS, SGNP and Karnala Bird Sanctuary harbouring the least disturbed pockets of wilderness. A site that appears to contain good quality forest growth is the Trombay Hill but because of mandatory requirements this site could not be explored.

The forest habitat, along with the wetland and the grass and scrub habitats, are home to a vast majority of the species diversity of all major faunal and floral taxonomic categories that were explored in the MMR. The overall forest habitat biodiversity comprises of nearly 1,100 species of flowering plants, 52 species of mammals, 169 of birds, 64 of herpetofauna (52 reptiles and at least 12 amphibians) and about 115 of butterflies.

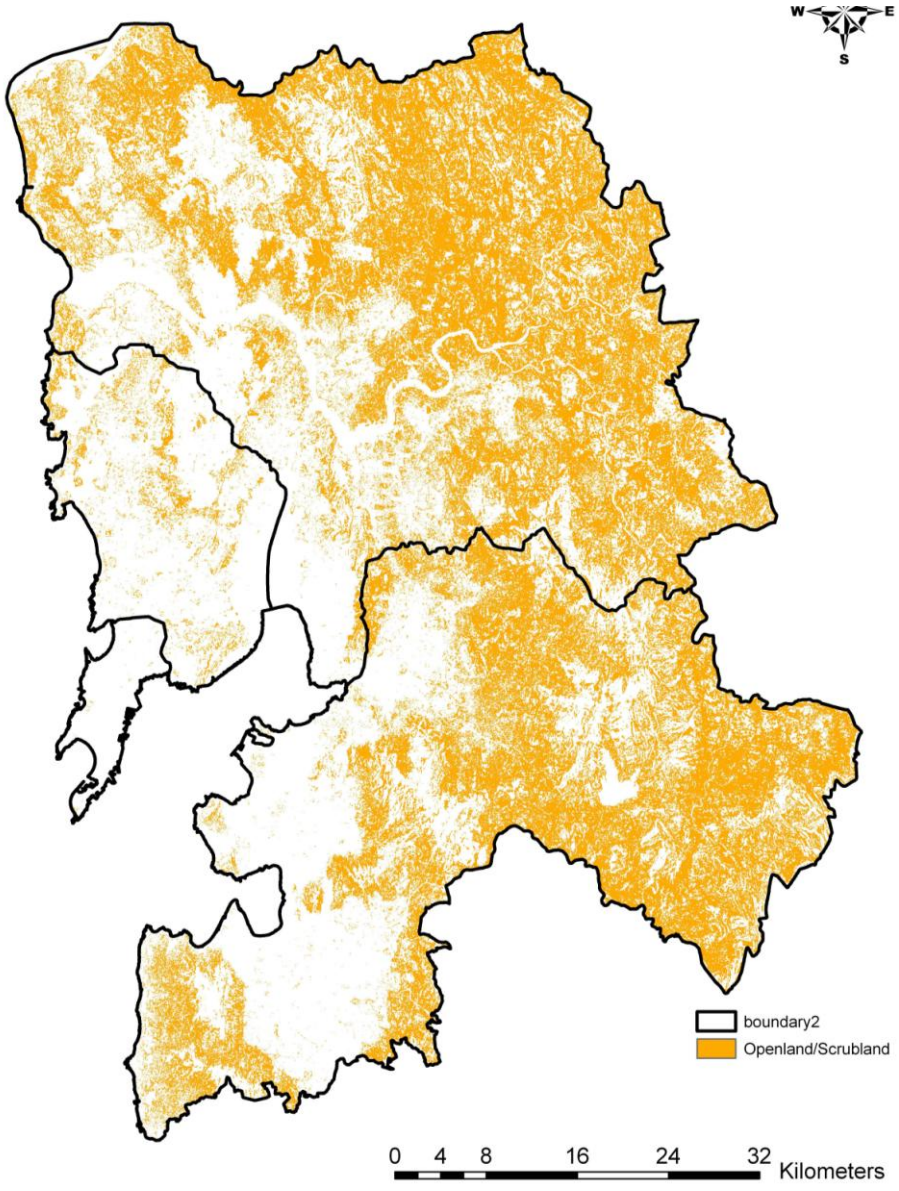
All biodiversity figures in Databse for habitats are Mimimum Estimates, based on findings during field visits, extrapolation of sample data and literature review.

MMR Forest Sites Database

SITE NAME	Location	Total Area	Forest/Habitat Qlty Index (1 - 5)	Altitude Range	Est Flora species	Est Bird species	Est Mammal species	Est Reptile species	Est Amph Species	Est B'Fly Species
Tungareshwar WLS	Zone 2. Thane Dist	85 sq km	SMxDcd, SEvG. Lower - 1-2. Upper: 3-4	30 - 670 mt	600	150	25	30	08-Jan	75
Sanjay Gandhi Nat Park	Zone 1	104 sq km	SMxDcd, SEG. Scrub & Exotics. Core - 3 - 4. Periphery - 1 - 2.	00 - 486 mt	800 - 900	290	42	52	11	125
Kaman-Mandvi Range	Zone 2. Thane Dist		SMxDcd, 1, 2	30 - 545 mt	300	90+	14	15	NE	38
B/w Ulhas - Tansa - East	Zone 2. Thane Dist	NE	SMxDcd.		300	160	15	22	NE	46
Matheran Range	Zone 2 & 3. Thane & Raigad Dist	> 200 sq km	EG & SG - UPPER. MxdDcd & Scrub - Lower slopes. 1 - 4	70 - 803 mt	700	130	27	36	12	62
Khopoli-Khalapur	Zone 3	NE	SMxDcd. 1 - 2		300	95	14	18	7	45
Karnala - Chirner	Zone 3, Raigad District	50 sq km	SMxDcd. 2 - 3	40 - 469 mt	450	150	22	20	9	75
Kankeshwar - North Alibaug	Zone 3, Raigad District	NE	SMxDcd, SeVG. 2-3		500+	200	15	27	7	68
Alibaug region		NE	SMxDcd, 2, 3		700	290	18	30	9	80
Navi Mumbai (Parsik - Khargarh)	Zone 3	NE	SMxDcd. 1 - 3	10 - 375 mt	400	100	15	20	6	52
Elephanta Island	Zone 3		SMxDcd 2-3	00 - ????	????	50	10	15+	NE	18+

GRASS AND SCRUB

Grass and scrub habitats are typically open landscapes with grassland and scrubland ecology. When clubbed with agriculture and plantations, it was one of the most widespread habitats in the MMR till recently. According to the MMRDA regional plan of 2011, these habitats were spread over 2,707 sq km or 64% of the land area under MMR. However, despite the widespread extent, these habitats have in just the past decade, come under the most severe



Grass and scrub Habitat across MMR

development and infrastructure pressures and are rapidly vanishing from the MMR, consistent with a national pattern. Superficial observation, sample surveys and oral histories

suggest that a large part of these habitats have already been transformed for urban developmental activities. The remaining habitats have been degraded with the spread of invasive flora and its impacts on this unique ecosystem.

Since forests personify the 'green' popularly associated with nature, and wetlands closely associated with life-giving water (even if they are polluted), they are both accorded some degree of protection. The open grass and scrub lands, however, have been popularly regarded as wastelands, and their biodiversity features poorly understood and appreciated. Indeed, during the course of the project fieldwork, the team members came across several instances that illustrated the lack of value attached to these habitats across different social strata.

It is hardly surprising then that this remains the most seriously affected habitat type across the MMR, with an estimated 80% of its original extent having been lost or severely degraded. The remaining grass and scrub habitat are peppered in small pockets in the plains, with some surviving patches on slopes and plateaus of the hill ranges where , in fact, the best remaining such habitat have survived so far, having escaped the havoc that similar habitats in the plains have suffered. With the loss of this habitat, the biological diversity associated with it has also been seriously affected, and which is discussed under appropriate faunal and floral chapters.

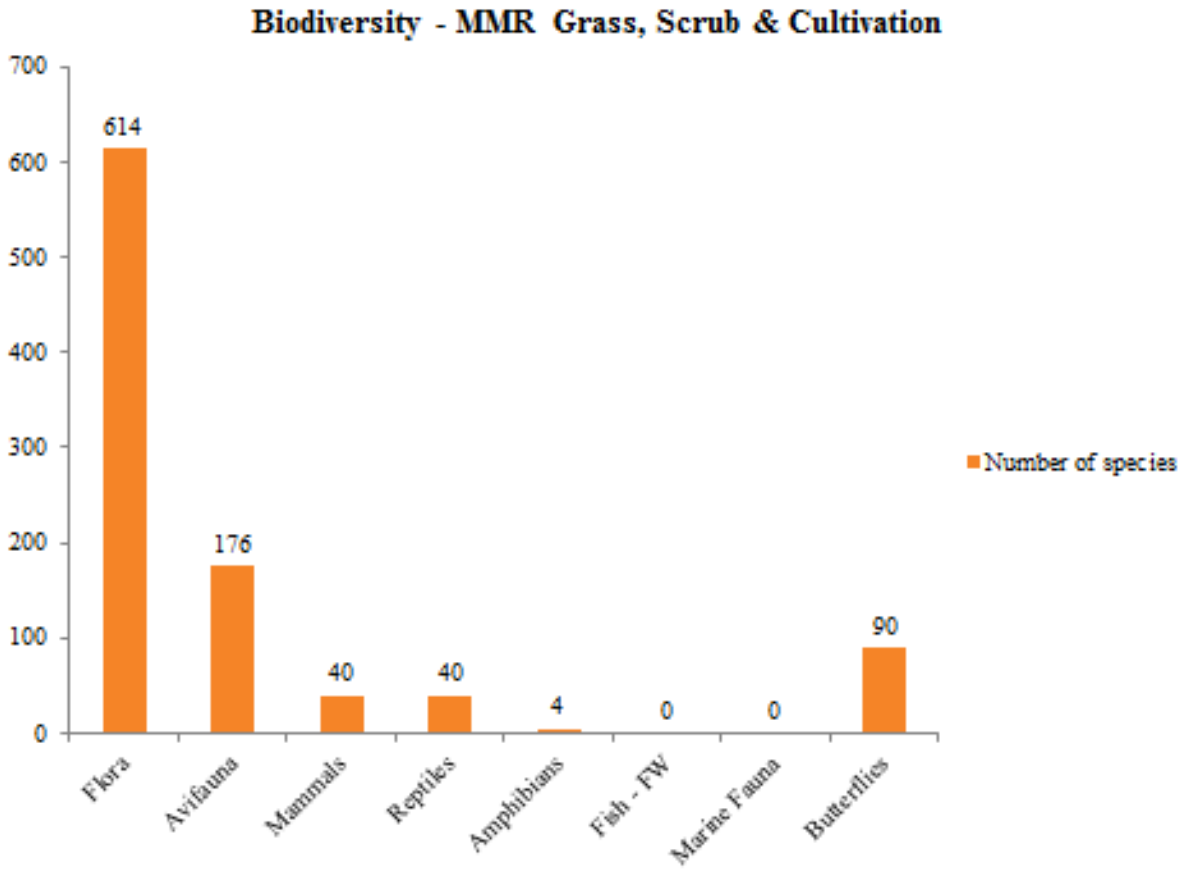
AGRICULTURE AND PLANTATIONS

The lowlands in the MMR historically harboured extensive pockets of agricultural tracts, where local communities cultivated a range of crops, vegetables and fruits. This was a characteristic feature of the MMR when much of it was a rural landscape. Though agriculture and plantations are often clubbed together with grass and scrub habitat with which it shares many ecological parameters, it is a habitat specifically introduced and maintained by humans and consequently, some of the biodiversity has benefitted more than others. As mentioned earlier, the MMRDA regional plan clubs both these categories together despite their similarities and differences.

Like the grass and scrub habitat, agricultural and plantation habitats too have been in steady decline in the MMR in the face of developmental pressures. Plantations of trees are now undertaken as part of restoration work in degraded forest areas. The disappearing Grass –

Scrub and cultivation across the MMR has resulted in a steady and marked decline in many of the characteristic species of these habitats **(Table …..)**. Though none of the species across taxonomic groups are strictly restricted to agricultural habitats alone, several of them have benefitted from agricultural practices while using grass and scrub habitats.

The biodiversity for the MMR Grass/scrub and agriculture/plantations habitat complex comprise of at least 614 species of plants, 40 species of mammals, 176 bird species, 44 species of Herpetofauna (40 reptiles, 04 amphibians) and about 90 of butterflies.

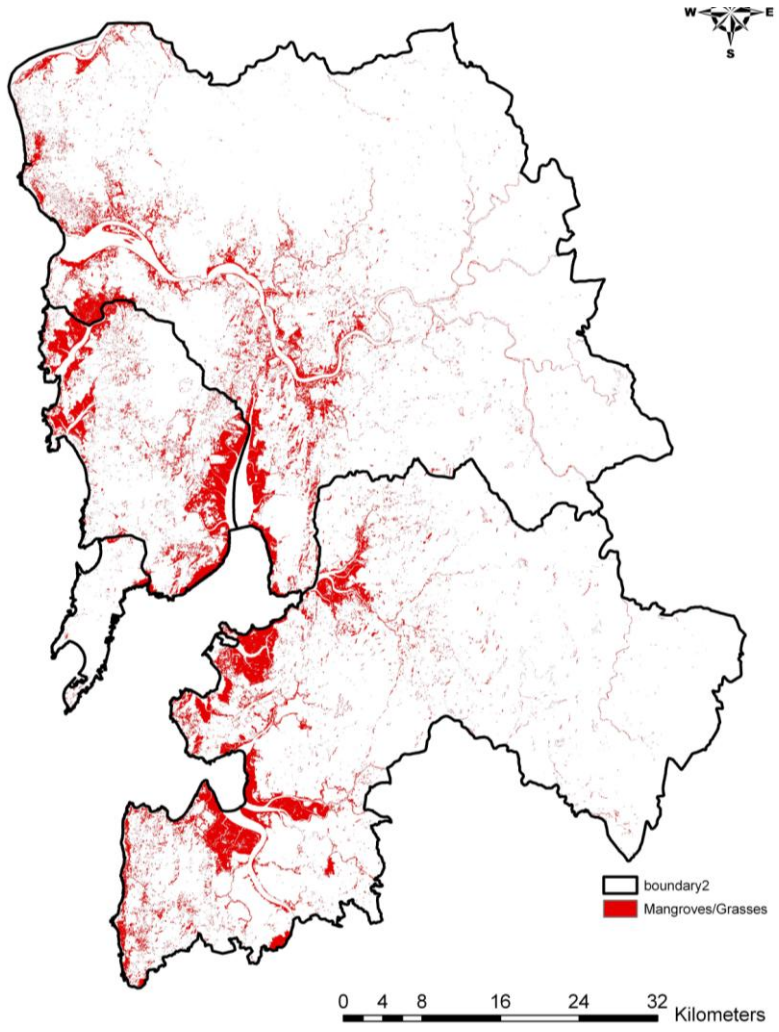


MMR GRASS-SCRUB & CULTIVATION HABITAT DATABASE

SITE NAME	Location	Area (Sq km/Acres)	Habitat Qlty Index	Altitude Range	Est Flora species	Est Bird species	Est Mammal species	Large Mammals	Est Reptile species	Est Amphbn species	Est B'fly species
Aarey		14 sq km (3000+ acres)	1,2	Lowlands	350	128	20	Y	40 - 45	8	80
AIR - Marve site		200 acres	2	Lowlands	120	85	10	Y	15	3	35
Marve - Madh		NE	1	Lowlands	175+	100	10	Y	15	3	45 - 50
Mira Rd - Virar		NE	1	Lowlands	200+	120	12	Y	15 - 18		NE
Gorai - Manori		NE	1,2	Lowlands	180+	125	10	Y	18-20	3	45 - 50
Kalina Campus		100 acres	1	Lowlands	NE	50	6+	N	6+	3	23
Thane Creek Edge/Godrej/Bhandup PS		2000 acres	2,3	Lowlands		180	20 - 25	Y	20 - 25	4	50 - 60
B/w Tung-Mandvi Ranges		NE	1,2		180+	90+	20	Y	20	4	NE
B/w Ulhas -Tansa Rivers		NE	1,2	Lowlands	NE	130	20 - 24	Y	24	6	NE
Ambernath - Barvi Area		NE	2	Lowlands	NE	125+	20 - 25	Y	20 - 25	7	NE
Matheran Range		NE	2	50 - 800 mt	150+	120+	30	Y	30	10+	50
Khopoli-Khalapur		NE	1,2	Lowlands	200+	100+	20 - 25	Y	20 - 25	9,10	NE
Alibaug area		NE	1,2	Lowlands	200+	130+	30	Y	30+	9	70+
Panvel - Chirner - Pen		NE	1	Lowlands	180+	100+	25 - 30	Y	25 - 30	8	NE
Khargarh - Mumbra Hills		2500+ acres	1,2	50 - 390 mt	200+	120	25+	Y	25 - 30	7	100

Large Mammal = Ungulates, Leopard, Jackal, Jungle Cat, Wild Boar, Primates, Mongooses

COASTAL WETLANDS



Coast & Mangrove areas of MMR

The MMR lies in a coastal area along the Arabian Sea and has a distinct habitat, classified under coastal wetlands. However, the coastal settings also permeate inland and influence several other habitats across the MMR. According to the MMRDA Developmental Plan of 2011, this habitat covers 358 sq km or about 8 % of the total area under the MMR. This includes a coastline in excess of 150 km length along the western perimeter of the MMR, from its southern-most limit south of Alibaug town to the mouth of the Tansa river in the north.

The coastline itself displays a mix of habitats and micro-habitats, ranging from a combination of sandy and rocky beaches, mangrove forests, built-up areas and islands**.** The coastal wetlands habitat has received mixed attention. Most of the coast has been intensively used and transformed by developmental activities, while the seas itself has been polluted by the effluents and garbage. Despite these pressures, some of the biodiversity of this habitat continues to survive, though much of it has declined, some quite significantly.

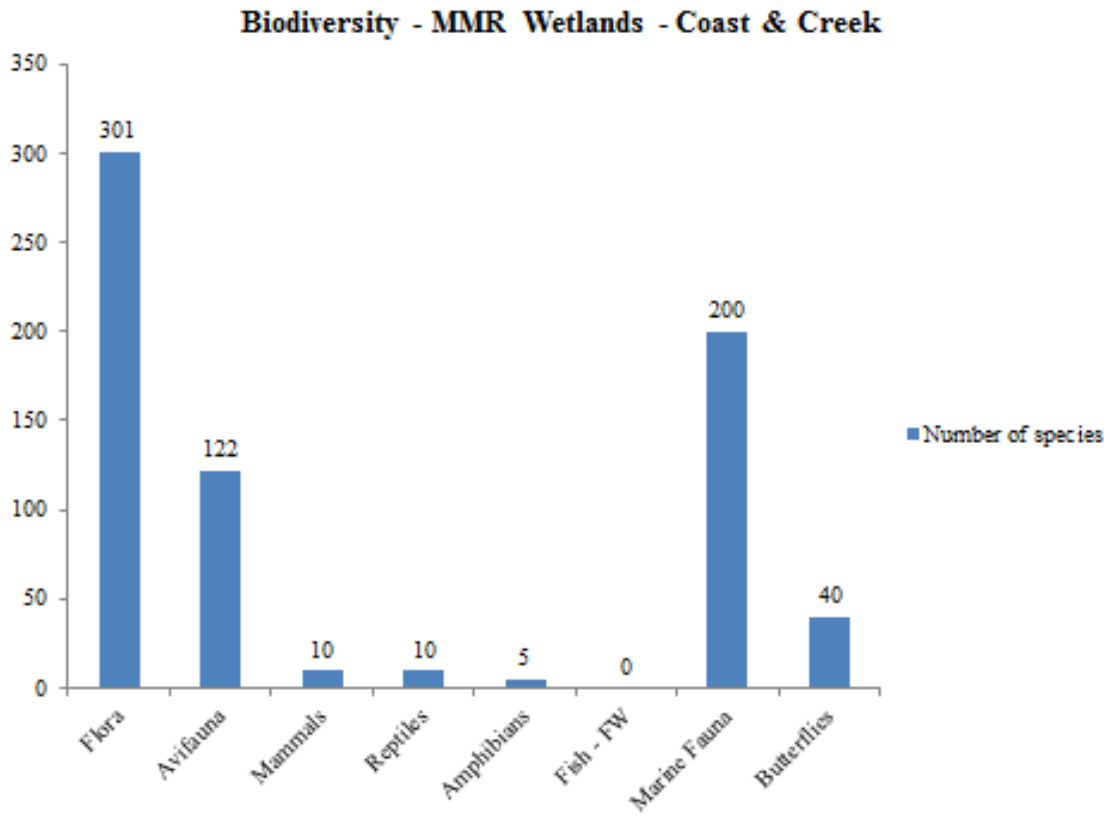
One of the critical features of the coastal wetland habitat is the mangroves along the tidal creeks and estuaries. This forest-like habitat is seen wherever any of the MMR's west flowing small streams or rivers drain into the sea, and including the most extensive mangroves on either side of Thane creek. Mangroves are also seen along Manori creek, Malad creek, Bassein (Vasai) creek and along Panvel and Dharamtar creeks.

There is a sizeable mangrove habitat in central Mumbai, along the Mahim creek, another along the Mahul – Sewri stretch, and smaller pockets along the Bandra promenade and in Colaba, which together remain the only natural habitat types surviving along with the small wooded parts of Malabar Hill, surviving anywhere in central–southern Mumbai city. Altogether, an area of about 95.43 sq km, i.e., 2.25% of the MMR are was under mangroves in theyear 1991 (Kulkarni, Vivek) and this unique forest habitat is today protected through some recent conservation attention extended to them. Though it remains a great challenge to protect these habitats it is not unusual now to see dense mangrove vegetation in some of the densely populated pockets in the MMR, and often spring up surprises in terms of species diversity.

The coastal wetland habitat also includes reed-encrusted brackish water-bodies that have today become possibly the rarest micro-habitat along the entire western length of the MMR. While the water-fronts and mangroves have had some protection from the Coastal Regulation Zone policies, most brackish ponds located further inland have remained ignored, and consequently been transformed or widely diminished in extent.

The biodiversity for the MMR's coastal wetland habitat, along with the creeks, comprise of at least 300 species of flora, over 200 species of marine fauna, including about 160 of marine

fish, about 122 bird species, at least 15 of herpetofauna and about 40 of butterflies. This may be a mammal paucity habitat yet interestingly several terrestrial mammals have adapted to the coastal mangroves and include the jackal, jungle cat and the common mongoose. There are obviously also several marine mammals that periodically get washed on the MMR coast and in coastal waters but these have not been surveyed for as part of this project.



MMR COASTAL - CREEKS & ESTUARIES HABITATS DATABASE (incl Mangroves)

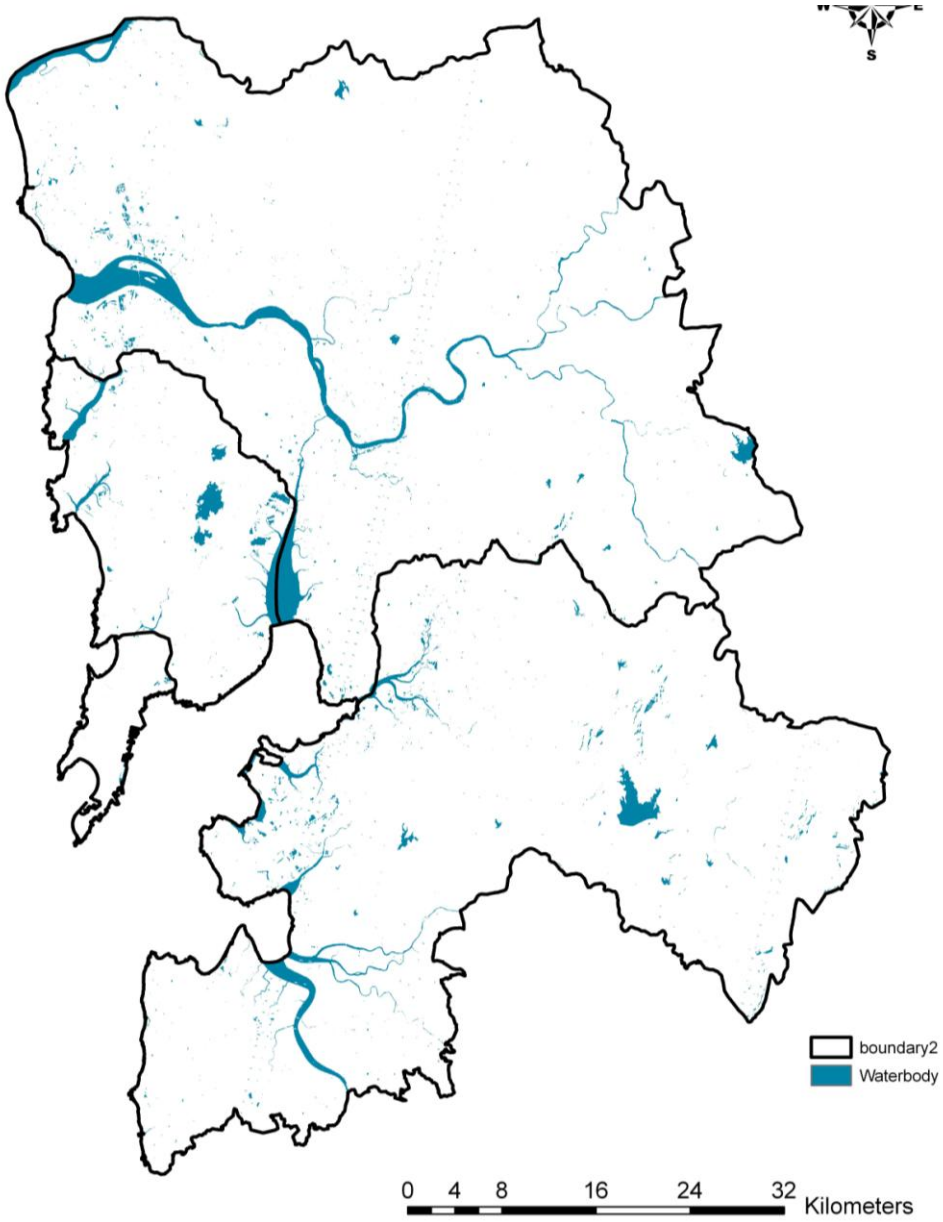
SITE NAME	Upstream River	Creek Length	Habitat Qlty Index	Est Flora species	Est Bird species	Est Mammal species	Large Mammals	Est Reptile species	Est Amphbn species	Est B'fly species
Mouth of Tansa (south) - Arnala North	Tansa	NE	1	NE	20	NE	N	15	NE	NE
Bassein Creek	Ulhas	17 km (till Retibunder)	1-3	45	40+	6	Y	15- 20	4+	12
Manori Creek	Dahisar	11 Km (till Dahisar R)	1,2	25	45 - 55	5	Y	18+	3+	10
Malad Creek	Poinsur	7 Km (till Marve Rd)	2	15 - 20	46	7	Y	12 - 15	3	23
Mahim Creek	Mithi	2.7 km (till E end of MNP)	1,2	15	40	NE	N	7	NE	15
Thane Creek	Ulhas (part)	16 km (Vashi – Kalwa Bridge)	2,3	50+	100+	10	Y	22+	4+	27
Sewri Bay		NE	2	10+	100+	NE	N	10	NE	NE
Panvel Creek	Gadhi	5 – 6 km	1,2	NE	50+	3	Y	15+	NE	NE
Shewa Creek		5 km	1,2	20+	40+	NE	Y	10+	2+	NE
Dharamtar Creek	Amba	NE	2	30+	50+	5	Y	15+	3+	NE
Elephanta Island		NE	2	20	40	NE	N	12 – 15	NE	7

FRESHWATER WETLANDS:

The Freshwater habitat across MMR comprises of natural lakes and village ponds, small rivers and seasonal wet cultivation. In addition, this habitat type has been augmented by human intervention that has resulted in the creation of numerous reservoirs and additional lakes. According to the MMRDA Developmental Plan of 2011, this habitat covers 78 sq km or about 2 % of the total area under the MMR.

Till the mid-1800s, there were no large reservoirs or lakes in the northern half of Greater Mumbai or across much of the MMR. The only water-bodies were small village ponds besides streams and river beds in forest, rain-filled depressions and seasonally flooded cultivations that were the major sources of freshwater habitats. The completion of the Bombay Municipality's water schemes resulted in the formation of the Vihar Lake in 1858 and the Tulsi Lake in 1879 (**Kulkarni C V, 1948)** by damming the Dahisar and Gopar rivers. The Pokharan Lake, near Thane was completed in 1880 and the Powai Lake in 1891. These lakes form, therefore, the main habitat of whatever freshwater fish is available around Bombay (Kulkarni C V 1948). The creation of these large lakes also influenced other aspects of the region's biodiversity.

Nearly all of the MMR freshwater bodies are located in the alluvial lowlands, with very few in the upper reaches of the numerous hill ranges. The highest freshwater body in the MMR are the Charlotte Lake and Simpson tank in Matheran, both of which are artificial waterbodies. The extent of the freshwater lakes in the MMR ranges from less than half an acre, even smaller, to the Vihar lake that encompasses a water-spread area of over 7 sq km and the Morbe Reservoir, spreading over almost 9 sq km towards the southern foothills of the Matheran Range. All the large freshwater bodies are reservoirs that have resulted from the damning of local rivers, and while Powai, Vihar and Tulsi were created during the mid/late-19th Century, the Morbe Reservoir is a recent development.



MMR – Freshwater bodies (Lakes, rivers)

It is interesting to observethat three of the largest freshwater bodies in the MMR lie in Greater Mumbai, namely Tulsi, Vihar and Powai. In fact, the Greater Mumbai area, along with the Thane urban area, bounded by the southern length of the Bassein Creek - Ulhas River –Thane Creek system has at least 52 extant freshwater bodies, most of them erstwhile small village ponds, many having deteriorated over time, while a few have disappeared altogether. Amongst the several important surviving lakes in the Greater Mumbai area are Powai, Vihar, Tulsi, SEEPZ pond and Talzan pond (brackish). Outside of this area, the Thane

and Raigad District segments within MMR have more than 100 freshwater bodies, several of which were explored for assessing their biodiversity status **(Annexure …)**.

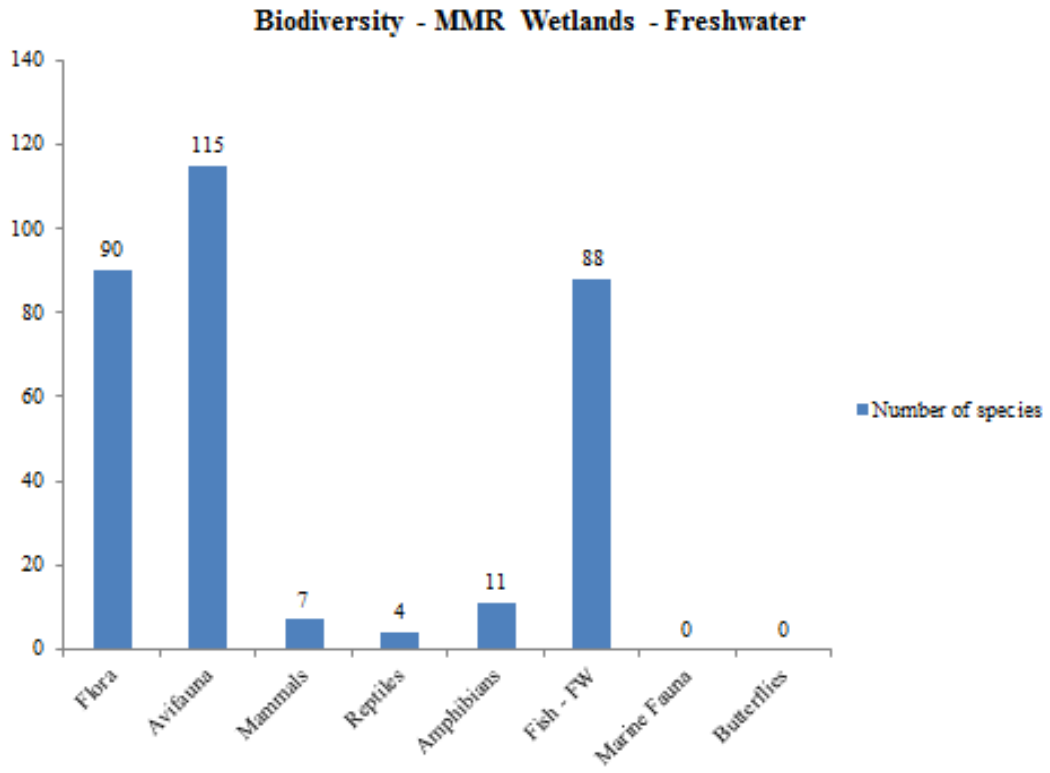
Though water quality estimation was not part of this project, the Greater Mumbai region was found to be most prone to the ill-effects of introduced exotic species. Thane, once called the city of Lakes has seen many of its 60 lakes either dissapear or degraded in recent times. Presently, only about half the original lakes exist. Several of these lakes are artificial including the famous Upawan or Pokharan lake, that was created in 1888. The lakes in Thane that still retain a fairly vibrant species diversity include Upawan, Shivaji Talao (Talaopali), Ambe Ghosale and Kachrali lake. More than 40 other lakes were explored across Thane district, including in Mira-Bhayandar, Vasai-Virar and the other municipal corporation areas.

The Raigad district area of the MMR (zone 3) has more than 65 freshwater bodies, several of which were explored. Many of these are small in extent, however, of all the regions, the freshwater bodies in this zone were found to be comparatively less impacted by introduced fish species and or occurrence of much weed flora and consequently more of the freshwater bodies here display a good extent of biodiversity, especially avifuana, herpetefauna, fish and other aquatic life.

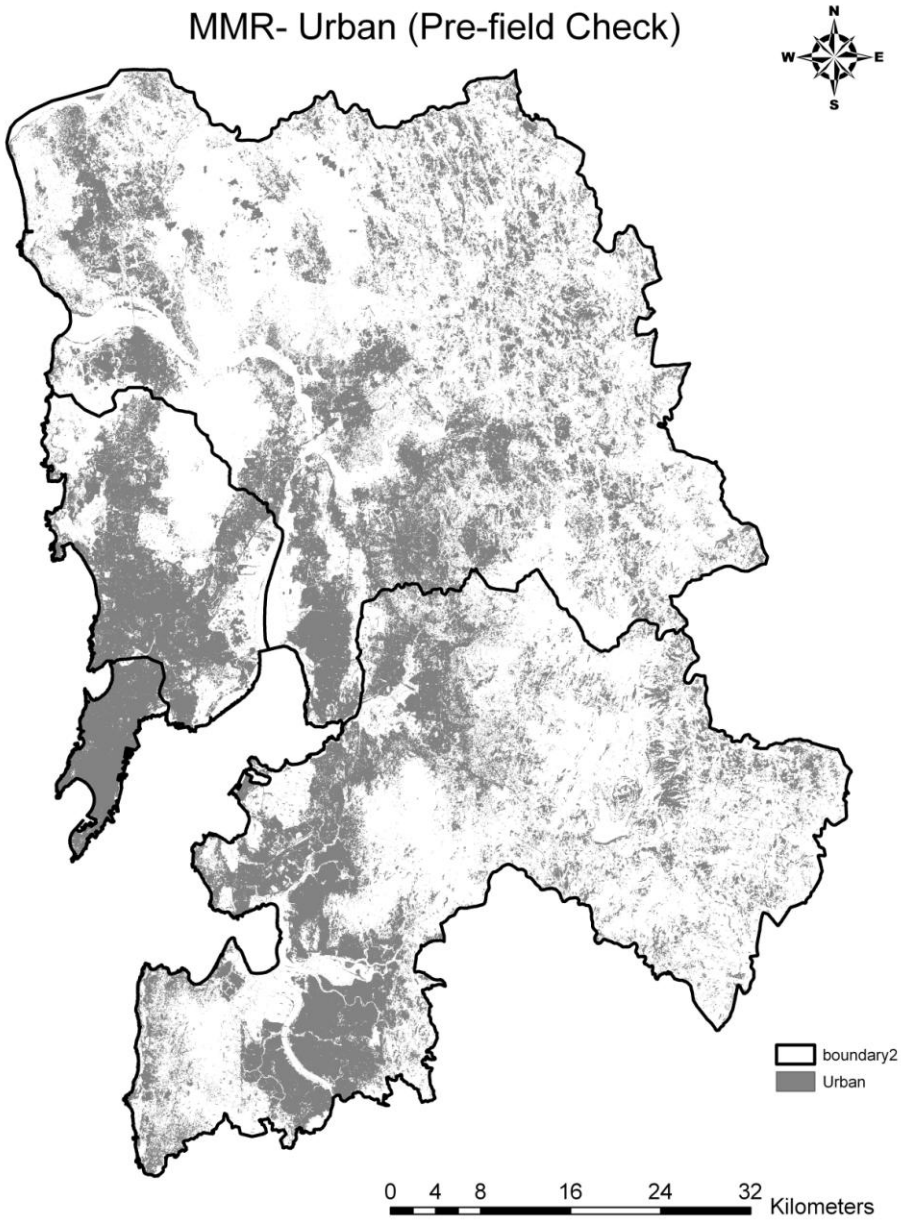
The MMR's freshwater habitat also includes a network of streams and rivers, dominated by the Ulhas river system, which bifurcates to form the Bassein and Thane creeks. In Thane district, several rivers flow into the Ulhas system including the Kalu, Patalganga, Kumbhari, Barvi, Varna, Bhatsai and Kamvadi rivers. In addition, a series of smaller rivers drain into the Panvel creek towards the southern limits of the MMR, while the Patalganga and the Amba rivers drain into the Dharamtar Creek.

The Freshwater habitat across MMR also consists of seasonal wet cultivation, especially paddy fields. However, the extent of this landscape has reduced drastically and has had a seriously impact on several birds and herpetofauna. In the Greater Mumbai area such wet cultivation has more or less vanished entirely while some pockets still exist across the Thane and Raigad district areas.

The reported biodiversity for freshwater wetland habitat comprise of about 90 species of plants, though with very few species of aquatic flora, 88 species of fish, 07 species of mammals, 120 bird species and 15 species of herpetofauna.



URBAN BUILT-UP ARES, PARKS/GARDENS/AVENUES



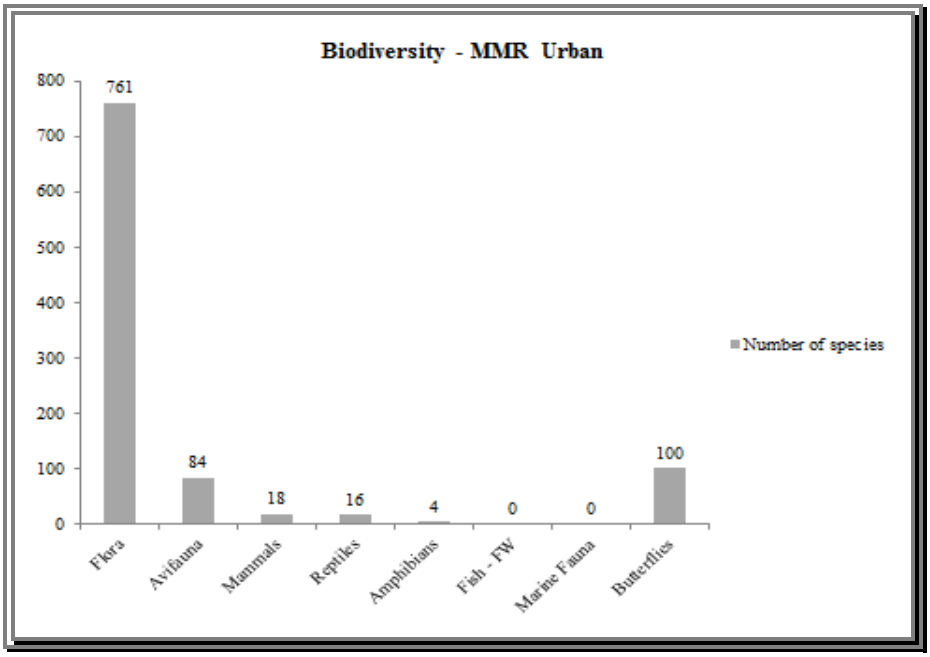
Map - Urban Development across MMR

The built-up habitat includes the concretised aspects of the MMR, which includes housing colonies, industrial complexes, ornamental parks and gardens etc which comprise a significant proportion of the area in the MMR. According to the MMRDA Developmental Plan of 2011, this habitat covers 523 sq km or about 12 % of the total area under the MMR. However, the actual area under absolute urbanization appears to be much higher. A lot of the grass/scrub and agricultural habitat complex have since been transformed into urban built up habitat, but are not included in the current land use categories under the development plan.

In mainstream ecology, this habitat is regarded as being devoid of biodiversity and detrimental to ecological processes. This interpretation or urban areas is accurate in terms of the loss of diversity and simplification of ecosystems that accompany processes of urbanisation. However, as Rosenzweig (2003) Cadenasso et al. (2007); Pickett et al. (2008) Francis et al. (2011) and others point out, the urban landscape is an heterogeneous space with variable ecological potential and impact of human intervention.

True several species have been excluded as habitats have been transformed for use as houses, industry and infrastructure, however the same process has also created new micro habitats that are exploited by other species are exploiting (Rosenzweig, 2003). This includes species that have benefitted from fruiting and flowering trees or from abundant waste material. These have mostly been the smaller mammals that have succeeded in exploiting conditions created in these urban habitats, while most of the larger mammals have disappeared from these areas.

The biodiversity for the urban habitat of the MMR comprise of at least 761 species of plants, 18 species of mammals, more than 80 bird species, 20 species of herpetofauna, and nearly 100 of butterflies. This does not include species in other habitats that may be abutting the urban spread (for instance, a mangrove creek through suburban or central Mumbai).



MMR - URBAN PARKS & BUILT-UP AREAS - RANDOM SITES IN 08 MUNICIPAL CORPORATIONS

SITE NAME	Location	Est Flora species	Est Bird species	Est Mammal species	Large Mammals	Est Reptile species	Est Amph species	Est B'fly species
US Club environs		NE	57	6	N	NE	NE	34
Sagar Upwan & Colaba Woods		NE	35 - 40	4	N	4	1	52
Malabar Hill		NE	44	5	N	12	2 or 3	25
Mahalaxmi Race Course & Willingdon		NE	60	NE	N	8	2	14
Byculla Zoo		NE	35	NE	N	8	2	21
Dadar 5 Gardens		41	23	5	N	4+	NE	16
Mah Nature Park (incl adjoining creek)		300	100+	6	N	25	4	70
Chembur Golf Course		NE	14	4	N	5	NE	NE
Bandra-Versova Parks & Avenues etc		NE	34	5	N	7	2	30
SEEPZ campus		90	65	6	N	16	3	60
Goregaon – Bhayandar (10 sites)		105	72		Y	20+	5+	50+
Sites along LBS Road		NE	34	5	N	11	NE	40
Thane Urban (9 sites)		NE		NE	N	15	3	55+
Vasai-Virar (5 sites)		NE	43	7	Y	18	4+	45
Kalyan (5 sites)		NE	34	NE	Y	13	NE	35+
Bhiwandi (4 sites)		NE	29	NE	Y	9	NE	24

Methodological approaches

This study is structured to enumerate species and ecological diversity in the delineated area, across different ecological niches and not to investigate overall population estimates. However, population estimates for certain key species will be estimated across the region, to determine their current status in the region.

The findings of this study are based on collecting primary data from field observations and unstructured interviews in the MMR. It also collected secondary data sourced from existing literature and archival records. The data collection processes for this study did not employ invasive methodological approaches or specimen collection. Instead, it used non-invasive methodological approaches, such as the use of high resolution photography to identify and record species while also serving to substantiate, verify and triangulate data.

Methods

1) SECONDARY DATA COLLECTION

1.1 Literature review:

The literature review tapped into a widely scattered knowledge source for data, as well as observations that were revisited and/or investigated. This review covered peer-reviewed journals (like *Journal of the Bombay Natural History Society*), thematic journals (like *Indian Forester*), books, book chapters, relevant notes by naturalists, scientists and bureaucrats who have worked in the area, reports in academic and non-academic media and also a serch for ethnographies that tap into traditional ecological knowledge. The literature review included reading, critiquing, note-making and cross-referencing. The literature review continued throughout the duration of the project, feeding data into the study while also being influenced by patterns that emerged during other data collection processes.

1.2 Archival search:

A systematic search through archival records was carried out to source historical records and changes that have taken place in the MMR. This research focused on piecing together the history of biological diversity in the region. This included resource extraction and hunting records, official Gazetteer records, land use patterns and any relevant historical records that can be sourced for the areas under the MMR. This information was meant to provide a

historical context and background information for phenomena observed today. Like the literature review, the archival research was carried out throughout the duration of the project. Its scope was defined by the research questions being asked in the larger study and the findings of other methods being employed.

2) PRIMARY DATA COLLECTION

The data collection processes for this study did not employ invasive methodological approaches or specimen collection, focusing on the use of non-invasive methodological approaches. Furthermore, since the investigations span across several taxonomical categories, a range of methodological approaches were employed to collect relevant data.

2.1 Sampling:

Since it is not feasible to cover the entire MMR across space and time, sample units were used. These units represented different sizes and diverse socio-ecological categories, which were sampled at different times of the day and in different seasons. The sampling for this study will be random as well as regular to ensure a larger sample of the MMR is covered (Magurran, 1988; Whittaker, 1972). The data generated helped generate an inventory of the species diversity for the MMR region. Data for different taxonomical categories were not necessarily collected from the same sample units. Also, they were not always collected at the same time. For instance, bird and mammal data may have been collected on during the same transect. However, independent transects were conducted to sample floral diversity. Similarly, herpetofauna may have been observed during a line transect for birds. This would then be noted or photographed for later reference but not included in the data till it was identified. Furthermore, given the variations in methodological approaches employed for different taxonomic groups, each sub section in the inventory provides a short note on the specific methods used for collecting the data for that group.

2.1.1 Line Transects:

This method has been employed to estimate diversity as well population density of birds and flora. It entails walking along a predetermined route, at a fixed speed to record observed various faunal species (primarily by sight and sound but signs were also noted).

The line transects followed the established norms for using line transect to study biological diversity (Bibby, Burges, & Hill, 1992; Magurran, 1988; Watson, 2004; Whittaker, 1972). For instance, during bird surveys distances between two parallel transects were never greater than 200m (Bibby et al., 1992). Furthermore, transects were adapted for different habitats to optimise their utility for data collection.

2.1.2. Point counts:

Another sampling method used for data collected was point transects, which are better suited for certain mixed habitats like scrub, woodlands and sometimes in wetlands (Bibby et al., 1992; Watson, 2004). They are also well suited to estimate population of certain key species, especially gregarious birds or mammals. In this method, fixed points are identified, either randomly or systematically, at sufficient distance to ensure there are no overlaps or duplication. Three types of point counts were used: plot counts (fixed radii for all species), point counts with variable radii (for particular species) and point counts with unlimited radii (total counts) (Bibby et al., 1992; Watson, 2004).

2.1.3 Plot sampling or Quadrat sampling:

This method was used primarily to study sessile (or stationary) or slow moving organisms. This was primarily employed to estimate floral and insect diversity in different habitats. While it is normally used to determine the population size of one or more species in a community, in this study it was employed to investigate distribution and diversity of species (Müeller-Dombois & Ellenberg, 1974). This sampling was done by locating plots in different locations in the biological community and counting the number of organisms in each plot. The size of the plot was determined by the size of the habitat being sampled and if a certain species was being used as a key indicator. For instance, one square meter or less may be sufficient for sampling small, herbaceous plants but mature trees may require plots of 100 m^2 (Müeller-Dombois & Ellenberg, 1974). A sufficient number of plots should be quantified so that adding additional plots to the sample does not reveal additional new species. Furthermore, this exercise is repeated across different habitats to provide a base line estimate of species diversity. As with the other sampling methods, plots were located randomly in the community as well as systematically.

2.2 Direct observation:

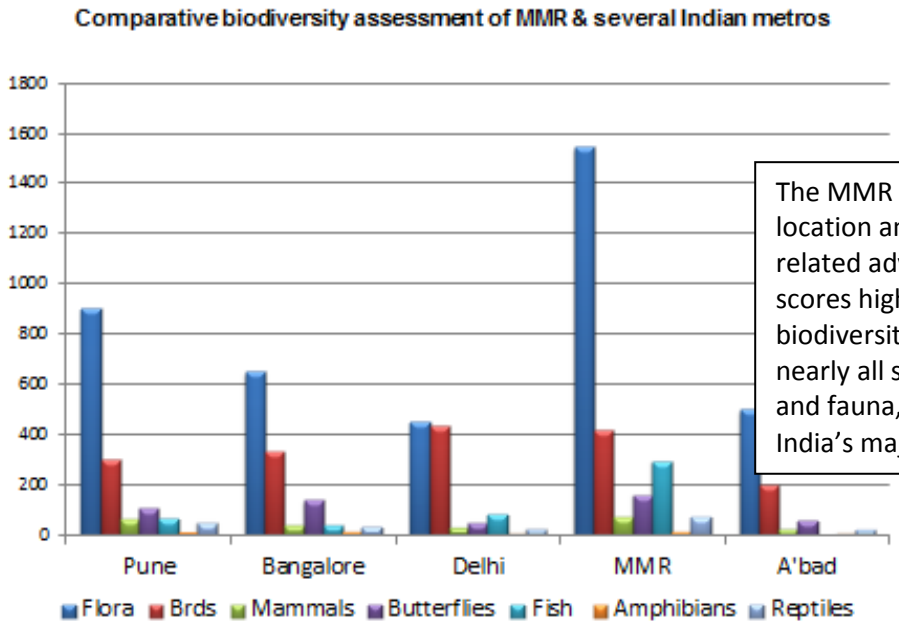
This method was employed to sample the general habitat and biodiversity in different habitats cutting across taxonomic groups. It was used intensively and extensively as part of the other sampling methods. Extensive observation provided inputs for identifying sampling units, while also provided inputs to update existing checklists for use during sampling methods. Intensive observations were employed as a follow up to sampling methods to investigate patterns that require additional inputs or cross checking records et Direct observation played a key role in triangulating data generated through sampling methods and were used in conjunction with other methods employed to collect data on mammals, birds, insects, herpetofauna and flora. However, this method proved to be rather difficult in the case of smaller mammals, as they are difficult to identify or photograph in the field.

2.3 Photography

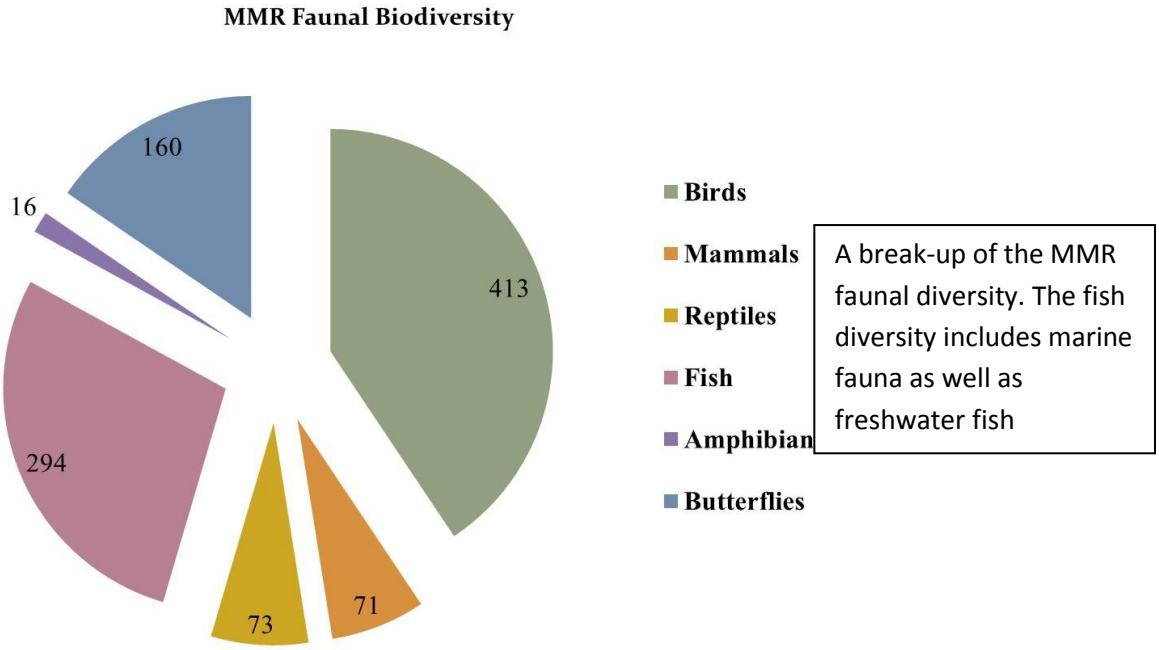
As this study did not collect specimens or use invasive methods, it relied on digital photography to document various species whenever possible. This included mammals, birds, insects, herpetofauna and flora. The advantage of using photography is multi-fold.

a. It will minimise the ecological impact of the study.
b. It will greatly assist in the identification process to the species and sub-species level.
c. It will provide evidence for data and records being collated by the study.
d. It will create a visual data-base of the biological diversity of the MMR.

There are obviously challenges to the use of photography. For instance, certain species are difficult to photograph, either due to their ecology, behavior or location. However, the purpose of using photography in this study is not to capture an image of each and every species but to assist other sampling and data collection methods, which generated a bulk of the data used in this report.



The MMR hass a great location and climate related advantage and scores high on biodiversity across nearly all strata, flora and fauna, amongst India's major cities



A break-up of the MMR faunal diversity. The fish diversity includes marine fauna as well as freshwater fish

The MMR AVIFAUNA (BIRDLIFE)

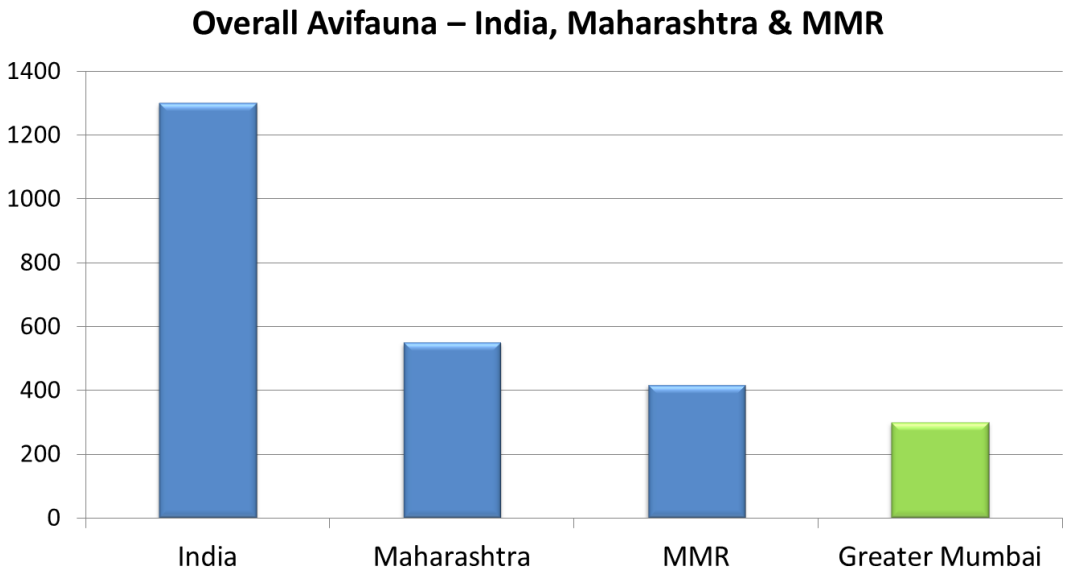
The varied geographical and topographical diversity of the MMR provides a wealth of opportunity for different forms of biodiversity, best exemplified by birds. The vast diversity of species that use this area is evidence of the richness of the region. The patterns and changes in distribution of different species of birds across the MMR are complex. For instance, some species seem to vanish with habitat change and degradation, while others seem to expand their range to exploit new habitat types and opportunities. Birds are attracted attention and interest from people in urban areas across the country and birdwatching is fasy growing leisure activity. There is thus a rich body of documented and undocumented reports of bird activity and species sightings, even in urban areas.

The occurrence and dynamics of birds in urban settings has been a topic of considerable interest worldwide, and there are numerous studies documenting the avifaunal richness, abundance, scarcity and ecological aspects on birds in urban areas. Interestingly, urban bird diversity is theorised to be an important indicator of human social diversity and economic inequality (Melles, 2005), which is supported by our findings in MMR. In fact, many naturalists reported that birds were instrumental in getting them interested in natural history and conservation.

Earlier Bird Work in the Region:

There has been no comprehensive study of birds across the MMR. There are, however, scattered, records and reports of different observations of the avifauna diversity in this region, based on personal observations and hunting accounts of British civil servants and army These are recorded in various sources especially the Gazetteers and the *Journal of the Bombay Natural History Society* (JBNHS) but also some popular articles. Many of these writings are for the erstwhile Bombay Presidency, which was far larger than the current spread of the MMR. Others reports focussed on the then emerging township of Bombay and the adjoining island of Salsette. Some of the notable contributions in this regard came from E H Aitken or EHA (Common Birds of Bombay), S.H. Prater, Hugh Whistler and E. Comber (Bird list for the Bombay Government Gazetteer).

The first comprehensive work on the region's birds was done by Salim Ali and Humayun Abdulali, which were published in a series of articles in JBNHS from 1936 to 1945. Though this work was mostly based on personal observations on innumerable birding and collection visits during the first half of the Twentieth Century, it laid the foundation for a systematic documentation of the avifauna of the region. Since then several authors have developed checklists and inventories for the avifaunal diversity of this region, including the *Annotated Checklist of the Birds of Bombay and Surrounds* (compiled by Anand Prasad, 2002), Birds of Mumbai (Monga, 2003) and Birds of Sanjay Gandhi National Park (Monga, 2006).



Present Project fieldwork:

One of the objectives of the present project was to document the avifauna of the MMR, make a comprehensive inventory of the entire study area and inventorise the various habitat types across the study area vis-à-vis several features of biodiversity. A more detail look was attempted at several bird families, with a view to ascertaining their status across different sites and habitats. The project work generated primary data through field-work across different seasons and habitats of the MMR, in addition to also reviewing the available secondary data in the published and unpublished literature.

During phase 1 of the project fieldwork (December 2009 – June 2010), a total of 72 biodiversity field surveys were carried out, covering all the general habitat types. Additionally, as many as 200 field visits across all the habitat types were made during Phase 2, between December 2011 and end-November 2012, up to the end of the project fieldwork. Besides these field visits by various team members, a further 35 visits, including 6 night visits and nocturnal surveys were made for observations on herpetofauna and fish fauna and which were also instrumental in providing additional inputs regarding avifauna. More than 50 point counts and observations during numerous general visits in urban areas across the MMR were also used for avifaunal (and other biodiversity) documentation.

Around 140 sites across the MMR were covered, encompassing the attributes of every habitat type known in the MMR. In addition, over 50 urban parks and gardens and scores of routine observations were also logged for bird, and other biodiversity data documentation throughout the duration of the Project in its 2 Phases.

During the project field-work to end November 2012, a total of **333** species out of the 417 species of birds known to occur in the Mumbai region had been observed. This total tally (417) of birds of the Mumbai region comprises of all species reported on various platforms, published and unpublished, and known to have been sighted by observers in the MMR since 1975. However, this does not include species that have been sporadically sighted over the past two centuries, some of them as a result of extreme weather conditions in the late-19th and very early 20th Centuries, which are listed separately in this report.

Methodology for fieldwork:

Avifaunal data was sampled using a variety of different methods to generate data regarding the species diversity of birds in the region. These include:

a) **Direct observations** (**Visual Encounter Survey**), based on sightings and vocalizations, provide evidence of presence, which can also be used to estimate relative abundance. These were carried out across different habitat-types in all three zones, crisscrossing the MMR.

b) **Line Transects**, monthly along a 2.9 km long stretch of the road in Sanjay Gandhi National Park (focusing on the southern and northern lengths of the Goregaon-Tulsi-Kanheri Road). Additionally, during the last two months of the fieldwork, Line Transect surveys were done along the entire length of 10.8 km of the forest road in the National Park.

c) **Point Counts**, at 200m radii, for between 60 – 75 minutes across more than 40 sites in every kind of habitat type, from forest and edge-of-forest to wetlands, grass-scrub and urban/built-up areas

d) **Park Biodiversity Assessment**, especially for avifauna, was done across nearly 50 urban parks and avenues across the MMR (**See Table …….)SEPARATE**

e) This assessment was also carried out in a range of disturbed and neglected/encroached sites and open spaces for comparison of human-impacted areas and protected sites

f) Certain key bird species and families for the various key habitat types were identified and their presence was intensively monitored in different sample sites across all three zones. These include *Accipitridae*, *Falconidae* and *Pandionidae* (eagles, hawks, falcons, vultures and other birds of prey), *Phasianidae* (junglefowl, quails, francolins), *Picidae* (woodpeckers), *Tytonidae* and *Strigidae* (owls), Grassland birds as *Alaudidae* (larks) and *Motacillidae* (pipits and wagtails) as well as semi-aquatic and aquatic bird families as *Rallidae* (rails, crakes and coots), *Ciconiidae* (storks). Some other species and groups (the Buttonquails (or Bustardquails)-quails, snipes for instance) were also explored in detail to enumerate their status in the study area.

Results and discussions

The MMR is a complex matrix of habitat types and in the context of the avifaunal observations, has been broadly divided into the following major types of habitat; there are sub and micro-habitats amongst some of these categories (for instance, there are various types of forests and coastal ecosystems), but the broad-level classification would comprise of:

Forest
Grass & Scrub
Agriculture & Plantations
Coastal Wetlands (Creeks, Estuaries, Mangroves)
Freshwater Wetlands (Lakes, ponds, rivers)
Urban Parks/Gardens/Avenues

The topography of the MMR ranges from varied landscapes extending from sea-level to a maximum altitude of 803 msl at Panorama point in the northern fringes of the Matheran ranges. Even though we have enumerated the biodiversity richness of the hilly areas and/or hill ranges (Table A), they have not been treated as a separate habitat but a distinct ecological unit. Every hill range in the MMR comprises of a mix of habitat types, and includes various types of forests, grass and scrub covered slopes and plateaus and also host freshwater bodies and pockets of agriculture.

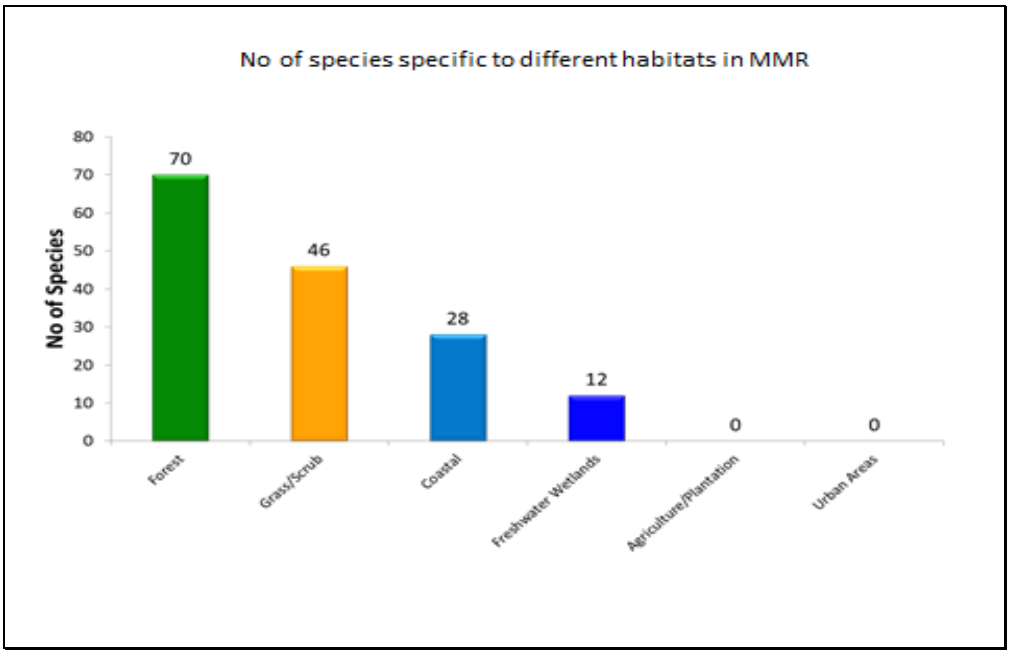
From the above broad habitat categories, in contemporary times, only the forest habitats retain native vegetation, along with smaller pockets of mangrove forests that are classified under coastal wetlands.

By native vegetation, this report implies a habitat that retain to a reasonable extent the natural or near-natural habitat assemblage of taxonomic groups. However, it is important to highlight that even in such areas there were changes like the presence of exotic species. While their presence can be attributed to accidental and planned introduction, it is important to note that alien floral species can be observed in nearly every sizeable forest site across the MMR. This could include herbs, shrubs and trees.

The forest habitat across the MMR is dominated by the southern mixed-deciduous forest type, with a lesser extent of dry-deciduous, semi-evergreen and evergreen types of forest. A mix of these forest types are seen from the low-lands, from almost near the sea-level to the upper slopes of several of the Hill Ranges across the MMR. The mangrove forests have not been included in the forest category but placed in the coastal wetlands. While many of the forest sites face anthropogenic stress, all the Protected Areas, which are predominantly forest habitats, can be justifiably said to have retained their biological assemblages. In comparison, every other habitat type across the MMR was found to be far more highly human impacted. Except for remnant, extensive tracts of mangrove vegetation along Thane creek, and smaller tracts along some of the other creeks, there is hardly any wilderness site of any habitat category left in the MMR.

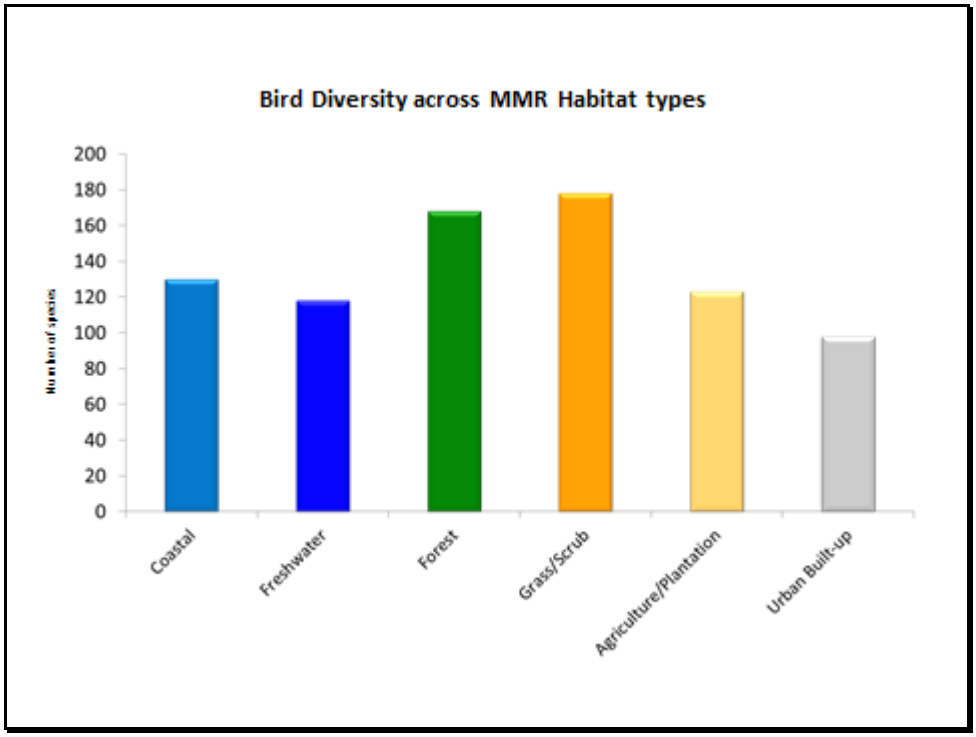
A very distinct division of avifaunal composition can be observed in the MMR. In a region dominated by coastal influences such as the MMR is, with creek inlets carrying the effects of a coastal environment several kilometres inland, it is observed that roughly 150 species are aquatic or predominantly prefer wetland habitats, of which around 115 species were observed around freshwater wetlands. Of these, approximately 90 species, or the greater majority of species inhabiting coastal and freshwater wetland habitats, are migratory species that spend between 4 to 8 months in the MMR. Also, nearly a quarter of the species inhabiting such coastal and freshwater wetland are highly habitat dependent or habitat-specific, those that would not survive in other types of habitats.

The other key habitat type surviving in the MMR with a much higher percentage of strictly habitat-specific (SHS) species is the forest habitat. A total of 167 species of birds were encountered in the various types of forest habitat across the MMR, with the mixed-deciduous forests and their marginal stretches accounting for the most diversity, with over 90 percent of the species seen here. The highest percentage of habitat-specific species range is also witnessed across the forest habitat, with 70 species seen in this habitat seldom if ever encountered in other habitats.



Grass and scrub habitats, the typically open landscapes that, in terms of extent, would have until recent times been the most widespread habitat type when clubbed together with agriculture and plantations in the MMR. These are also amongst the most rapidly vanishing habitat type in the MMR consistent with a national pattern. Superficial observation, sample surveys and oral histories suggest that a large part of these habitats have been completely transformed in developmental activities. The remaining habitats have been degraded with the spread of invasive flora and its impacts of this unique ecosystem.

Together, at least 175 species of birds have been observed in grass/scrub and agriculture/plantation habitats in the MMR. While nearly one-third of the species observed would are habitat-sensitive, in the MMR 46 species were restricted to the grasslands and intermittent scrublands. None of the bird species were strictly restricted to agricultural habitats though several of them have benefitted from agricultural practices. Reasons for this range from the relatively low percentage of surviving grass and scrub habitat as also the fact that today these are mostly scattered in the plains and the only extensively surviving patches are on slopes and plateaus of the hill ranges (*See Habitat Break-up Detail Table …….*)



Overlapping habitat preference was observed in both, aquatic as well as terrestrial species. In addition, there are very few aerialists (species that spend significant part of the day on the wing), this category comprising chiefly the swifts, swallows and martins, nearly all of which were encountered in different habitats across the MMR.

A proportionately higher percentage of freshwater species were sighted in coastal and brackish waters, perhaps indicative of some change in their ecology and habitat preferences. A much higher percentage of habitat overlap was observed in typically grass/scrub and agriculture/plantation frequenting species, many of these also having over-lapping range in adjoining forest habitats.

The number of species sighted in urban areas across the MMR includes only those species that we come across in parks, gardens and along avenues in the built-up urban areas of the MMR. We enumerated species in the 8 municipal jurisdictions that comprise the MMR, which are listed in **Table …** (pg 39). As evident in this table, the 8 municipalities are not uniform across any of parameters, including avifaunal species diversity. For instance, Greater Mumbai, has a geographical area more than 22 times the size of the smallest municipality

(Ulhasnagar). However, this does not directly correlate with species diversity or intensity of urbanisation processes. Instead, it contextualises the complexity of the different factors that influence urbanisation processes and species diversity. Various characteristics and factors influence the extent and distribution of biodiversity elements across any geographical area and includes the diversity, extent and status of habitat types as also the levels of protection accorded to certain specific sites. Peculiarly, only Greater Mumbai and Thane Municipal Corporations have any extent of protected areas in the MMR.

Municipal Corporations	No of Bird Species	Human Population (2011 census)	Area (km^2)	Human Density (per km^2)
Greater Mumbai	300+ species	12,478,447	603.40	20,694
Thane	198 species	1,262,551	147	12,000
Navi Mumbai	205 species	1,119,477	163.00	4,319
Kalyan-Dombivali	143 species	1,546,381	137.15	8,702
Vasai-Virar	141 species	1,221,233	105.00	11,614
Mira-Bhayandar	135 species	814,655	88.75	5,863
Bhiwandi-Nizampur	81 species	811,329	28.31	21,149
Ulhasnagar	90 species	506,937	27.54	17,201

Interestingly, while the number of species in all habitats combined within the urban areas appears quite large, these urban, built-up environments also support very large populations of birds thought dominated by just a few species. For instance, if one were to do an average bird density enumeration, we would have the highest for the Greater Mumbai area, with just 4 sites in this municipality possibly surpassing any similar site in other areas of the MMR. However, these would be dominated by barely 10 common species like house crow, rock pigeon, cattle egret, little stint, curlew sandpiper, yellow wagtail group, rosy starling et

Landfill sites, polluted water channels and creeks, and the sheer numbers of certain species immediately around the human society, can both, delight and shock. While no population density estimation were attempted for any species, however, in conformity with observations across several urban areas in the world, it can be safely assumed that in the MMR, the average density of birds is much higher in the built-up, urban surrounds than in other habitat type, except perhaps in certain wetland sites. For instance, the average bird density in urban Pune was estimated at 2.75 birds per hectare against 0.8 beyond city limits **(Nalavade, 1981)**.

The MMR also has 9 Municipal Councils.

1. Alibag
2. Ambernath
3. Karjat
4. Khopoli
5. Kulgaon Badlapur
6. Matheran
7. Panvel
8. Pen
9. Uran

However, this report does not classify biodiversity data in terms of municipal areas but according to respective habitat types, which are located across different municipalities.

In the context of the primarily urban and built-up habitat, point counts were done across several sites, including parks and gardens. This assessment was also done across several sample sites comprising of disturbed and neglected/encroached open spaces for comparison of human-impacted areas and more conserved sites. As part of the fieldwork, we noticed an interesting, even if somewhat worrying trend particularly discernible for avifauna. Though one might argue that there are varying population density and resource pressures, yet, for comparable areas of leafy residential environs and verdurous industrial estates as against shanty-towns and unplanned residential and industrial sites, we noticed an average of 19 species and overall species tally of 47 species for the former as against an average of 05 species and a tally of 12 species for the latter environs. In the urban context, this could

indicate the relevance of good green cover for a better ecological quality. This could be called an Ecological Poverty and it is evident across several other faunal taxa

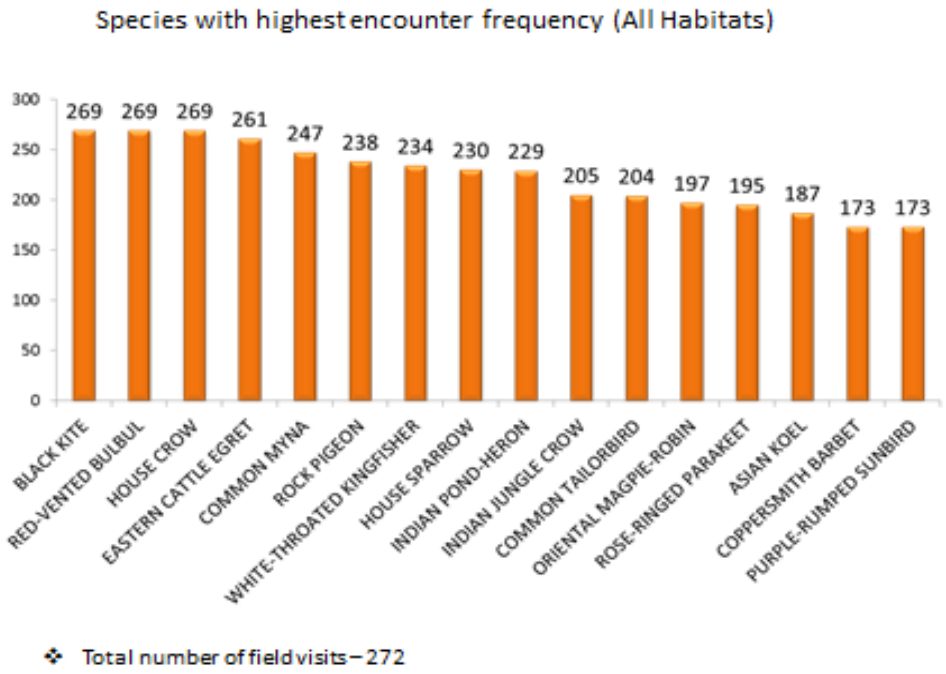
Equally well, a total of 45 species were observed along avenues and major roads that were lined with large, native trees (Ficus species, Mango, several others) as compared to 15 along avenues and roads along which Copper-pod (*Peltophorum*), Gulmohur and Rain-trees were the dominant tree species. Observations during Point Counts along distinct habitat and micro-habitat environs in urban settings are depicted in Table …….(Separate).

Critical Observations, Trends, Salient Features/Findings:

Project fieldwork findings point a distinct trend of rise in the encounter frequency and abundance of certain species, and varied levels of decline, some quite alarming, of several species that were perceptibly more common in the past (since late-1960s).

Encounter frequency refers to the number of times a particular bird species was observed. Its reference in terms of percentage pertains to the percentage of field visits with regard to total number of field visits in which the species were visually spotted and/or heard. The bird species whose numbers and encounter frequency were highest (averaging 80% and above) include species like house crow, cattle egret, black kite, rock pigeon, house sparrow, red-vented bulbul and white-throated kingfisher. The occurrence and increasing encounter frequency of some species across other habitat types, suggests a disturbing trend as these species follow human interventions and changes. Their occurrence correlates with the possible decline of other species in these habitats.

Most notable species belonging to this category are house crow, rock pigeon and black kite, which are regarded as commensal with humans, with atleast two of them, with the pigeon being the exception, living on an omnivorous diet. The cattle egret is another species whose numbers have risen sharply over the last 3 decades. This species has in the recent years



reduced its dependence to wetland habitats and the margins of such habitats, to benefit from different anthropogenic activities like agriculture, landfill, garbage dumps, fish-drying et A few other species periodically and seasonally also portray such ecological shifts. Individual references to species are discussed under specific Species Notes & Remarks.

While an upward swing in numbers and encounter frequency has been observed in a few species within intensively transformed areas, there is a decline for several species in forest and other habitats, which are themselves changing with the introduction of more adaptable, invasive species. These declines have been affected by different causes, which are not quantified as part of this project. The taxonomic families whose distribution seems to have reduced in this manner include ground-birds like junglefowl, spurfowl, quails and francolins, woodpeckers, larks, flycatchers, and birds of prey, while observations of individual species like rufous treepie, jungle babbler, yellow-eyed babbler have also declined in recent years. Some species have declined through the MMR, while others declined in specific locations owing to different factors. This is highlighted under Species Notes & Observations.

This trend of certain species benefitting from human interventions while others declining under the same set of conditions, has been particularly alarming over the past two decades and has also been observed across the wetland species.

Amongst wetland species:

The following seem to have been seriously affected across the MMR due to habitat loss and decline in overall habitat quality:

Eurasian oystercatcher, ruddy turnstone, Eurasian curlew, whimbrel, sanderling, various snipes, white stork, Caspian tern as well other terns, ruddy-breasted crake and several other crakes and rails, the larger gulls, terek sandpiper, marsh harrier and osprey. .

In contrast, species whose numbers and encounter frequency has increased include black winged stilt, wood sandpiper, ruff, common redshank, common sandpiper, pond heron, lesser whistling-duck, spotbilled duck, Indian cormorant, little cormorant, glossy ibis, black-headed gull, whiskered tern.

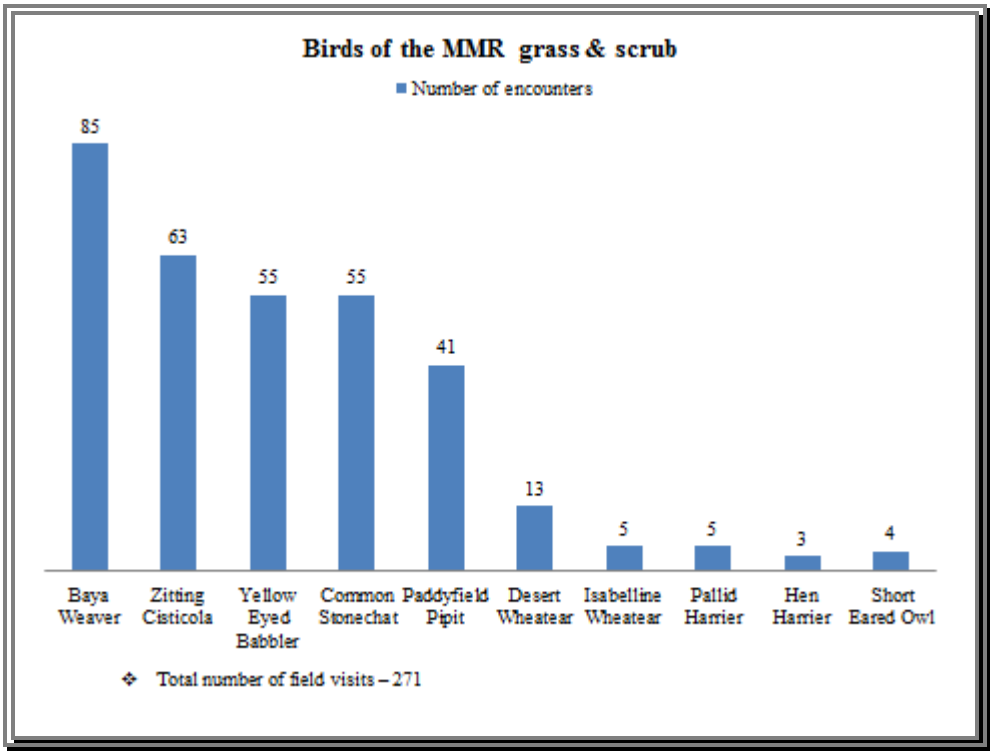
Some of these evidently have adapted well to/and/or benefitted much from polluted waters in creeks, other wetlands sites. The Lesser Whistling-duck and Spotbilled Duck are two examples of wetland species that seem to have expanded their habitat use to include fresh water bodies, brackish waters and also sewage-treatment lagoons. They are frequently observed at sites like Bhandup Pumping Station, Versova Pumping Station and along creek inlets across the MMR. In the last few years, these species have also been appearing regularly on a roughly ½ acre waterbody that was created inside Maharashtra Nature Park in Dharavi.

The Clamorous Reed-warbler is yet another species that seems to have made a comeback in the western fringes of the MMR, especially with the effective protection of some mangrove creek-sites in the area. This bird has also been observed colonising several areas on the margins of polluted wetland habitats.

Interestingly, some fluctuations have been observed in some wetland species, with frequent observations across the region in some periods alternating with an absence for extended periods. Though the cause of these fluctuations is not known and neither is their status in the region, except for their preference for wetland habitats where they have been encountered.

These include species such as white-breasted waterhen, grey heron, purple heron, Indian moorhen, bronze-winged jacana, little grebe, citrine and yellow wagtails.

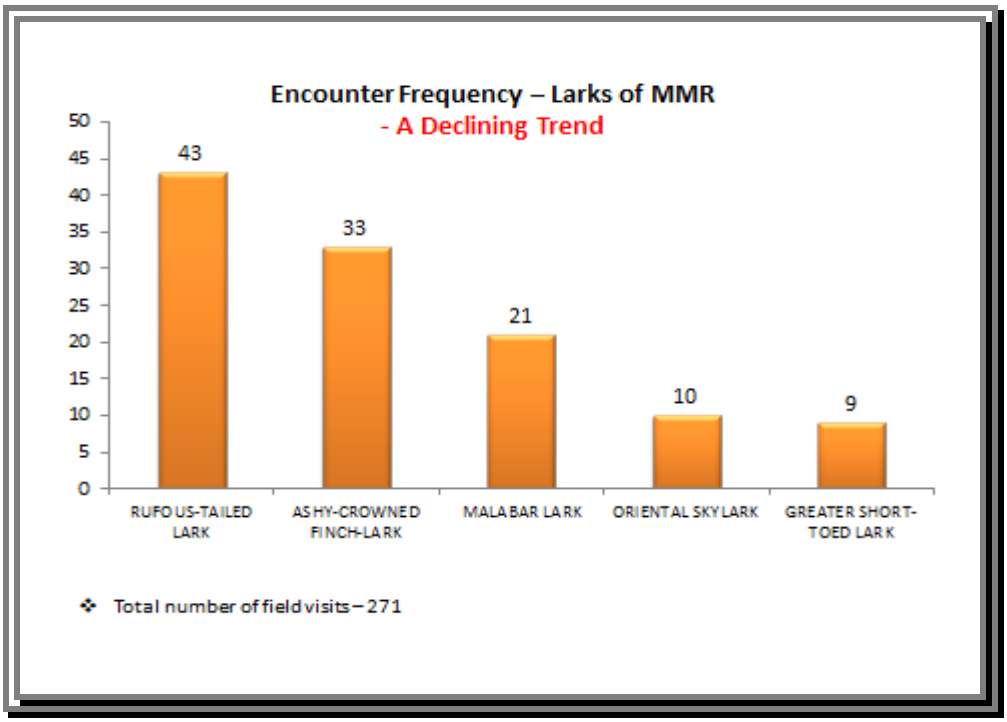
In grass and scrub Habitats, most of the strictly Habitat-specific species appear to have been seriously affected by human impact in recent years, some of which are depicted in the Illustration below.



All species of larks: Around 11 lark strongholds mentioned in the notes of Humayun Abdulali and Salim Ali (Ali & Abdulali 1936-45) and other birdwatchers, have more or less been wiped out in recent years as they have been included into the growing urban sprawl for developmental infrastructure and residential townships. These includes sites in northwestern and eastern suburbs, Uran – Navi Mumbai, Pen - Alibaug, Mira-Bhayandar, Vasai-Virar, and across several sites between Karjat-Khopoli up to the Tansa river.

The four species of resident larks in the MMR (oriental skylark, Malabar lark, rufous-tailed lark and ashy-crowned finch-lark) seem to have become marginalised from their prime habitats to the remaining fragments of their preferred grass and scrub habitats. The distribution and population decline has been observed on nesting surveys covered over the

years from late-1970s up to 2004. In fact, the four species have almost disappeared from the Greater Mumbai region (zone 1) with only a small population of two of the species surviving on open grass and scrub habitat on the western fringes of Thane Creek, between Bhandup and Vikhroli.



The fifth species of lark, greater short-toed lark, is a winter visitor. There have been no observations of the large flocks of these gregarious species in the open grasslands and brackish margins of the southern stretches of Navi Mumbai (Vashi – Uran, Wadkhal – Alibaug, MIDC Pipeline Road and the Vasai-Virar region). They have been wholly absent in some years. All the encounters of this species during the fieldwork for this project were of very small flocks in the fragment habitat patches in Uran and along Kalyan – Badlapur towards the eastern – northeastern fringes of the MMR.

While the greater majority of Grass and scrub habitat species have shown a general decline in numbers across most areas of the MMR, a few species such as red-vented bulbul, black drongo, spotted dove, red-wattled lapwing and a few others show an increase in their encounter frequency, some of these evidently adapting to marginalized and fringe habitats.

Line Transects for estimating avifaunal diversity were attempted only along the main forest road in SGNP. This was the only site for which we had a reference to similar works done earlier on two occasions, during the early 1990s and 2000s. Present findings portray a marked drop in the average encounter frequency and species range (Ill).

This shows the near continuous drop over more than two decades in avifaunal sightings along two Transects in the SGNP

Amongst the many interpretations of avifaunal findings, we also kept track of species diversity across the three Zones that the MMR was specially demarcated for this project. Once again reiterate here that this demarcation was only conceptual and followed existing administrative boundaries.

In Zone 1 (Greater Mumbai, the island city) up to the southern limits of Bassein Creek/Ulhas River to the north, the western limits of Thane Creek to the east), a total of 315 species of birds were encountered (SM per sobs)

In Zone 2 (the Thane District component of MMR, north to Tansa River), a total of 275 species of birds were observed (AB, NS – pers obs)

In Zone 3 (Raigad District component of MMR, to the southern limits of MMR in Alibag), a total of 293 species of birds were observed (VD, PK pers obs).

The extent of healthy cover for different habitats (forest, grass/scrub, wetland) is relatively better in zone 3, which has so far not witnessed the alarming expansion of urbanisation as witnessed in the other two zones. However, this too is changing and may transform even more rapidly with enormous developmental and infrastructure projects earmarked for this zone. For instance, the Navi Mumbai SEZ has already led to the transformation of hundreds of acres of some of the richest avifaunal habitats in western India and the proposed new airport will take away more than 2000 acres of open scrub and wetland-edge landscape. As a result, the encounter frequency of aquatic bird species has declined in zone 3 in recent years. This biodiversity of this zone has been well documented over the last few years and it is possible to trace changes in avifaunal abundance and distribution for the last few years, which are mentioned in species accounts.

Zone 1, the Greater Mumbai region, up to the southern length (edge) of Ulhas river/Bassein creek, and including Thane urban area, is the most intensively human-impacted area in the MMR. However, detailed observations across this zone (which were replicated across the other zones) have yielded interesting records and trends. This zone benefits from the presence of a diversity of species in areas like SGNP, Aarey Milk Colony and the western margins of Thane creek including Sewri bay. Around 252 of the 315 species reported in the Greater Mumbai zone were recorded from these sites. The period of October and November here yielded several interesting, including rarity, records for the MMR, including at least 3 new records for the region and the state. Some of the biggest bird congregations were noticed in this zone, along Thane creek, Sewri bay and at the Deonar landfill site.

Zone 2: The Thane district has historically been well documented in terms of its natural history and indigenous communities. This zone extends from the Bassein creek northward to Tansa river, and to the east includes a vast swathe of open, mostly lowland habitat along the easternmost limits of the MMR, including areas like Thane, Kalyan, Dombivli, Ambernath, Bhiwandi, Ulhasnagar and Kulgaon-Badlapur, which are at the foothills of the Western Ghats. The Ulhas River and some of its tributaries drain most of this zone. The highest point in this zone is the summit of Tungareshwar Wildlife Sanctuary (656 mt), which harbours some of the finest forests in the MMR. Some pockets of lowland deciduous forests still exist both, in the western and eastern fringes of this zone. The coastal areas of this zone include a

mix of sandy and rocky coastline, with several of the beaches having been highly polluted in recent years. A total of 275 species of birds have been reported in this zone.

Zone 3 comprises of the Raigad district and also Panvel, southern Navi Mumbai, Karjat, Khopoli, Pen and Alibag. The general topography here is a mix of lowlands interspersed with variably forested hilly country and the diverse coastal stretches, including sandy and rocky beaches and tidal creeks in the west. The hilly habitats in this zone includes much of the length of the well forested Matheran Range as well as the Khargarh Hills, the Karnala and Chirner hills and the hills of Alibag, which house some of healthiest forest habitats in the MMR, though most of the lowland forest has been lost.

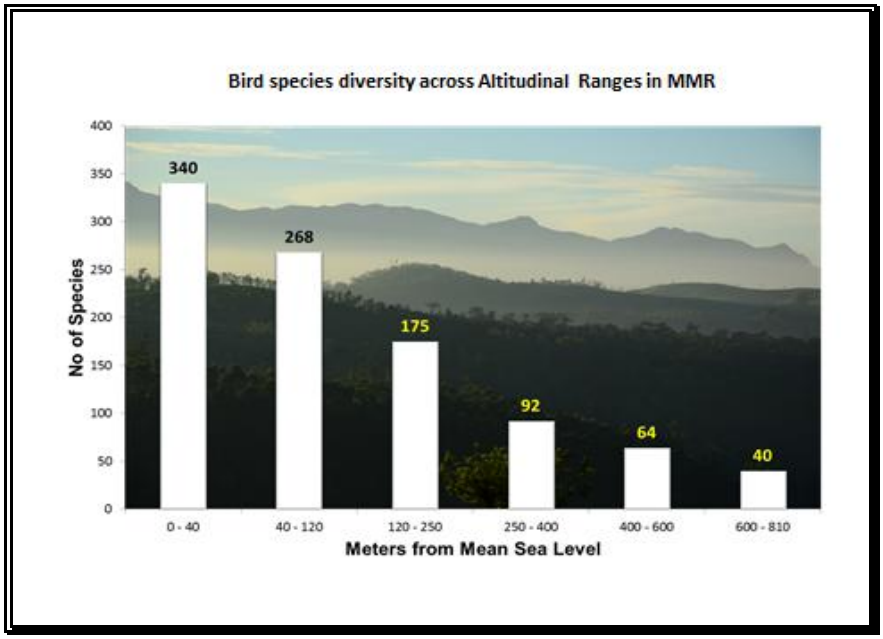
Several of the MMR's rivers flow through this Zone. With relatively less pressures from developmental and infrastructural development and expansion in comparison to the Greater Mumbai and the Thane district, this zone has the highest species diversity in the MMR. A higher percentage of diversity of all faunal and floral taxa in this zone compares to the other two, with the avifaunal diversity reported here being around 293 species, with a reasonable mix of wetland, openland and forest species.

CONCLUSION

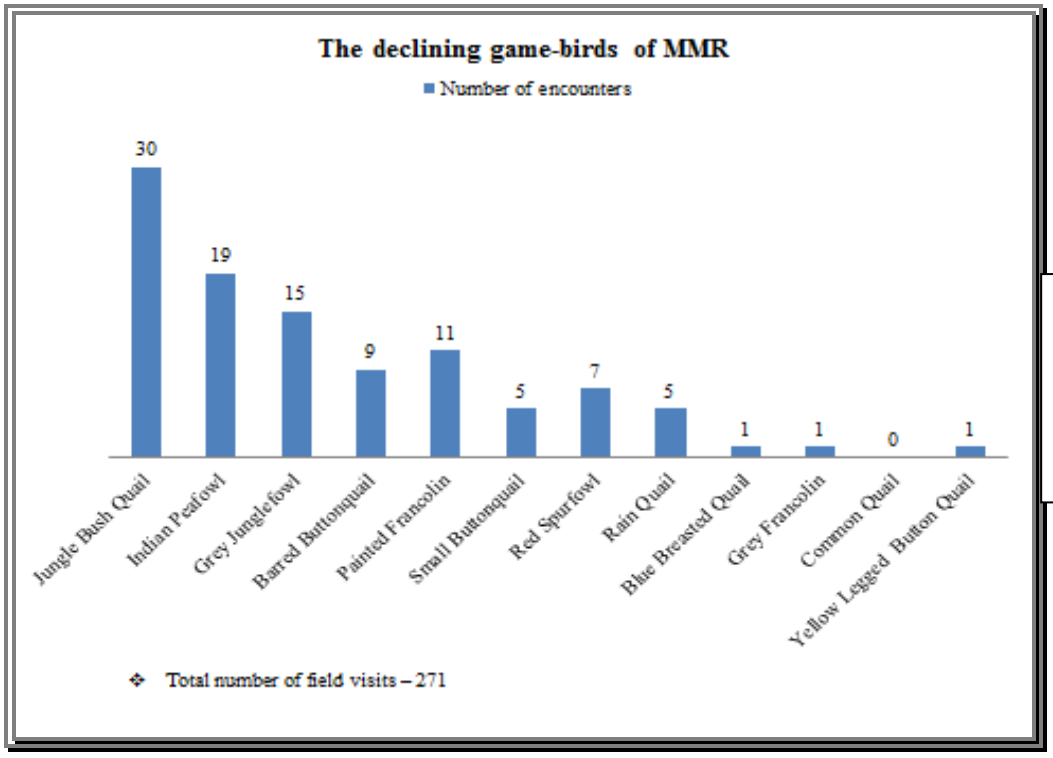
In conclusion, birds, while attracting the attention of naturalists and lay person alike, also provide insights into the ecological health of different habitats. The MMR, with its unique location and its internal diversity of habitats, is home to a wide diversity of avifaunal species. It is equally interesting to observe that the avifauna here is nearly equally divided between the three key habitat conditions, viz, forests, wetlands and the grass and scrub landscape, with a fair sprinkling on to urban built-up areas.

Our findings show that while the number of species observed across the MMR continues to be high, however, it is evident that the impact of urbanisation is being felt very strongly in recent times across all habitats in the MMR. It has been most severely felt across the Grass and Scrub habitats throughout the MMR, with populations of several species, residents as well as winter migrants, of such habitat declining considerably.

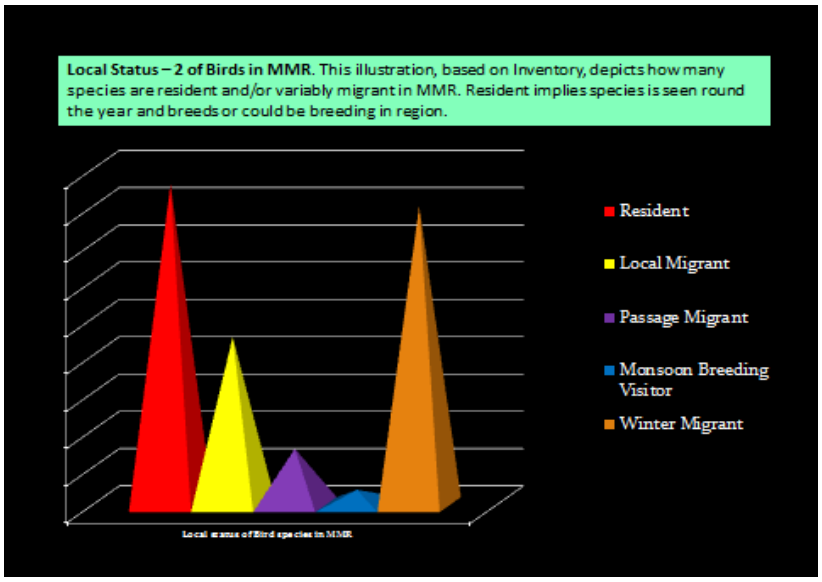
Just as well, the overwhelming numbers of certain species, especially in response to human-impacted factors is a topic that calls for a renewed and pragmatic planning to sustain the biological diversity of the MMR. As highlighted in this report, and its unique species inventory and observations chapter, the decline of several key bird species and families, and the overall decline of certain habitat quality are of great concern.



Even in the limited altitudinal range of the MMR (0 – 803 mt asl), birdlife shows a trend, with maximum diversity and abundance frequency observed in the lower reaches, from 0 – 120 mt asl.



A significant decline is observed almost across the entire group of game-birds



A very small percentage of bird species are either passage migrants or monsoon breeding-visitors to the region

Bird species Point Count Table across MMR Lakes

	Avg	Highest
Powai Lake - Summer	21	
Powai Lake - Winter	29	48
Vihar Lake - Summer	23	
Vihar Lake - Winter	23	56
Tulsi Lake - Summer	17	
Tulsi Lake - Winter	23	29
Lokhandwala Lake - Summer	18	
Lokhandwala Lake - Winter	27	45
Average of Lakes in Thane District - Summer	12	
Average of Lakes in Thane District - Winter	18	30
Average of Lakes in Raigad District - Summer	15	
Average of Lakes in Raigad District - Winter	23	38

Bird diversity across some key lakes and regions in MMR. More vegetation fringed lakes with marshy edges show greater bird diversity. Tulsi Lake, though in good forest, has comparatively lower bird diversity

Birdlife Point Counts & Surveys across varying neighbourhoods in MMR (all figs = No of species)

	Avg	Total
Shanties, unplanned residential and industrial areas	5	9
Residential/Industrial areas with good greenery, planning	19	47
Avenues with Native Trees, Verdure (Greater Mumbai)	15	45
Avenues with Exotic Trees (Greater Mumbai)	6	15
Tree-rich neighbourhoods (summer) – Avg of all Municipal Corpns	11	
Tree-rich neighbourhoods (winter) – Avg of all Municipal Corpns	16	
Highest No of bird species seen from single Point Count spot		29
Lowest No of bird species seen from single Point Count spot		7

MMR AVIFAUNA INVENTORY

	Bird Species & Scientific Name	Local Name Hindi / Marathi	Local Status	Forest	G-S-A	WL - FW	WL - C-Br	Urban	Hl >250mt
1	**LITTLE GREBE** *Tachybaptus ruficollis*	*Pandubi*	R, LM, FC			**X**			
2	**RED-BILLED TROPIC-BIRD** *Phaethon aethereus*		St				**X**		
3	**GREAT WHITE PELICAN** *Pelecanus onocrotalus*	*Hawasil*	St			**X**	**X**		
4	**INDIAN SHAG** *Phalacrocorax fuscicollis*	*Pan kowwa*	R, LM, C			**X**	**X**	**X**	
5	**GREAT CORMORANT** *Phalacrocorax carbo*	*Pan kowwa*	M, S			**X**			
6	**LITTLE CORMORANT** Phalacrocorax niger	*Pan-kowwa*	R, C			**X**	**X**	**X**	**X**
7	**ORIENTAL DARTER** *Anhinga melanogaster*	*Panwa*	S			**X**			
8	**LESSER FRIGATEBIRD** *Fregata ariel*		MV, S				**X**		
9	**GREAT FRIGATEBIRD** *Fregeta minor*		MV, S				**X**		
10	**MASKED BOOBY** *Sula dactylatra*		MV, S				**X**		
11	**RED-FOOTED BOOBY** *Sula sula*		MV, S				**X**		
12	**WESTERN REEF-HERON** *Egretta gularis*	*Kala bagla*	WM, LM, UC				**X**	**X**	
13	**LITTLE EGRET** *Egretta garzetta*	*Kilchia bagla*	R, FC			**X**	**X**	**X**	
14	**GREAT EGRET** *Egretta alba*	*Bada bagla*	R/LM, UC			**X**	**X**		
15	**INTERMEDIATE EGRET** *Egretta intermedia*	*Karchia bagla*	R/LM, UC			**X**	**X**		
16	**EASTERN CATTLE EGRET** *Bubulcus coromandus*	*Gai-bagla, Gochandi Khao*	R, C	**X**	**X**	**X**		**X**	**X**
17	**GREY HERON** *Ardea cinerea*	*Nari, Kabud Kudal (Kolis)*	WM/LM, FC			**X**	**X**		
18	**PURPLE HERON** *Ardea purpurea*	*Lal anjan*	WM/LM, UC			**X**			
19	**INDIAN POND-HERON** *Ardeola grayii*	*Bagla, Andha bagla*	R, C			**X**		**X**	**X**
20	**BLACK-CROWNED NIGHT-HERON** *Nycticorax nycticorax*	*Waak, Kwaak Raat Baggal*	R, FC			**X**			

21	**STRIATED (LITTLE) HERON** *Butorides striata*	*Kancha bagla*	R, UC				**X**		
22	**BLACK BITTERN** *Dupetor flavicollis*		S		**X**	**X**			
23	**CHESTNUT BITTERN** *Ixobrychus cinnamomeus*	*Lal bagla*	R/LM, UC		**X**	**X**			
24	**YELLOW BITTERN** *Ixobrychus Sinensis*	*Jun bagla*	R/LM, UC		**X**	**X**			
25	**ASIAN OPENBILL** *Anastomus oscitans*	*Gungla*	WM/LM, FC			**X**			
26	**WHITE STORK** *Ciconia ciconia*	*Laglag, Bada retwa*	WM, S		**X**	**X**			
27	**WOOLLY-NECKED STORK** *Ciconia episcopus*	*Laglag, Bagula, Kardok*	WM, S		**X**				
28	**PAINTED STORK** *Mycteria leucocephala*	*Janghil*	WM,FC			**X**			
29	**BLACK STORK** *Ciconia nigra*	*Surmal*	WM, S			**X**	**X**		
30	**LESSER ADJUTANT** *Leptoptilos javanicus*	*Chandiari, Chota garur*	St			**X**			
31	**BLACK IBIS** *Pseudibis papillosa*		S		**X**				
32	**BLACK-HEADED IBIS** *Threskiornis melanocephalus*	*Munda, Safed baza*	WM, UC			**X**	**X**		
33	**GLOSSY IBIS** *Plegadis falcinellus*	*Chhota buza*	WM, FC			**X**	**X**		
34	**EURASIAN SPOONBILL** *Platalea leucorodia*	*Chamach baza, Chamcha*	WM, UC			**X**	**X**		
35	**GREATER FLAMINGO** *Phoenicopterus roseus*	*Bog hans, Raj hans*	WM, C			**X**	**X**		
36	**LESSER FLAMINGO** *Phoeniconaias minor*	*Chhota rajhans*	WM, C				**X**		
37	**GREYLAG GOOSE** *Anser anser*	*Raj hans*	WM, S			**X**			
38	**LESSER WHISTLING-DUCK** *Dendrocygna javanica*	*Seelhi, Seelkahi*	R, C			**X**	**X**		
39	**RUDDY SHELDUCK** *Tadorna ferruginea*	*Chakwa, Sarza, Chakrawak*	WM, UC			**X**	**X**		
40	**COMB DUCK** *Sarkidiornis melanotos*	*Nakta*	R/LM, S			**X**			
41	**COMMON TEAL** *Anas crecca*	*Chhoti murghabi, Chakrang*	WM, C			**X**	**X**		
42	**GARGANEY** *Anas querquedula*	*Chaita*	WM, FC			**X**	**X**		
43	**GADWALL** *Anas strepera*	*Myla*	WM, UC			**X**			
44	**EURASIAN WIGEON** *Anas Penelope*	*Peasan*	WM, UC			**X**			

45	**NORTHERN SHOVELER** *Anas clypeata*	*Tidari, Tokarwala*	WM, UC			**X**	**X**		
46	**NORTHERN PINTAIL** *Anas acuta*	*Sand, Seenkh Par*	WM, FC			**X**	**X**		
47	**INDIAN SPOT-BILLED DUCK** *Anas poecilorhyncha*	*Garm-pai*	R, C			**X**	**X**		
48	**MALLARD** *Anas platyrhynchos*	*Nilsir*	WM, S			**X**			
49	**TUFTED DUCK** *Aythya fuligula*	*Dubaru*	WM, S			**X**	**X**		
50	**FERRUGINOUS DUCK** *Aythya nyroca*	*Kurchiya*	WM, S			**X**			
51	**COMMON POCHARD** *Aythya ferina*	*Lal seer*	WM, UC			**X**	**X**		
52	**COTTON TEAL** *Nettapus coromandelianus*	*Girri*	WM/R, S			**X**			
53	**BLACK-WINGED KITE** *Elanus caeruleus*	*Kapassi*	R/LM, UC		**X**			**X**	**X**
54	**BRAHMINY KITE** *Haliastur Indus*	*Brahmani cheel*	R/LM, FC	**X**		**X**	**X**	**X**	**X**
55	**BLACK KITE** *Milvus migrans*	*Cheel, Ghar*	R, C	**X**	**X**	**X**	**X**	**X**	**X**
56	**BESRA SPARROWHAWK** *Accipiter virgatus*	*Besra(female) Dhooti(male)*	WM, S	**X**				**X**	
57	**SHIKRA** **Accipiter badius**	*Shikra(male), Chipka (female)*	R/LM, FC	**X**	**X**			**X**	**X**
58	**EURASIAN SPARROWHAWK** *Accipiter nisus*	*Basha*	WM, S	**X**					**X**
59	**EURASIAN BUZZARD** *Buteo buteo*	*Chuhamar*	WM, S		**X**				**X**
60	**LONG-LEGGED BUZZARD** *Buteo rufinus*	*Chuhamar*	WM, S		**X**				**X**
61	**ORIENTAL HONEY-BUZZARD** *Pernis ptilorhyncus*	*Shahutela*	R/LM, FC	**X**				**X**	**X**
62	**WHITE-EYED BUZZARD** *Butastur teesa*	*Tisa*	WM, UC	**X**	**X**			**X**	**X**
63	**CRESTED SERPENT-EAGLE** **Spilornis cheela**	*Furj baz*	R, FC	**X**					**X**
64	**SHORT-TOED EAGLE** *Circaetus gallicus*	*Saampmar*	WM, UC		**X**				**X**
65	**BOOTED EAGLE** *Hieraaetus pennatus*	*Baghati*	WM, UC	**X**	**X**				**X**
66	**BONELLI'S EAGLE** *Hieraaetus fasciatus*		LM/WM, St	**X**					**X**

67	**CHANGEABLE HAWK-EAGLE** *Spizaetus cirrhatus*	*Shah baaz*	R/LM, UC	**X**					**X**
68	**BLACK EAGLE** *Ictinaetus malayensis*		LM, S	**X**					**X**
69	**INDIAN SPOTTED EAGLE** *Aquila hastata*	*Pahari teesa*	WM, S	**X**	**X**				**X**
70	**GREATER SPOTTED EAGLE** *Aquila clanga*	*Kaljanga*	WM, UC		**X**	**X**			**X**
71	**STEPPE EAGLE** *Aquila nipalensis*		WM, UC		**X**			**X**	
72	**TAWNY EAGLE** *Aquila rapax*	*Ukaab*	WM, UC		**X**			**X**	
73	**EASTERN IMPERIAL EAGLE** *Aquila heliaca*	*Jumiz*	WM, S		**X**				**X**
74	**OSPREY** *Pandion haliaetus*	*Machhlimar*	WM, UC			**X**	**X**		
75	**GREY-HEADED FISH-EAGLE** *Ichthyophaga ichthyaetus*	*Madhuya*	St			**X**			
76	**WHITE-BELLIED SEA-EAGLE** *Haliaeetus leucogaster*	*Kohassa*	LM, UC			**X**	**X**		
77	**WHITE-RUMPED VULTURE** *Gyps bengalensis*	*Gidh, Gidhad*	S		**X**				**X**
78	**INDIAN VULTURE** *Gyps indicus*	*Gidh, Gidhad*	S		**X**				**X**
79	**EGYPTIAN VULTURE** *Neophron percnopterus*	*Safed gidh*	S		**X**				
80	**RED-HEADED VULTURE** *Aegypius calvus*	*Rajgidh*	S		**X**				
81	**MONTAGU'S HARRIER** *Circus pygargus*	*Dastamal*	WM, S		**X**				**X**
82	**PALLID HARRIER** *Circus macrourus*		WM, S		**X**				**X**
83	**PIED HARRIER** *Circus melanoleucos*	*Pahatai*	WM, S		**X**				
84	**HEN HARRIER** *Circus cyaneus*		WM, S		**X**				
85	**WESTERN MARSH HARRIER** *Circus aeruginosus*	*Marsh Harrier*	WM, UC			**X**	**X**		
86	**LESSER KESTREL** *Falco naumanni*		PM, S		**X**				
87	**COMMON KESTREL** *Falco tinnunculus*	*Karontia,*	WM, UC		**X**				**X**
88	**EURASIAN HOBBY** *Falco subbuteo*		WM, UC	**X**	**X**				**X**
89	**ORIENTAL HOBBY** *Falco severus*		St?	**X**					

90	**AMUR FALCON** *Falco amurensis*		PM, UC	**X**	**X**		**X**		**X**
91	**RED-HEADED FALCON** *Falco chicquera*	*Turumti, Turumtari(female)*	S		**X**				
92	**PEREGRINE FALCON (SHAHEEN)** *Falco peregrinus peregrinator*	*Bhyri(female) Bhyri Bacha(male)*	R/LM, UC	**X**				**X**	**X**
93	**PEREGRINE FALCON** *Falco peregrinus calidus*	*Bhyri(female) Bhyri Bacha(male)*	WM, UC			**X**	**X**	**X**	**X**
94	**LAGGAR FALCON** *Falco jugger*	*Laggar*	WM, S		**X**			**X**	
95	**GREY FRANCOLIN** *Francolinus pondicerianus*		S		**X**				
96	**PAINTED FRANCOLIN** *Francolinus pictus*	*Kala teetar*	R, UC		**X**				**X**
97	**COMMON QUAIL** *Coturnix coturnix*	*Bater*	WM, S		**X**				
98	**RAIN QUAIL** *Coturnix coromandelica*		R/LM, UC		**X**				
99	**BLUE-BREASTED QUAIL** *Coturnix chinensis*		S		**X**				
100	**JUNGLE BUSH-QUAIL** *Perdicula asiatica*	*Lowwa*	R, UC	**X**	**X**				**X**
101	**RED SPURFOWL** *Galloperdix spadicea*	*Chhoti jungli murghi*	R, S	**X**					**X**
102	**GREY JUNGLEFOWL** *Gallus sonneratii*	*Jungli murga*	R, UC	**X**					**X**
103	**INDIAN PEAFOWL** *Pavo cristatus*	*Mor, Mor(male) Landor(female)*	R, UC	**X**					**X**
104	**SMALL BUTTON-QUAIL** *Turnix sylvaticus*	*Ginwa lowwa*	R, UC		**X**				
105	**BARRED BUTTONQUAIL** *Turnix suscitator*	*Gulu*	R, S		**X**				
106	**YELLOW-LEGGED BUTTON-QUAIL** *Turnix tanki*	*Lowwa (N. India)*	R, UC		**X**				
107	**SLATY-BREASTED RAIL** *Rallus striatus*		R, UC			**X**	**X**		
108	**'EASTERN' BAILLON'S CRAKE** *Porzana pusilla*		WM, UC			**X**			**X**
109	**LITTLE CRAKE** *Porzana parva*		St			**X**			

110	**SLATY-LEGGED CRAKE** *Rallina eurizonoides*		R?, S			**X**			
111	**SPOTTED CRAKE** *Porzana porzana*		St			**X**	**X**		
112	**RUDDY-BREASTED CRAKE** *Porzana fusca*		R/LM, S			**X**	**X**		
113	**WHITE-BREASTED WATERHEN** *Amaurornis phoenicurus*	*Dawak, Kuku kombdi*	R, C	**X**	**X**	**X**	**X**	**X**	**X**
114	**WATERCOCK** *Gallicrex cinerea*	*Kora*	Sc			**X**			
115	**PURPLE SWAMPHEN** *Porphyrio porphyrio*	*Kaim*	R, UC			**X**	**X**		
116	**COMMON MOORHEN** *Gallinula chloropus*	*Jal Murghi, Pan kombdi*	R, UC			**X**			
117	**EURASIAN COOT** *Fulica atra*	*Dasari, Kaam*	R/WM, FC			**X**	**X**		
118	**EURASIAN OYSTERCATCHER** *Haematopus ostralegus*	*Darya gajpaon*	WM, S				**X**		
119	**PHEASANT-TAILED JACANA** *Hydrophasianus chirurgus*	*Piho*	R, FC			**X**			
120	**BRONZE-WINGED JACANA** *Metopidius indicus*		R, FC			**X**	**X**		
121	**BLACK-WINGED STILT** *Himantopus himantopus*	*Gaz paon*	R/LM, C			**X**	**X**		
122	**PIED AVOCET** *Recurvirostra avosetta*	*Kusya chaha*	WM, UC				**X**		
123	**CRAB-PLOVER** *Dromas ardeola*		WM , S				**X**		
124	**COLLARED PRATINCOLE** *Glareola pratincola*		WM, S				**X**		
125	**SMALL PRATINCOLE** *Glareola lactea*		WM, S			**X**	**X**		
126	**GREAT THICK-KNEE** *Esacus recurvirostris*	*Bada karwanak*	St		**X**				
127	**EURASIAN STONE-CURLEW** *Burhinus oedicnemus*	*Karwanak*	St		**X**				**X**
128	**YELLOW-WATTLED LAPWING** *Vanellus malabaricus*	*Zirdi*	R/LM, S		**X**				
129	**RED-WATTLED LAPWING** *Vanellus indicus*	*Titeeri*	R, C	**X**	**X**	**X**	**X**	**X**	**X**
130	**WHITE-TAILED LAPWING** *Vanellus leucurus*		WM, S			**X**	**X**		

131	**GREY PLOVER** *Pluvialis squatarola*	*Bada batan*	WM, UC				**X**		
132	**PACIFIC GOLDEN PLOVER** *Pluvialis fulva*	*Chhota baton*	WM, UC				**X**		
133	**GREATER SAND PLOVER** *Charadrius leschenaultii*		WM, UC				**X**		
134	**LESSER SAND PLOVER** *Charadrius mongolus*		WM, FC				**X**		
135	**LITTLE RINGED PLOVER** *Charadrius dubius*	*Zierrea*	WM, FC			**X**	**X**		
136	**KENTISH PLOVER** *Charadrius alexandrinus*		WM, UC				**X**		
137	**EURASIAN CURLEW** *Numenius arquata*	*Goar*	WM, UC				**X**		
138	**WHIMBREL** *Numenius phaeopus*	*Chhotta goungh*	WM, UC				**X**		
139	**WESTERN' BLACK-TAILED GODWIT** *Limosa limosa*	*Gudera*	WM, FC				**X**		
140	**BAR-TAILED GODWIT** *Limosa lapponica*	*Gudera*	WM, UC				**X**		
141	**TEREK SANDPIPER** *Xenus cinereus*		WM, UC				**X**		
142	**COMMON GREENSHANK Tringa nebularia**	*Tantana, Timbla*	WM, FC				**X**		
143	**WOOD SANDPIPER** *Tringa glareola*	*Chupka*	WM, FC			**X**	**X**		
144	**GREEN SANDPIPER Tringa ochropus**		WM, UC			**X**	**X**		**X**
145	**COMMON SANDPIPER** *Actitis hypoleucos*		WM, C			**X**	**X**		**X**
146	**MARSH SANDPIPER** *Tringa stagnatilis*		WM, UC				**X**		
147	**COMMON REDSHANK Tringa totanus**	*Chhotta baton*	WM, C			**X**	**X**		
148	**SPOTTED REDSHANK** *Tringa erythropus*		WM, S				**X**		
149	**RUDDY TURNSTONE** *Arenaria interpres*		WM, S				**X**		
150	**BROAD-BILLED SANDPIPER** *Limicola falcinellus*		WM, UC				**X**		
151	**RUFF(MALE) / REEVE(FEMALE)** *Philomachus pugnax*	*Gehwala*	WM, UC			**X**	**X**		
152	**GREAT KNOT** *Calidris tenuirostris*		St				**X**		

153	**CURLEW SANDPIPER** *Calidris ferruginea*		WM, FC				**X**		
154	**DUNLIN** *Calidris alpina*		WM, UC				**X**		
155	**TEMMINCK'S STINT** *Calidris temminckii*		WM, UC				**X**		
156	**LITTLE STINT** *Calidris minuta*		WM, FC			**X**	**X**		
157	**SANDERLING** *Calidris alba*		WM, S				**X**		
158	**RED-NECKED PHALAROPE** *Phalaropus lobatus*		WM, S				**X**		
159	**GREATER PAINTED-SNIPE** *Rostratula benghalensis*	*Rajchaha*	LM/R, UC			**X**	**X**		
160	**JACK SNIPE** *Lymnocryptes minimus*	*Chhota chaha*	WM, S			**X**			
161	**COMMON SNIPE** *Gallinago gallinago*	*Chaha, Pan lawa*	WM, UC			**X**	**X**		
162	**PINTAIL SNIPE** *Gallinago stenura*	*Chaha, Pan lawa*	WM, S			**X**			
163	**WOOD SNIPE** *Gallinago nemoricola*		WM, S			**X**			
164	**GREAT BLACK-HEADED GULL** *Larus ichthyaetus*		WM, S				**X**		
165	**CASPIAN GULL (Yellow-legged)** *Larus cachinnans*		WM, S				**X**		
166	**HEUGLIN'S GULL** *Larus heuglini*		WM, UC				**X**		
167	**BROWN-HEADED GULL** *Larus brunnicephalus*	*Dhomra*	WM, UC				**X**		
168	**COMMON BLACK-HEADED GULL** *Larus ridibundus*		WM, FC			**X**	**X**	**X**	
169	**SLENDER-BILLED GULL** *Larus genei*		WM, UC				**X**		
170	**LITTLE TERN** *Sterna albifrons*		R/LM, UC/FC			**X**	**X**		
171	**COMMON TERN** *Sterna hirundo*		WM, S				**X**		
172	**WHITE-CHEEKED TERN** *Sterna repressa*		WM, S				**X**		
173	**WHITE-WINGED TERN** *Chlidonias leucopterus*		WM, S				**X**		
174	**BLACK-BELLIED TERN** *Sterna acuticauda*		WM, UC			**X**	**X**		
175	**GULL-BILLED TERN** *Gelochelidon nilotica*	*Tehari*	WM, FC			**X**	**X**		

176	**RIVER TERN** *Sterna aurantia*		WM, S			**X**	**X**		
177	**SANDWICH TERN** *Thalasseus sandvicensis*		WM, S				**X**		
178	**LESSER CRESTED TERN** *Thalasseus bengalensis*		WM, S				**X**		
179	**GREAT CRESTED TERN** *Thalasseus bergii*		WM, UC				**X**		
180	**CASPIAN TERN** *Hydroprogne caspia*		WM, UC				**X**		
181	**BRIDLED TERN** *Sterna anaethetus*		WM, S				**X**		
182	**SOOTY TERN** *Sterna fuscata*		WM, S				**X**		
183	**WHISKERED TERN** *Chlidonias hybrida*		WM, FC			**X**	**X**		
184	**BROWN NODDY** *Anous stolidus*	Indian Skimmer	St				**X**		
185	**INDIAN SKIMMER** *Rynchops albicollis*		St				**X**		
186	**ROCK PIGEON** *Columba livia*	*Kabutar, Parva*	R, C		**X**			**X**	**X**
187	**NILGIRI WOODPIGEON** *Columba Elphinstonii*		R/LM, S/UC	**X**					**X**
188	**ORIENTAL TURTLE-DOVE** *Streptopelia orientalis*	*Kala fakhta*	R, UC	**X**					**X**
189	**LAUGHING DOVE** Streptopelia senegalensis	*Chhota fakhta*	R, UC	**X**	**X**				**X**
190	**RED COLLARED-DOVE** *Streptopelia tranquebarica*		LM/WM, UC		**X**				
191	**SPOTTED DOVE** *Streptopelia chinensis*	*Chitroka fakhat, Thipkya kavda*	R, FC	**X**	**X**				**X**
192	**EURASIAN COLLARED-DOVE** *Streptopelia decaocto*		St		**X**				
193	**EMERALD DOVE** *Chalcophaps indica*	*Pachu kavda*	R, UC	**X**					**X**
194	**YELLOW-FOOTED GREEN-PIGEON** *Treron phoenicoptera*	*Harial(for green pigeons)*	R/LM, UC	**X**				**X**	**X**
195	**GREY-FRONTED GREEN-PIGEON** *Treron affinis*	*Harial*	R, UC	**X**					**X**
196	**ORANGE-BREASTED PIGEON** *Treron bicincta*		St	**X**					
197	**VERNAL HANGING-PARROT** *Loriculus vernalis*	*Latkan, Cheey*	R/LM, S	**X**					**X**

198	**MALABAR PARAKEET** *Psittacula columboides*	*Mandangour tota*	R/LM, UC	**X**				**X**	**X**
199	**PLUM-HEADED PARAKEET** *Psittacula cyanocephala*	*Tuiya tota, Keera*	R, UC	**X**					**X**
200	**ROSE-RINGED PARAKEET** *Psittacula krameri*	*Tota, Lybar, tota, Popat, Keera*	R, C	**X**	**X**			**X**	**X**
201	**ALEXANDRINE PARAKEET** *Psittacula eupatria*	*Rai-tota*	R, FC	**X**	**X**			**X**	**X**
202	**RED-BREASTED PARAKEET** *Psittacula alexandri*	*Madna Kajila*	Esc					**X**	
203	**GREY-BELLIED CUCKOO** *Cacomantis passerinus*	*Pousya*	R/LM, UC	**X**					**X**
204	**BANDED BAY CUCKOO** *Cacomantis sonneratii*		R/LM, UC	**X**	**X**				**X**
205	**'FORK-TAILED' DRONGO-CUCKOO** *Surniculus lugubris*		R/LM, UC	**X**					**X**
206	**JACOBIN CUCKOO** *Clamator jacobinus*	*Papiya,Chatak*	MBV, UC	**X**	**X**			**X**	
207	**CHESTNUT-WINGED CUCKOO** *Clamator coromandus*		St/PM?	**X**					
208	**ASIAN KOEL** *Eudynamys scolopaceus*	*Koel, kokil*	R, C	**X**	**X**			**X**	**X**
209	**INDIAN CUCKOO** *Cuculus micropterus*		R/LM, S	**X**					**X**
210	**COMMON CUCKOO** *Cuculus canorus*		St	**X**					
211	**SMALL CUCKOO** *Cuculus poliocephalus*		St	**X**					
212	**COMMON HAWK-CUCKOO** *Hierococcyx varius*	*Kapak*	R/LM, UC	**X**	**X**				**X**
213	**BLUE-FACED MALKOHA** *Phaenicophaeus viridirostris*		St		**X**				
214	**SIRKEER MALKOHA** *Taccocua leschenaultii*		St		**X**				
215	**GREATER COUCAL** *Centropus sinensis*	*Mahoka, Kumbhar kaola*	R, C	**X**	**X**			**X**	**X**
216	**BROWN HAWK-OWL** *Ninox scutulata*	*Chughad basra*	R, S	**X**					**X**
217	**COMMON BARN-OWL** *Tyto alba*	*Kuraya, Ghubad*	R, FC		**X**			**X**	
218	**BROWN FISH OWL** *Ketupa zeylonensis*	*Amrai-ka-ghughu, Ullu*	R, S	**X**		**X**			

219	**INDIAN EAGLE-OWL** *Bubo bengalensis*	*Ghughu, Ghubad*	R, S	**X**	**X**				**X**
220	**SHORT-EARED OWL** *Asio flammeus*		WM, UC		**X**				**X**
221	**MOTTLED WOOD OWL** *Strix ocellata*		R/LM, S	**X**					**X**
222	**INDIAN SCOPS OWL** *Otus bakkamoena*		R/LM, S	**X**					
223	**ORIENTAL SCOPS OWL** *Otus sunia*		R/LM, S	**X**	**X**				
224	**SPOTTED OWLET** *Athene brama*		R, UC	**X**	**X**			**X**	**X**
225	**JUNGLE OWLET** *Glaucidium radiatum*	*Jangli choghad*	R, FC	**X**					**X**
226	**INDIAN JUNGLE NIGHTJAR** *Caprimulgus indicus*	*Chippak*	R/LM, UC	**X**	**X**				**X**
227	**INDIAN LITTLE NIGHTJAR** *Caprimulgus asiaticus*	*Chapka*	R/LM, UC		**X**				**X**
228	**LARGE-TAILED NIGHTJAR** *Caprimulgus macrurus*		WM, S	**X**	**X**				**X**
229	**SAVANNA NIGHTJAR** *Caprimulgus affinis*	*Chhippak*	WM, S		**X**				
230	**CRESTED TREESWIFT** *Hemiprocne coronata*	*Tajdar ababeel*	R/LM, UC		**X**				**X**
231	**ASIAN PALM-SWIFT** *Cypsiurus balasiensis*	*Tadi ababeel, Shimri*	R, C	**X**	**X**	**X**		**X**	
232	**LITTLE (HOUSE) SWIFT** *Apus affinis*	*Ababeel, Pakoli*	R, C					**X**	**X**
233	**INDIAN WHITE-RUMPED SPINETAIL** *Zoonavena sylvatica*		LM, S	**X**					**X**
234	**ALPINE SWIFT** *Tachymarptis melba*	*Badi ababeel*	LM, S	**X**				**X**	**X**
235	**EUROPEAN ROLLER** *Coracias garrulus*		PM, UC/S		**X**				
236	**INDIAN ROLLER** *Coracias benghalensis*	*Tas*	WM/LM, UC	**X**	**X**			**X**	**X**
237	**COMMON HOOPOE** *Upupa epops*	*Hudhud, Hudhud*	WM, UC		**X**			**X**	**X**
238	**MALABAR TROGON** *Harpactes fasciatus*	*Kufni chiri, Karna*	St	**X**					**X**
239	**COLLARED KINGFISHER** *Todiramphus chloris*		LM, S				**X**		
240	**BLACK-CAPPED KINGFISHER** *Halcyon pileata*	*Kourilla (gen for kingfishers)*	LM, S			**X**	**X**		
241	**WHITE-THROATED KINGFISHER**	*Kilkila, Khandya*	R, C	**X**	**X**	**X**	**X**	**X**	**X**

	Halcyon smyrnensis								
242	**LESSER PIED KINGFISHER** *Ceryle rudis*	*Koryala*	St			**X**	**X**		
243	**BLACK-BACKED DWARF KINGFISHER** *Ceyx erithaca*		MBV, UC	**X**					**X**
244	**COMMON KINGFISHER** *Alcedo atthis*	*Chhota kilkila*	R, UC			**X**	**X**		
245	**BLUE-CHEEKED BEE-EATER** *Merops persicus*	*Bada patringa*	PM, UC		**X**	**X**			
246	**BLUE-TAILED BEE-EATER** *Merops philippinus*	*Bada patringa*	PM, UC		**X**	**X**			
247	**LITTLE GREEN BEE-EATER** *Merops orientalis*	*Patringa*	R/LM, C	**X**	**X**	**X**		**X**	**X**
248	**MALABAR GREY HORNBILL** *Ocyceros griseus*		LM, S/St	**X**					
249	**INDIAN GREY HORNBILL** *Ocyceros birostris*	*Dhanmar, Bhinas*	R, FC	**X**				**X**	**X**
250	**GREAT PIED HORNBILL** *Buceros bicornis*	*Banrao, Garud*	St	**X**					
251	**MALABAR PIED HORNBILL** *Anthracoceros coronatus*	*Dhan chiri*	St	**X**					
252	**COPPERSMITH BARBET** *Megalaima haemacephala*	*Katphora, Juktuk*	R, C	**X**	**X**			**X**	**X**
253	**WHITE-CHEEKED BARBET** *Megalaima viridis*	*Chhota basantha*	R, UC	**X**					**X**
254	**BROWN-HEADED BARBET** *Megalaima zeylanica*	*Bada basanta, Kuturga*	R, C	**X**				**X**	**X**
255	**EURASIAN WRYNECK** *Jynx torquilla*	*Gardan eyengtha*	WM/PM, UC/S	**X**	**X**			**X**	
256	**HEART-SPOTTED WOODPECKER** *Hemicircus canente*		R, UC	**X**					**X**
257	**INDIAN PYGMY WOODPECKER** *Dendrocopos nanus*		R, S	**X**					**X**
258	**YELLOW-FRONTED PIED WOODPECKER** *Dendrocopos mahrattensis*	*Katphora (gen woodpeckers)*	R, UC	**X**	**X**				**X**
259	**LESSER**		St	**X**					**X**

	YELLOWNAPE *Picus flavinucha*								
260	**RUFOUS WOODPECKER** *Micropternus brachyurus*		R, UC	**X**					
261	**BLACK-RUMPED FLAMEBACK** *Dinopium benghalense*		R, UC	**X**					**X**
262	**WHITE-NAPED FLAMEBACK** *Chrysocolaptes festivus*		R, S	**X**					
263	**INDIAN PITTA** *Pitta brachyura*	*Navrang*	R/PM, UC	**X**	**X**			**X**	**X**
264	**ORIENTAL SKYLARK** *Alauda gulgula*	*Bharat*	R, UC		**X**				
265	**MALABAR LARK** *Galerida malabarica*		R, S		**X**				**X**
266	**ASHY-CROWNED FINCH-LARK** *Eremopterix griseus*	*Diyora*	R, UC		**X**				
267	**RUFOUS-TAILED LARK** *Ammomanes phoenicura*		R, UC		**X**		**X**		**X**
268	**GREATER SHORT-TOED LARK** *Calandrella brachydactyla longipennis*	*Pullak*	WM, UC		**X**		**X**		
269	**SAND MARTIN** *Riparia riparia*		St		**X**	**X**	**X**		
270	**DUSKY CRAG-MARTIN** *Ptyonoprogne concolor*	*Chatan ababil*	R/LM, UC		**X**			**X**	**X**
271	**EURASIAN CRAG-MARTIN** *Ptyonoprogne rupestris*		WM, UC		**X**			**X**	**X**
272	**STREAK-THROATED SWALLOW** *Hirundo fluvicola*	*Nahar ababil*	R/LM, UC		**X**	**X**			
273	**BARN SWALLOW** *Hirundo rustica*	*Masjid-ababil*	WM, FC		**X**	**X**		**X**	**X**
274	**RED-RUMPED SWALLOW** *Hirundo daurica*	*Masjid-ababil*	R/LM/WWM, FC	**X**		**X**		**X**	**X**
275	**WIRE-TAILED SWALLOW** *Hirundo smithii*	*Ababil*	WM, UC			**X**	**X**		
276	**WESTERN YELLOW WAGTAIL** *Motacilla flava*	*Pilkya*	WM, FC			**X**	**X**		
277	**GREY WAGTAIL** *Motacilla cinerea*		WM, FC	**X**		**X**	**X**	**X**	**X**
278	**CITRINE WAGTAIL** *Motacilla citreola*	*Pilkya, Pani-ka-pilkya*	WM, UC			**X**			
279	**FOREST WAGTAIL** *Dendronanthus indicus*		WM, S	**X**					**X**

280	**WHITE WAGTAIL** *Motacilla alba*	*Dhoban*	WM, UC			**X**			
281	**WHITE-BROWED WAGTAIL** *Motacilla maderaspatensis*	*Mamula*	St			**X**			
282	**OLIVE-BACKED PIPIT** *Anthus hodgsoni*	*Musarichi*	WM, UC	**X**	**X**				**X**
283	**TREE PIPIT** *Anthus trivialis*		WM, UC	**X**	**X**				**X**
284	**PADDYFIELD PIPIT** *Anthus rufulus*	*Rugail*	R/LM, UC						
285	**TAWNY PIPIT** *Anthus campestris*		WM, UC		**X**				
286	**BLYTH'S PIPIT** *Anthus godlewskii*		WM, S		**X**				
287	**RICHARD'S PIPIT** *Anthus richardi*	*Anthus richardi*	WM, S		**X**				
288	**LONG-BILLED PIPIT** *Anthus similis*		St		**X**				
289	**GREAT TIT** *Parus major*		St	**X**					
290	**ASHY WOODSWALLOW** *Artamus fuscus*		R/LM, S		**X**				
291	**COMMON WOODSHRIKE** *Tephrodornis pondicerianus*	*Keroula*	R, FC	**X**	**X**				
292	**BLACK-HEADED CUCKOO-SHRIKE** *Coracina melanoptera*	*Jangli kasya*	R, UC	**X**					**X**
293	**LARGE CUCKOOSHRIKE** *Coracina macei*	*Kasya*	R, UC	**X**					**X**
294	**ORANGE MINIVET** *Pericrocotus flammeus*	*Pahari bulalchashm*	R, UC	**X**					**X**
295	**SMALL MINIVET** *Pericrocotus cinnamomeus*	*Bulalchashm*	R, UC	**X**					**X**
296	**ASHY MINIVET** *Pericrocotus divaricatus*		St / PM?	**X**					
297	**RED-VENTED BULBUL** *Pycnonotus cafer*	*Bulbul, Guldum*	R, C	**X**	**X**	**X**		**X**	**X**
298	**RED-WHISKERED BULBUL** *Pycnonotus jocosus*	*Kamera bulbul*	R, FC	**X**				**X**	**X**
299	**WHITE-EARED BULBUL** *Pycnonotus leucotis*		R, UC		**X**	**X**	**X**	**X**	
300	**WHITE-BROWED BULBUL** *Pycnonotus luteolus*	*Khar bulbul*	R, UC	**X**	**X**				

301	**YELLOW-BROWED BULBUL** *Lole indica*		R, S	**X**					**X**
302	**SQUARE-TAILED BLACK BULBUL** *Hypsipetes ganeesa*		St	**X**					**X**
303	**COMMON IORA** *Aegithina tiphia*	*Shaubeegi*	R, UC	**X**	**X**			**X**	**X**
304	**GOLD-FRONTED LEAFBIRD** *Chloropsis aurifrons*	*Chota harrial*	R, FC	**X**					**X**
305	**JERDON'S LEAFBIRD** *Chloropsis jerdoni*		R, S	**X**					**X**
306	**ASIAN FAIRY BLUEBIRD** *Irena puella*		St	**X**					
307	**LONG-TAILED SHRIKE** *Lanius schach*		WM, FC		**X**			**X**	**X**
308	**SOUTHERN GREY SHRIKE** *Lanius meridionalis*		St		**X**				
309	**BROWN SHRIKE** *Lanius cristatus*		WM, UC		**X**				
310	**ISABELLINE SHRIKE** *Lanius isabellinus*		WM, S		**X**				
311	**BAY-BACKED SHRIKE** *Lanius vittatus*	*Pachanak*	WM, S		**X**				**X**
312	**GREY HYPOCOLIUS** *Hypocolius ampelinus*		St				**X**		
313	**BLACK-NAPED BLUE MONARCH** *Hypothymis azurea*		R, FC	**X**	**X**				**X**
314	**ASIAN PARADISE FLYCATCHER** *Terpsiphone paradisi*	*Shah bulbul*	WM/R, UC	**X**	**X**			**X**	**X**
315	**WHITE-THROATED FANTAIL** *Rhipidura albicollis*		R, C	**X**	**X**			**X**	**X**
316	**WHITE-BROWED FANTAIL** *Rhipidura aureola*		R/LM, S	**X**	**X**				**X**
317	**BLUE ROCK-THRUSH** *Monticola solitarius*	*Pandu(male) Maal(female)*	WM, UC		**X**			**X**	**X**
318	**BLUE-HEADED ROCK-THRUSH** *Monticola cinclorhynchus*		WM, S	**X**					**X**
319	**ORANGE-HEADED THRUSH** *Zoothera citrina*		R, UC	**X**					**X**
320	**MALABAR WHISTLING-THRUSH** *Myophonus horsfieldii*	*Kasturo, Gogi*	R, UC	**X**					**X**
321	**INDIAN BLACKBIRD** *Turdus simillimus*		WM, S	**X**	**X**				**X**

322	**TICKELL'S THRUSH** *Turdus unicolor*		St	**X**					
323	**BLUETHROAT** *Luscinia svecica*	*Nil kanthi*	WM, FC		**X**	**X**			
324	**WHITE-RUMPED SHAMA** *Copsychus malabaricus*	*Shama*	R, UC	**X**					**X**
325	**ORIENTAL MAGPIE-ROBIN** *Copsychus saularis*	*Dhaiyal, Dominga*	R, C	**X**	**X**			**X**	**X**
326	**INDIAN BLACK ROBIN** *Saxicoloides fulicatus*		R, UC		**X**				**X**
327	**BLACK REDSTART** *Phoenicurus ochruros rufiventris/phoenicuroides*	*Thirthira*	WM, S		**X**				
328	**ISABELLINE WHEATEAR** *Oenanthe isabellina*		WM, S		**X**		**X**		
329	**DESERT WHEATEAR** *Oenanthe deserti*		WM, UC		**X**				
330	**PIED BUSHCHAT** *Saxicola caprata*		WM, UC		**X**				**X**
331	**COMMON STONECHAT** *Saxicola torquatus*		WM, UC		**X**				
332	**INDIAN BLUE ROBIN** *Luscinia brunnea*		WM, S	**X**					**X**
333	**ASIAN BROWN FLYCATCHER** *Muscicapa dauurica*	*Zakki*	WM, S	**X**					**X**
334	**RUSTY-TAILED FLYCATCHER** *Muscicapa ruficauda*		WM, S	**X**					**X**
335	**ULTRAMARINE FLYCATCHER** *Ficedula superciliaris*		WM, S	**X**					**X**
336	**RED-BREASTED FLYCATCHER** *Ficedula parva*	*Turra*	WM, FC	**X**	**X**				**X**
337	**TICKELL'S BLUE FLYCATCHER** *Cyornis tickelliae*		R, FC	**X**	**X**				**X**
338	**WHITE-BELLIED BLUE FLYCATCHER** *Cyornis pallipes*		St	**X**					**X**
339	**VERDITER FLYCATCHER** *Eumyias thalassinus*		WM, UC	**X**					**X**
340	**GREY-HEADED FLYCATCHER** *Culicicapa ceylonensis*		WM, UC	**X**					**X**
341	**SPOTTED FLYCATCHER** *Muscicapa striata*		WM, S/St		**X**				

342	**YELLOW-EYED BABBLER** *Chrysomma sinense*		R/LM, UC		**X**				
343	**TAWNY-BELLIED BABBLER** *Dumetia hyperythra*		R, S	**X**	**X**				**X**
344	**COMMON BABBLER** *Turdoides caudata*	*Chilchil*	R/LM, S		**X**		**X**		
345	**JUNGLE BABBLER Turdoides striata**	*Sat bhai*	R, FC	**X**					**X**
346	**INDIAN SCIMITAR - BABBLER** *Pomatorhinus schisticeps*		R, UC	**X**					**X**
347	**BROWN-CHEEKED FULVETTA** *Alcippe poioicephala*		R, UC	**X**					**X**
348	**PUFF-THROATED BABBLER** *Pellorneum ruficeps*		R, FC	**X**					**X**
349	**ZITTING CISTICOLA** *Cisticola juncidis*	*Ghaski-phutki*	R/LM, UC		**X**	**X**			
350	**GRASSHOPPER WARBLER** *Locustella naevia*		WM, UC		**X**				**X**
351	**ASHY PRINIA Prinia socialis**	*Phutki, kali phutki*	R, C	**X**	**X**			**X**	
352	**GREY-BREASTED PRINIA** *Prinia hodgsonii*	*Phutki*	R, C	**X**	**X**				**X**
353	**JUNGLE PRINIA** *Prinia sylvatica*		R/LM, UC	**X**	**X**				**X**
354	**PLAIN PRINIA** *Prinia inornata*	*Phutki*	R/LM, UC		**X**	**X**			
355	**CLAMOROUS REED WARBLER** *Acrocephalus [stentoreus] brunnescens*	*Karkat*	R, FC				**X**		
356	**BLYTH'S REED WARBLER** *Acrocephalus dumetorum*	*Podna*	WM, C	**X**	**X**			**X**	
357	**PADDYFIELD WARBLER** *Acrocephalus agricola*		WM, UC		**X**				
358	**BOOTED WARBLER** *Hippolais caligata*		WM, UC	**X**	**X**			**X**	
359	**COMMON TAILORBIRD** *Orthotomus sutorius*	*Darzee, Darzee*	R, C	**X**	**X**			**X**	**X**
360	**SIBERIAN CHIFFCHAFF** *Phylloscopus [collybita] tristis*		WM, S	**X**	**X**				
361	**BRIGHT-GREEN WARBLER** *Phylloscopus nitidus*		WM, UC	**X**	**X**				**X**

362	**SULPHUR-BELLIED WARBLER** *Phylloscopus griseolus*		WM, UC	**X**	**X**			**X**	
363	**TICKELL'S LEAF-WARBLER** *Phylloscopus affinis*		WM, UC	**X**	**X**				
364	**TYTLER'S LEAF-WARBLER** *Phylloscopus tytleri*		WM, S	**X**					**X**
365	**GREENISH WARBLER** *Phylloscopus trochiloides viridanus*		WM, C	**X**				**X**	**X**
366	**HUME'S LEAF-WARBLER** *Phylloscopus humei*		WM, S	**X**	**X**				
367	**WESTERN CROWNED WARBLER** *Phylloscopus occipitalis*		WM, S	**X**					**X**
368	**EASTERN ORPHEAN WARBLER** *Sylvia crassirostris*		WM, S		**X**				
369	**ASIAN DESERT WARBLER** *Sylvia nana*		St		**X**				
370	**LESSER (OR HUME'S) WHITETHROAT** *Sylvia spp*		WM, UC		**X**			**X**	
371	**PALE-BILLED FLOWERPECKER** *Dicaeum erythrorhynchos*	*Phoolchuki*	R, FC	**X**	**X**			**X**	**X**
372	**THICK-BILLED FLOWERPECKER** *Dicaeum agile*		R, FC	**X**					**X**
373	**NILGIRI FLOWERPECKER** *Dicaeum concolor*		R, S	**X**					**X**
374	**PURPLE-RUMPED SUNBIRD** *Leptocoma zeylonica*	*Shakarkhora*	R, C	**X**	**X**			**X**	**X**
375	**SMALL SUNBIRD** *Leptocoma minima*	*Chhota shakar khora*	R, UC	**X**					**X**
376	**PURPLE SUNBIRD** *Cinnyris asiaticus*	*Shakar khora, Chumka*	R, C	**X**				**X**	**X**
377	**LOTEN'S SUNBIRD** *Cinnyris lotenius*		R, UC	**X**					
378	**VIGORS'S SUNBIRD** *Aethopyga vigorsii*		R, UC	**X**					**X**
379	**ORIENTAL WHITE-EYE** *Zosterops palpebrosus*	*Baboona*	R/LM, S	**X**	**X**				**X**
380	**CRESTED BUNTING** *Melophus lathami*	*Pathar chiria*	R/LM, S		**X**				**X**
381	**BLACK-HEADED BUNTING** *Emberiza melanocephala*	*Gandam*	WM, S		**X**				

382	**RED-HEADED BUNTING** *Emberiza bruniceps*	*Gandam*	WM, S		**X**				
383	**GREY-NECKED BUNTING** *Emberiza buchanani*		St		**X**				
384	**COMMON ROSEFINCH** *Carpodacus erythrinus roseatus group*	*Tuti*	WM, UC	**X**	**X**			**X**	**X**
385	**TRICOLOURED MUNIA** *Lonchura malacca*	*Nakalnor*	R/LM, UC	**X**	**X**				
386	**INDIAN SILVERBILL** *Euodice malabarica*		R/LM, UC		**X**			**X**	
387	**WHITE-RUMPED MUNIA** *Lonchura striata*		R/LM, UC		**X**				**X**
388	**SCALY-BREASTED MUNIA** *Lonchura punctulata*	*Telia munia*	R/LM, FC	**X**	**X**			**X**	**X**
389	**RED AVADAVAT** *Amandava amandava*	*Lal, Lal munia*	R/LM, FC		**X**			**X**	
390	**HOUSE SPARROW** *Passer domesticus*	*Gauriya, Churi*	R, C		**X**			**X**	**X**
391	**YELLOW-THROATED SPARROW** *Petronia xanthocollis*	*Raji*	R/LM, UC	**X**					**X**
392	**BAYA WEAVER** *Ploceus philippinus*	*Baya*	R/LM, UC		**X**			**X**	
393	**BLACK-BREASTED WEAVER** *Ploceus benghalensis*	*Sarbo baya*	R/LM, S		**X**				
394	**EUROPEAN GOLDEN ORIOLE** *Oriolus oriolus*	*Peelak, Peelak*	R/WM, FC	**X**	**X**			**X**	**X**
395	**BLACK-HOODED ORIOLE** *Oriolus xanthornus*	*Peelak, Zardak*	R, FC	**X**					**X**
396	**BLACK-NAPED ORIOLE** *Oriolus chinensis*	*Peelak, Peelak*	St	**X**				**X**	
397	**BLACK DRONGO** *Dicrurus macrocercus*	*Kolsa, Chosia*	R, C	**X**	**X**			**X**	**X**
398	**ASHY DRONGO** *Dicrurus leucophaeus*		WM, C	**X**					**X**
399	**BRONZED DRONGO** *Dicrurus aeneus*	*Chhota kesraj*	R/LM, UC	**X**					**X**
400	**WHITE-BELLIED DRONGO** *Dicrurus caerulescens*	*Pahari Bujanga*	R, UC	**X**					**X**
401	**GREATER RACKET-TAILED DRONGO** *Dicrurus paradiseus*		R, FC	**X**					**X**
402	**HAIR-CRESTED DRONGO**		WM, UC	**X**					**X**

	Dicrurus hottentottus								
403	**BRAHMINY STARLING** *Temenuchus pagodarum*	*Popoya myna*	St		**X**	**X**			
404	**ROSY STARLING Sturnus roseus**	*Gulabi myna*	WM, C		**X**	**X**	**X**	**X**	
405	**GREY-HEADED STARLING** *Strunia malabarica*	*Pawei*	PM/LM, UC		**X**			**X**	
406	**MALABAR WHITE-HEADED STARLING** *Sturnia blythii*		PM/LM, UC		**X**			**X**	
407	**ASIAN PIED STARLING** *Gracupica contra*	*Ablak Myna*	R, C (Esc)		**X**	**X**		**X**	
408	**BANK MYNA** *Acridotheres ginginianus*		St		**X**	**X**			
409	**COMMON MYNA Acridotheres tristis**	*Desi myna, Shale*	R, C	**X**	**X**	**X**	**X**	**X**	**X**
410	**JUNGLE MYNA** *Acridotheres fuscus*	*Pahari myna*	R/LM, UC	**X**					**X**
411	**HOUSE CROW Corvus splendens**	*Kowwa, desi kowwa, Kaola*	R, C	**X**	**X**	**X**	**X**	**X**	**X**
412	**INDIAN JUNGLE CROW** *Corvus [macrorhynchos] culminatus*	*kala kowwa, Dom kaula*	R, C	**X**	**X**			**X**	**X**
413	**RUFOUS TREEPIE** *Dendrocitta vagabunda*	*Mahalat*	R, UC	**X**					**X**

STATUS: R - Resident
WM - Winter Migrant
LM - Local Migrant
PM - Passage Migrant
MBV - Monsoon Breeding Visitor
Esc - Originally Escaped from Captivity

C - Common (Seen > 80% visits)
FC - Fairly Common (Seen 50 - 80% visits)
UC - Uncommon (Seen 10 - 50% visits)
S - Scarce (Seen < 10% of visits)
St - Straggler (One or two stray reports)

MMR Avifauna

– Inventory Notes & Observations

The following notes refer to all species reported in MMR over the past 30 years (1980 onward). Species that were reported prior to this date are listed in a special Annexure. These notes are not a field identification guide for species but present an overview of status, threats and suchlike aspects of conservation concern. The sequence of species listing follows the Inventory.

Explanation of Terms:

IUCN Status: Pertains to the conservation status of every species based on The **IUCN Red List of Threatened Species.** This is the best-known worldwide conservation status listing and ranking system that classifies species by the IUCN Red List into nine groups set through criteria such as rate of decline, population size, area of geographic distribution, and degree of population and distribution fragmentation.

Local Status: Pertains to the status in terms of abundance, distribution, decline factors in the local region, which in this case refers to the MMR.

Habitat: Refers to the kind of Habitat a species inhabits as per descriptions employed by this Project.

Key Sites in MMR: The sites in MMR where the species is best seen or has the best potential for survival

Observations/Remarks: General observation comments of specific importance

Conservation Concerns: Pertains to conservation problems for a species and includes natural and human impacted parameters

Earliest Winter Date: Refers to earliest winter date during project fieldwork (period from 2009 November– 2012 November), on which a migrant species has been sighted in the MMR.

Latest Summer Date: Refers to the last summer date during project fieldwork period on which a migrant species has been sighted in the MMR.

It must be clarified that these dates are assessed chiefly for species that have been regularly monitored and assessed for status and are more consistent winter visitors in the region.

LOCAL STATUS DESCRIPTIONS:

R: Resident, **WM:** Winter Migrant, **LM:** Local Migrant, **PM**: Passage Migrant,

MBV: Monsoon Breeding Visitor**, Esc:** Originally Escaped from Captivity but may be resident now

C - Common (Seen > 80% visits). This ranking in some cases also given on basis of sighting frequency being higher in proportion to specific habitat types visited.

FC - Fairly Common (Seen 50 - 80% visits)

UC - Uncommon (Seen 10 - 50% viists)

S - Scarce (Seen < 10% of visits)

St - Straggler (One or two stray reports)

♫ - Indicates species has a diagnostic call and may be identified in field by its call-note(s)

All field-trip reports in the Field Logs are based on 4 - 5 hour field visits on average between 6:30 – 11:30 am. Evening Day trips are based on 2.5 hour trips between 4:30 – 7 pm.

LITTLE GREBE *Tachybaptus ruficollis*

IUCN Status: Least Concern **Local Status:** UC/FC

Habitat: Fresh-water wetlands; occasionally brackish waters

Key Sites in MMR: Most lakes

Observations/Remarks: The Little Grebe seems to be able to survive wherever there are fresh water-bodies with some vegetation, also seen on polluted, dirty water. Moves locally in some areas, appearing when the monsoon has well set-in and sites have been inundated; a good example is the Aarey pond, that is dry for over half the year but when waterlogged it is home to two breeding pairs of this bird most years. In Greater Mumbai this species is restricted chiefly to Vihar, Powai and Lokhandwala Lakes, with only sporadic sightings today in the Mira – Bhayandar – Gorai marshes. The species has also been sighted on the small pond created in recent years in Maharashtra Nature Park (MNP).

Conservation Concerns: Loss of fresh-water wetlands, continuing pollution, loss of water quality, poaching.

TROPICBIRDS

RED-BILLED TROPIC-BIRD *Phaethon aethereus*

IUCN Status: Least Concern **Local Status:** St

Habitat: Pelagic, coast

Key Sites in MMR: Unconfirmed sighting off South Mumbai coast Sept 1982

Observations/Remarks: There are about half dozen records of this species, mostly wind-swept during the early half of the SW monsoon season (June-July).

Conservation Concerns: Not assessed

PELICANS

GREAT WHITE PELICAN *Pelecanus onocrotalus*

IUCN Status: Least Concern **Local Status:** St

Habitat/Key Sites in MMR: Wetlands

Observations/Remarks: Rarity in region, perhaps a straggler. Only sighted in Uran wetlands, when a solitary bird was seen for two weeks during October – November 2004.

Conservation Concerns: Not assessed.

CORMORANTS

INDIAN SHAG P*halacrocorax fuscicollis*

IUCN Status: Least Concern **Local Status:** C/FC, R/LM

Habitat/Key Sites in MMR: Fresh-water wetlands; occasionally brackish waters. Increasingly being sighted on **m**ost larger freshwater bodies, creeks

Observations/Remarks: The species was uncommon until as recently as 2001. Over the past decade it has slowly been expanding its range in the MMR, with numbers rising over several major water-bodies, including the various tidal creeks. Often seen along with the commoner *P niger*. We have a total of 109 sighting reports of this species during project fieldwork, which is roughly half the encounter frequency of *P niger*.

Conservation Concerns: Loss of large wetlands.

GREAT CORMORANT *Phalacrocorax carbo*

IUCN Status: Least Concern **Local Status:** S, LM?

Habitat/Key Sites in MMR: Fresh-water wetlands; occasionally brackish waters

Observations/Remarks: Scarce in MMR presently; 08 sightings during project fieldwork, from Kalyan, Vasai-Virar and Alibaug regions, though there have also been a few sightings in the Greater Mumbai area over the years, including a small flock once on the Bandra pond (*Talao*); has been sighted sporadically across the MMR during the past decade and it appears that this species is very slowly increasing in numbers in several urban surrounds in recent times, and it would be interesting to observe its developing status in the context of the MMR.
Conservation Concerns: Loss and disturbance to habitat.

LITTLE CORMORANT *Phalacrocorax niger*
IUCN Status: Least Concern **Local Status:** C, R
Habitat/Key Sites in MMR: Fresh-water wetlands; occasionally brackish waters. Seen on **a**lmost every water-body, including urban ponds and polluted creeks
Observations/Remarks: This is one of the commonest birds in MMR; has benefitted immensely by its ability to survive in brackish water; commonly nests with Cattle Egret in heronries. A very high Encounter Frequency of just over 80%.
Conservation Concerns: Appears to be thriving now.

DARTER

ORIENTAL DARTER *Anhinga melanogaster*
IUCN Status: Near Threatened, Decreasing **Local Status:** St
Habitat: Key Sites in MMR: Large freshwater bodies
Observations/Remarks: Not reported during project fieldwork. There were a few reports of sightings during 1986 – 2001 and only more sighting since, when a solitary bird was seen on 25 December 2005. Not been sighted since.
Conservation Concerns: Not assessed for region, but generally habitat loss, pollution.

FRIGATE BIRDS

LESSER FRIGATEBIRD *Fregata ariel*
IUCN Status: Least concern, decreasing **Local Status:** St
Habitat: Key Sites in MMR: Coast, oceanic

Observations/Remarks: Like several other species, may be blown toward coast during strong pre-monsoon and monsoon winds. Several sightings during 1990 – 2005 off the MMR coast. No report during project fieldwork.

Conservation Concerns: Not assessed.

GREAT FRIGATEBIRD *Fregeta minor*

IUCN Status: Least concern, decreasing **Local Status:** St

Habitat: Key Sites in MMR: Coast, oceanic

Observations/Remarks: Very few confirmed records from MMR; last reports of the species'sightings in region include off Cuffe-Parade, South Mumbai, late-1990s and a solitary report during August 2003.

Conservation Concerns: Not assessed.

BOOBIES

MASKED BOOBY *Sula dactylatra*

IUCN Status: Least Concern **Local Status:** St

Habitat: Key Sites in MMR: Coast, Pelagic

Observations/Remarks: Usually a few get blown towards the coast during strong pre-monsoon and monsoon winds; nearly all records over the years during June – August; the most recent for the region was of a lone bird off the NW Mumbai coast in August 2010.

Conservation Concerns: Not assessed.

RED-FOOTED BOOBY *Sula sula*

IUCN Status: Least Concern **Local Status:** St

Habitat: Key Sites in MMR: Coast, Pelagic

Observations/Remarks: No encounter during project field-work; last reported sighting of this species in MMR is dated 15 Aug 2001, off the Colaba coast.

Conservation Concerns: Not assessed.

BITTERNS, HERONS & EGRETS

WESTERN REEF-EGRET *Egretta gularis*

IUCN Status: Least Concern **Local Status:** UC/FC, LM/WM

Habitat: Key Sites in MMR: Coast, Creeks

Observations/Remarks: Intermittently seen along coast and on creeks and estuaries; the greyer (darker) morph is more often seen here. Very few sightings June – early-October (only 02 out of a total of 42 sighting reports), indicating the species migrates locally for breeding.

Conservation Concerns: Not assessed but evidently avoids polluted and dirty creeks and coast.

LITTLE EGRET *Egretta garzetta*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat: Key Sites in MMR: Coast, creeks, inland freshwater sites

Observations/Remarks: Widespread in MMR but nowhere common; a small population breeds here and it appears that numbers are augmented during winter by an influx from birds from beyond MMR. Appears to be more widespread overall in the region than *E alba* and *E intermedia*, with as many as 99 sighting reports during project fieldwork. Evidently least gregarious of the four white egrets.

Conservation Concerns: Not assessed but seems to avoid the more polluted wetlands.

GREAT EGRET *Egretta alba*

IUCN Status: Least Concern **Local Status:** UC, LM/WM/R

Habitat: Key Sites in MMR: Creeks, estuaries, inland freshwater wetlands

Observations/Remarks: Invariably a part of the mixed egret flocks on creeks and inland wetlands; less common overall than *E intermedia* and sometimes collecting into loosely scattered flocks, especially over brackish wetlands. BPS/Thane Creek and Manori Creek are key sites.

Conservation Concerns: Not assessed.

INTERMEDIATE EGRET *Egretta intermedia*

IUCN Status: Least Concern **Local Status:** FC, LM/R

Habitat: Key Sites in MMR: Creeks, inland freshwater wetlands

Observations/Remarks: The second tallest egret in the MMR, invariably seen along with other egrets, sometimes several together; like with *E garzetta*, a small population breeds here and there seems to be an influx of birds from outside the MMR during winter.

Conservation Concerns: Not assessed.

EASTERN CATTLE EGRET *Bubulcus coromandus*

IUCN Status: Least Concern **Local Status:** C, WS

Habitat: Key Sites in MMR: Omnipresent. Typically wetland and wetland-edge species but greatly adapted to human-impacted environs, including enormous congregations on landfill sites, fish-drying yards; commonly nests in crowded localities.

Observations/Remarks: Amongst the most rapidly expanding species; has become very common over past quarter of a century; scattered flocks of over 2000 birds seen on fish-drying site off Malad Creek and on landfill sites. Commonly nests amid crowded localities. Amongst the 5 highest Encounter Frequency species, at nearly 95%.

Conservation Concerns: Species is thriving in the region.

GREY HERON *Ardea cinerea*

IUCN Status: Least Concern **Local Status:** UC/FC, LM/WM

Habitat: Key Sites in MMR: Creeks, inland freshwater wetlands

Observations/Remarks: Usually solitary but sometimes several scattered on a large wetland; seems to prefer more open wetlands and margins; up to two dozen birds have been sighted scattered over a wide expanse of wetlands at Uran. A total of 83 sighting reports during project fieldwork, with very few reports June – September, indicating local migration for breeding. No breeding observed thus far in the MMR.

Conservation Concerns: Not assessed.

PURPLE HERON *Ardea purpurea*

IUCN Status: Least Concern **Local Status:** UC, LM/WM

Habitat: Key Sites in MMR: Chiefly inland freshwater wetlands.

Observations/Remarks: More solitary than other herons; prefers reed-covered and vegetation encrusted wetlands. Can be regularly sighted on the Lokhandwala Lake, in the western suburbs, which remains one of the few sites in present-day western suburbs where this bird regularly occurs. Less widespread overall than *A cinerea*.

Conservation Concerns: Habitat loss, disturbance

INDIAN POND-HERON *Ardeola grayii*

IUCN Status: Least Concern **Local Status:** C, R/LM

Habitat: Key Sites in MMR: Inland freshwater wetlands, creeks, coast

Observations/Remarks: One of the most widespread birds but often overlooked until it takes wing; also seen on rain-filled depressions, even amid crowded urban localities. A total of 183 sighting reports (over 65% Encounter Frequency) during project fieldwork. Often breeds in mixed heronries along with *Babulcus coromandus, Phalacrocorax niger* and some other species.

Conservation Concerns: Not assessed.

BLACK-CROWNED NIGHT-HERON *Nycticorax nycticorax*

IUCN Status: Least Concern **Local Status:** FC

Habitat: Key Sites in MMR: Wetland margins (feeding) and Large, leafy trees (roost-sites, nesting). Most larger wetlands, forest streams, mangrove creeks

Observations/Remarks: Crepuscular and nocturnal bird of wetland margins; spends day in leafy foliage in tall trees, sometimes amid crowded localities, also nesting high in these trees; most breeding here observed April - July.

Conservation Concerns: Loss of large trees robs it of roosting and nesting sites.

STRIATED (LITTLE) HERON *Butorides striata*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat: Key Sites in MMR: Mangrove Creeks. Best seen along Thane Creek, Palm Beach Road

Observations/Remarks: Secretive little heron, seldom emerging in open. For most part remains on ooze and low branches of mangrove vegetation, occasionally seen at water's edge.

Conservation Concerns: Habitat disturbance, pollution. Few sightings along Malad and Manori Creeks in recent years, where quite regularly sighted until early-2000s.

BLACK BITTERN *Dupetor flavicollis*

IUCN Status: Least Concern **Local Status:** S, LM?/WM?

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Only 01 confirmed sighting during project fieldwork from Panvel Lake; 01 unconfirmed report from Vasai-Gaas (*not taken into consideration here*); there is also another sighting dating to 1987 from Vihar Lake marginis, in SGNP.

Conservation Concerns: Not assessed .

CHESTNUT BITTERN *Ixobrychus cinnamomeus*

IUCN Status: Least Concern **Local Status:** R/LM, UC

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Overlooked much of the year, most visible with onset of monsoon conditions; population has declined much in MMR in recent years. Of a total of 22 sighting reports during project fieldwork, while there were 02 sightings in the Mira – Bhayandar marshes during June 2010 (Phase 1 of Project), there was no sighting from that area since. It must be reiterated that the Mira-Bhayandar wetlands were one of the most extensive network of bird-rich herbage and reed-fringed waterbodies, of which an estimated 46 separate sites existed up to late-1990's. Barely 02 of these remain today, so near complete has been the destruction of this habitat in recent years in the wake of rampant developmental expansion.

Conservation Concerns: Habitat loss, very high decline in population in recent years.

YELLOW BITTERN *Ixobrychus Sinensis*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Less common overall than *I cinnamomeus*, the two species sometimes seen in same wetland area; most visible with onset of monsoon conditions. Up to 2004, there was a very good population of this species as well as of *I cinnamomeus* on the (then) extensive reedy marshes in Mira – Bhayander; an estimated 90% of the wetlands have disappeared and there has been a significant decline in the numbers of both these species of bittern.

Conservation Concerns: Habitat loss, very high decline in population in recent years

STORKS

ASIAN OPENBILL *Anastomus oscitans*

IUCN Status: Least Concern **Local Status:** FC, LM/WM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Uncommon until about a decade ago, this is one of several wetland (along with several other habitat species) birds whose numbers have increased in MMR over past few years; sighted more often on brackish wetlands. A total of 48 separate encounters

during project fieldwork, with nearly as many sightings of *Mycteria leucocephala*, the latter species sometimes seen in larger gatherings.

Conservation Concerns: Not assessed.

WHITE STORK *Ciconia ciconia*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Mostly brackish wetlands

Observations/Remarks: In recent years a sparse visitor during winter, with very few sightings since early-2000's. Has disappeared from several sites where seen earlier. There were 04 sighting reports during project fieldwork, from Uran, Vasai – Gaas, and Gandhari.

Conservation Concerns: Though the species enjoys a Least Concern status globally, however, in MMR the species had declined extensively over past quarter of a century.

WOOLLY-NECKED STORK *Ciconia episcopus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Inland freshwater wetlands, margins

Observations/Remarks: Mostly solitary, seldom with other storks; 13 reports during project fieldwork, mostly in the NE and S areas of MMR.

Conservation Concerns: Not assessed but general habitat loss and disturbance

PAINTED STORK *Mycteria leucocephala*

IUCN Status: Near threatened, **Local Status:** UC, LM/WM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands. BPS is a major site.

Observations/Remarks: Usually gregarious, sometimes a few hundred seen at BPS; often with other storks and waders; most numbers and sightings December – April. Has been sighted on highly polluted wetlands and margins. Is marginally more numerous than *Anastomus oscitans*, which however seems to be becoming more widespread in recent years.

Conservation Concerns: Declining globally but numbers increasing in recent years in MMR.

BLACK STORK *Ciconia nigra*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Brackish wetlands

Observations/Remarks: A rare visitor to the MMR; no report from MMR during project fieldwork though one was sighted on Barvi dam, just east of MMR in December 2012. Couple of sighting reports over past decade from the Uran wetlands.

Conservation Concerns: Not assessed.

LESSER ADJUTANT *Leptoptilos javanicus*

IUCN Status: Vulnerable **Local Status:** S, WM?

Habitat: Key Sites in MMR: Inland freshwater wetlands

Observations/Remarks: Species never reported in MMR until a solitary specimen sighted over a week on Vihar Lake (SGNP) during January 2001, April 2003 and June 2007. Not reported since in the region. Perhaps a straggler or scarce migrant.

Conservation Concerns: Not assessed but declining globally.

IBISES

INDIAN BLACK IBIS *Pseudibis papillosa*

IUCN Status: Near-threatened **Local Status:** S/St

Habitat: Key Sites in MMR: Open areas, cultivation, chiefly in lowlands.

Observations/Remarks: A seldom reported species for the region. Not reported in the past; however, 02 reported sightings during project fieldwork are probably the first for this species in the region. These were at Bhopar (05 February 2012) and Gandhari (18 Nov 2012). There is also an external observer's sighting from the region during October 2012.

Conservation Concerns: Not assessed.

BLACK-HEADED IBIS *Threskiornis melanocephalus*

IUCN Status: Near-threatened **Local Status:** UC/FC, LM/WM

Habitat: Key Sites in MMR: Creeks, brackish and freshwater wetlands

Observations/Remarks: Usually along with other waterside birds, especially storks, spoonbills; though treated Near-threatened under IUCN status, the species seems to be increasing in MMR, especially during past 5 years. Drop in sightings mid-May – September.

Conservation Concerns: Inland wetland habitats are decreasing.

GLOSSY IBIS *Plegadis falcinellus*

IUCN Status: Least Concern **Local Status:** FC, LM/WM

Habitat: Key Sites in MMR: Creeks, brackish and freshwater wetlands

Observations/Remarks: Usually gregarious; one of several aquatic and marsh-edge species whose population has been increasing in MMR over past few years. Though lower sighting frequency during monsoon, however, been sighted on Mahalaxmi Race Course July and August. Up to 150 birds seen in a flock in Uran and along Thane Creek.

Conservation Concerns: Inland wetland habitats are decreasing.

EURASIAN SPOONBILL *Platalea leucorodia*

IUCN Status: Least Concern **Local Status:** UC, LM/WM

Habitat: Key Sites in MMR: Creeks, Brackish and freshwater wetlands

Observations/Remarks: Usually gregarious, seen along with storks, ibises, other waders. BPS and other sites along Thane Creek are stronghold in MMR. A few are seen every winter, with an upsurge in numbers observed during 2011 – 12.

Conservation Concerns: Not assessed

FLAMINGOS

GREATER FLAMINGO *Phoenicopterus roseus*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat: Key Sites in MMR: Sewri Bay, Thane Creek, Uran. Chiefly brackish waters

Observations/Remarks: From an uncommon, seldom sighted species in the region during the last century, there has been a rise in the numbers of this species in MMR since late-1990s, and great numbers of the two species on Sewri Bay, in the heart of Central Mumbai, have become one of the most famous avifaunal stories of the sub-continent. Occasionally small flocks sighted along Manori and Gorai coasts and creeks, and once on the Mahim Creek.

Conservation Concerns: Habitat disturbance.

LESSER FLAMINGO *Phoeniconaias minor*

IUCN Status: Near-threatened **Local Status:** C/FC, WM

Habitat: Key Sites in MMR: Creeks, inter-tidal mudflats

Observations/Remarks: The Sewri Bay has become one of the best known sites in peninsular India to view this species; up to 15000 birds are estimated to spend up to 7 – 8 months here, mostly between late-October and late-May. Sporadically elsewhere along Thane Creek.

Conservation Concerns: Habitat disturbance.

DUCKS AND GEESE

GREYLAG GOOSE *Anser anser*

IUCN Status: Least Concern **Local Status:** St

Habitat: Key Sites in MMR: Brackish and freshwater wetlands

Observations/Remarks: Rare species in MMR, with only a record of 3 birds sighted late-2000 off Gorai/Manori Creek (SM, others). No other report since.

Conservation Concerns: Not assessed.

LESSER WHISTLING-DUCK *Dendrocygna javanica*

IUCN Status: Least Concern **Local Status:** C, R/LM

Habitat: Key Sites in MMR: Brackish and freshwater wetlands, creeks

Observations/Remarks: Commonest waterfowl in the region; flocks of up to 200 birds can be sighted; along with Spot-billed Duck, one of two waterfowl with high encounter frequency. Good population on several lagoons/sewage treatment waters and on several lakes. Has been sighted during monsoon on Mahalaxmi Racecourse, as also on small pond in MNP. Flocks roost beyond surf and fly around dusk to feed on inland wetlands. Sighted regularly during monsoon, however numbers are lower.

Conservation Concerns: Not assessed.

RUDDY SHELDUCK *Tadorna ferruginea*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat: Key Sites in MMR: Brackish and freshwater wetlands

Observations/Remarks: A declining winter migrant in MMR; from a rise in sightings during the 1998 – 2003 period, the species seems to be declining here, especially along the Uran – Alibaug corridor.

Conservation Concerns: Habitat loss, disturbance, occasional poaching.

COMB DUCK *Sarkidiornis melanotos*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat: Key Sites in MMR: Large freshwater wetlands

Observations/Remarks: The two key sites where this species was seen in the past are Gadeshwar Lake and Nirmal Lake. During project fieldwork, species was sighted only at Gandhari and an unconfirmed report from Uran. Last confirmed report from the region is of a solitary bird from Alibaug area (08 February, 2009).

Conservation Concerns: Disturbance, poaching.

COMMON TEAL *Anas crecca*

IUCN Status: Least Concern **Local Status:** C/FC, WM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Amongst the commonest winter migrants to MMR; large numbers on brackish water as also on larger lakes. Also seen on some polluted wetlands.

Conservation Concerns: Not assessed.

GARGANEY *Anas querquedula*

IUCN Status: Least Concern **Local Status:**

Habitat: Key Sites in MMR: Inland freshwater wetlands, occasionally brackish wetlands

Observations/Remarks: Widespread winter visitor; numbers seem to be augmented during mid-March, evidently many birds on passage during emigration. Population seems to have risen since early-2000s and the species is also being sighted in polluted waters along the various creeks.

Conservation Concerns: Not assessed

GADWALL *Anas strepera*

IUCN Status: Least concern **Local Status:** UC/FC, WM

Habitat: Key Sites in MMR: Inland freshwater wetlands, brackish wetlands

Observations/Remarks: Widespread some years, but on the whole an uncommon species here; very few sightings (a total of 05 reports) during project fieldwork, corresponding to two near-full wintering seasons.

Conservation Concerns: Not assessed

EURASIAN WIGEON *Anas Penelope*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat: Key Sites in MMR: Uran, BPS, Powai, few other brackish and inland freshwater wetlands

Observations/Remarks: Occasionally a few amongst other waterfowl; only 04 reports during project fieldwork, all during Nov – Dec; two of these sightings were of a pair on the Lokhandwala Lake, just off Malad Creek in the western suburbs.

Conservation Concerns: Not assessed

NORTHERN SHOVELER *Anas clypeata*

IUCN Status: Least Concern **Local Status:** FC/UC, WM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Widespread, and almost invariably a few around in large waterfowl gatherings as in Uran area, BPS, Powai, few other sites. Has also been sighted off Malad Creek, including on Lokhandwala Lake.

Conservation Concerns: Not assessed

NORTHERN PINTAIL *Anas acuta*

IUCN Status: Least concern **Local Status:** FC/UC, WM

Habitat: Key Sites in MMR: Inland freshwater wetlands, occasionally brackish wetlands

Observations/Remarks: Widespread species, with periodic abundance, especially along Thane Creek and on the larger Powai and Vihar Lakes.

Conservation Concerns: Not assessed

INDIAN SPOT-BILLED DUCK *Anas poecilorhyncha*

IUCN Status: Least Concern **Local Status:** FC, R/LM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Widespread in MMR, with population increase observed over past decade. Interestingly, populations and encounter frequency of both Resident (chiefly locally) waterfowl in the MMR have been rising in recent years; is a subject for continuous monitoring. Of this species up to 32 birds have been sighted on Lokhandwala Lake.

Conservation Concerns: Habitat loss, especially inland freshwater wetlands

MALLARD *Anas platyrhynchos*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Inland freshwater and brackish wetlands

Observations/Remarks: A scarce species in MMR; few reports dating to past hundred years but the species may have evidently declined in the region. No report during project fieldwork and in fact, no sighting report could be traced for the past decade.

Conservation Concerns: Habitat loss, disturbance

TUFTED DUCK *Aythya fuligula*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Species always uncommon in region and may have declined further in recent times. Few past records from Mumbai region; had been sighted on Vihar Lake (2001). No reports during project fieldwork or since 2005.

Conservation Concerns: Habitat loss, disturbance

FERRUGINOUS DUCK *Aythya nyroca*

IUCN Status: Near Threatened **Local Status:** UC/S, WM

Habitat: Key Sites in MMR: Brackish and freshwater inland wetlands

Observations/Remarks: From a once widespread species this bird seems to have declined much in the MMR over past quarter of a century; only 01 report during project fieldwork, of 03 birds on Feb 21 at Powai Lake.

Conservation Concerns: Not assessed

COMMON POCHARD *Aythya ferina*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Occasionally appears amongst mixed waterfowl flocks; 08 reports during project fieldwork, including one off Malad Creek, on Lokhandwala Lake.

Conservation Concerns: Not assessed.

COTTON TEAL *Nettapus coromandelianus*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat: Key Sites in MMR: Inland freshwater wetlands

Observations/Remarks: Regularly seen on the Vasai – Mira – Bhayander marshes up to early-2000, this small waterfowl has declined signifcantly in the MMR. Of 05 reports during project fieldwork, 03 were during the earlier phases of the project, indicating that the species may have declined even further in very recent times.

Conservation Concerns: Habitat loss, poaching, disturbance

HAWKS, KITES AND EAGLES

BLACK-WINGED KITE *Elanus caeruleus*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat: Key Sites in MMR: Open areas, occasionally urban areas

Observations/Remarks: Widespread and though we have quite a few sighting reports, but evidently declining species in MMR. We have 01 nesting record for the region but evidently the species may be breeding somewhat more widely along the north and east areas of MMR; overall it appears to mostly be a local/winter migrant.

Conservation Concerns: Habitat loss, disturbance

BRAHMINY KITE *Haliastur Indus*

IUCN Status: Least Concern **Local Status:** UC, R/LM,

Habitat: Key Sites in MMR: Coast, various wetland margins

Observations/Remarks: Widespread but evidently gradually declining. Most sightings here during October and June-August; a very small population breeds in the region, and active nests been observed in SGNP (along Vihar Lake margins) and near Funde, in the Uran area.

Conservation Concerns: Not assessed.

BLACK KITE *Milvus migrans*

IUCN Status: Least Concern **Local Status:** C, R

Habitat: Key Sites in MMR: All kinds of habitats

Observations/Remarks: India's most widespread raptor is also the commonest raptor in the MMR, and also amongst the most familiar birds. The wintering race (Black-eared, *lineatus*),

is uncommon but is sometimes seen along with the resident race. One of 5 species with the highest encounter frequency, at almost 99%.

Conservation Concerns: Not assessed.

BESRA SPARROWHAWK *Accipiter virgatus*

IUCN Status: Vulnerable **Local Status:** S, WM?

Habitat: Key Sites in MMR: Forest sites. SGNP, TWLS.

Observations/Remarks: A scarce visitor to the MMR; 03 reports during project fieldwork, 02 in SGNP, 01 in TWLS. A report from NW Mumbai early-2000s (SM, *pers obs*).

Conservation Concerns: Not assessed

SHIKRA *Accipiter badius*

IUCN Status: Least concern **Local Status:** FC, R/LM

Habitat: Key Sites in MMR: Forest, forest-edge. Also tree-dotted open country

Observations/Remarks: Second commonest raptor in MMR; few breed here, there being an influx of birds Oct – March. Occasionally in urban parks, hunting sparrows, lizards, squirrels.

Conservation Concerns: None, except occasional harassment from crows.

EURASIAN SPARROWHAWK *Accipiter nisus*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat: Key Sites in MMR: Forest/forest-edge, also open country

Observations/Remarks: An uncommon but perhaps overlooked species; intermittently reported over the years; 02 reports during project fieldwork.

Conservation Concerns: Not assessed.

EURASIAN BUZZARD *Buteo buteo*

IUCN Status: Least Concern **Local Status:** UC/S?, WM/PM?

Habitat: Key Sites in MMR: Open country, low hilly

Observations/Remarks: A sudden upsurge observed in reporting during last quarter of 2012; evidently species often overlooked, also partly due to identification confusion during intermediate phases. Could also be a more regular passage-migrant through region.

Conservation Concerns: Not assessed.

LONG-LEGGED BUZZARD *Buteo rufinus*

IUCN Status: Least Concern **Local Status:** UC/S, WM/PM?

Habitat: Key Sites in MMR: Open country, low hills

Observations/Remarks: Another species that may have been overlooked but evidently also may have become a more regular migrant to the region. At least half dozen reports during project fieldwork, mostly in open country.

Conservation Concerns: Not assessed.

ORIENTAL HONEY-BUZZARD *Pernis ptilorhyncus*

IUCN Status: Least Concern **Local Status:** FC/UC, R/LM?

Habitat: Key Sites in MMR: Forest, hilly; occasionally open country. KBS, TWLS, SGNP.

Observations/Remarks: The third most widespread raptor of the MMR; occasionally appears in urban areas. Breeding activity observed SGNP, TWLS.

Conservation Concerns: Not assessed.

WHITE-EYED BUZZARD *Butastur teesa*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Forest, forest-edge; also open country

Observations/Remarks: Usually overlooked but could be commoner than it appears; prefers forest-edge and low hilly country. No reports between May – Oct.

Conservation Concerns: Not assessed.

CRESTED SERPENT-EAGLE *Spilornis cheela*

IUCN Status: Least Concern **Local Status:** R, FC

Habitat: Key Sites in MMR: Chiefly forest, in lowlands and hills. Occasionally over adjoining forest-edge. Good population in TWLS. Seen in all hill-forest sites.

Observations/Remarks: Widespread, using pairs soaring; its diagnostic whistling scream is perhaps the most familiar raptor call of the MMR.

Conservation Concerns: Seems to be doing fine in well-wooded areas, both, hilly and lowlands. Estimate a population of at least 15 in TWLS which remains the best site in MMR. Lower numbers in SGNP, KBS, Alibaug Hills, other forested sites.

SHORT-TOED SNAKE EAGLE *Circaetus gallicus*

IUCN Status: Least Concern **Local Status:** UC, S, WM

Habitat: Key Sites in MMR: Open country; also seen Aarey, SGNP in Greater Mumbai.

Observations/Remarks: All reports between Nov – Feb; periodically a few birds appear in the MMR.

Conservation Concerns: Loss of open habitats, local persecution?

BOOTED EAGLE *Hieraaetus pennatus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Open country, forest, hilly

Observations/Remarks: Uncommon migrant in region, seen mostly Oct – March; one of the most widespread of our winter visiting raptors. Usually solitary; the pale phase is more commonly seen here and the dark phase has only been sighted once.

Conservation Concerns: Not assessed.

BONELLI'S EAGLE *Hieraaetus fasciatus*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Forest, hilly

Observations/Remarks: An increase in sightings noticed during past few years. Has been seen mostly in hilly country (TWLS, Matheran, Khargarh Hills), including once in conflict with Oriental Honey Buzzard and Common Buzzard. 05 confirmed reports during project fieldwork.

Conservation Concerns: Not assessed.

CHANGEABLE HAWK-EAGLE *Spizaetus cirrhatus*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat: Key Sites in MMR: Forest, hilly

Observations/Remarks: Prefers forest, sometimes flying over open country; appears to have declined over past quarter of a century. 07 reports during project fieldwork. Breeding observed KBS.

Conservation Concerns: Not assessed.

BLACK EAGLE *Ictinaetus malayensis*

IUCN Status: Least Concern **Local Status:** S, LM

Habitat: Key Sites in MMR: Forest, hilly

Observations/Remarks: Chiefly W Ghats (Sahyadri) Hills in this part of country; occasionally strays into MMR. Of the 06 reports during project fieldwork, TWLS was found to be a key site, with half the sightings from the upper reaches of this area.

Conservation Concerns: Not assessed.

INDIAN SPOTTED EAGLE *Aquila hastata*

IUCN Status: Vulnerable **Local Status:** ??, WM

Habitat: Key Sites in MMR: Open country, forest and wetland margins

Observations/Remarks: Split from the Lesser Spotted as a distinct species; much confusion in field identification but several reports during 2012.

Conservation Concerns: Needs monitoring in region to ascertain status.

GREATER SPOTTED EAGLE *Aquila clanga*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Wetland margins, open country, landfill sites

Observations/Remarks: Though this species is still quite widespread, *Aquila* eagles in general have declined in MMR over past few years. Up to 40 birds of several species in mixed gatherings would be regularly sighted on Deonar and Gorai dumping grounds up to early-2000s; often many *Aquila* eagles would be observed roosting on the transmission towers along the Thane Creek/Vashi bridge . Much local population decline in recent years.

Conservation Concerns: Needs monitoring

STEPPE EAGLE *Aquila nipalensis*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat: Key Sites in MMR: Open country, landfill sites

Observations/Remarks: 12 reports during project fieldwork, most towards the eastern and SE fringes of MMR. Marked decline in sighting reports of this species over past decade on Greater Mumbai landfills where it was reported quite regularly during 1990s – early 2000s.

Conservation Concerns: Intra-species competition, habitat disturbance.

TAWNY EAGLE *Aquila rapax*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat: Key Sites in MMR: Open country, landfill sites

Observations/Remarks: As in previous species; 08 reports during project fieldwork.

Conservation Concerns: As in previous species.

EASTERN IMPERIAL EAGLE *Aquila heliaca*

IUCN Status: Vulnerable **Local Status:** S, WM

Habitat: Key Sites in MMR: Open country

Observations/Remarks: Most uncommon of the Aquila eagles in the region. Several reports on landfill sites and along Naigon – Vasai area during late-1990s – early-2000s. At least 04 confirmed reports during project fieldwork, mostly from northern area of MMR.

Conservation Concerns: Not assessed.

OSPREY *Pandion haliaetus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Freshwater wetlands, creeks, coast

Observations/Remarks: Almost invariably around water; this is one raptor that still continues to appear regularly in the MMR; has been sighted on at least 15 waterbodies, including twice on small village ponds (Vasai – Virar, Alibaug). However, species distinctly abandons the more polluted waterbodies, several of which were surveyed.

Conservation Concerns: Wetland habitat loss, pollution, disturbance.

GREY-HEADED FISH-EAGLE *Ichthyophaga ichthyaetus*

IUCN Status: Near Threatened **Local Status:** S, WM?

Habitat: Key Sites in MMR: Freshwater wetlands

Observations/Remarks: The only report of its presence in MMR in recent years is of a solitary bird sighted 2000 – 2001 in SGNP. Not reported since.

Conservation Concerns: Not assessed.

WHITE-BELLIED SEA-EAGLE *Haliaeetus leucogaster*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat: Key Sites in MMR: Coast; occasionally inland freshwater wetlands

Observations/Remarks: Though seen quite regularly along the Alibaug (southern MMR) coast, in recent years the species is seldom reported along the Greater Mumbai and northern MMR coasts. It has been previously reported along Manori – Gorai (1998 – 2002). Breeding observed Alibaug – Kihim. Once a pair hunting over Tulsi Lake, SGNP. 06 of 08 sightings during project fieldwork from Alibaug, once on Elephanta Island.

Conservation Concerns: Disturbance along coast, pollution.

WHITE-RUMPED VULTURE *Gyps bengalensis*

IUCN Status: Critically Endangered **Local Status:** S, R/LM

Habitat: Key Sites in MMR: Open country, hilly, urban

Observations/Remarks: In the wake of the very alarming decline in vultures across India, there has been an alarming decline in MMR also, though one nesting pair was observed (Nagla, SGNP) during March-Apr 2000). 06 reports during project fieldwork, but mostly during earlier phase. No report since April 2012.

Conservation Concerns: Evidently as across much of the country

INDIAN VULTURE *Gyps indicus*

IUCN Status: Critically Endangered **Local Status:** S, LM?

Habitat: Key Sites in MMR: Open country, hilly

Observations/Remarks: The decline of this species in MMR appears even more severe. Up to early-2000s, few sporadic nesting sites reported in hills around Mumbai; none since. A 1933 record of possible nesting around Kanheri (SGNP). 01 report during project fieldwork.

Conservation Concerns: Loss

EGYPTIAN VULTURE *Neophron percnopterus*

IUCN Status: Least Concern **Local Status:** St

Habitat: Key Sites in MMR: Hilly areas, open country

Observations/Remarks: One of the species that were reported nesting in hilly areas of MMR during mid-1900s but seem to have vanished entirely. Last sight report for region is 1988.

Conservation Concerns: Disturbance, other factors.

RED-HEADED VULTURE *Aegypius calvus*

IUCN Status: Critically Endangered **Local Status:** St

Habitat: Key Sites in MMR: Open country

Observations/Remarks: This vulture too has almost disappeared from MMR in recent years. The last reported sightings of this species are from Mumbra and Bhiwandi (2000 – 2001).

Conservation Concerns: Loss

MONTAGU'S HARRIER *Circus pygargus*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Open grassy areas, including hills

Observations/Remarks: One of several grass and scrub (openland) species that has declined much across MMR over past decade. Numerous regular reports up to early-2000s but much declined since. Only 01 report on Khargarh Hills during project fieldwork.

Conservation Concerns: Habitat loss, disturbance.

PALLID HARRIER *Circus macrourus*

IUCN Status: Near Threatened **Local Status:** S/UC, WM

Habitat: Key Sites in MMR: Open grassy areas, including hills

Observations/Remarks: Less common generally in the region; 05 reports during project fieldwork, including one from Greater Mumbai area. A declining species of open grass/scrub terrain.

Conservation Concerns: Habitat loss

PIED HARRIER *Circus melanoleucos*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Open grassy areas, wetland margins

Observations/Remarks: At least 04 sightings in MMR during 1986 – 2001 (SM, *pers obs*). None since. No report during project fieldwork. Either a straggling passage migrant through area or vagrant some years.

Conservation Concerns: Not assessed.

HEN HARRIER *Circus cyaneus*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat: Key Sites in MMR: Open grassy areas, including hills

Observations/Remarks: This harrier too has declined much over the past decade; from several sighting reports (mostly Uran area, also elsewhere) during 1990s – early-2000s, there have been barely half dozen sightings over past decade, including 03 during current project fieldwork (TWLS, Kaman Range and above SGNP).

Conservation Concerns: Habitat loss

WESTERN MARSH HARRIER *Circus aeruginosus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Open damp grassy areas, freshwater and brackish wetlands

Observations/Remarks: From a very widespread and fairly common species until the early-200s, this harrier's population has declined much in the MMR in recent times. Despite 37 sighting reports during project fieldwork, however, more than half of these were during the earlier phases of project. Not been sighted on Mahalaxmi Racecourse site after 2010. Higher encounter frequency observed across MMR during September – October, with very few reports for the greater part of the migratory season, evidently suggesting the species may have begun using the MMR region as a passage corridor.

Conservation Concerns: Loss of wetland habitats, especially inland freshwater. Needs continuous monitoring.

FALCONS

LESSER KESTREL *Falco naumanni*

IUCN Status: Least Concern **Local Status:** S/St, PM?

Habitat: Key Sites in MMR: Open areas

Observations/Remarks: 02 sighting reports during 2001 – 2002 in the MMR, including a small flock at Charkop, NW Mumbai and a lone bird at Matheran. No report after that, nor during project fieldwork. Evidently a straggler group on passage migration.
Conservation Concerns: Not assessed.

COMMON KESTREL *Falco tinnunculus*
IUCN Status: Least Concern **Local Status:** UC, LM/WM
Habitat: Key Sites in MMR: Open areas, wetland margins. Uran, E/NE fringes of MMR, Khargar Hills
Observations/Remarks: Widespread winter visitor, seen mostly Sept – March. Of 35 reported sightings during project fieldwork, 03 also during April and August. Population appears to be declining in recent years. Small population reportedly breeds Matheran Range, Sahyadri hills.
Conservation Concerns: Loss of open country, disturbance. Unlike a couple of other falcons, the Kestrel has not taken to urban existence.

EURASIAN HOBBY *Falco subbuteo*
IUCN Status: Least Concern **Local Status:** S, PM/WM?
Habitat: Key Sites in MMR: Forest, hilly. SGNP.
Observations/Remarks: A scarce passage migrant; 03 of the 04 sightings during project fieldwork during October, SGNP. Many of the earlier sighting reports for the region are also during October.
Conservation Concerns: Not assessed.

AMUR FALCON *Falco amurensis*
IUCN Status: Least Concern **Local Status:** S/UC, PM
Habitat: Key Sites in MMR: Open areas, wetland margins. SGNP, Uran, Khargar Hills
Observations/Remarks: A small population of this falcon migrates on passage through the MMR, with most observations during October and again sporadically during mid-March – early-April. 04 separate sightings, including of small, loose flocks, during project fieldwork.
Conservation Concerns: Poaching during migration, especially in NE India.

RED-HEADED FALCON *Falco chicquera*

IUCN Status: Least Concern **Local Status:** St

Habitat: Key Sites in MMR:

Observations/Remarks: A seldom sighted species in the region in recent years. Several sight records during between 2000 – 2002, including Greater Mumbai. Post-project, a sight report by Pravin Subramanian (January 2013).

Conservation Concerns: Not assessed.

PEREGRINE FALCON (SHAHEEN) *Falco peregrinus peregrinator*

IUCN Status: Least Concern **Local Status:** UC, LM

Habitat: Key Sites in MMR: Chiefly hilly areas, rock faces

Observations/Remarks: This race (with rufous underparts) breeds on the rock faces of Sahyadri Hills, and possibly along Matheran Range; during monsoon it may be sighted over urban areas and open country. There is a nesting pair in Alibaug. Evidently a couple of more breeding pairs within urban MMR, however, difficulty of access to residential and office tower complexes prevent a thorough enumeration of species status within MMR.

Conservation Concerns: Not assessed.

PEREGRINE FALCON *Falco peregrinus calidus*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat: Key Sites in MMR: Wetlands, coast, open country

Observations/Remarks: This is the wintering race of the Peregrine; sporadically sighted over urban areas, living off pigeons, common myna and possibly some other birds; has no dearth of roost-sites in modern apartment towers. Could be commoner than the limited number of sight records would seem to suggest.

Conservation Concerns: Not assessed.

LAGGAR FALCON *Falco jugger*

IUCN Status: Least Concern **Local Status:** S, WM?/PM

Habitat: Key Sites in MMR: Open country, urban areas

Observations/Remarks: During 1980s and early-1990s there were several reports of this falcon sighted in Central and South Mumbai, evidently by the great numbers of pigeons and

the tall apartments. A few sightings also over open country and wetland margins (Uran, Alibaug) up to early-2000s. However, numbers seem to have declined much since. 02 sighting reports)both February) during project fieldwork.

Conservation Concerns: Not assessed.

PHEASANTS & FRANCOLINS

GREY FRANCOLIN *Francolinus pondicerianus*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat: Key Sites in MMR: Open country. Datiwere – Kelwe (north of MMR limits)

Observations/Remarks: Included here only because of confirmed presence of species around Datiwere - Kelwe during 2000 – 2001; may have reached this location only in recent years, and if it can survive there are chances of its further spread southward. However, we have 02 reports from Kalyan – Diva and the NE fringes of MMR and 01 from Kaman Range in northern MMR. No sight confirmation yet.

Conservation Concerns: Not assessed.

PAINTED FRANCOLIN *Francolinus pictus*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat: Key Sites in MMR: Open country, agriculture. Along Tansa River, Karjat-Khopoli.

Observations/Remarks: This species has certainly retreated from Greater Mumbai environs (reported early—1900's Mulund, Trombay Hill) and is fast declining with the shrinking openlands of N, NE and SE MMR. We have reports from Karjat – Kalyan – Diva – Kaman – TWLS and Khargar Hills, mostly between June and October when species is very active (breeding) and vocal.

Conservation Concerns: Rapidly disappearing open grass and scrub habitat.

COMMON QUAIL *Coturnix coturnix*

IUCN Status: Least Concern **Local Status:** S, PM/WM

Habitat: Key Sites in MMR: Open country, cultivation

Observations/Remarks: Once quite common in the region, this quail is today scarce in the MMR. Last reported sightings during late-1900's and up to 2001. No confirmed reports since.

Conservation Concerns: Habitat loss, poaching

RAIN QUAIL *Coturnix coromandelica*

IUCN Status: Least Concern **Local Status:** UC/S, LM, R?

Habitat: Key Sites in MMR: Open country, cultivation

Observations/Remarks: Not observed in Greater Mumbai. Of the 05 reports during project fieldwork, 04 are in Zone 2 (Vasai, Tungareshwar north slopes, Kalyan – Diva), and nearly all between June –Aug when breeding and vocal. Nests with 10 eggs found Aug just north of Tansa River. Evidently an influx with onset of monsoon conditions may suggest LM.

Conservation Concerns: Loss of open habitats, agricultural lands, poaching.

BLUE-BREASTED QUAIL *Coturnix chinensis*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat: Key Sites in MMR: Wet cultivation, damp grass, marsh-edge

Observations/Remarks: Little known, elusive, overlooked. 02 confirmed reports during project fieldwork include one from Alibaug area and another from northern slopes below TWLS, near Tansa River. Species definitely exists in MMR but needs monitoring to ascertain status.

Conservation Concerns: Not assessed

JUNGLE BUSH-QUAIL *Perdicula asiatica*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat: Key Sites in MMR: Grass and Scrub, forest-edge

Observations/Remarks: Once common and widespread across MMR, found even in Greater Mumbai area, this quail's population has much declined everywhere across MMR, as more and more of its habitat disappears under constant developmental expansion.

Conservation Concerns: Habitat loss.

RED SPURFOWL *Galloperdix spadicea*

IUCN Status: Least Concern **Local Status:** S/UC, R

Habitat: Key Sites in MMR: Forest, hilly areas

Observations/Remarks: Widespread until 2001, this species'decline has been most marked in recent years, with only intermittent signs of any small recovery. 05 of the 07 encounters during project fieldwork were in SGNP that remains the stronghold albeit with a very small population.

Conservation Concerns: Poaching, other factors

GREY JUNGLEFOWL *Gallus sonneratii*

IUCN Status: Least Concern **Local Status:** S/UC, R

Habitat: Key Sites in MMR: Forest, hilly areas. SGNP, TWLS, KBS, Alibaug hills

Observations/Remarks: In the Greater Mumbai area, SGNP remains the only site to harbor this species. However, the original population of this bird had been wiped out from the area by late-19th Century, and it is reported that only the release of some birds confiscated from hunters by the late Mr Humayun Abdulali enabled the species re-establish in the region. Here the species continues to have periodic ups and downs but evidently has never been able to claw back to a 'Common' status of the early-1980s. 'During project fieldwork all 17 encounters in the MMR were in SGNP. Though the species is reported from a few other sites, however, not coming across any during project fieldwork is indicative of the species having perhaps become even rarer in recent years.

Conservation Concerns: Poaching, disturbance

INDIAN PEAFOWL *Pavo cristatus*

IUCN Status: Least Concern **Local Status:** UC/S, R

Habitat: Key Sites in MMR: Forest, hilly areas

Observations/Remarks: Once common and widespread, the Peafowl has evidently declined much across the MMR, including in its last stronghold, the SGNP in Greater Mumbai proper. From an encounter frequency of nearly 70% during the 1980's and early-1990's, it is today a dismal 15 – 20%, with a marginal rise during the monsoon when breeding and vocal. 14 of the 17 encounters during project fieldwork were from SGNP, always a lone bird. Other sites this species was sighted/heard are Matheran Range (01), TWLS top (01) and an unconfirmed report from NE fringes of MMR, off Dombivli – Diva.

Conservation Concerns: Poaching, disturbance

BUTTONQUAILS

SMALL BUTTON-QUAIL *Turnix sylvaticus*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat: Key Sites in MMR: Open country, cultivation

Observations/Remarks: Like others of its kind, difficult bird to come across; very few reports from MMR; 04 confirmed reports during project fieldwork, including one from a dead specimen; almost all of these from northern and NE areas of MMR.

Conservation Concerns: Loss of open habitats, poaching.

BARRED BUTTONQUAIL *Turnix suscitator*

IUCN Status: Least Concern **Local Status:** S/UC, R/LM

Habitat: Key Sites in MMR: Open country, cultivation

Observations/Remarks: An elusive, overlooked species, sporadically sighted; rare or absent in Greater Mumbai and mostly encountered towards fringes of MMR; of 07 reports during project fieldwork, majority around Alibaug region and Vasai – Virar and the NE parts of MMR.

Conservation Concerns: Loss of open habitats, poaching.

YELLOW-LEGGED BUTTON-QUAIL *Turnix tanki*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat: Key Sites in MMR: Open country, cultivation

Observations/Remarks: The oldest records of this species in MMR dates back to 1949 when one was found on Malabar Hill; in late-1990's, a dead specimen was collected from near Murbad, just outside MMR limits, en-route to Malshej Ghat. A solitary specimen sighted, with record photograph, Matheran.

Conservation Concerns: Not assessed

RAILS, CRAKES, GALLINULES AND COOTS

SLATY-BREASTED RAIL *Rallus striatus*

IUCN Status: Least Concern **Local Status:** UC, R?

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands

Observations/Remarks: Secretive and difficult to locate but widespread; no report of breeding in MMR but doubtless seems to be resident for has been sighted round the year.
Conservation Concerns: Disturbance and loss of wetland habitats.

'EASTERN' BAILLON'S CRAKE *Porzana pusilla*
IUCN Status: Least Concern **Local Status:** UC, WM
Habitat: Key Sites in MMR: Inland freshwater wetlands, also brackish wetlands margins
Observations/Remarks: Widespread during winter (mid/late-Sept earliest), seen up to late-March; has also been sighted in Greater Mumbai area. Declining much due to habitat loss.
Conservation Concerns: Loss of freshwater habitats

LITTLE CRAKE *Porzana parva*
IUCN Status: Least Concern **Local Status:** S, WM?/PM?
Habitat: Key Sites in MMR: Freshwater and brackish wetlands
Observations/Remarks: A scarcely seen bird in this region; we have only 02 sightings during the first few weeks of Phase 1 of this project and no report thereafter. Both sightings were from Mira - Bhayander & Vasai – Gaas wetland margins.
Conservation Concerns: Not assessed

SLATY-LEGGED CRAKE *Rallina eurizonoides*
IUCN Status: Least Concern **Local Status:** St
Habitat: Key Sites in MMR: No information
Observations/Remarks: Has been sighted in the Sahyadri Hills just to the east of MMR; the Matheran and Khargarh Hills need to be surveyed for possible occurrence of this species during monsoon. **Conservation Concerns:** Not assessed.

SPOTTED CRAKE *Porzana porzana*
IUCN Status: Least Concern **Local Status:** St
Habitat: Key Sites in MMR: No information
Observations/Remarks: No reports during project fieldwork. Several reports date back to its regular occurrence up to early-20th Century; much declined thereafter.
Conservation Concerns: Habitat loss, disturbance.

RUDDY-BREASTED CRAKE *Porzana fusca*

IUCN Status: Least Concern **Local Status:** UC, R?

Habitat: Key Sites in MMR: Inland freshwater and brackish wetlands, preferably reed and herbage fringed; also wet cultivation margins.

Observations/Remarks: Highly elusive but widespread in MMR that seems to be northern limit of its distribution range along west coast; much declined due to developmental expansion.

Conservation Concerns: Severe habitat loss in recent years.

WHITE-BREASTED WATERHEN *Amaurornis phoenicurus*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat: Key Sites in MMR: Inland freshwater and brackish wetlands, creeks; occasionally urban parks.

Observations/Remarks: Most widespread and familiar crake of the region; has been seen in extreme South Mumbai, including Mahalaxmi Race Course (though no reports during 2011 – 12). Has disappeared from much of Greater Mumbai limits and restricted mostly to surviving creek-margins.

Conservation Concerns: Habitat loss.

WATERCOCK *Gallicrex cinerea*

IUCN Status: Least Concern **Local Status:** S, R?.LM?

Habitat: Key Sites in MMR: Inland freshwater wetlands, preferably reedy and overgrown.

Observations/Remarks: A seldom reported species in region; may have declined in recent years but perhaps never was widespread. Had been reported early/mid-1900's on Powai Lake. 03 reports during project fieldwork, chiefly from Satphool and Vasai – Gaas.

Conservation Concerns: Habitat loss, poaching.

PURPLE SWAMPHEN *Porphyrio porphyrio*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat: Key Sites in MMR: Inland freshwater and brackish wetlands, preferably reedy and overgrown.

Observations/Remarks: Striking bird on wetlands; seems to have become commoner post-1980s, and may even be encountered on polluted waterbodies at edge of habitation.
Conservation Concerns: Not assessed, but evidently poaching to a small extent.

COMMON MOORHEN *Gallinula chloropus*
IUCN Status: Least Concern **Local Status:** FC, R/LM
Habitat: Key Sites in MMR: Inland freshwater and brackish wetlands, preferably reedy and overgrown.
Observations/Remarks: Widespread across MMR; seen during every season with a small population resident; evidently an influx during winter from across other regions. Has declined locally in some parts of MMR due to sudden habitat loss (especially Mira – Bhayander area).
Conservation Concerns: Habitat loss, poaching.

EURASIAN COOT *Fulica atra*
IUCN Status: Least Concern **Local Status:** FC, WM/R?
Habitat: Key Sites in MMR: Inland freshwater and brackish wetlands
Observations/Remarks: Widespread across MMR, more visible during winter (mid-Oct – March); we have very few reports April – mid-October. Reported quite common and few even breeding early-1900's but reclamation began affecting populations in the region. Evidently a very small population may be breeding in MMR but needs monitoring.
Conservation Concerns: Habitat loss, poaching.

OYSTERCATCHERS

EURASIAN OYSTERCATCHER *Haematopus ostralegus*
IUCN Status: Least Concern **Local Status:** S, WM
Habitat: Key Sites in MMR: Coast, normally sandy. Alibaug coast.
Observations/Remarks: Scarce today but a species of which a few birds were regularly sighted up to late-1990s along the MMR coast. A few birds used to be consistently sighted every winter on the Madh – Gorai coast in NE Mumbai, where no reports since early'/mid-1990s. We have only 02 reports from Alibaug coast during project fieldwork.
Conservation Concerns: Disturbance, pollution, loss of habitat.

JACANAS

PHEASANT-TAILED JACANA *Hydrophasianus chirurgus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat: Key Sites in MMR: Chiefly vegetation covered inland freshwater wetlands.

Observations/Remarks: Widespread but greatly declining across the MMR; has more or less vanished from vast areas of northern MMR and many sites in Greater Mumbai; up to 40 have been seen up to 2001 on Mira-Bhayandera marshes; still seen on Powai and Vihar Lakes; more conspicuous monsoon when breeding and vocal.

Conservation Concerns: Loss of wetland sites

BRONZE-WINGED JACANA *Metopidius indicus*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat: Key Sites in MMR: Chiefly vegetation covered inland freshwater wetlands.

Observations/Remarks: More widespread and visible of the two Jacanas; is still seen on several polluted and choked waterbodies, including in Greater Mumbai.

Conservation Concerns: Loss of wetland sites

AVOCETS AND STILTS

BLACK-WINGED STILT *Himantopus himantopus*

IUCN Status: Least Concern **Local Status:** C, R/LM,

Habitat: Key Sites in MMR: Brackish and inland freshwater wetlands; also creeks

Observations/Remarks: Amongst the most familiar and widespread waterside birds in MMR; seen on every kind of waterbody, including polluted wetlands; sometimes up to 300 birds. Very small population resident here. During project fieldwork we found nesting on Vihar Lake, a new find for the MMR. Has been observed nesting around Uran.

Conservation Concerns: Not assessed.

PIED AVOCET *Recurvirostra avosetta*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat: Key Sites in MMR: Brackish wetlands, creeks. Thane Creek, Sewri Bay.

Observations/Remarks: One of several aquatic species that seems to have colonised MMR sites in relatively recent times and may have passed a peak period here. Though flocks of

several hundred sometimes sighted on Thane Creek, however the species is on the decline across MMR, with barely a handful of sites still harbouring numbers of this bird. Most of the 21 reports during project fieldwork during Sept – Nov 2012, with a large influx in the Thane Creek area. One of the major habitat loss was the reclamation of vast tracts of Uran, in southern Navi Mumbai area during mid-2000's. Earliest date of species arrival in MMR is 23rd September.

Conservation Concerns: Habitat loss, disturbance.

CRAB PLOVER

CRAB-PLOVER *Dromas ardeola*

IUCN Status: Least Concern **Local Status:** S/St, WM

Habitat: Key Sites in MMR: Coast, tidal mudflats

Observations/Remarks: No report of this species from MMR since Dec 2000 when a few birds were seen along Alibaug – Kihim coast; in Greater Mumbai the last report of the species is a sighting of 04 birds at Gorai beach in Dec 1989 (SM, *pers obs*). Very few older records from region. Species may have disappeared from MMR.

Conservation Concerns: Loss of good coastal habitat.

PRANTINCOLES AND COURSERS

COLLARED PRATINCOLE *Glareola pratincola*

IUCN Status: Least Concern **Local Status:** S, WM?/PM?

Habitat: Key Sites in MMR: Open areas around wetlands

Observations/Remarks: During project fieldwork, only 01 sighting of two birds in Uran area, Feb 2010. Few old records (early-1900's) from MMR. In Greater Mumbai, only two sight records of small flocks from Malad Creek and Charkop environs (1985 and 1987, SM, *pers obs*).

Conservation Concerns: Loss of open habitat around wetlands.

SMALL PRATINCOLE *Glareola lactea*

IUCN Status: Least Concern **Local Status:** St

Habitat: Key Sites in MMR: Open areas around wetlands.

Observations/Remarks: No report of species from MMR since mid-1980's when small flocks were observed along Dharamtar Creek, Tansa Creek, Datiwere mudflats/openlands.
Conservation Concerns: Not assessed.

THICK-KNEES

GREAT THICK-KNEE *Esacus recurvirostris*

IUCN Status: Least Concern **Local Status:** S, LM?

Habitat: Key Sites in MMR: Rivers, open areas around wetlands

Observations/Remarks: Few old reports of the species from MMR, where always considered rare. The only recent reports date to sightings during the winters of 2000 and 2001 (near Virar, Karanjia-Uran). No reports during project fieldwork.

Conservation Concerns: Not assessed.

EURASIAN STONE-CURLEW *Burhinus oedicnemus*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat: Key Sites in MMR: Open country, in plains and hills.

Observations/Remarks: Few old reports from MMR. At least 03 confirmed sightings from margins of Manori Creek and Gorai (1997 – 2001) and 01 from near Panvel. Only reports during project fieldwork were of (possibly) 02 birds calling on Khargarh plateau (April 28, 2012) but no birds were sighted.

Conservation Concerns: Not assessed.

LAPWINGS

YELLOW-WATTLED LAPWING *Vanellus malabaricus*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat: Key Sites in MMR: Openlands around coast, creeks, wetlands. Uran.

Observations/Remarks: Few sporadic reports from MMR, including possible nesting. 09 reports during project fieldwork though none after June 2012, several from northern areas of MMR (Vasai – Kaman).

Conservation Concerns: Disturbance, habitat loss.

RED-WATTLED LAPWING *Vanellus indicus*

IUCN Status: Least Concern **Local Status:** C, R

Habitat: Key Sites in MMR: Open country, wetland margins. Plains and Hilly areas.

Observations/Remarks: Widespread and familiar species. One of …. Species with highest encounter frequency in MMR, and the wader species with the highest encounter frequency. Can be seen on highly polluted creeks and other wetland margins as well. Seen on South Mumbai maidans also.

Conservation Concerns: Not assessed.

WHITE-TAILED LAPWING *Vanellus leucurus*

IUCN Status: Least Concern **Local Status:** S/St, WM

Habitat: Key Sites in MMR: Open grassy areas around wetlands

Observations/Remarks: A couple of old reports of this species from region; in recent years, two sightings of a solitary bird and a pair from Uran and Manor. No reports during project fieldwork.

Conservation Concerns: Not assessed.

PLOVERS

GREY PLOVER *Pluvialis squatarola*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Coast, creeks, brackish wetland margins

Observations/Remarks: An uncommon wader but a few invariably sighted every year. Seems to have declined somewhat in recent years due to reclamation of many brackish wetland sites. Earliest Winter Date is 13 October. Latest Summer Date 19 April.

Conservation Concerns: Habitat loss, disturbance.

PACIFIC GOLDEN PLOVER *Pluvialis fulva*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Creeks, brackish wetland margins

Observations/Remarks: The Earliest Winter Date is 10 October. Latest Summer Date 15 April.

Conservation Concerns: Habitat loss, disturbance.

GREATER SAND PLOVER *Charadrius leschenaultii*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Chiefy coast; occasionally creeks, tidal mudflats. Alibaug coast.

Observations/Remarks: Widespread shore-bird but numbers have declined since early-2000's.

Earliest Winter Date is 26 August. Latest Summer Date 15 April.

Conservation Concerns: Shore habitat loss, disturbance, pollution.

LESSER SAND PLOVER *Charadrius mongolus*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Chiefly coast; occasionally creeks, tidal mudflats. Alibaug coast, Uran, northern MMR coast.

Observations/Remarks: Commoner overall than *leschenaultia* with which often seen. Earliest Winter Date is 26 August. Latest Summer Date is 15 April.

Conservation Concerns: Shore habitat loss, disturbance, pollution.

LITTLE RINGED PLOVER *Charadrius dubius*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Coast, margins of brackish and inland freshwater bodies

Observations/Remarks: Widespread and fairly common small wader; solitary or few scattered over an expanse, often with other waders. One of the species often encountered on polluted wetland margins. Earliest Winter Date is 15 August but a solitary bird; more regular from 02 Sept onward. Latest Summer Date is 29 April. Nearest breeding to MMR reported from Khandala (1960's).

Conservation Concerns: Not assessed.

KENTISH PLOVER *Charadrius alexandrinus*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR: Brackish wetland margins; occasionally freshwater wetlands

Observations/Remarks: Uncommon and infrequent; may be commoner but overlooked.

Conservation Concerns: Not assessed.

CURLEWS, WHIMBRELS, GODWITS

EURASIAN CURLEW *Numenius arquata* ♫

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Inter-tidal mudflats, creeks, other brackish waters

Observations/Remarks: One of the largest waders; population has declined much in the MMR over past two decades; has more or less vanished along the entire western sea-board and intervening creeks. An influx of unusually high number of birds noticed during Oct – Nov 2012 along Thane Creek.

Conservation Concerns: Habitat loss, pollution, disturbance.

WHIMBREL *Numenius phaeopus*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR: Inter-tidal mudflats, creeks, other brackish waters

Observations/Remarks: Less common overall than Curlew, and declining in recent years; 06 reports during project fieldwork, half of these in Gorai – Manori Creek environs.

Conservation Concerns: Habitat loss, pollution, disturbance.

WESTERN' BLACK-TAILED GODWIT *Limosa limosa*

IUCN Status: Near Threatened **Local Status:** FC, WM

Habitat/Key sites in MMR: Creeks, inter-tidal mudflats, other brackish waters.

Observations/Remarks: The most widespread tall wader; seems to have become commoner over past two decades; sometimes several hundred in flock, often with other waders. Earliest Winter Date is 08 September. Latest Summer Date 04 May.

Conservation Concerns: Habitat loss, disturbance.

BAR-TAILED GODWIT *Limosa lapponica*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Creeks, inter-tidal mudflats.

Observations/Remarks: Much less common overall, and less gregarious than *limosa*. Several sightings in Greater Mumbai region. Earliest Winter Date is 04 October. Latest Summer Date 29 April.

Conservation Concerns: Habitat loss, disturbance.

SANDPIPERS, STINTS & ALLIES

TEREK SANDPIPER *Xenus cinereus*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR: Coastal lagoons, mudflats, creeks

Observations/Remarks: Has become uncommon overall, even scarce locally as along western sea-board of Greater Mumbai area. Earliest Winter Date is 12 October. Latest Summer Date 06 April.

Conservation Concerns: Pollution, habitat loss.

COMMON GREENSHANK *Tringa nebularia*

IUCN Status: Least Concern **Local Status:** UC/FC, WM

Habitat/Key sites in MMR:

Observations/Remarks: Much less widespread than Common Redshank with which often seen; usually not so gregarious though a few invariably scattered amid wader flocks.

Earliest Winter Date is 11 September. Latest Summer Date 19 April.

Conservation Concerns: Habitat loss, disturbance, poaching (until 2005).

WOOD SANDPIPER *Tringa glareola*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Varied brackish, inter-tidal and inland freshwater wetlands

Observations/Remarks: Amongst our most widespread wintering waders, sometimes seen on highly polluted waters and margins.

Earliest Winter Date is 31 August (though a lone bird sighted as early as 12 August). Latest Summer Date 04 May.

Conservation Concerns: Not assessed.

GREEN SANDPIPER *Tringa ochropus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Inland freshwater and brackish wetlands, creeks.

Observations/Remarks: Widespread and quite diverse in its choice of wetland sites; sometimes seen on forest pools and streams, especially early on arrival during Sept - Oct.

Earliest Winter Date is 08 September. Latest Summer Date 03 May. Occasionally a solitary bird seen during July – August.

Conservation Concerns: Disappearing wetlands, disturbance.

COMMON SANDPIPER *Actitis hypoleucos*

IUCN Status: Least Concern **Local Status:** C/FC, WM

Habitat/Key sites in MMR: All kind of brackish and inland freshwater wetlands.

Observations/Remarks: One of the most widespread wintering waders; usually solitary or pairs, seldom even in small flocks. Often on the most polluted creed-fronts.

Earliest Winter Date is 14 August. Latest Summer Date 09 May. Intermittently seen during June – August.

Conservation Concerns: Not assessed.

MARSH SANDPIPER *Tringa stagnatilis*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Varied brackish wetlands, occasionally freshwater margins.

Observations/Remarks: A regularly seen but uncommon wader in the MMR; mostly amid mix wader flocks when likely to be overlooked.

Conservation Concerns: Habitat loss, disturbance.

COMMON REDSHANK *Tringa totanus*

IUCN Status: Least Concern **Local Status:** FC

Habitat/Key sites in MMR: Varied brackish, inter-tidal and inland freshwater wetlands

Observations/Remarks: One of the commonest, familiar and vocal waders. Mid-size flocks (up to 80 birds) may be seen on arrival (early-Sept). Regularly on polluted creek channels in Greater Mumbai area. Earliest Winter Date is 14 August. Latest Summer Date 09 May.

Conservation Concerns: Not assessed.

SPOTTED REDSHANK *Tringa erythropus*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat/Key sites in MMR: Chiefly coastal lagoons, inter-tidal mudflats

Observations/Remarks: A highly uncommon wintering wader, perhaps even overlooked except during early on arrival and sometime mid/late April when it is can be striking on having acquired a breeding plumage. Earliest Winter Date is 30 September. Latest Summer Date 29April.

Conservation Concerns: Not assessed.

RUDDY TURNSTONE *Arenaria interpres*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Chiefly coast, sandy and rocky. Alibaug coast.

Observations/Remarks: Fairly widespread and regularly sighted until late-1990's, this wader is today a scarce species along the MMR coast. Only 05 sighting reports during project fieldwork, all along the southern coast of the MMR, along Alibaug – Uran beaches.

Conservation Concerns: Habitat loss, pollution, disturbance.

BROAD-BILLED SANDPIPER *Limicola falcinellus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Inter-tidal mudflats, coastal lagoons.

Observations/Remarks: Often gregarious and part of mixed wader flocks, it is possible this species is often overlooked. Most sightings of this species during project fieldwork were from Alibaug area (beach and creeks) and Sewri Bay in Greater Mumbai.

Conservation Concerns: Not assessed.

RUFF(MALE) / REEVE(FEMALE) *Philomachus pugnax*

IUCN Status: Least Concern **Local Status:** UC/FC?, WM

Habitat/Key sites in MMR: Varied freshwater and brackish wetlands. Thane Creek, BPS.

Observations/Remarks: Widespread but possibly also amongst the overlooked waders; often greagarious and possibly major passage migrant through MMR, with only a smaller population wintering in the region.

Conservation Concerns: Habitat loss.

GREAT KNOT *Calidris tenuirostris*

IUCN Status: Least Concern **Local Status:** S?, WM

Habitat/Key sites in MMR: Inter-tidal mudflats, creeks.

Observations/Remarks: An uncommon and infrequently reported wader. Several regular reports 1998 – 2001 from the Uran – Alibaug regions in southern MMR, including up to 35 birds at Uran on 02 Dec 2001 (SM, *pers obs*). Only a couple of reports from Alibaug since. No reports during project fieldwork.

Conservation Concerns: Not assessed.

CURLEW SANDPIPER *Calidris ferruginea*

IUCN Status: Least Concern **Local Status:** FC/C, WM

Habitat/Key sites in MMR: Inter-tidal mudflats, creeks, other brackish water margins. Thane Creek, Sewri Bay.

Observations/Remarks: Widespread and very common in certain years; can be highly gregarious; huge gatherings observed along Thane Creek, Sewri Bay. Less common and much declined along western sea-board creeks in Greater Mumbai. Earliest Winter Date is 29 September. Latest Summer Date 19 April.

Conservation Concerns: Not assessed, but evidently avoids polluted creeks and estuaries.

DUNLIN *Calidris alpina*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Inter-tidal mudflats, creeks. Thane Creek, Sewri Bay.

Observations/Remarks: Evidently less common than *ferruginea*; often part of great mixed-wader congregations, along with stints. Difficult to assess status with certainty.

Conservation Concerns: As in *ferruginea*.

TEMMINCK'S STINT *Calidris temminckii*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Brackish and inland freshwater wetlands.

Observations/Remarks: Less common overall than *minuta*, the two species often together. Often part of the great gatherings of mixed waders.

Conservation Concerns: Not assessed.

LITTLE STINT *Calidris minuta*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Brackish and inland freshwater wetlands, coast. Thane Creek.

Observations/Remarks: Amongst the most widespread, gregarious waders; flocks, often in association with other small waders, can consist of thousands of birds, especially familiar during summer weeks just before emigration. Greatest gatherings observed along Thane Creek, remnant wetland sites along Uran. Also seen on polluted creek channels along Greater Mumbai creeks.

Earliest Winter Date is 09 September. Latest Summer Date 04 May.

Conservation Concerns: Not assessed.

SANDERLING *Calidris alba*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat/Key sites in MMR: Chiefly sandy shore. Alibaug coast.

Observations/Remarks: A seldom reported species in the MMR, with barely a handful of old records, including from Arnala beach. Both the sight reports during project fieldwork were from the Alibaug coast, in southern MMR.

Conservation Concerns: Not assessed, but evidently coastal pollution and habitat loss.

RED-NECKED PHALAROPE *Phalaropus lobatus*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Coastal lagoons, salt-flats.

Observations/Remarks: No report during project fieldwork and the only reports of this species in the MMR dates to the early 2000's, when a few birds were sighted on a lagoon in the Uran area for two consecutive years.

Conservation Concerns: Not assessed.

PAINTED SNIPE

GREATER PAINTED-SNIPE *Rostratula benghalensis*

IUCN Status: Least Concern **Local Status:** UC/S, R/LM?

Habitat/Key sites in MMR: Vegetation along marsh-edge, freshwater and brackish; also wet cultivation. Uran, BPS, Powai, Alibaug, Vasai-Virar.

Observations/Remarks: Widespread until early-2000's but evidently population much declined in MMR of late. Secretive and elusive nature and cryptic plumage makes this, and other snipes, amongst the most difficult birds to locate; usually sighted when flushed. Nests with eggs found May, June, September.

Conservation Concerns: Habitat loss, disturbance, poaching.

SNIPES

JACK SNIPE *Lymnocryptes minimus*

IUCN Status: Least Concern **Local Status:**

Habitat/Key sites in MMR: Dense marsh-cover, around freshwater and brackish wetlands.

Observations/Remarks: Regarded as a common winter visitor by Salim Ali & Humayun Abdulali (1930's-1940's), this species, like most other snipes, have declined much. A couple of recent reports have proved to be erroneous or unconfirmed but this remains a species that needs monitoring to assess its status in the MMR.

Conservation Concerns: Not assessed.

COMMON SNIPE *Gallinago gallinago*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Marshy ground, both brackish and freshwater.

Observations/Remarks: This species was regarded a common migrant to the region during surveys in the early-20th Century (Salim Ali & Abdulali, 1930's – 1940's). It is perhaps the most widespread snipe in the region though numbers seem to have declined immensely over the past two decades, yet invariably a few sighted every season. 15 sightings during project fieldwork, half of these in Zone 3 – Uran, Alibaug, Panvel. BPS in Greater Mumbai a good site. Previously flushed on Vihar and Powai Lakes where doubtless also occurs. This (and possibly other species) were mentioned by EHA in reference to snipe shoots on the Flats of Mahalaxmi and Tardeo. Some unidentified snipe have been sighted during late-monsoon on the Mahalaxmi Racecourse (Kalpana Malani, *pers obs*).

Conservation Concerns: Loss

PINTAIL SNIPE *Gallinago stenura*

IUCN Status: Least Concern **Local Status:** UC?/S, WM

Habitat/Key sites in MMR: Marshy ground, both brackish and freshwater.

Observations/Remarks: Though regarded as the commonest snipe in the region (late-19th and early-20th Century), it has become scarce today, like nearly all other snipes. There are two confirmed reports of this species during project fieldwork, from Uran and Vasai-Gaas.

Conservation Concerns: Loss of habitat.

WOOD SNIPE *Gallinago nemoricola*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Marshy ground, both brackish and freshwater.

Observations/Remarks: Several reports of this species shot during late-19th and up to mid-20th Centuries from Mumbai region. No reports in recent years and none during project fieldwork.

Conservation Concerns: Loss of habitat.

GULLS

GREAT BLACK-HEADED GULL (PALLAS'S GULL) *Larus ichthyaetus*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat/Key sites in MMR: Coast, mudflats, large wetlands. Alibaug, Nirmal – Arnala, Uran.

Observations/Remarks: 09 sightings during earlier phase of project but no sighting in Oct – Nov 2012. The species was quite regular along the MMR coast, including a sighting on Gorai beach, up to 2001. Now may be largely restricted to Alibaug coast, Thane Creek and Elephanta.

Conservation Concerns: Disturbance.

CASPIAN GULL (Yellow-legged) *Larus cachinnans*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Coast, mudflats, large wetlands.

Observations/Remarks: The status of the several large gulls is uncertain for the MMR.

Conservation Concerns: Not assessed.

HEUGLIN'S GULL *Larus heuglini*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Chiefly coast; also large creeks

Observations/Remarks: The widespread large gull in the region; at least 12 sightings during project fieldwork, mostly from southern MMR regions, and from along Thane Creek.

Conservation Concerns: Not assessed.

BROWN-HEADED GULL *Larus brunnicephalus*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Coast, creeks, large inland wetlands.

Observations/Remarks: Second most widespread gull in MMR, often on coast and in harbours, around fish landing sites. Earliest Winter Date is 13 October. Latest Summer Date 15 April (seen in rich breeding plumage).

Conservation Concerns: Not assessed.

COMMON BLACK-HEADED GULL *Larus ridibundus*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Coast, harbours, creeks and inland freshwater wetlands.

Observations/Remarks: Most widespread wintering gull in MMR; routinely gathers into large flocks, especially prior to emigration. Large flocks also in harbours and around fishing villages.

Earliest Winter Date is 27 September. Latest Summer Date 06 April.

Conservation Concerns: Not assessed.

SLENDER-BILLED GULL *Larus genei*

IUCN Status: Least Concern **Local Status:** S, WM/PM?

Habitat/Key sites in MMR: Coast, creeks, large wetlands.

Observations/Remarks: Widespread but easily overlooked gull in MMR, especially when amid mixed gull flocks. At least 08 confirmed sight records during project fieldwork, most of these in the Uran – Elephanta – Alibaug regions of southern MMR.

Conservation Concerns: Not assessed.

TERNS

LITTLE TERN *Sterna albifrons*

IUCN Status: Least Concern **Local Status:** UC/FC, R/LM

Habitat/Key sites in MMR: Coast, creek channels; occasionally inland wetlands.

Observations/Remarks: Regularly sighted in Mumbai harbour, where often seen at fish-landing sites (Versova, Madh, Gorai-Manori, Arnala, Bassein, Uran, Alibaug area, occasionally Sasoon Dock). Only tern that breeds off the Mumbai coast, on one, and possibly a couple more, offshore islets. Definite breeding observed on Uttan Washi islet off the Gorai (North Mumbai) coast up to early-1990's and possibly to this day. Numbers augmented in winter by influx of birds from elsewhere along the coast.

Conservation Concerns: Coastal habitat and nesting site disturbances.

COMMON TERN *Sterna hirundo*

IUCN Status: Least Concern **Local Status:** S, PM/WM?

Habitat/Key sites in MMR: Coast, lagoons, inter-tidal mudflats.

Observations/Remarks: A highly uncommon species in MMR, but chances of overlooking not ruled out; possibly only a passage migrant in the region. Small flock seen around Gorai (1981) and a flock of about 400 birds reported at Colaba Point (Oct, 1974). 02 sighting reports during project fieldwork, at Alibaug (18 March) and BPS (23 Sept).

Conservation Concerns: Not assessed.

WHITE-CHEEKED TERN *Sterna repressa*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Coast, open sea.

Observations/Remarks: A couple of sighting reports during August in early-2000's at Karanja, Uran. An older record for the region dates to June 1973. No reports during project fieldwork.

Conservation Concerns: Not assessed.

WHITE-WINGED TERN *Chlidonias leucopterus*

IUCN Status: Least Concern **Local Status:**

Habitat/Key sites in MMR: Inland freshwater wetlands; possibly also brackish.

Observations/Remarks: Possibly an overlooked species in the region. A couple of sighting reports from Uran area (early-2000's). Only 01 sighting during project fieldwork (Dec 2011) on Lokhandwala Lake; this individual was set upon and killed by crows.
Conservation Concerns: Not assessed.

BLACK-BELLIED TERN *Sterna acuticauda*
IUCN Status: Least Concern **Local Status:** UC, PM?
Habitat/Key sites in MMR: Chiefly large freshwater wetlands. Powai Lake.
Observations/Remarks: This species is possibly only a sporadic passage migrant through the region; several regular reports during mid-March – early-April in early-2000's on Powai Lake, Uran. At least 11 sighting reports during project fieldwork, most during March-April and a couple in September, suggesting species may not be wintering in region. Late summer sightings were of birds in rich breeding plumage.
Conservation Concerns: Not assessed.

GULL-BILLED TERN *Gelochelidon nilotica*
IUCN Status: Least Concern **Local Status:** FC, WM
Habitat/Key sites in MMR: Creeks, inland freshwater wetlands; sometimes coast.
Observations/Remarks: Widespread wintering tern, usually solitary; numbers seem to have declined in recent years though a few continue to be sighted every season. Earliest Winter Date is 31 August. Latest Summer Date 04 May.
Conservation Concerns: Not assessed.

RIVER TERN *Sterna aurantia*
IUCN Status: Least Concern **Local Status:** UC/S, WM?
Habitat/Key sites in MMR: Inland freshwater wetlands, also brackish waters. BPS, Thane Creek.
Observations/Remarks: The MMR has largely been outside of the known distributional range of this species and there are very few records even during the early-20th Century. However, the species seems to be slowly appearing during winter in MMR, including on the larger surviving wetlands in the Greater Mumbai area. There has been a constant increase in sightings over the past 3 years with 15 reported sightings, including small flocks on two

occasions, during project fieldwork; majority were from BPS and elsewhere along Thane Creek, Sewri Bay, but a few also on inland lakes, including Papdi *Talao*, Vasai.

Conservation Concerns: A species that would require continuous monitoring in region to assess its status and any ecological shift.

SANDWICH TERN *Thalasseus sandvicensis*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Chiefly coast. Alibaug.

Observations/Remarks: Very few reports of the species on the MMR coast; we have 03 sightings from Alibaug and Arnala, both on the beach.

Conservation Concerns: Requires monitoring.

LESSER CRESTED TERN *Thalasseus bengalensis*

IUCN Status: Least Concern **Local Status:** S, WM?

Habitat/Key sites in MMR: Coast, lagoons, creeks.

Observations/Remarks: Another of the seldom reported terns from the MMR. Few older records from region dating to the mid-1900's; a couple of sighting reports during early-2000's. We have 03 sighting reports during project fieldwork, from Alibaug coast and along Thane Creek/Elephanta.

Conservation Concerns: Requires monitoring.

GREAT CRESTED TERN *Thalasseus bergii*

IUCN Status: Least Concern **Local Status:**

Habitat/Key sites in MMR: Chiefly coast.

Observations/Remarks: Another of the highly uncommon terns in the MMR, with sporadic sighting reports during early/mid-1900's. A few sightings around Karanja – Uran during 2000 – 2001. 05 sighting reports during project fieldwork, mostly from Alibaug – Elephanta.

Conservation Concerns: Needs monitoring.

CASPIAN TERN *Hydroprogne caspia*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR: Coast, creeks, other brackish and large freshwater wetlands.

Observations/Remarks: This large tern with a striking beak and loud, rasping call occasionally appears in the MMR; a few are reported every year. The species was never common in the region but has evidently declined much since early-2000's along the western side of MMR, with only 01 sighting on Bassein Creek out of a total of 19 sighting reports during project fieldwork; Up to the late-1980's the species was always sighted on the western sea-board and creeks.

Earliest Winter Date is 30 September. Latest Summer Date 30 March.

Conservation Concerns: Habitat quality loss, disturbance. Needs monitoring.

BRIDLED TERN *Sterna anaethetus*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Coast, rocky islets.

Observations/Remarks: One of several oceanic species that get blown or appear on coast during monsoon winds. Several old reports from region date to the early/mid-1900's and there is also a sighting dated 15 Aug 2002. No reports during project fieldwork.

Conservation Concerns: Not assessed but requires monitoring.

SOOTY TERN *Sterna fuscata*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Coast, rocky islets.

Observations/Remarks: Sporadic reports on sea and mostly south of Mumbai over the years; no confirmed sighting but a specimen found dead in Mumbai in BNHS collection. No reports during project fieldwork.

Conservation Concerns: Like several other terns, also requires monitoring to assess status.

WHISKERED TERN *Chlidonias hybrida*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Coast, creeks, inland freshwater wetlands.

Observations/Remarks: The most widespread wintering tern, it can be commonly seen on every creek, fish-landing site and often also on inland wetlands.

Earliest Winter Date is 26 August. Latest Summer Date 04 May.

Conservation Concerns: Loss

BROWN NODDY *Anous stolidus*

IUCN Status: Least Concern **Local Status:** Not known

Habitat/Key sites in MMR: Chiefly coast.

Observations/Remarks: No report from MMR but included only because its distribution range overlaps several other species that periodically get storm-blown during monsoons into the region.

Conservation Concerns: Requires monitoring.

INDIAN SKIMMER *Rynchops albicollis*

IUCN Status: Least Concern **Local Status:** S, WM?

Habitat/Key sites in MMR: Lagoons, coast; possibly also inland freshwater wetlands.

Observations/Remarks: Intermittently reported from around MMR over the years; however, during project fieldwork, came across this bird on BPS (October 2012) and on Alibaug coast (March 2012).

Conservation Concerns: Needs monitoring.

PIGEONS AND DOVES

ROCK PIGEON *Columba livia*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: Everywhere, especially built-up areas.

Observations/Remarks: The most abundant bird in MMR. Huge numbers in built-up localities, including the most crowded market-places. Breeds all year, raising up to 3 broods in a year. There is much debate about the ill-effects of so many pigeons on human health and general ecology but no headway in attempts to controlling numbers which are in fact only rising.

Conservation Concerns: None.

NILGIRI WOODPIGEON *Columba elphinstonii* **Endemic to Western Ghats**

IUCN Status: **Local Status:** S, R?

Habitat/Key sites in MMR: Forest, chiefly hilly. Matheran, Prabalgadh.

Observations/Remarks: A Western Ghats endemic, restricted to Matheran, and possibly Prabalgadh top in MMR; several sighting reports from Matheran in every season, suggesting possible resident. Reported SGNP, KBS (mid-1990's and early-2000's), also reported Phansad, just south of MMR.

Conservation Concerns: Needs monitoring.

ORIENTAL TURTLE-DOVE *Streptopelia orientalis*

IUCN Status: Least Concern **Local Status:** UC/S, R/LM

Habitat/Key sites in MMR: Forest, in lowlands and hilly.

Observations/Remarks: Uncommon in region, with regular reports only from Matheran Range, including Prabalgadh; sporadically from Elephanta, SGNP, few other sites. 11 reported sightings during project fieldwork, majority from hilly sites, including TWLS. Evidently only a rare local migrant in the plains.

Conservation Concerns: Not assessed.

LAUGHING DOVE *Streptopelia senegalensis*

IUCN Status: Least Concern **Local Status:** UC/FC, R/LM

Habitat/Key sites in MMR: Open country, in lowlands and hilly; also creek-edge.

Observations/Remarks: A species that was scarce in region until recent times has suddenly increased in numbers locally; this has been observed towards the fringes of the MMR, though there have also been a few sightings in Greater Mumbai area as well. A very marked and high increase in encounter frequency observed during 2011 – 12, with more than 60 reports in a year. Whether this was due to a possible seasonal influx of birds from elsewhere is not ascertained; nearly two-thirds of sightings were between Oct – March. Breeding observed in Uran (March 2001) and near Kaman (April 2007).

Conservation Concerns: Not assessed but needs monitoring to ascertain if and how the species may be increasing in MMR and its distribution pattern shifting due to any changing environmental and/or ecological factors.

RED COLLARED-DOVE *Streptopelia tranquebarica*

IUCN Status: Least Concern **Local Status:** S, LM?/WM?

Habitat/Key sites in MMR: Open country.

Observations/Remarks: An uncommon, even rare dove of the region, with very few old reports dating to early/mid-1990's. Only 02 sighting reports during project fieldwork, from Khargarh Hills (16 Feb 2012) and from near Vajreshwari-Kaman (03 May, 2012).
Conservation Concerns: Not assessed.

SPOTTED DOVE *Streptopelia chinensis*
IUCN Status: Least Concern **Local Status:** FC, R
Habitat/Key sites in MMR: Open country in lowlands and hills, forest edge, urban edge.
Observations/Remarks: Commonest dove in the region, with high encounter frequency, though there seems to have been a noticeable decline over past decade, especially from the once more extensive open grass and scrub areas (SM, *pers obs*). Has also been observed in South Mumbai, with breeding reported from Navy Nagar environs.
Conservation Concerns: Not assessed.

EURASIAN COLLARED-DOVE *Streptopelia decaocto*
IUCN Status: Least Concern **Local Status:** S/St
Habitat/Key sites in MMR: Open country.
Observations/Remarks: Scarce in the region, with few reports dating to early/mid-1990's. However, has been reported from Alibaug, Uran, Ambernath and Uran areas in recent years. No sighting reported during project fieldwork but, in Feb 2013, after the project fieldwork had terminated, a dead specimen was located in Kandivli, NW Mumbai.
Conservation Concerns: Not assessed.

EMERALD DOVE *Chalcophaps indica*
IUCN Status: Least Concern **Local Status:** UC, R
Habitat/Key sites in MMR: Forest, lowlands and hilly.
Observations/Remarks: One of several forest pigeons in the MMR, though one sighting in heavily built-up urban area (Andheri). SGNP is a stronghold in region, with smaller populations in Matheran Range, TWLS, KBS and along the Karjat – Khopoli and Alibaug hills. Of 26 reported sightings during project fieldwork, well over half were from SGNP.
Conservation Concerns: Not assessed.

YELLOW-FOOTED GREEN-PIGEON *Treron phoenicoptera*

IUCN Status: Least Concern **Local Status:** UC/FC, R

Habitat/Key sites in MMR: Forest, largely lowland; occasionally hilly, and forest-edge.

Observations/Remarks: Small bands of this arboreal pigeon occasionally encountered in forest, rarely in forest-edge. Key sites include SGNP, TWLS, Alibaug region, and fringes of MMR to the east.

Conservation Concerns: Not assessed.

GREY-FRONTED GREEN-PIGEON *Treron affinis* **Endemic to Western Ghats**

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills. KBS,

Observations/Remarks: Restricted to the taller forest sites, and less common overall than *phoenicoptera*. Key sites are KBS and TWLS, with lesser numbers in Alibaug area, SGNP.

Conservation Concerns: Not assessed.

ORANGE-BREASTED GREEN-PIGEON *Treron bicinctus*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Forest.

Observations/Remarks: Never previously reported north of Goa in the Western Ghats, a small flock was sighted on the eastern fringes of Tulsi Lake on …. …… (Tushar Nidambur). **Conservation Concerns:** Not assessed.

GREEN IMPERIAL-PIGEON *Ducula aenea*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Forest, in lowlands; possibly also hills.

Observations/Remarks: Though restricted to Western Ghats forest, the species also occurs regularly in the dense forests of Phansad WLS, just south of MMR. Reported from TWLS upper areas (early-1900's). 01 report from SGNP (June 2003). No reports since, nor during project fieldwork.

Conservation Concerns: Not assessed.

PARROTS AND ALLIES

VERNAL HANGING-PARROT *Loriculus vernalis*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat/Key sites in MMR: Forest, forest-edge.

Observations/Remarks: The MMR is almost the northern limit of the species'distributional range along the Western Ghats. Has been observed consistently in Phansad WLS, the south of and outside of MMR limits. Sporadic sighting reports from Alibaug and KBS. A 1980's sighting in Kandivli, NW Mumbai (SM, *pers obs*).

Conservation Concerns: Loss

MALABAR PARAKEET *Psittacula columboides* **Endemic to Western Ghats**

IUCN Status: Least Concern **Local Status:** S, R/LM

Habitat/Key sites in MMR: Forest, in lowlands and hills. KBS.

Observations/Remarks: A Western Ghats endemic, this species was previously reported only from the TWLS (1934). Over the years, the species has been sighted several times in the lowland forests of MMR, suggesting possible spread into this part of North Konkan. Of 10 sighting reports during project fieldwork, 05 were from KBS and Alibaug area, 02 each from TWLS and SGNP and once from Elephanta Island.

Conservation Concerns: Needs monitoring in the context of its distributional range in MMR.

PLUM-HEADED PARAKEET *Psittacula cyanocephala*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Chiefly forest, in lowlands and hills.

Observations/Remarks: Though the precise status of this parakeet in the MMR has not been clear, a decline in numbers and encounter frequency has been observed at most forest sites; one-third of the sighting reports during project fieldwork were from SGNP, with KBS and TWLS being the other key sites for this species.

Conservation Concerns: Needs monitoring, like several other woodland species in the MMR.

ROSE-RINGED PARAKEET *Psittacula krameri*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban built-up localities.

Observations/Remarks: One of the most widespread and familiar species, with amongst the highest encounter frequencies in urban areas. Has locally become common in some forest localities, with a proportionate decline noted in the more forest-dwelling *cyanocephala*.

Conservation Concerns: This and other species of parakeets requires continuous monitoring in the context of urban flora and their relationship with several introduced fruiting trees.

ALEXANDRINE PARAKEET *Psittacula eupatria*

IUCN Status: Least Concern **Local Status:** UC/FC, R

Habitat/Key sites in MMR: Forest, open country, urban built-up localities, parks.

Observations/Remarks: MMR is outside of the known distributional range of this large parakeet that reportedly first appeared in the wild here during the early-1900's. This is one of three species that are known to have established populations in MMR (naturalised) upon release of captive birds or from escaped cage-birds. Today the species is widespread across all habitat types, including many urban areas; in fact, we assess that this species may be slowly usurping the distribution range of the native, commoner Rose-ringed Parakeet in some localities. We have 91 sighting reports during project fieldwork.

Conservation Concerns: A species deserving of continuous monitoring.

RED-BREASTED PARAKEET *Psittacula alexandri*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat/Key sites in MMR: Greater Mumbai urban areas.

Observations/Remarks: This is a bird of Himalayan foothills and Northeastern India. Evidently, sometime in mid/late-1990's a few captive birds either escaped or were released in Greater Mumbai and in a few years were sighted across suburban Mumbai; the species was even reported to be possibly breeding. However, unlike the hardier *eupatria*, this species has not been able to establish well in the MMR and we have only sporadic reports of an odd specimen sighted in Andheri and another near Manori/Gorai, both of these during the first phase of the present project (seen Jan & March 2010). No reports since.

Conservation Concerns: Present status uncertain.

CUCKOOS

GREY-BELLIED CUCKOO *Cacomantis passerinus*

IUCN Status: Least Concern **Local Status:** UC, MBV?/R?

Habitat/Key sites in MMR: Forest, forest-edge. SGNP, TWLS, KBS, Aarey, Alibaug-Chirner.

Observations/Remarks: Like most other parasitic cuckoos in region, more visible and audible May-September. 21of 22 encounters during project fieldwork during May– early-September, suggesting the strictly seasonal activity of the species.

Conservation Concerns: Its breeding ecology requires monitoring.

BANDED BAY CUCKOO *Cacomantis sonneratii*

IUCN Status: Least Concern **Local Status:** UC, MBV?/R?

Habitat/Key sites in MMR: Forest, forest-edge.

Observations/Remarks: This species occasionally active (calling) from late-summer (mid-April) onward, this also noticed on sudden overcast and very humid days. All 15 encounters of this species during project fieldwork during April – September, with 01 bird calling actively on 12 March (SGNP).

Conservation Concerns: Monitoring for ascertaining breeding status.

'FORK-TAILED' DRONGO-CUCKOO *Surniculus lugubris*

IUCN Status: Least Concern **Local Status:** UC, MBV?

Habitat/Key sites in MMR: Forest, forest-edge. SGNP, KBS, Alibaug area, TWLS, Karjat.

Observations/Remarks: This cuckoo becomes active closer to the onset of the monsoon; 11 of 13 encounters during project fieldwork during June – mid-September.

Conservation Concerns: Like several other parasitic cuckoos, little known regarding status of its breeding biology.

JACOBIN CUCKOO *Clamator jacobinus*

IUCN Status: Least Concern **Local Status:** MBV, UC

Habitat/Key sites in MMR: Open country, forest edge; occasionally urban parks.

Observations/Remarks: The cuckoo that invariably heralds the onset of the monsoon. Flying from Africa across the Arabian Sea on the SW monsoon winds, this bird appears

around mid/end May and is seen until Nov – De It can be quite widespread some years and noticeable uncommon during others. 23 encounters during project fieldwork, earliest seen 19 May, latest 28 October, with a solitary sighting on 01 February. Most widespread in open country and forest-edge, including Aarey environs in Greater Mumbai.

Conservation Concerns: Requires monitoring of its breeding ecology.

CHESTNUT-WINGED CUCKOO *Clamator coromandus*

IUCN Status: Least Concern **Local Status:** St / PM?

Habitat/Key sites in MMR: Unknown

Observations/Remarks: Included only because of some past reports suggestive of it being an occasional passage migrant in the region; however, no reports for many years now.

Conservation Concerns: Not assessed.

ASIAN KOEL *Eudynamys scolopaceus*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban built-up localities.

Observations/Remarks: Amongst the most widespread and familiar birds in MMR, with amongst the highest encounter frequencies, at over two-thirds of all field-visits during project. Commonest in urban areas, especially Greater Mumbai proper, but seen in every kind of habitat, especially since its host species, the House Crow, has become so abundant.

Conservation Concerns: Monitoring for its breeding biology.

INDIAN CUCKOO *Cuculus micropterus*

IUCN Status: Least Concern **Local Status:** S, MBV?

Habitat/Key sites in MMR: Chiefly forest, forest-edge.

Observations/Remarks: A seldom sighted cuckoo, invariably audible during monsoon; has always been considered uncommon in region, but could almost be rated Scarce. 06 encounters during project fieldwork, always confirmed by its diagnostic calling, and all reports between 10 June – 14 July. Sites include SGNP, TWLS, Bhopar – Ambernath, and once on Elephanta at the onset of the monsoon.

Conservation Concerns: Not assessed, but little known of its breeding biology here.

COMMON CUCKOO *Cuculus canorus*

IUCN Status: Least Concern **Local Status:** S, WM?

Habitat/Key sites in MMR: Forest, forest-edge.

Observations/Remarks: Uncommon and seldom reported in MMR in recent years; however, several reports during Oct – Dec in early-2000's suggest the species may have intermittently passed through on migration. Had been classified as uncommon for the area through the mid/late-1900's by Abdulali (1981). We have an unconfirmed report from Khargarh Hills during project fieldwork but this has been discounted.

Conservation Concerns: Not assessed.

SMALL CUCKOO *Cuculus poliocephalus*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Not ascertained.

Observations/Remarks: Other than a confirmed sighting of a hepatic female near the southern fringes of SGNP (October 2000) we have no other report of this species from MMR in recent years. **Bombay** and neighbouring area, uncommon, breeding migrant?, *Abdulali, H. 1981a (sic);* No sighting or report during project fieldwork.

Conservation Concerns: Not assessed.

COMMON HAWK-CUCKOO *Hierococcyx varius*

IUCN Status: Least Concern **Local Status:** UC, MBV?/R?

Habitat/Key sites in MMR: Forest, forest-edge, open, tree-dotted country.

Observations/Remarks: Renowned for its call, most audible during the monsoon, like all other parasitic cuckoos. Has also been reported from Central and South Mumbai. Though most active May – September, however there have been 01 sightings each in April, November and December. The rest of the month-wise break-up includes 03 in May, 10 in June, 09 in July, 07 in August, 04 in September

Conservation Concerns: Little is known of its breeding biology.

BLUE-FACED MALKOHA *Phaenicophaeus viridirostris*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Open scrub country.

Observations/Remarks: The species was first reported in region back in 1953. The species has since been sighted in Alibaug region (Vaibhav Deshmukh & Pravin Kawale, *pers obs*), around Khopoli and once along Tansa River (SM *pers obs*). However, there have been no recent sightings, including during project fieldwork.

Conservation Concerns: Not assessed and would require monitoring.

SIRKEER MALKOHA *Taccocua leschenaultii*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Open scrub country.

Observations/Remarks: Though there are reports dating to mid-1900's in region, the only recent reports are from along Ambernath – Badlapur area and the sighting of one in Yeur, fringes of SGNP on Thane side on 02October 2005 (Salil Choksi, *pers obs*).

Conservation Concerns: Not assessed.

GREATER COUCAL *Centropus sinensis*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including some urban parks, overgrown sites.

Observations/Remarks: One of the most widespread and familiar birds in MMR, this non-parasitic cuckoo is unmistakable by sight and by sound. Its encounter frequency across MMR is only marginally lower than the Asian Koel, pointing to its great adaptability.

Conservation Concerns: May have declined in some urban sites that have lost their green cover to development in recent years.

OWLS

BROWN HAWK-OWL *Ninox scutulata*

IUCN Status: Least Concern **Local Status:** S, R

Habitat/Key sites in MMR: Forest, in lowlands and hills. SGNP, KBS, TWLS.

Observations/Remarks: Widespread in the forest tracts but little known and elusive; 05 reports during project fieldwork, from SGNP and TWLS. Also reported from Alibaug area (VD & PK).

Conservation Concerns: Not assessed.

COMMON BARN-OWL *Tyto alba*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Chiefly urban areas; also open country.

Observations/Remarks: Most widespread owl in the urban areas and urban-edge open country across the MMR. Species seems to have established itself stronghold in the region over past two decades, though number of reports during project fieldwork may not indicate thus. In Greater Mumbai proper, the encounter frequency and reports of sightings of this species have risen by an estimated 600+% over just two decades (SM *pers obs*).

Conservation Concerns: Not assessed but definitely a species that needs continuous monitoring in key urban areas.

BROWN FISH OWL *Ketupa zeylonensis*

IUCN Status: Least Concern **Local Status:** S, R.

Habitat/Key sites in MMR: Forest, wetlands in forest, creeks.

Observations/Remarks: One of several elusive, little-known big owls of the MMR. Population evidently very low, but confirmed presence reported from SGNP, Talzan Charkop and Alibaug area. No sighting or report during project fieldwork.

Conservation Concerns: Not assessed.

INDIAN EAGLE-OWL *Bubo bengalensis*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Open country, rocky areas/cliffs. SGNP fringes, Alibaug area.

Observations/Remarks: The relatively widespread large owl in MMR; a small population has established over past decade and half in rocky terrain on NW fringes of SGNP. Also observed Alibaug area, Khargarh – Mumbra Hills, near Kaman – Vajreshwari and Gandhari.

Conservation Concerns: Habitat disturbance.

SHORT-EARED OWL *Asio flammeus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Open grass and scrub country, in lowlands and hills.

Observations/Remarks: Uncommon winter visitor, having been observed at quite a few locations over the years, including MRC, Vikhroli grasslands and Kalina Campus in Greater

Mumbai. 04 reports during project fieldwork from Khargarh Hills, Kanheri Hill and Vasai – Virar. Species may have been far more widespread when much extensive openlands flanked the many creeks in the region.

Conservation Concerns: Not assessed but requires continuous monitoring in view of vanishing habitat and increasing disturbance.

MOTTLED WOOD-OWL *Strix ocellata*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: Sporadic reports from forested tracts of MMR over the years, with at least two confirmed reports during early-2000 from SGNP. 01 report from Tulsi Valley, SGNP, during project fieldwork. Unconfirmed report from KBS.

Conservation Concerns: Not assessed but requires monitoring in region to ascertain status.

BROWN WOOD-OWL *Strix leptogrammica*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat/Key sites in MMR: Forest.

Observations/Remarks: The MMR lies north of the known distributional range of this species; however, the species has in recent years been reported in Alibaug area (VD & PK), in the Phansad WLS.

Conservation Concerns: Not assessed but requires monitoring in region to ascertain status.

INDIAN SCOPS OWL *Otus bakkamoena*

IUCN Status: Least Concern **Local Status:** UC/S, R?

Habitat/Key sites in MMR: Forest, forest-edge; in lowlands and hills.

Observations/Remarks: Like nearly all owls, little known and seldom easily sighted. Evidently the more widespread of the Scops owls in the region but scant information. 03 reports during project fieldwork, from SGNP, TWLS and from the eastern fringes (Kalyan – Murbad road).

Conservation Concerns: Not assessed and requiring monitoring to ascertain status.

ORIENTAL SCOPS OWL *Otus sunia*

IUCN Status: Least Concern **Local Status:** S?/UC?, R?

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: 02 confirmed reports during project fieldwork from Matheran Range; species may be commoner than the encounter frequency suggests but only a detail monitoring of the owls can provide further information.

Conservation Concerns: Not assessed and requiring monitoring to ascertain status.

PALLID SCOPS- OWL *Otus brucei*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Not known but evidently light forest, tree-dotted open country.

Observations/Remarks: There are 02 specimens dating to the 1960's (collected Thane and Andheri) in BNHS collection; there have been some unsubstantiated reports over past two decades of this species' occurrence in/around the MMR.

Conservation Concerns: Not assessed and requires monitoring to ascertain status.

EURASIAN SCOPS-OWL *Otus scops*

IUCN Status: Least Concern **Local Status:** S, WM?/PM?

Habitat/Key sites in MMR: Unknown.

Observations/Remarks: No reports since mid-1930's but 02 specimens from Mumabi region in BNHS collection, dating to 1891 & 1925. Included here only because MMR is included as part of the species'distributional range.

Conservation Concerns: Not assessed and requires monitoring to ascertain status.

SPOTTED OWLET *Athene brama*

IUCN Status: Least Concern **Local Status:** UC/S, R

Habitat/Key sites in MMR: All kind of habitats, including urban built-up, parks.

Observations/Remarks: Most widespread little owl of the country, this familiar bird was common over the MMR until the late-1980's. Very sharp decline in numbers since, the bird having disappeared from many known localities. Periodically a slight local comeback observed but on the whole the species seems to be on a decline.

Conservation Concerns: Disturbance, loss of nesting sites, competition from Barn Owl, persecution by crows. Needs monitoring to ascertain status.

JUNGLE OWLET *Glaucidium radiatum*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: The common owl of forest tracts here, often sighted and heard by day. SGNP is a key site, with 33 of the 54 encounters during project fieldwork from this protected area. Other key sites are TWLS, KBS - Chirner, Chinchoti and Alibaug area.

Conservation Concerns: Not assessed, but needs monitoring.

NIGHTJARS

INDIAN JUNGLE NIGHTJAR *Caprimulgus indicus*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Forest, clearings, open country in lowlands and hills.

Observations/Remarks: Widespread but seldom sighted by day, unless flushed. Prefers grassy rocky terrain and clearings in forest and forest-edge; such habitat in SGNP a stronghold. In winter, up to a dozen birds, along with *asiaticus*, *affinis* and *atripennis* have been sighted.

Conservation Concerns:

INDIAN LITTLE NIGHTJAR *Caprimulgus asiaticus*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Open areas in lowlands and hills, forest clearings.

Observations/Remarks: Widespread but has declined much from several sites, including SGNP, Aarey, Manori – Gorai, MIDC Road, several other sites. The relative abundance of this species (and of *indicus* and *affinis*) can also be judged from the frequency with which these birds would be encountered on drives in Alibaug area, Karjat – Khopoli and other outer areas of MMR until the mid/late-1990's and a comparative in contemporary times. An approximate 30 km drive has yielded up to 30 and more nightjars during 1980's and up to mid-1990's and a similar dusk and night drive in 2012 yielded not a single bird on the same road. This species was quite common in the Manori – Gorai – Uttan stretch where up to 11

breeding pairs/nests have been found in a season (late-1970's – mid -1990's) while none were discovered during the past 5 years. Such has been the impact of developmental expansion, roads and automobiles on the countryside and the wilderness.

Conservation Concerns: Habitat loss, disturbance.

JERDON'S NIGHTJAR *Caprimulgus atripennis*

IUCN Status: Least Concern **Local Status:** S, WM?

Habitat/Key sites in MMR: Open areas in lowlands and hills, forest-edge.

Observations/Remarks: From regular sightings up to late-1990's and a few up to about 2003, this species has declined much in the MMR. No reports during entire project fieldwork.

Conservation Concerns: Disturbance, Habitat loss.

SAVANNA NIGHTJAR *Caprimulgus affinis*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Open areas in lowlands and hills, forest-edge.

Observations/Remarks: Up to late-1990's there were always 3 – 4 of this species amongst the mixed nightjar bands roosting on the open rocks around Kanheri. In two winter seasons during the course of this project a maximum of 03 nightjars were flushed at any time and none of this species or of *atripennis*. No reports from any other site though it must be admitted that several other potential nightjar habitat sites may not have been as regularly surveyed. Even then a marked decline in numbers of the several species is evident.

Conservation Concerns: Disturbance, habitat loss.

TREESWIFTS, SWIFTS

CRESTED TREESWIFT *Hemiprocne coronata*

IUCN Status: Least Concern **Local Status:** S, R/LM

Habitat/Key sites in MMR: Open tree-dotted areas, forest-edge.

Observations/Remarks: Intermittently sighted even in its strongholds such as KBS fringes and Alibaug – Khopoli area. A total of 08 reports during project fieldwork, most of these from above-mentioned sites. Breeding observed at KBS (Feb, March). Has been sighted Aarey and Manori-Gorai (1990's).

Conservation Concerns: Not assessed but possible disturbance.

ASIAN PALM-SWIFT *Cypsiurus balasiensis*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: Open, palmyra-dotted country, forest-edge.

Observations/Remarks: The commonest and most visible swift in the region, with an overall encounter frequency just in excess of 60%. Its survival is entirely inter-related with the Palmyra plant and across parts of Greater Mumbai the bird has declined locally as its typical habitat disappears under endless development.

Conservation Concerns: Survival of palmyras.

LITTLE (HOUSE) SWIFT *Apus affinis*

IUCN Status: Least Concern **Local Status:** FC, R/LM

Habitat/Key sites in MMR: Chiefly urban built-up areas; also urban-edge open sites, cliffs.

Observations/Remarks: Fairly common in the built-up localities, including in some of the most crowded localities. Many old nesting sites continue to exist; the famed nesting colony under the archway of the Greaves Cotton & Co on Forbes Street, Fort was active at least until 2010 and perhaps still exists. Numerous British era architectural marvels of southern Mumbai are the haunts of this swift, whose rambling flocks with their trilling cries are a feature of downtown Mumbai.

Conservation Concerns: Not assessed.

INDIAN WHITE-RUMPED SPINETAIL *Zoonavena sylvatica*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Over forest.

Observations/Remarks: A species of which flocks were sighted quite regularly up to 2002, the decline in recent years has been quite noticeable. No reports for past few years and only 01 report of a small flock over TWLS during the first phase of this project, in January 2010.

Conservation Concerns: Not assessed.

ALPINE SWIFT *Tachymarptis melba*

IUCN Status: Least Concern **Local Status:** S/UC, LM

Habitat/Key sites in MMR: Over urban areas, cliffs, forest, open areas.

Observations/Remarks: Sporadically small flocks appear over any kind of habitat, evidently dispersing whilst foraging along their Western Ghats range. Have even been sighted over urban built-up localities. At least 10 encounters during project fieldwork, including around/over some of the high altitude points in MMR, such as TWLS top, Matheran Range ridges, Kankeshwar top and Kanheri top.

Conservation Concerns: Not assessed.

ROLLERS

EUROPEAN ROLLER *Coracias garrulus*

IUCN Status: Near Threatened **Local Status:** S, PM

Habitat/Key sites in MMR: Open areas, creek margins.

Observations/Remarks: Over the years there have been several sporadic sightings of this species; it has never been seen over more than a few days, clearly suggesting that the MMR is a passage migration route. No report of any sighting between 2003 – 2009. However, an unusually high number of birds on passage observed between 29 Sept – 28 Oct, with over 100 birds noticed on 07 separate occasions at several sites, including along Thane Creek, Khargarh Hills, Nhava-Sheva, Uran and Malad Creek. Also been sighted on MRC and around US Club lawns, Colaba.

Conservation Concerns: Not assessed.

INDIAN ROLLER *Coracias benghalensis*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Open country, forest-edge, in lowlands and hills.

Observations/Remarks: An uncommon species in the region but a few individuals invariably sighted every winter. No confirmed breeding reported but there have been at least three separate reports of courtship displays in MMR. It is almost entirely a winter visitor, with all but one of the 35 sighting reports during project fieldwork between mid-October and early-May.

Conservation Concerns: Not assessed.

HOOPOES

COMMON HOOPOE *Upupa epops*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Open areas, in lowlands and hills; occasionally urban parks.

Observations/Remarks: Widespread but invariably in small numbers; no evidence of breeding in MMR though there are breeding reports from the Deccan. 28 sighting reports during project fieldwork; except for one stray sighting on June 16 (Diva), the species was seen in MMR between 29 September – 09 April.

Conservation Concerns: Not assessed.

TROGONS

MALABAR TROGON *Harpactes fasciatus*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: There are several sighting reports of this bird from SGNP (incl SM *pers obs*) up to late-1980's and an undated sighting from TWLS during 1995 (anon). Species has also been reported for Phansad WLS, south of the MMR. No evidence of any sighting for nearly two decades now.

Conservation Concerns: Needs monitoring to ascertain status in region.

KINGFISHERS

COLLARED KINGFISHER *Todiramphus chloris*

IUCN Status: Least Concern **Local Status:** S, LM

Habitat/Key sites in MMR: Coast, creeks.

Observations/Remarks: A seldom reported species for MMR, with the only previous sightings during 1990's – early 2001 from Gorai and Nirmal coast. A lone bird sighted at Gorai on March 25 2012, during project fieldwork is the only recent report for species here.

Conservation Concerns: Not assessed.

BLACK-CAPPED KINGFISHER *Halcyon pileata*

IUCN Status: Least Concern **Local Status:** UC/S, LM

Habitat/Key sites in MMR: Coast, creeks; occasionally inland freshwater sites.

Observations/Remarks: The MMR lies on the distributional range of this largely coastal kingfisher that, however is scarce on the western sea-board north of Goa. Invariably a few reports every year, and has also been seen on a forest stream in SGNP and in forest off Yeur. 06 reports during project fieldwork, most of them from Alibaug coast.

Conservation Concerns: Not assessed.

WHITE-THROATED KINGFISHER *Halcyon smyrnensis*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, in lowlands and hills; often in urban built-up sites.

Observations/Remarks: The commonest, most familiar kingfisher in MMR, often also seen amid crowded urban localities. Has amongst the highest encounter frequencies in the region, at almost 90%. Only kingfisher regularly also sighted away from water.

Conservation Concerns: Not assessed.

LESSER PIED KINGFISHER *Ceryle rudis*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat/Key sites in MMR: Inland freshwater bodies, brackish wetlands.

Observations/Remarks: This is a highly uncommon species in the MMR though is seen more regularly in the Konkan and on the Deccan. Has been intermittently reported over the years; there are 06 sighting reports during project fieldwork, all of them from the eastern and southern fringes of MMR (Alibaug – Kalyan – Tansa River), and none from Greater Mumbai area.

Conservation Concerns: Not assessed but requires monitoring.

BLACK-BACKED DWARF KINGFISHER *Ceyx erithaca*

IUCN Status: Least Concern **Local Status:** UC, MBV.

Habitat/Key sites in MMR: Forest streams, in lowlands and hills. SGNP.

Observations/Remarks: This tiny kingfisher is a strictly forest-dwelling kingfisher; appears around mid-May with onset of monsoon winds. SGNP is the key site in region, and has been sighted in TWLS, KBS and along Matheran Range.

Conservation Concerns: Not assessed.

COMMON KINGFISHER *Alcedo atthis*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Inland freshwater wetlands; also brackish wetlands, creeks.

Observations/Remarks: The archetypal kingfisher, widespread over every kind of waterbody; however, numbers seem to be on a decline and the species is infrequent, even absent, on a few small wetlands that have been regularly surveyed.

Conservation Concerns: Pollution, disturbance, habitat loss.

BEE-EATERS

BLUE-CHEEKED BEE-EATER *Merops persicus*

IUCN Status: Least Concern **Local Status:** S, PM

Habitat/Key sites in MMR: Open country, often around wetlands.

Observations/Remarks: This species, along with *philippinus*, is a passage migrant through the MMR. This is overall less common and intermittently reported, on average, at a ratio of one sighting of this to 05 of *philippinus*. Of 04 sightings during project fieldwork, 02 were during October while there is a sighting each reported during December and February.

Conservation Concerns: Not assessed but should be monitored.

BLUE-TAILED BEE-EATER *Merops philippinus*

IUCN Status: Least Concern **Local Status:** UC, PM

Habitat/Key sites in MMR: Open country, often around wetlands.

Observations/Remarks: A passage migrant through the MMR, more widespread than persicus with which sometimes sighted. Unusually high number of encounters and bird numbers observed during 27 September – 04 November 2012, with 14 separate sighting reports of small flocks from across MMR. There were also some sightings during Dec ember, January and Feburary, pointing towards the possibility of a small population wintering in the region.

Conservation Concerns: Not assessed but should be monitored.

LITTLE GREEN BEE-EATER *Merops orientalis*

IUCN Status: Least Concern **Local Status:** FC, R/LM

Habitat/Key sites in MMR: All habitats, including forest-edge and built-up urban areas.

Observations/Remarks: The most widespread bee-eater across MMR, with a high encounter frequency of just over 60%. A small population is resident here and there is an influx of birds during winter.

Conservation Concerns: Not assessed.

HORNBILLS

MALABAR GREY HORNBILL *Ocyceros griseus* **Endemic to Western Ghats**

IUCN Status: Least Concern **Local Status:** S, R?/LM

Habitat/Key sites in MMR: Forest, in lowlands and hills. KBS.

Observations/Remarks: A forest species, with the southern fringes of MMR (KBS) probably forming the northern limit of the species' distributional range along the western coast. A couple of sighting reports for SGNP date to 1960's and early-1970's but no confirmed sighting since. Has been seen in KBS, Alibaug Hills. There are 03 sighting reports during project fieldwork, from KBS and Alibaug.

Conservation Concerns: Not assessed.

INDIAN GREY HORNBILL *Ocyceros birostris*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: The common hornbill of the region, sometimes sighted in suburban areas; has also been sighted on a couple of occasions in the green belt along Malabar Hill, where a pair has been seen since 2010; has also been seen at Manori – Gorai, Kalina and Trombay Hill. Interestingly, a lone bird sighted (and photographed) near Otter's Club, Bandra on 21 February 2013. SGNP is a key site, with a good population, and at least 07 nest sites (up to 2007). There are 78 sighting reports during project fieldwork, just over half of these in SGNP, including parties of up to 12 birds on two occasions.

Conservation Concerns: Not assessed.

GREAT PIED HORNBILL *Buceros bicornis*

IUCN Status: Near Threatened **Local Status:** St?

Habitat/Key sites in MMR: Forest.

Observations/Remarks: The distributional range of this huge bird in the region is restricted to the main Western Ghats, from Kerala north roughly to the vicinity of Pune – Khandala. There have been sporadic unsubstantiated reports of its presence in North Konkan and the first sighting was on 06 Feb 2000 in lowland forest around Vihar Lake, SGNP (SM + 4). This was along with 02 Malabar Pied Hornbills. This bird was sighted at least thrice more over the next days until a specimen of *B bicornis* (evidently same) was discovered dead. Could not be confirmed whether this was a straggler to the region or a captive bird released by someone.

Conservation Concerns: Not assessed.

MALABAR PIED HORNBILL *Anthracoceros coronatus*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Forest, forest-edge.

Observations/Remarks: Two individuals (a pair) of this species were sighted on 06 February 2000 in forest around Vihar Lake, SGNP. Over the next year and half there were several sighting reports of the two birds, including from Ambedkar Garden, near Powai Lake. No reports for almost a decade now.

Conservation Concerns: Not assessed.

BARBETS

COPPERSMITH BARBET *Megalaima haemacephala*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: Urban areas (built-up and parks, avenues); also forest, tree-dotted open country.

Observations/Remarks: Widespread species in MMR, more often heard than seen. It is also declared as the Bird of Mumbai during the Mumbai BirdRace. One of few species that has survived well due to planting of soft-wooded exotic trees and availability of several fruiting trees. However, a decline due to various factors is evident from breeding surveys along several sites in Greater Mumbai. One of …. Species with highest overall Encounter Frequency, at over 65%.

Conservation Concerns: Rising traffic noise, declining fruiting trees, persecution by crows.

WHITE-CHEEKED BARBET *Megalaima viridis* **Endemic to Western Ghats**

IUCN Status: Least Concern **Local Status:** S, R?

Habitat/Key sites in MMR: Forest. Matheran.

Observations/Remarks: Evidently occurs in the MMR only on Matheran top, and possibly Prabalgadh. 04 sighting reports during project fieldwork.

Conservation Concerns: Not assessed.

BROWN-HEADED BARBET *Megalaima zeylanica*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: The common forest barbet of MMR, with a most diagnostic call. SGNP is the key site, the species commoner in the lowland forests; seen on almost every forest visit to the area. Also observed TWLS, Chinchoti, KBS, Karjat-Khopoli (scarce), Alibaug area.

Conservation Concerns: Not assessed.

WOODPECKERS & ALLIES (all species require monitoring to ascertain status following decline of most species in recent years).

EURASIAN WRYNECK *Jynx torquilla*

IUCN Status: Least Concern **Local Status:** S, PM?

Habitat/Key sites in MMR: Forest-edge, scrub at creek-edge.

Observations/Remarks: A scarce passage migrant in the MMR; 02 sighting reports during project fieldwork, in February (Manori) and October (BPS). Evidently easily overlooked.

Conservation Concerns: Not assessed but could be commoner than reports suggest.

HEART-SPOTTED WOODPECKER *Hemicircus canente*

IUCN Status: Least Concern **Local Status:** S, R

Habitat/Key sites in MMR: Forest, chiefly lowland. SGNP, KBS.

Observations/Remarks: Always patchily distributed in the region, seldom seen up in hill forest; however there may have been a decline from some sites over past decade. 09 sighting reports during project fieldwork and key sites are KBS and Tulsi Valley in SGNP.

Conservation Concerns: Not assessed.

INDIAN PYGMY WOODPECKER *Dendrocopos nanus*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat/Key sites in MMR: Forest, chiefly lowland.

Observations/Remarks: Species possibly overlooked because of its tiny size and unobtrusive nature. At least 05 sighting reports during project fieldwork, from Yeur – SGNP, KBS, Chinchoti-TWLS and one from eastern fringes of MMR.

Conservation Concerns: Not assessed.

YELLOW-FRONTED PIED WOODPECKER *Dendrocopos mahrattensis*

IUCN Status: Least Concern **Local Status:** S

Habitat/Key sites in MMR: Forest, forest-edge, tree-dotted open country; chiefly lowlands.

Observations/Remarks: A widespread species, declined much over past decade; shows a periodic upswing in numbers some years but overall not as often encountered.

Conservation Concerns: Not assessed.

LESSER YELLOWNAPE *Picus flavinucha*

IUCN Status: Least Concern **Local Status:** S?/St?

Habitat/Key sites in MMR: Forest, chiefly hilly.

Observations/Remarks: The

Conservation Concerns: Loss

RUFOUS WOODPECKER *Micropternus brachyurus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, chiefly lowland. SGNP.

Observations/Remarks: A fairly common and widespread species until 2001, this woodpecker has declined significantly across key sites in the MMR. Of 25 sighting reports during project fieldwork, more than half were from SGNP. The 9 km length of main paved road in SGNP, from Goregaon gate to Kanheri barrier is a good yardstick for enumerating status of this and several other forest birds over the years. From an average of 06 nests along this stretch (with a high of 09 nests during 1987-88), not more than 02 nests were located during 2005 – 2008, none in 2009, 01 each in 2010, 2011 and 2012.

Conservation Concerns: Not assessed.

BLACK-RUMPED FLAMEBACK *Dinopium benghalense*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, forest-edge, chiefly in lowlands, occasionally in hills.

Observations/Remarks: Most widespread woodpecker in MMR, this species too has had a noticeable decline over the past decade and half, with sighting frequency as also number of nests found having dropped by over 50% in relation to observations during 1980's and 1990's.

Conservation Concerns: Not assessed.

WHITE-NAPED FLAMEBACK *Chrysocolaptes festivus*

IUCN Status: Least Concern **Local Status:** S, R

Habitat/Key sites in MMR: Forest, chiefly in lowlands.

Observations/Remarks: Another of the woodpeckers that has more or less disappeared from several of its known lowland forest sites in MMR, including SGNP, lower TWLS, Chinchoti and KBS. Only 03 sighting reports during project fieldwork, twice from Yeur Hills area and once from Tulsi Valley, all in SGNP.

Conservation Concerns: Not assessed.

PITTAS

INDIAN PITTA *Pitta brachyura*

IUCN Status: Least Concern **Local Status:** S, PM/R

Habitat/Key sites in MMR: Forest, in lowlands and hills; also open areas, urban areas.

Observations/Remarks: This species sometimes lands in urban built-up localities, especially during May and October, when on passage migration through MMR, and there have been several instances of the notorious House Crows setting upon this 'new' arrival, with a few fatalties.

Of 13 sighting reports during project fieldwork, 09 were during May-June, 01 in October. 03 were during July – August, with a nest with fledged chick on TWLS Upper on 24 August. The breedin status of the species in MMR has always been unclear and the species is perhaps mostly a passage migrant; however, locating an active nest at TWLS and reports of nest-building at Chirner and KBS suggest that a small population is resident here.

Conservation Concerns: Not assessed but would require some monitoring.

LARKS (Open grass and scrub habitat birds, populations of most of which have declined substantially across MMR since early-2000's, largely due to habitat loss; the larks in general require monitoring and further surveys to assess an unstable status).

ORIENTAL SKYLARK *Alauda gulgula*

IUCN Status: Least Concern **Local Status:** S, R

Habitat/Key sites in MMR: Open grass and scrub areas, short cultivation.

Observations/Remarks: Has vanished almost entirely from Greater Mumbai except for very small population along Thane Creek (BPS, Godrej-Vikhroli). 10 sighting reports during project fieldwork, only one after May 2012, at Juichandar, near Naigon.

Conservation Concerns: Habitat loss, disturbance.

MALABAR LARK *Galerida malabarica* **ENDEMIC TO WEST PENINSULAR INDIA**

IUCN Status: Least Concern **Local Status:** UC/S, R

Habitat/Key sites in MMR: Open grass and scrub, in lowland and hills.

Observations/Remarks: Restricted to the western sea-board of India, from the plains to the hills, including slopes of Western Ghats. Was widespread and fairly common in MMR until just over a quarter of a century ago; significant population decline since due to continuous habitat loss. Still retains a foothold in the southern areas of MMR (Uran - Alibaug area, Khargarh Hills) where 13 of the 19 sighting reports during project fieldwork. Rare on Greater Mumbai mainland today, though may exist on the Bhandup – Vikhroli length along the western margins of Thane Creek.

Conservation Concerns: Habitat loss.

ASHY-CROWNED FINCH-LARK *Eremopterix griseus*

IUCN Status: Least Concern **Local Status:** UC, R/LM?

Habitat/Key sites in MMR: Open grass and scrub areas in lowlands.

Observations/Remarks: Widespread species, quite common until recent times but population diminishing markedly over past 5 years; the bird is scarce or has disappeared from several sites (Uran, Greater Mumbai environs, Juichander – Virar etc).

Conservation Concerns: Habitat loss.

RUFOUS-TAILED LARK *Ammomanes phoenicura*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR:

Observations/Remarks: Despite the continuous vanishing of openland habitats and the decline of larks (and pipits) in general, this is one lark species still often sighted in the drier, outlying areas to the N, E and S of Greater Mumbai. Of 43 sighting reports during project fieldwork, only 01 in Greater Mumbai (BPS). The species doubtless exists on the Godrej - Vikhroli expanse. The species could be one of the transitory beneficiaries of the reclamation of vast wetlands of Uran in the recent past, the resultant barren openlands having come as a 'new' (quasi) habitat for this and for at least two other lark species (*Eremopterix griseus* and *Calandrella*) and which needs to be monitored.

Conservation Concerns: Not assessed.

GREATER SHORT-TOED LARK *Calandrella brachydactyla longipennis*

IUCN Status: Least Concern **Local Status:**

Habitat/Key sites in MMR:

Observations/Remarks: 09 sighting reports during project fieldwork, but only one of which was during 2012 winter. No large size flocks observed during past 3 years, compared to several flocks of up to 200 strong, seen on Uran mudflats and saltpan margins up to 2004 winter. It is possible that the reclamation of vast tracts of wetland habitat may result in a transitory benefit for this species but that has not been noticed yet, perhaps indicating the significance of natural open habitats vis-à-vis altered habitats.

Conservation Concerns: Not assessed.

MARTINS

SAND MARTIN *Riparia* sps.

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Not assessed.

Observations/Remarks: There remains some confusion as to status of this species in the region. A small flock observed Sewri Bay during 2012; at least two other reports.

Conservation Concerns: Not assessed.

DUSKY CRAG-MARTIN *Ptyonoprogne concolor*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Open areas, cliffs, built-up structures inurban areas.

Observations/Remarks: Widespread resident; seen even in built-up urban areas, with several pairs around the British era architecture of South Mumbai. During winter sometimes with the migrant *rupestris*.

Conservation Concerns: Not assessed.

EURASIAN CRAG-MARTIN *Ptyonoprogne rupestris*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR:

Observations/Remarks: Prefers more opener areas on urban edge, forest cliffs, hillsides, ruins. 11 sighting reports during project fieldwork.

Conservation Concerns: Loss

SWALLOWS

STREAK-THROATED SWALLOW *Hirundo fluvicola*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat/Key sites in MMR: Open areas, normally in vicinity of water.

Observations/Remarks: This swallow has been intermittently reported for the outlying areas of MMR; in 2010 an active breeding colony was observed under the Karal flyover, en-route to Uran. There have been a few sighting reports from late-1990's onward but the species has apparently not well colonized the region.

Conservation Concerns: Not assessed.

BARN SWALLOW *Hirundo rustica*

IUCN Status: Least Concern **Local Status:** FC/UC, WM

Habitat/Key sites in MMR: Open areas, vicinity of water, urban built-up localities.

Observations/Remarks: Widespread winter visitor though much declined in Greater Mumbai area. Though small numbers can still be seen, however the species is hardly visible in any numbers at the several sites that played host to huge gatherings (Khar, Sanatacruz, Juhu airfield, Aksa-Marve-Gorai, Kalina, Vikhroli, Ghatkopar-Navi Mumbai Road) during

1970's – 1990's. Largest congregations in recent years sighted on Deonar and Gorai dumping grounds (now closed). Earliest Winter Date is 30 September. Latest Summer Date 15 April.
Conservation Concerns: Not assessed.

RED-RUMPED SWALLOW *Hirundo daurica*
IUCN Status: Least Concern **Local Status:** FC, R/WM
Habitat/Key sites in MMR: Open areas in lowlands, urban built-up areas and surrounds.
Observations/Remarks: Widespread in the region, with a small population resident (nests found at several localities). More birds during winter with influx of Himalayan breeding race, whence large flocks can sometimes be seen. 36 of the 54 sighting reports during project fieldwork seen between late-September – early-April.
Conservation Concerns: Not assessed.

WIRE-TAILED SWALLOW *Hirundo smithii*
IUCN Status: Least Concern **Local Status:** FC, LM/WM?
Habitat/Key sites in MMR: Open areas, chiefly around water.
Observations/Remarks: There seems to have been an upswing in the encounter frequency of this species during past few years in MMR. Reasons for this are not clear but this seems to have been in direct proportion to a declining number of *rustica* and *daurica*. There were a total of 52 sighting reports of this species during project fieldwork, barely 07 of these between 01 April and 08 September, suggesting the species is largely a winter or local migrant tothe region.
Conservation Concerns: Loss

WAGTAILS AND PIPITS (Uncommon status to some species primarily because of recent assessments).
WESTERN YELLOW WAGTAIL *Motacilla flava*
IUCN Status: Least Concern **Local Status:** UC/FC, WM
Habitat/Key sites in MMR: Open marshy areas, coastland and inland wetland margins.
Observations/Remarks: Gregarious, especially on arrival and just prior to emigration (March – April). Widespread across MMR however, as with most other wagtails, numbers have declined in recent years. This and other species have become particularly uncommon in

Greater Mumbai area, with several previous wagtail strongholds having been lost; intermittently sighted MRC, US Club environs in Colaba. This species commoner on opener wetlands than cinerea. Earliest Winter Date is 02 October. Latest Summer Date 18 April.

Conservation Concerns: Habitat loss, disturbance.

GREY WAGTAIL *Motacilla cinerea*

IUCN Status: Least Concern **Local Status:** UC/FC, WM

Habitat/Key sites in MMR: Wetlands, inland and coastal; also forest streams, hilly areas.

Observations/Remarks: A widespread species, less gregarious than *flava* and more often seen on forest streams and in hill areas; has been sighted on Matheran and TWLS top. Earliest Winter Date is 26 September. Latest Summer Date 09 April.

Conservation Concerns: Not assessed but definitely affected by habitat loss and disturbance.

CITRINE WAGTAIL *Motacilla citreola*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat/Key sites in MMR: Marshy areas, wetland margins, chiefly in lowlands.

Observations/Remarks: Mostly in the lowlands, this wagtail loves marshy ground and herbage encrusted waterbodies, chiefly inland freshwater. It is nowhere common but in some years numbers higher than of *cinerea*; like *flava*, flocks seen on arrival soon disperse.

Conservation Concerns: Not assessed but loss of marshy areas and vegetation covered freshwater wetlands.

FOREST WAGTAIL *Dendronanthus indicus*

IUCN Status: Least Concern **Local Status:** S, PM?/WM?

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: A seldom reported species from the region. Invariably solitary, it has been sighted intermittently over the years, including a couple of times in suburban Mumbai (1970's). 04 sighting reports during project fieldwork from TWLS, SGNP, Elephanta and Alibaug area. Has never been seen for any extended duration and could possibly be only a passage migrant in MMR.

Conservation Concerns: Not assessed.

WHITE WAGTAIL *Motacilla alba*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat/Key sites in MMR: Open areas, often away from water also.

Observations/Remarks: A once widespread species, its numbers have declined significantly in the region in recent years, most marked having been in Greater Mumbai. 09 sightings during Phase 1 of project (end Nov 2009 – June 2010) , and an equal number of reports during Phase 2 (Nov 2011 – Nov 2012) over nearly thrice as many field visits.

Conservation Concerns: Habitat loss, disturbance.

WHITE-BROWED WAGTAIL *Motacilla maderaspatensis*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat/Key sites in MMR: Freshwater wetlands, tanks.

Observations/Remarks: A rarely reported species in MMR though has been seen on few occasions around Vaitarna Lake and towards Roha and Nagothane outside the MMR limits. Only 01 sighting report of a pair in March 2010 from near Khopoli …. on Amba River.

Conservation Concerns: Not assessed.

OLIVE-BACKED PIPIT *Anthus hodgsoni*

IUCN Status: Least Concern **Local Status:** S, WM/PM?

Habitat/Key sites in MMR: Forest, chiefly in hills. TWLS, SGNP, Khargarh Hills, Alibaug area, Matheran Range.

Observations/Remarks: This species is mostly seen in hill forest, and is today an irregular winter migrant in the MMR; 05 sighting reports during project fieldwork. Winter range overlaps with *trivialis* but habitat preference quite distinctive.

Conservation Concerns: Not assessed.

TREE PIPIT *Anthus trivialis*

IUCN Status: Least Concern **Local Status:** S, WM/PM?

Habitat/Key sites in MMR: Forest, forest-edge, chiefly in lowlands; also been seen in open country, groves.

Observations/Remarks: Also a passage migrant or irregular winter migrant in the MMR; numbers and general encounter frequency of this and hodgsoni have evidently declined much

since early-2000's. There are 05 sighting reports of this species during project fieldwork, including 01 sighting from Greater Mumbai (Aarey, February 2010).

Conservation Concerns: Not assessed.

PADDYFIELD PIPIT *Anthus rufulus*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Open areas, chiefly in lowlands; also around wetlands.

Observations/Remarks: Widespread until mid-1990's, including in Greater Mumbai, this species has today largely disappeared from Greater Mumbai, with the margins of Thane Creek and Kalina campus harbouring a small population while the species is also occasionally sighted on MR A total of 41 sighting reports during project fieldwork, with 06 of these in Greater Mumbai area, including Manori – Gorai. An additional 07 sightings during urban openlands and park sites visits in Greater Mumbai and other municipal corporation areas of MMR.

Conservation Concerns: Habitat loss, disturbance.

TAWNY PIPIT *Anthus campestris*

IUCN Status: Least Concern **Local Status:** S, PM?/WM?

Habitat/Key sites in MMR: Open areas, evidently in lowlands.

Observations/Remarks: A scarce winter migrant in MMR, possibly a passage migrant. Chances of overlooking and confusion with some other pipit species quite possible. 03 confirmed sightings during project fieldwork, during February and October (Uran, Kalyan & Khargarh Hills).

Conservation Concerns: Not assessed.

BLYTH'S PIPIT *Anthus godlewskii*

IUCN Status: Least Concern **Local Status:** S, PM?

Habitat/Key sites in MMR: Wetland margins, cultivation.

Observations/Remarks: Highly uncommon in region, possibly only a passage migrant; 02sighting reports from Alibaug area during Phase 1 of project (Feb-end 2010). Chances of being overlooked.

Conservation Concerns: Not assessed.

RICHARD'S PIPIT *Anthus richardi*

IUCN Status: **Local Status:**

Habitat/Key sites in MMR:

Observations/Remarks: The

Conservation Concerns: Loss

LONG-BILLED PIPIT *Anthus similis*

IUCN Status: Least Concern **Local Status:** S, WM?

Habitat/Key sites in MMR: Open grass and scrub.

Observations/Remarks: A rarely reported species in the region; there are a couple of specimens from Ambernath and Kalyan in the BNHS collection; sporadic reports early-2000's from Alibaug. Only 01 sighting report from Uran (January 2010).

Conservation Concerns: Not assessed.

WOODSWALLOWS

ASHY WOODSWALLOW *Artamus fuscus*

IUCN Status: Least Concern **Local Status:** S, R/LM

Habitat/Key sites in MMR: Open country, preferably around Toddy Palms.

Observations/Remarks: A once widespread species, this has declined significantly in the MMR since mid-1990's; it was regularly sighted at several sites in Greater Mumbai area but has probably vanished from here since February 2000 (last reported sighting). In recent years the bird has disappeared from many sites in S, E and N MMR as well. A total of 06 sighting reports during project fieldwork, none after 20 May 2010. Half these sightings were in the Karjat – Alibaug stretch, and the rest towards Nirmal/Arnala – Kaman towards northern fringes of MMR.

Conservation Concerns: Disturbance from expanding developmental activities, loss of Toddy Palm, possibly also some other ecological factors.

WOODSHRIKES

COMMON WOODSHRIKE *Tephrodornis pondicerianus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Open forest, forest-edge, in lowlands and hills.

Observations/Remarks: Open lowland forests are the preferred haunt of this dull-plumaged bird whose calls are widespread February – May (breeding). Its numbers have declined in the Greater Mumbai area (especially the edge areas of SGNP) while it seems to be holding on reasonably all right in several other sites.

Conservation Concerns: Not assessed.

CUCKOO-SHRIKES

BLACK-HEADED CUCKOO-SHRIKE *Coracina melanoptera*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: A resident species, it is more active and visible from late-summer to end of monsoon, when breeding; two-thirds of the12 sighting reports during project fieldwork during May – September. In Greater Mumbai only seen at SGNP.

Conservation Concerns: Not assessed.

LARGE CUCKOOSHRIKE *Coracina macei*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, preferably open, in lowlands and hills.

Observations/Remarks: A forest and forest-edge species, like *melanoptera*, restricted to a few sites in MMR. More vocal and visible during summer and first half of monsoon; prefers light forest but also often in plantations, groves and secondary growth, as observed towards the entire outlying stretches of MMR.

Conservation Concerns: Not assessed.

MINIVETS

ORANGE MINIVET *Pericrocotus flammeus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forests, in lowlands and hills. SGNP, KBS, TWLS, Alibaug area, Elephanta Island.

Observations/Remarks: Of the two resident species of minivets in the region, this one appears more widespread and visible, though number of sightings have reduced considerably over past decade. Has been seen on TWLS top as also around highest point in SGNP. No

report of this species from any urban park/garden or even from the sprawling Aarey environs adjoining SGNP.

Conservation Concerns: Not assessed.

SMALL MINIVET *Pericrocotus cinnamomeus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, forest-edge, groves.

Observations/Remarks: Unlike *flammeus*, this species sometimes seen in forest-edge, as also in groves and tree-dotted open areas. Has been sighted in Gorai/Uttan, Aarey and other such sites in MMR. Evidently rarer on mountain top sites; has also been sighted on Elephanta Island.

Conservation Concerns: Not assessed.

ASHY MINIVET *Pericrocotus divaricatus*

IUCN Status: Least Concern **Local Status:** S, WM?/PM?

Habitat/Key sites in MMR: Chiefly forest.

Observations/Remarks: A seldom reported species in the region, there have been sporadic reports, nearly all except one KBS (a specimen in BNHS collection). Last sighted on February 26, during project fieldwork, also in KBS. Has been reported from Goregaon, probably SGNP (early-1990;s).

Conservation Concerns: Not assessed.

BULBULS

RED-VENTED BULBUL *Pycnonotus cafer*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban parks.

Observations/Remarks: One of the commonest birds in the MMR, adapted to every kind of habitat, and usually well able to tackle the menace of house crows. One of …. Species with highest encounter frequency, at nearly 95%.

Conservation Concerns: Not assessed.

RED-WHISKERED BULBUL *Pycnonotus jocosus*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban parks.

Observations/Remarks: Amongst the most familiar and widespread birds in MMR, only less common than *cafer* in the urban context of parks, avenues and gardens. Has a high encounter frequency, at over 60%. In some areas more adaptable than *cafer* in tackling house crows but evidently, because of its lower nesting preference (in low bushes), this species shows a higher casualty to rising number of cats.

Conservation Concerns: Predation by cats.

WHITE-EARED BULBUL *Pycnonotus leucotis*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Chieflymangrove creeks and creek-edge.

Observations/Remarks: The MMR is almost the southern limit of the distributional range of this bird of scrub and open country; however, the species seems to have almost entirely adapted here to the mangrove and mangrove-edge areas. Routinely seen at every creek-site, and has even been sighted in South Mumbai. "First reported to us by Mr. McCann in 1928 has since been on the increase, though very gradual. They are either descendants of escaped cage birds or represent a southward extension of range from Gujarat," *Ali, S. & Abdulali, H. 1936.*

Conservation Concerns: Not assessed.

WHITE-BROWED BULBUL *Pycnonotus luteolus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Open country, scrub, forest-edge.

Observations/Remarks: Uncommon in the region, and seldom appears in forested areas or on the higher reaches of the hill ranges. Difficult to sight but the sudden burst of its rambling calls at once indicate bird's presence in locality.

Conservation Concerns: Not assessed.

YELLOW-BROWED BULBUL *Lole indica*

IUCN Status: Least Concern **Local Status:** Unknown

Habitat/Key sites in MMR: Forest

Observations/Remarks: Though there has been no report in recent years, there were at least two unsubstantiated sightings below Bhimashankar, in the Bhivpur area, which is directly below the Western Ghats sites where the species is widespread.

Conservation Concerns: Not assessed.

SQUARE-TAILED BLACK BULBUL *Hypsipetes ganeesa*

IUCN Status: Least Concern **Local Status:** S, R?

Habitat/Key sites in MMR: Evergreen forest on hills.

Observations/Remarks: A scarcely sighted species in the region, with the only site where it has been seen over the years being the upper areas of Matheran; during project fieldwork a pair was also sighted on the TWLS top, in evergreen forest. A trekking group reports sighting from the top of Prabalgadh mountain.

Conservation Concerns: Not assessed.

IORAS

COMMON IORA *Aegithina tiphia*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, groves; uncommonly in urban parks.

Observations/Remarks: Widespread in the region, sighted or heard on almost one-third of all field visits during project fieldwork. Numbers have declined from several sites in Greater Mumbai though can be sporadically heard/sighted on Malabar Hill in South Mumbai. Species has been seen up to the highest altitudes in MMR (Matheran, Prabalgadh, TWLS).

Conservation Concerns: Not assessed.

LEAFBIRDS

GOLD-FRONTED LEAFBIRD *Chloropsis aurifrons*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills. SGNP, TWLS, KBS, Alibaug area, Matheran Range.

Observations/Remarks: Commoner of the two leafbirds in the MMR, with more than 10 times as many sighting reports than *jerdoni*. Seems to prefer forest sites, occasionally in forest-edge.

Conservation Concerns: Not assessed.

JERDON'S LEAFBIRD *Chloropsis jerdoni*

IUCN Status: Least Concern **Local Status:** UC/S?, R

Habitat/Key sites in MMR: Forest-edge, groves ,in lowlands and hills.

Observations/Remarks: There has been some confusion in sighting reports of the two species over the years but it is quite obvious this is a far less common species overall. We have only 06 confirmed sighting reports during project fieldwork, several of these from the Alibaug area and the adjoining southern fringes of MMR.

Conservation Concerns: Not assessed.

ASIAN FAIRY BLUEBIRD

ASIAN FAIRY BLUEBIRD *Irena puella*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Forest.

Observations/Remarks: A scarce bird in the region, with only one reported sighting from the MMR in KBS (Andrea Britto, ….). No other report. Species has been reported from Phansad WLS, Bhimashankar and along ghat forest between Mahad – Mahabaleshwar.

Conservation Concerns: Not assessed.

SHRIKES

LONG-TAILED SHRIKE *Lanius schach*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Open country, forest-edge; occasionally urban parks.

Observations/Remarks: Most widespread shrike in region, with a high encounter frequency, at just under 50% during project fieldwork. Breeds sporadically in Deccan immediately flanking the MMR. Earliest Winter Date is 04 September. Latest Summer Date 29 April. However, a lone sighting of one at Diva, 16 June.

Conservation Concerns: Not assessed.

SOUTHERN GREY SHRIKE *Lanius meridionalis*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Open areas.

Observations/Remarks: Though no sighting in recent years, there are at least two sighting reports dating to mid-1980's from southern MMR (Pen – Wadkhal) and NE MMR (Virar – Bhiwandi).

Conservation Concerns: Not assessed.

BROWN SHRIKE *Lanius cristatus*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Forest edge, secondary growth, in lowlands and low hills.

Observations/Remarks: Small numbers of this species scatter down towards the MMR, where it has been sighted during project fieldwork in the Uran area, Khargarh Hills and around Kaman – Vajreshwari. Interestingly, both, this species as well as *isabellinus*, have been seen in the MMR, which appears to be the distributional limit of both.

Conservation Concerns: Not assessed.

ISABELLINE SHRIKE *Lanius isabellinus*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: More open, drier and scrubby areas, usually in lowlands.

Observations/Remarks: Probably slightly less frequent than cristatus though several sighting reports have remained unsubstantiated. Evidently, this species prefers opener, lowland areas.

Conservation Concerns: Not assessed.

BAY-BACKED SHRIKE *Lanius vittatus*

IUCN Status: Least Concern **Local Status:** S, PM?/WM?

Habitat/Key sites in MMR: Scrub, tree-dotted open areas, in lowlands and hills.

Observations/Remarks: One of the three sporadic wintering shrikes in the MMR; 06 sighting reports during project fieldwork; the species is reported to breed just above the MMR limites, on the Deccan plateau around Lonavala and beyond.

Conservation Concerns: Not assessed.

HYPOCOLIUS

GREY HYPOCOLIUS *Hypocolius ampelinus*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Creek-edge vegetation.

Observations/Remarks: There is only reported sighting of this species in the MMR, when a small flock was sighted in Salvatora vegetation at the edge of Malad Creek, along the Marve Road. This was the only known sighting of this winter migrant outside of Kutch, where it is a regular wintering species every winter.

Conservation Concerns: Not assessed.

MONARCHS

BLACK-NAPED BLUE MONARCH *Hypothymis azurea*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, forest-edge, groves, commoner in lowlands.

Observations/Remarks: Widespread resident flycatcher, sometimes seen in semi-urban parks and overgrown tracts. Prefers shaded areas; has been seen on Malabar Hill until early-2000's and in several other localities in suburban Mumbai. However, species much declined in suburban Mumbai and most other urban areas in MMR and largely restricted to forest and groves today.

Conservation Concerns: Not assessed, but possibly disturbance, pollution.

ASIAN PARADISE FLYCATCHER *Terpsiphone paradisi*

IUCN Status: Least Concern **Local Status:** UC, WM/R

Habitat/Key sites in MMR: Forest, forest-edge, groves, urban parks; in lowlands and hills.

Observations/Remarks: A striking bird, especially sub-adult and adult males with their long tail-streamers and there are regular reports of people getting fascinating on catching a glimpse of this splendid bird darting across shaded greenery amid many a neighbourhood. Largely winter migrant, when also more widespread and visible. A very small population perhaps continues to breed even today in MMR. The only nesting record is from Gorai, dating to 1980's.

Conservation Concerns: Not assessed.

FANTAILS

WHITE-SPOTTED FANTAIL *Rhipidura albogularis*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including mangrove creeks; often urban parks.

Observations/Remarks: A classic example of a species that has in a short time adapted to varied habitats and even to the crow menace. This species has today become one of the widespread birds in the region, including in Greater Mumbai. It has also adapted to the sprawling mangrove creekside habitat, even breeding in mangrove creeks (nests found Malad Creek, Manori Creek, Colaba and along Bandra promenade). In fact, the species is less common in forest and in hilly areas.

Conservation Concerns: Species is expanding range in MMR.

WHITE-BROWED FANTAIL *Rhipidura aureola*

IUCN Status: Least Concern **Local Status:** UC/S, R

Habitat/Key sites in MMR: Forest-edge, groves, in lowlands and low hills.

Observations/Remarks: Unlike the widespread *albicollis*, this species is far less widespread and less common overall. Several reported sightings in Greater Mumbai and other urban sightings have been errors in reporting and identification. We find this species to be restricted to forest edge and secondary growth with good tree cover in urban-edge and low hilly landscapes, towards the NE and southern areas of MMR and the species possibly does not exist or is very scarce in Greater Mumbai proper.

Conservation Concerns: Not assessed.

THRUSHES AND ALLIES

BLUE ROCK-THRUSH *Monticola solitarius*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat/Key sites in MMR: Open areas, in lowlands and hills; occasionally urban built-up structures, including tall skyscrapers.

Observations/Remarks: An uncommon winter migrant in MMR, perhaps always sparsely distributed. Interestingly, a rather high number observed 2005 – 2007. Prefers open undulating landscape, with a marked preference for rocky hills with sparse cover.

Conservation Concerns: Not assessed.

BLUE-HEADED ROCK-THRUSH *Monticola cinclorhynchus*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: One of several forest species whose wintering populating has evidently declined significantly in the region. From an average of 12 – 15sightings every winter from SGNP, KBS and TWLS every winter between 1995 – 2002 (SM *pers obs*), present surveys show some seasons with hardly any sighting of this species, even from its favoured haunts. There were 03 reported sightings during project fieldwork, 01 from SGNP and 02 from Matheran-Alibaug area. Its quiet and unobtrusive nature during winter does suggest some chances of being overlooked, however, the decline in sighting reports is too conspicuous to ignore.

Conservation Concerns: Not assessed.

ORANGE-HEADED THRUSH *Zoothera citrina*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, forest-edge, groves; in lowlands and hills.

Observations/Remarks: A widespread forest thrush, most conspicuous during summer and first half of monsoon, when breeding and vocal. Occasionally in groves. SGNP is a key site for species, with nearly half the 35 reported sightings during project fieldwork from here.

Conservation Concerns: Not assessed.

MALABAR WHISTLING-THRUSH *Myophonus horsfieldii*

ENDEMIC TO PENINSULAR INDIA

IUCN Status: Least Concern **Local Status:** UC, R/LM?

Habitat/Key sites in MMR: Forest, lowlands and hilly. SGNP, KBS, Matheran Range.

Observations/Remarks: A bird at once associated with the Western Ghats mountains; in MMR, restricted to forested streams and rocky areas, where most active and vocal during end-May – September, when breeding. Key sites in region include Matheran Range, SGNP, KBS, Alibaug Hills and TWLS. At least 02 pairs have been observed nesting (June-September) around the Karnala pinnacle for over three decades.

Conservation Concerns: Not assessed.

INDIAN BLACKBIRD *Turdus simillimus*

IUCN Status: Least Concern **Local Status:** S, R/LM?

Habitat/Key sites in MMR: Forest, chiefly hilly.

Observations/Remarks: A seldom reported species over a wide area of MMR, with Matheran and KBS being the only sites where it is more regularly seen. A lone sighting of a pair on the TWLS top during April 2012 and an unconfirmed sighting of a lone bird in Khargarh Hills, end-April. Seldom in lowland forests with the only reported sighting being of a pair along the Tulsi Back-Road during late-1990's. Has also been sighted in Phansad WLS, just south of MMR.

Conservation Concerns: Not assessed.

CHATS, ROBINS

BLUETHROAT *Luscinia svecica*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Creek-edge, wetland margins, chiefly in lowlands.

Observations/Remarks: A widespread but elusive and easily overlooked winter migrant; suddenly quite a few on some days at creek edge, as observed along Manori Creek. Possibly overlooked because of its quiet, unobtrusive nature. Less common along inland freshwater wetlands in the region.

Conservation Concerns: Not assessed.

WHITE-RUMPED SHAMA *Copsychus malabaricus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills. KBS, SGNP.

Observations/Remarks: A forest species, preferring the more dense, shaded ares. One of the finest avian vocalists, richly-voiced, most vocal April – September, when breeding. Key sites in Can be seen in SGNP, KBS, TWLS, Matheran Range and Alibaug Hills.

Conservation Concerns: Not assessed.

ORIENTAL MAGPIE-ROBIN *Copsychus saularis*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban parks, inhabited neighbourhoods.

Observations/Remarks: One of the most familiar, widespread and richly voiced birds in MMR. Commonly sighted in urban parks, green patches amid inhabited areas, its rich call-notes and song often floating over urban din March – July. One of the species with amongst the highest encounter frequency, at almost 70% during project fieldwork.

Conservation Concerns: Not assessed.

INDIAN BLACK ROBIN *Saxicoloides fulicatus*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Open areas, secondary growth, in lowlands and hills.

Observations/Remarks: Widespread but not sparsely distributed in the MMR, being commoner in open scrub and foothills landscape. Restricted in Greater Mumbai toAarey, fringes of SGNP and sporadically across the surviving open and creek-edge environs of NW and E suburbs, but has also been sighted during winter on MRC and US Club lawns. A total of at least 78 sighting reports during project fieldwork.

Conservation Concerns: Not assessed.

BLACK REDSTART *Phoenicurus ochruros*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Open areas, secondary growth, creek-edge; in lowlands and hills.

Observations/Remarks: More widespread up to late-1990's, numbers of this wintering species have declined significantly in the MMR, reasons for which are difficult to assess. Only 03 sightings during project fieldwork.

Conservation Concerns: Not assessed but requires monitoring.

ISABELLINE WHEATEAR *Oenanthe isabellina*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Open areas, creek-edge, in lowlands.

Observations/Remarks: A sparsely distributed and highly uncommon species in the region, that has been sighted mostly in the open expanse of the Uran area, with a total of 05 sighting reports during project fieldwork.

Conservation Concerns: Not assessed but requires monitoring.

DESERT WHEATEAR *Oenanthe deserti*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR: Open areas, creek-edge, chiefly in lowlands.

Observations/Remarks: The more widespread wheatear in the region, perhaps easily overlooked because of its cryptic colours and unobtrusive nature. The Uran – Alibaug area is a key site for this species that has also been regularly sighted in the Madh – Gorai areas from late-1970's up to mid-2000's but not since (SM *pers obs*).

Conservation Concerns: Not assessed but requires monitoring.

PIED BUSHCHAT *Saxicola caprata*

IUCN Status: Least Concern **Local Status:** UC, LM/WM/R?

Habitat/Key sites in MMR: Open areas, in lowlands and hills.

Observations/Remarks: Largely, possibly entirely a winter migrant in the region, with areas to the south, east and NE of MMR being major haunts of this species. Has always been a rare visitor to Greater Mumbai proper though 04 sighting reports over end-2009 – 2012. Is known to breed immediately above the Western Ghats on the MMR edge, around Lonavala - Rajmachi, with unsubstantiated breeding reports from the northern half of Matheran Range.

Conservation Concerns: Not assessed.

COMMON STONECHAT *Saxicola torquatus*

IUCN Status: Least Concern **Local Status:** UC, WM

Habitat/Key sites in MMR: Open areas, creek-edge; chiefly in lowlands, sparsely in hills.

Observations/Remarks: Widespread winter visitor, though numbers seem to have declined much in Greater Mumbai region; a gradual but consistent decline in sightings also observed along the entire southern Navi Mumbai/Uran development since early-2000's, clearly suggesting how this species (and several others) can get affected by disturbance resulting from habitat loss. A total of 55 sighting reports during project fieldwork. Earliest Winter Date is 11 September. Latest Summer Date 18 April.

Conservation Concerns: Disturbance (evidently in Greater Mumbai area), possibly also some ecological factors.

FLYCATCHERS

ASIAN BROWN FLYCATCHER *Muscicapa dauurica*

IUCN Status: Least Concern **Local Status:** S, WM/PM?

Habitat/Key sites in MMR: Open forest, forest-edge, groves, in lowlands and hills.

Observations/Remarks: A sparsely seen species, evidently an erratic winter visitor. Has been seen on several occasions in the outer areas of southern SGNP, and sporadically elsewhere across MMR, including Alibaug, eastern and NE MMR. A total of 09 sighting reports during project fieldwork; not seen beween 28 Feb – 21 October.

Conservation Concerns: Not assessed.

RUSTY-TAILED FLYCATCHER *Muscicapa ruficauda*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Forest, forest-edge.

Observations/Remarks: An erratic, possibly sparse winter visitor to region, with barely 04 reported sightings since early-1980's. Has been sighted SGNP, Phansad WLS (south of MMR). During project fieldwork, a lone specimen sighted and photographed Khargarh – Mumbra Hills on 17 October, 2010.

Conservation Concerns: Not assessed.

ULTRAMARINE FLYCATCHER *Ficedula superciliaris*

IUCN Status: Least Concern **Local Status:** S, WM/PM?

Habitat/Key sites in MMR: Forest. SGNP, KBS.

Observations/Remarks: A highly uncommon winter visitor or passage migrant in MMR, with barely a couple of sightings in recent years, including thrice during project fieldwork (SGNP, TWLS). Besides, a couple of unsubstantiated sighting reports from Alibaug area, Matheran.

Conservation Concerns: Not assessed.

RED-BREASTED FLYCATCHER *Ficedula parva*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Forest, forest-edge, groves; occasionally urban parks. In lowlands and hills.

Observations/Remarks: Widespread wintering species in region, its diagnostic call at once attracting attention and confirming presence in a locality. At least 53sighting reports during project fieldwork, the species evidently commoner in the lowlands. There is an unconfirmed sighting report of the Red-throated (*albicilla*) species from Matheran. Earliest Winter Date is 06 October. Latest Summer Date 19 April, when quite a few birds, perhaps as many as 11 in vicinity, were observed on Elephanta Island.

Conservation Concerns: Not assessed.

TICKELL'S BLUE FLYCATCHER *Cyornis tickelliae*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, forest-edge, groves; in lowlands and hills.

Observations/Remarks: Most widespread resident flycatcher in the region, though has much declined from Greater Mumbai, with no reports in recent years from previously reported sites (Gorai – Uttan, Malabar Hill). A classic example of a species that has demonstrated a retreat from localites as urbanization proceeds unabated.

Conservation Concerns: In urban areas, retreated due to vanishing green patches.

WHITE-BELLIED BLUE FLYCATCHER *Cyornis pallipes*

ENDEMIC TO WESTERN GHATS

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: The MMR is way north of the known distributional range of this Western Ghats endemi Sporadic reports since late-1980's from Matheran, Phansad WLS (south of MMR) and SGNP. Not sighted during project fieldwork.

Conservation Concerns: Not assessed.

VERDITER FLYCATCHER *Eumyias thalassinus*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Forest, in lowlands and hills. KBS.

Observations/Remarks: A regular but sparse winter visitor, intermittently reported in the region. The lower reaches of KBS seem to be a key site for the species here. Has also been sighted Alibaug area, TWLS, Elephanta, Matheran and SGNP, with a sole sighting also from

Kalwa Hills during project fieldwork. A total of 05 sighting reports during project fieldwork. Average Oct – March sighting frequency as noted during 1991 – 1998 (SM *pers obs*) was 07.
Conservation Concerns: Not assessed.

GREY-HEADED (CANARY-) FLYCATCHER *Culicicapa ceylonensis*
IUCN Status: Least Concern **Local Status:** S, WM
Habitat/Key sites in MMR: Forest, in lowlands and hills. KBS, TWLS, SGNP, Alibaug area.
Observations/Remarks: An uncommon, perhaps even erratic winter visitor to region, though possibly also overlooked. A total of 07 sighting reports during project fieldwork.
Conservation Concerns: Not assessed.

BABBLERS

YELLOW-EYED BABBLER *Chrysomma sinense*
IUCN Status: Least Concern **Local Status:** UC, R
Habitat/Key sites in MMR: Open areas, secondary growth, chiefly in lowlands.
Observations/Remarks: One of several birds that get active and vocal with foremost monsoon winds. A widespread species, its numbers much declined over past decade, largely due to loss of good grass and scrub habitat. In Greater Mumbai, has retreated from much of its former range across the suburbs, and the two main surviving sites are along Thane Creek (especially BPS) and Aarey. A total of 48 sighting reports across the MMR during project fieldwork.
Conservation Concerns: Extensive loss of grass/scrub and reed habitat.

TAWNY-BELLIED BABBLER *Dumetia hyperythra*
IUCN Status: Least Concern **Local Status:** UC, R/LM
Habitat/Key sites in MMR: Secondary growth, forest-edge, in lowlands and hills.
Observations/Remarks: One of several classic species that were reported from several areas of South and Central Mumbai during early/mid-20th Century and has been gradually declining, especially in the Greater Mumbai area. Had then been reported from Malabar Hill, Napenan Sea Road, Warden Road, Andheri and several other sites. Reported Malabar Hill

(Raj Bhavan grounds) mid-1990's but no report since. We have a total of 12 sighting reports during project fieldwork, 03 of these from SGNP fringes, only one during 2012.

Conservation Concerns: Not assessed.

COMMON BABBLER *Turdoides caudata*

IUCN Status: Least Concern **Local Status:** UC/S, R/LM?

Habitat/Key sites in MMR: Open areas, secondary growth, creek-edge.

Observations/Remarks: Recorded over parts of Central Mumbai up to the 1940's, including a breeding record from Bandra, the species is today highly uncommon. A small population exists on creek-edge open scrub and the outer limits of the MMR, along Tansa River, the expanse between Matheran Range to the eastern-most fringes of MMR and the area around Alibaug – Kihim. In Greater Mumbai it has been sighted along Thane and Manori Creeks. A total of 14 sighting reports during project fieldwork.

Conservation Concerns: Not assessed.

JUNGLE BABBLER *Turdoides striata*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: Invariably seen in small flocks of 5 – 8 birds, this was a widespread species across the MMR until early-1990's. In Greater Mumbai, until the 1940's it was reported from many parts of present-day suburban Mumbai, as also from Central and South Mumbai (Parel, Dadar, Malabar Hill). Evidently it is today restricted to SGNP, with an occasional sighting in Aarey. Key sites today included SGNP, TWLS, Karjat – Bhiwandi – Tansa stretch, Alibaug area, KBS. A total of 67 sighting reports, almost always small flocks, during project fieldwork.

Conservation Concerns: Not assessed.

INDIAN SCIMITAR - BABBLER *Pomatorhinus schisticeps*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: One of three forest babblers in the MMR, more often heard than sighted. Its diagnostic, mellow whistling notes are amongst the most familiar bird-calls in

forested tracts. The key site is SGNP, with over two-thirds of the 38 encounter reports during project fieldwork registered from here. This species may be encountered up to the highest reaches of the hill ranges.

Conservation Concerns: Not assessed.

BROWN-CHEEKED FULVETTA *Alcippe poioicephala*

IUCN Status: Least Concern **Local Status:** UC/S, R

Habitat/Key sites in MMR: Forest, in lowlands and hills. SGNP, TWLS, Matheran.

Observations/Remarks: A forest babbler, reported from only a few key sites such as SGNP, KBS, TWLS and Matheran with a couple of reports from the Karjat – Barvi foothills stretch. It is a much more common species in the main Western Ghats range, especially at Mahabaleshwar and Bhimashankar.

Conservation Concerns: Not assessed.

PUFF-THROATED BABBLER *Pellorneum ruficeps*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: Perhaps the most vocal of the forest babblers, with one of the most diagnostic and familiar bird-calls. Widespread in Greater Mumbai up to the mid-1900's, when reported from Andheri, Mulund and Trombay Hill. Today it is restricted to SGNP where quite common. Other key sites include Matheran Range, TWLS, KBS and Alibaug hills.

Conservation Concerns: Not assessed.

WARBLERS

ZITTING CISTICOLA *Cisticola juncidis*

IUCN Status: Least Concern **Local Status:** FC, R/LM

Habitat/Key sites in MMR: Open areas, grass and reedbeds, cultivation in lowlands.

Observations/Remarks: One of the characteristic birds of open grass-scrub and tall reedbeds; numbers have locally declined due to habitat loss yet still arrives with unfailing regularity wherever such habitats hold on. Can be seen on MRC and Kalina University campus where breeding too recorded. A total of 56 reported sightings during project

fieldwork, with the western fringes of Thane Creek, especially around BPS, being a key site. Agricultural tracts across MMR are favoured breeding sites though the second or late broods in season often suffer heavily due to September – October harvest while herbage and grass-cutting activity during September too accounts for considerable breeding failure. In a key open grass-scrub site like Aarey, breeding has been observed during March – April also.

Conservation Concerns: Habitat loss.

GRASSHOPPER WARBLER *Locustella naevia*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Secondary growth and grassy areas in low hills, lowlands.

Observations/Remarks: An apparently scarce, or possibly more likely, an easily overlooked winter visiting warbler. 05 sighting reports during project fieldwork include a couple from Greater Mumbai area, where it has also been sighted on the open scrubby hills around Kanheri. Other sites where this species has been sighted include Kaman Range, Uran and Khargarh Hills.

Conservation Concerns: Not assessed.

ASHY PRINIA *Prinia socialis*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban parks; commoner in lowlands.

Observations/Remarks: One of the commonest birds, and most widespread of our resident warblers, with amongst the highest encounter frequencies observed, at 60%. A close relation of the Common Tailorbird, this bird too builds an almost similar type of nest, usually very low down in large-leaved herbage; it also sometimes makes a more open nest in herbage. A very distinct division of habitat inclination observed between this and the more common *Orthotomus sutorius*, the latter having adapted much better to urban environs as also to forest sites, whilst *Prinia socialis* is commoner in the more semi-wild herbage encrusted margins. Herbs such as the widespread *Malachra capitata* have come as a nesting-site windfall for this bird.

Conservation Concerns: Not assessed, but see next species note.

GREY-BREASTED PRINIA *Prinia hodgsonii*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Open areas, secondary growth, in lowlands and hills.

Observations/Remarks: One of the birds that has been expanding its distributional range, not just in MMR but across a large expanse of peninsular India. A total of 95 sighting reports during project fieldwork, including in several sites in Greater Mumbai. The co-existence of three closely allied *Prinia* species in similar or immediately overlapping habitats, with a clear division of plant species utilized for nesting, is a topic of great interest for research. In several forest-edge sites, *P hodgsonii* seems to be displacing *Orthotomus sutorius*.

Conservation Concerns: Not assessed but a topic of considerable research interest along with several other warbler species.

JUNGLE PRINIA *Prinia sylvatica*

IUCN Status: Least Concern **Local Status:** UC/S?, R?/LM?

Habitat/Key sites in MMR: Secondary growth in lowlands and hills.

Observations/Remarks: The less common of the Prinias here, though several reported sightings remain unsubstantiated, especially in sites where two or more species co-exist. We have at least 17 confirmed sighting reports, including a couple from Greater Mumbai area. Some of the sites from where this species has been recorded include Alibaug – Khopoli area, foothills of Matheran Range, Khargarh Hills, Gandhari – Bhopar and adjoining sites and northern slopes of TWLS towards Tansa River.

Conservation Concerns: Not assessed.

PLAIN PRINIA *Prinia inornata*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Open areas, wetland margins, reed-beds, cultivation in lowlands.

Observations/Remarks: A widespread resident *Prinia*, almost restricted to the lowlands. Is still widespread in Greater Mumbai area, occasionally sighted on MRC where it evidently also breeds during monsoon. A total of 71 sighting reports during project fieldwork.

Conservation Concerns: Disappearing damp grasslands and cultivation.

CLAMOROUS REED WARBLER *Acrocephalus [stentoreus] brunnescens*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Mangrove creeks; occasionally around brackish water ponds.

Observations/Remarks: This species has almost entirely adapted to the mangrove-creek side habitat in the MMR, and in recent years numbers of this species, perhaps due to negligible completion, have actually increased locally along certain creeks. The extensive Thane Creek is the key site for the species though it has also been sighted on every other creek, occasionally even on narrow, polluted inlets. A total of 79 separate encounter reports during project fieldwork. Nesting observed along Thane and Manori Creeks (Gorai).

Conservation Concerns: Dependent on mangrove creeks.

BLYTH'S REED WARBLER *Acrocephalus dumetorum*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Forest-edge, open country with trees, including around water; commoner in lowlands. Occasionally urban parks.

Observations/Remarks: Possibly the most common and widespread wintering warbler, seen in a variety of habitats, including sometimes in urban parks. Usually solitary, though as many as half a dozen were sighted near Chirner, in early-October, evidently on arrival in the region. A total of 108 sighting reports during project fieldwork, very few from the upper reaches of the various hill ranges. Earliest Winter Date is 29 September. Latest Summer Date 18 April.

Conservation Concerns: Not assessed.

PADDYFIELD WARBLER *Acrocephalus agricola*

IUCN Status: Least Concern **Local Status:** UC?, WM

Habitat/Key sites in MMR: Secondary growth, reed-beds, cultivation, mostly in lowlands.

Observations/Remarks: Evidently this warbler may be commoner than reports suggest, with chances of overlook higher for this species. It seems restricted to the lowlands, and may sometimes be seen amongst bands of small birds flitting about, as has been observed around BPS and Uran. Earliest Winter Date is 15 October (but could be earlier, possibly overlooked). Latest Summer Date 29 April.

Conservation Concerns: Not assessed.

BOOTED WARBLER *Hippolais caligata*

IUCN Status: Least Concern **Local Status:**

Habitat/Key sites in MMR: Light open forest, groves, open areas with trees.

Observations/Remarks: A widespread winter visitor but seems erratic, with good numbers during certain years and with a great deal of activity noticed between mid-February and mid-March 2012, with many birds active, possibly gathered on passage. Appears commoner in the lowlands but has been sighted near TWLS top.

Earliest Winter Date is 31 October (but definitely arrives earlier; this date was noticed only for 2012). Latest Summer Date 28 April (though only a solitary bird sighted; had been seen regularly up to 25 March).

Conservation Concerns: Not assessed.

COMMON TAILORBIRD *Orthotomus sutorius*

IUCN Status: Least concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, from lowlands to the hills. Commonly in urban areas.

Observations/Remarks: One of the most familiar birds in the MMR, perhaps as common in urban areas as it is in other habitats. It is one of several species that have benefitted immensely by the wealth of floral species introduced by people, especially large-leaved crotons and such other ornamentals. In recent years, the bird has even taken to nesting higher in the leaves of the widely introduced Terminalis catappa, as also unusually high nesting observed in some localities, apparently in response to predation pressures from a rising number of domestic cats locally. Has invaded the uppermost areas of the forested hills (TWLS, Matheran) where nests have been found. One of the highest encounter frequencies, at almost 75%, with the creekside habitat being just about the only areas with a low number of this species.

Conservation Concerns: Not assessed.

SIBERIAN CHIFFCHAFF *Phylloscopus [collybita] tristis*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Forest-edge, secondary growth, in lowlands and hills.

Observations/Remarks: A scarcely reported bird in the region. The two sightings during project fieldwork were both towards the extreme north of the MMR, in country along Tansa River, in January 2010 and again in January 2012.

Conservation Concerns: Not assessed.

SULPHUR-BELLIED WARBLER *Phylloscopus griseolus*

IUCN Status: Least Concern **Local Status:** UC/S, WM

Habitat/Key sites in MMR: Scrubby, rocky areas, secondary growth, in lowlands and hills.

Observations/Remarks: An uncommon winter migrant to the region, most of the sightings of the species were from scrubby hilly terrain. It is suspected that this species may be actually increasing in the region in recent years.

Conservation Concerns: Not assessed.

TICKELL'S LEAF-WARBLER *Phylloscopus affinis*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Forest, forest-edge, in hills and lowlands.

Observations/Remarks: A scarcely reported wintering warbler, reported mid-1900's from Trombay Hill and sporadically over the years from a few locations. A total of 04 sighting reports during project fieldwork, from Matheran, Alibaug area and TWLS.

Conservation Concerns: Not assessed.

TYTLER'S LEAF-WARBLER *Phylloscopus tytleri*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Forest, in hills, but also in lowlands.

Observations/Remarks: Another scarcely reported winter visitor, though it is more widespread in the Western Ghats, with quite a good number observed regularly in Mahabaleshwar. 05 sighting reports during project fieldwork, from TWLS top, Matheran, Alibaug area and one from above Kanheri, in SGNP.

Conservation Concerns: Not assessed.

GREENISH WARBLER *Phylloscopus trochiloides viridanus*

BRIGHT-GREEN WARBLER *Phylloscopus nitidus*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Forest, groves, in lowlands and hills.

Observations/Remarks: Both these species have been clubbed here. Widespread and found in every forest in lowland and in the hills; occasionally in groves and suchlike patches with large trees; has been sighted on the US Club grounds in South Mumbai and on Malabar Hill. Evidently trochiloides is commoner in the region. We have a total of 108 sighting reports during project fieldwork.

Conservation Concerns: Not assessed.

HUME'S LEAF-WARBLER *Phylloscopus humei*

IUCN Status: Least Concern **Local Status:**

Habitat/Key sites in MMR: Forest-edge, secondary growth, in lowlands and hills.

Observations/Remarks: Possibly a sparsely wintering warbler in this region. Previously reported from SGNP (2002, Jamdar). An unsubstantiated sighting report from the northern slopes of TWLS (February 2010).

Conservation Concerns: Not assessed.

WESTERN CROWNED WARBLER *Phylloscopus occipitalis*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: Not reported in the earlier literature for the region. However, since mid-1980's there have been several sighting reports of the species, including from SGNP (1983 – 85, 2001, Jamdar). In recent years, including during project fieldwork, has been sighted in TWLS, KBS, SGNP (once) and in Alibaug area (twice).

Conservation Concerns: Not assessed, but this and several other Phylloscopus in the region need to be monitored continuously to assess status.

EASTERN ORPHEAN WARBLER *Sylvia crassirostris*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Scrub, mangrove creek-edge. Chiefly lowlands.

Observations/Remarks: Previously reported "apparently rare and irregular passage migrant in spring," *Ali, S. & Abdulali, H. 1937a;"* Only 03 sighting reports during project fieldwork, from Kaman Range (December 2009), Uran area (February 2010) and in scrub off Malad Creek (October 2012).

Conservation Concerns: Not assessed.

ASIAN DESERT WARBLER *Sylvia nana*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Open areas, possibly in lowlands.

Observations/Remarks: There is only report of this species from the region, a solitary bird photographed in Uran (2004). This species is restricted to the arid semi-desert and suchlike country in Kutch.

Conservation Concerns: Not assessed.

HUME'S LESSER WHITETHROAT *Sylvia althaea*

IUCN Status: Least Concern **Local Status:** S/UC, WM

Habitat/Key sites in MMR: Secondary growth, open areas with some trees. Chiefly lowlands.

Observations/Remarks: Perhaps a more widespread wintering warbler in region than is known and is a species that is often overlooked due to its somewhat more elusive nature or confused by many observers. We have at least 11 confirmed sighting reports during project fieldwork from across the MMR, almost always in open scrub and suchlike haunts in lowlands; a few sighting reports have been disregarded because of doubts expressed by observers.

Conservation Concerns: Not assessed.

FLOWERPECKERS

PALE-BILLED FLOWERPECKER *Dicaeum erythrorhynchos*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, forest-edge, groves, in lowlands and hills. Occasionally urban parks.

Observations/Remarks: The most widespread flowerpecker in the region, its loud call a distinctive feature of most forest outings. Also seen in groves, with good numbers at Gorai. Was found Malabar Hill and spotted in Colaba (near Afghan Church) 2009 February. Occasionally reported from urban parks, especially in suburban Mumbai, though has also appeared in MNP and Five Gardens – Dadar.

Conservation Concerns: Not assessed.

THICK-BILLED FLOWERPECKER *Dicaeum agile*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: Far less widespread overall than *erythrorhynchos;* the two species are occasionally seen together in a patch of forest. This species mostly prefers forest.

Conservation Concerns: Not assessed.

NILGIRI FLOWERPECKER *Dicaeum concolor*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Forest.

Observations/Remarks: This species has only been sighted in Phansad WLS, in the southern fringes of the Alibaug area, but which is outside of the MMR jurisdiction. Has been included only because, like several species of similar distributional pattern, this needs monitoring for possible occurrence in the MMR.

Conservation Concerns: Not assessed but needs monitoring to ascertain presence in MMR.

SUNBIRDS

PURPLE-RUMPED SUNBIRD *Leptocoma zeylonica*

ENDEMIC TO PENINSULAR INDIA

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban parks; in lowlands and hills.

Observations/Remarks: Most widespread sunbird in the region, seen in every habitat, including urban parks, sometimes even potted plants on higher floors of apartments in congested localities. In forest and hills, the species marginally seems to loose out to *asiaticus*

and both can be sighted together occasionally. One of the birds with high abundance frequency, at almost 70%.

Conservation Concerns: Not assessed.

SMALL SUNBIRD *Letocoma minima* **ENDEMIC TO WESTERN GHATS**

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: a Western Ghats endemic, commoner on the main range and in foothills country. Reported originally in the Khandala area, where also observed breeding (early/mid-1900's). In the Konkan, the species has been sighted since late-1970's in Phansad WLS, and since late-1980's increasingly in KBS. Also occurs Matheran. A couple of sightings in recent years, including during project fieldwork, in SGNP and TWLS while there is also a report from Karjat – Barvi, towards the eastern fringes of MMR. Evidently, the species may be slowly expanding range in MMR though numbers are small everywhere except KBS and Matheran where more often sighted.

Conservation Concerns: Not assessed.

PURPLE SUNBIRD *Cinnyris asiaticus*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, in lowlands and hills. Commoner in forest.

Observations/Remarks: One of the most widespread, restless birds, and the second-most common sunbird in MMR. Prefers forest and forest-edge, often nesting low along clearings and forest-paths; less common in urban environs than *zeylonica*. High encounter frequency, at almost 50% across a range of habitats.

Conservation Concerns: Not assessed.

LOTEN'S SUNBIRD *Cinnyris lotenius*

IUCN Status: Least Concern **Local Status:** UC/S, R

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: Endemic to SW India and Sri Lanka, this species is sparsely distributed in the region, and numbers are evidently declining, perhaps a result of the

expanding range of *asiaticus* and *zeylonica*. However, it continues to be sighted intermittently, with at least 10 sightings during project fieldwork.

Conservation Concerns: Not assessed but could be losing out to the two increasingly widespread species.

VIGORS'S SUNBIRD *Aethopyga vigorsii*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: Numbers of this sunbird too have declined in recent years, especially in the Greater Mumbai area, where SGNP was a key site; from an average of at least 4 nests every year during 1980's and 1990's, it is rare to come across even one in many a year over the past decade. The species seems to be staging a comeback in some hill areas such as Khargarh Hills, TWLS, Matheran Range as also in the Alibaug area; it has also been sighted towards Karjat – Barvi in the eastern fringes of MMR.

Conservation Concerns: Not assessed.

WHITE-EYES

ORIENTAL WHITE-EYE *Zosterops palpebrosus*

IUCN Status: Least Concern **Local Status:** S, R?/LM?

Habitat/Key sites in MMR: Forest-edge, groves, evidently commoner in lowlands.

Observations/Remarks: Perhaps always uncommon in the region, except perhaps the Alibaug area where was sighted regularly. Little past data to compare with but numbers seem to have declined considerably over the years and the species is definitely scarce in Greater Mumbai area. A total of 08 sighting reports during project fieldwork, includes only one sighting in Greater Mumbai area, of a pair at Gorai (June 2010).

Conservation Concerns: Not assessed.

BUNTINGS

CRESTED BUNTING *Melophus lathami*

IUCN Status: Least Concern **Local Status:** S/St?

Habitat/Key sites in MMR: Open, scrubby hills.

Observations/Remarks: No existing record from Mumbai region except for a specimen from Kalyan in BNHS collection. A lone sighting of a solitary male on the slopes of Kaman Hill, in northern MMR (January 2010) remains the only recent report of this species from the region.

Conservation Concerns: Not assessed.

BLACK-HEADED BUNTING *Emberiza melanocephala*

IUCN Status: Least Concern **Local Status:** UC, WM/PM?

Habitat/Key sites in MMR: Open areas with short grass, short cultivation, creek-edge.

Observations/Remarks: Possibly a widespread winter visitor until recent times, with few reports since 2006, suggesting numbers may have declined locally. Though the large wintering flocks, several hundred strong have not been sighted at Uran for a few years, the species intermittently appears, perhaps even passing through the region March – April. It has been sighted on Kalina University campus (February 2010).

Conservation Concerns: Not assessed.

RED-HEADED BUNTING *Emberiza bruniceps*

IUCN Status: Least Concern **Local Status:** S?, WM/PM?

Habitat/Key sites in MMR: Open areas with short grass, cultivation.

Observations/Remarks: Overall less widespread than melanocephala, frequenting much the same biotopes. 03 sighting reports during project fieldwork, small flocks seen at BPS/Thane Creek margins and Uran area (January 2010) and a third sightin near Neral (November 2012).

Conservation Concerns: Not assessed.

GREY-NECKED BUNTING *Emberiza buchanani*

IUCN Status: Least Concern **Local Status:** S, WM?/PM?

Habitat/Key sites in MMR: Open scrubby areas, in lowlands and low hills.

Observations/Remarks: A seldom reported species in the region. Past reports include sightings on the Airport Authority grounds at Andheri West (early-2000's) and another report sighting from Kalyan – Dombivli. Most recent report was of a pair sighted at Uran (near Funde) during project fieldwork (January 2010). Perhaps this species is sometimes overlooked because of its unobtrusive nature and the kind of habitat it frequents.

Conservation Concerns: Not assessed.

FINCHES, ETC

COMMON ROSEFINCH *Carpodacus erythrinus*

IUCN Status: Least Concern **Local Status:** S, PM

Habitat/Key sites in MMR: Light forest, forest-edge, groves, in lowlands and hills.

Observations/Remarks: Appears to be mostly a passage migrant in the region, with a very small population possibly spending any extensive period here during winter. A sudden spurt in sightings was noticed during mid/late-March when 07 of the 11 sightings occurred during project fieldwork. Invariably there is a small flock scattered in neighbourhood. Has also been sighted in Greater Mumbai, including on MRC and Colaba.

Conservation Concerns: Not assessed.

TRICOLOURED MUNIA (BLACK-HEADED) *Lonchura malacca*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Marsh-edge, wet cultivation and secondary growth, chiefly in lowlands.

Observations/Remarks: Like most other munias in the region, this species too moves around locally, and is more visible June – September, when breeding. Seldom in the higher zones of hill ranges. With five species of munias vying for the MMR's diminishing open habitats of grass and secondary growth and marsh-edge, competition is high. This species would rank fourth in terms of encounter frequency but is nowhere as common as *punctulata*.

Conservation Concerns: Declining wet cultivation and wetlands with reed-beds.

INDIAN SILVERBILL *Euodice malabarica*

IUCN Status: Least Concern **Local Status:** UC/FC, R/LM

Habitat/Key sites in MMR: Secondary growth, open areas, often drier habitat.

Observations/Remarks: This munia will often be seen dry scrub and open areas, and can be come across more commonly during the dry seasons. It is also the one species that has been found breeding during the dry months also. We have a total of 43 sighting reports of this species during project fieldwork, including on MRC in South Mumbai.

Conservation Concerns: Not assessed.

WHITE-RUMPED MUNIA *Lonchura striata*

IUCN Status: Least Concern **Local Status:** UC/S?, R/LM

Habitat/Key sites in MMR: Open country, cultivation, chiefly in lowlands.

Observations/Remarks: Observations during project fieldwork indicate this to be the species with lowest encounter frequency, except perhaps in the Alibaug area in the southern parts of MMR where it seems to be holding on . We have a total of only 10 sighting reports overall, just one of these from Greater Mumbai. This is a far cry for the species from up to the early-2000's when this was a fairly widespread species, with many regular sightings in the region.

Conservation Concerns: Not assessed, but perhaps competition and vanishing open areas.

SCALY-BREASTED MUNIA *Lonchura punctulata*

IUCN Status: Least Concern **Local Status:** FC, R/LM

Habitat/Key sites in MMR: Secondary growth, forest-edge, cultivation, in lowlands and hills.

Observations/Remarks: Where *striata* seems to have lost, this species has evidently gained in expanding its range in the region. We have a total of 77 sighting reports of this species, including from forest-edge and from several sites in urban environs, including MRC and US Club in South Mumbai. An ability to survive in a wider range of habitats has possibly seen this species gain.

Conservation Concerns: Not assessed, but evidently numbers increasing locally.

RED AVADAVAT *Amandava amandava*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Secondary growth, wet herbage, chiefly in lowlands.

Observations/Remarks: Nowhere common, yet this bright-plumaged little bird appears with unfailing regularity, sometimes good numbers around. It seems to have periods of ups and downs, and during project fieldwork we have 43 sighting reports, the greater majority of them during the monsoon and immediate-post-monsoon of 2012. There was an unsually good number along the grass and scrub fringes of Thane Creek, and the species was also sighted on MRC and Kalina campus.

Conservation Concerns: Not assessed.

HOUSE SPARROW *Passer domesticus*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: Urban areas, open country, in lowlands and hills.

Observations/Remarks: Though much in the news in recent years due to its decline in many parts of the world, however, this familiar, famous bird seems to have had only fleeting local declines in the MMR, and seems to be actually bouncing back in many areas. We find it in every kind of habitat, from lowlands to the hills, except dense forest. It also ranks amongst birds with the highest encounter frequency, at 85%. Even then, a variety of factors continue to influence this bird, including our changing architecture, rising numbers of crows, amongst others.

Conservation Concerns: Lack of nesting sites, vanishing little green patches, predation/competition by crows.

YELLOW-THROATED SPARROW *Petronia xanthocollis*

IUCN Status: Least Concern **Local Status:** FC, R/LM

Habitat/Key sites in MMR: Forest, forest-edge, in lowlands and hills.

Observations/Remarks: The forest sparrow of MMR, seldom emerging into surrounding urban areas. Commoner in the lowlands but small populations have begun colonizing the upper reaches of the hill ranges. Sometimes collects into flocks during winter, when seen on forest clearings. Marked fall in number of sightings during monsoon may be indicative of some local migration but not conclusively proven.

Conservation Concerns: Not assessed.

WEAVERS

BAYA WEAVER *Ploceus philippinus*

IUCN Status: Least Concern **Local Status:** UC, R/LM

Habitat/Key sites in MMR: Open areas, cultivation, vicinity of wetlands, in lowlands.

Observations/Remarks: One of India's celebrated birds, renowned for its amazing nest and breeding behavior. Once widespread across the MMR, the past two decades have witnessed a gradual and alarming decline of this species, especially with the large-scale loss of openland, cultivation and wetland-edge landscapes. In Greater Mumbai the decline has been severest, with the species more or less entirely disappearing from numerous sites. In some sites while

the species appears during the monsoon, however, no breeding has been observed (Kalina campus). From an estimated 56 breeding colonies reported from the Madh – Gorai – Malavni – Kandivli – Borivli up to early-1990's, barely a high of 10 colonies were observed during the mid-2000's and only seven during the 2012 monsoon. The species is still relatively widespread in the Alibaug area as well as along pockets towards the northern and eastern areas of the MMR but it is quite evident that increasing developmental and infrastructural expansion is taking a toll on this bird here as well, as it has with numerous other birds of grass and scrub habitats. While the species is most active and visible during May – September, when breeding, however there continue to be sporadic sightings during other months as well, suggesting that while there appears to be an influx of birds around May, a small population is also a year-round resident in the region.

Conservation Concerns: Loss of habitat.

BLACK-BREASTED WEAVER *Ploceus benghalensis*

IUCN Status: Least Concern **Local Status:** UC/S, R/LM?

Habitat/Key sites in MMR: Open areas, damp grassland tracts, in lowlands.

Observations/Remarks: A sparsely occurring species in the region, with barely a handful of past records, including breeding reports, dating to more than a hundred years ago. In the early 2000's a small breeding population was discovered (SM *pers obs*) in the Uran area and the birds were sporadically sighted for a couple of years following. A small flock was also observed in the Naigon – Vasai belt. Unfonfirmed previous reports from south of MMR. The Uran – southern MMR population seems to have since disappeared. However, the species has been recently reported from the E – NE fringes of MMR, and in July 2012, a small flock was sighted near Chirner.

Conservation Concerns: Not assessed but definitely would require continuous monitoring to ascertain status in the region.

OLD WORLD ORIOLES

EUROPEAN GOLDEN ORIOLE *Oriolus (oriolus) kundoo*

IUCN Status: Least Concern **Local Status:** FC, LM/WM/R

Habitat/Key sites in MMR: Forest, forest-edge, groves, urban parks, in lowlands and hills.

Observations/Remarks: One of the most exciting birds in urban areas of MMR, often sighted in town-centers, in urban parks and wherever there are large trees. A very small number breed here, with at least 08 nesting records from Greater Mumbai alone, and several more from other areas of MMR. However, this bird is most visible during October to late-April when there is a large influx of birds from elsewhere in peninsular India; on arrival, flocks of up to a dozen can be sighted, and heard over the chaos of urban MMR. We have a total of 109 sighting reports during project fieldwork.

Conservation Concerns: Not assessed.

BLACK-HOODED ORIOLE *Oriolus xanthornus*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: One of the several strictly forest species, seldom sighted outside the forest habitat. This is one of the characteristic bird species of the mixed-deciduous forests that are the dominant forest-type of the MMR and seems to be surviving well. Key sites for the species here are SGNP, KBS, TWLS, Matheran Range and the Alibaug hills.

Conservation Concerns: Loss

BLACK-NAPED ORIOLE *Oriolus chinensis*

IUCN Status: Least Concern **Local Status:** S, WM

Habitat/Key sites in MMR: Forest, groves, urban parks/avenues, apparently more common in lowlands.

Observations/Remarks: A highly uncommon winter visitor, sporadically sighted some years; it has also been sighted along avenues in South and Central Mumbai. A total of 04 sighting reports during project fieldwork, from SGNP, South Mumbai, Alibaug area and Matheran.

Conservation Concerns: Not assessed.

DRONGOS

BLACK DRONGO *Dicrurus macrocercus*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban parks; in lowlands and hills.

Observations/Remarks: One of the ten most widespread and visible birds in MMR, with a 90% encounter frequency. Despite much of its typical tree-dotted open habitat having vanished, this species can quickly adapt to edge-habitat and even intrude into other spaces, including urban parks, forest, and into hilly areas. During winter some conflict observed in forest areas between this and *leucophaeus*, a widespread winter visitor.

Conservation Concerns: Not assessed.

ASHY DRONGO *Dicrurus leucophaeus*

IUCN Status: Least Concern **Local Status:** FC, WM

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: The most widespread winter visiting drongo, seldom sighted outside the forest habitat. Can be very aggressive upon arrival, usually early/mid-October, often conflicting with the resident Black Drongo and other birds. Aggression also observed on flowering trees. Earliest Winter Date is 13October. Latest Summer Date 18 April.

Conservation Concerns: Not assessed.

BRONZED DRONGO *Dicrurus aeneus*

IUCN Status: Least Concern **Local Status:** UC, R?/LM

Habitat/Key sites in MMR: Chiefly forest, in lowlands and hills.

Observations/Remarks: The smallest of our drongos, occasionally seen in some of the forest areas. Key sites include KBS and Matheran, with a lesser number of sightings in TWLS, Alibaug hills, SGNP and in the Karjat – eastern fringes of MMR. Must be mentioned that an unusually high number was observed in TWLS during 2005 – 06. Though has been sighted during May – July, including during project fieldwork, we do not have any record yet of breeding in MMR.

Conservation Concerns: Not assessed.

WHITE-BELLIED DRONGO *Dicrurus caerulescens*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, chiefly in lowlands, occasionally in hills.

Observations/Remarks: An uncommon forest drongo, observed breeding SGNP, KBS and TWLS. Has also been sighted in the Karjat – Barvi area in the E – SE fringes of MMR.

Usually restricted to the more undisturbed forest patches, sometimes emerging in forest-edge and clearings. May also be occasionally sighted amid mixed bird parties. A total of 18 sighting reports during project fieldwork.

Conservation Concerns: Not assessed.

GREATER RACKET-TAILED DRONGO *Dicrurus paradiseus*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Forest, in lowlands and decreasingly in the hills.

Observations/Remarks: One of the most vocal, familiar birds of forest habitat. Key sites include SGNP, KBS and TWLS. Of 70 sighting reports, more than three-fourtth from SGNP and KBS, with a lone sighting in the Barvi – Karjat area and a few in TWLS and Matheran Range, including Prabalgadh. Species has not been sighted outside of forest areas, and rarely seen in forest-edge either.

Conservation Concerns: Not assessed.

HAIR-CRESTED DRONGO *Dicrurus hottentottus*

IUCN Status: Least Concern **Local Status:** UC/S, LM/WM

Habitat/Key sites in MMR: Forest, chiefly in lowlands, occasionally in hills.

Observations/Remarks: This bird is often a highlight of forest bird-watching outings in the region. Though mostly seen in lowland forests, it has also been sighted close to the highest reaches of TWLS (620 mt). Though it is known to breed in the Western Ghats, it is invariably sighted here during December – February, with a lone sighting in October. Flowering Red Silk-cotton trees routinely draw this and other drongos.

Conservation Concerns: Not assessed.

STARLINGS

BRAHMINY STARLING *Temenuchus pagodarum*

IUCN Status: Least Concern **Local Status:** UC, WM/LM

Habitat/Key sites in MMR: Open areas, chiefly in lowlands; also urban environs.

Observations/Remarks: One of several widespread species that have never been able to either reach or strongly establish presence in the north Konkan. It remains an erratic visitor to the region, suddenly a few sighted some year and none for a long time. Evidently, the N – NE

and E fringes of MMR are the key areas where this species is sighted, with an odd sighting along Thane Creek/BPS in the Greater Mumbai area. It has also been intermittently seen in the Alibaug – Uran stretch. It had previously been found breeding near Lonavla while to the north, it breeds commonly up to southern Gujarat. Apparently, the domineering presence of the two widespread resident Myna/Starlings – *Acridotheres tristis* and *Gracupica contra*, as also the enormous numbers of the wintering *Sturnus roseus* could be critical determining factors checking the ingress of this species into the region.

Conservation Concerns: Not assessed.

ROSY STARLING *Sturnus roseus*

IUCN Status: Least Concern **Local Status:** C, WM

Habitat/Key sites in MMR: Open areas around wetlands, chiefly in lowlands. Also urban parks.

Observations/Remarks: One of the most abundant winter visitors to the region; huge gatherings seen periodically, especially coinciding with the flowering and fruiting of certain trees and shrubs. Enormous numbers roost in mangrove creeks, feasting on the juicy berries of *Salvadora persica* and equally well spend the hot hours in densely foliaged trees in urban areas after feeding on several flowering trees. This bird is most abundant February – mid-April. Earliest Winter Date is 30 September. Latest Summer Date 16 April.

Conservation Concerns: Not assessed.

GREY-HEADED STARLING *Strunia malabarica*

IUCN Status: Least Concern **Local Status:** FC/UC, LM

Habitat/Key sites in MMR: Open areas, urban parks; chiefly in lowlands.

Observations/Remarks: A seasonal visitor, most sighted July – October and only intermittently during winter. A total of 36 sighting reports during project fieldwork, 09 of these between December – March. Sometimes seen with *Sturnia blythii* that is a far less common seasonal visitor.

Conservation Concerns: Not assessed.

MALABAR WHITE-HEADED STARLING *Sturnia blythii*

IUCN Status: Least Concern **Local Status:** S/UC, LM

Habitat/Key sites in MMR: Open areas, often around creek-edge, wetlands.

Observations/Remarks: An erratic, sparse, seasonal visitor, mostly seen July – September, and seldom at other times of the year. A total of 11 sighting reports during project fieldwork, mostly from the margins of Thane, Manori and Malad creeks, as also one sighting each from Gandhari and from northern MMR, near Tansa River. Observed associating with *S malabarica* and *Gracupica contra*.

Conservation Concerns: Not assessed.

ASIAN PIED STARLING *Gracupica contra*

IUCN Status: Least Concern **Local Status:** FC, R

Habitat/Key sites in MMR: Open areas in lowlands, often around wetlands; also urban parks, other urban sites. Seldom in hills.

Observations/Remarks: One of the two species (the other is Alexandrine Parakeet) that are reported to have escaped from captivity in the region, sometime during mid-1900's, and have established good resident populations. It also ranks amongst the most widespread birds, with an encounter frequency exceeding 50%. In some areas the bird appears to be even ousting the resident *Acridotheres tristis*. In Greater Mumbai, the species seems to have become locally abundant, especially in suburban areas, during the 1980's – early-2000's and has been on a local decline since. However, it is still quite widespread with a marginal decline observed as several large wetlands and damp grassland sites are lost. Evidently, this bird has been restricted to the opener areas, secondary growth, the vicinity of cattle-sheds, damp areas and wetland margins and not been able to intrude into the urban space of *A tristis* that commonly nests amid urban structures, including inside building structures.

Conservation Concerns: Not assessed but is in perennial competition with *A tristis*.

BANK MYNA *Acridotheres ginginianus*

IUCN Status: Least Concern **Local Status:** St

Habitat/Key sites in MMR: Not known.

Observations/Remarks: The MMR is just out of the known distributional range of this species that has somehow not been able to move into this region; it is quite common and

familiar from barely a couple of hundred kilometers north of the MMR (South Gujarat northward). During the mid-1900's there are reports of several sightings including of a few breeding pairs in the region but apparently these disappeared soon and there has been no such report since. We have only one sighting report during project fieldwork, of a pair close to the northern limits of MMR, near Tansa River.

Conservation Concerns: Not assessed.

COMMON MYNA *Acridotheres tristis*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban built-up areas and forest. In lowlands and hills.

Observations/Remarks: One of the most widespread and familiar birds, and one of barely half dozen species that routinely nest in built-up structurs, including sometimes inside homes. A very high encounter frequency of 90% indicates how widespread this bird is. It has even intruded into forest sites and we have nesting reports from fairly undisturbed patches of forest in SGNP and from just below the highest points in TWLS. The assertive presence of this bird has proven to be an effective barrier against a couple of equally feisty featherfolk setting in strongly in the urban context of the MMR.

Conservation Concerns: Not assessed.

JUNGLE MYNA *Acridotheres fuscus*

IUCN Status: Least Concern **Local Status:** S/UC, R?/LM?

Habitat/Key sites in MMR: Open areas, forest, in lowlands. Occasionally in hills.

Observations/Remarks: A widespread species along the west coast, both in the Konkan plains as well as the adjoining Western Ghats range, however, this species has never been able to establish itself strongly across much of the MMR. During the 1940's there is a report of a breeding colony at Powai and several sightings from then Salsette (present-day western suburbs). The species seems to have remained sparse in the region, sporadically sighted in the lowlands as well as in the hills, including the forested tracts. We have a total of 15 sighting reports during project fieldwork, including during April – July, suggesting it may be resident here.

Conservation Concerns: Not assessed but competition with the more widespread and domineering *A tristis* possible.

CROWS, TREEPIES

HOUSE CROW *Corvus splendens*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, most abundant in urban areas.

Observations/Remarks: The most familiar, widespread bird around us, described as an extension of the human social system. In the MMR it seems a close race between this and Columba livia as to which is the most abundant, however, there is no denying that the House Crow makes its presence felt in more ways than any other species. It is continually adapting to changes emerging in our increasingly human influenced world, adaptations that range from finding food sources to ways of discovering food and nesting sites and materials. Random surveys of nest counts during peak breeding seasons (1990's and early 2000's) indicated a House Crow population in Greater Mumbai alone at upwards of half a million birds on the second survey, having almost doubled in a decade. The bird has invaded many a forested tract as well in recent years, and there has scarcely been any forest-walk over the past decade when a few gangs of this bird have not been encountered; this is an alarming sign in itself. Casualties resulting from predation by House Crow are also high, with this bird having an uncanny knack of discovering the nest sites of other birds. However, the Asian Koel, a parasitic cuckoo, continues to make the most of the crow's abundance. At the same time, the House Crow ensures that its larger, darker cousin, the Indian Jungle Crow, while widespread is nowhere common. Needless to add, of all birds in the MMR, the House Crow boasts the highest encounter frequency, at almost 100 percent.

Conservation Concerns: Not assessed.

INDIAN JUNGLE CROW *Corvus [macrorhynchos] culminatus*

IUCN Status: Least Concern **Local Status:** C, R

Habitat/Key sites in MMR: All habitats, including urban areas.

Observations/Remarks: The larger of the two crows in the region, this is another widespread species, found in all kind of habitats, and quite commonly in urban areas as well. However, its numbers everywhere are much lower, and in the urban areas *C splendens* is

simply too domineering to let this larger bird thrive much. Even in the forest habitats, *C splendens* has been making serious inroads in recent years, uprooting the established larger crow. Even then, this large crow maintains a high encounter frequency, at almost 75 percent.

Conservation Concerns: Not assessed, but competition pressure from *C splendens* can become serious.

RUFOUS TREEPIE *Dendrocitta vagabunda*

IUCN Status: Least Concern **Local Status:** UC, R

Habitat/Key sites in MMR: Forest, in lowlands and hills.

Observations/Remarks: One of several forest species whose declining numbers in recent years can be a matter of some concern. Though a widespread bird of forest-edge and groves in most parts of the country, in the MMR, the species is more or less restricted to the few forest sites; it seldom emerges in forest edge. Appears to be more widespread in the lowlands, with SGNP being a key site for the species. Other sites where this species reported include KBS, TWLS, Alibaug area and Matheran Range, with sporadic reports from Khargarh Hills and from remnant forest patches along the Karjat – Barvi – Tansa stretch along eastern fringes of MMR. A total of 32 sighting reports during project fieldwork.

Conservation Concerns: Not assessed.

ADDITIONAL SPECIES NOTES:

GREAT TIT *Parus major*

IUCN Status: Least Concern **Local Status:** S,Rr?

Habitat/Key sites in MMR: Open areas, groves.

Observations/Remarks: A scarcely reported species in the region. A few reports in areas immediately adjoining MMR and on extreme eastern fringes during 1990's – early-2000's (Murbad, Wada, Tansa). However, a single sighting report during project fieldwork (01 July 2012, Kumbhar – Bhiwandi area).

Conservation Concerns: Not assessed.

TICKELL'S THRUSH *Turdus unicolor*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Forest, forest-edge.

Observations/Remarks: Though the MMR is known to be on the wintering and passage distributional range of this species, however, there has not been any substantiated report of the species from the region. We have no sighting report of this species during project fieldwork but a lone specimen was observed and photographed in Yeur, on the eastern side of SGNP (early 2013), after the project fieldwork terminated.

Conservation Concerns: Not assessed.

INDIAN BLUE ROBIN *Luscinia brunnea*

IUCN Status: Least Concern **Local Status:** S, PM?/WM?

Habitat/Key sites in MMR: Forest, chiefly hills. Matheran.

Observations/Remarks: This Himalayan breeding species winters in the Western Ghats south of Goa, but could be a more regular passage migrant through the MMR than hitherto known or reported. Though not reported during project fieldwork, however, there are a few sporadic reports from Matheran (within MMR) as also from Panchgani and Mahabaleshwar. Also, there is an interesting record from Greater Mumbai area: "Turned up in our garden at Pali Hill, Bandra in the middle of February for at least 3 years from 1994 to 1996," SAL, 10/3/01.

Conservation Concerns: Not assessed.

SPOTTED FLYCATCHER *Muscicapa striata*

IUCN Status: Least Concern **Local Status:** St?

Habitat/Key sites in MMR: Open secondary growth.

Observations/Remarks: No past report of this species from region and the only sighting during project fieldwork (15 October, 2012) from the Malawni area (near AIR grounds) would probably be a Vagrant to the area. This species is a passage migrant through extreme NW India, including parts of Gujarat (chiefly Kutch) around late-September – mid-October.

Conservation Concerns: Not assessed.

The mammalian fauna in MMR

This sub section of the report summarises the finding of the sample surveys for mammalian fauna carried out across the MMR, including their implications. This data is contextualised within historical trends subject to the availability and access to past records from the data collected through the review of relevant literature and archives.

The area:

The MMR is located in the northern Konkan region, which forms a narrow fertile belt between the Arabian Sea and the Western Ghats. A large part of the MMR is an alluvial lowland, with an average elevation of just under 100 metres above mean sea level (msl), penetrated by numerous shallow creeks and tidal marshes, though several of these have been reclaimed or silted up.

The MMR landscape is marked by a series of low hill ranges that run north-south parallel to the coast and the Western Ghats. The highest elevation in the MMR is reached at 803 msl at the Panorama point in the Matheran range stands. These hills are separated by low lying plains, estuaries and creeks and also dotted with numerous freshwater bodies, which include natural ponds and lakes as well as artificial reservoirs.

The coastline extends for over a 100 km, including a heterogeneous mix of sandy beaches, rocky shores, bays, mangroves, offshore islands and different kinds of human habitation. The

MMR has a moderate tropical climate, generally warm, with extensive rainfall during the monsoon, between June and September.

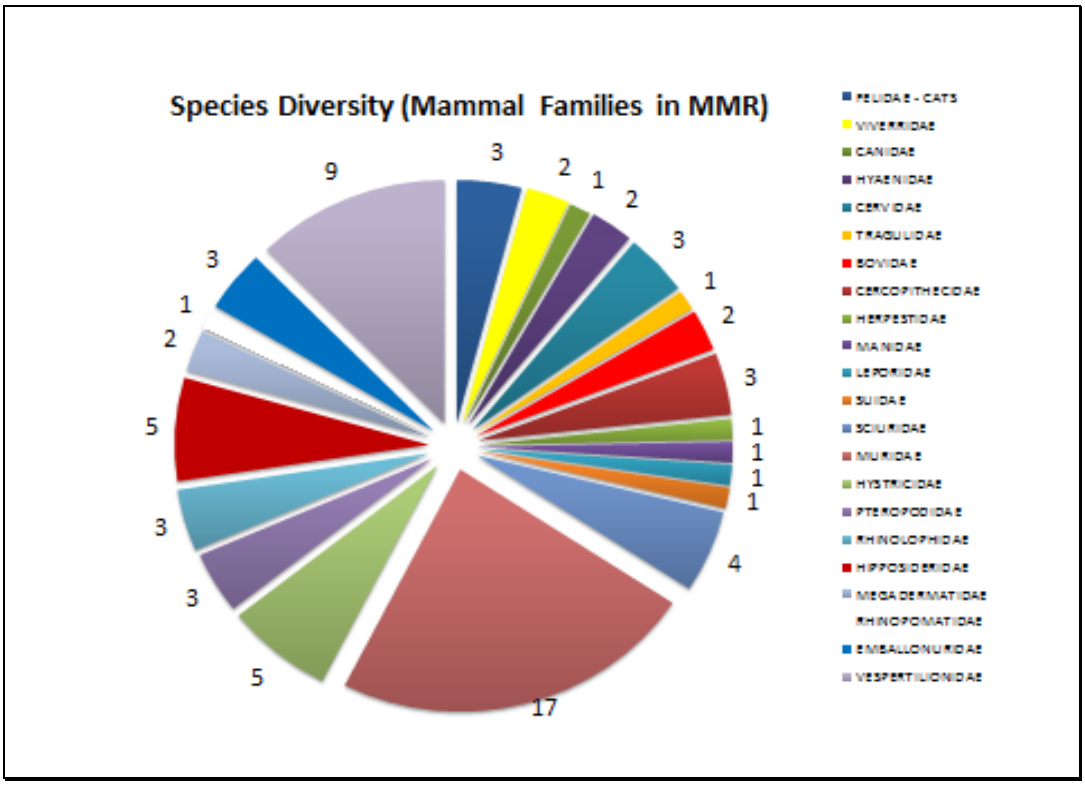
The heterogeneity of habitats, influenced by climate, terrain and human action makes the MMR more diverse and complex than comparable metropolitan regions around the world. However, as developmental changes seek to reshaped the landscape, this biological diversity is increasingly vulnerable to environmental and anthropogenic stresses.

Mammals in the urban context

Historically, this varied geographical diversity has hosted a richness of biological diversity, including a mammalian fauna. Though avifauna, flora and butterflies attract more attention, the MMR is also home to a rich and diverse assemblage of mammalian fauna. Contemporary evaluations reveal the occurrence of at least 71 species of mammals (Pradhan & Talmale, 2009). There are records of tigers from the Malabar hill-Gowalia Tank area in southern Mumbai in 1882, from Mazagaon in 1829 and 1858 and from Mahim in 1863 (Prater 1929) while the last confirmed tiger within the current MMR is one reported to have been shot on 22 January 1929 near Vihar lake, in present day Sanjay Gandhi National Park (Prater 1929).

Urban areas are not commonly associated with a wealth of mammalian diversity but the presence of an estimated minimum of 71 species and sub-species in the MMR serves as an effective counter point. This further strengthens the arguments we framed in the introduction on the heterogeneity of habitats and the biological diversity in the MMR. Though the MMR is possibly one of the few such urban landscapes in the world that host such a rich diversity, it further highlights the importance of carrying out more intensive and extensive socio-ecological research in urban areas.

Mammals, being homeotherms (as compared to reptiles that are ectotherms or poikilothermic) are less affected by variations in abiotic factors such as rainfall and temperature variations. This enables mammals to exploit a far greater diversity of niches and ecosystems than reptiles. A significant number of the MMR's mammal diversity comprises of the smaller mammals, with the orders of Rodentia (squirrels, rats and mice) and Chirpotera (bats) accounting for 23 and 26 species respectively. These mammalian orders have possibly



been the most successful in exploiting the niches available for biomass extraction in urban ecosystems. Amongst the mammals, the species that are adaptable and can tolerate some degrees of disturbance are the ones that have thrived in the MMR (Begon et al. 1990). The checklist of mammal species recorded in the MMR is listed in **Table ……** An even more detail account of the MMR mammals, with observations on the status of all the species reported, appears under the Mammal Inventory & Comments (pgs 225 - 238).

As mentioned earlier, mammals have often been under-reported and under-studied in urban areas. The common association of urban mammals are either ones that come into conflicts with humans (for instance, leopards in the MMR) or over familiar ones associated with unhealthy environments (like the rodents). The biggest challenge of estimating mammal diversity is that they are present in low densities and largely nocturnal their presence is under reported. Furthermore, the smaller mammals are also difficult to identify in the field or to estimate their population density.

As compared to avifauna and flora, there is a marked paucity in data and reports on mammals in the literature especially related to their ecology, distribution and contemporary conservation status. For many species, chance observations during field surveys were often most fruitful and opportunistic sightings being the chief source of data to evaluate presence and status of species. Camera traps and capture/traps are a useful method to assess species status but were not used in this project. However, it does draw on other work done in somar parts of the MMR using camera traps. Thus, field surveys during the course of this project yielded a bulk of the information for several small mammals, which rank amongst the most difficult species to encounter and identify in the field. Another source, ironically, were road kills that revealed their presence in specific localities.

Literature on mammals in the MMR:

There have not been any significant studies of mammals in the MMR, though there are scattered reports and notes of mammalian fauna of the erstwhile Bombay Presidency, which covered a far larger area than the MMR. Many of these were reports from chance encounters, personal visits, observations and collections made by British civil service and army officers, intermittently stationed in the region.

The earliest of modern-day notes appear in the District Gazetteers that records events from the 18th Century, especially for the larger mammals that occurred in the region. The tiger is mentioned often, while others like the gaur and leopard also make frequent appearances. The *Journal of the Bombay natural History Society* (JBNHS) is another rich source of data, dating back to its first issue in 1886.

The Mammal Survey of India was undertaken by the Bombay Natural History Society in the 1910s, and its results have been recorded across several issues of the journal. While the surveys were conducted and specimens collected across a wide geographical area, some of them do fall within the present day limits of the MMR. Furthermore, the impact of these surveys still reverberates in the identification of different sub-species, some of which continue to be recognised today.

Even after independence in 1947, very little intensive or extensive research or documentation has been carried out in the area on its mammalian diversity. The Maharashtra State Gazetteers and the JBNHS remain some of the best sources for observations and reports. The only survey of note in the region in this period have been the annual surveys and wildlife census in the protected areas that dot the MMR, especially Sanjay Gandhi National Park (SGNP), Tungareshwar Wildlife Sanctuary (TWLS), and Karnala Bird Sanctuary (KBS). These surveys are carried out by forest department personnel and volunteers.

However, more recently Talmale and Pradhan (2005) recorded 48 species of Bats and Rodents from the Mumbai region and remains the most comprehensive inventory of the smaller mammals from the Mumbai region.
Thus there exists a vast knowledge gap in terms of the current status of mammals in the region and the existing reports are scattered in different documents. While this report does use these reports in the literature that were accessible to contextualise the findings, a bulk of the data for this reports is based on actual fieldwork, other related field research and inputs with naturalists in the MMR. Through these sources, this sub section of the MMR Biodiversity Project report attempts to inventorise the region's mammalian fauna, including current status and occurrence of some species.

Methodological approaches

Direct observations, or Visual Encounter Surveys, based on sightings and vocalisations (for some species) formed important parameters for recording species presence and relative abundance.
However, in the case of some of the larger mammals, species presence also included documenting visual signs like pugmarks/hoof print, territorial markings and scat (droppings). Most larger, terrestrial mammals leave telltale signs of their presence in an area, especially on loose, 'sandy' soil and in the vicinity of water-holes and other damp patches in the form of pug marks (most obvious for felids and canids) and hoof-prints (ungulates).

For the Rodents, Secondary data and contemporary as well as primary field observations in consultations with recognized experts and institutions is providing some interesting data. All direct visible sightings and any indirect evidence of all mammal presence were

opportunistically noted during every field visit. The work was conducted from Nov 2009 to June 2010 and again from Dec 2011 to Nov 2012 over the course of extensive field surveys to assess presence, distribution and status of larger mammals, and for an overview of the smaller mammals.

Given the challenges of working in a densely populated landscape, it was difficult to follow a standard protocol for sampling and field surveys in the MMR. However, the following methods were used to document mammal species presence data across the MMR:

a) Direct visual observations during field visits across different habitat-types. This included nearly 300 field visits, which were used to assess mammal-related observations and other taxonomic groups.
b) Once a month line transects along a 2.9 km length of forest road of Sanjay Gandhi National Park (this was done along both, the southern and northern lengths of the Goregaon-Tulsi-Kanheri Road)
c) For the vast group of rodents and bats, that comprise a majority of the mammal species diversity in the MMR, the project attempted to enumerate the built-up v/s forest and other natural habitat diversity range and index
d) Data was also sourced through review of historical reports in the literature, feedback from noted experts on mammals, dissertations, unpublished papers, popular, scientific articles, books, reports on social media and reports from institutions like Haffkine, reports by forest department personnel in the region, naturalists notes and observations by locals living in the area. These reports were cross-checked as far as possible and provided material to estimate species richness of groups and species such as cats (felidae), civets (viverridae), mongooses (herpestidae), dogs (canidae) and some species of ungulates in the MMR.
e) Flying Fox (Large Fruit-bat) Survey: This most conspicuous of the MMR mammals is the flying fox and this survey focussed on locating and documenting its communal roosting colonies. From an estimated 63 large roosting colonies during the late-1980s/early-1990s, the project estimates a 60% reduction in Zone 1, though several newer, but smaller colonies were located. However there seems to have been a very marked decline in overall numbers of this large frugivorous bat although there is no historical data for the region for comparison and analysis.

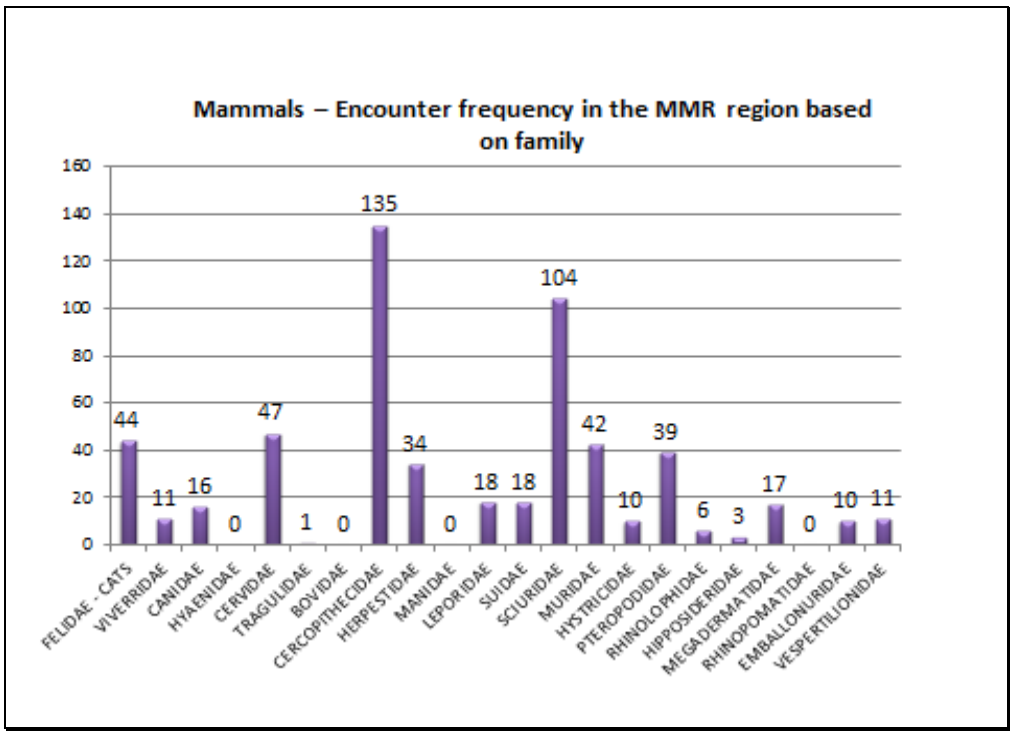
f) Since many of the mammals are crepuscular and nocturnal creatures, the project fieldwork also had several nocturnal visits and night surveys across a range of habitat-types. These were carried out in forest habitats, grass and scrub, built-up urban areas. Nine such surveys were carried out in Sanjay Gandhi National Park, Aarey and various creeks and seven in other sites across the MMR.

g) Several additional night visits were made for an enumeration of mammal richness

h) Besides actual sightings, occupancy signs were also documenting including tracks, carcasses, droppings, dead specimens, calls et

Results:

During Phase 1, a total of 13 species of the larger mammal species and 13 species of rodents and bats were encountered across the MMR. A list of the species encountered, frequency of encounters and abundance index are included in **Table…..**. This report contains the findings of the entire duration of the Project.



Over the entire duration of the project, till end November 2012, a total of 49 out of the 71 species known to occur in the MMR were encountered. For two of these species the identification remains in doubt, as the field sightings were neither very clear nor substantiated by photographic evidence and highlighted by a question mark. This research also did not find

any evidence, either direct sightings or recent reports, of 14 species of rodents and bats. However, this cannot be regarded as a conclusive proof of their absence as these are amongst the most difficult species to encounter and identify in the field.

Nonetheless, the greater concern is the almost complete absence of sightings of 9 of the 22 larger mammals reported in the MMR. This includes hyaena, fox, *nilgai*, *chowsingha*, mouse deer, rusty spotted cat, ruddy mongoose, Indian pangolin and the Indian crested porcupine (though there were some signs for some of these species). Observations and comments for each species appear under appropriate species and notes where the possible status—current and historical—of these species is discussed.

Mammal Distribution across MMR Sub-regions

The highest percentage of direct sightings, signs of presence and encounter frequency of the larger mammals, and a sizeable number of rodent and bat species were from Zone 1. This seems counter intuitive as this zone includes the densely populated urban areas of Mumbai city and its immediate suburbs. However, this zone also includes the Sanjay Gandhi National Park (SGNP), which is regarded as one of only four protected areas in the world located in an urban area (see http://english.upa-network.org/).

At least twelve of the larger mammals (**See Annexure**) were encountered in SGNP, while an additional species was encountered in the adjoining Tungareshwar Wildlife Sanctuary (TWLS). In addition, 15 species of the smaller mammals were also observed in SGNP and 3 species in TWLS. Additionally camera traps deployed by the Forest Department as part of a concurrent survey yielded presence of one more species, the ruddy mongoose, which has not been photographically recorded in the MMR. No other site in the MMR, across any habitat type revealed even half as many species of mammals, as those recorded in and around SGNP in zone 1. This could be a critical determining indicator about the importance of effective protection to local sites in the context of nature conservation even in a human-impacted urban habitat (Woodroffe & Ginsberg 1998).

Not surprisingly in zone 1 outside SGNP 1, the only other site where 5 or more species were encountered was the nearly 13 sq km spread of Aarey Milk Colony. Located along the south-

west corner of SGNP, Aarey remains rich in mammalian diversity with encounters of leopard, jackal, jungle cat, small Indian mongoose, wild boar, black-naped hare and the occasional ungulate. Also, 11 species of smaller mammals were also observed in Aarey. Reasons for the occurrence of so many mammal species, and the frequency of encounters, point towards the considerable human activity and resulting biomass that attracts animals, especially untreated and open disposal of garbage.

Mangrove creeks, with their unique forest ecosystems are a prominent habitat in the MMR. Over the years several species of biodiversity, representing different taxonomic groups have been observed, either exclusively or increasingly, in the mangroves. A reasonably high degree of activity of certain mammal species was noticed in and around the mangrove creeks and channels in zone 1, and sporadically throughout the MMR.

In zone 1, the key mammal species that were regularly sighted or signs of their presence observed, in the mangrove creeks include Indian jackal, jungle cat and Common Mongoose, with at least three instances of wild boar as well. Also, 5 species of smaller mammals, especially rodents, were regularly observed in mangrove creeks in Malad, Manori and Thane creeks. No large mammals were observed or reported from Mahim creek, possibly owing to its smaller extent and location within a heavily transformed landscape.

Zone 2, comprising of the Thane District segment of the MMR, is located to the north and north-east of Greater Mumbai. It includes a diversity of habitats including lowlands as well as some prominent hilly tracts like the Chinchoti – Tungareshwar hills and the Kaman Range. The northern-most tips of the Matheran range and the Khargar-Parsik-Mumbra hills also extend into this zone, while some low hilly areas are present in the Vasai-Virar region as well as the eastern fringes of this zone.

A vast portion of this zone is drained by the Ulhas river and its tributaries including the Barvi, Kalu, Bhatsai, Kumbhari and the Kamvadi rivers. The Tansa river forms the northern limits of this zone and the MMR, with the northern slopes of the Tungareshwar Ridge almost running down to the river in the northwest. This zone has a very limited coastal habitats.

In recent years, the Thane District's urban human population has nearly doubled and the satellite towns in the vicinity of Greater Mumbai have increased manifold, resulting in an intensification of urbanisation at the cost of the countryside. Most severely affected has been the grass-scrub and riparian habitats across this region, as across much of the MMR itself.

Across much of this zone, the smaller mammals appear to be more widely distributed, especially in the more verdant and agricultural areas. In contrast, the larger mammals are highly uncommon, even in the TWLS that has an extent of 86 sq km.
Signs of 9 species of larger mammals (See **Annexure)** were observed in TWLS, but the frequency of encounters was markedly lower than in SGNP. Also, unlike SGNP, no sizeable herds of spotted deer were observed. Seven species of smaller mammals were also observed. Evidently the more hilly terrain and the lack of adequate water bodies could be a determining factor despite the healthy forest ecosystem in the middle and upper reaches. However, more visible signs of presence of smaller carnivores (mostly civets) were observed in the middle and upper reaches of TWLS, mostly above 300 msl, than at any other site in the MMR.

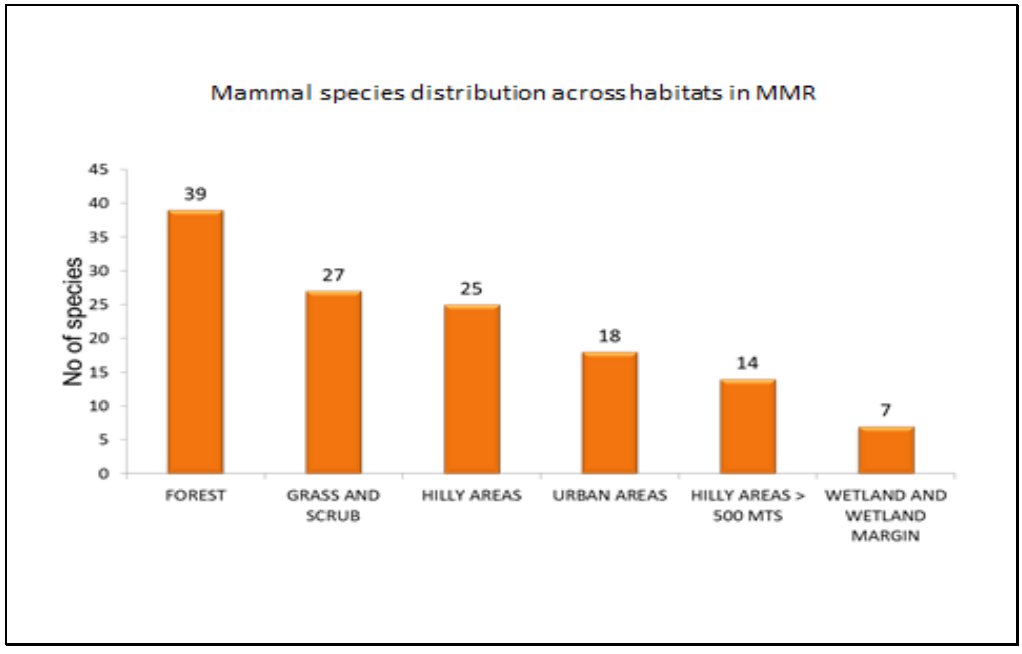
In the adjoining hilly Kaman Range, very low mammal activity was noticed, with black-naped hare accounting for the bulk of the sightings. Towards the eastern frontiers of the MMR, in the sprawling region to the north and northeast of the Bhiwandi–Kalyan–Ulhasnagar municipal council areas, the landscape is predominantly open scrub and agriculture, interspersed with little pockets of secondary tree-growth near the eastern fringes of the MMR and towards the lower slopes of the Western Ghats. Here, through direct field observations and signs and interactions with locals, including hunters, this project recorded the presence of several of smaller mammals as well as barking deer, Indian pangolin and Indian crested porcupine and the occasional reports of the leopard.

Considerable human pressures, including hunting, have had a deep impact on the landscape that symbolises the last frontier in the MMR to be affected by urban sprawl and infrastructural developments. In this area, we recorded a very small population of around 6 species of larger mammals, which included barking deer, hanuman langur, bonnet macaque and the odd sign of leopard, and 9 species of smaller mammals, which included small Indian civet, jungle cat, black-naped hare and several species of rodents and bats**.**

Zone 3 comprises the Raigad district segment in the MMR and is the vast area to the south and south-east of Greater Mumbai. This region includes most of the Navi Mumbai development, the Panvel – Uran - Karjat – Khopoli - Pen – Khalapur - Alibaug - corridors extending to the southern boundary of the MMR.

The highest diversity of mammals was observed in this zone. Though in very recent times this region has been caught in the throes of developmental expansion, it still contains heterogeneous diversity of habitats, including forest, grass and scrub and extensive wetlands. Much of the Matheran Range lies in this area, as also the Karnala Bird Sanctuary, the Chirner hills and the scattered hilly pockets in the Alibaug region. The greater length of the Khargarh hills too lies in this zone. These hills are largely covered with mixed-deciduous and semi-evergreen forests. Furthermore, several slopes in these ranges as the plateau tops (like the Khargarh hills) contain extensive grass and scrub habitats that are also observed in the low-land plains along the margins of creeks and other coastal habitats in this Zone.
At least 10 species of the larger mammals were reported here, either through direct field sightings or through various field signs. An estimated 18 species of the smaller mammals too were reported here, including several species of bats on Elephanta island.

HABITAT WISE MAMMALS: The following illustratation depicts the Habitat wise occurrence and distribution of mammals in the MMR.



The various forest habitats together comprise the richest mammal zone, with at least 39 (and possibly 42) of the 71 species recorded from the MMR. This accounts for a significant proportion of the known mammal diversity of the MMR. The lower altitude, mixed-deciduous forests have the maximum mammal diversity, including the larger mammals, with only 14 species or signs of their occurrence observed in the upper areas up the hill ranges.

Unlike birds, it is difficult to ascribe any mammal species, especially any larger mammal species, except possibly sambar, barking deer and mouse deer as being habitat-specific in the MMR. The reason for this would include the very isolated, island-like quality of the forest habitats and the tremendous results of human impact along the periphery of every forest site, resulting in a marked ecological shift in the behavioural aspects of every mammal, drawing benefits and also being impacted by human interference.

The grass and scrub habitats along with agriculture and plantations were also rich in mammal diversity in the MMR, with at least 27 species observed in these areas. These habitats also include forest-edge sites where many of the crepuscular and nocturnal mammal species emerge to forage in the dark. Even the principal predator in the MMR, the leopard has been observed in the grass and scrub landscapes adjoining the forest tracts in Aarey Milk Colony.

Though wetlands are a dominant feature of the MMR landscape, they were not very rich in mammal diversity in the MMR. However, there has been a shift in the recent years with several species have adapted to living in and around mangrove creeks and also some brackish waters as observed in Uran, Alibaug and Vasai–Virar. Notable amongst such mammals are the Indian jackal, jungle cat and common mongoose, with a sizeable population of the former two species having seemingly adapted to exclusively living in such habitats. In recent years, we have also come across a few wild boar in mangrove creeks, especially along Thane Creek. A total of 07 species of mammals were observed in wetland habitats, mostly on the margins of the wetlands but which seemed to display a proclivity for this specific habitat-type.

The urban built-up habitat, with its concrete and infrastructure and ornamental parks and gardens occupy a significant proportion of the area in the Greater Mumbai area (zone 1) and increasingly of the other zones too. This has pushed several species away as their habitats

have transformed, however the same process has simultaneously also created new habitats that other species are exploiting (Rosenzweig 2003). 18 species of mammals were reported from the urban areas in the MMR, but this inventory includes species such as the Indian Fox that has not been sighted for over two decades. This mammal tally includes species that have benefitted from fruiting and flowering trees or from abundant waste material. These have mostly been the smaller mammals who have succeeded in exploiting these conditions created in these urban habitats, while most of the larger mammals have disappeared from these areas. One example is the Indian fox, which was infrequently reported around the vicinity of human habitation up to the early1970s and is no longer observed in these areas.

Discussion

All small carnivore sightings were in or adjacent to protected areas. While this may suggest that their status outside such places could be of concern, it may also be a result of sampling methods used and frequencies.

Few comprehensive ecological studies exist on the small carnivores of India, notably on the Brown Palm Civet (Mudappa 2001) Asian Small-clawed Otter Aonyx cinerea (Perinchery 2008) and Smooth-coated Otter (Anoop & Hussain 2004, 2005, Perinchery 2008). Their roles as predators, prey and seed dispersers have been inadequately investigated even as severe loss and fragmentation of their habitat threatens their populations (Mudappa 2001, Mudappa et al. 2007). Most viverrids, herpestids and mustelids are cryptic species that among popular minds lack the hype surrounding the large carnivores such as tigers *Panthera tigris*. When information on their ecology and behaviour is not readily forthcoming, opportunistic observations such as these have to be exploited to further our knowledge about these fascinating creatures.

The Mammals of MMR – Advance & Retreat:

The preceding sections provides a brief overview of the range of mammal species and their locally extinct and adaptations, across the varied habitat-types in the MMR. It illustrates that urbanisation is a huge threat to biodiversity but it also serves as an opportunity for certain species, including some of the larger mammal species. It results in an ecological behavioural shift wherein species that manage to adapt to the changing environments have greater

chances of survival. It was observed that the greater majority of species thus observed in the hugely human-impacted zones of the MMR comprised of the smaller mammals. Twelve species of rodents and bats were observed in the built-up urban areas of the MMR. Additionally, 3 species of larger mammals were also observed on a fairly regular basis and a further two species sometimes stray into built-up localities. A case in point is the leopard, which has been resident in areas around SGNP, TWLS and habitats like Aarey Milk Colony (Athreya & Venkatesh 2013).

While in nearly every other municipal area, at least one or more of the larger mammals were periodically reported in human-impacted zones, in one half of the Greater Mumbai area, of Central and South Mumbai south of Bandra, no large mammal have been reported, with the flying fox being the largest species with several surviving roost-colonies. This project did not look at marine mammals of which there have been a few instances of whales and sharks washed ashore along the Greater Mumbai coast. This further underlines the unique value of the SGNP landscape in the Greater Mumbai context.

Different species have specific ecological factors that enable and influence their ability to live in hugely human-impacted habitats. Some species, such as several rodents, thrive because of the waste generated by urban communities. Similarly, numerous species of insectivorous bats thrive as they find shelter (structures, ruins etc) and food (huge numbers of insects). Several species of frugivorous bats benefit from the fruiting trees that humans have introduced and nurture in their urban space. These have in turn supported some larger mammals such as jungle cat and mongoose prey on rodents and birds, while the jackal, though a predator, also survives by scavenging in and around built up areas. In many areas, these large mammals come into intense conflict with feral dogs, who occupy a similar ecological niche, but are better adapted to the presence of humans. The leopard is the only large mammals in the region who actually feed on feral dogs. Edgaonkar and Chellam (2002) analysed leopard scat in SGNP and estimate that dogs form 65% of the leopards overall diet.

While the above outline some key factors for changes in mammals species and their distribution in built up areas and also in peripheral semi urban areas and forested areas.

Several other factors are also at work that influence the presence and absence of native as and exotic mammal species.

Habitat Loss – Degradation – Disturbance:

One of the most important factors that impacts mammals in the MMR is habitat loss and habitat degradation. This has affected every habitat in the MMR, and continues to change at a rapid pace across the region. Except for the three PAs, which account for a total area of approximately 200 sq km that have received a higher degree of conservation protection, there is extensive habitat loss and degradation across the MMR. More than 90% of the habitat of the three PAs consists of mixed-deciduous and semi-evergreen forest habitats. Outside of these protected sites, most of the reserve forests in the MMR fare poorly on the Habitat Quality Index.

The forest habitat degradation outside these PAs has affected at least 10 mammal species. This is based on long term observations along the western and eastern fringe slopes of SGNP dating back to the early 1970s (Salim Ali & Abdulali, Humayun). Unfortunately, the lack of specific data on this issue means it is difficult to draw comparisons data to estimate the extent of habitat loss or decline of mammal species. However, observations suggest that with the exception of pockets in the Matheran range, the upper elevations of Matheran, the adjoining Prabalgadh plateau and a small extent on Kankeshwar hill in Alibaug, nearly every other forest site in the MMR has lost a considerable extent of its vegetation and the surviving patches score low on the Habitat Quality Index.

The extent and intensity of habitat loss and degradation of overall quality is even pronounced in other habitat types across the MMR. Grass and scrub habitats seem the worst affected with an estimated 80% of the original extent having either been replaced by infrastructure and developmental expansion or the remaining patches have deteriorated alarmingly. The same applies to the agricultural tracts across the MMR, with many of the year-round cultivation pockets being rapidly absorbed into the rapid spread of urban sprawl across the MMR. The only pockets that have survived are the ones further removed from the main urban areas.

This disappearance of the grassland-scrub-agriculture habitat complex could be significant factor for several species that frequented in grass and scrub habitats have moved into the relatively less disturbed but more polluted mangrove creeks. These include the Indian jackal, jungle cat and to a lesser extent the Common Mongoose while several rodent species take advantage of the drying margins of the creeks. Several of the larger mammals of the MMR to have disappeared altogether, including the four-horned antelope, Nilgai, hyaena and Indian fox, which favour grass and scrub habitats.

Wetlands are the last of the major habitat types that have survived, even though they are highly polluted and under constant pressure. However, they are not particularly rich in mammal diversity in the MMR. While there are several marine mammals that are periodically reported in the seas off the MMR coast, the present project did not include them in this research for mammal groups for logistical reasons. While there are no wholly aquatic mammals in the wetlands of MMR, the few species recorded, and discussed earlier, are ones who have adapted to this habitat by exploiting its drier margins.

The change discussed earlier is also evident in the built-up areas throughout the MMR. For instance, leafy lanes and old bungalows with ancient trees have made way for malls and high rises made from steel, glass and concrete. There is no large mammal species in any of the MMR urban zones though an occasional macaque are reported in areas adjoining forests, as are leopards in different parts of suburban Mumbai and Thane.

Poaching – Hunting – Superstitions & Other

The MMR has historically had several hunting communities who would hunt wild animals for subsistence. In addition, there was also the organised hunt amongst the upper classes. According to various reports, the most popular species for hunting were the wild boar, black naped hare, sambar, barking deer and *chowsingha*.

Poaching, coupled with habitat decline and superstitions may have been the key factors responsible for the disappearance of striped hyaena and Indian fox from the MMR. Similarly, poaching and hunting may have also driven the *chowsingha* and *nilgai* from this region. While poaching does continue on a smaller scale, which we also documented during our

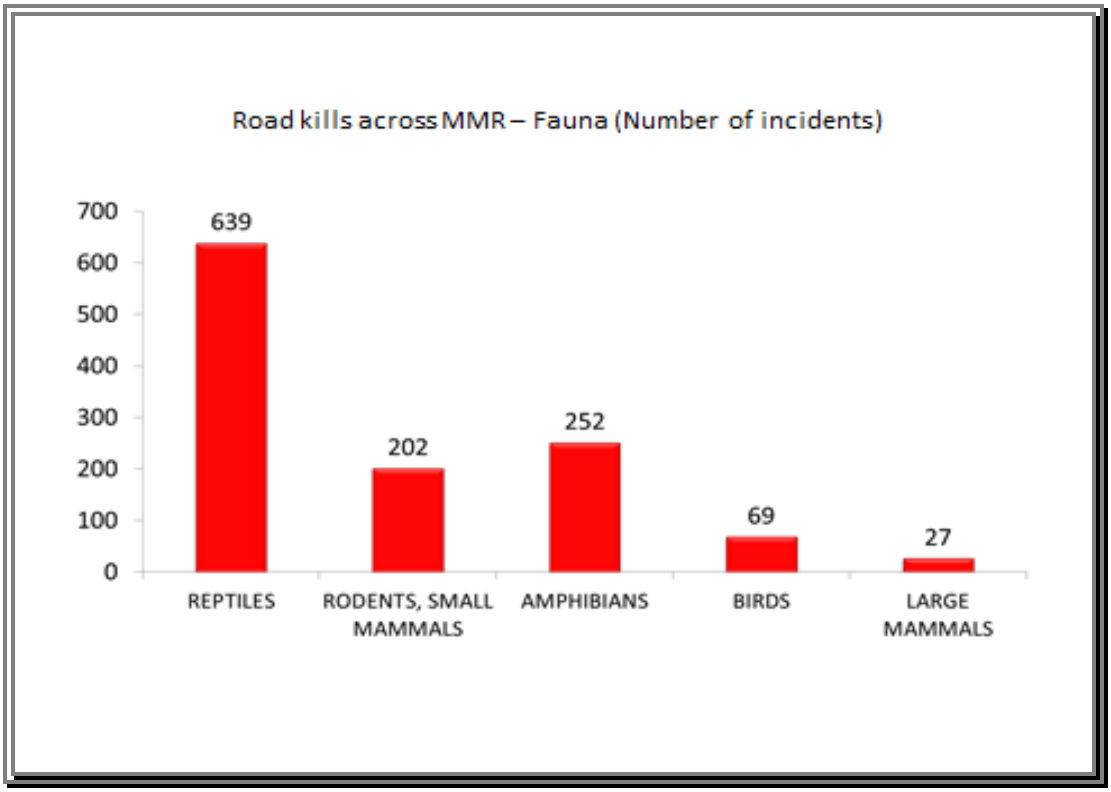
interactions with local communities, it possibly does not function as major threat with a large number of alert, nature-conscious individuals, groups, journalists et Similarly, cultural change has eroded several superstitions and myths as different communities have integrated into urban lifestyles.

Road-kills, Electrocution

A far more serious threat to biodiversity and to mammals and reptiles especially, comes from road kills. The high density of vehicular traffic in the region and with one of the highest growth rates in automobiles and road networks has had a serious impact on different species. In fact, observations and studies across several parts of the urban world show a high degree of mortality by road-kills of species of numerous taxonomic groups.

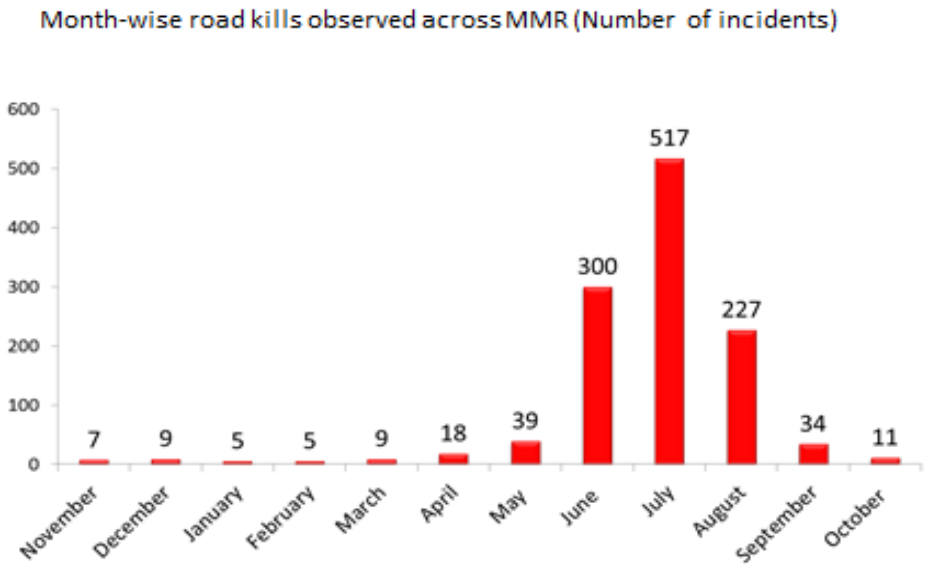
We do not have exhaustive data for the MMR and this issue has not been looked at seriously across India. However, Havlick (2004) reports that road kills are reported to be one of the five greatest threats to wildlife. Statistics for some of the US states reveal a grim picture:
65,451 deer in Michigan in 1997
43,002 deer in Pennsylvania, 30,306 deer in Ohio
More than 10,000 deer per year in Kansas. 102 Black bear in North Carolina in 2002
A one-year study of a two-mile length of U.S. Highway 441 (through Payne's Prairie State Park) in Florida, found a total of 3,356 dead animals: 1,291 snakes, 1,333 frogs, 374 turtles, 265 birds, 72 mammals, 29 alligators, 1 lizard. In Australia, an estimated 5.5 million reptiles die in road kills every year

Increasing speed of automobiles due to better paved roads, rash driving practices, increasing spread of roads and the delayed response time of many species to the powerful headlight makes our roads a killing arena. In the MMR, we found Road-kills to be a significantly important challenge as illustrated by the great number of incidents and casualties. This is corroborated by a recent study analysing leopard mortality due to vehicular collisions north of SGNP (Bijoor et al. 2013).



A seasonal influence was observed in road kills peaking during the monsoons months between June and August. During the course of the project fieldwork, more than 800 separate incidents of road kills were recorded across the MMR. This includes only the specimens that were actually found dead or badly mutilated along the roads. A sizeable number possibly scamper off after being hit and invariably die some distance from the road.

Over two seasons, reptiles and amphibians accounted for the most number of casualties amongst fauna, accounting for well over three-fourths of the total number of incidents.



Amongst mammals, out of a total of 153 recorded incidents, more than 80 % were species of rodents, though many of them could not be identified due to the mutilating impact of the collision. Of larger mammals, Indian jackal, black naped hare, small Indian civet, and Common Mongoose were found in road kills during the duration of the project. There were also incidents of leopards and sambar being hit north of SGNP.

The airborne mammals are no safer and face different hazards in the form of overhead transmission cables. These crisscross over every habitat, from forests, grasslands, scrublands and wetlands to built-up areas. While some of these serve as a possible perch, several species of bats, especially the largest bats of the region, the Indian flying fox often get electrocuted on such transmission cables. Three such incidents were during field work for this project.

To conclude, the overall status for mammals in the MMR is rather grim. Except for about 10 of the smaller mammals, comprising entirely of rodent and bat species, the others remain highly vulnerable to the growth of urban sprawls. Their presence may well persist only in the the Protected Areas in the MMR and the fragmented forested areas.

MMR Mammals Inventory

Family, Species & Latin Name	Local Name	Local Status	For	G-S-A	WL-FW	WL-C,Br	Urban	Hilly > 250 mt
FELIDAE - CATS								
Common Leopard *Panthera pardus*	Tendua, Biblya Wagh	FC - SGNP UC - Other	X	X			X	X
Rusty-spotted Cat # *Prionailurus rubiginosus*		S	X					X
Jungle Cat *Felis chaus*	Jangli Billi, Baul	UC	X	X		X	X	X
VIVERRIDAE								
Small Indian Civet *Viverricula indica*	Kasturi, Ud Manjar	UC	X	X				X
Common Palm Civet OR Toddy Cat *Paradoxurus hermaphroditus*	Khatas, Tapkiri Ud Manjar	UC	X	X				X
CANIDAE								
Jackal *Canis aureus*	Gidar, Kolha	UC	X	X		X	X	X
HYAENIDAE								
Striped Hyena # *Hyaena hyaena*	Lakkad Bagga, Taras	S?/Ex?	X	X				
Fox #	Lomri, Kokri	Ex?		X				
CERVIDAE								
Sambar *Cervus unicolor*	Sambar, Sambar	UC	X					X
Spotted Deer *Axis axis*	Cheetal, Cheetal	FC	X	X				X
Barking Deer OR Muntjac *Muntiacus muntjak*	Kakar, Bhekar	UC	X					X

TRAGULIDAE								
Mouse Deer # *Moschiola meminna*	Pisura, Pisori Haran	S	X					
BOVIDAE								
Chousingha or Four-horned Antelope # *Tetracerus quadricornis*	Chowsingha, Chowsingha	Ex	X					
Nilgai # *Boselaphus tragocamelus*	Nilgai, Rohu	Ex	X	X				
CERCOPITHECIDAE								
Western Hanuman Langur *Semnopithecus achates*	Hanuman Langur Hanuman Langur	FC	X					X
Bonnet Macaque *Macaca radiata*	Bandar, Lak Makad	C	X	X			X	X
Indian Rhesus Macaque *Macaca mulatta*	Bandar, Makad	S	X					
HERPESTIDAE								
Common or Grey Mongoose *Herpestes edwardsii*	Newala, Mungoos	UC	X	X		X	X	X
Ruddy Mongoose # *Herpestes smithii*		S?/UC?	X					X
MANIDAE								
Indian Pangolin # *Manis crassicaudata*	Bajra Keet, Khavlya Manjar	S	X	X				
LEPORIDAE								
Indian OR Black-naped Hare *Lepus nigricollis*	Kharghosh, Ran Sassa	FC	X	X		X		X
SUIDAE								
Wild Boar OR Wild Pig *Sus scrofa*	Jungli Suar, Ran Dukkar	UC	X	X		X		X

RODENTS (RODENTIA) - 22								
SCIURIDAE								
Jungle-striped Squirrel *Funambulus tristriatus (Waterhouse)* **Three-striped Palm Squirrel** *Funambulus palmarum*	Gilehri, Khadi Khar	S	X					X
Five-striped Northern Palm Squirrel *Funambulus pennantii* Wroughton	Gilehri, Khadi Khar	C	X	X		X	X	X
Indian Giant Squirrel *Ratufa indica (Erxleben)*	Karat, Shekra/Shekru	S	X					X
Common Giant Flying Squirrel # *Petaurista philippensis (Elliot)*		S	X					
MURIDAE								
Indian Gerbil or Antelope Rat *Tatera indica (Hardwicke)*		S/UC	X	X				
Long-tailed Tree Mouse *Vandeleuria oleracea (Bennet)*		UC?/S?	X	X				
House Rat or Roof Rat *Rattus rattus rufescence (Gray)*	Chooha, Undir	C		X			X	
White Bellied Rat *Rattus rattus wroughtoni (Hinton)*		FC		X		X	X	
European Black Rat *Rattus rattus rattus (Linnaeus)*		FC					X	
Norvey Rat *Rattus norvegicus (Berkenhout)*		FC					X	
Blanford Rat *Madromys blanfordi (Thomas)*		UC/S	X	X				X
Soft - furred Metad *Millardia meltada (Gray)*		UC	X	X				
Common House Mouse *Mus musculus castaneus (Waterhouse)*	Chooha, Undir	C		X			X	
Little Indian Field Mouse *Mus booduga (Gray)*		UC	X	X	X			

Indian Brown Spiny Mouse *Mus platythrix (Bennet)*		UC	X	X				X
Elliot's Spiny Mouse # *Mus saxicola (Elliot)*		S?	X	X				
Indian Bush Rat # *Golunda ellioti (Gray)*		S?/UC?	X	X				
Lesser Bandicoot Rat *Bandicota bengalensis (Gray and Hardwicke)*		FC		X	X	X	X	
Large Bandicoot Rat *Bandicota indica indica (Bechstein)*		FC		X			X	
Large Bandicoot Rat *Bandicota indica malabarica (Shaw)*		FC		X	X		X	
Large Bandicoot Rat *Bandicota maxima* Pradhan et. Al.		FC		X			X	
HYSTRICIDAE								
Indian Crested Porcupine # *Hystrix indica Kerr*	Sayal, Sheval	S	X	X				
SORICIDAE								
Common House Shrew *Suncus murinus murinus* Linn.		UC		X	X		X	
Savi's Pygmy Shrew # *Suncus estruscus* Savi		S?	X	X				
Anderson's Shrew # *Suncus stoliczkanus* Anderson		S?	X	X				
Madras Tree Shrew *Anathana ellioti ellioti* Waterhouse		UC	X	X				X
BATS - CHIROPTERA)								
PTEROPODIDAE								
Indian Flying Fox *Pteropus giganteus (Brunnich)*	Chamgadar, Vat Vaghul	C	X	X	X	X	X	X
Indian Fulvus Fruit Bat *Rousettus leschenaulti (Desmarest)*		FC	X					X

Lesser Dog-faced Fruit Bat *Cynopterus sphinx (Vahl)*		FC	X	X	X		X	
RHINOLOPHIDAE								
Woolly (Bedomme's) Horseshoe Bat *Rhinolophus beddomei (Andersen)*		??						
Blyth's Horseshoe Bat *Rhinolophus lepidus (Blyth)*		S	X	X				
Rufous Horseshoe Bat *Rhinolophus rouxii (Temminck)*		S	X					
HIPPOSIDERIDAE								
Anderson's Leaf-nosed Bat # *Hipposideros pomona gentilis (Andersen)*		??						
Dusky Leaf-nosed Bat # *Hipposideros ater (Templeton)*		??						
Fulvus Leaf-nosed Bat *Hipposideros fulvus (Gray)*		S	X					
Cantor's Leaf-nosed Bat # *Hipposideros galeritus brachyotis (Dobson)*		??						
Schneider's Leaf-nosed Bat *Hipposideros speoris (Schneider)*		S	X					
MEGADERMATIDAE								
Lesser False Vampire Bat *Megaderma spasma horsfieldi (Blyth)*		S/UC	X					
Greater False Vampire Bat *Megaderma lyra (Geoffroy)*		UC/S	X	X				
RHINOPOMATIDAE								
Greater Mouse-tailed Bat # *Rhinopoma microphyllum kinneari (Wroughton)*		??						

EMBALLONURIDAE								
Black-bearded Tomb Bat *Taphozous melanopogon (Temminck)*		S	X					
Long winged Tomb Bat *Taphozous longimanus (Hardwicke)*		S	X					
Naked-rumped Pouched Bat # *Saccolaimus saccolaimus crassus (Blyth)*		??						
VESPERTILIONIDAE								
Tickell's Bat # *Hesperoptenus tickelli (Blyth)*		??						
Lesser Asiatic Yellow House Bat # *Scotophilus kuhlii (Leach)*		??						
Greater Asiatic Yellow House Bat # *Scotophilus heathii (Horsfield)*		S?/UC?	X	X				
Kelaart's Pipistrelle *Pipistrellus ceylonicus indicus (Dobson)*		??						
Indian Pipistrelle *Pipistrellus coromandra (Gray)*		C	X	X			X	X
Indian Pygmy (Least) Pipistrelle # *Pipistrellus tenuis mimus (Wroughton)*		??						
Dormer's Bat # *Scotozous dormeri (Dobson)*		??						
Horsfield's Myotis *Myotis horsfieldii peshwa (Thomas)*		S/UC	X					
Painted Bat *Kerivoula picta (Pallas)*		S/UC	X	X			X	

MAMMALS - MUMBAI REGION – INVENTORY & COMMENTS

An overview based on field observations and secondary data

1. A total of 71 species of mammals have been recorded and collated for the MMR region. A majority of these (49) comprise of bats and rodents. The break-up of species composition is seen in Table/Chart …… This exhaustive section includes current (primary) data and information from past records.
2. Primary data is based on actual encounters, calls, scats and tracks
3. Data for some species have been collated based on secondary data, especially for bats and rodents species that are often difficult to identify in the field.
4. Some rare reports include confirmed records of **Ruddy Mongoose** (*Herpestes smithii* Gray) in camera traps installed by the forest department in Sanjay Gandhi National Park, Borivali.
5. From the percentage sightings during Field visits in all the phases of the Project fieldwork, as also based on reports, personal interactions and analysis of all current collections and popular and unpublished authentic work**,** we can get an idea of present-day population shifts (especially in the larger mammal species) distribution in the MMR in response to habitat and land use change, and in some cases these have been compared to past distribution patterns.

Abbreviations explained:

SGNP - Sanjay Gandhi National Park

TWLS – Tungareshwar Wildlife Sanctuary

KBS – Karnala Bird Sanctuary

PA – Protected Area (collectively also for the above three protected sites)

SCANDENTIA : TUPAIIDAE

MADRAS TREE SHREW *Anathana ellioti ellioti* (Waterhouse)

05 encounters during Project Fieldwork. Seems to prefer forested tracts, especially in hilly areas. Status unclear.

PRIMATES : CERCOPITHECIDAE

WESTERN HANUMAN LANGUR *Semnopithecus achates* (Dufresne)

50 encounters during Project Fieldwork, over two-thirds in SGNP. Species appears most common in SGNP but more shy and vulnerable elsewhere. It is mostly restricted to the Protected Areas in the MMR but occasionally emerges outside, into and around habitation. Troops of up to a dozen animals seen in SGNP, usually by itself, seldom in association with Bonnet Macaque.

BONNET MACAQUE *Macaca radiata* (E. Geoffroy)

60 encounters during Project Fieldwork. Common in SGNP, Matheran, Elephanta Island and KBS. Uncommon in TWLS. Most widespread primate in the MMR. Evidently released on Elephanta Island during 1930s-1940s.

RHESUS MACAQUE *Macaca mulatta* (Zimmermann)

11 encounters during Project Fieldwork. Mostly seen in SGNP and KBS. 01 specimen seen on Elephanta Island.

The common primate of North India, this species is not native to the MMR and this part of India. This species is reported to naturally occur north of the Godavari river which forms the dividing line between this and the bonnet macaque. Evidently the rhesus only established in region upon release of a few hundred animals during the 1930s – 40s, when a consignment was to be shipped overseas for research. Was more conspicuous up to the late-1990s but numbers appear to be diminishing since, evidently unable to cope with the commoner Bonnet Macaque and the more dominating Common Langur. We have noticed a marked decline of the species in the region over Phase 2 fieldwork, during 2011- 12, and it may be possible that the species has been slowly dying out in a region where it had been introduced years ago.

RODENTS (RODENTIA)

SCIURIDAE

JUNGLE STRIPED SQUIRREL *Funambulus tristriatus* (Waterhouse)

Has been sighted in forest in SGNP & TWLS in the study area. Unconfirmed sighting in Matheran Range.

During project fieldwork there have also been 02 recent possible sightings (September, 2012) of **Three-striped Palm Squirrel** (*Funambulus palmarum*) in edge of forest localities in

Borivli and Thane. The occurrence of this species in SGNP and elsewhere in MMR needs a more detail investigation.

FIVE-STRIPED NORTHERN PALM SQUIRREL *Funambulus pennantii* Wroughton
The common squirrel of the MMR. Seen in every urban locality and sporadically also present in forest and edge of forest tracts, as also in tree-dotted grass/scrub and agriculture country. Its shrill and loud calls are the most audible mammal calls in the MMR.

INDIAN GIANT SQUIRREL *Ratufa indica* (Erxleben)
02 encounters during Project Fieldwork, in TWLS (2010 and Matheran Hills (2012).
The MMR is reportedly the northern limit or just out of distributional range of this species. Difficult to ascertain if it were sightings of wild-living animals or captive specimens released into the wild. We have got reports of a sighting from TWLS where at least 02 animals having been released in TWLS (*pers comments, local*). However, the species is distributed throughout the Western Ghats and is known to occur in the Matheran – Bhimashankar belt.

COMMON GIANT FLYING SQUIRREL *Petaurista philippensis* (Elliot)
No Encounter during Project Fieldwork.
However, there is one report of the species from TWLS (Awsare, 2008). It has been sporadically reported by some forest staff from Karjat – Khopoli.

MURIDAE

INDIAN GERBIL or ANTELOPE RAT *Tatera indica* (Hardwicke)
Total 05 encounters during Project Fieldwork, mostly from the Alibaug – Khopoli area and once from the fringes of TWLS. Not sighted during Phase 2 of the project (2011-12). Present status unknown and not reported during 2012 surveys.

LONG-TAILED TREE MOUSE *Vandeleuria oleracea* (Bennett)
06 confirmed and 01 doubtful encounters during project fieldwork, from TWLS, Kalyan – Ambernath, SGNP and Alibaug. Status unclear.

HOUSE RAT or ROOF RAT *Rattus rattus rufescence* (Gray)
BOTH, *Rattus rattus* and *R. norvegicus* are common in built up/inhabited and adjacent areas throughout MMR

WHITE BELLIED RAT *Rattus rattus wroughtoni* (Hinton)

EUROPEAN BLACK RAT *Rattus rattus rattus* (Linnaeus)

NORWAY RAT *Rattus norvegicus* (Berkenhout)

BLANFORD RAT *Madromys blanfordi* (Thomas)

Total 03 encounters during Project Fieldwork, from in/around TWLS and SGNP

SOFT - FURRED METAD *Millardia meltada* (Gray)

02 definite encounters during Project Fieldwork & 01 doubtful from TWLS. Reported from Alibaug and Chirner.

COMMON HOUSE MOUSE *Mus musculus castaneus* (Waterhouse)

Came across the species intermittently in Mumbai and Thane, Kalyan and Panvel urban areas, and a few from some other sites. It appears to be much less common overall than *Rattus rattus*.

LITTLE INDIAN FIELD MOUSE *Mus booduga* (Gray)

08 encounters during Project Fieldwork, mostly from Alibaug - Chirner – Khopoli area and Aarey - SGNP.

Seems to prefer cultivated tracts towards forest edge, margins of urban areas. Evidently, may be commoner than the sighting frequency may indicate.

INDIAN BROWN SPINY MOUSE *Mus platythrix* (Bennet)

02 confirmed sightings and as many doubtful reports during project fieldwork, chiefly from the Matheran foothills and Alibaug Hills. Unconfirmed sighting from SGNP Yeur side

ELLIOT'S SPINY MOUSE *Mus saxicola* (Elliot)

No Encounter during Project Fieldwork.

INDIAN BUSH RAT *Golunda ellioti* (Gray)

02 Unconfirmed encounters from near Khopoli – Pen and around Chirner.

LESSER BANDICOOT RAT *Bandicota bengalensis* (Gray)

Many encounters throughout MMR, but seems commoner in Greater Mumbai, Thane urban and some of the other urban areas. Uncommon in agricultural areas.

LARGE BANDICOOT RAT *Bandicota indica indica* (Bechstein)

LARGE BANDICOOT RAT *Bandicota indica malabarica* (Shaw)

Seems more widespread in opener built-up localities, clearings et

LARGE BANDICOOT RAT *Bandicota maxima* Pradhan et al.

HYSTRICIDAE

INDIAN CRESTED PORCUPINE *Hystrix indica* Kerr

No live specimen seen during Project Fieldwork but several instances of quills located. Sightings during 1993, 1994 (Geetanjali Tiwari, Vijay Awsare). The species is much persecuted in the MMR and seems to have declined much in recent years, when even quills are rarely come across (various pers obs).

LAGOMORPHA : LEPORIDAE

INDIAN OR BLACK-NAPED HARE *Lepus nigricollis* (F. Cuvier)

18 Encounters during Project Fieldwork, many in SGNP. Seen in all other PAs, Khargarh Hills, Alibaug area, elsewhere. Widespread in MMR, where mostly restricted to open grassy and scrubby terrain, including hill-top plateaus. Presence in any locality often revealed by droppings strewn about. According to various observers, species seems to have declined much in the region in recent years.

SORICOMORPHA : SORICIDAE

COMMON HOUSE SHREW *Suncus murinus* (Linnaeus) (SYN – *S. caeruleus*)

Many encounters in MMR, especially in suburban built-up localities, sewers. Also seen in many edge of built-up areas as also occasionally in scrub/agricultural tracts. Appears to come in conflict with House Mouse (Mus musculus) in several localities.

SAVI'S PYGMY SHREW *Suncus etruscus* **(**Savi)

Did not come across this species during project fieldwork. A few specimens have been collected from Raigad distrct by ZSI survey parties in nineties.

ANDERSON'S SHREW *Suncus stoliczkanus* **(**Anderson)

Did not come across this species during project fieldwork

CHIROPTERA (BATS)

PTEROPODIDAE

INDIAN FLYING FOX *Pteropus giganteus (Brunnich)*

Most visible and common bat in the MMR. See Detail Note on species (pg ….) along with Table (…. …) listing all roost colonies that were encountered across MMR. It was observed that while trees of *Ficus* species and Mast Ashoka (*Polyalthia longifolia*) were the principal tree species on whose fruits this enormous bat feeds, this bat was also seen to prefer several other trees in fruit. Guava, mango, banana, Kadamba, etc

Note: A recent survey of their feeding habits indicates that the three common fruit bats alone aid in the pollination and seed dispersal of more than 114 species of plants. Many of these are of great economic, ecological, medicinal, and even religious importance. Essential wild varieties of bananas, guavas, and other fruits are dependent on bats to maintain natural populations. Fig trees are such favorites of fruit bats that one can often see a carpet of "spats," or chewed fruits, on the ground near the trees. Such ecologically important trees are considered keystone species because numerous animals utilize them as a resource

INDIAN FULVUS FRUIT BAT *Rousettus leschenaultii* (Desmarest)

Widespread species, seen in many localities. Until 2008 there was a sizeable roosting population at Kanheri Caves but is now much diminished. Sporadically in urban areas.

GREATER NOSED FRUIT BAT *Cynopterus sphinx (Vahl)*

Common throughout the MMR. Based on sighting frequency, this may be the commoner of the two species of smaller fruit-bats in the MMR. Seen roosting in many sites in built-up urban areas across the MMR.

All these Fruit-bats benefit from the variety of fruiting trees that have been planted over a long time and their sightings and numbers are in direct proportion to the abundance and

fruiting seasons of their principal food plants (Guava, custard-apple, bananas, Mast Ashoka, Ficus species). Additionally the two smaller fruit-bats also feed on fallen fruit.

RHINOLOPHIDAE

WOOLLY (BEDOMME'S) HORSESHOE BAT *Rhinolophus beddomei (Andersen)*

Doubtful sighting of a few specimens disturbed at roost in Korlai Fort (though exact site is just outside the MMR limit)

BLYTH'S HORSESHOE BAT *Rhinolophus lepidus* (Blyth)

Reported Alibaug fort, Elephant and Kanheri caves. However, no confirmation or any photographic record available during fieldwork. An easily overlooked species.

RUFOUS HORSESHOE BAT *Rhinolophus rouxii* (Temminck)

02 reports, one confirmed from a dead specimen, both from Kanheri Caves, in SGNP. Has been previously reported from several sites in the MMR

HIPPOSIDERIDAE

ANDERSON'S LEAF-NOSED BAT *Hipposideros pomona gentilis (Andersen)*

Did not come across this species during project fieldwork

DUSKY LEAF-NOSED BAT *Hipposideros ater* (Templeton)

Did not come across this species during project fieldwork

FULVUS LEAF-NOSED BAT *Hipposideros fulvus* (Gray)

02 reports during project fieldwork, both sightings in caves at Elephant Island. The species seems restricted to just a few sites.

CANTOR'S LEAF-NOSED BAT *Hipposideros galeritus brachyotis* (Dobson)

Did not come across this species during project fieldwork

SCHNEIDER'S LEAF-NOSED BAT *Hipposideros speoris* (Schneider)

One confirmed sighting/report from Elephant Island when three animals spotted in Cave 3.

MEGADERMATIDAE

LESSER FALSE VAMPIRE BAT *Megaderma spasma horsfieldii* (Blyth)

02 sightings during fieldwork. Sighted/photographed in Kanheri Caves and along Tunnel Trail, both in SGNP.

GREATER FALSE VAMPIRE BAT *Megaderma lyra* (E Geoffroy)

13 sightings/reports during project fieldwork, majority (11) in SGNP (Kanheri Caves, Tunnel Trail), and 01 each in Elephanta Caves and Bassein Fort. However, species seems to have declined much extent over past few years. Most sightings were during Phase 1 during 2010.

RHINOPOMATIDAE

GREATER MOUSE-TAILED BAT *Rhinopoma microphyllum kinneari* (Wroughton)

Did not come across this species during project fieldwork

EMBALLONURIDAE

BLACK-BEARDED TOMB BAT *Taphozous melanopogon* (Temminck)

06 sightings/reports during fieldwork. All in SGNP (in Kanheri Caves). Most (05) of these were during Phase 1, in 2010.

LONG-WINGED TOMB BAT *Taphozous longimanus* (Hardwicke)

04 sightings/reports during fieldwork. However, 02 of these remain unconfirmed. Reported in Elephanta Caves, Bassein Fort and a possible dead specimen found in a disused quarry.

NAKED-RUMPED POUCHED BAT *Saccolaimus saccolaimus crassus* (Blyth)

Did not come across this species during project fieldwork

VESPERTILIONIDAE

TICKELL'S BAT *Hesperoptenus tickelli* (Blyth)

Did not come across this species during project fieldwork

LESSER ASIATIC YELLOW HOUSE BAT *Scotophilus kuhlii* (Leach)

Did not come across this species during project fieldwork

GREATER ASIATIC YELLOW HOUSE BAT *Scotophilus heathii* (Horsfield)

03 reports during fieldwork. 01 remains unconfirmed. A possible specimen seen in an old ruin at Marve – Madh. 02 sightings/reports from Elephanta.

KELAART'S PIPISTRELLE *Pipistrellus ceylonicus indicus* (Dobson)

Did not come across this species during project fieldwork

INDIAN PIPISTRELLE *Pipistrellus coromandra* (Gray)

Widespread and common. Sighted in most urban areas within MMR. Roosts in buildings, structures as well as in trees.

INDIAN PYGMY PIPISTRELLE *Pipistrellus tenuis mimus* (Wroughton)

Did not come across this species during Project Fieldwork. There is much ambiguity as regards field identification of this tiny bat and we have no confirmed report/sighting.

DORMER'S BAT *Scotozous dormeri* (Dobson)

No confirmed identification during project fieldwork

HORSFIELD'S MYOTIS *Myotis horsfieldii peshwa* (Thomas)

01 definite sighting on Elephant Island. There are also a couple of unconfirmed reports, also from Elephanta Island.

PAINTED BAT *Kerivoula picta* (Pallas)

05 sightings/reports during fieldwork, 01 remains unconfirmed. Most of the sightings/reports from areas at base of TWLS, and elsewhere in Vasai – Virar belt. There is also one report from near Chirner. The species has been previously reported from Greater Mumbai proper but we have not come across it during past two years.

PHOLIDOTA : MANIDAE

INDIAN PANGOLIN *Manis crassicaudata* (E. Geoffroy)

No Encounter during project fieldwork.
However, sighting reported towards southern fringes of SGNP by Deepak Apte & Vijay Awsare (1993 - 94). Also reported by Geetanjali Tiwari, SGNP (1993). Reported Matheran and other hill plateaus. No other report of the species from the region.

CARNIVORA : FELIDAE

JUNGLE CAT *Felis chaus* (Schreber)

Total 10 encounters during fieldwork, half of these in Greater Mumbai limits.
Species seems to avoid forested tracts and prefers open, edge-of-forest and agriculture/scrub towards the central areas of the MMR, and the coastal fringes of mangrove creeks towards the western areas of the MMR. This feature is observed also in several other mammals, including Grey Mongoose and Jackal, besides a few rodent species.

RUSTY-SPOTTED CAT *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire)

Not Reported in the MMR during project fieldwork. Known to occur in region, including reported from SGNP where a specimen had been trapped during early 2000s. Highly elusive small predator, not reported in camera traps in SGNP.
Sighted by V. Shubhalaxmi, Deepak Apte & Vijay Awsare (1996) towards southern fringes of SGNP.
Sighted by Dr. M. S. Pradhan and Shri. K. A. Shaikh Tansa wildlife sanctuary in nineties.

COMMON LEOPARD *Panthera pardus* (Linnaeus)

Total 32 Encounters during project fieldwork.
In Zone 1: 17 encounters in SGNP and 07 in Aarey Colony area
In Zone 2: 07 encounters in and around Tungareshwar Wildlife Sanctuary (TWLS)
In Zone 3: 01 encounter in Karnala Sanctuary
07 field sightings during day and/or night visits
On 16 occasions, scats ranging from a few hours to up to 5 – 6 days old, indicated signs of presence.
On 11 occasions, fresh pug-mark revealed signs of presence, including with cubs on 03 occasions in SGNP.

Nearly 2/3rd of the number of encounters were in and immediately around the SGNP. Based on interaction with local residents/forest officials and other observers, the Leopard is present in Matheran Range and possibly sporadically in the Karjat area, especially along the eastern fringes of the MMR, at the base of the Sahyadri Hills. Almost invariably, across the MMR, the Leopard's principal prey appears to be pariah dog, with a smaller amount of domestic hen and goat. Wild prey species form a much smaller part of the Leopard's diet, perhaps around 20 – 30% and include Hanuman Langur, Black-naped Hare, Wild Boar and Spotted Deer). It has also been observed trying to hunt large land crabs and bull-frogs in SGNP.

VIVERRIDAE

COMMON PALM CIVET or TODDY CAT *Paradoxurus hermaphroditus* (Pallas)

Total 03 encounters during project fieldwork

All 03 encounters (visual or scats/pug marks) were in TWLS, at altitude of over 400 mt. The species has been reported in camera traps in SGNP where it has been sighted on a few occasions in the past. This appears to be a less common species than the Small Indian Civet in the MMR.

SMALL INDIAN CIVET *Viverricula indica* (E. Geoffroy Saint-Hilaire)

Total 05 encounters during project fieldwork

Thrice in upper Tungareshwar (TWLS) and 02 in SGNP

A widespread species in MMR. Known to also occur in the forested and hilly tracts throughout MMR, including Alibaug, Karnala, Chirner Hills, Khopoli – Karjat, Matheran Range, Khargarh Hills

Species has been reported in camera traps in SGNP.

HERPESTIDAE

COMMON INDIAN MONGOOSE *Herpestes edwardsii* (Geoffroy)

Total 33 encounters during project fieldwork

Only 03 in SGNP or any forest habitat. Nearly all other encounters in open grass/scrub and creek-edge habitats, including up to 600 mt altitude in several hill ranges. The common mongoose of the region; however, based on personal observations (SM, VA, others) the

species seems to have declined much over the past decade, with large-scale development in such habitats taking a heavy toll.

RUDDY MONGOOSE *Herpestes smithii* (Gray)

No Encounter during project fieldwork.

However, sighting reported towards southern fringes of SGNP by Geetanjali Tiwari & Vijay Awsare (*during reptile survey, 1993*).

At least 02 records in camera traps during recent work in SGNP (2012). The MMR might well be the northernmost limit of the distribution range of the species along the west coast.

HYAENIDAE

STRIPED HYENA *Hyaena hyaena* (Linnaeus)

Not reported in the MMR during project fieldwork. Reportedly uncommon unil the late-1970s in open grass and scrub terrain, including along the margins of creeks and around village habitation. (SM, other pers obs). Seems to have become locally extinct and disappeared from much of the MMR since the mid-1980s. The last confirmed presence of the species in the region was coming across of 02 dead specimens, both having been shot dead on the grounds of Film City, Goregaon, sometime in the late-1980s (*photograph attached*).

CANIDAE

GOLDEN JACKAL *Canis aureus* (Linnaeus)

Total 13 encounters during project fieldwork.

11 were sightings of solitary or more animals, including cubs on one occasion.

The species avoids forested tracts and has more or less adapted to living on the margins of mangrove creeks, in grass and scrub terrain. It appears to be quite common alongside the eastern margins of Malad Creek in Greater Mumbai, and is likewise present along most other creeks throughout the MMR. It has also been seen on the southern margins of SGNP, trying to catch frogs and crabs. It thrives as a scavenger but also hunts small prey.

INDIAN FOX *Vulpes bengalensis* (Shaw)

Not reported in the MMR during project fieldwork.Reportedly widespread until the earlier half of the 20th Century, the species was intermittently seen along the creek margins and

around village habitation up to the early 1970s (SM, other pers obs). Seems become locally extinct and disappeared from the MMR since the mid-1970s. Several recent mistaken reports of Fox have proven to be of Jackal.

ARTIODACTYLA

SUIDAE

WILD BOAR OR WILD PIG *Sus scrofa* (Linnaeus)

Total 18 encounters during project fieldwork, more than half of these in the SGNP – Aarey environs. Has also been seen TWLS, KBS, Alibaug area, Matheran.

Widespread across the MMR where numbers seem to have increased in recent years. Prefers a variety of habitats, from forest to grass/scrub and in recent years has also adapted to mangrove creek and creed-edge habitats, as observed along Thane Creek.

TRAGULIDAE

MOUSE DEER *Moschiola meminna* (Erxleben)

Not reported in the MMR during project fieldwork.

The species has been previously reported in SGNP, TWLS and KBS (VA, SM) but has not been sighted or any signs of presence encountered since May 2003. Has been seen more often in Phansad WLS, south of the MMR.

CERVIDAE

SPOTTED DEER *Axis axis* (Erxleben)

Total 27 encounters during project fieldwork, all except one of these in SGNP.

Almost entirely restricted to the Protected Areas in the MMR.

India's most widespread deer is commonest in the protected environs of the SGNP (Zone 1). Herds of up to 40 animals have been sighted here, and the species is regularly sighted along the open margins of Vihar Lake and a large herd regularly visits the environs of the Forest RH at Borivli. It is a lowland living species here, seldom ascending higher in the hills. Small populations of this deer have been periodically released in SGNP during the mid-1980s up to late-1990s.

BARKING DEER or MUNTJAC *Muntiacus muntjak* (Zimmermann)

Total 16 encounters during project fieldwork, all except three of these in SGNP. Has also been seen in TWLS and in the Karjat – Barvi – Bhivpuri area.

Almost entirely restricted to the Protected Areas in the MMR.

This elusive, forest-dwelling, small ungulate appears more widespread in the protected central sprawl of SGNP than elsehwere in the MMR. Reported presence also indicated in KBS and Alibaug area though no direct visible evidence encountered during Project surveys. According to pers. observations, the species is also locally present on the Matheran Range where reportedly it suffers from poaching pressure. Except for one occasion when a pair was around, on all other occasions only a solitary animal seen.

SAMBAR *Rusa unicolor* (Kerr)

Total 11 encounters during project fieldwork, more than half of these in SGNP, thrice in TWLS and once in KBS.

Avoiding the lowland forest, this species prefers rugged, hillier terrain. In th MMR, the protected environs of SGNP appear to be its stronghold, small numbers of this species also having been released here during the 1990s. Sightings or signs of presence (hoof-prints, droppings, calls) were also observed in TWLS and KBS.

BOVIDAE

NILGAI *Boselaphus tragocamelus* (Pallas)

Not reported in the MMR during project fieldwork.

Last confirmed sighting of species in region was from SGNP in late-1980s and from Karjat – Khopoli area around the same period (all pers obs).

CHOWSINGHA or FOUR-HORNED ANTELOPE *Tetracerus quadricornis* (de Blainville)

Not reported in the MMR during project fieldwork.

Sighted and photographed in the SGNP up to the mid-1990s. The last confirmed report was of a pair during 1997 and there has been no report of the species' occurence in SGNP or elsewhere in the MMR since.

HERPETOFAUNA

Herpetofauna refers to reptiles (lizards, snakes, turtles, crocodiles) and amphibians (frogs, toads, caecilians). This inventory report is the result of two phases of the MMR Biodiversity Project, and includes the use of primary and secondary data. This report covers includes the diversity of habitats that make up the MMR. The herpetofauna chapter is divided into separate sections for reptiles and amphibians,

REPTILES:

Reptiles, being Ectotherms/Poikilothermic, are more directly affected by variation in abiotic factors such as temperature (Shall & Pianka, 1978) and rainfall (Rogers 1976, Lee 1980). This necessitates different ecological and physiological strategies compared to other taxonomic groups. To attain required optimum body temperatures, reptiles are often dependent on the availability (and accessibility) of micro-habitats (Cunningham 1966, Vance 1973) and on humidity conditions (Cloudsley-Thompson 1971). Thus, unlike most other animals, the reptiles must divide or partition the 24 hour time (diel time) more effectively. Further, reptiles being largely terrestrial may often be bound to their immediate environment and even have smaller home ranges (Turner et al, 1969).

This limitation is most apparent in terrestrial reptiles and naturally extends into their ability to adapt to the slightest changes in their surroundings. One of the ways in which reptiles adapt to stresses in prey availability is through starvation (Toft 1985). This is especially true for the terrestrial reptiles that comprise the bulk of the reptilian diversity. In comparison the aquatic reptiles (sea-snakes, turtles) are far more mobile and appear to have a more robust capacity to adapt to various limiting factors including sunlight, temperature et

The average summer temperature over the MMR in summer varies between 30- 37^0c, while average winter temperature varies between 16- 22^0 The average annual precipitation is 2160 mm. Such weather conditions are conducive to reptilian survival and despite intensive urbanisation several species seem to have become modified in their ecological and perhaps even gained from new and additional habitats available, which includes various human-made structures and the many nooks and crannies that these changes have created

Literature on herpetofauna in the MMR:

By and large, suffice to say that reptiles have remained relatively little known in comparison to birds, mammals and flora, and a variety of reasons may have played a role in influencing thus. The few systematic studies on reptiles in India have been confined to surveys, with the Western Ghats and the Indian desert being intensively documented.

Unlike birds and mammals that have attracted much attention, there is hardly any major work or mention of reptiles before the 1900s, with Stoliczka (1872) perhaps being one of the first to formally observe and write about herpetofauna in Kutch and elsewhere in Gujarat. Daniel and Shull (1963) and Vyas (2003) have documented the herpetofauna from Gujarat. The Western Ghats is another among one of few Biogeographic Zones in India that has been surveyed extensively for herpetofauna. Amongst some of the works on Herpetofauna of the Western Ghats are Fraser (1937), McCann (1940), Daniel & Shull (1963), Tiwari & Sharma (1970), Inger et al (1987) and Murthy (1981 – 90). Even then, there are knowledge gaps in our understanding of the distribution and status of many reptiles.

The Mumbai region has attracted some attention with Prater (1925) being one of the earliest. There have been some scattered reports and records in the *Journal of the Bombay Natural History Society* and the Gazetteers. More recently, the areas has started to receive more attention from herpetologists. This MMR lies in the north Konkan, and flanks the northern part of the Western Ghats range. Several surveys, by institutions and individuals, have added to our information on the region's herpetofauna (Giri et al. 2003; Giri et al. 2004; Giri 2008; Giri & Bauer 2008).

While Tiwari & Sharma (1970) reported 42 species of reptiles from western Maharashtra (Kolaba, Pune, Satara), Geetanjali Tiwari's survey on Reptiles of SGNP (1994) reported 46 species from SGNP alone. This included 25 species of snakes and 18 of lizards. Kedar Bhide and Ashok Captain (2004-05) report 48 species of snakes in the Mumbai region, though this lists includes several species released over the past two decades, which have not been reported since. Zeeshan Mirza and Saunak Pal (2008) reported 62 species of reptiles from SGNP and adjoining sites, including Aarey and Powai, including 39 species of snakes and 19 species of lizards. A more detail exploration of Aarey-Powai and Film City environs, along

the southern fringes of SGNP yielded 47 species of reptiles (Zeeshan Mirza, Sunny Patil, Yogendra Satam and Kunal Ullalkar, 2009) while Rahulratan Chauhan and Hitesh Shingadia (2012) reported 22 species of reptiles from a mangrove belt along Manori creek in Borivali.

More recently, a reptile survey of Maharashtra Nature Park has reported 44 species belonging to 18 families (Nitin Walmiki et al, 2012, Vijay Awasare 2011). This showed how a restricted area in the midst of a highly polluted and congested urban belt is colonised by different species over time. However, it needs be reiterated that several of the species may have been released there, while a few may have established themselves. However, some like Russell's viper, checkered keelback, rat snake, Indian bull frog, garden lizard, brahminy skink and Indian flapshell terrapin may have been naturally occurring in the area, including the adjoining creek margins.

A herpetofaunal assessment of the Bassien fort and surrounding environs was conducted over a year, which found 42 species in this area, including 23 snake species and 11 of saurians, besides a species a terrapin and turtle (Walmiki et al 2013). Besides, 5 species of amphibians were also reported, illustrating the heterogeneity of this site with its mosaic of micro-habitats. A similar survey of a coastal habitat along the Manori creek, near Borivali revealed the occurrence of 22 species of reptiles and 5 species of amphibians (Chauhan & Shingadia, 2012). There are besides, several popular articles and reports add to the data on herpetofauna of the region.

This present report, as part of the exhaustive MMR Biodiversity Project, builds its inventory based on field research and a critical review of the existing literature on the herpetofaunal diversity of the MMR.

METHODOLOGY - Materials and Methods

As part of the MMR Biodiversity Project, the herpetofaunal surveys were carried out on foot in different seasons, at least once a week throughout the duration of the project, with several additional field visits at certain times of the year or as required for specific sites and taxa. The herpetofauna surveys were done during the two phases of the project, from Dec 2009 – June 2010, and from November 2011 – Nov 2012. Total 126 visits were made in the 18 months of

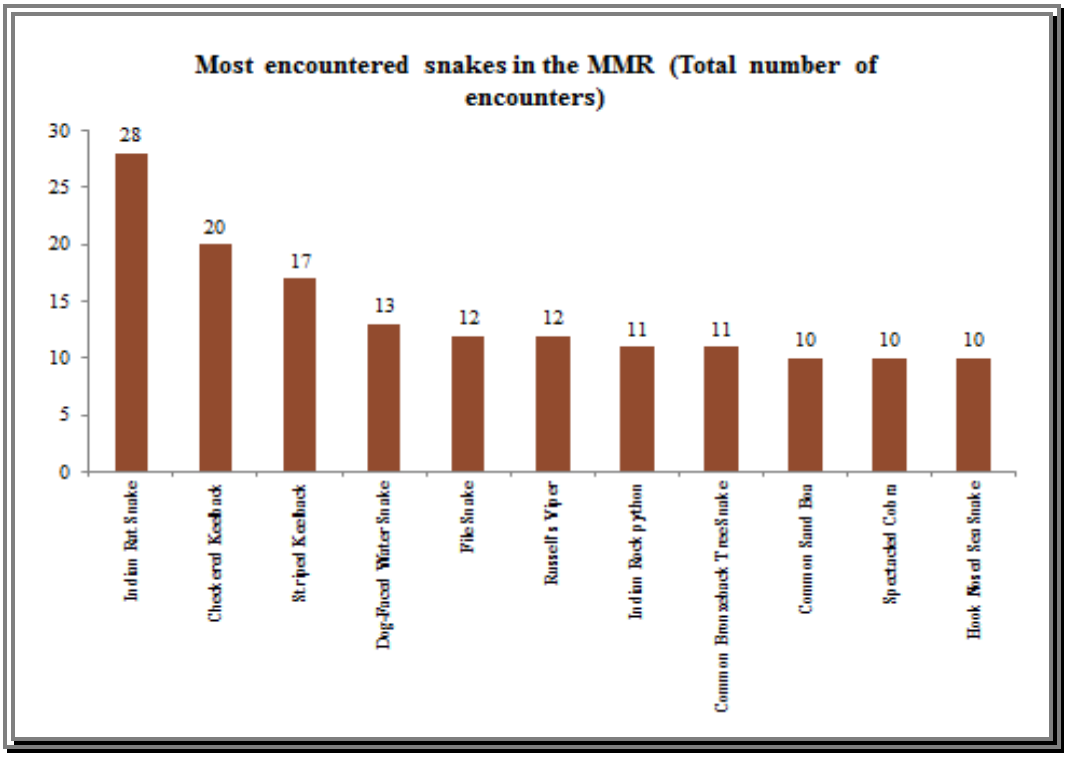
the project fieldwork. It must be reiterated that herpetofaunal observations were made, and data documented, by other members of the team during all other visits as well.

The survey was done with the help of visual encounter method (Champbell and Christman, 1982) employing randomised walk, carried out along with active searches in day and night. Known habitats of reptilian and amphibian were thoroughly searched i.e. all micro- habitats (rocks and boulders, dead and fallen logs, dense bushes and grass patches, rock and tree crevices, leaf litters and water bodies) were thoroughly checked using snake hooks and tongs, snake bags, measuring tape, fishing net, head torch, GPS, et Specimen were photographed and identified using literature and field guide (Smith 1935; Smith 1943; Whittaker & Captain 2004) (Ahmed, Das and Dutta 2009, Neelimkumar Khaire 2008). No specimens were trapped or hunted, while a few were handled when there were doubts over their identification, photographed and immediately released at the same location.

The results are based on the survey team's primary field observation, reliable oral information from a variety of sources including the observations and field notes of subject experts, records from various institutions and literature surveys. Abundance Index of species is gauged from the Encounter Frequency of species across different habitats and ecosystems though it must be stated that considering the cryptic and elusive nature of reptiles in particular, coupled with their silent existence, this is not always a highly reliable indicator yet does serve to give an idea vis-à-vis local status of species.

FINDINGS AND REPTILES ACROSS THE HABITAT TYPES

A total of 73 species of reptiles and 16 species of amphibians are reported (**Annexure** …….), and this is based on primary data collection and secondary data. The reptilian fauna of MMR as in this report comprises of 45 species of serpents belonging to 8 families, 19 species of saurian (lizards) of 7 families, 1 species of crocodile and 8 species of testudines (turtle, terrapin, tortoise) of 5 families as recorded in the study area, based on all primary data as well as available secondary data. This includes the red-eared slider, a species of terrapin that was introduced by hobbyists and private collectors and can today be sighted in some temple ponds and lakes in the MMR.



We did not come across any reports or signs of four species of snakes—ornate flying snake, king cobra, royal snake, Phippson's shieldtail, listed in snakes of the Mumbai region (Bhide & Captain, 2004- 05), that are reported have been released in the MMR over the years. Furthermore ,we did not find any recent evidence of the occurrence of three more snake species, red-lined shieldtail, Cantor's black-headed snake, Leithei's sand snake and of the Oriental leaf-toed gecko (Hemidactylus bowringi), of which there are reports of specimens having been collected from the Mumbai region (Tiwari, 1994). Accordingly these are not listed in the present inventory. In light of this it must be stated that, considering the fact that the Mumbai region has witnessed much unregulated release of species not native to the region or to the MMR, there is the possibility of some further reports of such and exotic species occurring or getting reported.

Based on the Project field surveys, interaction with local experts and locals and analysis of available literature, this project reports a total of 73 species of Herpetofauna in the MMR. This includes two new finds for the MMR, the black coral snake and the day gecko, both of which were found in Matheran.

This report is a result of intensified combing and contemporary interest in a rising band of herpetofauna enthusiasts. Incidentally, this also happens to be the highest reported herpetofaunal diversity amongst any metropolitan areas of the country that have been intensely surveyed. The location of the MMR, the influences of the Sahyadri and associated mountain ranges, the fertile Konkan plains and the varied coastal landscapes, the overall range of habitat types available, the climactic factors, and to some extent the ability of certain reptiles themselves to cope with the fallouts of human-impact have together contributed to the high herpetofaunal diversity in the MMR.

The MMR landscape has been broadly divided into the following major types of habitat; there are sub and micro-habitats amongst some of these categories and which are more pertinent and critical in the context of herpetofauna than perhaps for any other faunal taxa surveyed during this project. The broad-level classification comprises of:

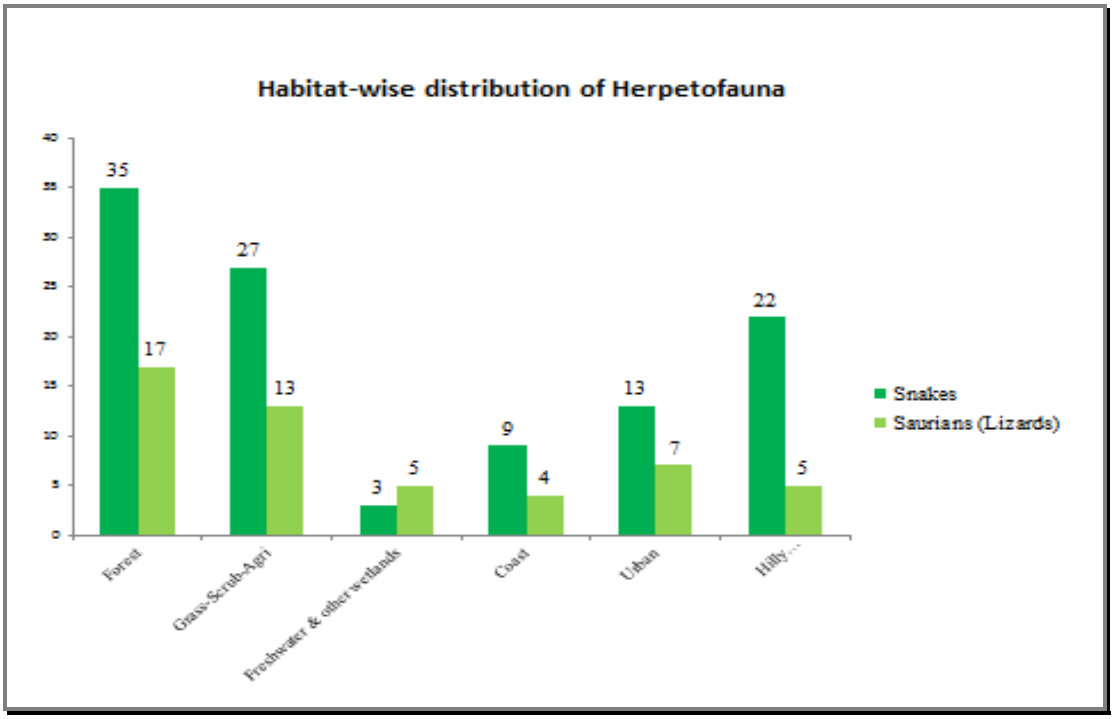
Forest

Grass & Scrub & Agriculture & Plantations

Coastal Wetlands (Creeks, Estuaries, others)

Freshwater Wetlands (Lakes, ponds, rivers)

Urban Parks/Gardens/Avenues & Human settlements and structures



These habitat types have been discussed in detail in the habitat chapter and here the habitat discussion focuses on its relevance to herpetofaunal diversity in the MMR.
The forest habitat across the MMR is dominated by the southern mixed-deciduous forest type (Champion & Seth, 1968), with a lesser extent of dry-deciduous, semi-evergreen and evergreen types of forest. A mix of these forest types are seen from the low-lands, from almost near the sea-level to the upper slopes of several of the Hill Ranges across the MMR. As also explained earlier, , in contemporary times, only the Forest types could be said to comprise of wilderness zones, along with smaller pockets of mangrove forests that, however, are classified under the coastal wetlands.

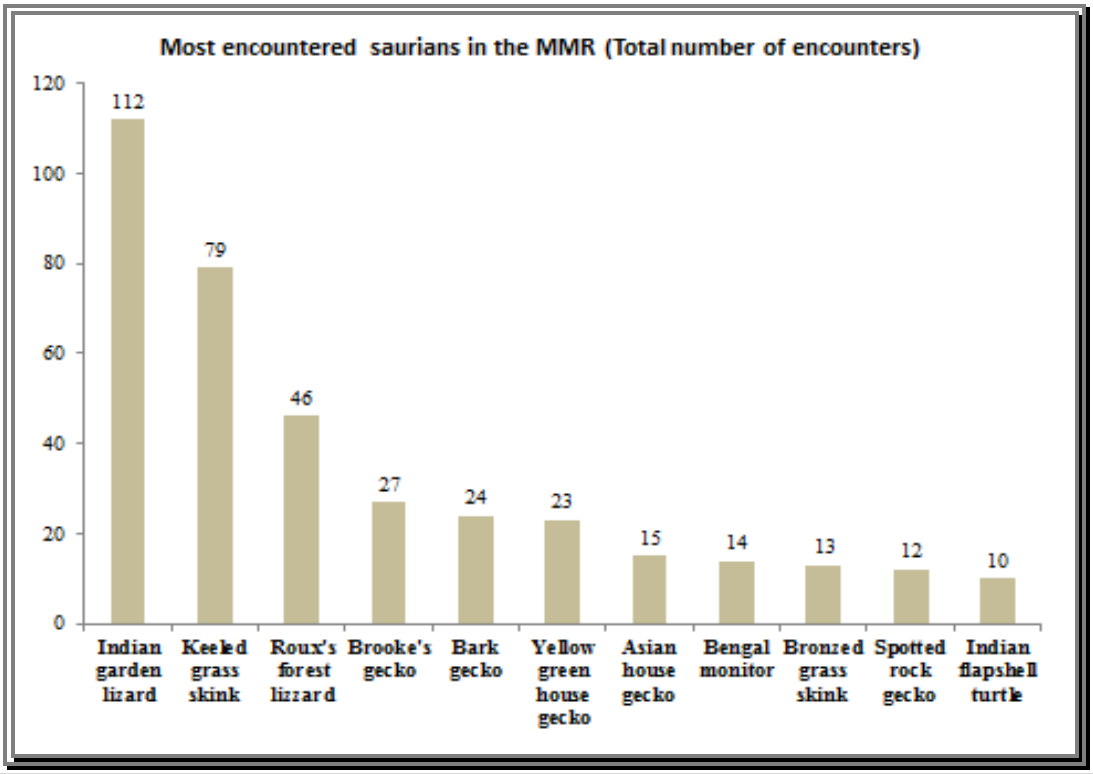
Of the 73 species of reptiles reported for the MMR based on the surveys conducted for this project, literature review and other measures, the highest diversity of species were encountered in the forest habitat. A total of 52 species were observed across a range of forest habitats and sites, from near sea-level to the higher altitudes in the MMR. This comprised of 35 species of snakes and 17 of saurians (lizards). However, a great many of these species were also encountered in some of the other habitats (grass and scrub, agriculture, urban settlements), with 4 snake species and 3 lizards being distinctly habitat-specific for the forest sites. A couple of *Hemidactylus* lizards were encountered more often in caves and similar dark micro-habitats within the forest zone but these were also sighted in numerous s ruins and structures in human settlement and other habitats. For instance, spotted rock gecko (h maculatus) is restricted to caves in the MMR and has also been sighted in the Tunnel Trail in SGNP and Bassein fort ruins. It seems to be particularly common in the Tunnel Trail more than 20 have been spotted in two hours (Awsare, pers comm). Similarly, the first record of day gecko (Cnemaspis sp) was reported in the Matheran region, which suggests a northern range extension.

This is in keeping with various observations and reports that suggest several reptile species have, in recent times, become modified as regards their ecological adaptations and possibly even gained from new and additional habitats available at the edge of the forested sites, and from anthropogenic changes. Correspondingly less reptilian diversity (and encounter frequency) were observed in the less disturbed forest sites across the MMR than in the relatively higher disturbed and forest edge landscape. In total, 7 species of saurians and 15

species of snakes were observed in less-disturbed forest tracts as against 14 of saurians and 30 of snakes in the more disturbed and forest-edge sites across the MMR (See Graph …). This shows the variability and adaptation of reptiles to the limited ecological disturbances by human activities, which provide addition habitats and eco-niches for a number of species.

The high herpetofaunal diversity indicated by Mirza and Pal's preliminary study conducted in the periphery of the SGNP highlights the need for a more intensive and detailed herpetofaunal survey within (the SGNP). Prior to this, only a single survey was conducted by G. Tiwari (1994), who documented 48 species of reptiles. Also, there is no data on the status of the marsh mugger population at Powai lake, yet another intensive survey is needed to determine their status. Thus, an indepth study will estimate the species diversity of the entire SGNP landscape but also help establish base-line data for future studies.

Of saurians, the highest encounter frequencies/abundance frequency in all kinds of forest zones were of the common garden lizard (*Calotes versicolor*), forest calotes (C rouxi), *Eutropis macularia*, *E carinata* and *Hemidactylus brooki*. Of snakes, the highest encounter frequency across the forest habitats was of Indian rat snake, checkered keelback, buff-striped keelback, common bronze-back tree-snake and Russell's viper.



Inventory of Herpetofauna (Snakes) reported in MMR.

Sr No	Family, Common & Latin Names	Local Name	Habitat	For	G-S-A	WL FW	WL-C,Br	Urban	Hilly
	Typhlopidae								
1	**BRAHMINY WORM SNAKE** *Ramphotyphlops braminus*	*Wala*	Fossorial	**X**	**X**			**X**	
2	**BEAKED WORM SNAKE** *Gryphotyphlops acutus*	*Gandul Saap*	Fossorial	**X**	**X**			**X**	
	Uropeltidae								
3	**LARGE-SCALED SHIELDTAIL** *Uropeltis macrolepis*	*Khapar Khavlya Saap*	Fossorial	**X**					**X**
4	**MAHABALESHWAR SHIELDTAIL** *Uropeltis macrolepis mahabaleshwarensis*	*Mahabaleshwarcha Khapar Khavlya Saap*	Fossorial	**X**					**X**
	Acrochordidae								
5	**FILE SNAKE** *Acrochordus granulatus*	*Ekeri*	Marine Aquatic				**X**		
	Pythonidae								
6	**INDIAN ROCK PYTHON** *Python molurus molurus*	*Ajgar*	Terrestrial, Arboreal, Aquatic	**X**	**X**	**X**		**X**	**X**
	Boidae								
7	**COMMON SAND BOA** *Gongylophis conicus*	*Durkya Ghonas*	Fossorial , Terrestrial	**X**	**X**				
8	**RED SAND BOA** *Eryx johnii*	*Dutondi Saap*	Fossorial , Terrestrial		**X**				
	Colubridae								
9	**INDIAN RAT SNAKE** *Ptyas mucosus*	*Dhaman*	Terrestrial	**X**	**X**	**X**		**X**	
10	**MONTANE TRINKET SNAKE** *Coelognathus helena monticollaris*	*Montanecha Taskar*	Arboreal, Terrestrial	**X**	**X**				**X**
11	**COMMON TRINKET SNAKE** *Coelognathus helena helena*	*Saamanya Taskar*	Arboreal, Terrestrial	**X**	**X**				
12	**TRANVANCORE WOLF SNAKE** *Lycodon travancoricus*	*Travancorecha Kavdya*	Rocks & Cervices	**X**					**X**
13	**COMMON WOLF SNAKE** *Lycodon aulicus*	*Saamanya Kavdya*	Rocks & Cervices, Settlements	**X**	**X**			**X**	**X**
14	**BARRED WOLF SNAKE**	*Patteri Kavdya*	Terrestrial	**X**					**X**

	Lycodon striatus								
15	**YELLOW-SPOTTED WOLF SNAKE** *Lycodon flavomaculatus*	*Pivlya Thipkyacha Kavdya*	Terrestrial	**X**					**X**
16	**RUSSELL'S KUKRI SNAKE** *Oligodon taeniolatus*	*Russellscha Kukri Saap*	Terrestrial	**X**	**X**				**X**
17	**COMMON KUKRI SNAKE** *Oligodon arnensis*	*Saamanya Kukri*	Terrestrial	**X**	**X**			**X**	
18	**COMMON CAT SNAKE** *Boiga trigonata*	*Saamanya Manjrya*	Arboreal	**X**	**X**				
19	**BEDDOME CAT SNAKE** *Boiga beddomei*	*Beddomecha Manjrya*	Arboreal	**X**	**X**				**X**
20	**FORSTEN'S CAT SNAKE** *Boiga forsteni*	*Forstenischa Manjrya*	Arboreal	**X**	**X**				
21	**CEYLON CAT SNAKE** *Boiga ceylonensis*	*Ceyloncha Manjrya*	Arboreal	**X**					
22	**COMMON BRONZEBACK TREE SNAKE** *Dendrelaphis tristis*	*Rukhai*	Arboreal	**X**	**X**			**X**	**X**
23	**BANDED RACER** *Argyrogena fasciolata*	*Gargar*	Terrestrial	**X**	**X**			**X**	
24	**SLENDER RACER** *Coluber gracilis*	*Gargar*	Terrestrial	**X**	**X**				
25	**GREEN KEELBACK** *Macropisthodon plumbicolor*	*Gawtya*	Terrestrial	**X**	**X**				**X**
26	**STRIPED KEELBACK** *Amphiesma stolatum*	*Naaneti*	Terrestrial		**X**			**X**	**X**
27	**CHECKERED KEELBACK** *Xenochrophis piscator*	*Divad*	Aquatic freshwater	**X**		**X**		**X**	**X**
28	**COMMON VINE SNAKE** *Ahaetulla nasuta*	*Harantol*	Arboreal	**X**	**X**				**X**
29	**VINE SNAKE** Brown morph *Ahaetulla nasuta* VARIETY *isabellinus*		Arboreal	**X**					
30	**DUMERILL'S BLACK-HEADED SNAKE** *Sibynophis subpunctatus*	*Dumerill'scha kaal Tondya*	Terrestrial, Rock & Cervices	**X**	**X**				
31	**DOG-FACED WATER SNAKE** *Cerberus rynchops*	*Shwanmukhi*	Marine Aquatic				**X**	**X**	

32	**STOUT SAND SNAKE** *Psammophis longifrons*	*Motha Valu Saap*	Terrestrial	**X**	**X**				**X**
33	**GLOSSY MARSH SNAKE** *Gerarda prevostiana*	*Chamakdar Khadi Sarp*	Marine Aquatic				**X**		
	Elapidae								
34	**COMMON KRAIT** *Bungarus caeruleus*	*Manyaar*	Terrestrial	**X**	**X**			**X**	**X**
35	**SLENDER CORAL SNAKE** *Calliophis melanurus*	*Raat Sarp*	Terrestrial, Rocks & Cervices	**X**	**X**				**X**
36	**BLACK CORAL SNAKE** *Calliophis nigrescens* VAR *khandalanensis*		Terrestrial, Rocks & Cervices	**X**					**X**
37	**SPECTACLED COBRA** *Naja naja*	*Naag*	Terrestrial	**X**	**X**			**X**	**X**
38	**HOOK-NOSED SEA SNAKE** *Enhydrina schistosa*	*Tokeri Samudra Saap*	Marine Aquatic				**X**	**X**	
39	**BOMBAY GULF SEA SNAKE** *Hydrophis mamillaris*		Marine Aquatic				**X**		
40	**ANNULATED SEA SNAKE** *Hydrophis cyanocinctus*	*Samudra Saap*	Marine Aquatic				**X**		
41	**MALACCA SEA SNAKE** *Hydrophis caerulescens*	*Samudra Saap*	Marine Aquatic				**X**		
42	**SHORT SEA SNAKE** *Lapemis curtus*	*Chota Samudra Saap*	Marine Aquatic				**X**		
43	**BLACK AND YELLOW SEA SNAKE** *Pelamis platurus*	*Pivlya-Kaalya Pattyacha, Chetul*	Marine Aquatic				**X**		
	Viperidae								
44	**RUSSELL'S VIPER** *Daboia russelii*	*Ghonas*	Terrestrial	**X**	**X**			**X**	
45	**SAW-SCALED VIPER** *Echis carinatus*	*Furse*	Rocks & Cervices, Terrestrial	**X**	**X**				**X**
46	**BAMBOO PIT VIPER** *Trimeresurus gramineus*	*Hirva Ghonas*	Arboreal	**X**					**X**

The number of species and encounter/abundance frequency was not uniform across the different forest habitat and adjoining forest-edge sites throughout MMR. The SGNP was observed to be most productive on both these parameters, with a total of 51 species of reptiles

reported here. If one includes the adjoining 13 sq km area if Aarey Milk Colony, the number of species increases to 53, though Aarey is considered more of grass and scrub habitat. In SGNP, the highest abundance frequency was more or less in keeping with the overall trends in the MMR. All the other key forest habitat sites reported between 28 and 41 species of reptiles. The reasons for the higher diversity and abundance frequency in the SGNP area include greater habitat range (from sea-level to 500 mt), higher availability of micro-habitats (caves, ruins, forest types, streams) and a generally greater level of insect prey profusion that could also be a critical determining factor.

The grass and scrub habitat are amongst the most rapidly disappearing landscapes across the MMR. Much of the developmental and infrastructural expansion over the past decade has been at the cost of this habitat of which it is estimated that more than three-fourths extent may have been lost in recent times. We have here included the cultivated landscapes under this habitat type because these share most topographical, floral and ecological features.

Extensive surveys in grass, scrub and agricultural habitats across the MMR revealed the presence of 38 species of reptiles. This included 27 species of snakes and 11 of saurians. Only one species of snake, the red sand boa that has been introduced in the MMR and become well acclimatised to the region, would classify as strictly habitat-specific for this habitat type, while the fan-throated lizard too is more specific to dry, grassy plateaus and hill-slopes. Sighting frequency of at least 10 species of snakes and 4 of lizards was higher in the grass, scrub and agricultural habitats, perhaps indicative of their greater ability to adapt to edge and modified habitats.

However, it is feared that with the rapid loss of the extent of these habitats in the MMR, several species of reptiles may lose out on a critical habitat, with only a few of the species able to immediately adapt to sudden modifications characteristic of the spread of urban sprawl.

While there are intermittent extensive pockets of human-impacted grass, scrub and agricultural habitats across the MMR, amongst the largest of extents is in the Greater Mumbai area (zone 1), with the Aarey Colony encompassing nearly 13 Sq km of a disturbed habitat. A comprehensive herpetofauna survey of this site reported 47 species of reptiles

(Zeeshan Mirza, Sunny Patil , Yogendra Satam & Kunal Ullalkar, 2009). During the present field-work, 34 species were encountered in the Aarey area alone. It may be that there has been a considerable decline in habitat quality and a marked rise in human disturbance and impact in the past few years to have resulted in a drop in both, species numbers as well as sighting frequency of several species.

The most rapidly expanding habitat-type in the MMR are the built up areas. As discussed earlier, several reptiles have been observed to benefit from the micro-habitats that human-impacted habitats create. A tally of 15 species of snakes, 8 of lizards and at least 1 terrapin species were observed in and immediately around human settlements. Though, in a densely populated and largely human-impacted region such as the MMR, it must be highlighted that many species are influenced indirectly by human intervention and intermittently turn up in these areas. For instance, a few species such as the brahminy worm snake has been observed on a few occasions in flower pots and soil that have been transported into the built up areas for gardens and landscaping. Similarly, on two occasions common wolf snake have turned up in a vegetable market, in baskets used for transportation.

Wetland habitats are amongst the dominant landscapes in the MMR, especially along the western perimeter of the MMR, with considerable coastal influenced habitats seen here. There are also a number of freshwater bodies, including some sizeable lakes. In fact, three of the largest existing freshwater bodies in the entire MMR lie in the Greater Mumbai area. This includes the Powai, Vihar and Tulsi Lakes. Nearly 125 other water-bodies and wetland sites, including freshwater and coastal wetland sites (including creeks, creek inlets, brackish ponds etc), were surveyed for herpetofauna and general habitat assessment. Our research revealed 22 species of reptiles for these habitats. This includes 13 species of snakes, 1 lizard species, 1 crocodile and 7 species of terrapins and turtles.

Unlike the grass and scrub habitats that have largely been run over by developmental demands, the wetland habitats across the MMR are faced with the problem of degradation of habitat quality. Most of the lakes suffer from serious problems of siltation due to untreated disposal of solid (and liquid) waste from domestic and other sources, industrial pollution, unchecked invasion of exotic flora and general apathy. Many of the smaller lakes suffer from

serious problems of eutrophication, surface and water pollution and it is a worrying scenario as far as the wetland habitats are concerned. The greater majority are in an urgent attention for ecological revival. Its effects are seen across a broad spectrum of floral and faunal taxa that are influenced by this waterlogged wealth.

To sum up, it must be emphasised that while contemporary greater interest in Herpetofauna is helping reveal more about these elsuve creatures across a range of habitat-types in the MMR, however, our findings show that only a few species appear have to readily adapted to heavily modified habitats. The reptiles of the MMR appear trapped between habitat loss, degradation, the suddenness of change and human apathy and fear-induced killing. Unless greater attention is paid towards ecological restoration and conservation efforts across different habitats many reptiles may not be able to cope with the rapidity of human impact.

Sr No	Family, Common & Latin Names	Local Names (Hindi, Marathi)	For	G-S-A	FW Wl	Coast	Urban	Hly
	Gekkonidae							
1	**BROOKE'S GECKO** *Hemidactylus brookii*	*Pal - generic for geckos*	**X**	**X**			**X**	
2	**YELLOW-GREEN HOUSE GECKO** *Hemidactylus flaviviridis*						**X**	
3	**ASIAN HOUSE GECKO** *Hemidactylus frenatus*						**X**	
4	**BARK GECKO** *Hemidactylus leschenaultii*		**X**	**X**				
5	**SPOTTED ROCK GECKO** *Hemidactylus maculatus*	*Tipkewali Pal*	**X**					
6	**KOLLEGAL GROUND GECKO** *Geckoella collegalensis*		**X**					
7	**DECCAN GROUND GECKO** *Geckoella dekkanensis*	*Patteri Pal*	**X**					**X**
8	**DAY GECKO** *Cnemaspis* sps.		**X**					
	Agamidae							
8	**INDIAN GARDEN LIZARD** *Calotes versicolor*	*Sarda*	**X**	**X**	**X**	**X**	**X**	**X**

9	**ROUX'S FOREST LIZARD** *Calotes rouxii*	*Ran Sarda*	**X**	**X**				
10	**FAN-THROATED LIZARD** *Sitana ponticeriana*		**X**	**X**				
	Scincidae							
11	**KEELED GRASS SKINK** *Eutropis carinata*	*Saap surli*	**X**	**X**	**X**	**X**	**X**	**X**
12	**BRONZED GRASS SKINK** *Eutropis macularia*		**X**	**X**	**X**	**X**	**X**	**X**
13	**LINED SUPPLE SKINK** *Lygosoma lineata*		**X**	**X**				
14	**SPOTTED SUPPLE SKINK** *Lygosoma punctata*		**X**	**X**				
	Lacertidae							
15	**SNAKED-EYED LACERTA** *Ophisops jerdoni*		**X**	**X**				
16	**BEDDOME'S LACERTA** *Ophisops beddomei*		**X**	**X**				
	Chamaeleonidae							
17	**SOUTH ASIAN CHAMELEON** *Chamaeleo zeylanicus*	Guheri Sarda Girgit	**X**	**X**				
	Varanidae							
18	**BENGAL MONITOR** *Varanus bengalensis*	Ghorpad	**X**	**X**	**X**	**X**	**X**	**X**
	Crocodylidae							
19	**MARSH CROCODILE** *Crocodylus palustris*	Magar			**X**			
	Bataguridae							
20	**INDIAN BLACK TURTLE (Pond Terrapin)** *Melanochelys trijuga*	Kasav			**X**			
	Trionychidae							
21	**INDIAN FLAPSHELL TURTLE** *Lissemys punctata*	Maupathiche kasav			**X**			
22	**LEITH'S SOFTSHELL TURTLE** *Aspideretes leiithii*				**X**			

23	**RED-EARED SLIDER TERRAPIN** *Trachemys scripta elegans*				**X**			
	Testudinidae							
24	**STARRED TORTISE** *Geochelone elegans*			**X**				
	Cheloniidae							
25	**OLIVE RIDLEY TURTLE** *Lepidochelys olivacea*					**X**		
26	**LOGGERHEAD SEA TURTLE** *Caretta caretta*					**X**		
27	**SEA GREEN TURTLE** *Chelonia mydas*					**X**		

Marine Turtles have been included under Coastal Habitat because of their periodic/intermittent appearance on several beaches, including dead specimens sometimes found

Amphibians

One of the two main divisions of the Herpetofauna are the Amphibians. (Class *Amphibia*). These include the frogs, toads, salamanders and caecilians. They are tetrapod, ectothermic vertebrates inhabiting a great range of habitats, from the varied freshwater habitats to brackish waters, terrestrial and arboreal, with many species also fossorial in nature.

In present times amphibians have been a focus of considerable attention both, because of the dwindling numbers of many species, especially in the context of an increasingly urbanizing and agricultural transformation, as also for the fact that a very intensive research and survey works over the past decade has resulted in the discovery of many new species, especially in the world's tropics, including in India.

The dwindling numbers of many species is of great concern also in the context of our better understanding of environment and ecology, because amphibians are often very sensitive to environmental changes, offering a visible warning to humans that significant changes are taking place. A lot or research is underway examining the causes of this issue. The decline in amphibian population is a major concern throughout the world (Dalto 2000, Simon 2004).

Around 6,771 amphibian species are listed throughout the world, of which 333 species are recorded from India (Frost 2011). The Western Ghats, one of the 25 biodiversity hotspots in the world (Myers 2000), is rich in amphibian fauna. Over half of India's amphibian fauna is

found in the Western Ghats, nearly three-fourths of these endemi After 20 years, intensive work was shows that of the 183 species of amphibian species listed in the Western Ghats, perhaps as many as 162 (88.5%) are endemic (Gururaja 2012).

However, the biodiversity of the Western Ghats is under great threat due to habitat loss, especially deforestation (Myers 1990). A majority of the amphibian fauna here occurs south of Goa, and that has also been the more surveyed region, where recent work has resulted in the discovery of 10 new species.

In comparision, the northern length of the Western Ghats (also called Sahyadris), mostly in Maharashtra, has received less attention of research and been comparatively less studied. The proportionately lesser diversity along this extensive length of the Western Ghats could be due to the proportionately longer dry periods here.

Reproductive behavior and climatic conditions greatly influence the pattern of amphibian diversity. The northern Western Ghats have longer dry periods (about 5 to 8 dry months), and the wettest months are June and July (Daniels 1992). It evidently results in a shorter period of reproductive activity for these sensitive animals. In the MMR, it was observed that mid/late June to mid-August was the period of maximum amphibian activity.

Habitat features plays an important role in governing species diversity and distribution of amphibians (Becker et al. 2007; Santos-Barrera & Urbina-Cardona 2011). Alteration and loss of habitat structure by multiple anthropogenic activities and changes in land use have been identified as the most critical factors affecting amphibian survival (Cushman 2006; Gardner et al. 2007; Urbina-Cardona 2008).

It is already known that habitat destruction due to several anthropogenic activities has had a negative impact on amphibian diversity and distribution in Western Ghats (Krishnamurthy 1996, 2003; Padhye et al. 2002; Dahanukar & Padhye 2005; Krishnamurthy & Reddy 2008).

Recent work in Northern Western Ghats was done by Neelesh Dahanukar and Anand Padhye(2005) on Tamhini Ghat encountered 23 species. U Katwate (2013) reported 22 amphibian species in Phansad wildlife sanctuary, just south of the MMR, and 11 of these were found to be endemic to the Western Ghats. According to Datta (1997) there are 23 species of amphibians known from the state of Maharashtra. However, continuous laterwork

has shed more light on the diversity and abundance of these fauna. A.G Sekar (1999) reported 34 species in Maharashtra state. A.D Padhye and H.V Ghate (2002) reported 43 species from Maharashtra state.

In the MMR, during the course of this Biodiversity Project, a total of 16 species of amphibian were reported (Annexure). Of these, 11 species were observed in the hilly areas and hill ranges, with the Matheran Range having the highest diversity. The most widespread species observed here are the Indian Bullfrog *Hoplobatrachus tigerinus* and Common Toad *Duttaphrynus melanostictus*. At least three of the species in the MMR are endemic to the Western Ghats/India.

These two species were also observed in all the urban areas of the MMR, with occasional observations of two more species, the Common Treefrog *Polypedates maculatus* and Skittering Frog *Euphlyctis cyanophlyctis*. However, numbers of all these are very low and though no detail research has ever been done, the decline has been very sharp and alarming, especially in the Greater Mumbai region. There is no doubt that more fieldwork and research will shed more light on these seasonal fauna.

Annexure: Amphibians of MMR

Sr No	Common Name	Scientific Name	Local Status	Observations & Remarks	For	FW-WL	G-S-A	Urb	Hly
	Bufonidae								
1	**COMMON TOAD**	*Duttaphrynus melanostictus*	FC - C	Very common up to late-1990s but numbers declining since		X	X	X	X
2	**MARBLED TOAD**	*Duttaphrynus stomaticus*	S	Generally rare across MMR	X		X		X
	MICROHYLIDAE								
3	**ORNATE MICROHYLID**	*Microhyla ornata*	S		X		X		X
4	**JERDON'S NARROW-MOUTHED FROG**	*Ramanella montana*	S, EN	Near-threatened species. Endemic to India (Western Ghats)	X				X
	DICROGLOSSIDAE								
5	**INDIAN BULLFROG**	*Hoplobatrachus tigerinus*	UC	Big population decline in urban areas; patchily fairly common		X	X	X	X

6	**SKITTERING FROG**	*Euphlyctis cyanophlyctis*	UC	Widespread in lowlands		X	X		X
7	**PADDYFIELD FROG**	*Fejervarya limnocharis*	UC	Agricultural araes, wetlands		X	X		
8	**BURROWING FROG**	*Sphaerotheca breviceps*	FC	Widespread	X		X		X
	Ranidae								
9	**FUNGOID FROG**	*Hydrophylax (Hylarana) malabarica*	UC	Marked decline observed since early-2000s in Greater Mumbai region; uncommon in	X				X
10	**BOMBAY BUSHFROG**	*Roarchestes bombayensis*	Ddf	An arboreal frog; seen Chirner, KBS, Matheran. Reported SGNP.	X				X
	RHACOPHORIDAE								
11	**COMMON TREEFROG**	*Polypedates maculatus*	FC - For	Occ seen in urban parks	X		X	X	X
12	**HUMAYUN'S NIGHT FROG**	*Nyctibatrachus humayuni*	S, EN	A rare frog today; Endemic to Western Ghats. Reported Matheran					X
	RANIXALIDAE								
13	**LEITH'S LEAPING FROG**	*Indirana leithii*	Ddf, S	Matheran, Prabalgadh					X
	DICROGLOSSIDAE								
14	**LONG-LEGGED CRICKET FROG**	*Fejervarya syhadrensis*	S, EN	Seen Matheran	X				X
	ICHTHYOPHIIDAE								
15	**BOMBAY CAECILIAN**	*Ichthyophis bombayensis*	S	Scarce and little known in MMR. Seen near Aarey & SGNP		X	X		
16	***PENINSULAR CAECILIAN**	*Ichthyophis peninsularis*	S	Scarce and little known in MMR. Seen near Aarey-SGNP boundary		X	X		

FRESHWATER FISH OF MMR

Wetlands are one of the most crucial natural resources. They include areas that are either temporarily or permanently covered by water meaning that a wetland is neither truly aquatic nor entirely terrestrial. Furthermore, wetlands are also dependent on several seasonal factors too. Thus, wetlands exhibit enormous diversity according to their genesis, geographical location, water regime and chemistry, dominant plants and soil or sediment characteristics.

Wetlands can be classified into two main streams - the freshwater wetlands and coastal wetlands. Inland wetlands are further divided into two key divisions, the inland-natural wetlands comprising of lakes, meanders, high altitude wetlands, waterlogged surfaces, rivers/streams. Inland manmade wetlands include reservoirs/barrages, tank/ponds and waterlogged cultivation. Coastal wetland are similarly divided into two the coastal natural wetlands, which include lagoons, creeks, sandy and rocky beach, intertidal mudflats, salt marsh, mangrove creeks and coral reefs. Coastal-manmade wetlands are far more limited of range and comprise of saltpans and aquaculture.

One of the critical habitat types in the MMR, wetlands harbor plenty of biodiversity, and the faunal taxonomic group closely associated with this habitat is Pisces or fish. In the animal kingdom, the class Pisces constitutes the highest species diversity among all vertebral groups. It also holds enormous economic significance for human livelihood.

The Freshwater habitat across MMR comprises of a mixture of natural lakes and village ponds, small rivers and seasonal wet cultivation. In addition, this habitat type has been augmented by human impact, resulting in the creation of numerous reservoirs and additional lakes. There are also several small rivers that flow through the MMR and include the Ulhas, Tansa, Kalu and Patalganga rivers, amongst a few others. The majority of them are part of the Ulhas River system, that drains seaward into the Bassein (Vasai) Creek. Numerous other creeks dot the western length of the MMR and are a critical part of the Freshwater faunal ecology.

As part of this Project, we visited and surveyed just over 100 freshwater sites. Nearly all of the MMR freshwater bodies are located in the alluvial lowlands, with very few in the upper reaches of the numerous hill ranges. Peculiarly, three of the largest freshwater bodies in the MMR—Tulsi, Vihar and Powai Lakes—all lie in the Greater Mumbai area.

A wealth of Fish:

Nelson (2006) estimated the world's fish diversity at about 27,977 valid species, with 62 orders, 515 families and 4,494 genera. The eventual number of extant fish species was projected to be close to 32,500. Of this, about 11,952 species or 42.72 %, are known to typically inhabit freshwater bodies, primarily lakes and rivers that between them cover barely 1 % of the earth's surface and account for a little less than 0.01% of its water. Then there are the Secondary Freshwater species, those that survive in both, freshwater and also in brackish and low, coastal waters. The number of such fish species is estimated to be 12,457 species. The remaining 3568 species are exclusively marine.
From the above one can gauge the significance of freshwater habitats in the context of fish diversity, besides also playing host to a very large range of biodiversity of every fauna taxa.

The Indian subcontinent, located at the confluence of three biogeographic realms, viz., the Palearctic, Afro-Tropical and Indo-Malayan, exhibits great range of ecological habitats, harbouring rich ichthyofaunal diversity, comprising about 2,500 species. Of this, about 930 species are freshwater inhabitants while 1,570 species are marine. The fish species diversity of India accounts for almost 8.9% of the known fish species of the world. Various authorities have reported varying tallies of India's freshwater species, with Jayaram (1999) listing 852 species.

According to the Gazetteer of India (1974) there are more than 600 species of fishes in Maharashtra, of which 414 are marine and 168 are freshwater species. A high degree of endemism is observed in the Western Ghats, especially with regard to hill-stream freshwater species, though the extent of such species is higher in the southern half of the mountain range. In recent years there have been several studies on the freshwater fish of the northern Western Ghats, including the Konkan (Jadhav B V 2011, (Kharat et al. 2003; Wagh & Ghate 2003; Daniels 2006; Raghavan et al. 2008; Knight 2010, Kharat 2012, Dahanukar N 2012).

All these surveys, including extensive work on the Freshwater fish of the Pune region in recent years, indicate how seriously the fish fauna in this region is threatened due to several anthropogenic activities including introduced fish species, deforestation, over fishing, sand mining, recreational activities and pollution. Since the fish fauna in this MMR region also supports the livelihood of several communities and industries, there is an urgent need to understand the conservation priorities to design and implement conservation action plans. In fact, a very major decline in freshwater fish of the Pune urban area was reported (Kharat, Dahanukar & Raut, 2001). They could not find 48 of the 114 species previously reported in the Pune region while 18 species were presumed to be locally extinct.

The MMR, in the north-western parts of Maharashtra State, lies in the narrow strip of country between the Western Ghats and the Arabian Sea. This area is a fertile region with ample water sources. Its western length is lined by the coast of the Arabian Sea, with numerous coastal influenced landscapes. Numerous inland rivers, mostly from the mountains, have a quick run through the central region of the MMR that comprises of flat surfaces interspersed with numerous hill ranges, and drain into the Arabian Sea through the several creeks. The landscape is dotted with a wealth of freshwater bodies, from natural lakes, ponds and reservoirs to large man-made lakes.

Even though freshwater is a critical resource for humans and other species, research on this habitat and its ecological dimensions has not received as much attention. While the adjoining Deccan's fish fauna had been a subject of interest as early as the mid-nineteenth century (Sykes, 1841), there was even there, a long pause for almost a century until Fraser (1942), Hora and Misra (1942) reported 52 species of freshwater fish for the Pune area. In contrast, while the marine habitat and marine fish fauna of the Konkan, including the MMR, has received considerable research attention, the freshwater habitat and the freshwater fish resource along Konkan and north Konkan areas have received relatively little attention. Some of the earliest works on this fauna include Annandale 1919, Kulkarni 1947, Bal & Mohmed, 1957 and Singh & Yazdani 1988 while ongoing investigations continue to shed fresh light on the wealth of this biodiversity. Singh & Yazdani (1993) have reported 106 freshwater and marine fish species in the entire Konkan region of northern Western Ghats of which 41 fish species were recorded from Raigad district. More recently (U Katwate 2012)

studies on freshwater and secondary freshwater fish of Raigad district recorded 66 species of which the cyprinids were the most dominant group representing 22 species.

The Western Ghats of India harbor rich biodiversity and are aptly classified as one of the 34 Biodiversity Hotspots of the world owing to the concentration of endemism (Mittermeier et al. 2005). The literature till date records 288 freshwater fish species from the Western Ghats with 41% fish species endemic to this region (Dahanukar et al. 2004). The fish fauna of northern Western Ghats have been well studied but most of the studies are limited to the east flowing rivers of the Western Ghats while the west flowing rivers have had limited attention (Dahanukar et al. 2011). While very few studies are available on fishes of the Konkan region (Annandale 1919; Kulkarni 1947; Bal & Mohmed, 1957; Singh & Yazdani 1988; Singh & Yazdani 1993; Arunachalam 2000, 2002).
Arunachalam (2000) and Arunachalam et al. (2002) studied Kundalika, Savitri River and Kal River a major tributary of Savitri River as well as Phansad Wildlife Sanctuary area. Arunachalam (2000) recorded 20 fish species, while Arunachalam et al. (2002) reported 22 species.

Methods:

This part of the report investigates the freshwater fish fauna of the MMR based on a survey of the region's freshwater bodies. It is founded on field visits to more than 100 sites of freshwater habitats across the MMR, and also includes an assessment of all other sources of information over a period of nearly 18 months. Field visits included more than 40 special-focus visits across a wealth of Freshwater sites.

Enumerating presence of species at specific freshwater bodies and sampling for data at many of the sites involved random collection at different sites and spots (though each and every specimen was released back into the same area immediately after identification confirmation). Often we used the help and services of local fishermen and there was a constant interaction with local fishermen at all sites to ascertain and gauge the status of several species and surveying local markets for observing fish catches. All of these approaches also helped gauge the relative status of fish species diversity and possible changes.

Observations & Findings:

Around 88 species of primary and secondary freshwater fish were recorded in the MMR (Annexure). At least 34 families of fish are represented in the MMR, with *Cyprinidae* being the dominant, accounting for almost 36 % of this fish fauna. The other key families are Cichlidae (10%) and Bagridae (5%). Table ……. provides an account of the various Families of fish existing in the MMR.

Of the 88 species reported, 63 are known to be indigenous to India. Of these, 16 species observed are known to be endemic to the Western Ghats. In addition, we also found a high number of exotic species, with at least 25 of the species having been introduced either purposely or accidentally for ornamental fishery, aquaculture and game-fishing interests. Many of these species have adapted and naturalised to these habitats over the years. Several of these species had been introduced in the region as far back as the 1930s and 1940s (Kulkarni C V, 1948 – 50).

Observations across the MMR indicate a worrying scenario vis-à-vis the rise in the extent of exotic and introduced species, both, for native fish species as well as for wetland habitats themselves. Non-native fish are being introduced around the world mainly for improving fisheries, sport, ornamental fish trade and bio-control of the mosquito (Bijukumar 2000). Transport of live fishes across the globe to nurture the aquarium industry has been on for at least a century. However, the recent focus on and increase in this trade poses a far more dangerous threat. The aquarium trade (in fish varieties) has not face the scrutiny of environmentalists, ecologists and policy makers that has characterized the trade in terrestrial endangered species (Naylor et al. 2001; Chapman et al. 2003; Padilla & Williams 2004). The avenues from captivity to the wild include the dumping of unwanted fish, escape from tanks and breeding farms during storms, and through unchecked drainage of water from tanks and public aquariums (Padilla & Williams 2004). Such organisms are usually adult fish that are often more resilient and have a greater probability of surviving and reproducing in the wild, often at the cost of native fauna, about which precious little is known.

Introduced fish frequently alter the aquatic ecology by changing water quality and also result in the local extinction of native fish by predation and resource competition (Pimentel 2002). Introduced aquarium fish represent a major source of ecological destruction that may be locally alarming if ignored (Liang et al. 2006). A number of fish species also hybridise with one another in the wild diluting the wild genetic stock leading to long-term introgression of gene pools (Pimentel 2002).

There is much concern now about Invasive ornamental fish in peninsular India and their ecological impacts (J D Marcus Knight 2010).

Tilapias and the major carps are good examples of invasive food fish species; in fact, these are a major treat to native species due to their voracious feeding and high adaptability. Other species of non-native fish have also started to establish local populations driven by the flourishing aquarium trade. Ornamental fishes ranging from the tiny guppy fish (*Poecilia reticulata*) to the large and aggressive red piranha (*Pygocentrus nattereri*) have been recorded in southern India (Bijukumar 2000). In the MMR, these were observed quite commonly in Powai lake but it is possible these may have also been introduced or spread to several of the other freshwater bodies in the MMR.

In addition to *P reticulata,* various ornamental fish such as *Osphronemus goramy, Trichopodus trichopterus, Atractosteus spatula, Lepisosteus osseus, Arapaima gigas, Helostoma temminckii, Amphilophus labiatus, Astronotus ocellatus, Cichlasoma trimaculatum, Hypostomus punctatus, Pygocentrus nattereri, Colossoma macropomum, Gyrinocheilus aymonieri, Pterophyllum scalare, Pangasianodon hypophthalmus, Osteoglossum bicirrhosum* have been recorded from freshwater bodies of MMR, with the sprawling Powai lake in the Greater Mumbai area, being one of the major sites affected by introduced species.

Our observations suggest that Powai lake has become a modern dumping ground for freshwater fish that include several alien invasive species like *Cyprinus carpio, Oreochromis mossambicus* and *Clarias gariepinus,* which negatively affect native fish species. Besides predation, several of these introduced exotics are known to be aggressive in defending

territories and competing for food, thereby displaying greater ability to colonise new sites. In fact, *P reticulate and O goramy, amongst several other species,* have also been recorded from the Chalakudy river, a biodiversity hotspot in Kerala (Raghavan et al. 2008; Krishnakumar et al. 2009). The paucity of information on the ecological impacts of these and some other fish species in prime habitats across peninsular India makes it an even more worrying scenario.

Another widely introduced species is the giant gourami (*Osphronemus goramy),* a classic example of an introduced exotic and its detrimental repercussions. This large-sized gourami was introduced into Chennai (Madras Presidency) in the year 1866 (Raj 1916) and other parts of peninsular India such as Maharashtra (Bombay Presidency) and Karnataka (Mysore State) as well (Bhimachar et al. 1944). We recorded it in several of the larger waterbodies in the MMR, including Powai and Vihar lakes. It was also observed in Ulhas and Tansa rivers. This big fish was introduced both, as a food source as well as a control over aquatic macrophytes. It is a voracious feeder (Petr 2000) feeding on plant material (Raj 1916; Bhimachar et al. 1944), insects and other fish (Raj 1916). It has successfully established itself in the wild in several parts of peninsular India and has become quite common in some of the large waterbodies in the MMR. There is also the possibility of this gourami spreading to other sites, this prospect seemingly more compelling because it is a fast-growing species. It is also known to survive well in polluted water as it is an air-breather (Raj 1916). Their detrimental effects also include their ability to carry pathogens such as the lymphocystis disease virus which can be transmitted to native fishes (Whittington & Chong 2007).

Another group of introduced fishes that have spread in the freshwaters of peninsular India are the tropical American live-bearers. The mosquito fish (*Gambusia affinis*) and the wild guppy (*Poecilia reticulata*) were first introduced as larvicidal fish in an effort to control malaria (Daniels 2002). *P. reticulata* has also been recorded from freshwater habitats of Pune (Wagh & Ghate 2003; Kharat et al. 2003), and along several other parts of India. Guppies are widely sold in the aquarium trade for their ornamental value, especially their wide variety of colours. Observations have also shown that *P reticulate can* prefer other insect larvae to mosquito larvae in the presence of alternate prey (Manna 2008). It is a known carrier of trematode parasites and iridoviruses which may affect native fish populations (Leberg & Vrijenhoek 1994; Whittington & Chong 2007). It is known to eat the eggs of several native

fish species and act as a host for several parasites. We have not been able to ascertain the various detrimental effects of this, and several other introduced species in the MMR, and this is an area that needs to be investigated urgently.

Livebearers are closely related to the panchaxes that are found in peninsular India. However, the livebearers, as the name suggests, produce live young and hence multiply more rapidly. *Gambusia,* a livebearer has been suspected of affecting the population of *Aplocheilus lineatus* in the Mula and Mutha rivers in Pune. This is possible because both are surface feeders and can compete with one another. *A lineatus* is also widespread in the MMR, where it has also been observed in brackish waters. We observed this species in several waterbodies across all zones of the MMR. But the ecological advantage that *Gambusia* has over *A. lineatus* is that it is viviparous while the latter is oviparous (Wagh & Ghate 2003). Moreover *Gambusia* and *Poecilia reticulata* appear to be more tolerant of pollution than the native fish (Wagh & Ghate 2003; Karat et al. 2003).

Famed for the many man-eating tales revolving around it, the red piranha (*Pygocentrus nattereri*) is quite a voracious predator. It was brought into India illegally by the aquarium trade (Bijukumar 2000) and has found its way into the many waterbodies. In the MMR, we came across this predator in Powai lake and in Thane's Shivaji talao. Piranhas are shoaling predators which not only feed on smaller fish but also occasionally take a bite out of fins, scales and muscle of larger fish, in the process mutilating them (Sazima & Machado 1990). As they are predators, they not only eat up small native fish but also tend to compete with the native predatory fish (Bennett et al. 1997) such as *Clarias batrachus, Wallago attu and Channa punctata.*

In 1951, tilapia species (Cichlidae) were introduced into several South Asian countries due to a great demand in aquaculture. Until now only one genus of African cichlids (*Oreochromis*) was known to be invasive in India, tilapias are maternal mouth-brooders, and a male will build a nest and aggressively defend territory. The three species of African tilapia, *Oreochromis mossambicus*, *Oreochromis niloticus niloticus*, *Oreochromis aureus*, reported in the MMR are very susceptible to diseases such as whirling disease and ich (Popma, 1999). Of these, *O mossambicus* is a robust and fecund fish, readily adapting to available food

sources and breeding under sub-optimal conditions, and has become one of the most widespread species in the MMR where our observations and interaction with several local fishermen indicate that is seriously affecting several native fish species. The African tilapia is also an excellent table fish, commonly available in local markets throughout the MMR.

Additionally, several South American cichlids have also spread widely in the MMR where they had been introduced as popular aquarium fish. Some of the widely sold fish include *Cichlasoma trimaculatum* (a Flowerhors), *Astronotus ocellatus, Amphilophus labiatus, Pterophyllum scalare,* all of which are increasingly competing with indigenous freshwater faunal diversity.

One of the best known game-fish is the mahseer. Two species, golden and deccan mahaseer are native to India and have been reported in the MMR, having been introduced in Powai lake. In addition, several other exotic carps native to China and Russia have also been introduced in the MMR. These had been introduced by the British during the early 20th Century in major waterbodies in India, and it is not known when they were brought into the MMR.

More than twice as many species than the introduced and exotic fish species comprise of the native and indigenous varieties. Of the 63 native fish species in the MMR, some of the common and widely distributed are *Channa punctata, Clarias batrachus, Rasbora daniconius, Glossogobius giuris, Anabas testudineus, Anguilla bengalensis, Chanda nama, Mystus gulio, Mystus bleekeri, Puntius sarana, P vittatus* and *Etroplus maculates*. Amongst the foremost observations on the freshwater fish fauna of the region was an assessment of the Powai Lake's indigenous fish fauna (Kulkarni C V, **1948**) whence 21 species of indigenous fish were reported.

Most of these can be seen in the lowland freshwater bodies while a few such as *Rasbora daniconius* and *Gara mullya Lepidocephalus thermalis* were observed on the hill streams in the hilly areas of the MMR, where it is largely seasonal and active during the monsoon. At other times this fish is restricted to small rock pools and cisterns as were observed in

Tungareshwar WLS (540 msl), Kanheri caves, Karnala fort and Prabalgad, Charlotte lake and Panorama point environs at Matheran .

Amongst some of the rarely sighted freshwater fish in the MMR are Puntius ticto, Crossocheilus latius, Parapsilorhynchus tentaculatus and Tenualosa ilisha. In fact, the last-mentioned species also prefers brackish water and was sighted in Bhandup pumping station, Ahwa creek, Uran and in Thane creek near kopri village.

The freshwater fish fauna of the MMR also comprised several species that are endemic to the Western Ghats. Of these, *Garra mullya*, *Lepidocephalus thermalis*, *Puntius amphibious*, *Puntius bimaculatus*, *Devario aequipinnatus*, *Devario malabaricus* and *Indoreonectes evezardi* are quite common in the MMR whereas *Parapsilorhynchus discophorus*, *Pseudosphromenus dayi* and *Monopterus indicus* are amongst the species seldom sighted here nowadays. Majority of these Western Ghats endemics were observed and/or reported in the southern parts of the MMR, in the Raigad district areas of Zone 3. It is quite possible this may be because this zone is less affected by anthropogenic activities and resultant pressures than the others areas of the MMR.

In conclusion, it must be said that a topic ignored for long, is revealing some interesting and worrying trends about how human are managing these freshwater habitats. The introduction of several exotic species of fish may have been justified by utilitarian, economic and sport reasons some decades ago, and some may even argue that it has added substantially to the fish fauna of the MMR. However, it is possibly a double-edged sword, in the impact these species have had on native fauna and the habitat ecosystem as a whole. It may not be easy to assess the economic value of these ad hoc pursuits of species introduction just as there is a very little data their impact on indigenous biodiversity. It is a topic that requires a continuous monitoring and thorough investigations if we are to conserve our freshwater wetlands and their flora and fauna.

Inventory of MMR Freshwater Fish fauna

Sr. No.	Common Name	Local Name	Family	Status	IUCN Status	Key sites where seen in MMR
1	**Malabar Ricefish** *Oryzias setnai* (Kulkarni, 1940)	*Anu*	**Adrianichthyidae**	En, Brk	Least concern	Patalganga, Chirner-Awra creek, Khanderi-Undari creek
2	**Climbing Perch** *Anabas testudineus*(Bloch, 1792)	*Choti Khajuri*	**Anabantidae**	Ind,Brk	Data deficient	Powai,Patalganga,Tugareshwar, Chinchoti, M.N.P
3	**Eel** *Anguilla bengalensis* (J. E. Gray, 1831)	*Wam*	**Anguillidae**	Ind	Least concern	Powai, Vihar, Tulsi, Chirner dam, Ulhas, Patalganga
4	**Indian Glass fish** *Parambassis ranga*(Hamilton 1822)	*Kaachki*	**Ambassidae**	Ind, Brk	Least Concern	Powai, Mansunda, Thane, Patalganga
5	**Elongated glassyperchlet** *Chanda nama* (Hamilton, 1822)		**Ambassidae**	Ind, Brk	Least Concern	Powai,Vihar, Chirner-Awra creek
6	**Top minnow OR Striped panchax** *Aplocheilus lineatus*(Valencienne, 1846)	*Tikli Piku/ Tarangya*	**Aplocheilidae**	En, Brk	Least concern	Patalganga,Ulhas,Vajreshwari,Dherja, Panvel city lake, Bhandupeshwar kund
7	**Sagor catfish** *Hexanematichthys sagor* (Hamilton, 1822)		**Ariidae**	Ind, Brk	NBE-red list	Bassien creek, Patalganga
8	**Sona Sea cat fish** *Sciades sona* (Hamilton, 1822)		**Ariidae**	Ind, Brk	NBE-red list	Revdanda creek, Thane creek (Slatpans behind K.C college)

9	**Days mystus cat fish** *Mystus bleekeri* (Day, 1877)		**Bagridae**	Ind	Least concern	Powai, Vihar
10	**Long whiskers cat fish** *Mystus gulio* (Hamilton, 1822)		**Bagridae**	Ind, Brk	Least concern	Powai, Patalganga, RCF lake (Chembur), Chirner dam, Barvi dam
11	**Seenghala/Giant river-catfish** *Sperata seenghala* (Sykes, 1839)	*Shingada/*	**Bagridae**	Ind	Least concern	Patalganga, Ulhas, Ransai Dam
12	**Jerdon's Mystus** *Mystus malabaricus* (Jerdon, 1849)	*shingada/*	**Bagridae**	Ind	Near Threatened	Patalganga; rare catfish in MMR
13	**Stone Loach** *Indoreonectes evezardi* (Day, 1872)	*Chiklii*	**Balitoridae**	En	Least concern	Streams of Karjat, Matheran (also Charlotte Lake), Tulsi, Yeur, Chirner, Karnala, Madvi and Tugareshwar, Elephanta
14	**Mangoose Loach** *Nemacheilus rueppelli* (Sykes, 1839)	*Mura*	**Balitoridae**	En	Least concern	Patalganga river; rarely seen loach species
15	**Freshwater Goby OR Tank goby** *Glossogobius giuris* (Hamilton, 1822)	*Kharba*	**Gobiidae**	Ind, Brk	Least concern	Powai Tulsi, Vihar, Patalganga, Ghadeshwar
16	**Freshwater gar fish** *Xenentodon cancila* (Hamilton, 1822)	*sui*	**Belonidae**	Ind	Least concern	Patalganga, Ghadeshwar
17	**Orange chromide** *Etroplus maculatus*(Bloch, 1795)	*Pivla Paaplet*	**Cichlidae**	Ind, Brk	Least concern	Powai, Chirner-Awra creek, Tulsi, Upwan, Bhandup pumping station
18	**Pearl spot OR Green chromide** *Etroplus suratensis*	*Kalundar/Karimeen*	**Cichlidae**	Ind, Brk	Least Concern	Powai, Vihar. A famed State fish of Kerala

	(Bloch, 1790)					
19	**Israeli tilapia OR Blue tilapia** *Oreochromis aureus* (Steindachner, 1864)	*Paaplet*	**Cichlidae**	Ex, Intro-G	NBE-red list	Powai. Can become a problematic invasive species
20	**Mozambique tilapia** *Oreochromis mossambicus*(Peters, 1852)	*Paaplet*	**Cichlidae**	Ex, Intro-G	Near Threatened	Powai, Balganga, Thane lakes, Patalganga, Vihar, Khandpe dam. Best example of Mouth-breeding fish
21	**Nile tilapia** *Oreochromis niloticus* (Linnaeus, 1758)	*Paaplet*	**Cichlidae**	Ex, Intro-G	NBE-red list	Powai, Khandpe dam
22	**Freshwater Angel fish** *Pterophyllum scalare* (Schultze, 1823)		**Cichlidae**	Ex	NBE-red list	Powai
23	**Flower horn** *Cichlasoma trimaculatum* (Günther, 1867)	*fantush*	**Cichlidae**	Ex	NBE-red list	Powai, Khandpe dam, where abundant during monsoon; also seen in Ulhas river during overflow,
24	**Oscar** Astronotus ocellatus (Agassiz, 1831)		**Cichlidae**	Ex	NBE-red list	Powai, Shivaji & Upwan pond in thane, Khandpe dam
25	**Red Devil** *Amphilophus labiatus*(Günther, 1864)		**Cichlidae**	Ex	NBE-red list	Powai, Khandpe dam
26	**Brown/ Dwarf Snakehead** *Channa gachua* (Hamilton, 1822)	*kala daku masa*	**Channidae**	Ind	Least Concern	Powai, Patalganga, Vihar

27	**Spotted snakehead** *Channa punctata* (Bloch, 1793)	*piwla daku masa*	**Channidae**	Ind, Brk	Least Concern	Powai, Thane lakes, Patalganga, Chirner-Awra creek, M.N.P pond
28	**Redbilled Piranha** *Pygocentrus nattereri* (Kner, 1858)		**Characidae**	Ex	NBE-red list	Powai, Shivaji & Upwan pond in thane
29	**African cat fish** *Clarias gariepinus* (Burchell, 1822)	*Mangur*	**Clariidae**	Ex, Intro-G, Brk	NBE-red list	Powai, Patalganga, Bandup pumping station, Thane salt pans(Behind KC College)
30	**Walking cat fish** *Clarias batrachus* (Linnaeus, 1758)	*Mangur*	**Clariidae**	Ind, Intro-G, Brk	Least concern	Powai, Vihar, Ambeghosale, Pelhar, Palasdari
31	**Scavenger Loach** *Lepidocephalus thermalis* (Valenciennes, 1846)	*Mura*	**Cobitidae**	En	Least concern	Streams of Karjat, Matheran, Tulsi, Yeur, Chirner, Karnala, Madvi and Tugareshwar, Chinchoti, Elephanta. Locally common
32	**Zebra Loach** *Botia striata* (Narayan Rao, 1920)		**Cobitidae**	En, Intro	Endangered	Powai over flow water in garden of Powai lake area during monsoon. Native to Karnataka and SW Maharashtra
33	**Bloch razorbelly minnow** *Salmophasia balookee* (Sykes, 1839)	*Chilwa*	**Cyprinidae**	En	Least concern	Powai, Vihar, Palasdari, Patalganga
34	**Blackline or slender rasbora** *Rasbora daniconius* (Hamilton, 1822)	*Kadavli*	**Cyprinidae**	Ind	Least concern	Powai, Vihar, Tulsi, Chirner dam, Ulhas, Patalganga, Matheran lakes and hill streams(All Major river and streams)
35	**Malabar Danio** *Devario malabaricus* (Jerdon, 1849)	*Pidatoli*	**Cyprinidae**	En	Least concern	Powai, Vihar, Tulsi, Patalganga
36	**Fraser Danio** *Devario fraseri* (Hora, 1935)		**Cyprinidae**	En	Vulnerable	Powai, Patalganga. Endemic to northwern Western Ghats, in Maharashtra State

37	**Giant danio** *Devario aequipinnatus* (McClelland, 1839)		**Cyprinidae**	En	Least concern	Forest hills Streams in Thane and Raighad region
38	**Catla** *Gibelion catla* (Hamilton, 1822)	*catla*	**Cyprinidae**	Ind, Intro-G	Least concern	Powai, Masunda, Hariyali, Upwan, Ambeghosale, Khandpe dam, Chirner dam
39	**White Carp** *Cirrhinus cirrhosus* (Bloch, 1795)	*mirgal carp*	**Cyprinidae**	Ind, Intro-G	Vulnerable	Powai, Khandpe lake, Patalganga river
40	**Mrigal** *Cirrhinus mrigala* (Hamilton 1822)	*mirgal*	**Cyprinidae**	Ind, Intro-G	Least concern	Powai, Khandpe dam, Ransai Dam, Barvi dam. Introduced into MMR through Aquaculture trade
41	**Khandalla minnow** *Parapsilorhynchus tentaculatus* (Annandale, 1919)		**Cyprinidae**	Ind	Least concern	Khandpe dam(Ulhas river)
42	**Ratnagiri minnow** *Parapsilorhynchus discophorus* (Hora 1921)		**Cyprinidae**	En	Vulnerable	Morbe river, Patalganga
43	**Stone carp** *Garra mullya* (Sykes, 1839)	*Mulya*	**Cyprinidae**	En	Least concern	Streams of Karjat, Matheran, Tulsi, Yeur, Chirner, Patalganga, Chota kashmir, Ulhas, Karnala, Madvi and Tugareshwar, Elephanta
44	**Gangetic Latia** *Crossocheilus latius* (Hamilton, 1822)	*Mulya*	**Cyprinidae**	Ind	Least concern	Ulhas, Patalganga
45	**Grass carp** *Ctenopharyngodon idella* (Valenciennes, 1844)	*nandi*	**Cyprinidae**	Ex, Intro-G	NBE-red list	Powai, Khandpe dam, Chota kashmir
46	**Wild common carp** *Cyprinus carpio* (Linnaeus, 1758)		**Cyprinidae**	Ex, Intro-G	Vulnerable	Powai, Khandpe dam

47	**Silver Carp** *Hypophthalmichthys molitrix* (Valenciennes, 1844)	*Silver*	**Cyprinidae**	Ex, Intro-G	Near Threatened	Powai, Khandpe dam, Hariyali, Masumda. Common game fish in Powai. Specimens up to 35 kg weight have been caught
48	**Orange fin labeo/Karnataka labeo** *Labeo calbasu* (Hamilton, 1822)	*Kalaghosh/ Kanoshi*	**Cyprinidae**	Ind, Intro-G	Least concern	Powai, Vihar
49	**Red rohu/Fringed-lipped peninsula carp** *Labeo fimbriatus* (Bloch, 1795)	*Tamka/ Tambra*	**Cyprinidae**	Ind, Intro-G	Least concern	Powai, Vihar
50	**Rohu** *Labeo rohita* (Hamilton, 1822)	*Rohu*	**Cyprinidae**	Ind, Intro-G	Least concern	Powai, Vihar, Khandpe dam, Barvi dam, Chirner dam
51	**Deccan Mahseer** *Tor khudree* (Sykes, 1839)	*Mahaseer*	**Cyprinidae**	Ind, Intro-G	Endangered	Powai. Both species of Mahseer been introduced in Powai
52	**Putitor mahseer Or Golden mahseer** *Tor putitora* (Hamilton, 1822)	*Mahseer*	**Cyprinidae**	Ind, Intro-G	Endangered	Powai
53	**Olive barb** *Puntius sarana* (Hamilton, 1822)	*Khavlya , Sava Masa*	**Cyprinidae**	Ind	Least concern	Powai
54	**Silver barb** *Puntius vittatus* (Day, 1865)		**Cyprinidae**	Ind	Least concern	Powai, Vihar, Chota Kashmir, Gadeshwar
55	**Rosy barb** *Puntius conchonius* (Hamilton, 1822)		**Cyprinidae**	Ind	Least concern	Powai, Sivaji & Upwan ponds of Thane

56	**Flying Barb** *Esomus danrica* (Hamilton, 1822)		**Cyprinidae**	Ind	Least concern	Powai, Vihar Ulhas stream near Khandpe dam
57	**Scarlet banded barb** *Puntius amphibius* (Valenciennes, 1842)	*Kharat*	**Cyprinidae**	En	Data deficient	Patalganga, Ulhas river in Karjat area
58	**Two Spot barb OR Red side barb** *Puntius bimaculatus* (Bleeker, 1863)		**Cyprinidae**	En	Least concern	Patalganga, Ulhas river in Karjat area
59	**Swamp barb** *Puntius chola* (Hamilton, 1822)		**Cyprinidae**	Ind	Least concern	Powai, Vihar, Tulsi, Upwan, Bhiwpuri lake
60	**Pool barb/ Stigma barb** *Puntius sophore* (Hamilton, 1822)		**Cyprinidae**	Ind	Least concern	Powai & Khandpe dam
61	**Ticto barb/ Two spot barb** *Puntius ticto* (Hamilton, 1822)		**Cyprinidae**	Ind, Intro	Least concern	Powai; introduced from aquariums
62	**Melon barb** *Puntius fasciatus* (Jerdon, 1849)		**Cyprinidae**	Ind, Intro	Least concern	Powai, Khandpe dam; introduced from aquariums
63	**Black spot barb** *Puntius filamentosus* (Valenciennes, 1844)		**Cyprinidae**	Ind, Intro	Least concern	Powai; introduced from aquariums
64	**Indian glass barb** *Laubuca laubuca* (Hamilton, 1822)		**Cyprinidae**	Ind	Least concern	Powai, Vihar, Khandpe dam, Patalganga
65	**Hilsa shad** *Tenualosa ilisha* (Hamilton, 1822)	*Chaksi/Pala*	**Clupeidae**	Ind, Brk	NBE-red list	Chirner-Awra creek, Khanderi-Undari creek, Thane creek near Kopri village, Bhandup puming station

66	**Indian algae Eater OR Honey sucker** *Gyrinocheilus aymonieri* (TIRANT, 1883)		**Gyrinocheilidae**	Ex	Least concern	Powai
67	**Stinging Cat fish** *Heteropneustes fossilis* (Bloch, 1794)	*Sindhi/ Narshingli*	**Heteropneustidae**	Ind, Intro-G	Least concern	Powai, Vihar, Gadeshwar
68	**Kissing gourami** *Helostoma temminckii* (Cuvier, 1829)		**Helostomatidae**	Ex	NBE-red list	Powai, Upwan & Shivaji ponds of Thane
69	**Cock up/Asian seabass/Barramundi** *Lates calcarifer* (Bloch, 1790)	*Khajura Jitada*	**Latidae**	Ind, Intro-G, Brk	NBE-red list	Powai, Patalganga, Chirner-Awra creek, Khanderi-Undari creek, Revdanda creek
70	**Longnosed garfish** *Lepisosteus osseus* (Linnaeus, 1758)		**Lepisosteidae**	Ex	NBE-red list	Powai
71	**Alligator gar** *Atractosteus spatula* (Lacépède, 1803)		**Lepisosteidae**	Ex	NBE-red list	Powai
72	**Suckermouthed Catfish** *Hypostomus punctatus* (Valenciennes, 1840)		**Loricariidae**	Ex	NBE-red list	Powai
73	**Zig zag eel OR Spiny eel** *Mastacembelus armatus* (Lacepède, 1800)	*Vaam*	**Mastacembelidae**	Ind, Intro-G	Least Concern	Powai, Vihar, Tulsi, Patalganga, Khandpe dam

74	**Indian trapon** *Megalops cyprinoides* (Broussonet, 1782)		**Megalopidae**	Ind, Intro-G, Brk	Data deficient	Powai, M.N.P pond, Bhandup pumping station, Patalganga
75	**Beehead/Giant gourami** *Osphronemus goramy* (Lacepède, 1801)	*Gourami*	**Osphronemidae**	Ex, Intro-G	NBE-red list	Powai, Khandpe dam
76	**Blue gourami** *Trichopodus trichopterus* (Pallas, 1770)	*Gourami*	**Osphronemidae**	Ex	NBE-red list	Powai, Upwan, Kandar pada, Marve kamal talav
77	**Indian Paradise Fish** *Pseudosphromenus dayi* (Köhler, 1908)		**Osphronemidae**	En	Vulnerable	Vihar {Could be introduced in vihar lake bcoz sps is never been seen in that area as well as they are endemic to western Ghats of Kerala }
78	**Silver Arowana** *Osteoglossum bicirrhosum* (Cuvier (ex Vandelli), 1829)		**Osteoglossidae**	Ex	NBE-red list	Powai
79	**Arapaima** *Arapaima gigas* (Cuvier, 1817)		**Osteoglossidae**	Ex	Data deficient	Powai
80	**Shark cat fish/ Albino** *Pangasianodon hypophthalmus* (Sauvage, 1878)		**Pangasiidae**	Ex	Endangered	Powai, Marve kamal pond, Thane lakes, Kandar pada, Khandpe dam. Very common fish released in many freshwater bodies in MMR
81	**Mosquito fish** *Gambusia affinis*(Baird & Girard, 1853)	*Gutter Guppy*	**Poeciliidae**	Ex, Brk	NBE-red list	Powai, Gadeshwar, Thane lakes, Dhaisar river, Bhandupeshwar khund, Patalganga, Ulhas, Majorly seen in railway tracks
82	**Wild Guppy** *Poecilia reticulata* (Peters, 1859)	*Gutter Guppy*	**Poeciliidae**	Ex	NBE-red list	Powai, Thane lakes, Patalganga, M.N.P pond, Patalganga, Gadeshwar, Khandpe dam, Ulhas river, Mahakali lake, Hariyali lake, Banganga

83	**Freshwater shark/Wallago** *Wallago attu*(Bloch & Schneider, 1801)	*shiwda*	**Siluridae**	Ind, Intro-G	Near Threatened	Powai, Ulhas, Patalganga
84	**Indian Butter Catfish** *Ompok bimaculatus* (Bloch, 1794)	*Wanz*	**Siluridae**	Ind	Near Threatened	Powai, Patalganga. A rare species, only seen twice
85	**Silong catfish** *Silonia silondia* (F. Hamilton, 1822)	*Bekti*	**Schilbeidae**	Ind, Intro-G	Least concern	Powai, Khandpe dam, Chirner dam
86	**Pacu Piranha/Cachama** *Colossoma macropomum* (Cuvier, 1816)		**Serrasalmidae**	Ex, Intro-G	NBE-red list	Powai
87	**Bombay swamp eel** *Monopterus indicus* (Silas & Dawson, 1961)	*wam*	**Synbranchidae**	En	Vulnerable	Matheran, Tulsi, Kondane caves near Rajmachi. Rare in MMR
88	**Freshwater pipe fish** *Hippichthys penicillus* (Cantor, 1849)	*wala*	**Syngnathidae**	Ind, Brk	Least concern	Patalganga, Gadeshwar, Thane creek (near Kopri), Bhandup pumping station

MARINE FISH and other FAUNA of MMR

In a region that is dominated by the coastal/marine environment whose effects have permeated into every aspect of its ecology, the class Pisces (fish) is critical to the region's ecology and economy. This present sub section of the report looks at the marine fish and other marine fauna of the MMR.

The class Pisces contains the highest species diversity among all the vertebral groups. It is also of most economic concern to humanity the world over. Of the 27,997 species of fish known to exist (Nelson 2006), comprising of 62 orders, 515 families and 4,494 genera, at least 3568 species are exclusively marine fish, while a further 12000 species frequent the marine and brackish environment during certain stages of their life-cycle.

Marine fish account for more than 85% of the world's fisheries industry. Of the approximately 2,500 species of fish reported for the Indian region, at least 1,570 are from the marine and brackish habitats**.**
India's coastline extends for over 7,000 km and Maharashtra has a coastline of over 700 km. According to the Gazetteer of India (1974) of the 600 species of fish reported in Maharashtra, 414 are marine species (Annexure …).
In the context of this fauna, the marine habitat comprises of the coastal stretch from south of Alibaug town to the mouth of the Tansa river in the north. The off-shore and shore areas, include inter-tidal areas, estuaries and creeks. According to the MMRDA Developmental Plan of 2011, this habitat covers 358 sq km or about 8 % of the total area under the MMR.

Method:

This marine fish survey and inventorisation is a result of field visits for primary data collections and intensive assessment of all other sources of information during the course of the project work. Surveys for the assessment and inventorisation of the marine fauna as part of this report involved visits to coastal habitats and also visits to the fish-landing centers, of which there are more than 15 along the coast of the MMR. The major fish-landing sites are Alibaug-Rewas, Mora–Uran, Trombay, Sassoon Dock, Ferry Wharf, Versova, Madh and

Manori–Gorai. The methodology also involved extensive interaction with local fishermen and local communities and subject experts from various institutions.

The various creeks of the MMR were also extensively explored to enumerate the presence of fish fauna, especially through interaction with local fishing communities.

Observations & Findings:

Marine fish fauna has attracted far more attention from observers than fresh-water fish. The Central Marine Fisheries Research Institute (CMFRI) is the premier institution that looks carries out research into marine fish.

The CMFRI reported 142 finfish and shellfish in November 1982 from the Maharashtra and Gujarat coast. Recently a total of 184 species from 41 families were recorded from the western coast of India (Rorbert Sluka 2012), while 31 species of fish were reported from Uran region (PR Pawar 2011) and 21 species of gobies were reported from the inter-tidal region of Mumbai (K.B Mutsaddi mid of 20 century). Rathod et al [2002] reported 67 species of fishes in the Thane creek, Mumbai and observed that various human activities like industrial effluents, domestic waste disposal, reclamation, sand dredging and eradication of mangrove flora have deteriorated the creek leading to a decline in fin-fish fauna during last two decades.

In the context of the present project, we report a total marine fish diversity of 206 species for the MMR, which includes 161 species of fin-fish and 45species of shell-fish. This is based on field surveys and findings and secondary data in the literatures. Of these, we came across 152 species during the project field-work. Since marine fish are a topic of immense economic interest, it is hardly surprising that commercially important species have received far more attention from both, the scientific community as well as the trade community. Of the 161 species of fin-fish reported in the MMR, at least 29 are of high commercial importance (Table….). The commercial fish fauna of India has been studied extensively (James et al. 1994, 1996). However, little is known about non-commercial fishes (Kuthalingam et al. 1973, 1979; Sreenivasan & Lazarus 1973; James et al. 1988; Murty 2002). Biodiversity and community structures are now recognized as important determinants of ecosystem

functioning. In this regard, the marine ecosystem has been studied to a much lesser extent compared to the terrestrial (Raghukumar 2003).

Commercially Important Fish Species of MMR

Sr. No.	Common Name	Scientific Group	Local Name (Marathi)
1	Golden Anchovye	Anchoviella	Mandelli
2	Black Pomfret	Black Pomfrets	Halwa
3	Pony Fish	Leiognathus	Khap
4	Unicorn cod.	Bregmaceros/Macelelendi	Tendali
5	Groupers	Perches	Karkara,Khajura,Heum,Gobr
6	Indian Mackerel	Mackerel	Bangada
7	Cracker	Otolithes species	Dhoma, dhodi
8	Other (Carangids)	Carangids Small	Kokari, Toki
9	Horse Mackerel	Caranx	Kharba Bangada
10	Red Snapper	Red Snapper	Tamb
11	Cat Fishes	Clarius	Shingada
12	Cuttle Fish	Cephalopoda	Mhakul
13	Thread Fins	Polynomids	Dadha & Rawas
14	White Sardines	Other Clupeids	Bhiljee,Khavali,Paturdi
15	Silver bar/Walf Heming	Chirocentrus	Karli & Datali
16	Eels	Anguilliformes	Wam
17	Pomfret	Pomfrets	Saranga
18	Shark & Rays	Elasmobranchs	Mushi & Pakat
19	Bombay Duck	Harpodon Nehereus	Bombil
20	Hilsa Ilisha / Toli	Hilsa Shad & Giant Herrings	Bhing & Palla
21	Big-Jaw Jumper	Lactarius	Soundala
22	Ribbon Fish	Ribbon Fishes	Bala & Wakti
23	Sardines and Oil Sardines	Sardines	Pedwa,Pedi & Tarali

24	Goat Fish	Upenaids Sp.	Chirati, Rane
25	Tuna Gedar,	Tunnies	Kupa
26	Thrissocles	Mustached Anehovy	Kati
27	Soles	Soles	Lep,Bhakas
28	Lobster	Lobsters	Shewand
29	Shrimp	Non-Penaeid Prawns	Jawala,Karandi

Many species of marine fish are encountered in the coastal-edge and creek areas, including brackish waters, during the period end-May – late-August. This coincides with their breeding season, due to which local fishing communities refrain from fishing during the monsoon. They resume fishing after several weeks following the festival of Nariyal Poornima, which marks the onset of the fishing season.

Across many parts of the world, fish catches are falling and becoming a matter of much concern. The advent of mechanized fishing, improved gear, longer fishing seasons and extension of fishing operations into deeper and distant waters coupled with a lack of regulation has resulted in over-exploitation of fish resources but also impacted other fish species besides the commercially valuable ones. This has been a major cause for concern. The impacts of removal of non-target organisms from the ecosystem through incidental catch or by-catch remain largely unstudied around the world (Pettovello 1999; Milton 2001). Many species in the marine ecosystem have thus become endangered or threatened for the simple reason that they inhabit the same habitat as the commercially valued marine fish. Additionally, the use of Bottom Trawl-nets is resulting in huge catches, which affect a very large population of fauna.

A sizeable percentage of non-target and incidental catch was observed at several of the fish landing jetties. In just two landings at the Madh and Versova jetties in Greater Mumbai, several species of sea-snakes, jellyfish, sea-turtles and vast quantities of juvenile and young fish were also observed.

Declining fish catches are affecting the western region of India too, including the MMR. In Greater Mumbai ferry wharf and Sasoon Dock are the prime fish-landing sites, with an

estimated volume of around 50,000 to 65,000 tons annually. Versova is another major landing site, with over 30,000 tons. In Thane district, Bassein (Vasai) and Arnala are the key landing sites while Alibaug, Uran and Mora are the principal fish-landing sites in Raigad district.

One approach to conserving these species is by protecting them through policy instruments like the Wildlife Protection Act and declaring them as threatened/vulnerable/endangered. While this approach may be successful for terrestrial species, it will not work in the marine ecosystem.
Instead what is required is a regime of regulation of catch and implementation of strategies to reduce non-target exploitation and incidental catch.

Marine turtles are caught in bottom trawling, gill nets and shore seines. Even though many awareness programmes have been carried out with regard to conservation of marine turtles by government agencies and NGOs, there is much more to be done. Some communities in Uthan, Manori, Gorai, Mankeshwar beach of Uran and Raigad consider turtle meat a delicacy and also of medicinal value, especially green turtles and olive ridleys. These turtles are already imperiled and such harvest further engenders their populations.

Along the Maharashtra coast *panchayats* form the central structure of the local fisheries management systems. They play an important role in solving conflicts concerned with resource management among the fishing communities. After the sudden boom in the mechanised fishing operations, from the late 1980s till the mid-1990s, there had been an increase in the number of complaints from traditional fishermen regarding exploitation of fisheries by the trawlers.

Some observation:

- Marine fish do not depict any endemism and there is no endemism observed in the MMR's marine fish fauna
- Offshore species data were collected from fish landing center of Versova, Sassoon dock, new ferry wharf and Alibaug. Of the 161 fin-fish, the common commercially important species based on catches are *Harpadon nehereus. Coilia dussumieri,*

Eleutheronema tetradactylum, Polydactylus indicus, Trichiurus lepturus and *Rastrelliger kanagurta.*

- Species such as *Chiloscyllium punctatum, Filimanus heptadactyla, Stolephorus bataviensis, Gymnura micrura, Rhizoprionodon acutus* have become rarer in the past 5-6 years possibly due to over-fishing,
- While *Xiphias gladius*, Galeocerdo sps., *Rhincodon typus* are the biggest marine fish reported in the MMR, the smallest is *Bregmaceros mcclellandi*.
- Amongs cuttle fish and squids *Sepia aculeate, Sepia prashadi, Uroteuthis duvaucelii, Cistopus indicus* are commonly recorded. *Cistopus indicus* is the only octopus species reported from the MMR, while *Uroteuthis duvaucelii* is the only loligo (squids) species.
- The MMR has 29 crustacean (prawns, shrimps) species with *Acetes indicus, Penaeus monodon, Solenocera crassicornis, Metapenaeus dobsoni, Parapenaeopsis sculptilis, Parapenaeopsis stylifera* living along the shore and *Solenocera choprai, Metapenaeopsis stridulans, Metapenaeus brevicornis, Acetes johni* being common offshore.
- Amongst the rarely sighted of marine shell-fish species are *Metapenaeus kutchensis, Parapenaeus longipes, Melicertus latisulcatus*.
- Two species of lobsters occur in the MMR, *Panulirus polyphagus* is a rocky shore species and is more common with large catches observed in September-December from Mumbai, Thane and Raigad coast. *Thenus orientalis* are sandy shore species.

CONCLUSION:

Coastal wetlands habitat has received mixed attention. It has been a coveted urban space and also has an immense economic impact with the livelihood of a large number of people closely associated with it. This is also where most of the waste from the city ends up, which threaten the ecological impact of this critical habitat. Thus this habitat faces the twin pressure of pollution and over exploitation by mechanized commercial fishing evidence by a steady drop in fish catch over the years.

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
LOBSTERS					
Palinuridae					
Mud spiny lobster OR Rock Lobster *Panulirus polyphagus (Herbst, 1793)*	Shewand	LC	C	Y	Commonly observed in Coastal area of Mumbai thane and Alibaug (Shore 2m uptill offshore 35m). Higb catch Observed September - December.
Scyllaridae					
Sand Lobster/flathead lobster *Thenus orientalis (Lund, 1793)*	Shewand	LC	C	Y	Sandy shore of Mumbai, Uttan, Gorai, Manori, Versova, New Ferry Warf, Alibaug
CRABS					
Calappidae					
Shame face crab *Calappa lophos (Herbst, 1782)*	Khekada	N Ev	R		Alibaug (Rarely observed)
Matutidae					
Moon Crab *Ashtoret lunaris (Forskål, 1775)*		N Ev	Un	Y	New ferry warf, Versova, Uttan, Daramtara, Alibaug
Portunidae					

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Mangrove crab *Scylla serrata (Forskål, 1775)*		N Ev	C	Y	Commonly observed in mumbai coast thane creek and Alibaug creek
Coral crab OR Christian crab *Charybdis (Charybdis) feriata (Linnaeus, 1758)*		N Ev	Un	Y	Versova, Sasoon dock, New ferry warf, Alibaug
Blue or Flower crab *Portunus (Portunus) pelagicus (Linnaeus, 1758)*		N Ev	C	Y	Observed commnly in shore and offshore area of Mumbai thane and Alibaug
Blood spotted swimming crab *Portunus (Portunus) sanguinolentus (Herbst, 1783)*		N Ev	C	Y	New ferry warf, Versova, Vasai creek, Alibaug
Squillidae					
Mantis Shrimp *Oratosquilla nepa (Latreille, 1828)*		N Ev	Un		
MOLLUSCS					Squids, Octopi & cuttle fish together forms Cephalopods (0.27% of world fish production). Cuttlefish abundant along MMR coast post-monsoon.
Sepiidae					
Ovalbone cuttlefish	Goti		R		Rare

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Sepia elliptica (Hoyle, 1885)					
Needle cuttlefish *Sepia aculeata (Van Hasselt, 1835)*		Data def	C	Y	Commnly observed after post monsoon in Sasoon dock, Versova, Alibaugh
Pharaoh Cuttlefish *Sepia pharaonis (Ehrenberg, 1831)*		Data def	Un	Y	Sasoon dock, Versova, Alibaug during Sept-Jan
Hooded cuttlefish *Sepia prashadi (Winckworth, 1936)*	Chaka goti	LC	C	Y	Observed in Sasoon dock on 25th of Sept
Spineless cuttlefish *Sepiella inermis (Van Hasselt, 1835)*		Data def		Y	Sasoon dock, Versova, Alibaug during Oct-Dec
Loliginidae					
Indian squid *Uroteuthis duvaucelii (d'Orbigny, 1835)*	Makul		C	Y	New Ferry Wharf,Sasoon dock, Versova, Alibaug
Octopodoidea					

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Indian octopus OR Old woman octopus *Cistopus indicus (Rapp, 1835)*		N Ev	C	Y	Sasoon dock & Alibaug
CRUSTACEANS					
Solenoceridae					
Coastal mud shrimp *Solenocera crassicornis (H.Milne Edwards, 1837)*		N Ev	C	Y	New Ferry Wharf, Versova in month of Jan, Mar, Feb, April
Ridge back Shrimp *Solenocera choprai (Nataraj, 1945)*		N Ev	C	Y	Off shore (Common)
Penaeidae					
Fidler Shrimp *Metapenaeopsis stridulans (Alcock, 1905)*		N Ev	C	Y	Offshore just away from itertidal area (Beyond 7m depth upto 90m)
Pink Prawn OR Jinga shrimp *Metapenaeus affinis (H.Milne Edwards, 1837)*	Lal Jinga	N Ev	C	Y	
Yellow shrimp *Metapenaeus brevicornis (H.Milne*	Pevla Jinga	N Ev	C	Y	Offshore and shore area of Uttan, Manori, Versova, Sasoon dock, Daramtara, Panvel

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Edwards, 1837)					creek
Kadal Shrimp *Metapenaeus dobsoni (Miers, 1878)*		N Ev	C	Y	Common in Shore area around Mumbai , Alibaug and Thane
Speckled shrimp *Metapenaeus monoceros (Fabricius, 1798)*		N Ev	Un	Y	Mostly Muddy region of Shore n sumparts of Offshore area
Kutch shrimp *Metapenaeus kutchensis (George & Rao, 1963)*		N Ev	R		Mostly offshore area of Mumbai and sum shore part of Alibaug.
Hawknose Shrimp *Parapenaeopsis acclivirostris (Alcock, 1905)*		N Ev	Un	Y	
Spear Shrimp *Parapenaeopsis hardwickii (Miers, 1878)*		N Ev	C	Y	April-may Versova & Arnala, Nov-Dec Sasoon dock with peak time Oct in mumbai coast
Rainbow Prawn *Parapenaeopsis sculptilis (Heller, 1862a)*		N Ev	C	Y	Arnala creek, Uttan, Thane, Versova, New ferry warf, Sasoon dock, Alibaug

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Kiddi Shrimp *Parapenaeopsis stylifera (H. Milne Edwards, 1837)*		N Ev	C	Y	Major landing observed in New ferry warf and versova (Very common)
Uncta Shrimp *Ganjampenaeopsis uncta (Alcock, 1905)*		N Ev	Un	Y	
Flamingo Shrimp *Parapenaeus longipes Alcock, 1905*	Bhoonsi	N Ev	R	Y	Rare- seen only in Offshore area towards gujarat
Indian white shrimp *Fenneropenaeus indicus (H.Milne Edwards, 1837)*		N Ev	C	Y	New ferry warf
Kuruma or Bamboo Shrimp *Marsupenaeus japonicus (Spence Bate, 1888)*		N Ev	Un	Y	
Western King Prawn *Melicertus latisulcatus (Kishinouye, 1896)*		N Ev	Un	Y	
Banana prawn *Fenneropenaeus merguiensis (De Man, 1888a)*		N Ev	C	Y	Sasoon dock, New ferry warf, Versova, Vasai jetty

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Giant tiger prawn *Penaeus monodon (Fabricius, 1798)*		N Ev	C	Y	New ferry warf, Versova
Red tail prawn *Fenneropenaeus penicillatus (Alcock, 1905)*		N Ev	Un	Y	New ferry warf
Green tiger prawn *Penaeus semisulcatus (De Haan, 1844)*		N Ev	Un		
Southern rough shrimp *Trachysalambria curvirostris (Stimpson, 1860a)*	Dugdu	N Ev	Un	Y	Sasoon dock, New ferry warf, Versova, Alibaug
Sergestidae					
Jawla Shrimp *Acetes indicus (H. Milne Edwards, 1830)*			C	Y	Abundantly common in Mumbai, Thane and Alibaug creek area
Acetes johni Shrimp *Acetes johni (Nataraj, 1949)*		N Ev	C	Y	Alibaug, Versova
Akiami paste shrimp *Acetes japonicus (Kishinouye,*		N Ev	C	Y	Sasoon dock and Versova

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1905)					
Alamang shrimp *Acetes sibogae sibogae (Hansen, 1919)*		N Ev	Un	Y	Thane creek , Sasoon dock
Palaemoninae					
Spider prawn *Nematopalaemon tenuipes (Henderson, 1893)*	Safed kolmi	N Ev	C	Y	Abudantly common in Mumbai, thane and Alibaug creek area
Roshna Prawn *Exopalaemon styliferus (H. Milne Edwards, 1840)*		N Ev	Un		Alibaug
Hippolytidae					
Hunter shrimp *Exhippolysmata ensirostris ensirostris (Kemp, 1914)*		N Ev	Un	Y	Alibaug, Sasoon dock
GROUPER FISH					
Serranidae					

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Spinycheek grouper *Epinephelus diacanthus (Valenciennes, 1828)*	hekru	Nr Thr	C	Y	Offshore sps found in catch of Sasoon dock, Ferry warf (Near Thr species)
Greasy grouper *Epinephelus tauvina (Forsskål 1775)*		Data def	Un	Y	Observed once in clear water of TIFR area (Data deficient species)
Blacktip grouper *Epinephelus fasciatus (Forsskål, 1775*		LC	Un	Y	
Terapontidae					
Tiger perch *Terapon jarbua (Forsskål, 1775)*		LC	C	Y	Common sps in Esturies, marine as well as fresh water of Mumbai , Thane and Raigad region
Priacanthidae					
Moontail bullseye *Priacanthus hamrur (Forsskål, 1775)*	kombda	LC	Un	Y	Sassoon Docks and New Ferry Wharf
Apogonidae					
Threadfin cardinalfish *Zoramia leptacantha (Bleeker,*		N Ev	Un	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1856-57)					
Sillaginidae					
Silver sillago *Sillago sihama (Forsskål, 1775)*		N Ev	Un	Y	Sasoon dock
Lactariidae					
False trevally *Lactarius lactarius (Bloch & Schneider, 1801)*	Perwi	N Ev	C	Y	Sasoon dock, Versova, New ferry warf, Alibaug
Rachycentridae					
Black kingfish *Rachycentron canadum (Linnaeus, 1766)*	Sakla	N Ev	Un	Y	New ferry warf
Carangidae					
African pompano *Alectis ciliaris (Bloch, 1787)*		LC	R	Y	
Indian Threadfin *Alectis indicus (Rüppell, 1830)*		N Ev	Un	Y	New ferry warf

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
shrimp scad *Alepes djedaba (Forsskål, 1775)*		N Ev	Un	Y	
Indian scad *Decapterus russelli (Rüppell, 1830)*			C	Y	Sasson dock, Versova, New ferry warf
Yellowtail scad *Atule mate (Cuvier, 1833)*		N Ev	C	Y	Sasoon dock, New ferry warf
Torpedo scad *Megalaspis cordyla (Linnaeus, 1758)*		N Ev	C	Y	Sasoon dock, New ferry warf, Versova
Cleftbelly trevally *Atropus atropos (Bloch & Schneider, 1801)*		N Ev	C	Y	Sasoon dock, New ferry warf
Longnose trevally *Carangoides chrysophrys (Cuvier, 1833)*		N Ev	Un	Y	
Blue trevally *Carangoides ferdau (Forsskål, 1775)*		N Ev	Un	Y	
Giant trevally		N Ev	R		not observed in study period , But can see these gaint rarely in New ferry warf offshore

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Caranx ignobilis (Forsskål, 1775)					sps
Black-tailed Trevelly *Caranx hippos (Linnaeus, 1766)*		N Ev	Un		
Rainbow runner *Elagatis bipinnulata (Quoy & Gaimard, 1825)*		N Ev	Un	Y	New ferry warf
Talang queenfish *Scomberoides commersonnianus (Lacepède, 1801)*			Un	Y	
Doublespotted queenfish *Scomberoides lysan (Forsskål, 1775)*		N Ev	Un		
Needlescaled queenfish *Scomberoides tol (Cuvier, 1832)*		N Ev	Un		
Black pomfret *Parastromateus niger (Bloch, 1795)*	Halwa	N Ev	C	Y	Sasoon dock, Versova, New ferry warf, Alibaug (Offshore sps)
Menidae					

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Moonfish *Mene maculata (Bloch & Schneider, 1801)*		N Ev	Un	Y	New ferry warf, Alibaug (Offshore sps)
Coryphaenidae					
Common dolphinfish *Coryphaena hippurus (Linnaeus, 1758)*		LC	R		
Lutjanidae					
John's snapper *Lutjanus johnii (Bloch, 1792)*		N Ev	C	Y	Sasoon dock, New ferry warf
Emperor red snapper *Lutjanus sebae (Cuvier, 1816)*		N Ev	Un	Y	
Nemipteridae	Locally Nemipterus genus is call as Rani fish				
Japanese threadfin bream *Nemipterus japonicus (Bloch, 1791)*		N Ev	C	Y	Sasoon dock, New ferry warf, Versova, Alibaug
Delagoa threadfin bream *Nemipterus bipunctatus (Valenciennes, 1830)*		N Ev	Un, S		Known Distribution along east coast of South Africa; rarely seen along MMR coast; once …???

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Mauvelip threadfin bream *Nemipterus mesoprion (Bleeker, 1853)*		N Ev	C	Y	Sasoon dock, versova, New ferry warf
Sciaenidae					
Spotted OR Sin Croaker *Johnius dussumieri (Cuvier, 1830)*	Vari kathalai	N Ev	Un	Y	
Sharpnose hammer croaker *Johnius borneensis (Bleeker, 1851)*		N Ev	R		Rarely sighted
Belanger's Croaker *Johnius belangerii (Cuvier, 1830)*		N Ev	C	Y	Common
Lesser tigertooth croaker *Otolithes cuvieri Trewavas, 1974*	Dhoma	N Ev	C	Y	New ferry warf, sasoon dock, Vasai jetty, Versova, Alibaug
Tigertooth croaker *Otolithes ruber (Bloch & Schneider, 1801)*	Dhoma	N Ev	C	Y	New ferry warf, sasoon dock, Vasai jetty, Versova, Alibaug
Bronze croaker *Otolithoides biauritus (Cantor, 1849)*	Dhoma	N Ev	Un	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Mullidae					
Yellowstriped goatfish *Upeneus vittatus (Forsskål, 1775)*	Chiri / Rana	N Ev	C	Y	Versova, Sasoon dock, New ferry warf, Alibaug
Yellow-goatfish *Upeneus sulphureus (Cuvier, 1829)*	Chiri / Rana	N Ev	C	Y	Versova, Sasoon dock,Vasai jetty, New ferry warf, Alibaug
Ephippidae					
Spadefish *Ephippus orbis (Bloch, 1787)*	Vada/Chandwa		Un	Y	Versova, New ferry warf (Offshore)
Drepaneidae					
Spotted sicklefish *Drepane punctata (Linnaeus, 1758)*	Chand	N Ev	Un	Y	New ferry warf, sasoon dock, Alibaug (Offshore)
Scatophagidae					
Spotted Scatfish *Scatophagus argus (Linnaeus, 1766)*	Kaski	LC	C	Y	Commonly observed in mumbai coast thane creek and Alibaug creek
Chaetodontidae					

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Filamented coral fish *Chaetodon auriga (Forsskål, 1775)*		LC	Un	Y	
Trichiuridae					
Smallhead hairtail fish *Eupleurogrammus muticus (Gray, 1831)*	Wagti	N Ev	C	Y	New ferry warf, versova, Vasai creek, Alibaug
Savalai hairtail *Lepturacanthus savala (Cuvier, 1829)*	Wagti/Bala	N Ev	C	Y	New ferry warf, versova, Sasoon dock, Vasai, Alibaug
Largehead hairtail *Trichiurus lepturus (Linnaeus, 1758)*	Baga	N Ev	C	Y	New ferry warf, Sasson dock, versova, Alibaug (Peak Sept-Dec)
Scombridae					
Frigate tuna *Auxis thazard thazard (Lacepède, 1800)*	Bugudi/Kuppa/ Gedar	LC	Un	Y	Sasoon dock
Eastern Little tuna *Euthynnus affinis (Cantor, 1849)*	Bugudi/Kuppa/ Gedar	LC	C	Y	Sasoon dock, versova, New ferry warf, Alibaug

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Skipjack tuna *Katsuwonus pelamis (Linnaeus, 1758)*	Bugudi/Kuppa/ Gedar	LC	Un	Y	Sasoon dock, New ferry warf
Indian mackerel *Rastrelliger kanagurta (Cuvier, 1816)*	Bangada	Data def	C	Y	Sasoon dock, Vasai jetty, Alibaug, New ferry warf
Narrow-barred Spanish mackerel *Scomberomorus commerson (Lacepède, 1800)*	Surmai/ Towar/ Anjari	Near thr	Un	Y	Sasoon dock, Alibaug, New ferry warf
Indo-Pacific king mackerel *Scomberomorus guttatus (Bloch & Schneider, 1801)*	Surmai/ Towar/ Anjari	Data def	Un	Y	New ferry warf
Streaked Spanish mackerel *Scomberomorus lineolatus (Cuvier, 1829)*	Surmai/ Towar/ Anjari	LC	R		
longtail tuna *Thunnus tonggol (Bleeker, 1851)*		Data def	Un		Sasoon dock
Istiophoridae					
Indo-Pacific sailfish *Istiophorus platypterus (Shaw,*	Tadmasa	LC	Un		

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1792)					
Black marlin *Makaira indica (Cuvier, 1832)*	Tadmasa	Data def	R		
Xiphiidae					
Swordfish *Xiphias gladius Linnaeus, 1758*	Tadmasa	LC	Un	Y	
Stromateidae					
Silver or White Pomfret *Pampus argenteus (Euphrasen, 1788)*	Saranga/Paplet	N Ev	C	Y	Sasoon dock, Versova, New ferry warf, Alibaug
Chinese silver pomfret *Pampus chinensis (Euphrasen, 1788)*	Kalwad/Kafri	N Ev	C	Y	Sasoon dock, Versova, New ferry warf, Alibaug
Gobiidae					
Common Mudskipper *Boleophthalmus dussumieri (Valenciennes, 1837)*	Kharbi/Nevta	N Ev	C	Y	Creeks area of Mumbai , Thane and Alibaug very common and Abduntant sps of intertidal area
Blue-spotted Mudskipper *Boleophthalmus boddarti (Pallas,*	newty	LC	Un	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1770)					
Cryptocentrus inexplicatus (Herre, 1934)	Kharbi/Nevta	N Ev	Un	Y	worli mahim khardanda
Scribbled goby *Awaous stamineus (Valenciennes, 1837)*	Kharbi/Nevta	LC	Un		
Parachaeturichthys ocellatus (Day, 1873)	Kharbi/Nevta	N Ev	Un	Y	Muddy creek of Colaba madh mahul thana
Taileyed Goby *Parachaeturichthys polynema (Bleeker, 1853)*	Kharbi	N Ev	C	Y	Creeks and backwaters of Colaba cuffe-parade beach candy Haji ali thana madh
Maned goby *Oxyurichthys microlepis (Bleeker, 1849)*	kharbi	N Ev	Un		Creeks and backwaters of Colaba
Day's goby *Acentrogobius dayi Koumans, 1941*	Kharbi	N Ev	Un		Soft Muddy flats partly burrowed seen in Elephanta islands and Marve beach

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Grey goby *Acentrogobius griseus*		N Ev	Un		Soft Muddy flats partly burrowed seen only on Elephanta islands
Spotted green goby *Acentrogobius viridipunctatus (Valenciennes)*	Kharbi	N Ev	Un		Below stones algae seen in colaba thana worli mahim
Acentrogobius masoni		N Ev	R		Below Algae beds of thana revdanda rarely seen
Acentrogobius cyanomos		N Ev	Un		Back water of Elephanta and Madh
Ornate goby *Istigobius ornatus*		N Ev	C	Y	Rocky beaches of Mahim bandra bandstand versoava thana revdanda
Gobius reichei *Acentrogobius reichei*		Near thr	C	Y	Rocky beaches of colaba cuff-parade worli danda madh
Sharptail goby *Oligolepis acutipennis*		Data def	C		Algal waters beach cady hazi ali Doodhi beach Thana
Oligolepis cylindriceps		N Ev	C		Back water of Mahim and Thana
Barbalogobius asanai		N Ev	Un		

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Quisquilious eugenius		N Ev	Un		Intertidal pools of Alibaug colaba bandra band stand
Sleepy goby *Psammogobius/Glossogobius biocellatus*		LC	Un		Intertidal pools of Mahim Worli Bandra band stand Alibaug
Bar-eyed goby/Tank goby *Glossogobius giuris*		LC	Un		Blackish green intertidal pools Mahim and Versova
Stigmatogobius javanicus		N Ev	Un		
Yongeichthys/ Ctenogobius criniger		N Ev	Un		Below stones Alibaug bandra colaba mahim
Dusky frillgoby *Bathygobius fuscus*		LC	Un		Below stones Elephanta Alibaug beach cady Haziali Bandra Mahul-Sewri Madh
Queen of Siam Goby *Mugilogobius valigouva*		N Ev	Un		
Burrowing goby *Trypauchen vagina (Bloch & Schneider, 1801)*	Tambade	N Ev	Un	Y	Soft Muddy area of Sewri-Mahul Revdanda Marve

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Psettodidae					
Indian Turbo *Psettodes erumei (Bloch & Schneider, 1801)*	Bhakas/Lepti	N Ev	R	Y	Rarely sighted only one time in Alibaug area
Paralichthyidae					
Largetooth Flounder *Pseudorhombus arsius (Hamilton, 1822)*	Lepti/Lep/Jeebhti	N Ev	C	Y	Alibaug revdanda Bandstand Colaba Versova Mandwa
Cynoglossidae					
Malabar tongue sole *Cynoglossus macrostomus Norman, 1928*	Shivra/Lep	N Ev	Un	Y	
Largescale tonguesole *Cynoglossus arel (Bloch & Schneider, 1801)*	Gipti/Lep/Shivra	N Ev	C	Y	Alibaug Versova Mandwa
Monacanthidae					
Unicorn leatherjacket *Aluterus monoceros (Linnaeus,*		N Ev	Un	Y	Revdanda

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1758)					
Tetraodontidae					
Smooth blaasop puffer fish *Lagocephalus inermis (Temminck & Schlegel, 1850)*		N Ev	Un		
Spotted Green Puffer fish *Tetraodon nigroviridis Marion de Procé, 1822*		N Ev	C	Y	Thana Colaba Alibaug
SHARKS					
Hemiscylliidae					
Ridge back cat shark/Spotted catshark *Chiloscyllium punctatum (Müller & Henle, 1838)*	Mushi	Near thr	Un	Y	
Ginglymostomatidae					
Rusty shark *Nebrius ferrugineus (Lesson, 1831)*		N Ev	Un	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Rhincodontidae					
Whale shark *Rhincodon typus Smith, 1828*		Vul	R		
Stegostomatidae					
Zebra Shark *Stegostoma fasciatum (Hermann, 1783)*		Vul	*Un*		
Carcharhinidae					
Grey shark/Black tip shark *Carcharhinus limbatus (Müller & Henle, 1839)*		Near Thr	*C*	Y	
Black tip reef shark *Carcharhinus melanopterus (Quoy & Gaimard, 1824)*		Near Thr	*Un*		
Spot tail shark *Carcharhinus sorrah (Müller & Henle, 1839)*		Near Thr	*Un*		
Tiger shark *Galeocerdo sps.*		Near Thr	*Un*		

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Milk Grey dog shark/Fish shark *Rhizoprionodon acutus (Rüppell, 1837)*		LC	***R***		
Sharpnose dog shark/Grey sharpnose shark *Rhizoprionodon oligolinx Springer, 1964*		LC	*Un*		
Yellow dog shark/Spadenose shark *Scoliodon laticaudus (Müller & Henle, 1838)*		Near Thr	*Un*		
Sphyrnidae					
Scalloped hammerhead *Sphyrna lewini (Griffith & Smith, 1834)*		End	***Un***		
Round headed shark *Sphyrna zygaena (Linnaeus, 1758)*		Vul	*Un*		
SKATES					
Rhinobatidae			R		

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Sharpnose guitarfish *Glaucostegus granulatus (Cuvier, 1829)*		Vul	***Un***		
Gaint guitarfish *Rhynchobatus djiddensis*		Vul			
Pristidae					
Smalltooth Sawfish *Pristis microdon (Latham, 1794)*		Crit En	R		Rare (Critically Endangered)
RAYS					
Dasyatidae					
Pale-edged stingray or sharpnose *Dasyatis zugei*		Near Thr	R		Rare (Near Thr (IUCN 3.1)
Whiptail stingray *Himantura bleekeri (Blyth, 1860)*		Vul	R		Rare (Threat to humans-Venomous)
Scaly whipray *Himantura imbricata (Bloch & Schneider, 1801)*		Data def	R		Rare Data Deficient (Threat to humans-Venomous)

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
GYMNURIDAE					
Smooth butterfly ray *Gymnura micrura (Bloch & Schneider, 1801)*		Data def	R		Rare (Data Deficient)
Longtail Butterfly Ray *Gymnura poecilura (Shaw, 1804)*		Near Thr	R		Rare (Near Thr)
Bleeker's whipray *Himantura bleekeri (Blyth, 1860)*		Data def	Un	Y	Rare Data Deficient
Banded whip tailed ray *Himantura uarnak (Forsskål, 1775)*	Confrim in pic rupresh	Vul	Un	Y	Vulnerable
Mobulidea					
Giant Manta Ray *Manta birostris (Donndorff, 1798)*		Vul	Un		Vulnerable
Myliobatidae					
Lesser Devil Ray *Mobula diabolus (Shaw, 1804)*	Shing Pakat OR Mhorcha	Data def	Un		
Clupeidae					

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
White sardine *Escualosa thomcata (V alenciennes,. 1847)*		N Ev	Un	Y	
Indian OR Hilsa shad *Tenualosa ilisha (Hamilton, 1822)*	Chaksi	N Ev	Un	Y	Seen twice in Karanja creek
Indian oil sardine *Sardinella longiceps Valenciennes, 1847*		LC	Un	Y	
Fringescale Sardinella *Sardinella fimbriata(Valenciennes, 1847)*			Un		
Hilsa toli *Tenualosa toli (Valenciennes 1847)*		N Ev	C	Y	
Pristigasteridae					
Elongate ilisha *Ilisha elongata (Anonymous [Bennett], 1830)*		N Ev	Un	Y	
Coromandel ilisha *Ilisha filigera (Valenciennes,*		N Ev	Un		

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1847)					
Bigeye ilisha *Ilisha megaloptera (Swainson, 1839)*		N Ev	Un		
Indian pellona *Pellona ditchela (Valenciennes, 1847)*		N Ev	Un		
Engraulidae					
Goldspotted anchovy *Coilia dussumieri Valenciennes, 1848*	Mandeli	N Ev	C	Y	Bombil and Mandeli are most common fishes of Mumbai reagion.(common food of Native Mumbaikar's)
Scaly hairfin anchovy *Setipinna taty (Valenciennes, 1848)*		N Ev	Un	Y	
Spotty Face Anchovy *Stolephorus bataviensis Hardenberg, 1933*		N Ev	Un	Y	
Moustached thryssa *Thryssa mystax (Bloch & Schneider, 1801)*	Tolkati	LC	C	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Dussumier's thryssa *Thryssa dussumieri (Valenciennes, 1848)*	Kati	N Ev	C	Y	
Baelama anchovy *Thryssa baelama (Forsskål, 1775)*		N Ev			
Chirocentridae					
Dorab wolf-herring *Chirocentrus dorab (Forsskål, 1775)*	Datali	N Ev	Un	Y	
Whitefin wolf-herring *Chirocentrus nudus Swainson, 1839*	Kiru-wahlah-Tamil	N Ev		Y	
Chanidae					
Milkfish *Chanos chanos (Forsskål, 1775)*	Humeen- Kanada	N Ev	Un	Y	
Synodontidae					
Greater lizardfish *Saurida tumbil (Bloch, 1795)*	Chor Bombil	N Ev	C	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Bombay-duck *Harpadon nehereus (Hamilton, 1822)*	Bombil	N Ev	C	Y	Abundantly and commonly found in Mumbai region.
Myctophidae					
lantern fish *Myctophum pterotum*		N Ev	Un	Y	Reported from Maharashtra coast in 1985
Ariidae					
Sagor Catfish *Hexanematichthys sagor (Hamilton, 1822)*		N Ev	Un	Y	Threat to humans (Traumatogenic)
Engraved Catfish *Arius caelatus (Valenciennes, 1840)*	Kontia	N Ev	C	Y	
Blacktip sea catfish *Plicofollis dussumieri (Valenciennes, 1840)*	Shingala	LC	Un	Y	
Blackfin sea catfish *Arius jella (Day, 1877)*	Shingala	N Ev	C	Y	
Spotted catfish *Arius maculatus (Thunberg,*	Shingala	N Ev	C	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1792)					
Dusky Catfish *Arius sona (Hamilton, 1822)*	Sona Tengra	N Ev	C	Y	
Giant catfish *Netuma thalassina (Rüppell, 1837)*	Shingala	N Ev	Un	Y	
Muraenesocidae					
Yellow pike conger *Congresox talabonoides (Bleeker 1853)*	Piula waam	N Ev	C	Y	New ferry wharf, sasoon dock, thane creek area, versova, Alibaug
Daggertooth pike conger *Muraenesox cinereus (Forsskål, 1775)*	Kala Waam	N Ev	C	Y	New ferry wharf, sasoon dock, thane creek area, versova, Alibaug
Hemiramphidae					
Halfbeak *Hyporhamphus quoyi (Valenciennes, 1847)*		N Ev	Un	Y	
Belonidae					
Full Beak *Strongylura strongylura (Hasselt,*		N Ev	Un	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
1823)					
Exocoetidae					
Spofin Flyingfish *Cypselurus furcatus (Mitchill, 1815)*		N Ev	R		
Bregmacerotidae					
Unicorn cod *Bregmaceros mcclellandi (Thompson, 1840)*		N Ev	R		
Sphyraenidae					
Great Barracuda *Sphyraena barracuda (Edwards, 1771)*		N Ev	Un	Y	
Mugilidae					
Gold spot mullet *Liza parsia (Hamilton 1822*)			Un	Y	
Grey mullet *Mugil cephalus (Linnaeus, 1758)*	Boi	LC	C	Y	Common sps around the Mumbai coastal and intertidal area

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Polynemidae					
Fourfinger threadfin *Eleutheronema tetradactylum (Shaw, 1804)*	Rawas	N Ev	C	Y	Common fish of offshore region in mumbai
Sevenfinger thread fish *Filimanus heptadactyla (Cuvier, 1829)*	Ma-kala OR Shende	N Ev	Un	Y	
Indian Threadfin *Polydactylus indicus (Shaw, 1804)*	Dara OR Chelna OR kala	N Ev	C	Y	Common sps as well as commercially important fishes of Mumbai and Surrounding region
Blackspot threadfin *Polydactylus sextarius (Bloch & Schneider, 1801)*	Kati kala	N Ev	Un	Y	
Sixfinger threadfin *Polydactylus sexfilis (Valenciennes, 1831)*	Dhigi OR	N Ev	Un	Y	
Ambassidae					
Commerson's glassy perchlet *Ambassis ambassis (Lacepède, 1802)*		LC	Un	Y	

Common & Latin Name	Local Names	IUCN Status	Local Status	Seen during Project	Observz`ation & Comments
Naked-head glassy perchlet *Ambassis gymnocephalus (Lacepède 1802)*		LC	Un	Y	

Floral Wealth of the MMR

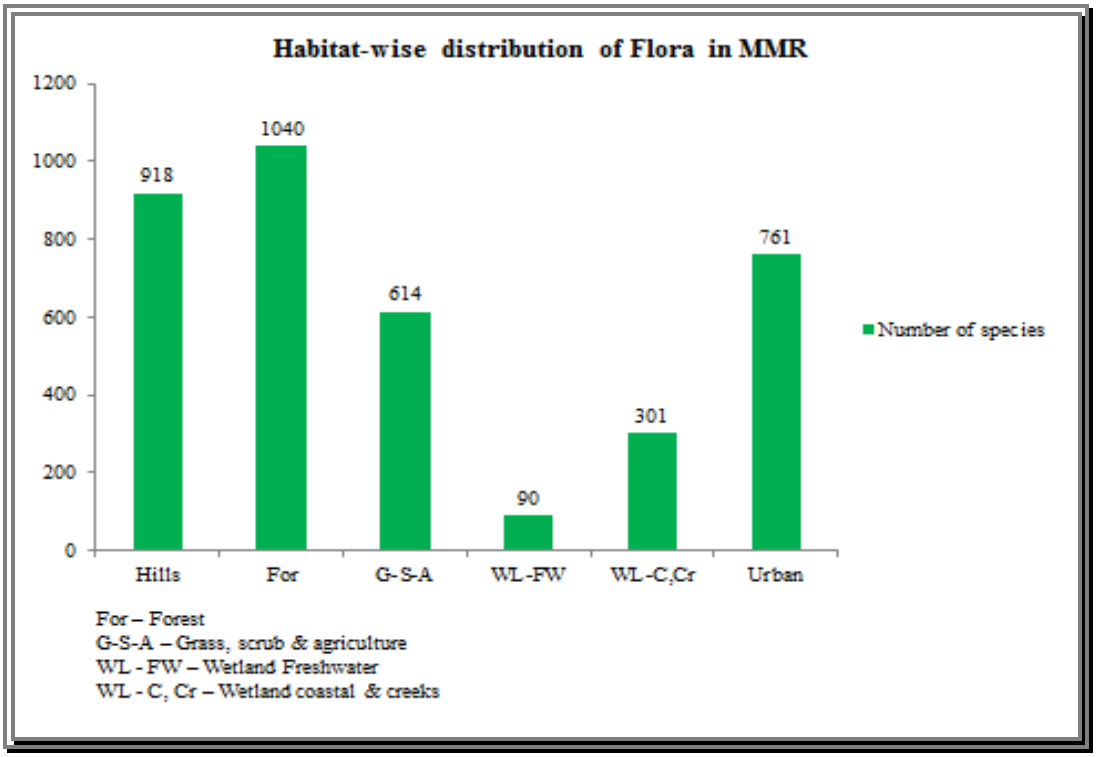
The floral studies of any region have immense significance, ecologically but also socially and economically. No inventory of the ecological diversity of any region is complete without highlighting this important taxonomic group. It also provides critical insights into the health of the overall habitat and its vitality. Furthermore, as primary producers, floral diversity are a crucial cornerstone of the large ecosystem.

The MMR not only benefits from its location in one of the richest biogeographical zones with plenty of seasonal rain, but also with a diversity of habitats including coastal mudflats, mangroves, hills, scrub and grassland and the built up habitats. The floral diversity in these habitats ranges from grass, scrub, herbs and shrubs to gigantic evergreen and deciduous trees. There have been very few studies specific to the floral aspects of the Mumbai region, though several documented works have explored the flora of the larger surrounding region, including the erstwhile Bombay presidency that included the state of Gujarat, two-thirds of Maharashtra and parts of Karnataka.

Amongst the foremost works was The Bombay Flora (Nicholas A Dalzell & Alexander Gibson, 1861), which described the indigenous plants in and around the Bombay presidency,

together with a supplement of introduced and naturalised species. The *Gazetteer of the Bombay Presidency* (1872) contains several accounts on the region's flora, and include, *Useful Plants o£ the Bombay Presidency* (J C Lisboa) and *Botany of the Bombay Presidency* (Surgeon Major W Gray). It also included *List of Gujarat Trees* (Prom materials supplied by G.H,D. Wilson and Lieut. Col J. G. McRae. JAMES M. CAMPBELL. August 1886).
Dr Lindsay Stewart began compiling information for 'Forest flora of Northwest and Central India' and his book was completed in 1874 by Dietrich Brandis who was also the first Inspector-General of Forests. Brandis also compiled 'Indian Trees' (1906) which has always been considered a major reference work on the region. It also deals with shrubs, bamboos, other palms of the British India Empire. Of the 4400 species in that work, nearly 2000 were species of trees, all indigenous species.

That work inspired much other work on the flora of a vast part of peninsular India and included 'Forest Flora of Bombay Presidency and Sindh' Vol I & II (1906 – 1911) by W A Talbot. More comprehensive scientific work on the region's flora was the *The flora of the Presidency of Bombay* by Theodore Cooke, 1903 -08, also referred to as Cooke's Flora.
There has since been much interest in the region's flora, with numerous checklists including a popular book, *Trees of Mumbai* (Almeida & Chaturvedi, 2006). In recent times, the most comprehensive work has been *Flora Of Maharashtra* (Almeida, M R, 2011).
These works have documented the larger region's flora, especially the Greater Mumbai area. However, as part of the exhaustive MMR Biodiversity Project, this report looks at the vast flora of this study area across the entire swathe of habitats of the MMR, and assesses its diversity flora in the context of the anthropogenic impacts and on its overall ecological considerations.



An inventorisation of the flora of a region with such varied habitats and topography is a colossal task. Not only are the number of species far higher than any other faunal taxonomic group but also the classification systems are in a constant state of flux. In addition, humans have, knowingly and unknowingly, continually altered the floral landscape with introduced, ornamental plants that 'escape' into other habitats and become naturalised. These have had an impact on the ecology of many habitats and their biodiversity. While the ecological impact of the larger faunal taxonomic groups is more observable, the dynamics of the silent floral empire remains poorly misunderstood. In the urban context this attains even more alarming dimensions, as we noticed across the MMR with respect to several species of flora.

The Study Area:

The MMR includes a complex matrix of habitats and ecosystems, including forest, grass and scrub, freshwater wetlands, coastal wetlands, agricultural tracts and built up areas. From native ecosystems at one end to intensely human-impacted spaces, the MMR comprises a spectrum of habitats linked together in a dynamic matrix of heterogenic complexity. The habitat diversity across the MMR is discussed in greater detail in the introduction chapter.

Material and Methods:

The habitat classification scheme used for this inventorisation has already been discussed. This includes forest, grass and scrub, cultivation and agriculture, freshwater wetlands, coastal wetlands, and built up areas. The several hills in the area have been treated as a distinct ecological unit within the different habitats in which they are located.
This sub section is structured to enumerate species and ecological diversity in the delineated area, across different ecological niches and not to investigate overall population estimates of any floral group or of any particular species. However, some of the uncommon and rare species of flora across the MMR have been documented in greater detail.

The findings are based on collecting primary data and semi-unstructured interviews of different stake holders. It also collected secondary data sourced from existing literature and archival records.
Identification of floral species is done through various references but primarily using morphological characters and descriptions available in *Flora of Maharashtra* by Dr. M.R. Almeida. The taxonomic scheme follow the one used by *Flora of Maharashtra* and International Plant Name Index.

Urbanised Municipalities:

One of the most prominent features of any urban area is the intensively built-up and human impacted features, dominated by concrete, steel and glass. This includes housing complexes, skyscrapers and industrial complexes but is dotted with tree-lined roads, city parks and gardens. Such areas are spread across the MMR, but most prominent in the Greater Mumbai area. Besides Greater Mumbai, there are seven other municipal corporations, with a spread of urban townships that are expanding exponentially at the cost of several other habitat features.

Though such urban areas are often treated as being empty of biodiversity, there is a growing literature that suggests that the urban landscape is heterogeneous with variable ecological potential and impact of human intervention (Cadenasso, Pickett, & Schwarz, 2007; Francis, Lorimer, & Raco, 2011; Pickett et al., 2008; Rosenzweig, 2003). While on one hand it may have transformed vast natural landscapes and topographical attributes into homes and

industry and bridges and roads. However, it has simultaneously resulted in the creation of micro-habitats, which serves as a windfall certain species.

Various municipal corporations in the study range are considered in this category, which includes the human settlements, parks, gardens, avenues, open spaces, patches of sporadic vegetation in the limit of each municipal corporation. Further urban flora is categorised area wise as the limit of Municipal Corporation of Greater Mumbai (MCGM) which covers a large part of urbanised area and the seven other municipal corporations which are clumped together for their floral assessment.

Salient Features:

The urban flora (township vegetation) of MMR comprises of at least 828 species of the higher plants, the angiosperms or flowering plants. This does not include the many small ornamental herbs and shrubs that have been introduced in private gardens and other locations. Over time, with continuous and more intensive surveys, this number is bound to increase, also because the human society will continue to bring in additional flora as well as ecological processes themselves are agents of continuous change.

Trees are often the most prominent aspect of flora diversity, in urban as well as in wilderness landscapes. A very distinct pattern is evident across the urban areas of the MMR, especially ornamental and exotic trees that have become an common part of the MMR. Largely exotic tree species like *Peltophorum pterocarpum, Samania saman, Terminalia catappa, Alstonia scholaris, Gliricidia sepium, Spathodia campanulata, Pongamia pinnata, Thespesia populnea, Polyalthia longifolia, Delonix regia* and *Cocos nucifera* are common in the urban areas of the MMR.

These dominating exotic species are intermittently mixed with the presence of various non exotic species like *Ficus religiosa, Ficus benghalensis, Mangifera indica, Artocarpus heterophyllus, Lagerstroemia speciosa, Tabebuia rosea, Ficus elastica , Neolamarckia cadamba, Acacia auriculiformis, Sterculia foetida, Parkia biglandulosa* and *Barringtonia asiatica*, amongst a few others. Besides, trees such as *Syzygium cuminii, Azadirachta indica, Melia azadirach, Ficus glomerata, Tamatindus indica, Cassia fistula, Morus alba* and

Couroupita guianensis can be seen growing sporadically at specific sites in the township area, many of these part of old-growth patches in municipal gardens, large industrial estates and private estates.

Across many urban areas of the MMR, a very disturbing trend is the systematic loss of old growth tree cover. The shifting of many older industrial estates, conversion of several of such estates and other leafy surrounds to giant housing complexes, the continuous infrastructural development with the augmentation of the road network as well as the development for newer and alternative transportation under MUTP (metro train networks, monorail, additional railway corridors, road widening, flyovers, bridges, coastal roads etc) are extracting significant price in terms of loss of flora diversity (and consequently other biodiversity). In fact, a very distinct lack of coordination and understanding of ecological attributes is evident throughout the MMR with the loss of an overall ecological quality of the MMR flora and general environment. The most worrying aspect of this development is the loss of old growth indigenous trees that attract birds and other biodiversity **(Table ….)**.

Thousands of large trees have been lost over the past decade to developmental expansion and several on-going and proposed infrastructural projects envisage taking a further very heavy toll on extant tree growth in the MMR. There has scarcely been any reasonable attempt to explore alternatives that would take a lesser toll on environment and more often than not mature, indigenous trees are sacrificed.

No.	Declining indigenous trees in urban MMR	No.	Declining indigenous trees in urban MMR
1	*Aegle marmelos*	14	*Mammea suriga*
2	*Azadirachta indica*	15	*Mimusops elengi*
3	*Buchanania lanzan*	16	*Mitragyna parvifolia*
4	*Butea monosperma*	17	*Morinda pubescens*
5	*Crataeva tapia*	18	*Pterocarpus marsupium*
6	*Drypetes roxburghii*	19	*Sapindus trifoliatus*

7	*Erythrina indica*	20	*Spondias pinnata*
8	*Garuga pinnata*	21	*Streblus asper*
9	*Heterophragma quadriloculare*	22	*Terminalia arjuna*
10	*Holoptelia integrifolia*	23	*Terminalia bellerica*
11	*Lagerstroemia speciosa*	24	*Terminalia chebula*
12	*Lannea coromandelica*	25	*Vateria indica*
13	*Madhuca indica*		

The attempts at translocation of giant trees have been disheartening. Instead, in the name of replacing and planting trees in lieu of indigenous trees that are felled, more and more exotic trees are planted to serve little purpose for most native biodiversity **(Table …)**. Many of the exotic and introduced tree species planted across the MMR are also strong colonisers and which completely thwart the growth patterns and survival rates of most indigenous trees.
A clear dominance of certain tree species is apparent across the MMR and includes species such as *Peltophorum pterocarpum, Terminalia catappa, Gliricidia sepium, Alstonia scholaris* and *Spathodia campanulata*, amongst a few more. While these may also be seen extensively in modern-day parks and residential compounds, such trees appear more widespread due to the mono-culture practices adopted by the various municipal corporations over the years, depicting a clear lack of planning and maintenance of floral diversity in the urban context, the underlying objective being the fast growth achieved by these exotic and introduced species. Some of the largest trees surviving in the MMR, especially in Greater Mumbai area, are giant specimens of the Rain Tree *Samania saman*, seen along roads and other urban areas. These are remnants of the British era, and also include the last few specimens of the **Baobab** tree (all remaining baobab trees in MMR have been GPS mapped) that is reported to have been brought into India, and especially along the west coast, including the Mumbai region, by the Portuguese about 500 years ago. Several other rare trees in the MMR have also been mapped.

However, it is the large presence of ornamental, avenue trees such as *Polyalthia longifolia, Delonix regia, Roystonea regia, Peltophorum pterocarpum*, *Caryota urens*, and *Casuarina equisetifolia* that reveals the more detrimental effects of human interference on ecology and

about which very little has been documented. Across the MMR it was observed that while some of these trees **(Table ….)** constitute the bulk of the tree growth, dominating both in numbers and spread, they tend to attract very few birds, butterflies and other biodiversity.

No.	Ubiquitous exotic trees across MMR	No.	Ubiquitous exotic trees across MMR
1	*Acacia auriculiformis*	12	*Parkia biglandulosa*
2	*Alstonia scholaris*	13	*Peltophorum pterocarpum*
3	*Casuarina equisetifolia*	14	*Pithecellobium dulce* *
4	*Ceiba pentandra*	15	*Polyalthia longifolia*
5	*Delonix regia*	16	*Roystonea regia*
6	*Eucalyptus* spp.	17	*Samanea saman*
7	*Gliricidia sepium*	18	*Senna siamea*
8	*Kigelia pinnata*	19	*Spathodea campanulata*
9	*Leucaena leucocephala*	20	*Tabebuia rosea*
10	*Melia azedarach*	21	*Tecoma* spp.
11	*Millingtonia hortensis*	22	*Terminalia catappa*
	* *: Naturalized*		

Observations on mature growth of these predominantly exotic trees suggest barely 5 species of birds actually use these trees for nesting or as perch-sites. These trees also attracted few squirrels and butterfly species, though the fruits of P longifolia attract the large Indian fruit-bat or Flying Fox. It is also the food plant of the tailed-jay butterfly besides its dense leafy growth is a boon for several small birds to roost and nest in. We observed both, red-vented and red-whiskered bulbuls nesting extensively in *P longifolia*. It is observed that very few introduced and exotic tree species have benefitted other biodiversity, clearly indicating that management of such floral diversity requires sensitivity and planning.

The project botany team also surveyed urban areas that included avenues and parks and recorded a huge of number of foliage rich ornamental plants. In addition there are many many hundreds of sites that, on paper, are classified as open spaces but have either been encroached

or reduced to a dustbowl and garbage dump. This, along with large scale development and its many fallouts, has seriously affected the lower strata of floral growth; the herbs and shrubs.

The secondary growth layer or shrubs, it could be argued, seems to have been as seriously affected and altered by human impact than the higher growing trees, perhaps even more so. Unlike the taller, visually appealing trees, the indigenous wealth of shrubs and herbs have received scant attention of town-planners, agencies and the larger populace, and this is evident across every urban area of the MMR. Much of the native shrubbery and herb growth has been alarmingly affected by pollution, dust and general loss of habitat quality and instead, the altered and subnormal landscape is instantly colonised by a host of more resilient species, including alien species that had been introduced over the years or that may have escaped from 'captivity'. There are may be as many varieties of exotic, ornamental herbs and shrubs in these urban areas as native species.

Amongst the most widespread species of non-tree growth are *Ricinus communis*, *Ficus hispida, Lantana camara, Malachra capitata*, *Plumeria alba*, *Tabernaemontana divericata*, *Tecoma stans*, *Ixora coccinea*, various *Ipomoea* species, while others such as *Psidium guajava, Annona sqamosa, Achyras sapota, Carrica papaya too are widespread in some sites.* Several introduced exotics have been extensively planted in the urban areas across the MMR for ornamental arches and suchlike factors and include *Quisqualis indica, Bougainvillea spectabilis*, amongst several others.

Interestingly, it was observed that several of the herbs and shrubs, especially numerous annuals, have in recent years colonised, or perhaps held on and returned, to the on-going developmental sites across central and south Mumbai as also in the town-centres of several other urban areas. This includes species such as *Impatiens balsamina, Gloriosa superba*, *Abelmoschus manihot*, *Abutilon indicum*, *Azanza lampas* and a few others.
The urban MMR region also sustains a high number of invasive plants, most of them as an undergrowth of herbs and shrubs and the monsoon months witnesses an upsurge of many of these species, especially a large number of annuals that emerge.

A conscious planning of urban flora, both, trees as well as herbaceious flora, should become a critical part of the urban development process from the very initial stages of an area or region's development plan. The urban MMR region sustains approximately 830 floral species and the following are some of the tree species suggested for planting in the MMR for both attracting biodiversity (birds, butterflies and other insects, small mammals) and also for overall ecological good .

No.	Suggested trees for attracting biodiversity	No.	Suggested trees for attracting biodiversity
1	*Bauhinia racemosa*	9	*Ficus benghalensis*
2	*Bombax ceiba*	10	*Ficus racemosa*
3	*Bridelia retusa*	11	*Ficus religiosa*
4	*Butea monosperma*	12	*Firmiana colorata*
5	*Careya arborea*	13	*Garuga pinnata*
6	*Cochlospermum religiosum*	14	*Heterophragma quadriloculare*
7	*Crataeva tapia*	15	*Mimusops elengi*
8	*Erythrina indica*	16	*Moringa pterygosperma*

Grass/Scrub – Agricultural:

These typically open landscapes with grass and scrub growth were until recently the most widespread of all habitat types in the MMR. This is also clubbed with the cultivation or agricultural landscape that was a typical feature of a once predominantly rural MMR, with every village having its own cultivation where seasonal and/or year round crops and vegetables were grown. Together, these habitats were spread over more than 64% of MMR area (MMRDA regional plan, 2011). However, in the past decade or so, these habitats have come under severe developmental pressures and shrunk rapidly across the MMR.

The lowlands in the MMR traditionally harboured extensive pockets of agricultural tracts, where local communities cultivated a range of crops, vegetables and fruits. These landscapes often shared many features of the similar grass and scrub habitat and there was a lot in common, both of flora and fauna. During the course of this project it was observed that much of the grass, scrub and cultivation in the lowlands and plains have either disappeared or severely degraded and only small, healthy-looking pockets are peppered across the MMR. Similar habitat fare better in the hills, and can be seen both along the slopes and the plateaus of these hill ranges.

Agriculture and cultivation is a habitat specifically introduced and maintained by humans and consequently, some of the biodiversity has benefitted more than others. The key sites for the grass/scrub and cultivation habitat complex across the MMR include considerable pockets along Alibaug area, Khopoli – Karjat, Bhiwandi - Tansa, Vasai – Virar, Manori – Gorai, Badlapur – Neral, and the few surviving pockets in Greater Mumbai, such as Aarey, and along the western length of Thane creek. Besides, there are several institutional campuses in the Greater Mumbai area that retain some of their grass/scrub habitats. Interestingly, some such habitat type can be encountered along some stretches of the suburban railway routes in Greater Mumbai and Thane areas.

Typically, the grass/scrub landscapes depict a greater range of shrub, herb and grass flora, the landscape sprinkled with fewer trees. Of agricultural sites, Alibaug sustains the largest agricultural area followed by Karjat – Khopoli. Unlike the urbanised areas with their estates, parks, gardens and avenues, the grass/scrub and agricultural landscapes generally show lower tree density and diversity, the tree flora here often also influenced by human action, either for functional purposes along land borders or to supplement earnings to a lesser extent. Rarely are trees in the MMR planted on such habitats for their ecological functions. The dominant trees across such Grass/Scrub and Cultivation landscapes include *Mangifera indica, Butea monosperma, Erythrina variegata, Erythrina stricta, Erythrina suberosa, Moringa pterygosperma, Tamarindus indica, Terminalia bellirica, Schleichera oleosa, Syzygium cumini, Ficus racemosa, F. religiosa, F. benghalensis, Terminalia paniculata, Bombax ceiba, Tectona grandis and Vitex negundo*. Also seen are several species of palms such as *Borassus flabellifer, Cocos nucifera* and *Phoenix* spp.

A typical composition of the flora of agricultural landscapes, with a mix of wild flora intruding around cultivated crops, is evident in the MMR, with such species as *Abelmoschus esculentus, Cucurbita maxima* and several other cucurbits*, Momordica charantia, Luffa acutangula, Luffa aegyptiaca, Luffa echinata, Lycopersicon esculentum, Coccinia grandis, Oryza sativa, Spinacia oleracea, Amaranthus cruentus* being some of the widespread cultivated plants that include various herbs, shrubs and climbers.

Where the cultivation crops are seasonal, the landscape can get colonised by a variety of wild-growing herbage and shrubbery that includes plants like *Argemone mexicana, Blumea oxyodonta, Cyathocline purpurea, Sphaeranthus indicus, Eragrostis unioloides, Eragrostis cilianensis, Alternanthera sessilis, Malachra capitata, Calotropis* spp., *Scoparia dulcis, Vernonia cinerea, Ageratum conyzoides* and several others. Some of these and other species are also invasive exotics, and a few are even seen in populous neighbourhoods.

When original grass/scrub habitat gets degraded, there is a change in floral composition and several exotic invasive species tend to dominate the landscape. Amongst the most widespread plant species along the disturbed habitats throughout the MMR are *Malachra capitata,*

Ricinus communis, Lantana camara, Chromolaena odorata, Parthenium hysterophorus, Carissa spp., *Sida* spp., *Datura* spp. et

Coastal:

The MMR, with its proximity to the Arabian sea is endowed with a long coastline and various habitat types influenced by coastal features. This includes sandy and rocky beaches, creeks and estuaries, tidal mudflats et This overall setting is a key factor for the biodiversity richness as compared to many inland urban areas.
By itself the coastal habitat contains a far lesser diversity of habitat-specific flora, with a total of 267 species reported for the MMR, the wealth of mangrove species along the numerous creeks being the most dominant aspect of this biotope.

There is no doubt that this coastal habitat must bear the brunt of the refuse generated on all terrestrial habitats as also the fact that a sizeable extent of the region's human population resides on or immediately alongside the coast and has continual impact on this ecosystem. Consequently, the coastal flora seems to have been far more affected than of other habitats and what is seen is a mix of vegetation that comprises of several indigenous and naturally growing species along with various ornamentals, mangrove species, mangrove associates as well as a few coastal species such as *Ipomoea pes-caprae and Sesuvium portulacastrum* can be seen on sandy shores.

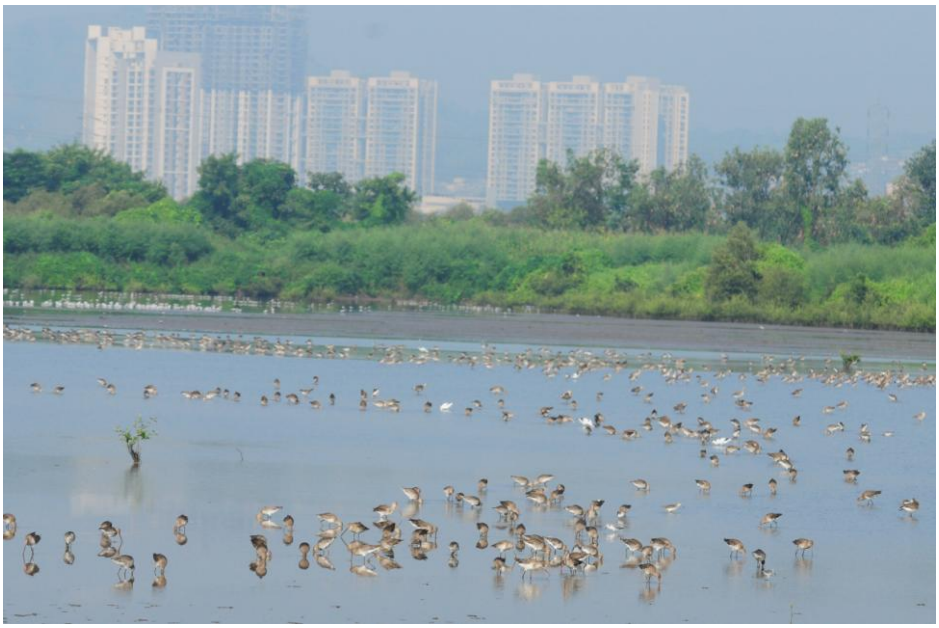
The horsetail tree or Suru, *Casuarina equisetifolia* has been extensively planted all along the MMR on open seashores. It is a well known coastal tree planted to check soil erosion and functions as a wind-break. Some of the other trees and palms seen along the MMR coast include *Cocos nucifera*, *Borassus flabellifer* and *Barringtonia asiatica,* the latter having been extensively grown along the coast in urban areas, as also seen along Mumbai's famed Marine Drive promenade.

As many as 24 species of mangrove have been reported for the MMR that has more mangrove creeks and extent of mangrove forest than any other major metropolis. Besides, there are also several mangrove associates that include some of the above-mentioned species

and a few others such as *Salvadora persica*, *Derris trifoliata*, *Acanthus ilicifolius* and *Suaeda nudiflora*.

The various sites under coastal habitat across the MMR are Arnala - Rajewad – Nirmal, Bassein Creek, Uttan – Uttan- Gorai-Manori, Marve – Madh, Mumbai proper, Rewas – Mandwa, Kihim – Alibag and Akshi.

Creek/Estuaries



The several small rivers that originate in the hilly country towards the eastern limits of the MMR all flow west into the Arabian sea. Their drainage basins closer to the coast result in the formation of mangrove encrusted creeks, and which are a most important ecological feature of the MMR. In fact, no other Indian city has so many creeks and such extensive mangrove growth within its metropolitan area. This mangrove vegetation is not just a critical natural barrier against the ravages of the sea but is a unique habitat for a host of biodiversity, including several terrestrial species that have adapted to this world of creeks.

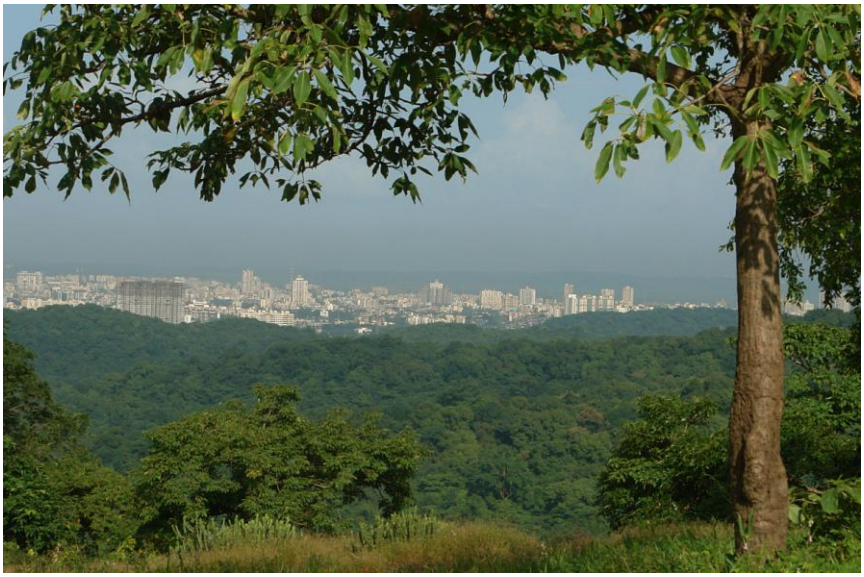
The most extensive and healthy mangrove growth is seen within the Greater Mumbai area proper, with the Thane creek and its many inlet channels harbouring amongst the largest contiguous stretch of this habitat anywhere along the western sea-board of India south of Gujarat. Other creeks within Greater Mumbai include Manori, Malad, Bassein and Mahim

Creeks, with smaller pockets of mangroves also seen along Sewri bay, Bandra reclamation and Colaba in extreme south Mumbai. Mangroves are also seen on Elephant island, in the mouth of Thane creek, while stands of this vegetation are also seen along the Palm Beach road in Navi Mumbai.

In the northern parts of the MMR, mangrove vegetation is seen along the southern fringes of Tansa creek and sporadically along the northern length of Bassein creek. Southward, in Raigad district, the Panvel, Nava-Sheva and Dharamtar creeks hold variable extent of mangrove vegetation.

The major vegetation as such are the mangrove and mangrove associates which are capable of sustaining halophytic conditions, since these creeks or so formed estuaries are subjected to tidal inundations. Thick vegetation can be seen along the banks of creeks also overlapping with the adjacent grass and scrub lands. Some of the mangroves and mangrove associates are *Acanthus ilicifolius, Aegiceras corniculatum, Avicennia marina, Avicennia officinalis, Aeluropus lagopoides, Anthistria ciliata, Argemone mexicana, Bruguiera cylindrica, Ipomoea obscura, Sonneratia apetala, Sonneratia alba, Sonneratia caseolaris*.
A total of 94 species of flora is seen in and along the mangrove creeks in MMR. This includes species of mangrove, mangrove associates and various other fringe species.

Forests



The MMR includes diverse forest habitats, from the lowlands to the upper reaches of the hill ranges that dot its landscape. However, in the absence of significant altitudinal or latitudinal change, forest type remains predominantly southern mixed-deciduous type, which also include dry-deciduous, semi-evergreen and evergreen forest types (Champion & Seth, 1968). The three protected areas within the MMR comprise primarily of forest habitats and cover about 200 sq km. According to the MMRDA Regional Plan of 2011, the total forest area in the MMR extends over 1,143 Sq km or 25.8% of the total area under the MMR.
Our field work during the course of this project, spread over 18 months between end-2009 and 2012 indicates that the actual extent of forest cover in the MMR would be about a third of this area and the coverage of good quality forest, ranking high on the habitat quality index would account for less than a quarter of the protected area extent.

The key forest sites across the MMR include the three protected areas of SGNP, TWLS and KBS. In addition, forest growth is also seen extensively along the middle and upper reaches of the Matheran range, pockets along the Khargarh – Parsik hills, Alibaug hills, and scattered lowland forests towards the southeastern and notheastern fringes of the MMR, in the Raigad and Thane districts.
Almost 1,000 species of plants are reported for the MMR forest area. The predominating mixed-deciduous forest community is composed of a mix of tree species that includes *Tectona grandis, Ailanthus excelsa, Alangium salviifolium, Albizia lebbeck, Allophylus cobbe, Alseodaphne semecarpifolia, Anacardium occidentale, Anogeissus latifolia, Bombax ceiba, Bridelia retusa, Cassia fistula, Cordia dichotoma, Dalbergia sissoo, Firmiana colorata, Heterophragma quadriloculare, Holarrhena antidysenterica,Holoptelea integrifolia* and many others that form the primary strata or canopy.

The understory comprises of a range of herbs and shrubs comprising of secondary strata and herbs forming the ground vegetation. This is often dominated by *Karvi* or Strobilanthes that flower once every seven years, and cover extensive tracts of the MMR's less disturbed forest understory. It has been observed across all forest habitats from the lowlands to the hills. Where Karvi is absent, the deciduous forest is dominated by species of bamboo, especially in

the lower and middle altitudes of the hill ranges. There is comparatively less bamboo in the Matheran range.

More than 25 species of orchids, including terrestrial and epiphytic, are reported for the MMR, which is indicative of the rich biogeography of the MMR. Most of these orchids are observed in the forest habitat. A variety of climbers, including the woody climber *Entada rheedii* can be seen in the better protected forest sites.

The effects of human intervention are visible throughout the MMR, including the forested sites. It is only in some small pockets of the middle and upper reaches of the hilly forests that one observed some of the original forest habitat and its diversity, which have also been gauged highest Habitat Quality ranking in the MMR (**pgs …..**).

Throughout the forest areas are also seen a spate of exotic and introduced species of flora, including numerous tree species, that have been slowly invading the floral landscape to the detriment of indigenous species. Some of the widespread exotic and invasive species across the MMR *include Gliricidia sepium, Acacia auriculiformis, Leucaena leucocephala, Peltophorum pterocarpum, Delonix regia, Eucalyptus globulus, Parkia biglandulosa* and several others. Some of these such as *Gliricidia sepium* and *Acacia auriculiformis* have invaded the margins of sizeable healthy forest and being rapid colonisers these have affected not just the natural floral community of the immediate environs but also, the detrimental effects of these invaders on other biodiversity, including avifauna, insects, mammals and reptiles and on the entire ecosystem is evident wherever these species have started to dominate. This includes the woody trees, which form the visually prominent group of the forest habitats, where the damaging impact of invasive exotic lower flora of herbs and shrubs on the ecosystem has intensified silently.

A great array of herbs and shrubs are highly resilient invaders that quickly colonise large tracts of the landscape and exterminate plenty of native ground flora. Species such as *Lantana camara, Chromolaena odorata, Ficus hispida, Malachra capitata, Argemone Mexicana, Parthenium hysterophorus* and several others are seen to extensively colonise

areas of the MMR, including forest clearings, forest edges and suchlike, and there is hardly any study on the extent of damage done to indigenous flora already.

Add to this a spate of exotic species that are further regularly introduced by people and which intently or accidentally escape into the wilds and semi-wilds. Perhaps the most extensive coloniser of the MMR landscape in recent years has been *Ricinus communis*. It has already established strongly on most open spaces in every kind of habitat, including coastal edge, and though it has not yet extended its cancerous hold on to the forest community, it is already becoming visibly dominant around forest-edge, as seen at Aarey and towards the lower reaches of TWLS and KBS.

Hill Ranges:

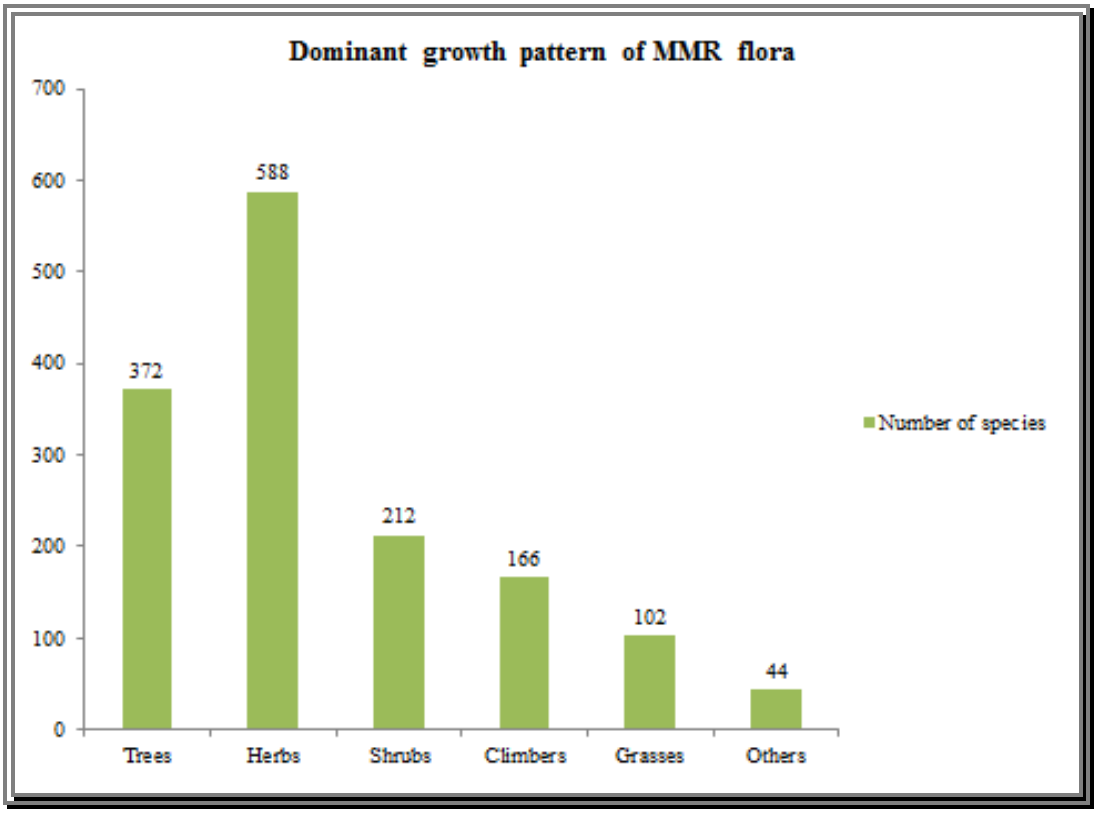
The MMR landscape includes several small and large hill ranges, including some isolated hillocks. These topographical features, though not classified as a distinct habitat, are nevertheless treated as critical ecological units that harbour pockets, often extensive, of nearly every kind of habitat type described in the MMR, except perhaps the coastal habitats. After the forest communities themselves, these hilly ranges harbour the second most extensive diversity of floral species. In fact, since most of the forest habitats have survived intact only on these hill ranges, it could be said that these hills constitute the most biodiversity rich unit of the MMR. The habitats in the middle and upper slopes, mostly above 200 msl harbour some of the finest surviving forest habitats and biodiversity.

The most extensive hill ranges in the MMR include Matheran range, Khargarh hills, the SGNP – Tungareshwar hill system, Kaman-Mandvi hills, Alibaug hills, Chirner – Karnala hills and the isolated massif of Trombay hill in Greater Mumbai.

The floral composition in the hill ranges is moreover similar to that of forested habitats comprising primarily of trees such as *Anacardium occidentale, Anogeissus latifolia, Caesaria tomentosa, Holptelea integrifolia, Saccopetalum tomentosum, Semecarpus anacardium, Terminalia bellerica, Terminalia chebula, Terminalia arujna, Terminalia crenulata* et but there are some elements of the evergreen towards the upper reaches of the hills, and which are most extensive on the upper slopes and plateau of Matheran and TWLS. Several of the

elements of the Western Ghats evergreens can be observed here and include *Memecylon umbellatum*, *Mimusops elengi*, *Syzygium cumini*, other *Syzygium* sps., *Garcinia indica*, amongst a few more.

The hill slopes often also harbour grass and scrub pockets, quite extensive as seen on the Khargarh hills, especially on the eastern slopes. Grass and scrub habitat are seen intermittently sprinkled along the slopes and plateau tops of nearly every hill range system and often constitute the finest surviving pockets of such habitat, with nearly all the once very extensive lowland grass and scrub landscape having vanished under the enormous, ongoing developmental and infrastructural expansion of recent times.
The MMR hill ranges thus remain the last kaleidoscope remnant of an entire range of habitats, with some pockets of certain habitats ranking highest on the habitat quality index.



Annexure to follow here:

a) **Comprehensive, first-of-its-kindn Inventory of the entire flora of MMR. This includes nearly 1500 species of flora reported for the region, based on all findings**

b) **The Inventory details English and local names (where possible), Family, Growth Pattern, and lists all the Habitats where every species occurs**

c) **Hundreds of photographs of flora and habitats**

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1	*Abelmoschus manihot* (L.) Medik.	Malvaceae	Wild ladyfinger	*Ranbhendi*	H	+	+	+			+
2	*Abelmoschus esculentus* W. & A.	Malvaceae	Ladyfinger	*Bhendi*	H	+	+			+	+
3	*Abelmoschus moschatus* Medicus	Malvaceae	Wild ladyfinger	*Ranbhendi*	H	+					+
4	*Abrus precatorius* Linn.	Fabaceae	Rosary pea	*Gunj*	CL	+	+	+		+	+
5	*Abutilon indicum* Sweet	Malvaceae	Country mallow	*Petari*	H	+	+	+	+	+	+
6	*Abutilon persicum* (Burm.f.) Merrill	Malvaceae	Persian Mallow	*Madam*	H		+	+			
7	*Acacia auriculiformis* A. Cunn.	Mimosaceae	Australian acacia	*Kadambo*	T	+	+	+		+	+
8	*Acacia catechuoides* (Roxb.) Benth.	Mimosaceae	Catechu tree	*Khair*	T	+	+	+		+	+
9	*Acacia sinuta* (Lour.) Merrill	Mimosaceae	Soapnut tree	*Shikekai*	S	+	+	+			+
10	*Acacia chundra* (Roxb.) Willd.	Mimosaceae	Red Cutch	*Lal Khair*	T	+	+				+
11	*Acacia gamblei* Bahadur & Gaur	Mimosaceae	Soapnut tree	*Shikekai*	S						+
12	*Acacia farnesiana* (Linn.) Willd.	Mimosaceae	Needle Bush	*Babhul*	T	+					
13	*Acacia ferruginea* D	Mimosaceae	Rusty Acacia	*Pandhara-khair*	T		+				
14	*Acacia leucophloea* (Roxb.) Willd.	Mimosaceae	White Bark Acacia	*Himvar*	T		+				
15	*Acacia mangium Willd.*	Mimosaceae	Black Wattle	*Babhul*	T		+			+	+
16	*Acacia nilotica* (Linn.) Del.	Mimosaceae	Egyptian thorn	*Babhul*	T		+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
17	*Acacia nilotica var. indica* Hill.	Mimosaceae		*Babhul*	T					+	+
18	*Acacia pennata* (Linn.) Willd.	Mimosaceae	Climbing Acacia	*Shembi*	T	+	+				
19	*Acacia polyacantha* Willd.	Mimosaceae	White Thorn	*Kumtia*	T		+				
20	*Acacia torta* (Roxb.) Craib.	Mimosaceae	Twisted Acacia	*Chilarwel*	S			+			+
21	*Acacia horrida* (Linn.) Willd.	Mimosaceae	Cape Gum	*Dev-Babul*	S						+
22	*Acalypha fruticosa* Forsk.	Euphorbiaceae	Birch-leaved Acalypha	*Cupi*	S		+	+			
23	*Acalypha hispida* Burm. f.	Euphorbiaceae	Philippines Medusa		S						+
24	*Acalypha indica* Linn.	Euphorbiaceae	Indian acalypha	*Kupi*	S	+	+			+	
25	*Acalypha lanceolata* Willd.	Euphorbiaceae	Indian acalypha	*Kupi*	S						+
26	*Acalypha wilkesiana* Mull.-Arg.	Euphorbiaceae	Copperleaf		S						+
27	*Acampe praemorsa* (Roxb.) Blatter. & Mc Cann	Orchidaceae	Acampe orchid	*Waghri*	EH	+	+	+			+
28	*Acanthospermum hispidum* D	Asteraceae	Goat's head	*Sarata*	H	+	+	+			+
29	*Acanthus ilicifolius* Linn.	Acanthaceae	Sea holly	*Marandi*	S		+	+	+	+	+
30	*Achyranthes aspera* Linn.	Amaranthaceae	Prickly chaff flower	*Aghada*	H	+	+	+		+	+
31	*Achyranthes bidentata* Blume	Amaranthaceae	Ox Knee		H		+				
32	*Achyranthes coynei* Sant.	Amaranthaceae	Coyne's Chaff Flower	*Lal aghada*	H	+	+				+
33	*Achyranthes porphyrostachya* Wall. ex Moq.	Amaranthaceae			H	+	+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
34	*Achyranthes zaririi* Alm. & Alm.	Amaranthaceae			H	+	+				+
35	*Actinodaphne gullavra* (Buch. -Ham.) Almeida	Lauraceae			T		+				
36	*Spilanthes oleraceae* Linn.	Asteraceae	Toothache Plant	*Pipulka*	H						+
37	*Adansonia digitata* Linn.	Bombacaceae	Baobab	*Gorakhchinch*	T			+		+	+
38	*Adenanthera pavonina* Linn.	Mimosaceae	Coral wood	*Ratan gunj*	T	+	+	+		+	+
39	*Adelocaryum coelestinum* (Lindl.) Brand	Boraginaceae	Common Hill Borage	*Nisurdi*	S	+	+				+
40	*Adenostemma lavenia* (L.) O. Kuntze	Asteraceae	Sticky Daisy	*Jangli-jira*	H	+	+				+
41	*Adiantum capillus-veneris* L.	Adiantaceae	Fern		H	+	+				+
42	*Adiantum philippense* L.	Adiantaceae	Fern		H	+	+				+
43	*Aegiceras corniculata* Blanco	Myrsinaceae	River Mangrove	*Kajala*	T			+		+	+
44	*Aeginetia indica* Linn.	Orobanchaceae	Forest ghost flower	*Gulabdani*	H	+	+	+		+	+
45	*Aegle marmelos* Corr.	Rutaceae	Bael fruit tree	*Bael*	T	+	+	+		+	+
46	*Aeluropus lagopoides* (L.) Trin. ex Thwaites	Poaceae			H	+	+			+	+
47	*Aerides maculosum* Lindl.	Orchidaceae	Orchid	*Thipke Irid-amri*	EH	+	+	+			+
48	*Aeschynomene indica* Linn.	Fabaceae	Indian Joint Vetch	*Nalabi*	H	+	+				+
49	*Aeschynomene americana* Linn.	Fabaceae	American Joint Vetch	*Soli*	H	+	+			+	+
50	*Aerva lanata* (L.) Juss.	Amaranthaceae	Mountain Knot Grass	*Kapurmadhuri*	H	+		+	+		+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
51	*Aerva sanguinolenta* Blume	Amaranthaceae	Climbing Wool-Plant		H		+				
52	*Agave americana* L.	Agavaceae	Century plant	*Ghaypat*	S	+	+	+			+
53	*Agave sisalana* (Englm.) Perrine	Agavaceae	Sisal Agave		H		+				+
54	*Agathis robusta* (Moore ex F.Muell.) F.M.Bailey	Araucariaceae	Kauri Pine		T						+
55	*Ageratum conyzoides* Linn.	Asteraceae	Mexican floss flower	*Osadi*	H	+	+	+		+	+
56	*Ageratum houstonianum* Mill.	Asteraceae	Floss flower		H	+	+				+
57	*Aglaia lawii* (Wight) J.Saldanha	Meliaceae		*Telya*	T		+	+			
58	*Aglaonema marantifolium* Blume	Araceae			H						+
59	*Ailanthus excelsa* Roxb.	Simaroubaceae	Indian Tree of Heaven	*Marukh*	T	+	+				+
60	*Alangium salviifolium* (Linn.f.) Wangerin	Alangiaceae	Sage Leaved Alangium	*Akola*	T	+	+	+			+
61	*Albizia amara* (Roxb.) Boivin	Mimosaceae		*Lallei*	T		+				
62	*Albizia procera* (Roxb.) Benth.	Mimosaceae	White siris	*Pandhara shirish*	T	+	+	+			+
63	*Albizia lebbeck* (Linn.) Willd.	Mimosaceae	Siris tree	*Shirish*	T	+	+	+		+	+
64	*Albizia chinensis* (Osbeck) Merrill	Mimosaceae	Chinese albizia	*Faradi*	T	+	+				+
65	*Albizia odoratissima* (Linn.f.) Benth.	Mimosaceae	Black Siris	*Chinchava*	T	+	+				
66	*Allamanda cathartica* Linn.	Apocynaceae	Golden Trumpet Vine		S	+					+
67	*Allamanda violacea* Gardn. & Field.	Apocynaceae	Purple Allamanda		S						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
68	*Allium cepa L.*	Alliaceae	Onion	*Kanda*	H			+			
69	*Allophylus cobbe* (L.) Raeuch.	Sapindaceae	Indian Allophylus	*Theepani*	S	+	+				
70	*Aloe vera* (L.) Burm.f.	Aloaceae	Medicinal aloe	*Korphad*	H						+
71	*Alloteropsis cimicina* (L.) Stapf.	Poaceae	Summer Grass		H	+	+				+
72	*Alocasia indica* (Roxb.) Schott.	Araceae	Giant taro	*Jungli Alu*	H						+
73	*Alocasia macrorhiza* (L.) Schott.	Araceae	Giant taro		H						+
74	*Alpinia arabica* (L.) Almeida	Zingiberaceae	Thai ginger	*Kolinjan*	H			+			
75	*Alseodaphne semecarpifolia* Nees	Lauraceae	Nelthare	*Phudgus*	T	+	+	+			
76	*Alstonia macrophylla* Wall.	Apocynaceae	Batino	*Mothi Saatveen*	T						+
77	*Alstonia scholaris* R. Br.	Apocynaceae	Devil's tree	*Saptparni*	T	+	+	+		+	+
78	*Alternanthera sessilis* (L.) R. Br.	Amaranthaceae	Sessile Joyweed	*Kanchari*	H	+	+	+	+	+	+
79	*Alternanthera paronychioides* St. Hill	Amaranthaceae	Smooth Chaff Flower		H		+				
80	*Alternanthera pulchella* Kunth	Amaranthaceae			H	+				+	+
81	*Alternanthera pungens* H.B.K.	Amaranthaceae	Khaki Weed		H						+
82	*Alysicarpus glumaceus* (Vahl) D	Fabaceae			H		+				+
83	*Alysicarpus glumaceus var. thothathrii* Almeida	Fabaceae			H		+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
84	*Alysicarpus longifolius* Wt. & Arn.	Fabaceae	Long Leaved Alyce Clover	*Durangi Shevara*	H	+	+	+		+	+
85	*Alysicarpus vaginalis* (L.) D	Fabaceae	Alyce Clover	*Shevra*	H	+	+	+			+
86	*Alysicarpus vaginalis var. nummularifolius* Baker	Fabaceae			H		+				
87	*Alysicarpus vaginalis var. stocksii* Baker	Fabaceae			H		+				
88	*Alysicarpus bupleurifolius* (L.) D	Fabaceae	Sweet Alyce Clover		H	+					+
89	*Alysicarpus hamosus* Edgeworth	Fabaceae			H	+					+
90	*Alysicarpus heyneanus* Wt. & Arn	Fabaceae			H		+				
91	*Alysicarpus ovalifolius* Leonard	Fabaceae	Oval-leafed Alysicarpus		H	+					
92	*Alysicarpus bupleurifolius* (L.) D	Fabaceae	Sweet Alyce Clover		H						+
93	*Amaranthus cruentus* Linn.	Amaranthaceae	Red Amaranth	*Rajgira*	H			+			
94	*Amaranthus tricolor* Linn.	Amaranthaceae	Joseph's coat	*Chavalaayi*	H	+	+				+
95	*Amaranthus hybridus* Linn.	Amaranthaceae	smooth amaranth		H		+				
96	*Amaranthus spinosus* Linn.	Amaranthaceae	Needle burr	*Kante bhaji*	H	+	+			+	+
97	*Amaranthus viridis* Linn.	Amaranthaceae	Green Amaranth	*Katemath*	H	+	+	+			+
98	*Amherstia nobilis* Wall.	Caesalpiniaceae	Pride of Burma		T						+
99	*Amorphophallus bulbifer* (Roxb.) Blume	Araceae	Devil's Tongue	*Ransuran*	H	+	+	+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
100	*Amorphophallus commutatus* Engler	Araceae	Dragon Stalk Yam	*Shevala*	H	+	+	+		+	+
101	*Ammania baccifera* Linn.	Lythraceae	Blistering Ammannia	*Aginbuti*	H	+	+		+		+
102	*Ammannia multiflora* Roxb.	Lythraceae	Many Flowered Ammannia		H	+	+		+	+	+
103	*Ampelocissus latifolia* Planch.	Vitaceae	Wild Grape	*Ran draksha*	CL	+	+	+		+	+
104	*Anacardium occidentale* Linn.	Anacardiaceae	Cashew	*Kaju*	T	+	+	+		+	+
105	*Ananas comosus (L.) Merr.*	Bromeliaceae	Pineapple	*Ananas*	H						
106	*Ananas sativus Schult. f.*	Bromeliaceae	Pineapple	*Ananus*	H			+			
107	*Ancistrocladus heyneanus* Wall. ex Graham	Ancistrocladaceae	Kardal	*Khardali*	CL	+		+			+
108	*Andrographis paniculata* (Burm.f.) Wall. ex Nees	Acanthaceae	Kariyat	*Oli-kiryata*	H	+	+				+
109	*Andropogon annulatus* Forssk.	Poaceae	Sheda Grass		G	+	+		+		+
110	*Heteropogon contortus* Beauv. ex Roem. & Schult.	Poaceae		*Kusali gavat*	G	+	+	+			+
111	*Andropogon monticola* Schult. & Schult. f.	Poaceae			G	+	+				+
112	*Andropogon pertusus* (L.) Willd.	Poaceae			G	+	+				+
113	*Andropogon triticeus* R.Br.	Poaceae			G	+	+				
114	*Anethum graveolens* Linn.	Apiaceae	Dill	*Shepu*	H	+	+				+
115	*Anisomeles heyneana* Benth.	Labiatae	Western Hill Catmint	*Gopali*	H	+	+	+		+	+
116	*Anisomeles malabarica* (L.) R.Br.	Labiatae	Malabar Catmint	*Gojibha*	H	+	+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
117	*Annona reticulata* Linn.	Annonaceae	Netted Custard Apple	*Ramfal*	T	+		+		+	+
118	*Annona squamosa* Linn.	Annonaceae	Custard apple	*Sitafal*	T	+	+	+		+	+
119	*Anodendron paniculatum* (Roxb.) D	Apocynaceae	Andamanese Bowstring Plant		CL		+				
120	*Anogeissus latifolia* (Roxb. ex D) Guillman & Perottet	Combretaceae	Axle Wood Tree	*Dhavada*	T	+	+	+			+
121	*Anogeissus sericea* Brandis	Combretaceae			T					+	+
122	*Anthistria ciliata* Henry.	Poaceae	Kangaroo Grass		G	+	+				+
123	*Anthurium cristalinum* Linden & Andre	Araceae	Anthurium		H						+
124	*Antigonon leptopus* Hook.	Polygonaceae	Ice-cream creeper	*Jungali mogara*	CL	+	+	+			+
125	*Antidesma acidum* Retz.	Euphorbiaceae	Rohitaka	*Ghondurili*	T		+				
126	*Apluda mutica* L.	Poaceae	Mauritian Grass		G	+	+				+
127	*Aponogeton natans* (L.) Engler & Krause	Aponogetonaceae	Floating Lace Plant		AQ/H		+				
128	*Arachis pintoi* Krapov. & W.Greg.	Fabaceae			H						+
129	*Araucaria araucana* (Molina) K.Koch	Araucariaceae			T						+
130	*Areca catechu* L.	Arecaceae	Betel nut palm	*Supari*	T	+	+	+		+	+
131	*Argemone mexicana* Linn.	Papaveraceae	Mexican poppy	*Pivala dhotara*	H	+	+	+	+		+
132	*Argyreia nervosa* (Burm. f.) Bojer	Convolvulaceae	Elephant glory	*Samudra soka*	CL	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
133	*Argyreia sericea* Dalz.	Convolvulaceae	Silky Morning Glor	*Gavel*	CL		+	+			
134	*Aristida redacta* Stapf	Poaceae			G	+	+				+
135	*Aristida setacea* Retz.	Poaceae			G	+	+				+
136	*Ariopsis peltata* Nimmo ex Graham	Araceae	Shield Leaf Ariopsis	*Nagmani*	H	+	+	+			+
137	*Arisaema murrayi* Graham	Araceae	Murray's Cobra Lily	*Pandhra sap-kanda*	H	+	+				+
138	*Arisaema tortuosum* (Wall.) Schott.	Araceae	Whipcord Cobra Lily	*Sardacha-jad*	H	+	+	+			+
139	*Aristolochia indica* Linn.	Aristolochiaceae	Indian birthwort	*Sapsan*	CL	+	+	+			+
140	*Artabotrys hexapetalus* (L.f.) Bhandari	Annonaceae	Climbing lang-lang	*Hirva chapha*	CL	+	+				+
141	*Arthraxon lanceolatus* (Roxb.) Hochst.	Poaceae			G	+	+				+
142	*Arthraxon hispidus* (Thunb.) Makino	Poaceae			G	+	+				+
143	*Artocarpus altilis* (Parkinson) Fosberg	Moraceae	Breadfruit tree	*Vilayati phanus*	T			+		+	+
144	*Artocarpus heterophyllus* Lamk.	Moraceae	Jackfruit tree	*Phanas*	T	+	+	+		+	+
145	*Artocarpus lacucha* Buch.-Ham.	Moraceae	Lakoocha	*Badhar*	T					+	+
146	*Araucaria columnaris* Hook.	Araucariaceae	Coral reef araucaria		T					+	+
147	*Araucaria cunninghamii* Aiton ex D.Don	Araucariaceae	Hoop pine	*Christmas Tree*	T		+				
148	*Arundinella ciliata (Roxb.) Nees ex Miq.*	Poaceae			G	+			+		
149	*Arundinella metzii* Hochst. ex Miq.	Poaceae			G	+	+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
150	*Arundinella pumila* (Hochst.) Steud.	Poaceae		*Chimanchara*	G	+	+	+			+
151	*Arundinella setosa* Trin.	Poaceae			G	+	+				+
152	*Asclepias curassavica* L.	Asclepiadaceae	Scarlet Milkweed	*Pivla chitrak*	H	+	+				
153	*Asparagus racemosus* Willd.	Liliaceae	Satawari	*Shatavari*	CL	+	+	+		+	+
154	*Aster amellus* Linn.	Asteraceae	Italian Aster		H						+
155	*Asparagus racemosus var. javanicus* Baker	Liliaceae			S	+					
156	*Hygrophila schuli* (Buch. - Ham.) Almeida & Almeida	Acanthaceae	Long Leaves Barleria		H	+	+		+		
157	*Asystasia nemorum* Nees	Acanthaceae	Violet Asystasia	*Neelkanth*	H	+	+				
158	*Asystasia gangetica* (L.) T.Anders.	Acanthaceae	Ganges Primrose	*Lavanvalli*	H	+		+			
159	*Asystasia intrusa* Blume	Acanthaceae	Chinese violet		H	+		+			
160	*Atalantia racemosa* W. & A.	Rutaceae	Bombay Atalantia	*Ran limbi*	T	+	+	+			
161	*Atalantia wightii* Tanaka	Rutaceae	Nilgiri Atalantia		T						+
162	*Averrhoa bilimbi* Linn.	Oxalidaceae	Bilimbi	*Bilambi*	T	+	+			+	+
163	*Averrhoa carambola* Linn.	Oxalidaceae	Star fruit	*Karmar*	T	+		+		+	+
164	*Avicennia marina* (Forsk.) Virh.	Avicenniaceae	Grey Mangrove	*Tivar*	T		+	+	+	+	+
165	*Avicennia officinalis* Linn.	Avicenniaceae	Indian Mangrove	*Tivar*	T		+	+	+	+	+
166	*Azadirachta indica* Juss.	Meliaceae	Neem	*kadulimb*	T	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
167	*Azanza lampas* (Cav.) Alef.	Malvaceae	Common Mallow	*Raan bhendi*	S	+	+				+
168	*Bacopa monnieri* (L.) Wettest	Scrophulariaceae	Brahmi	*Nirbrahmi*	H	+	+	+		+	+
169	*Baccharoides scabridum* (D) Almeida	Asteraceae			S	+	+	+		+	+
170	*Bambusa arundinacea* (Retz.) Willd.	Poaceae	Thorny bamboo	*Bamboo*	T	+	+	+			+
171	*Bambusa bambos* (L.) Voss	Poaceae	Thorny bamboo	*Bamboo*	T						+
172	*Bambusa vulgaris* Schrad. ex J.Wendl.	Poaceae	Golden Bamboo	*Bamboo*	T						+
173	*Balanophora indica (Arn.) Griff.*	Balanophoraceae			H					+	
174	*Baliospermum solanifolium* (Burm.) Suresh	Euphorbiaceae	Red Physic Nut	*danti*	H	+	+				
175	*Barleria cristata* Linn.	Acanthaceae	Crested barleria	*Koranti*	H	+	+	+			
176	*Barleria cristata var. dichotoma* (Roxb) Prain.	Acanthaceae	White Philippine violet	*Koranti*	H	+					+
177	*Barleria cuspidata* B.Heyne ex Nees	Acanthaceae	Lesser yellow nail-dye	*Kate koranti*	H	+	+	+			
178	*Barleria gibsonioides* Blatt.	Acanthaceae		*Dev koranti*	US	+					
179	*Barleria grandis* Hochst. ex Nees	Acanthaceae	Grand\ Barleria	*Dev koranti*	H	+	+				
180	*Barleria lawii* T. Anders.	Acanthaceae	Law's Barleria	*Pandhri koranti*	H	+	+			+	+
181	*Barleria montana* Nees	Acanthaceae	Mountain Barleria	*Dongari koranti*	H	+	+	+			
182	*Barleria pratensis* Sant.	Acanthaceae	Forest barleria	*Gulabi koranti*	H	+	+	+		+	+
183	*Barleria prionitis* Linn.	Acanthaceae	Yellow hedge barleria	*Kholeta*	H	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
184	*Barleria lupulina* Lindl.	Acanthaceae	Hophead		H	+	+				
185	*Barleria strigosa* Willd.	Acanthaceae	Blue barleria	*Nili koranti*	H	+	+	+			
186	*Barringtonia acutangula* (Linn.) Gaertn.	Lecythidaceae	Barringtonia	*Sathaphala*	S	+	+			+	+
187	*Barringtonia asiatica* (Linn.) Kurz.	Lecythidaceae	Sea Poison Tree	*Samudraful*	T					+	+
188	*Basella alba L.*	Basellaceae	Ceylon spinach	*Velbendi*	S	+	+				
189	*Bauhinia racemosa* Lamk.	Caesalpiniaceae	Bidi Leaf Tree	*Apta*	T	+	+	+		+	+
190	*Bauhinia integrifolia* Roxb.	Caesalpiniaceae	Orchid Tree	*Chambul*	T		+				
191	*Bauhinia acuminata* Linn.	Caesalpiniaceae	Dwarf White orchid tree	*kanchan*	T	+		+			+
192	*Bauhinia malabarica* Roxb.	Caesalpiniaceae	Malabar Bauhinia	*amli*	T	+	+				
193	*Bauhinia purpurea* (Benth. ex Baker) Blatter	Caesalpiniaceae	Butterfly tree	*Rakta chandan*	T	+	+	+	+	+	+
194	*Bauhinia foveolatus* Dalz.	Caesalpiniaceae	Pore Leaved Bauhinia	*Chambal*	T	+	+				
195	*Bauhinia variegata* L.	Caesalpiniaceae	Orchid Tree	*Rakta-kanchan*	T	+	+				+
196	*Bauhinia variegata var. candida Voigt*	Caesalpiniaceae	Buddhist Bauhinia	*Kovidara*	T	+					
197	*Bauhinia tomentosa* Linn.	Caesalpiniaceae	Yellow Orchid Tree		T					+	+
198	*Benincasa hispida (Thunb.) Cogn.*	Cucurbitaceae	White Gourd	*Kohla*	CL	+	+				
199	*Begonia crenata* Dryand.	Begoniaceae	Common Begonia	*Berki*	H	+	+				
200	*Bergia capensis* Linn.	Elatinaceae			H					+	+
201	*Bhidea fischeri Sreek. & B.V.Shetty*	Poaceae		*Kusal gavat*	G	+	+	+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
202	*Bhidea burnsiana Bor*	Poaceae			G	+					
203	*Bidens biternata* (Lour.) Merrill & Scherf.	Asteraceae	Yellow Flowered Blackjac		H	+	+	+			
204	*Bidens pilosa* L.	Asteraceae	Beggar Tick		H	+	+	+			
205	*Biophytum sensitivum* D	Oxalidaceae	Little tree plant	*Lajwanti*	H	+	+	+			
206	*Bixa orellana* Linn.	Bixaceae	Lipstick tree	*Sendri*	T	+	+	+			+
207	*Blainvillea acmella* (Linn.) Philips.	Asteraceae	Para Cress Flower		H	+	+				
208	*Cynarospermum asperrimum* (Nees) Vollesen	Acanthaceae	Hill blepharis	*Dikna*	H	+	+	+			+
209	*Blepharis repens* (Vahl) Roth.	Acanthaceae	Samadana	*Kate-maka*	H		+				
210	*Blepharis maderaspatensis* Roth.	Acanthaceae	Creeping Blepharis		H	+	+				
211	*Blumea lacera* D	Asteraceae	Kakronda	*Burando*	H	+	+	+		+	+
212	*Blumea oxyodonta* D	Asteraceae	Spiny Leaved Blumea		H	+	+	+			+
213	*Blumea belangeriana* D	Asteraceae	Belanger's Blumea		H	+	+				
214	*Blumea eriantha* D	Asteraceae			H	+	+				+
215	*Blumea paniculata* (Willd.) Almeida	Asteraceae	Panicled Blume		H	+	+				
216	*Blumea mollis* DC	Asteraceae	Soft Blumea		H	+	+				
217	*Blyxa aubertii Rich.*	Hydrocharitaceae			AQ/G		+				
218	*Blyxa japonica*	Hydrocharitaceae	Bamboo Plant		AQ/G				+		

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
219	*Boehmeria caudata Poir.*	Urticaceae	False Nettle	*Khaja*	H	+	+	+			
220	*Boehmeria urticifolia Pers.*	Urticaceae			H	+					
221	*Boerhavia erecta* Linn.	Nyctaginaceae	Erect Spiderling		H	+	+			+	+
222	*Boerhavia repens* Linn.	Nyctaginaceae	Common hogweed	*Punarnava*	H	+	+	+		+	+
223	*Bougainvillea glabra* Choisy ex D	Nyctaginaceae	Bougainvillea	*Booganvel*	S	+	+	+			+
224	*Bougainvillea spectabilis* Willd.	Nyctaginaceae	Great Bougainvillea	*Boganwel*	S			+			+
225	*Bombax ceiba* Linn	Bombacaceae	Silk Cotton Tree	*Savar*	T	+	+	+	+	+	+
226	*Bombax insigne var. wightii* Prain	Bombacaceae	Shalmali	*Shalmali*	T	+	+				
227	*Borassus flabellifer* L.	Arecaceae	Palm tree	*Taad*	T	+	+	+		+	+
228	*Schefflera actinophylla* Harms.	Araliaceae	Octopus Tree		T					+	+
229	*Bothriochloa pertusa (L.) A. Camus*	Poaceae	pitted beardgrass		G	+	+				
230	*Brachiaria milliformis*	Poaceae	Summer grass	*Gavat*	G	+			+		
231	*Brachiaria mutica* (Forssk.) Stapf	Poaceae	Para grass		G	+	+				+
232	*Brachiaria ramosa* (L.) Stapf	Poaceae			G	+	+				+
233	*Brassica juncea* Hook.f. & Thoms.	Brassicaceae	Mustard		H	+	+				+
234	*Brassica oleracea* Linn.	Brassicaceae	Cabbage	*Kobi*	H			+			
235	*Brassica oleracea* Linn. *var. gongylodes* Linn.	Brassicaceae	Kohlrabi	*Navalkol*	H			+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
236	*Brassica nigra* (L.) Koch.	Brassicaceae	Black mustard	*Kali Mohari*	H	+	+				
237	*Bonamia semidignya* (Roxb.) Hall. f.	Convolvulaceae			CL			+			
238	*Breynia retusa* (Dennst.) Alston	Euphorbiaceae	Cup and sauccer	*Kangli*	S	+	+	+			
239	*Bremekempia spinosus* (Lour.) Almeida	Acanthaceae			H	+	+	+		+	+
240	*Bremekempia tentaculatus* (L.) Sreemadh.	Acanthaceae			H	+	+				
241	*Bremekempia neilgherryensis* (Wight) Sreemadh.	Acanthaceae			H		+				
242	*Bremekempia tentaculatus var. plumusus* (Cl.) Almeida	Acanthaceae			H	+	+	+			
243	*Bridelia hamiltoniana* Wall. ex Hook. f.	Euphorbiaceae	Hamilton's Bridelia	*Jungali asana*	S	+	+				+
244	*Bridelia spinosa* Willd.	Euphorbiaceae	Spinous Kino Tree	*Asana*	T	+	+	+		+	+
245	*Bridelia stipularis* (L.) Bl.	Euphorbiaceae			T	+	+				
246	*Briza media L.*	Poaceae	Quaking-grass	*Kavadyache pohe*	G	+	+	+			
247	*Brownea coccinea* Jacq.	Caesalpiniaceae	Scarlet Flame Bean	*Lal Zumbar*	T						+
248	*Brownea grandiceps* Jacq.	Caesalpiniaceae	Rose of Venezuela		T					+	+
249	*Bruguiera cylindrica* (Linn.) Blume	Rhizophoraceae	White Burma Mangrove		T			+		+	+
250	*Bruguiera gymnorhiza* Sawigny	Rhizophoraceae	Burma Mangrove	*Zumbar*	T			+			
251	*Buchnera hispida* Buch.-Ham.	Scrophulariaceae	Karanji	*Karanji*	H	+	+	+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
252	*Buchanania cochinchinensis* (Lour.) Almeida	Anacardiaceae	Chironji Tree	*charoli*	T	+	+				+
253	*Burmannia coelestis* D. Don.	Burmanniaceae	Indian bluethread	*Neelmani*	H	+		+			
254	*Butea monosperma* (Lamk.) Taub.	Fabaceae	Flame of the forest	*Palas*	T	+	+	+		+	+
255	*Butea superba* Roxb.	Fabaceae		*Palasvel*	CL	+	+	+			
256	Cadaba fruticosa (L.) Druce	Capparaceae	Indian cadaba	*Cadaba*	S	+	+	+			
257	*Caesalpinia bonduc* (Linn.) Roxb.	Caesalpiniaceae	Yellow Nicker	*Sagargota*	T	+	+	+		+	+
258	*Caesalpinia coriaria* (Jacq.) Willd.	Caesalpiniaceae	Divi Divi		T						+
259	*Caesalpinia pulcherrima* (Linn.) Sw.	Caesalpiniaceae	Peacock Flower	*Shankasur*	S	+	+	+		+	+
260	*Casearia elliptica* Willd.	Flacourtiaceae	Toothed Leaf Chilla	*Kirmira*	T	+					
261	*Casearia obovata* Poepp. ex Eichler	Flacourtiaceae			T	+	+				
262	*Casearia graveolens Dalzell*	Flacourtiaceae	Chilla	*Bhokoda*	T	+					
263	*Caesulia axillaris* Roxb.	Asteraceae	Pink Node Flower	*Maka*	H	+	+			+	+
264	*Cajanus cajan* (Linn.) Mills.	Fabaceae	Arhar	*Tur*	H	+	+	+			+
265	*Caladium bicolor* (Aiton) Vent.	Araceae	Fancy-Leaf Caladium		H						+
266	*Cajanus lineatus* (Wt. & Arn.) Van der Meusen	Fabaceae	Wild Toor	*Ran tur*	H		+				
267	*Cajanus platycarpus* (Benth.) Van der Meusen	Fabaceae	Flat-Seeded Pigeon Pea	*Gophanvel*	CL		+				
268	*Cajanus scarabaoides* (Linn.) Thouars.	Fabaceae	Showy Pigeonpea		CL	+	+				

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269	*Calacanthus grandiflorus* (Dalzell) Radlk.	Acanthaceae	Large Flowered Calacanthus	*Mugut*	S	+	+	+			
270	*Calliandra haematocephala* Hassk.	Mimosaceae	Red Powder Puff		T						+
271	*Calliandra surinamensis* Benth.	Mimosaceae	Surinam Powderpuff		T		+				
272	*Callicarpa macrophylla* Vahl.	Verbenaceae			S		+				
273	*Callicarpa tomentosa* (Linn.) Murray	Verbenaceae	Velvety Beauty Berry	*Aiser*	T	+	+	+			
274	*Callistemon citrinus* (Curtis) Skeels	Myrtaceae	Bottle brush		T		+	+		+	+
275	*Calophyllum inophyllum* Linn.	Clusiaceae	Beauty Leaf	*Surangi*	T	+	+			+	+
276	*Calotropis gigantea* (L.) Br.	Asclepiadaceae	Crown Flower	*Rui*	S	+	+	+	+	+	+
277	*Calotropis procera* Br.	Asclepiadaceae	Rubber bush		S	+				+	+
278	*Calycopteris floribunda* Lamk.	Combretaceae	Paper Flowers	*Ukshi*	S	+	+	+			+
279	*Canavalia enciformis* (L.) D	Fabaceae	Horse Bean	*Abai*	H	+		+			
280	*Canavalia gladiata* (Jacq.) D	Fabaceae	Sword Bean		H	+	+			+	+
281	*Canna flaccida* Ros	Cannaceae			S						+
282	*Canna indica* L.	Cannaceae	Indian Shot	*Kardal*	S	+	+	+		+	+
283	*Canscora diffusa* Br.	Gentianaceae	Kilwar	*Kilwar*	H	+	+	+	+	+	+
284	Cansjera rheedei J.F.Gmel.	Opiliaceae		*Lahan deepmal*	S		+	+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
285	*Canthium angustifolium* Roxb.	Rubiaceae	Narrow Leaved Canthium	*Shengali*	S		+				
286	*Psydrax umbellata* (Wt.) Brisden	Rubiaceae	Ceylon Boxwood	*Tupa*	T	+	+				
287	*Capparis brevispina* D	Capparaceae	Indian Caper		S		+				+
288	*Capparis moonii* Wt.	Capparaceae	Large Caper	*Waghati*	S	+	+	+			
289	*Capparis rotundifolia* Rottl	Capparaceae	Round Leaf Caper	*Kolisma*	S		+				+
290	*Capparis sepiaria* Linn.	Capparaceae	Wild Caper Bush	*Kanther*	S	+	+	+			+
291	*Capparis spinosa* Linn.	Capparaceae	Common caperbush		S	+	+	+			+
292	*Capparis zeylanica* Linn.	Capparaceae	Ceylone caper	*Govindphal*	S	+	+	+		+	+
293	*Capillipedium filiculme* (Hook.f.) Stapf	Poaceae			G		+				
294	*Capillipedium huegelii* (Hack.) A.Camus	Poaceae			G		+				
295	*Capsicum annuum* Linn.	Solanaceae	Capsicum	*Lal mirchi*	S						+
296	*Cardiospermum halicacabum* Linn.	Sapindaceae	Balloon vine	*Kapalphodi*	CL	+	+	+			
297	*Cardamine scutata* Thunb.	Brassicaceae			H		+				
298	*Carallia brachiata* (Lour.) Merrill.	Rhizophoraceae	Freshwater Mangrove	*Kamdelo*	T	+	+	+			
299	*Careya arborea* Roxb.	Lecythidaceae	Wild guava	*Kumbhi*	T	+	+	+		+	+
300	*Carica papaya* Linn.	Caricaceae	Papaya	*Papaya*	T	+	+	+		+	+
301	*Carissa carandas* Linn.	Apocynaceae	Christ thorn	*Karawand*	S	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
302	*Carissa congesta* Wt.	Apocynaceae	Bengal Currant		S	+	+				
303	*Carissa congesta* Wt. var. albida Sant.	Apocynaceae		*Safed Karvanda*	S		+				
304	*Carvia callosa* (Nees) Bremek.	Acanthaceae	Karvy	*Karavi*	S	+	+	+			
305	*Caryota mitis* Lour.	Arecaceae			T						+
306	*Caryota urens* L.	Arecaceae	Fishtail palm	*Bherali mad*	T	+	+	+		+	+
307	*Casearia ovata* (Lamk.) Willd.	Flacourtiaceae	Casearia	*Kirmar*	T	+	+	+		+	
308	*Cassia biflora* Linn.	Caesalpiniaceae			S						+
309	*Cassia fistula* Linn.	Caesalpiniaceae	Golden shower tree	*Bahava*	T	+	+	+		+	+
310	*Cassia javanica* Linn.	Caesalpiniaceae	Java cassia		T						+
311	*Cassia nodosa* Buch.-Ham.	Caesalpiniaceae			T						+
312	*Cassia glauca* Lamk.	Caesalpiniaceae	Sulphur Cassia	*Motha tarvad*	S						+
313	*Cassia grandis* Linn.f.	Caesalpiniaceae	Coral Shower Tree		T					+	+
314	*Cassia kleinii* Wt. & Arn.	Caesalpiniaceae			H		+				
315	*Cassia mimosoides* L.	Caesalpiniaceae	Feather leaved cassia	*Chichani*	H	+	+	+			
316	*Cassia renigera* Benth.	Caesalpiniaceae	Burmese Pink Cassia		T			+			+
317	*Cassia uniflora* Mill.	Caesalpiniaceae	Oneleaf Senna		H	+				+	+
318	*Cassytha filiformis L.*	Cassythaceae	Love Vine	*Amarvel*	CL	+	+				
319	*Cassine glauca (Rottb.) Kuntze*	Celastraceae	Ceylon Tea	*Motha bhutya*	T	+	+				
320	*Casuarina litorea* Linn.	Casuarinaceae	Horse tail tree	*Suru*	T	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
321	*Castanospermum australe* A.Cunn. & Fraser	Fabaceae	Australian Chestnut		T						+
322	*Catunaregam spinosa* (Thunb.) Tirveng.	Rubiaceae	Mountain Pomegranate	*Gelphal*	S	+	+	+			
323	*Catharanthus roseus* (L.) G.Don	Apocynaceae	Periwinkle	*Sadafuli*	H	+	+	+		+	+
324	*Cayratia tenuifolia* Gagnep.	Vitaceae			CL			+			
325	*Cayratia trifolia* (L.) Domin	Vitaceae	Bush Grape	*Amativel*	CL	+	+	+			
326	*Cayratia auriculata* Gamble	Vitaceae	Threeleaf Cayratia	*lali*	CL		+				
327	*Ceiba pentandra* (L.) Gaertn.	Bombacaceae	Kapok	*Son savar*	T	+	+	+		+	+
328	*Celastrus paniculatus* Willd.	Celastraceae	Black Oil Plant	*Pingawi*	CL	+	+	+		+	
329	*Celosia argentea* Linn.	Amaranthaceae	Cockscomb	*Kurdu*	H	+	+	+	+	+	+
330	*Celosia argentea var spicata*	Amaranthaceae	Silver Cockscomb	*Kombda*	H	+	+				
331	*Celosia cristata* Linn.	Amaranthaceae	Cockscomb	*Kombda*	H						+
332	*Celosia argentea var. mumbaiana* Alm.	Amaranthaceae			H	+	+				+
333	*Celtis tetrandra Roxb.*	Ulmaceae	Eastern Nettle Tree	*Nilgiri elm*	CL		+	+			
334	Centella asiatica (L.) Urb.	Apiaceae	Indian Pennywort	*Brahmi*	H	+	+	+			+
335	*Centranthera indica* (L.) Gamble	Scrophulariaceae	Undir kani	*Undirkani*	H	+	+	+			
336	*Centaurium meyeri* (Bunge) Druce	Gentianaceae	Pink Centaury	*Lahankirayat*	H	+	+				
337	*Ceratophyllum demersum L.*	Ceratophyllaceae	Rigid hornwort		AQ/G		+				
338	*Ceratophyllum submersum L.*	Ceratophyllaceae	Tropical Hornwort		AQ/G		+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
339	*Ceriops tagal* (Pers.) Robs.	Rhizophoraceae	Tagal Mangrove		T					+	+
340	*Ceropegia attenuata* Hook.	Asclepiadaceae	Tender Ceropegia	*Khaparkundi*	CL	+	+	+			
341	*Ceropegia bulbosa* Roxb.	Asclepiadaceae	Candlestick Ceropegia	*Kanwel*	CL	+					
342	*Ceropegia media* (Huber) Ansari	Asclepiadaceae	Medium Ceropegia	*Medi Kharchudi*	CL		+				
343	*Ceropegia oculata* Hook.	Asclepiadaceae	Peacock Ceropegia	*Mor kharchudi*	CL	+	+	+			
344	*Ceropegia odorata* Nimmo ex Hook.	Asclepiadaceae			CL	+					
345	*Ceropegia vincaefolia* Hook.	Asclepiadaceae			CL	+	+				
346	*Ceropegia lawii* Hook.f.	Asclepiadaceae	Sahyadri Ceropegia	*Pandhri kharchudi*	CL	+					
347	*Ceropegia rollae* Hemadri	Asclepiadaceae	Rolla's Ceropegia	*Kharpudi*	CL	+					
348	*Cestrum nocturnum* L.	Solanaceae	Night-blooming cestru	*Ratrani*	S		+	+			+
349	*Canarium strictum Roxb.*	Burseraceae		*Raldhup*	T		+				
350	*Cassia kolabensis* Kothari et al.	Caesalpiniaceae			S	+	+				
351	*Cassia absus* Linn.	Caesalpiniaceae	Tropical Sensitive Pea	*Chamada*	S	+	+				
352	*Chionachne koenigii* (Spreng.) Thw.	Poaceae			G		+				
353	*Chionanthus mala-elengi (Dennst.) P.S.Green.*	Oleaceae	Malabar Fringe Tree	*Heddi*	T			+			
354	*Cheilanthes farinosa* (Forsk.) Kaulf.	Adiantaceae			H	+	+				+
355	*Chloris barbata* Sw.	Poaceae	Swollen Finger Grass	*gondvel*	G	+	+	+			+
356	*Chloris montana Roxb.*	Poaceae			G	+	+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
357	*Chloris quinquesetica* Bhide	Poaceae			G	+	+				+
358	*Chloris virgata* Sw.	Poaceae	Feather fingergrass		G	+	+				+
359	*Chlorophytum attenuatum* Baker	Liliaceae			H		+				
360	*Chlorophytum breviscapum* Dalz.	Liliaceae	Short Scaped Spider Plant	*Phulkadi*	H	+	+	+			
361	*Chlorophytum borivilianum* Sant. & Fernandez	Liliaceae	Safed Musli	*Safed musli*	H	+	+				
362	*Chlorophytum nimmonii* (Graham) Dalz.	Liliaceae			H		+				
363	*Chlorophytum niveum* (Poir.) Almeida	Liliaceae	Edible Chlorophytum	*Kulu*	H	+	+	+			+
364	*Chromolaena odorata* (L.) King & Robins.	Asteraceae	Siam Weed		H	+	+	+		+	+
365	*Chrozophora prostrata* Dalz.	Euphorbiaceae			H		+				
366	*Chrozophora rottleri* (Geiss.) Juss.	Euphorbiaceae	Suryavarti	*Suryavarti*	H	+	+				
367	*Chrysophyllum cainito* Linn.	Sapotaceae	Star Apple	*Tarsiphala*	T	+	+			+	+
368	*Chrysalidocarpus lutescens* Wendl.	Arecaceae	Cane palm		T						+
369	*Chrysalidocarpus madagascariensis* Bec	Arecaceae			T						+
370	*Chukrasia tabularis* Juss.	Meliaceae	Chittagong Wood		T		+				
371	*Cinnamomum verum* Presl.	Lauraceae	Cinnamon	*Dalchini*	T			+			+
372	*Cissus elongata* Roxb.	Vitaceae			CL		+	+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
373	*Cissus javanaica* D	Vitaceae			CL		+	+			
374	*Cissus woodrowii* (Stapf) Santapau	Vitaceae	Woodrow's grape tree	*Girnul*	S	+	+	+			
375	*Cissampelos pareira* Linn.	Menispermaceae	Velvet Leaf	*Pahadvel*	CL	+	+			+	+
376	*Cissampelos pareira* Linn. *var.hirsuta* Forman	Menispermaceae			CL	+					
377	*Cistanche tubulosa* (Schenk) Wight	Orobanchaceae	Desert hyacinth		H	+	+				
378	*Citharexylum spinosum* Linn.	Verbenaceae	Fiddlewood		T						+
379	*Citharexylum quadrangulare* Jacq.	Verbenaceae	Fiddlewood		T					+	+
380	*Citrullus lanatus (Thunb.) Matsum. & Nakai*	Cucurbitaceae	Water melon	*Kalingad*	CL		+	+			
381	*Citrus aurantiifolia* (Christ.) Swingle	Rutaceae	Lime	*limbu*	T			+			
382	*Citrus grandis* Osbeck	Rutaceae	Pomelo	*Papanus*	T			+			+
383	*Citrus limon* (L.) Burm.f.	Rutaceae	Lemon		T	+	+				
384	*Clematis Gouriana* Roxb.	Ranunculaceae	Gourian Clematis	*Gometi*	CL	+					+
385	*Clematis recta L.*	Ranunculaceae	Erect Clematis		CL			+			
386	*Clematis heynei M.A.Rau & al.*	Ranunculaceae	Deccan Clematis	*Morvel*	CL	+	+				
387	*Clematis hedysarifolia* D	Ranunculaceae	Burman Clematis	*Bendrichi vel*	CL	+	+				+
388	*Cleome rutidosperma* D	Cleomaceae	Fringed Spider Flower	*Til*	H	+	+	+		+	+
389	*Cleome speciosa* H.B.K.	Cleomaceae	Showy Spider Flower	*Nani*	H			+			
390	*Cleome viscosa* Linn.	Cleomaceae	Yellow spider flower	*Kanputi*	H	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
391	*Cleome gynandra* Linn.	Cleomaceae	Wild Spider Flower	*Pandhari tilvan*	H	+	+				+
392	*Clerodendrum chinense* (Osbck) Mabberley	Verbenaceae	Chinese Glory Bower		S		+				
393	*Clerodendrum fragrans Willd.*	Verbenaceae	Chinese Glory Bower	*Hajar mogara*	S			+			
394	*Clerodendrum inerme* (L.) Gaertn.	Verbenaceae	Common hedge bower	*Koyanel*	S	+	+	+		+	+
395	*Clerodendrum paniculatum* Linn.	Verbenaceae	Pagoda Flower	*Samai*	S			+			
396	*Clerodendrum serratum* (L.) Moon	Verbenaceae	Blue fountain bush	*Bharang*	S	+	+	+			
397	*Clerodendrum thomsoniae* Balf.	Verbenaceae	Bleeding Heart Vine		S			+			+
398	*Clerodendrum viscosum* Vent.	Verbenaceae	Hill clerodendrum	*Bhandira*	S	+	+	+		+	
399	*Clitoria annua* Graham	Fabaceae	Bombay Bean	*Supali*	H	+	+				
400	*Clitoria ternatea* Linn.	Fabaceae	Butterfly Pea	*Gokarna*	CL	+	+	+	+	+	+
401	*Clusia rosea* Jacq.	Clusiaceae	Autograph Tree		T					+	+
402	*Coccinia grandis* (Linn.) Voigt	Cucurbitaceae	Ivy Gourd	*Tondali*	CL	+	+	+		+	+
403	*Cocculus hirsutus* (L.) Diels.	Menispermaceae	Broom Creeper	*vasanvel*	CL	+	+	+		+	+
404	*Coccoloba uvifera* (L.) L.	Polygonaceae	Sea Grape		T					+	+
405	*Cochlospermum religiosum* (L.) Ait.	Cochlospermaceae	Buttercup tree	*Ganer*	T	+		+		+	+
406	*Cocos nucifera* L.	Arecaceae	Coconut tree	*Narali*	T	+	+	+		+	+
407	*Coix lacryma-jobi* L.	Poaceae	Job's Tears	*Ran-maka*	G	+	+	+			+
408	*Coix aquatica* Roxb.	Poaceae	Aquatic Job's Tears		G	+	+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
409	*Caladium esculentum* Vent.	Araceae	Green Taro	*Alu*	H	+	+	+			+
410	*Colebrookea oppositifolia* (Poir.) Sm.	Labiatae	Squirrel tail	*Bhamin*	S		+	+			
411	*Coleus amboinicus* Lour.	Labiatae	Cuban Oregano	*Pathurchur*	H						+
412	*Coleus scutellaroides* (L.) Benth.	Labiatae	Coleus		H		+				
413	*Colvillea racemosa* Bojer	Caesalpiniaceae	Colville's Glory		T						+
414	*Combretum albidum* D. Don	Combretaceae		*Piluki*	CL	+	+	+			+
415	*Combretum coccineum* Lamk.	Combretaceae	Flame vine		CL						+
416	*Commelina benghalensis* L.	Commelinaceae	Whiskered Commelina	*Kena*	H	+	+	+			+
417	*Commelina diffusa* Burm.f.	Commelinaceae	Spreading dayflower		H	+	+				
418	*Commelina forskalaei* Vahl.	Commelinaceae	Rat's ear		H	+	+				
419	*Commelina kotschyi* Hassk.	Commelinaceae			H	+					
420	*Commelina hasskarlii* Clarke	Commelinaceae			H	+	+				
421	*Commelina maculata* Edgew.	Commelinaceae	Spotted Dayflower		H	+					
422	*Commelina suffruticosa* Blume	Commelinaceae	Shrubby Dayflower		H	+	+				
423	*Connarus monocarpus L.*	Connaraceae	Indian Zebrawood	*Sumdari*	S		+				
424	*Convolvulus arvensis* Linn.	Convolvulaceae	Field Bindweed	*Chandvel*	CL	+	+	+			
425	*Conyza leucantha* (D.Don) Ludlow	Asteraceae			H	+					
426	*Conyza stricta* Willd.	Asteraceae	Erect Horseweed	*Bat dawana*	H		+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
427	*Corchorus aestuans L.*	Tiliaceae	East Indian Mallow		H	+	+				
428	*Corchorus capsularis L.*	Tiliaceae	White Jute	*chonche*	H	+	+				
429	*Corchorus trilocularis L.*	Tiliaceae	Wild Jute	*Kaaduchunch*	H	+	+				
430	*Corchorus olitorius L.*	Tiliaceae	Nalta Jute	*Motichhunchh*	H	+	+				
431	*Codiaeum variegatum* (L.) Blume	Euphorbiaceae	Croton		S						+
432	*Cordia dichotoma* Forst.	Ehretiaceae	The sebestan plum tree	*Bhokar*	T	+	+	+		+	+
433	*Cordia domestica* Roth	Ehretiaceae	Assyrian Plum		T						+
434	*Cordia sebestina* Linn.	Ehretiaceae	Scarlet cordia		T			+			+
435	*Cordia macleodii* Hook.f.	Ehretiaceae		*Dahiwad*	T	+	+				
436	*Cordia subcordata* Lamk.	Ehretiaceae	Beach Cordia		T						+
437	*Corymbia maculata* (Hook.) K.D. Hill & L.A.S.Johnson	Myrtaceae	Spotted Gum	*Neelgiri*	T			+			
438	*Cosmos bipinnatus* Cav.	Asteraceae	Cosmos Pied		H		+	+			+
439	*Cosmos caudatus* Kunth	Asteraceae	Wild Cosmos		H	+	+	+			
440	*Cosmostigma cordatum* (Dennst.) Almeida	Asclepiadaceae	Green Milkweed Creeper	*Shendvel*	H	+	+				
441	*Pyxa speciosa* (Koen. ex Retz.) Almeida	Pyxaceae	Crepe Ginger	*Pev*	H	+	+	+		+	+
442	*Costus villosissimus Jacq.*	Costaceae			H			+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
443	*Costus woodsonii* Maas	Zingiberaceae	Red Button Ginger		H						+
444	*Cuphea micropetala* H.B.K.	Lythraceae			H						+
445	*Couroupita guianensis* Aubl.	Lecythidaceae	Cannon ball tree	*Kailaspati*	T	+	+	+		+	+
446	*Corypha umbraculifera* L.	Arecaceae	Talipot Palm	*Bajer*	T						+
447	*Cordyline fruticosa* Goepper	Agavaceae	Hawaiian Ti Plant		S						+
448	*Crataeva adansonii* D	Capparaceae	Garlic pear	*Varun*	T			+			
449	*Crataeva tapia ssp. odora* (Jacob.) Almeida	Capparaceae			T	+	+				
450	*Crataeva tapia* Linn.	Capparaceae			T	+	+			+	+
451	*Crescentia alata* H.B.K.	Bignoniaceae	Mexican Calabash		T						+
452	*Crinum woodrowii* Baker	Amaryllidaceae	Woodrow's Crinum Lily	*Rowi karnaphul*	H	+	+	+			+
453	*Crinum asiaticum* Linn.	Amaryllidaceae	Grand crinum lily	*Nagdavana*	H	+	+	+			
454	*Crinum brachynema* Herb.	Amaryllidaceae			H		+				
455	*Crinum latifolium Linn.*	Amaryllidaceae	Milk and Wine Lily	*Gulabi karnphul*	H	+	+	+			
456	*Crinum latifolium L. var. zeylanicum (L.) Hook. f.*	Amaryllidaceae			H	+	+				
457	*Crinum pratense* Herb.	Amaryllidaceae			H	+					
458	*Crossandra infundibuliformis var. aurantica* Voight	Acanthaceae	Crossandra	*Pivali aboli*	S			+			
459	*Crossandra infundibuliformis* (L.) Nees	Acanthaceae	Crossandra	*Aboli*	S		+	+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
460	*Crotalaria albida* Heyne ex Roth	Fabaceae	Narrowleaf Rattlepod		H	+	+			+	+
461	*Crotalaria filipes* Benth.	Fabaceae	Creeping Hemp	*Phatphati*	H	+	+	+		+	+
462	*Crotalaria juncea* Linn.	Fabaceae	Sunn hemp		H	+	+				
463	*Crotalaria medicaginea* Lamk.	Fabaceae	Medick Rattlepod		H		+				
464	*Crotalaria montana* Roth	Fabaceae	Rattlepod		H		+				
465	*Crotalaria leschenaultii* D	Fabaceae	Greater rattle pod	*Dingla*	H	+		+			
466	*Crotalaria pallida* Ait.	Fabaceae	Smooth Rattlepod	*Jungali tag*	H	+	+	+			
467	*Crotalaria prostrata* Rottl.	Fabaceae	Prostrate Rattlepod		H	+	+	+			
468	*Crotalaria spectabilis* Roth	Fabaceae	Showy Rattlepod	*Khulkhula*	H	+	+	+			
469	*Crotalaria verrucosa* Linn.	Fabaceae	Blue Rattlepod	*Sagar tag*	H			+		+	+
470	*Crotalaria retusa* Linn.	Fabaceae	Rattleweed	*Gagra*	H	+	+				
471	*Crotalaria triquetra* Dalz.	Fabaceae			H					+	
472	*Crotalaria calycina* Schrank.	Fabaceae	Hairy Rattlepod	*Kesal tag*	H	+					
473	*Crotalaria leptostachya* Benth.	Fabaceae	Slender Spiked Rattlepod	*Dongari tag*	H	+	+				
474	*Crotalaria mysorensis* Roth	Fabaceae	Mysore Rattlepod	*Maisuri tag*	H	+					
475	*Crotalaria hebecarpa* (D) Rudd	Fabaceae	Fuzzy Fruited Rattlepod	*Godhadi*	H	+	+				
476	*Croton virbalaie* Almeida	Euphorbiaceae		*Ghansoli*	S			+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
477	*Croton bonplandianus* Baill.	Euphorbiaceae	Ban tulsi	*Raan Tulas*	S	+	+				
478	*Cryptolepis dubia* (Burm.f.) Almeida	Asclepiadaceae	Wax Leaved Climber	*Kavali*	CL	+	+	+			
479	*Cullen corylifolia* (Linn.) Medik.	Fabaceae	Scurfy Pea	*Babachi*	H	+	+				
480	*Cucumis melo* Linn.	Cucurbitaceae	Melon	*Chibunda*	CL	+	+	+			
481	*Cucumis melo ssp. agrestis* Panglo	Cucurbitaceae	Wild Melon	*shinde*	CL	+					
482	*Cucumis sativus* Linn.	Cucurbitaceae	Cucumber	*Kakadi*	CL		+	+			
483	*Cucumis trigonus Roxb.*	Cucurbitaceae		*Dongarmekha*	CL			+			
484	*Cucurbita maxima* Duch. ex Lamk.	Cucurbitaceae	Giant Pumpkin	*Bhopala*	CL	+	+	+		+	+
485	*Curculigo orchioides* Gaertn.	Hypoxidaceae	Golden Eye Grass	*Kali musali*	H	+	+	+			+
486	*Curcuma aromatica* Salisb.	Zingiberaceae	Wild turmeric	*Jungalihalad*	H	+					
487	*Curcuma cf. Mutabilis*	Zingiberaceae	Changeable Turmeric		H	+	+				
488	*Curcuma inodora* Blatter	Zingiberaceae	Scentless Turmeric	*Ranhalad*	H	+	+				
489	*Curcuma neilgherrensis* Wt.	Zingiberaceae			H		+				
490	*Curcuma pseudomontana* Graham	Zingiberaceae	Wild turmeric	*Ran halad*	H	+	+	+			+
491	*Cuscuta reflexa* Roxb.	Cuscutaceae	Giant Dodder	*Amarvel*	CL	+	+	+		+	+
492	*Cyamopsis tetragonoloba* (Linn.) Taub	Fabaceae	Gaur	*Gavar*	H						+
493	*Cyanotis cristata* (L.) D.Don	Commelinaceae		*Nabhali*	H	+		+			
494	*Cyanotis fasciculata* (Heyne ex Roth) Schult.	Commelinaceae	Nilwanti	*Nirphuli*	H	+	+	+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
495	*Cyanotis tuberosa* (Roxb.) Schult. & Schult.	Commelinaceae	Greater Cat Ears	*Abhali*	H	+	+	+			
496	*Cyanotis axillaris (L.) Sweet*	Commelinaceae			H	+	+				
497	*Cyathocline lutea* Law ex Wt.	Asteraceae	Yellow bane	*Pivala gangotra*	H		+	+			
498	*Cyathocline purpurea* (Don) Kuntze	Asteraceae	Purple bane	*Gangotra*	H	+	+	+		+	+
499	*Cycas rumphii* Miq.	Cycadaceae	Ceylon Sago Palm		T	+	+	+			+
500	*Cyclea peltata* Hook.f. & Thoms.	Menispermaceae	Raj Patha	*Thorali Padval*	CL	+	+				
501	*Cymbopogon winterianus Jowitt*	Poaceae	Java grass	*Gavati chaha*	G			+			
502	*Cymbopogon citratus* (D) Stapf	Poaceae	Lemon grass		G	+					+
503	*Cymbopogon martini* (Roxb.) W.Watson	Poaceae	Palmarosa		G	+	+				+
504	*Cynodon dactylon* (L.) Pers.	Poaceae	Durva grass	*Durva*	G	+	+	+	+	+	+
505	*Cyperus nervosus* Willd. ex Kunth	Cyperaceae			G						+
506	*Cyperus esculentus* L.	Cyperaceae	Chufa sedge		G						+
507	*Cynoglossum zeylanicum* (Hornem.) Thunb.	Boraginaceae	Ceylon Forget Me Not		H	+	+				
508	*Juncellus alopecuroides* (Rottb.) Clarke	Cyperaceae		*Lavhale*	G			+			
509	*Cyperus rotundus* Linn.	Cyperaceae	Common Nut Sedge	*Nagarmotha*	G	+	+	+		+	+
510	*Cyperus scariosus* R.Br.	Cyperaceae	Umbrella Sedge	*lawala*	H		+	+			
511	*Dactyloctenium aegyptium (L.) Willd.*	Poaceae	Crowfoot Grass		G		+	+	+		

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
512	*Pergularia daemea* (Forssk.) Chiv.	Asclepiadaceae	Hairy flowered cuncanchum	*Utarani*	CL	+		+			
513	*Dalbergia horrida* (Dennst. ex Fortsetz) Mabberley	Fabaceae	Prickly Dalbergia		CL	+	+				
514	*Dalbergia lanceolaria* Linn.f.	Fabaceae			T		+				
515	*Dalbergia lanceolaria subsp. lanceolaria L.f.*	Fabaceae	Takoli	*Dandoshi*	T	+	+				
516	*Dalbergia latifolia* Roxb.	Fabaceae	Black rose wood tree	*Shisam*	T	+	+	+			
517	*Dalbergia paniculata* Roxb.	Fabaceae	Patri	*Fashi*	T	+	+				
518	*Dalbergia sissoo* Roxb. ex D	Fabaceae	Indian rosewood	*Shisham*	T	+	+			+	+
519	*Dalbergia volubilis* Roxb.	Fabaceae	Climbing Dalbergia	*Alai*	T		+				
520	*Datura metel* Linn.	Solanaceae	Thorn apple	*Dhotara*	S	+	+	+			+
521	*Datura inoxia* Mill.	Solanaceae	horn of plenty	*Dhotara*	S	+	+				
522	*Datura ferox* Linn.	Solanaceae	Fierce Thorn Apple	*Dhotara*	S					+	+
523	*Datura stramonium* Linn.	Solanaceae	Jimsonweed		S		+				
524	*Delphinium dasycaulon* Fres.	Ranunculaceae	Malabar Delphinium	*Neelamabari*	H		+				
525	*Delonix regia* (Boj. ex Hook.) Raf.	Caesalpiniaceae	Flame Tree	*Gulmohor*	T	+	+	+	+	+	+
526	*Dendrocalamus strictus* (Roxb.) Nees	Poaceae	Calcutta Bamboo	*udha*	G	+	+				+
527	*Dendrophthoe curvata* Blume	Loranthaceae	Rainforest Mistletoe		S	+					

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
528	*Dendrobium ovatum* (Willd.) Kranz.	Orchidaceae	Green Lipped Dendrobium	*Hirvi dande-amri*	H/Or	+	+				
529	*Dentella repens* Forst.	Rubiaceae	Creeping lickstoop		S	+	+		+		
530	*Derris scandens* (Roxb.) Benth.	Fabaceae	Jewel Vine	*Garudvel*	CL	+	+	+		+	+
531	*Derris trifoliata* Lour.	Fabaceae	Common Derris	*Karanjvel*	CL	+	+	+		+	+
532	*Derris heyneana* Benth.	Fabaceae	Climbing Derris	*Gharvel*	CL	+					
533	*Desmostachya bipinnata* (L.) Stapf.	Poaceae	Daabh	*Darbha*	G	+	+				+
534	*Desmodium laxiflorum* D	Fabaceae	Loose Flowered Desmodium	*Asud*	H	+	+	+			
535	*Desmodium dichotomum* (Klein ex Willd.) D	Fabaceae	Desmodium	*Chikta*	H		+	+			
536	*Desmodium gangeticum* (L.) D	Fabaceae	Sal Leaved Desmodium	*Dai*	H	+	+	+		+	+
537	*Desmodiastrum racemosum var. rotundifolium (Baker) A.Pramanik & Thoth.*	Fabaceae	Ritchie's Desmodium		H	+	+				
538	*Desmodium triangulare* (Retz.) Merrill	Fabaceae	Triangular Horse Bush		H	+	+			+	
539	*Desmodium triquetrum* (Linn.) D	Fabaceae	Trefle Gros	*Kakganja*	H		+	+		+	
540	*Desmodium scorpiurus* (Sw.) Desv.	Fabaceae			H	+	+	+			+
541	*Desmodium heterocarpon* (Linn.) D	Fabaceae	Asian Tick Trefoil	*Jambhli Dashmi*	H	+	+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
542	*Desmodium triflorum* (Linn.) D	Fabaceae	Creeping Tick Trefoil	*chipti*	H	+	+			+	+
543	*Desmodium umbellatum* (Linn.) D	Fabaceae	Horse Bush	*pandhra chikta*	S	+	+				
544	*Ougenia oojenensis* (Roxb.) Hochrest	Fabaceae	Sandan	*kalapalas*	T	+					
545	*Dicliptera cuneata* Nees	Acanthaceae			H		+				
546	*Dicliptera foetida* (Forssk.) Blatter	Acanthaceae	Stinking Foldwing	*Jivani*	H	+	+				
547	*Dicliptera verticillata* (Forsk.) Christensen	Acanthaceae			H		+				
548	*Dieffenbachia seguine* Schott	Araceae	Dumbcane		S						+
549	*Digera muricata* (L.) Mart.	Amaranthaceae	False Amaranth	*Gitana*	H	+	+				
550	*Digitaria stricta* Roth	Poaceae			G	+	+				+
551	*Digitaria ciliaris (Retz.) Koeler*	Poaceae	Wild Crabgrass		G	+	+				
552	*Digitaria longiflora (Retz.) Pers.*	Poaceae	Indian crabgrass		G		+				
553	*Dillenia indica* Linn.	Dilleniaceae	Elephant Apple	*Pandhara karamal*	T		+	+			+
554	*Dillenia pentagyna* Roxb.	Dilleniaceae	Karmal	*Karambel*	T	+	+	+			+
555	*Dimeria ornithopoda Trin.*	Poaceae			G	+					
556	*Diplachne fusca* (L.) Beauv.	Poaceae			G		+				
557	*Dioscorea bulbifera* L.	Dioscoreaceae	Aerial yam	*Kadu karinda*	CL	+	+			+	+
558	*Diospyros nigra* (Gmelin) Almeida	Ebenaceae	Indian Ebony	*Abnus*	T						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
559	*Dioscorea pentaphylla* L.	Dioscoreaceae	Five Leaf Yam	*Shendvel*	CL	+	+				
560	*Dioscorea oppositifolia* L.	Dioscoreaceae	Cinnamon Vine	*paspoli*	CL		+				
561	*Diospyros malabarica* (Desr.) Kostel ex Baker	Ebenaceae	Persimmon tree		T	+	+	+			+
562	*Diospyros philippinensis* Almeida	Ebenaceae		*Mabolo*	T						+
563	*Diospyros melanoxylon* Roxb	Ebenaceae	Ebony tree	*Tembhurni*	T	+	+	+			
564	*Diospyros sylvatica* Roxb.	Ebenaceae			T		+				
565	*Dioscorea belophylla* (Prain) Voigt	Dioscoreaceae	Spear-Leaved Yam	*Turar*	CL	+	+				+
566	*Dipteracanthus prostratus* (Poir.) Nees	Acanthaceae			H	+	+				
567	*Diploclisia glaucescens* (Bl.) Miers.	Menispermaceae	Glaucous Diploclisia	*Vatan-vel*	CL	+	+				
568	*Diplocyclos palmatus* (Linn.) Jeffrey	Cucurbitaceae	Lollipop Climber	*Kavdoli*	CL	+	+				+
569	*Dipcadi saxorum* Blatt.	Liliaceae			H	+	+				
570	*Dipcadi concanense* (Dalz.) Baker	Liliaceae	Konkan Dipcadi		H	+	+				
571	*Dipcadi montanum* (Dalz.) Baker	Liliaceae	Dipcadi	*Deepkadi*	H	+	+				
572	*Dracaena sps.*	Agavaceae			S						+
573	*Dregea volubilis* Benth. ex Hook.f.	Asclepiadaceae	Sneeze Wort	*Harandodi*	CL	+	+				+
574	*Drimia indica* (Roxb.) Jessop.	Liliaceae			H	+					
575	*Drosera indica L.*	Droseraceae	Flycatcher	*Gawati davbindu*	H	+	+				

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576	*Drynaria quercifolia* (L.) J. Sm	Polypodiaceae	oak-leaf fern		S	+	+				+
577	*Drypetes roxburghii* (Wall.) Hurusawa	Euphorbiaceae	Putranjiva	*Jivanputra*	T		+			+	+
578	*Dolichondrone atrovirens* Sprague	Bignoniaceae	Wavy Trumpet Flower	*Gudmurki*	T						+
579	*Dolichandrone spathacea* (L.)K. Schum.	Bignoniaceae	Medhshingi	*Medhshingi*	T	+	+			+	+
580	*Dopatrium lobelioides* (Retz.) Benth.	Plantaginaceae			H			+			
581	*Dopatrium junceum* (Roxb.) Buch.-Ham. ex Benth.	Plantaginaceae	Horsefly'S Eye		H	+	+				
582	*Duranta erecta* Linn.	Verbenaceae	Sky flower		S	+	+	+		+	+
583	*Duranta repens var variegata* Bailey	Verbenaceae	Variegated Sky Flower		S			+			
584	*Ecbolium ligustrinum* (Vahl) Vollesen	Acanthaceae	Green Shrimp Plant	*Ran aboli*	H	+		+			+
585	*Ecbolium virde ssp. ligustrina* (Vahl.) Almeida	Acanthaceae	Green Shrimp Plant	*Ran aboli*	H		+				
586	*Echinochloa colona* (L.) Link.	Poaceae			G	+	+				
587	*Echinochloa crus-galli (L.) P. Beauv.*	Poaceae	Common Barnyard Grass		G		+				
588	*Eclipta prostrata* Linn.	Asteraceae	False Daisy	*Maka*	H	+	+	+		+	+
589	*Ehretia aspera* Roxb.	Ehretiaceae		*Ajanvruksha*	S		+				
590	*Ehretia laevis* Roxb.	Ehretiaceae	Chamro	*Datrang*	T		+				
591	*Eichornia crassipes* (Mart.) Solms.	Pontederiaceae	Water hycinth	*Jalkumbhi*	AQ		+	+	+	+	+

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592	*Elaeagnus conferta Roxb.*	Elaegnaceae		*Nurgi*	S	+	+	+			
593	*Elaeis guineensis* Jacq.	Arecaceae	African Oil Palm		T					+	+
594	*Elatostemma cuneatum Wt.*	Urticaceae			H		+				
595	*Elephantopus scaber* Linn.	Asteraceae	Elephant Foot	*Hastipad*	H	+	+	+			+
596	*Eleusine aristata* Ehrenb. ex Boiss.	Poaceae			G	+					
597	*Eleusine indica* (L.) Gaertn.	Poaceae	Indian Crowfoot Grass	*Rannachani*	G	+	+				+
598	*Eleusine coracana* (L.) Gaertn.	Poaceae	Finger Millet	*nachani*	G		+	+			+
599	*Elytrophorus spicatus (Willd.) A.Camus*	Poaceae			G		+				
600	*Embelia ribes* Burm f.	Myrsinaceae	False Black Pepper	*wavding*	S	+	+	+			
601	*Embelia basaal* D	Myrsinaceae	Malabar Embelia	*Ambati*	S	+	+				
602	*Emilia sonchifolia* D	Asteraceae	Purple Sow Thistle	*Sadamandee*	H	+	+	+			
603	*Ensete glaucum* (Roxb.) Cheesm.	Musaceae	Rock Banana	*Ran keli*	S	+	+	+		+	+
604	*Entada phaseoloides* (L.) Merr.	Mimosaceae	African Dream Herb	*Garambi*	CL			+			
605	*Entada rheedei* Spreng.	Mimosaceae	Sea Bean	*Garambi*	CL	+	+				
606	*Epaltes divaricata* Cass.	Asteraceae			H		+				
607	*Episcia cupreata* (Hook.) Hanst.	Gesneriaceae	Flame Violet		H						+
608	*Eragrostis cilianensis* (All.) Lutati	Poaceae	Stink Grass		G			+			+
609	*Eragrostis unioloides (Retz.) Nees ex Steud.*	Poaceae	Chinese Lovegrass	*seete-che pohe*	G	+		+	+		

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610	*Eragrostis gangetica* (Roxb.) Steud.	Poaceae			G	+	+				+
611	*Eragrostis nutans* (Retz.) Nees ex Steud.	Poaceae			G	+	+				+
612	*Eragrostis pilosa* (L.) P. Beauv.	Poaceae			G	+	+				+
613	*Eragrostis tenella* (Linn.) P Beauv.	Poaceae			G	+	+				+
614	*Eranthemum roseum* (Vahl) R.Br.	Acanthaceae	Blue eranthemum	*Dashmuli*	H	+	+	+			+
615	*Eria microchilos* Lindl.	Orchidaceae			H/Or		+				
616	*Erigeron benghalensis* (D) Almeida	Asteraceae		*Sonasali*	H		+				
617	*Eriocaulon tuberiferum* Kulkarni & Desai	Eriocaulaceae	Tuberous Pipewort	*Pangend*	H		+	+			
618	*Eriocaulon eurypeplon* Koern.	Eriocaulaceae			H						+
619	*Eriocaulon heterolepis* Steud.	Eriocaulaceae	Buttonhead Pipewort		H	+	+				+
620	*Eriocaulon sedgwickii* Fyson	Eriocaulaceae	Spherical Pipewort	*Gend*	H		+				
621	*Eriocaulon dianae var. longibracteatum* Fyson	Eriocaulaceae			H		+				+
622	*Eriolaena quinquelocularis* Wt.	Sterculiaceae	Bothi	*Bothi*	T	+	+				
623	*Eriochloa polystachya Kunth*	Poaceae	Carib grass		G		+				
624	*Eriochloa procera (Retz.) E.Hubb.*	Poaceae	cupgrass		G		+				
625	*Erinocarpus nimmonii J. Graham*	Tiliaceae	Nimmo's Erinocarpus	*Chera*	T	+	+				

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626	*Erythrina variegata* Linn.	Fabaceae	Indian coral tree	*Pangara*	T	+	+	+	+	+	+
627	*Erythrina variegata var. orientalis* (L.) Merr.	Fabaceae	Tiger's claw		T		+				
628	*Erythrina stricta* Roxb.	Fabaceae	Corky Coral Tree	*Pangara*	T	+	+				
629	*Erythrina suberosa* Roxb.	Fabaceae		*Pangara*	T		+				+
630	*Eulalia fimbriata (Hack.) Kuntze*	Poaceae			G	+	+				
631	*Eucalyptus globulus* Labill.	Myrtaceae	Southern Blue Gum	*Neelgiri*	T	+	+				+
632	*Eucharis grandiflora* Planch. & Linden.	Amaryllidaceae	Amazon Lily								+
633	*Eulophia ochreata* Lindl.	Orchidaceae	Golden-Yellow Eulophia	*Amarkanda*	H/Or		+				
634	*Eupatorium repandum* Willd.	Asteraceae		*Ranmodi*	S		+				
635	*Eupatorium glandulosum* Michx.	Asteraceae	Catweed	*osadi*	H	+	+				
636	*Euphorbia antiquorum* Linn.	Euphorbiaceae	Triangular Spurge	*Narasya*	S		+				+
637	*Euphorbia clarkeana* Hook.f.	Euphorbiaceae			H		+				
638	*Euphorbia erythroclada* Boiss.	Euphorbiaceae			H		+				
639	*Euphorbia fusiformis* Buch.-Ham.	Euphorbiaceae			H		+				
640	*Euphorbia heterophylla* Linn.	Euphorbiaceae	Wild Poinsettia		H		+				
641	*Euphorbia hirta* Linn.	Euphorbiaceae	Asthma Weed	*Dudhi*	H	+	+	+		+	+
642	*Euphorbia millii* Desmoul.	Euphorbiaceae	Crown of Thorns		H						+
643	*Euphorbia neriifolia* Linn.	Euphorbiaceae	Hedge Euphorbia	*Vai nivadung*	H	+	+	+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
644	*Euphorbia parviflora* Linn.	Euphorbiaceae		*Gulabi dudhi*	H	+	+	+			
645	*Euphorbia tirucalli* Linn.	Euphorbiaceae	Firestick Plants		T	+	+			+	+
646	*Euphorbia pulcherrima* Willd.	Euphorbiaceae			S					+	+
647	*Euphorbia rothiana* Spr.	Euphorbiaceae	Common Hill Spurge	*Dudhi*	S	+	+			+	+
648	*Euphorbia serpens* Benth.	Euphorbiaceae	Matted Sandmat		S	+	+			+	+
649	*Euphorbia thymifolia* Linn.	Euphorbiaceae	Gulf Sandmat	*Dhakti dudhi*	S	+	+				+
650	*Evolvulus nummularius* (L.) Linn.	Convolvulaceae	Roundleaf Bindweed	*Nimulwel*	H		+			+	+
651	*Evolvulus alsinoides* Linn.	Convolvulaceae	Dwarf Morning Glory	*Vishnukranta*	H	+	+	+		+	+
652	*Exacum bicolor* Roxb.	Gentianaceae	Bicolor Persian Violet	*Udi-chirayat*	H	+	+	+			
653	*Exacum carinatum* Roxb.	Gentianaceae			H		+				
654	*Exacum pedunculatum* Linn.	Gentianaceae	Stalked Persian Violet	*Lahan chirayat*	H	+	+	+			
655	*Exacum pumilum* Griseb.	Gentianaceae	Little Persian Violet	*Jambhali chirayat*	H	+		+			
656	*Exacum lawii* Clarke	Gentianaceae	Law's Persian Violet	*Lahan chirayat*	H	+					+
657	*Excoecaria agallocha* Linn.	Euphorbiaceae	Blinding tree	*Geva*	T		+	+		+	+
658	*Antidesma bunuis* (L.) Spr.	Euphorbiaceae	Tiger's Milk Spruce	*Hura*	T		+				
659	*Fernandoa adenophylla* D	Bignoniaceae	Katsagon		T		+			+	+
660	*Feronia limonia* (L.) Swingle	Rutaceae	Wood Apple	*Kavath*	T		+	+		+	+
661	*Ficus arnottiana* Miq.	Moraceae	Indian Rock Fig	*Payar*	T	+	+				+
662	*Ficus ampelos* Burm.f.	Moraceae		*Karoti*	T	+	+	+			

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663	*Ficus benghalensis* Linn.	Moraceae	Banyan tree	*Vad*	T	+	+	+	+	+	+
664	*Ficus benghalensis var. krishnae* D	Moraceae	Krishna's Butter Cup		T					+	+
665	*Ficus benjamina* Linn.	Moraceae	Weeping Fig	*Nandaruk*	T	+	+			+	+
666	*Ficus drupacea var. Mysorensis* (Heyne) ex Roth. Almeida	Moraceae	Mysore Fig	*Burali-Wad*	T	+	+				+
667	*Ficus elastica* Roxb.	Moraceae	Rubber Tree	*Rabracho-vad*	T		+			+	+
668	*Ficus racemosa* Linn.	Moraceae	Country fig	*Umbar*	T	+	+	+			+
669	*Ficus rubescens* Vahl	Moraceae	Climbing stream fig	*Datir*	CL	+	+				
670	*Ficus hispida* Linn.f.	Moraceae	Hairy Fig	*bokhada*	T	+	+	+	+	+	+
671	*Ficus longifolia* Schott	Moraceae	long leaved Ficus		T					+	+
672	*Ficus pumila* Linn.	Moraceae	Climbing Fig		CL						+
673	*Ficus religiosa* Linn.	Moraceae	The peepal tree	*Pimpal*	T	+	+	+		+	+
674	*Ficus microcarpa* Linn.f.	Moraceae	Laurel Fig	*Nandruk*	T	+	+	+			
675	*Ficus amplissima* Sm.	Moraceae		*Pipar*	T	+	+				+
676	*Ficus rumphii* Bl.	Moraceae	Rumpfs Fig Tree		T			+			+
677	*Ficus parasitica ssp. gibbosa* Almeida	Moraceae			T		+				
678	*Ficus tsjahela* Burm. f.	Moraceae			T		+				
679	*Ficus virens* Dryand.	Moraceae	White Fig	*Bassari*	T	+	+				

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680	*Filicium decipiens* Thw.	Sapindaceae	Fern Tree		T	+	+	+		+	+
681	*Firmiana colorata (Roxb.) R.Br.*	Sterculiaceae	The bonefire tree	*Khavashi*	T	+	+	+		+	+
682	*Flacourtia montana* Graham	Flacourtiaceae	Mountain Sweet Thorn	*Athurni*	T	+	+	+			
683	*Flacourtia indica* (Burm. f.) Merrill.	Flacourtiaceae	Governor's Plum	*Atrun*	T	+	+				
684	*Flacourtia jangomas* (Lour.) Rausch.	Flacourtiaceae	Coffee Plum	*Champeran*	T	+	+				
685	*Flueggea leucopyrus Willd.*	Phyllanthaceae	Bushweed	*Pandharphali*	S	+					
686	*Flemingia bracteata* (Roxb.) Wight	Fabaceae			S	+	+				
687	*Flemingia strobilifera* (Linn.) R.Br.ex. Ait.	Fabaceae	Wild Hops	*Kanphuti*	S	+	+				
688	*Flemingia lineata* (L.) Roxb.	Fabaceae			S		+				
689	*Flemingia macrophylla* (Willd.) Prain ex Merrill	Fabaceae		*Daudala*	S		+				
690	*Flemingia macrophylla var. Nana* (Baker) Almeida	Fabaceae	Slender Flemingia	*Jartari*	H		+				
691	*Foeniculum vulgare* Miller	Apiaceae	Fennel	*saunf*	H	+	+				+
692	*Furcraea foetida* (L.) Haw.	Agavaceae	False Agave		H		+				
693	*Galphimia gracilis* Bartling	Malpighiaceae	Gold shower		S						+
694	*Gamochaeta pensylvanica* (Willd.) Cabrera	Asteraceae	Pennsylvania Cudweed		H		+				
695	*Garcinia indica* Choiss	Clusiaceae	Kokam	*Kokam*	T	+	+	+		+	+
696	*Garcinia xanthochymus* Hook.f.	Clusiaceae	Mysore Gamboge		T						+

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697	*Garcinia talbotii* Raiz. ex Sant.	Clusiaceae	Talbot Garcinia	*Tavir*	T	+	+				
698	*Gardenia jasminoides* Ellis	Rubiaceae	Gardenia	*Anant*	S		+	+			+
699	*Gardenia jasminoides* Ellis *var. plana* Almeida	Rubiaceae	Confederate jasmine		S						+
700	*Gardenia gummifera* Linn.f.	Rubiaceae	Gummy gardenia	*Dikemali*	S	+	+				+
701	*Gardenia resinifera* Roth	Rubiaceae	Brilliant Gardenia	*Dikemal*	T	+	+	+			+
702	*Garuga pinnata* Roxb.	Burseraceae	Garuga	*Kakad*	T	+	+	+		+	+
703	*Gerbera Jamesonii* Bolus.	Asteraceae	Gerber daisy	*Gerbera*	H						+
704	*Girardiana platyphylla D. Don.*	Urticaceae	Bichchhoo	*Mothi khajoti*	H			+			
705	*Gliricidia sepium* (Jacq.) H.B.K.	Fabaceae	Mexican lilac	*Undirmari*	S	+	+	+	+	+	+
706	*Gloriosa superba* L.	Liliaceae	Glory Lily	*Kallawi / Khadyanag*	CL	+	+	+			+
707	*Glossocardia bosvallia* D	Asteraceae	Patthar Suva	*Ranshepu*	H		+	+			
708	*Glochidion ellipticum* Wt.	Euphorbiaceae	Bhoma	*Bhoma*	T	+	+				
709	*Gmelina arborea* Roxb.	Verbenaceae	Gamhar	*Shivan*	T	+	+	+			+
710	*Gnaphalium polycaulon* Pers.	Asteraceae	Many-Stemmed Cudweed		H	+	+				
711	*Gnetum ula Brongn.*	Gnetaceae	Gnetum	*Kombali*	CL	+	+	+			
712	*Gnidia glauca (Fresen.) Gilg*	Thymelaeaceae	Fish Poison Bush	*Rameta*	T	+					
713	*Gomphrena celosioides* Mart.	Amaranthaceae	Prostrate Gomphrena		H	+	+	+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
714	*Graptophyllum pictum* (L.) Griff.	Acanthaceae	Caricature Plant		S						+
715	*Gomphrena globosa* Linn.	Amaranthaceae	Globe Amaranth		H		+				
716	*Grangea maderaspatana* Poir.	Asteraceae	Madras Carpet	*Mashipatri*	H	+	+		+		
717	*Grevillea robusta* A.Cunn.	Proteaceae	Silver oak		T		+			+	+
718	*Grewia asiatica L.*	Tiliaceae	Phalsa	*Dahipalas*	T	+	+	+			
719	*Grewia flavescens Juss.*	Tiliaceae	Donkey Berry	*Pitkuri*	S	+		+			
720	*Microcos paniculata* Linn.	Tiliaceae	Microcos	*Shirali*	T	+	+	+			
721	*Grewia serrulata D*	Tiliaceae		*kaori*	T	+	+	+			
722	*Grewia tiliaefolia Vahl*	Tiliaceae	Dhaman	*Dhaman*	T	+	+	+			
723	*Grewia abutilifolia* Vent. ex Juss.	Tiliaceae	Mallow-Leaved Crossberry	*kirmith*	S	+					
724	*Grewia laevigata Vahl*	Tiliaceae	Two-Lobed Crossberry		S	+					
725	*Grewia rhamnifolia Heyne ex Roth*	Tiliaceae			S						
726	*Guaiacum officinale* L.	Zygophyllaceae	Tree of Life,		T						+
727	*Guazuma ulmifolia* Lamk.	Sterculiaceae	West Indian Elm	*Rudrakshi*	T						+
728	*Gustavia augusta* Linn.	Lecythidaceae	Majestic Heaven Lotus		T						+
729	*Gymnosporia rothiana* (Walp.) Wight & Arn. ex M. A. Lawson.	Celastraceae	Roth's Spike Thorn	*Lokhandi*	T	+					

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
730	*Gynura bicolor* (Willd.) D	Asteraceae			H		+				
731	*Habenaria foliosa* A.Rich.	Orchidaceae	Leafy Habenaria	*Ugra Habe-amri*	H	+	+	+			+
732	*Habenaria grandifloriformis* Blatt. & Mc	Orchidaceae	Single Leaved Habenaria	*Chikarkanda*	H	+	+	+			
733	*Habenaria longicorniculata* Graham	Orchidaceae	Habenaria orchid	*Sheput habe-amri*	H		+				
734	*Habenaria marginata* Coleb	Orchidaceae	Golden Yellow Habenaria	*Pivali habe amri*	H	+	+	+			
735	*Habenaria plantaginea* Lindl.	Orchidaceae	Plantain Orchid	*Kadali habe-amri*	H	+	+	+			
736	*Peristylus stocksii* (Hk.f.) Kranz.	Orchidaceae	Stocks's Peristylus		H	+					
737	*Habenaria heyneana* Lindl.	Orchidaceae	Toothbrush Orchid	*Kangwa Habe-amri*	H	+	+				+
738	*Habenaria rariflora* A.Rich.	Orchidaceae	Spreading Flowered Habenaria	*Chire habe-amri*	H	+	+				
739	*Peristylus plantagineus* (Lindl.) Lindl.	Orchidaceae	Plantain Peristylus		H	+	+				
740	*Habenaria roxburghii* R.Br.	Orchidaceae	Roxburgh's Habenaria		H	+	+				
741	*Haldina cordifolia (Roxb.) Ridsdale*	Rubiaceae	Haldu	*Haladu*	T	+	+	+		+	+
742	*Hamelia patens* Jacq.	Rubiaceae	Firebush		S	+					+
743	*Hedychium coronarium* Koen. ex Retz.	Zingiberaceae	Butterfly Ginger Lily	*Sontaka*	H			+			+
744	*Helianthus annuus* Linn.	Asteraceae	Sunflower		H						+
745	*Helicteres isora* Linn.	Sterculiaceae	Screw fruit bush	*Murudsheng*	S	+	+	+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
746	*Heliconia psittacorum* L.f.	Heliconiaceae	Parakeet Flower		H						+
747	*Heliotropium indicum* Linn.	Boraginaceae	Indian turnsole	*Bhurundi*	H	+	+	+			+
748	*Heliotropium ovalifolium* Forsk.	Boraginaceae	Grey Leaf Heliotrope	*Pandya*	H	+	+	+			
749	*Hemidesmus indicus* Br.	Periplocaceae	Indian Sarsaparilla	*Anantmul*	H	+	+	+		+	+
750	*Hemigraphis latebrosa* (Heyne ex Roth) Nees	Acanthaceae	Shade Loving Hemigraphis	*Morphankhi*	H	+	+	+			
751	*Hemigraphis latebrosa var. ebracteata* (Dalz.) Cooke	Acanthaceae			H	+	+				
752	*Heracleum grande* (Dalz. & Gibs.) Mukhopadhay	Apiaceae	Hill Carrot	*Baphali*	H		+				
753	*Heritiera littoralis* Dryand.	Sterculiaceae	Looking Glass Mangrove	*Sundari*	T		+				
754	*Heterophragma quadriloculare* (Roxb.) K.Schum.	Bignoniaceae		*Varas*	T	+	+	+		+	+
755	*Heterostemma dalzellii* Hook.f.	Asclepiadaceae	Dalzell's Heterostemma		T	+	+				
756	*Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult	Poaceae	Black spear grass		G	+	+				+
757	*Goniogyna hirta* (Willd.) Ali	Fabaceae			H					+	+
758	*Hibiscus hirsuta* G. & P.	Malvaceae		*Dupari*	H	+		+		+	
759	*Hibiscus hirtus* Linn.	Malvaceae	Lesser Mallow	*Dupari*	S	+	+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
760	*Hibiscus rosa-sinensis* Linn.	Malvaceae	China rose	*Jaswand*	S	+	+	+		+	+
761	*Hibiscus sabdariffa* Linn.	Malvaceae	Roselle	*Laal-ambaari*	H			+			
762	*Hibiscus schizopetalus* (Mast.) Hook.	Malvaceae	Japanese Hibiscus		H	+					+
763	*Hibiscus hispidissimus* Griff.	Malvaceae	Wild Hibiscus	*Kateri bhendi*	H	+	+				
764	*Hibiscus vitifolius* Linn.	Malvaceae	Grape Leaved Mallow	*Van kapus*	H		+				
765	*Kosteletzkya vitifolia* (L.) Almeida & Patil	Malvaceae	Grape Leaved Mallow	*Van kapus*	S		+				+
766	*Hippeastrum puniceum* (Lamk.) Voss. var. minus (Herb.) Alm.	Amaryllidaceae	Barbados Lily		H			+			
767	*Hiptage benghalensis (*L.) Kurz	Malpighiaceae	Helicopter Flower	*Madhavilata*	CL		+	+			
768	*Hitchenia caulina* (Graham) Baker	Zingiberaceae	Indian Arrowroot	*Chavar*	H	+					+
769	*Holarrhena antidysenterica* Wall.	Apocynaceae	Indrajao	*Safed kuda*	S	+	+	+			+
770	*Holoptelea integrifolia* (Roxb.) Planch.	Ulmaceae	Indian Elm	*Vavala*	T	+	+	+		+	+
771	*Holostemma annulare* (Roxb.) K. Schum	Asclepiadaceae	Holostemma Creeper	*Siri/ Kad-dodi*	CL	+	+	+			
772	*Homonoia riparia* Lour.	Euphorbiaceae	Willow-Leaved Water Croton	*raan kaner*	H	+	+		+		
773	*Hoya wightii* Hook.f.	Asclepiadaceae	Pendulous Wax Flower	*Ambri*	CL	+	+				
774	*Hoya pubicalyx* Merr.	Asclepiadaceae	Pink Silver Wax Flower		CL						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
775	*Hydrilla Verticillata* (L.F.) royle.	Hydrocharitaceae	Water Thyme	*Seval*	AQ/H		+		+		+
776	*Hydrolea zeylanica* (L.) Vahl	Hydrophyllaceae	Ceylon Hydrolea	*Popti*	H	+	+		+	+	+
777	*Hygrophila serpyllum* (Nees) T. Anders.	Acanthaceae	Marsh Carpet	*Ran-teevan*	H	+	+	+	+	+	+
778	*Hygrophila serpyllum var. hookeriana* Clarke	Acanthaceae			H		+			+	+
779	*Hygrophila polysperma* (Roxb.) T. Anders.	Acanthaceae	Dwarf hygrophila		H		+				
780	*Hygrophila ringens* (L.) R. Br.	Acanthaceae	Erect Hygrophila		H	+	+				+
781	*Hygrophila schulii* (Buch.-Ham.) Almeida & Almeida	Acanthaceae	Marsh Barbel	*Talimhkana*	H	+	+	+	+	+	
782	*Hymenodictyon orixense* (Roxb.) Mabberley.	Rubiaceae	Bridal Couch Tree	*Bhorsal*	T	+	+	+		+	+
783	*Hymenodictyon obovatum* Wall.	Rubiaceae		*Kadwa Sirid*	T	+	+				
784	*Hyphaene dichotoma* (White) Furtado	Arecaceae	Brancing palm	*Sat-tad*	T			+			+
785	*Hyptis suaveolens* (L.) Poir.	Labiatae	American mint	*Jaungali tulas*	H	+	+	+		+	+
786	*Hypoxis aurea* Lour.	Hypoxidaceae	Golden Star Grass	*Sontara*	H	+	+				
787	*Impatiens acaulis* Arn.	Balsaminaceae	Rock Balsam	*Pan terda*	H		+				
788	*Impatiens balsamina* Linn.	Balsaminaceae	Garden Balsam	*Terada*	H	+	+	+			
789	*Impatiens inconspicua* Benth.	Balsaminaceae			H		+				

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790	*Impatiens rosamarinifolia* Retz.	Balsaminaceae	Rosemary Leaved Balsam	*Terada*	H	+	+	+			+
791	*Impatiens minor* (D) Bennett	Balsaminaceae	Lesser Balsam	*Lahan Terda*	H	+	+				
792	*Impatiens lawii* Hook.f. & Thoms.	Balsaminaceae	Law's Balsam	*Jambhla terada*	H	+					
793	*Impatiens rufescens* Benth.	Balsaminaceae	Marsh Balsam		H	+	+				
794	*Impatiens dalzellii* Hook. f. & Thoms.	Balsaminaceae	Dalzell's Yellow Balsam	*Pivla terda*	H	+					
795	*Indigofera astragalina* D	Fabaceae	Silky indigofera	*Phulzadi*	H	+	+	+			
796	*Indigofera cassioides* Rottl. ex D	Fabaceae	Cassia Indigo	*Chimnati*	S	+					
797	*Indigofera cordifolia* Heyne ex Roth	Fabaceae	Heart-Leaf Indigo	*Bechka*	H	+	+				
798	*Indigofera linifolia* (Linn.f.) Retz.	Fabaceae	Narrowleaf Indigo	*Pandarphalli*	H	+	+	+			
799	*Indigofera suffruticosa* Miller	Fabaceae	West Indian Indigo	*Nilambi*	H	+	+	+			+
800	*Indigofera tinctoria* Linn.	Fabaceae		*Bhui-Tarvar*	S		+				
801	*Indigofera trita* Linn.f.	Fabaceae	Asian Indigo		H		+	+			
802	*Indigofera trifoliata* Linn.	Fabaceae	Bekahriya		H		+				
803	*Indigofera dalzellii* Cooke	Fabaceae	Sheild Indigo	*Dhal godhadi*	H	+					
804	*Indigofera linnaei Ali.*	Fabaceae	Birdsville Indigo	*Bhingule*	H	+					
805	*Isachne venusta Veldkamp*	Poaceae	bamboo grass		G	+	+				+
806	*Isachne globosa (Thunb.) Kuntze*	Poaceae	child bamboo grass		G	+	+				

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807	*Ischaemum aristatum L.*	Poaceae	Toco grass		G	+	+				
808	*Ischaemum indicum* (Houtt.) Merr.	Poaceae	Indian Murainagrass		G	+	+	+	+		+
809	*Ischaemum afrum* (J.F.Gmel.) Dandy.	Poaceae			G	+	+				
810	*Ischaemum rugosum* Salisb.	Poaceae	Ribbed Murainagrass		G	+	+				
811	*Ischaemum santapaui* Bor	Poaceae			G	+	+				+
812	*Iseilema laxum Hack.*	Poaceae	Musal grass		G	+	+				
813	*Iphigenia indica (L.) A.Gray ex Kunth*	Colchicaceae	Indian Grass Lily	*Bhui chakra*	H	+	+				
814	*Iphigenia pallida Baker*	Colchicaceae	Pale Grass Lily	*Bhui chakra*	H	+					
815	*Ipomoea alba* Linn.	Convolvulaceae	Moon vine	*Gulchandi*	CL		+	+			
816	*Ipomoea aquatica* Forsk.	Convolvulaceae	Marsh glory	*Nadishaka*	CL	+	+	+	+		+
817	*Ipomoea batatas* Poir.ex. Lamk.	Convolvulaceae	Sweet potato	*Ratale*	CL			+			+
818	*Ipomoea cairica* (L.) Sweet	Convolvulaceae	Railway glory	*Gar-vel*	CL	+	+	+		+	+
819	*Stictocardia tiliiaefolia* (Desr.) Hall. f.	Convolvulaceae		*Tambervel*	CL	+	+	+		+	+
820	*Ipomoea carnea* Jacq.	Convolvulaceae	Hedge glory	*Besharam*	S	+	+	+	+	+	+
821	*Ipomoea clarkei* Hook.f.	Convolvulaceae	Morning Glory	*Pivali pungali*	CL	+	+	+			
822	*Ipomoea eriocarpa* Br.	Convolvulaceae	Tiny Morning Glory	*Ranbhori*	CL		+	+		+	+
823	*Ipomoea hederifolia* Linn.	Convolvulaceae	Redstar glory	*Lal pungali*	CL	+	+	+	+	+	+
824	*Ipomoea marginata* (Desv.) Verd	Convolvulaceae	Purple Heart Glory	*Amtivel*	CL	+	+	+	+	+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
825	*Ipomoea mauritiana* Jacq.	Convolvulaceae	Greater gkory	*Bhui kohala*	CL	+	+	+			
826	*Ipomoea nil (L.) Roth*	Convolvulaceae	Blue Morning Glory	*Neeli pungali*	CL	+	+	+	+	+	+
827	*Ipomoea obscura* (L.) Ker. - Gawl	Convolvulaceae	Lessar glory	*Pilibonavari*	CL	+	+	+	+	+	+
828	*Ipomoea pes-caprae* R. Br.	Convolvulaceae	Goat's foot vine	*Maryadavel*	CL		+	+	+	+	+
829	*Ipomoea pes-tigridis* Linn.	Convolvulaceae	Tiger's paw glory	*Tel bhingari*	CL		+	+		+	+
830	*Ipomoea quamoclit* Linn.	Convolvulaceae	Cypress Vine	*Vishnukranti*	CL		+				+
831	*Ipomoea grandifolia* (Dammer) O'Donell	Convolvulaceae	Little Bell		CL						+
832	*Ipomoea triloba* Linn.	Convolvulaceae	Little Bell		CL	+	+	+	+		+
833	*Ipomoea turbinata* Lagasca	Convolvulaceae	Purple Moonflower	*Barik-bhomvari*	CL	+	+	+			
834	*Ipomoea violacea* Linn.	Convolvulaceae	Beach Moonflower	*kinarwel*	CL	+	+		+		+
835	*Isachne elegans* Dalzell	Poaceae	Bamboo grass		G						+
836	*Ipomoea sinensis* (Desv.) Choisy	Convolvulaceae	Chinese Morning Glory	*Pandhari Karnaful*	CL	+	+				
837	*Aniseia barlerioides* Choisy	Convolvulaceae	Pink Morning Glory		CL	+					
838	*Ipomoea diversifolia* R. Br.	Convolvulaceae	Cut-Leaved Morning Glory		CL	+			+		
839	*Ipomoea indica* (Burm.f.) Merrill	Convolvulaceae	Blue Dawn Flower		CL				+		+
840	*Ipomoea parasitica* (Kunth) G. Don	Convolvulaceae	Yellow-Throated Morning Glory		CL	+	+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
841	*Operculina turpethum* Manso	Convolvulaceae	Transparent Wood Rose	*Nasottar*	CL	+	+				+
842	*Ixora alba* Linn.	Rubiaceae			S						+
843	*Ixora brachiata* Roxb	Rubiaceae	Iron wood tree	*Lokhandi*	T	+	+	+		+	+
844	*Ixora coccinea* Linn.	Rubiaceae	Jungle flame	*Bakavali*	S	+	+	+		+	+
845	*Ixora coccinea L.' New Pink'*	Rubiaceae	Ixora		S						+
846	*Ixora pavetta* Anders.	Rubiaceae	Small Flowered Ixora	*Raikuda*	T	+	+	+			+
847	*Ixora lutea* Hutchins.	Rubiaceae	Yellow Flame of the Woods		S					+	+
848	*Ixora nigricans* Br.	Rubiaceae	Black Ixora	*Katkuda*	S		+				
849	*Jacaranda mimosifolia* D.Don	Bignoniaceae	Blue Jacaranda	*Neeli gulmohur*	T					+	+
850	*Jasminum auriculatum* Vahl	Oleaceae		*Jai*	S						+
851	*Jasminum flexile* Vahl	Oleaceae	jasmines		S	+	+	+			+
852	*Jasminum hirsutum* (L.) Willd.	Oleaceae			S						+
853	*Jasminum malabaricum* Wight	Oleaceae	Malabar Jasmine	*Kusur*	CL	+	+	+			+
854	*Jasminum sambac L. var. 'Belle of India'*	Oleaceae	Arabian Jasmine 'Belle of India'	*Madan mogra*	S						+
855	*Jasminum sambac L. var. 'Grand Duke Of Tuscany'*	Oleaceae	Arabian Jasmine 'Grand Duke Of Tuscany'	*Butt mogra*	S						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
856	*Jasminum sambac* Ait.	Oleaceae	Arabian Jasmine 'Grand Duke Of Tuscany',	*Butt mogra*	S		+				+
857	*Jasminum officinale L.*	Oleaceae	Common Jasmine	*Jati-jai*	S		+	+			
858	*Jatropha curcas* Linn.	Euphorbiaceae	Physic Nut	*Mogli Erand*	T	+	+	+		+	+
859	*Jatropha integerrima* Jacq.	Euphorbiaceae	Peregrina		S		+	+			
860	*Jatropha gossypiifolia* Linn.	Euphorbiaceae	Cotton leaf		H	+	+				
861	*Jatropha podagrica* Hook.	Euphorbiaceae	Australian bottle plant		H						+
862	*Jacquemontia pentantha* (Jacq.) G. Don	Convolvulaceae	Skyblue Clustervine		CL		+				+
863	*Justicia betonica* Linn.	Acanthaceae	Squirrel's tail	*Gulabi adulasa*	H	+	+	+			
864	*Justicia gendarussa* Burm. f.	Acanthaceae	Gandarusa	*Tev*	S	+	+				+
865	*Justicia latifolia* Vahl	Acanthaceae	Wayanad Justicia		H	+					
866	*Justicia adhatoda* L.	Acanthaceae	Malabar Nut	*Adulsa*	S	+	+				+
867	*Kaempferia scaposa* (Nimmo) Benth.	Zingiberaceae	Scaped Ginger	*Sunha*	H	+					
868	*Kalanchoe pinnata* (Lamk.) Pers.	Crassulaceae	Air Plant	*Panphuti*	H		+				+
869	*Kandelia candel* (L.) Druce	Rhizophoraceae	Narrow-Leaved Kandelia	*Kandal*	T			+			
870	*Khaya senegalensis* A.Juss.	Meliaceae	African Mahogany		T					+	+
871	*Kigelia africana* (Lamk.) Benth.	Bignoniaceae	Sausage Tree		T		+			+	+
872	*Kleinhovia hospita* Linn.	Sterculiaceae	Guest Tree		T	+				+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
873	*Kopsia fruticosa* Wall	Apocynaceae	Shrub Vinca		S						+
874	*Kyllinga nemoralis* (Forst. & Forst.) Dandy	Cyperaceae	White Water Sedge		H		+	+			
875	*Kydia calycina* Roxb.	Malvaceae	Kydia	*Warung*	T	+	+				
876	*Lablab purpureus* (Linn.) Sweet	Fabaceae	Lablab Bean	*Valghevada*	CL	+	+	+			
877	*Lagascea mollis* Cav.	Asteraceae	Silk Leaf	*Jharwad*	H		+				
878	*Lagenaria siceraria* (Molina) Standl.	Cucurbitaceae	Bottle Gourd	*Dudhibhopala*	CL		+	+			
879	*Lagerstroemia indica* Linn.	Lythraceae	Crepe myrtle		T						+
880	*Lagerstroemia lanceolata* Wall. ex. Wt. & Arn.	Lythraceae	Ben Teak	*Nana*	T	+	+	+			
881	*Lagerstroemia speciosa* (Linn.) Pers.	Lythraceae	Pride of India	*Taman*	T	+	+	+		+	+
882	*Lagerstroemia parviflora* Roxb.	Lythraceae	Small Flowered Crape Myrtle	*Lende*	T	+	+				+
883	*Lagerstroemia thoreli* Gagnepin	Lythraceae	Thorel's Crape Myrtle		T		+				+
884	*Lannea coromandelica* (Houtt.) Merrill.	Anacardiaceae	Indian Ash Tree	*Moine*	T	+	+	+			+
885	*Lantana camara* Linn.	Verbenaceae	Lantana	*Ghaneri*	S	+	+	+	+	+	+
886	*Lantana camara var. hybrida* Mold.	Verbenaceae	Lantana	*Ghaneri*	S					+	+
887	*Lantana canara var. nivea* Bailey	Verbenaceae	Lantana	*Ghaneri*	S						+
888	*Laportea interrupta* (L.) Chev.	Urticaceae	Hen's Nettle	*Khaja*	H	+	+	+			+

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889	*Launaea obtusus* (D) Clarke	Asteraceae	Creeping Launaea	*Pathari*	H	+		+			+
890	*Launaea sarmentosa* (Willd.) O. Kuntze	Asteraceae	Beach Launaea	*sagar pathari*	H		+				
891	*Lawsonia inermis* Linn.	Lythraceae	Heena	*Mehandi*	S	+	+	+			+
892	*Leea cinerea M.Laws*	Leeaceae			S		+				
893	*Leea indica (Burm.f.) Merr.*	Leeaceae	Bandicoot Berry	*Karkani*	S	+	+	+			
894	*Leea macrophylla* Roxb. ex Hornem.	Leeaceae	Hathikana	*Safed dindya*	S	+	+	+			+
895	*Leea asiatica* (L.) Ridsdale	Leeaceae	Banchalita	*Dinda*	S	+	+				+
896	*Lemna gibba* Linn.	Lemnaceae	fat duckweed		AQ				+		
897	*Spirodela polyrhiza* (L.) Schleiden	Lemnaceae	Greater Duckweed		AQ					+	+
898	*Lemna perpusilla* Horrann	Lemnaceae	Common Duckweed		AQ						+
899	*Leonotis nepetaefolia* (L.) R.Br.	Labiatae	Lion's Ear	*Deepmal*	H	+	+	+	+		
900	*Lepidagathis cuspidata* (Wall.) Nees	Acanthaceae	Spiny Lepidagathis	*Kate adulsa*	H	+	+	+			
901	*Lepidagathis trinervia* Wall. ex Nees	Acanthaceae	Frilly Lepidagathis	*Pathar-phor*	H		+	+			+
902	*Lepisanthes tetraphyllus* (Vahl) Radlk.	Sapindaceae	Kurpa	*Karapa*	T	+	+	+			+
903	*Leucas aspera* (Willd.) Link	Labiatae	Common Leucas	*Tamba*	H	+	+	+			
904	*Leucas ciliata* Benth.	Labiatae	Tufted Leucas	*Burumbi*	H	+					
905	*Leucas stelligera* Wall.	Labiatae	Starry Leucas	*Goma*	H		+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
906	*Leucaena leucocephala* (Lamk.) De Wit	Fabaceae	Wild tamarind	*Kubhabhul*	T	+	+	+		+	+
907	*Limnophila sessiliflora* Bl.	Scrophulariaceae			AQ				+	+	+
908	*Limnophyton obtusifolium (L.) Miq.*	Limnocharitaceae	Blunt Arrowhead		H		+				
909	*Lindernia anagallis (Burm. f.) Pennell*	Linderniaceae			H		+				
910	*Lindernia antipoda (L.) Alston.*	Linderniaceae			H		+				
911	*Lindernia ciliata* (Colsm.) Pennell.	Linderniaceae	Fringed False Pimpernel		H	+	+	+			+
912	*Lindernia crustacea* (Linnaeus) F. Mueller	Linderniaceae	Brittle False Pimpernel		H		+	+			+
913	*Lindernia multiflora (Roxb.) Mukerjee*	Linderniaceae			H		+				
914	*Lindernia parviflora* (Roxb.) Haines	Linderniaceae	Small-Flowered Lindernia		H		+				+
915	*Lindernia oppositifolia (L.) Mukerjee*	Linderniaceae			H			+			
916	*Lindernia quinqueloba (Blatt. & Hallb.) Mukerjee*	Linderniaceae			H						
917	*Lindernia estaminodiosa (Blatt. & Hallb.) Mukerjee*	Linderniaceae			H						
918	*Linum mysorense B.Heyne ex Wall.*	Linaceae	Mysore Flax	*Undari*	H	+		+			
919	*Litsea deccanensis* Gamble	Lauraceae	Deccan Tallow Laurel	*chikna*	T						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
920	*Litsea josephi* Almeida	Lauraceae	Joseph's Laurel	*Naramba*	T	+					
921	*Litsea tersa* (L.) Almeida	Lauraceae			T		+				
922	*Livistona chinensis* R.Br.	Arecaceae	Chinese Fan Palm		T	+	+	+		+	+
923	*Dendropthoe falcata* (L.) Etting	Loranthaceae		*Bandgul*	H		+	+		+	+
924	*Dendrophthoe falcata var. coccinea* (Talb.) Sant.	Loranthaceae	Honey Suckle Mistletoe	*Vanda*	S						+
925	*Scurula stocksii* (Hk.f.) Danser	Loranthaceae		*Bandgul*	H	+	+				
926	*Lobelia chinensis Lour.*	Lobeliaceae	Chickweed Lobelia		H		+				
927	*Lobelia nicotianifolia Heyne*	Lobeliaceae	Wild Tobacco	*Dhawal*	H	+					
928	*Ludwigia octovalvis* (Jacq.) P.H. Raven	Onagraceae	Willow Primrose	*Pan lawang*	H			+			+
929	*Ludwigia parviflora* L. Roxb	Onagraceae		*Kadu chinch*	H	+	+		+		+
930	*Ludwigia erecta (L.) H. Hara*	Onagraceae			H		+				
931	*Ludwigia hyssopifolia (G. Don) Exell*	Onagraceae	Hyssop-Leaved Water Primrose		H	+	+				
932	*Luffa acutangula* (Linn.) Roxb.	Cucurbitaceae	Bitter Luffa	*Shirale*	CL	+	+	+			+
933	*Luffa acutangula var. amara* Clarke	Cucurbitaceae	Ribbed Sponge Gourd	*Divali*	CL		+			+	+
934	*Luffa aegyptiaca* Mill.	Cucurbitaceae	Sponge Gourd	*Ghosale*	CL	+		+			+
935	*Luffa cylindrica M. Roem.*	Cucurbitaceae		*Ghosale*	CL			+		+	+
936	*Luffa echinata* Roxb.	Cucurbitaceae	Bitter Sponge Gourd	*Satpute*	CL	+	+	+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
937	*Lumnitzera racemosa* Willd.	Combretaceae	Black Mangrove	*Kirpa*	T					+	+
938	*Solanum rantonnetii* Carr.	Solanaceae	Blue Potato Bush		S						+
939	*Lycopersicon lycopersicum* (L.) Karst.	Solanaceae	Tomato	*Tamatar*	S	+	+				+
940	*Lygodium flexuosum* (L.) Sw.	Lygodiaceae	Fern		H	+	+				+
941	*Lygodium microphyllum* (Cav.) R. Brown	Lygodiaceae	Fern		H	+	+				+
942	*Maba angustifolia* Miq.	Ebenaceae	Narrow-Leaved Ebony	*Rakta roda*	T	+	+				
943	*Macaranga peltata* (Roxb.) Muell.-Arg.	Euphorbiaceae	Chandada	*Chanda*	T	+	+	+			+
944	*Leptacanthus integrifolius* (Dalz.) Almeida	Acanthaceae	Wayti	*Wayti*	S	+	+	+			
945	*Madhuca indica* Gmelin.	Sapotaceae	The butter tree	*Moha*	T	+	+	+		+	
946	*Madhuca longifolia (Koen.) McBride*	Sapotaceae	South Indian Mahua	*Mohwa*	T		+				+
947	*Madhuca neriifolia* (Moon) H.J. Lam.	Sapotaceae	Illipe Butter Tree	*Tupa*	T	+					
948	*Magnolia grandiflora L.*	Magnoliaceae	Magnolia,	*Kavathi chapha*	T			+			
949	*Malachra capitata* Linn.	Malvaceae	Brazil jute	*Bhur bhendi*	H	+	+	+		+	+
950	*Mallotus philippensis* (L.) Muell.-Arg.	Euphorbiaceae	Monkey face tree	*Kunkuphal*	T	+	+	+		+	+
951	*Malpighia coccigera* Linn.	Malpighiaceae	Miniature Holly		S						+
952	*Malvaviscus arboreus* Dillone	Malvaceae	Sleeping beauty	*Jaswand*	S			+			+
953	*Malvaviscus arboreus var. arboreus*	Malvaceae	Firecracker Hibiscus	*Jaswand*	S						+

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954	*Malvaviscus arboreus var. drummondii* (Torr. & A. Gray) Schery	Malvaceae	Wax Mallow	*Jaswand*	S		+				+
955	*Corymborkis versicolor* (Lindl.) Almeida	Orchidaceae	Colorful Malaxis		H/Or	+	+				
956	*Mammea longifolia* (Wt.) Planch.	Clusiaceae	Surangi	*Surangi*	T	+	+	+			
957	*Mangifera indica* Linn.	Anacardiaceae	Mango tree	*Amba*	T	+	+	+		+	+
958	*Manilkara hexandra* (Roxb.) Dubard	Sapotaceae	Ceylon Iron Wood	*Ranjan*	T	+	+	+		+	+
959	*Manilkara zapota* (L.) Van Royen	Sapotaceae	Chikoo	*Chikkoo*	T	+	+	+		+	+
960	*Mappia foetida (Wight) Miers.*	Icacinaceae	Ghanera	*Naraki*	S			+			
961	*Marsilea minuta* L.	Marsileaceae	dwarf waterclover		H	+	+				+
962	*Martynia annua L.*	Martyniaceae	Devill's claw	*Winchavi*	H		+	+			
963	*Maytenus heyneana (Roth) D.S.Raju & Babu*	Celastraceae			S		+	+			
964	*Maytenus senegalensis (Lam.) Exell*	Celastraceae			S			+			
965	*Melanocenchris jacquemontii Jaub. & Spach*	Poaceae			G		+	+			
966	*Melia azedarach* Linn.	Meliaceae	Neem	*Bakana limb*	T	+	+			+	+
967	*Melaleuca leucadendron* (Linn.) Benth.	Myrtaceae	Cajuput Tree	*Kayaputi*	T						+
968	*Wollastonia biflora* (L.) D	Asteraceae	Sea Daisy	*Solanki*	H						+
969	*Melochia corchorifolia* Linn.	Sterculiaceae	Chocolate Weed	*Lahan methuri*	H	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
970	*Melochia pyramidata* Linn.	Sterculiaceae	Pyramid Flower	*Veppulari*	H						+
971	*Mukia maderaspatana* (Linn.) Roem.	Cucurbitaceae	Madras pea pumpkin	*Pangori*	CL	+	+	+			+
972	*Memecylon umbellatum Burm.f.*	Melastomataceae	Delek air tree	*Anjani*	T	+	+	+			
973	*Merremia hederacea* (Burm. f.) Hall. f.	Convolvulaceae	Ivy Woodrose	*Hemali*	CL	+	+		+		+
974	*Xenostegia tridentata* Austin & Staples	Convolvulaceae	Arrow-leaf Morning Glory	*Morga*	CL			+			
975	*Merremia umbellata* Hall.f.	Convolvulaceae	Yellow Hogvine	*Motia*	CL			+			
976	*Merremia vitifolia* (Burm. f.) Hall.f.	Convolvulaceae	Grape-leaf Wood Rose	*Navalicha vel*	CL	+	+	+	+	+	+
977	*Merremia gangetica* (L.) Cufo.	Convolvulaceae	Kidney Leaf Morning Glory	*Undirkani*	CL		+		+		
978	*Merremia quinquefolia* (L.) Hall. f.	Convolvulaceae	Five-Fingered Morning Glory		CL	+	+		+		+
979	*Mesua ferrea* Linn.	Clusiaceae	Cobra saffron	*Thorlachampa*	T					+	+
980	*Meyna spinosa* Roxb. ex Link	Rubiaceae	Muyna	*Huloo*	S	+	+			+	+
981	*Michelia champaca L.*	Magnoliaceae	Joy Perfume Tree	*Sonchapha*	T	+	+	+		+	+
982	*Michelia champaca var White*	Magnoliaceae	Champa	*Chafa*	T						+
983	*Millingtonia hortensis* Linn.f.	Bignoniaceae	Indian cork tree	*Champa*	T	+	+	+		+	+
984	*Miliusa tomentosa* (Roxb.) Sinclair	Annonaceae	Humb		T	+	+				

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985	*Mimosa pudica* Linn.	Mimosaceae	Touch-me-not	*Lajalu*	H	+	+	+		+	+
986	*Mimusops elengi* Linn.	Sapotaceae	Indian medlar tree	*Bakul*	T	+	+	+		+	+
987	*Mirabilis jalapa* L.	Nyctaginaceae	Four pm	*Gulbakshi*	H	+	+	+			+
988	*Mitragyna parvifolia* (Roxb.) Korth.	Rubiaceae	Kaim	*Kalam*	T	+	+	+		+	+
989	*Trichosanthes tricuspidata* Lour.	Cucurbitaceae	Indrayan	*Kaundal*	T	+	+	+			
990	*Mollugo pentaphylla L.*	Molluginaceae	Five Leaved Carpetweed	*Jharasi*	H	+	+				
991	*Mollugo oppositifolia* L.	Molluginaceae	Jima		H	+	+				+
992	*Mollugo lotoides* (L.) Kuntze	Molluginaceae	Lotus Sweetjuice	*Kotak*	H	+	+				
993	*Momordica charantia* Linn.	Cucurbitaceae	Bitter Gourd	*Karale*	CL	+	+	+		+	+
994	*Monstera deliciosa* Liebem.	Araceae	Split-leaf philodendron		CL						+
995	*Momordica dioica* Roxb.	Cucurbitaceae		*kartoli*	CL	+	+	+			
996	*Morinda citrifolia* L.	Rubiaceae	Indian Mulberry	*Bartondi*	T	+	+				+
997	*Morinda pubescens* Sm.	Rubiaceae	Indian Mulberry	*Dhaula*	T	+	+	+			+
998	*Moringa pterygosperma* Gaertn.	Moringaceae	horse radish		T		+	+		+	+
999	*Morus alba* Linn.	Moraceae	White Mulberry		T		+			+	+
1000	*Moullava spicata* (Dalzell) Nicolson	Caesalpiniaceae	Candy Corn Plant	*Wagati*	CL	+	+				+
1001	*Mucuna pruriens* (Linn.) D	Fabaceae	Velvet bean	*Khajkujali*	CL	+	+	+	+	+	+
1002	*Mucuna monosperma* D	Fabaceae	Negro Bean	*Pandhri khajkuiri*	CL	+					

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1003	*Muntingia calabura* L.	Elaeocarpaceae	Jamaica Cherry	*Paanchara*	T	+	+	+			+
1004	*Murdannia edulis* (Stokes) Faden.	Commelinaceae	Edible Dewflower		H	+	+				
1005	*Murdannia nudiflora* (L.) Brenan.	Commelinaceae	Naked-Stem Dewflower	*Nilima*	H	+	+	+	+		
1006	*Murdannia nimmoniana* (Graham) Bole & Almeida	Commelinaceae	Panicled Dewflower		H	+	+	+	+		
1007	*Murdannia spirata* (L.) Bruckner	Commelinaceae	Asiatic Dewflower		H	+	+	+			+
1008	*Murdannia simplex* (Vahl.) Brenan	Commelinaceae	Blue dove weed	*Neelima*	H	+	+				
1009	*Murdannia pauciflorum* Bruckn.	Commelinaceae	Few Flowered Dewflower	*Neelima*	H	+		+	+		
1010	*Murdannia versicolor* (Dalz.) Bruckner	Commelinaceae	Changing Color Dewflower		H	+	+				+
1011	*Murdannia lanuginosa* (Wall.) Bruckn.	Commelinaceae	Marsh Dewflower	*Abolima*	H				+		
1012	*Murraya paniculata* (L.) Jack.	Rutaceae	Orange Jasmine	*Kunti*	T	+	+				+
1013	*Murraya koenigii* Spr.	Rutaceae	Curry Leaf	*Kadipatta*	T	+	+	+			+
1014	*Musa paradisiaca* L.	Musaceae	Banana	*Keli*	H			+			+
1015	*Mussaenda erythrophylla* Schumach. & Thonn.	Rubiaceae	Mussaenda	*Mithai Phool*	S		+				+
1016	*Mussaenda frondosa* Linn.	Rubiaceae			S						+
1017	*Mussaenda glabrata* (Hook.f.) Hutch. ex Gamble	Rubiaceae	Dhobi Tree	*bhutakesha*	S	+					+

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1018	*Mussaenda philippica* A. Rich	Rubiaceae	White Mussaenda		S						+
1019	*Myristica fragrans Houtt.*	Myristicaceae	Nutmeg	*Jaiphal*	T			+			
1020	*Knema attenuata (Wall.) Warb.*	Myristicaceae	Wild Nutmeg	*Ran Jayphal*	T	+					
1021	*Naregamia alata* Wight & Arn.	Meliaceae	Goanese Ipecac	*Pitmari*	H	+					
1022	*Neanotis tinctoria*	Rubiaceae			H	+					
1023	*Neanotis montholonii* (Hook.f.) W.H.Lewis	Rubiaceae	Montholon's Starviolet	*Tanoti*	H			+			+
1024	*Neanotis paniculata* (L.) M.R.Almeida	Rubiaceae			H		+				
1025	*Nelumbo nucifera Gaertn.*	Nelumbonaceae	Lotus	*Komshira*	AQ			+			
1026	*Neolamarckia cadamba* (Roxb.) Bosser	Rubiaceae	Kadam	*Kadamba*	T	+	+	+		+	+
1027	*Nephrolepis cordifolia* (L.) Presl	Lomariopsidaceae	sword fern		H/Fern	+	+				+
1028	*Nerium oleander* Linn.	Apocynaceae	Oleander	*Kaner*	S	+		+			+
1029	*Nervilia aragoana* Gaud.	Orchidaceae	Aragoa-Like Nervilia	*Duduki*	H/Or	+		+			+
1030	*Nervilia infundibuliformis* Blatter & McCann	Orchidaceae	Funnel-Leaf Nervilia	*Naravi amri*	H/Or	+	+	+			+
1031	*Nervilia plicata* (Anders) Schltr.	Orchidaceae	Pleated Leaf Nervillia		H/Or	+					
1032	*Nervilia crociformis* (Zoll. & Moritzi) Seidenf.	Orchidaceae	Trembling Nervilia	*Naravi amri*	H/Or	+					
1033	*Nesphostylis bracteata* (Baker) D.Potter & J.J.Doyle	Fabaceae	Indian Nesphostylis	*Bhendri*	CL	+	+				

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1034	*Neuracanthus trinervius* Wt.	Acanthaceae	Nilgonda	*Nilgonda*	H	+	+				+
1035	*Neuracanthus sphaerostachys* (Nees) Dalz.	Acanthaceae	Pin Cushion Plant	*Golgonda*	H	+	+	+			
1036	*Nilgirianthus heyneanus* (Nees) Bremek.	Acanthaceae		*Akra*	S		+				
1037	*Nilgirianthus membranaceus* (Talbot) Bremek.	Acanthaceae			S		+				
1038	*Nyctanthes arbor-tristis* L.	Oleaceae	Coral jusmine	*Parijatak*	T	+	+	+		+	+
1039	*Nymphaea nauchali* Burm.f.	Nymphaeaceae	Blue water lily	*Kamal*	AQ		+	+		+	+
1040	*Nymphaea pubescens* Willd.	Nymphaeaceae	Water lilly		AQ		+	+	+	+	+
1041	*Nymphoides indica* (L.) Kuntze	Menyanthaceae	Water Snowflake	*Kumudini*	AQ		+	+	+		+
1042	*Nymphoides hydrophylla (Lour.) Kuntze*	Menyanthaceae	Crested Floatingheart	*Kumudini*	AQ		+				
1043	*Oberonia falconeri* Hk.f.	Orchidaceae	Falconer's Oberonia	*hirvi chapti amri*	H/Or	+	+				
1044	*Ochna wightiana Wall.*	Ochnaceae	Mickey Mouse Plant		T			+			
1045	*Ochna obtusata* D	Ochnaceae	Ramdhan Champa	*Ramdhan Champa*	T	+	+	+			+
1046	*Ocimum americanum* L.	Labiatae	Hoary Basil	*Kali tulasi*	H	+	+				
1047	*Ocimum basilicum* Linn.	Labiatae	Basil	*Sabaja*	H	+	+	+			
1048	*Orthosiphon aristatus* (Bl.) Haines	Labiatae		*Ran tulas*	H	+	+	+			
1049	*Ocimum gratissimum* Linn.	Labiatae		*Ramatulasi*	H		+				
1050	*Orthosiphon rubicundus* Benth.	Labiatae	Red Java Tea		H		+				

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1051	*Ocimum tenuiflorum* Linn.	Labiatae	Holy basil	*Tulas*	H	+	+	+			+
1052	*Olax psittacorum (Willd.) Vahl*	Olacaceae		*Kukarbit*	H			+			
1053	*Oldenlandia corymbosa* L.	Rubiaceae	Diamond Flower	*pitpapda*	H	+	+	+		+	+
1054	*Olea dioica Roxb.*	Oleaceae	Rose Sandalwood	*Parjambhul*	T	+	+	+			
1055	*Opuntia elatior Mill.*	Cactaceae	Prickly Pear	*Nivadung*	S	+	+	+			
1056	*Ophioglossum costatum* R.Br.	Ophioglossaceae	adder's-tongue		H	+	+				+
1057	*Oplismenus burmannii (Retz.) P.Beauv.*	Poaceae	Wavy-Leaf Basketgrass		G	+	+				
1058	*Oplismenus compositus (Linn.) P. Beauv.*	Poaceae			G		+				
1059	*Orthosiphon thymiflorus* (Roth) Van der Sleesen	Labiatae		*Ran tulas*	H	+	+				
1060	*Origanum marjorana* Linn.	Labiatae	Sweet Marjoram	*Murva*	H			+			
1061	*Oroxylum indicum* Vent.	Bignoniaceae	Broken Bones Tree	*Tetu*	T	+	+	+		+	+
1062	*Oryza sativa* L.	Poaceae	Rice	*tandul*	H			+			+
1063	*Oryza rufipogon Griff.*	Poaceae	red rice	*Lal tandul*	H		+				
1064	*Osbeckia leschenaultiana D*	Melastomataceae	Leschenault's Osbeckia	*Gulbeki*	H	+	+	+			
1065	*Osbeckia truncata D. Don*	Melastomataceae	Wall Osbeckia	*Gulbeki*	H	+	+				+
1066	*Ottelia alismoides (L.) Pers.*	Hydrocharitaceae	Duck Lettuce		AQ/H		+				
1067	*Oxalis corniculata* L.	Oxalidaceae	Creeping Wood Sorrel	*Ambuti*	H	+	+	+			+
1068	*Oxystelma secamone* (L.) Karst.	Asclepiadaceae	Rosy Milkweed Vine	*Sirdodi*	CL		+				+

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1069	*Oxalis reinwardtii* Zuc	Oxalidaceae	Reinwardt's Tree Plant	*Mothi lajwanti*	H	+	+				
1070	*Oxalis debilis var. corymbosa (D) Lourteig*	Oxalidaceae	Large-Flowered Pink Sorrel		H	+					
1071	*Oxystelma secamone (L.) Karst.*	Asclepiadaceae	Rosy Milkweed Vine	*Sirdodi*	CL	+	+	+			
1072	*Oxyceros rugulosus (Thwaites) Tirveng.*	Rubiaceae	Climbing Randia	*Vela Gela*	CL	+					
1073	*Pandanus odorifera* (Forssk.) Chiov.	Pandanaceae	Kewda	*Kevada*	S	+	+	+			+
1074	*Paracalyx scariosus* (Roxb.) Ali	Fabaceae	Ran Ghevada	*Ranghevada*	CL	+	+	+			
1075	*Panicum montanum* Gaudich.	Poaceae			G	+	+				
1076	*Panicum psilopodium* Trin.	Poaceae	Barefoot panicgrass		G		+				
1077	*Panicum psilopodium Trin var. coloratum H.K.F.*	Poaceae	Barefoot panicgrass		G		+				
1078	*Panicum repens L.*	Poaceae	Creeping panic		G	+			+		
1079	*Panicum trypheron* Schult.	Poaceae			G	+	+				+
1080	*Pancratium parvum* Dalz.	Amaryllidaceae	Forest Spider Lily	*Lamb pankusum*	H	+	+				+
1081	*Pancratium triflorum* Roxb.	Amaryllidaceae	Pankusum	*Pankusum*	H		+				
1082	*Parkia biglandulosa* Wt. & Arn.	Mimosaceae	Badminton Ball Tree	*Chenduphal*	T	+	+	+		+	+
1083	*Parkinsonia aculeata* Linn.	Fabaceae	Jerusalem thorn	*Vilaiti-kikkar*	T				+		
1084	*Parthenium hysterophorus* Linn.	Asteraceae	Carrot Grass	*Gajargavat*	S	+	+	+		+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1085	*Parmentiera cereifera* Seem	Bignoniaceae	Candle Tree		T						+
1086	*Paspalidium geminatum* (Forssk.) Stapf	Poaceae	Egyptian Panicgrass		G	+	+				+
1087	*Paspalidium flavidum (Retz.) A. Camus.*	Poaceae	Yellow Watercrown Grass		G		+				
1088	*Paspalum scrobiculatum* L.	Poaceae	koda millet		G	+	+				+
1089	*Paspalum scrobiculatum L.*	Passifloraceae	Blue Passion Flower	*Krishnakamal*	CL			+			+
1090	*Passiflora caerulea* L.	Passifloraceae			CL		+				+
1091	*Passiflora edulis* Sims	Passifloraceae	Passion fruit		CL			+			+
1092	*Passiflora suberosa* L.	Passifloraceae	Corky Passion Flower		CL						+
1093	*Passiflora incarnata L.*	Passifloraceae	Maypop	*Krishnakamal*	CL						+
1094	*Passiflora foetida* L.	Passifloraceae	Love-in-a-mist	*Vel-ghani*	CL	+	+				+
1095	*Pavetta crassicaulis* Bremek.	Rubiaceae	Indian paveta	*papat,*	S	+					+
1096	*Pavetta indica L.*	Rubiaceae	Indian Pellet Shrub	*Papdil*	S	+		+			
1097	*Pecteilis gigantea* (Sm.) Rafin.	Orchidaceae	Butterfly Orchid	*Waghchora*	H/Or		+				
1098	*Pedalium murex* Linn.	Pedaliaceae	Large Caltrops	*Mothe gokharu*	H	+		+			+
1099	*Pedilanthus tithymeloides* (L.) Poit.	Euphorbiaceae	Devil's Backbone	*Chikhada*	S		+	+			+
1100	Peltophorum pterocarpum (D) Baker	Caesalpiniaceae	Copperpod	*Tambadsheng*	T	+	+	+		+	+
1101	*Pentas lanceolata* (Forssk.) Deflers	Rubiaceae	Pentas		S						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1102	*Pentatropis nivalis* Field & Wood	Asclepiadaceae		*Aakari Bel*	CL						
1103	*Pentatropis capensis* (Linn. f.) Bullock	Asclepiadaceae	Ambarvel	*Shingrota*	CL	+		+		+	+
1104	*Pentanema cernua* (Dalz.) Ling	Asteraceae		*Sonsari*	H		+				
1105	*Pentanema indicum* (L.) Ling	Asteraceae	Sonkadi	*Sonkadi*	H	+	+				
1106	*Pennisetum americanum* (L.) Leeke	Poaceae	cattail millet		G	+	+				+
1107	*Pennisetum setaceum (Forssk.) Chiov.*	Poaceae	African fountain grass,		G	+					
1108	*Pennisetum typhoides (Burm. f.) Stapf & E. Hubb. - Pennisetum glaucum (L.) R.Br.*	Poaceae	Pearl millet		G		+				
1109	*Peperomia pellucida (L.) Kunth*	Piperaceae	Shiny brush	*Varshabhoo*	H		+	+			
1110	*Pergularia daemia* (Forsk.) Chiv.	Asclepiadaceae	Pergularia	*Utarani*	CL			+			
1111	*Persicaria glabra* (Willd.) Gomez	Polygonaceae	Denseflower Knotweed	*Sheral*	H	+	+		+	+	+
1112	*Petunia integrifolia* (Lodd.) Schinz. & Thell.	Solanaceae	Petunia		H						+
1113	*Philodendron erubescens* Schott.	Araceae			CL						+
1114	*Philodendron giganteum* (Roxb.) Schott.	Araceae			CL						+
1115	*Phlox subulata* L.	Polemoniaceae	Creeping Phlox		CL						+
1116	*Peristrophe paniculata* (Forsk.) Brummitt	Acanthaceae	Panicled Foldwing	*Kakajangha*	H	+	+	+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1117	*Peristylus plantagineus* Lindl.	Orchidaceae	Plantain Peristylus		H/Or	+	+	+			
1118	*Peristylus stocksii* (Hk. f.) Kranz.	Orchidaceae	Stocks's Peristylus		H/Or	+					
1119	*Peristylus exilis* Wt.	Orchidaceae	Spiked Peristylus		H/Or	+					
1120	*Petalidium barlerioides* (Roth) Nees	Acanthaceae	Nail Dye	*Goranti*	S	+	+	+			
1121	*Vigna trilobata* (Linn.) Verd	Fabaceae	Wild Gram	*Ranmug*	CL	+		+			
1122	*Phoenix acaulis* Buch.-Ham.	Arecaceae	Stemless Date Palm		T						+
1123	*Phoenix dactylifera* L.	Arecaceae	Date palm	*Khajur*	T						+
1124	*Phoenix sylvestris* (L.) Roxb.	Arecaceae	Wild Date Palm	*Shindi*	T	+	+	+		+	+
1125	*Phyla nodiflora* (Linn.) Greene	Verbenaceae	Frog Fruit	*Jalapimpali*	H	+	+				
1126	*Cicca acida* (L.) Merrill	Euphorbiaceae	Star Gooseberry	*Raiavala*	T			+			+
1127	*Phyllanthus emblica* Linn.	Euphorbiaceae	Amla	*Avala*	T	+	+	+		+	+
1128	*Phyllanthus amarus* Schum. & Thonn.	Euphorbiaceae	Carry Me Seed	*Bhui awla*	H	+	+				
1129	*Kirganelia reticulata* (Poir.) Bail.	Euphorbiaceae	Black-Honey Shrub,	*panjuli*	S						+
1130	*Phyllanthus erecta* (Medi) Almeida	Euphorbiaceae	Gulf Leaf-Flower	*bhuiavali*	H	+	+				+
1131	*Phyllanthus tenellus* Roxb.	Euphorbiaceae	Long Stalked Leaf-Flower		H	+			+		+
1132	*Phyllanthus virgatus* Forst. f.	Euphorbiaceae	Seed Under Leaf,		H	+	+				+
1133	*Phyllanthus maderaspatensis* Linn.	Euphorbiaceae	Madras Leaf-Flower	*bhuiavali*	H	+	+		+		+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1134	*Phyllanthus urinaria* Linn.	Euphorbiaceae	Chamber Bitter	*laal bhooyiavali*	H	+	+				
1135	*Phyllodium pulchellum (L.) Desv.*	Fabaceae	Showy Desmodium		H						
1136	*Physalis minima* Linn.	Solanaceae	Ground Cherry	*Ran-popti*	H	+	+	+	+		
1137	*Physalis angulata* Linn.	Solanaceae	Cutleaf Ground Cherry		H	+	+				
1138	*Physalis joe-diasii* Almeida & Almeida	Solanaceae	Joe Dias's Ground Cherry		H	+	+				+
1139	*Physalis peruviana* Linn.	Solanaceae	Cape Gooseberry	*Chirbot*	H		+				
1140	*Physalis grisea* (Waterf.) M. Martínez	Solanaceae	Grey Ground Cherry		H		+				
1141	*Pimpinella tomentosa* Dalz.	Apiaceae	Hairy Hogweed	*Ranjire*	H	+		+			
1142	*Pinda concanensis* (Dalz.) Constance & Mukhopadhaya	Apiaceae	Konkan Pinda	*Panda*	H	+	+				
1143	*Piper nigrum L.*	Piperaceae	Black Pepper	*Kale meere*	CL		+	+			
1144	*Piper trichostachyon (Miq.) D*	Piperaceae			CL	+					
1145	*Piper longum* L.	Piperaceae	Long Pepper	*Pimpli*	CL						+
1146	*Pisonia grandis* R. Br.	Nyctaginaceae	Bird lime tree		T	+	+	+		+	+
1147	*Pistia stratiotes* Linn.	Araceae	Water cabbage	*Gondali*	AQ/H			+	+		+
1148	*Pithecellobium dulce* (Roxb.) Benth.	Mimosaceae	Manilla Tamarind	*Veelayati Chinch*	T	+	+	+	+	+	+
1149	*Plumbago auriculata* Lam.	Plumbaginaceae	Plumbago	*Nila chitra*	H						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1150	*Plumbago zeylanica* L.	Plumbaginaceae	Chitrak	*Pandhara chitrak*	H	+	+	+		+	+
1151	*Plumbago indica* Linn.	Plumbaginaceae	Scarlet leadwort	*Tambdi chitrak*	H						+
1152	*Plumeria acuminata* Ait.	Apocynaceae		*Pandhara chafa*	T			+		+	+
1153	*Plumeria alba* Linn.	Apocynaceae	White Plumeria	*Pandhara chapha*	T	+	+	+		+	+
1154	*Plumeria obtusa* Linn.	Apocynaceae	Frangipani	*Chafa*	T	+	+	+			+
1155	*Plumeria rubra* Linn.	Apocynaceae	Frangipani	*Lal chapha*	T	+	+	+		+	+
1156	*Plumeria rubra forma tricolor* (R. & S.) Woodrow	Apocynaceae	Frangipani	*Gulabi chafa*	T						+
1157	*Podocarpus elongatus* Aiton L'Herit. ex Pers.	Podocarpaceae	Breede River Yellowwood		H						+
1158	*Eusteralis tomentosa* (Dalz.) Paingrahi	Labiatae	Jambhli Manjiri		H	+			+		+
1159	*Pogostemon purpurascens* Dalz.	Labiatae	Sangbrei		H	+	+				
1160	*Pogostemon benghalensis* Kuntze	Labiatae	Bengal Pogostemon	*Pangali*	H		+	+			
1161	*Pogostemon heyneanus* Benth.	Labiatae	False Patchouli	*pach*	H	+					
1162	*Polyalthia longifolia* (Sonn.) Hook.f. & Thomson	Annonaceae	Ashok	*Ashoka*	T	+	+	+		+	+
1163	*Polyalthia longifolia cv. pendula* Hort.	Annonaceae	Ashok	*Ashoka*	T	+	+	+		+	+
1164	*Polyscias scutellaria* (Burm.f.) Fosberg	Araliaceae	Shield Aralia		S						+
1165	*Polyalthia cerasoides* Benth. & Hook. f.	Annonaceae		*Hum*	T	+	+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1166	*Polycarpon prostratum (Forssk.) Asch. & Schweinf.*	Caryophyllaceae			H		+				
1167	*Polygala elongata Klein ex Willd.*	Polygalaceae	Narrow-Leaved Milkwort		H	+		+			
1168	*Polygala persicariaefolia D*	Polygalaceae	Knotweed Leaved Milkwort		H	+	+				
1169	*Polygala erioptera D*	Polygalaceae	Woolly-Winged Milkwort	*Gulpankhi*	H	+					
1170	*Polygala arvensis Willd.*	Polygalaceae	Field Milkwort	*Phutani*	H		+				
1171	*Polygonum plebeium* R. Br.	Polygonaceae	Small Knotweed	*Gulabi Godhadi*	H	+	+				
1172	*Derris indica* (Lamk.) Bennett	Fabaceae	Pongam oil tree	*Karanj*	T	+	+	+	+	+	+
1173	*Pongamia uliginosa (Willd.) D*	Fabaceae	Common Derris	*karanj vel*	CL					+	+
1174	*Porana malabarica* Clarke	Convolvulaceae			CL		+				
1175	*Portulaca oleracea* L.	Portulacaceae	Purslane	*Ghol*	H		+	+		+	+
1176	*Pouzolzia zeylanica (L.) Bennett & Brown*	Urticaceae	Graceful Pouzolz's Bush		H		+				
1177	*Premna serratifolia L.*	Labiatae	Headache Tree	*Arani*	S	+				+	
1178	*Premna resinosa* Schauer	Labiatae			S						+
1179	*Priva leptostachya* (L.) Juss.	Verbenaceae	Heart-Leaf Velvet Bur		H		+				
1180	*Prosopis cineraria* (Linn.) Druce	Fabaceae	Jhand	*Shami*	T			+			+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1181	*Prosopis chilensis* (Molina) Stuntz.	Fabaceae	Chilean Mesquite		T		+				
1182	*Pseudarthria viscida* (L.) Wight & Arn.	Fabaceae	Salaparni		US	+	+				
1183	*Pseudanthistiria heteroclita (Roxb.) Hook.f.*	Poaceae			G		+				
1184	*Pseudoraphis spinescens (R. Br.) Vickery.*	Poaceae			G		+				
1185	*Psidium guajava* Linn.	Myrtaceae	common guava	*Peru*	T	+	+	+		+	+
1186	*Pseuderanthemum carruthersii* (Seem.) Guillaumin	Acanthaceae	Purple false eranthemum		S						+
1187	*Pteris pellucida* Presl	Pteridaceae	Variegata mini		H	+	+				+
1188	*Pterocarpus indicus* Willd.	Fabaceae	Prickly Padauk		T						+
1189	*Pterocarpus santalinus* Linn.f.	Fabaceae	Red sanders	*Raktachandan*	T			+			
1190	*Pterocarpus marsupium* Roxb.	Fabaceae	Indian Kino Tree	*Bibla*	T	+	+				+
1191	*Pterygota alata* R.Br.	Sterculiaceae	Buddha Coconut		T	+	+			+	+
1192	*Pterospermum acerifolium* Willd.	Sterculiaceae	Maple-leaved Bayur tree	*Muchkund*	T			+			+
1193	*Pueraria tuberosa* (Roxb.) D	Fabaceae	Indian kudzu	*Vidarikanda*	CL		+	+			
1194	*Pulicaria wightiana* Clarke	Asteraceae		*Sontikli*	H		+				
1195	*Punica granatum* Linn	Punicaceae	Pomegranate	*Dalimba*	T	+	+	+			+
1196	*Pycreus macrostachyos* (Lamk.) Raynal	Cyperaceae			G						+
1197	*Rhaphidophora decursiva* (Roxb.) Schott	Araceae	Creeping Philodendron		CL						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1198	*Pyrostegia venusta* (Ker.-Gawl.) Miers.	Bignoniaceae	Flame vine		T	+	+	+			
1199	*Quisqualis indica* Linn.	Combretaceae	Rangoon Creeper	*Vilayati chambeli*	CL	+	+	+		+	+
1200	*Remusatia vivipara* (Roxb.) Schott.	Arecaceae	Shield Leaf Ariopsis	*Rukhalu*	H	+	+	+			
1201	*Rauwolfia tetraphylla* Linn.	Apocynaceae	Wild Snake Root	*Vanasarpagandha*	S	+		+			
1202	*Rauwolfia serpentina* Benth.	Apocynaceae	Indian Snakeroot	*Sarpgandha*	H	+	+	+			
1203	*Rauwolfia densiflora* Benth.	Apocynaceae	Dense-Flowered Snake Root		S	+					
1204	*Ravenala madagascariensis* Sonner.	Strelitziaceae	Traveler's Palm		T			+			+
1205	*Rhamphicarpa longiflora* (Arn.) Benth.	Scrophulariaceae	Tutari	*Bhatgulal*	H	+	+	+			
1206	*Rhizophora mucronata* Poir.	Rhizophoraceae	Asiatic Mangrove	*Kamodumbi*	T		+	+		+	+
1207	*Rhinacanthus nasutus* (L.) Kurz	Acanthaceae	Snake Jasmine	*Gajkarni*	S		+				+
1208	*Rhoeo spathacea* (Sw.) Stearn	Commelinaceae	Trdescantia		H						+
1209	*Rhynchostylis retusa* (L.) Blume	Orchidaceae	Foxtail Orchid	*Seetechi veni*	H/Or	+	+	+			+
1210	*Reinwardtia indica Dum.*	Linaceae	Yellow Flax	*Basanti*	S	+					
1211	*Rivea hypocratiformis* Choisy	Convolvulaceae	Midnapore Creeper	*Sanjvel*	CL		+				
1212	*Rhynchospora wightiana* (Nees) Steud.	Cyperaceae	Wight's Beak-Sedge		G	+	+				
1213	*Ricinus communis* Linn.	Euphorbiaceae	Castor bean	*Surati earand*	S	+	+	+	+	+	+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1214	*Rorippa indica* (L.) Hiern.	Brassicaceae	Indian Field-Cress		H		+				
1215	*Rostellularia crinita* Nees	Acanthaceae			H		+				
1216	*Rostellularia japonica* (Thunb.) Ellis	Acanthaceae			H		+				
1217	*Rostellularia procumbens* (L.) Nees	Acanthaceae	Water Willow	*Karambal*	H	+	+	+			+
1218	*Rotala densiflora* (R. & S.) Koechne	Lythraceae	Jalmukhi	*Jalmukhi*	H		+				
1219	*Rotala serpyllifolia* (Roth) Bremek.	Lythraceae	Slender Rotala		H	+	+				
1220	*Rotala indica* (Willd.) Koechne	Lythraceae	Indian toothcup		H		+				
1221	*Rotala occultiflora* Koechne	Lythraceae			H		+				
1222	*Rotula aquatica* Lour.	Ehretiaceae	Aquatic Rotula	*Machim*	H	+	+				
1223	*Rosa indica* L.	Rosaceae	Indian strawberry		H						+
1224	*Rosa Damascena* Mill.	Rosaceae	Damask Rose	*Gulab*	S						+
1225	*Roystonea regia* Cook	Arecaceae	Royal palm		T	+	+	+		+	+
1226	*Ruellia tuberosa* Linn.	Acanthaceae	Wayside ruellia	*Wayati*	H	+	+	+			+
1227	*Lepidagathis fasciculata* (Retz.) Nees.	Acanthaceae	Striped Lepidagathis		H	+					
1228	*Russelia equisetiformis* Schltdl. & Cham.	Scrophulariaceae	Firecracker plant		H						+
1229	*Rungia repens* (L.) Nees	Acanthaceae	Creeping Rungia	*Ghati pittapapada*	H	+	+	+			+
1230	*Rungia pectinata* (L.) Nees.	Acanthaceae	Comb Rungia	*Sut*	H	+	+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1231	*Rungia parviflora* Nees	Acanthaceae	Small Flowered Rungia	*Sut*	H	+	+				
1232	*Saccharum spontaneum* L.	Poaceae	Kans grass	*Kamis*	G	+	+				+
1233	*Sacciolepis interrupta (Willd.) Stapf*	Poaceae			G		+				
1234	*Sageraea laurina* Dalz.	Annonaceae		*Sageri*	T	+	+				
1235	*Salvadora persica* L.	Salvadoraceae	Meswalk	*Pilu*	S		+	+		+	+
1236	*Salvia officinalis* Linn.	Labiatae	Garden sage		S						+
1237	*Sansevieria trifasciata* Prain	Agavaceae	Snake Plant		S						+
1238	*Sansevieria roxburghiana* Schult.f.	Agavaceae	Bow - string hemp		H					+	+
1239	*Salvinia sp.*	Salviniaceae	floating fern		AQ			+			
1240	*Salix tetrasperma* Roxb.	Salicaceae	Indian Willow		T				+		+
1241	*Samanea saman* (Jacq.) Merrill	Mimosaceae	Rain Tree	*Vilaiti siris*	T		+	+		+	+
1242	*Santalum album* L.	Santalaceae	Sandlewood tree	*Chandan*	T			+			+
1243	*Sansevieria cylindrica* Boj.	Agavaceae	Spear Sansevieria		H						+
1244	*Sapindus emarginatus* Vahl	Sapindaceae	Notched Leaf Soapnut	*Reetha*	T						+
1245	*Sapindus trifoliatus* Linn.	Sapindaceae	Soapnut tree	*Ritha*	T		+	+			+
1246	*Sapium insigne var. Malbaricum* (Wt.) Hook. f.	Euphorbiaceae	Tiger's Milk Spruce	*Chikhada*	T	+	+	+			
1247	*Saraca asoka* (Roxb.) de Willde	Caesalpiniaceae	Ashok	*Ashok*	T	+	+	+		+	+
1248	*Scaevola salutaria* (Lour.) Almeida	Goodeniaceae	Half Flower	*Bhadrak*	S						+

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1249	*Saraca indica* Linn.	Caesalpiniaceae	Ashok	*Seetecha ashok*	T			+			
1250	*Scaevola taccada (Gaertn.) Roxb.*	Goodeniaceae	Half Flower	*Bhadrak*	S						+
1251	*Schleichera oleosa* Oken.	Sapindaceae	Ceylon oak	*Koshimb*	T	+	+	+			+
1252	*Ledebouria hycinthina* Roth.	Liliaceae	South Indian Squill	*Khajkanda*	H	+	+	+			+
1253	*Schoenopletus naikianus* (W. Khan) Almeida	Cyperaceae	Cottongrass		H					+	
1254	*Scoparia dulcis* Linn.	Scrophulariaceae	Sweet Broom Weed	*Mithi patti*	H	+	+		+		+
1255	*Elocharis spiralis* (Rottb.) R.Br.	Cyperaceae	Hairy Cottongrass		H						+
1256	*Cassia alata* Linn.	Caesalpiniaceae	Candle cassia		S	+	+	+			+
1257	*Cassia auriculata* Linn.	Caesalpiniaceae	Tanner's Cassia	*Tarwad*	S	+					+
1258	*Cassia siamea* Lamk.	Caesalpiniaceae	Siamese Senna	*Kassod*	T	+	+	+		+	+
1259	*Cassia sophera* Linn.	Caesalpiniaceae	Sophera Senna	*Ran-takla*	S	+	+	+		+	+
1260	*Cassia tora* Linn.	Caesalpiniaceae	Foetid cassia	*Takala*	H	+	+	+		+	+
1261	*Securinega obovata* (Willd.) Almeida	Euphorbiaceae			H	+	+				
1262	*Semecarpus anacardium* Linn.f.	Anacardiaceae	Marking nut tree	*Bibba*	T	+	+	+			+
1263	*Xantolis tomentosa* Raf.	Sapotaceae			T	+	+	+			
1264	*Selaginella delicatula* (Desv. ex Poir.) Alston	Selaginellaceae			H	+	+				+
1265	*Senecio arachnoidea* (Clarke) Almeida	Asteraceae	Cobwebby Paintbrush	*Sonki*	H	+	+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1266	*Senecio lanuginosa* (Edgew.) Almeida	Asteraceae	Sonki	*Hivali sonaki*	H	+		+			
1267	*Sesamum radiatum Schumach. & Thon.*	Pedaliaceae	benniseed		H		+				
1268	*Sesamum orientale Linn.*	Pedaliaceae	Sesame	*Rantil*	H	+	+	+		+	
1269	*Sesbania grandiflora* (Linn.) Pers.	Fabaceae	Agati	*Agasta*	T		+	+			+
1270	*Sesbania sesban* (Linn.) Merrill	Fabaceae	Common sesban	*shewarie*	T	+	+				+
1271	*Sesbania bispinosa* (Jacq.) Wight	Fabaceae	Prickly Sesban	*Bhuiavali*	H	+	+				+
1272	*Sesuvium portulacastrum* (L.) L.	Aizoaceae	Sea Purslane	*dhapa*	H		+		+	+	+
1273	*Setaria glauca* (L.) Beauv.	Poaceae	Yellow Foxtail	*Barati*	G	+	+	+			
1274	*Setaria pallide-fusca* (K. Schum.) Stapf & Hubbard	Poaceae			G		+				
1275	*Setaria verticillata (L.) P.Beauv.*	Poaceae	Bristly Foxtail		G		+				
1276	*Sida acuta* Burm.f.	Malvaceae	Common Wireweed	*Mahabala*	H	+	+	+		+	
1277	*Sida cordata* (Burm.f.) Borss.Waalk.	Malvaceae	Long-stalk Sida	*Bhumi petari*	H	+	+	+			
1278	*Sida cordifolia* Linn.	Malvaceae	Heart-Leaf Sida	*Bala*	H	+	+				
1279	*Sida ovata* Forsk.	Malvaceae	Oval-Leaf Fan-Petals		H	+		+			
1280	*Sida rhombifolia* Linn.	Malvaceae	Cuban jute	*Sahdevi*	H	+	+	+			
1281	*Sida rhombifolia var. microphylla* Cav.	Malvaceae			H		+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1282	Sida spinosa Linn.	Malvaceae	Prickly Fan-Petals		H	+	+				
1283	*Sida pannosa G.Forst.*	Malvaceae	Ragged Mallow		H	+					
1284	*Smilax ovalifolia* Roxb.	Smilacaceae	Kumarika	*Ghotvel*	CL	+	+	+			
1285	*Smilax zeylanica* L.	Smilacaceae			CL		+				
1286	*Smithia conferta* Smith	Fabaceae	Paired Flower Smithia		H	+	+	+			
1287	*Smithia sensitiva* Ait.	Fabaceae	Sensitive Smithia	*Lajalu kavla*	H	+	+	+		+	
1288	*Smithia bigemina* Dalz.	Fabaceae	Double Paired Smithia	*lahan kawala*	H	+					
1289	*Smithia gracilis* Benth.	Fabaceae			H		+				
1290	*Smithia salsuginea* Hance	Fabaceae	Brackish Smithia		H	+	+		+		
1291	*Smithia hirsuta* Dalz.	Fabaceae	Hairy Smithia	*Kawla*	H	+					
1292	*Smithia setulosa* Dalz.	Fabaceae	Bristly Smithia	*Motha Kawla*	H	+					
1293	*Smithia purpurea* Hook.	Fabaceae	Purple Smithia	*Barka*	H	+					
1294	*Solanum aculeastissimum* Jacq.	Solanaceae	Tropical Soda Apple		H	+	+				
1295	*Solanum americanum* Mill.	Solanaceae	American nightshade		S		+				
1296	*Solanum anguivi* Lam.	Solanaceae	Poison berry		S	+	+				
1297	*Solanum melongena* Linn.	Solanaceae	Brinjal	*Vanga*	H			+			
1298	*Solanum erianthum* D. Don	Solanaceae	Big Eggplant	*Kutri*	T	+	+				
1299	*Solanum nigrum* Linn.	Solanaceae	Black nightshade	*Vange*	H	+	+	+			
1300	*Solanum pseudocapsicum* Linn.	Solanaceae	Jerusalem Cherry		H		+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1301	*Solanum virginianum* Linn.	Solanaceae	Thorny Nightshade	*Kateringani*	H	+	+		+		
1302	*Solanum mammosum* Lour.	Solanaceae	Nipple Fruit		H				+		+
1303	*Solanum torvum* Sw.	Solanaceae	Turkey Berry	*Marang*	H		+				+
1304	*Solena amplexicaulis* (Lamk.) Gandhi	Cucurbitaceae	Creeping Cucumber	*Gometi*	CL	+	+	+			
1305	*Sonneratia apetala* Buch.-Ham.	Sonneratiaceae	Sonneratia Mangrove	*Chipi*	T	+	+	+		+	+
1306	*Sonneratia caseolaris* (Linn.) Engler	Sonneratiaceae	Apple Mangrove		T					+	+
1307	*Sopubia delphinifolia* Don	Scrophulariaceae	Common Sopubia	*Dudhali*	H	+	+	+			
1308	*Sopubia trifida* Buch.-Ham.	Scrophulariaceae	Split Leaf Sopubia		H	+					
1309	*Sorghum halepense* (L.) Pers.	Poaceae	Johnson Grass		G	+	+				
1310	*Sporobolus marginatus* A. Rich.	Poaceae	Giant Parramatta Grass		G		+				
1311	*Butea parviflora* Roxb. ex D	Fabaceae	Bando Lata	*Phalsan*	CL		+				
1312	*Spathiphyllum clevelandii* Schott.	Araceae	Cobra plant		H						+
1313	*Spathodea campanulata* Beauv.	Bignoniaceae	African tulip tree	*Pichkari*	T	+	+	+		+	+
1314	*Spermacoce pusilla* Wall.	Rubiaceae	Tiny False Buttonweed	*Safed phooli*	H	+	+				
1315	*Sphaeranthus indicus* Linn.	Asteraceae	East Indian Globe Thistle	*Gorakhmundi*	H	+	+	+	+		+
1316	*Sphaeranthus africanus* Linn.	Asteraceae	African Globe Thistle	*Mundi*	H	+	+			+	
1317	*Spilanthes calva D*	Asteraceae	Panicled Spot Flower		H	+				+	

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1318	*Spilanthes debilis* Kunth	Asteraceae	White Spot-Flower		H	+					
1319	*Spinifex littoreus (Burm. f.) Merr.*	Poaceae	Ravan's Moustache		G		+				
1320	*Spinacea oleracea* Linn.	Amaranthaceae	Spinach	*Palak*	H			+			+
1321	*Spondias pinnata* Kurz.	Anacardiaceae	Wild Mango	*Ambada*	T	+	+	+			
1322	*Sporobolus capillaris Miq.*	Poaceae	Mist Grass		G		+				
1323	*Stachytarpheta jamaicensis* (L.) Vahl	Verbenaceae			S		+				
1324	*Stephania hernandifolia* Walp.	Menispermaceae	Tape-vine	*Patal*	CL		+				
1325	*Sterculia balanghas* Linn.	Sterculiaceae	Mainma-shaw		T		+				
1326	*Sterculia foetida* Linn.	Sterculiaceae	Java Olive	*Jungali badam*	T		+	+		+	+
1327	*Sterculia guttata* Roxb.	Sterculiaceae	Spotted Sterculia	*Kokaru*	T	+	+	+			
1328	*Sterculia urens Roxb.*	Sterculiaceae	Indian-tragacanth	*Kahandol*	T	+	+	+		+	+
1329	*Sterculia villosa* Roxb.	Sterculiaceae	Hairy Sterculia	*Sardol*	T	+	+			+	+
1330	*Stereospermum chelonoides* D	Bignoniaceae	Fragrant Padri Tree	*Padal*	T	+	+	+			
1331	*Radermachera xylocarpa* Schum.	Bignoniaceae	Padri Tree	*Kadashing*	T	+	+				
1332	*Stereospermum personatum* (Hassk.) Chatt.	Bignoniaceae	Yellow Snake Tree	*padal*	T	+	+				
1333	*Streblus asper* (Retz.) Lour.	Moraceae	Sand Paper Tree	*Kharvat*	T	+	+	+		+	
1334	*Striga asiatica* (L.) Kuntze	Scrophulariaceae	Asiatic Witchweed	*Agya*	H	+	+	+			
1335	*Striga asiatica var. lutea* Almeida	Scrophulariaceae			H		+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1336	*Striga gesnerioides* (Willd.) Vatke	Scrophulariaceae	Purple Witchweed	*Bambaku*	H	+	+	+			+
1337	*Striga densiflora* Benth.	Scrophulariaceae	Denseflower Witchweed	*Agya*	H	+	+				
1338	*Thelepaepale ixiocephala* (Benth.) Bremek.	Acanthaceae	Sky Blue Karvy	*Waiti*	S	+					
1339	*Pleocaulus reticulatus* (Stapf) M.R.Almeida	Acanthaceae	Hill Conehead	*Bhui karvi*	S	+					
1340	*Pleocaulus sessilis* (Nees) Bremek.	Acanthaceae	Mal Karvy	*Topli karvi*	S	+					
1341	*Strychnos nux-vomica* L.	Loganiaceae	Poison nut tree	*Kajara*	T		+	+		+	
1342	*Strychnos potatorum L.f.*	Loganiaceae			T		+				
1343	*Stylosanthes hamata* (Linn.)Taub	Fabaceae	Caribbean Stylo	*Hamata*	H	+	+	+			
1344	*Suaeda nudiflora* Moq.	Chenopodiaceae	Common Indian Saltwort		S				+		+
1345	*Swietenia macrophylla* King	Meliaceae	Big leaf mahogany		T		+			+	
1346	*Swertia minor* (Griesb.) Knobl.	Gentianaceae	Lesser Swertia	*Lahan chirayat*	H		+				
1347	*Swietenia mahogani* (L.) Jacq.	Meliaceae	West Indies Mahogany	*Mahogany*	T	+	+			+	
1348	*Soymida febrifuga* A. Juss.	Meliaceae	Indian Redwood	*Potar*	T	+		+			
1349	*Symphorema involucratum Roxb.*	Symplocaceae	Bhingri	*Bhingari*	CL	+	+	+			
1350	*Synedrella nodiflora* (L.) Gaertn.	Asteraceae	Cinderella Weed		H	+	+	+			+
1351	*Syngonium podophyllum* Schott.	Araceae	Arrowhead plant	*Alu*	H						+
1352	*Hygrophila anomala* (Blatter) Almeida	Acanthaceae			H	+	+				

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1353	*Syzygium alterans* (Wt.) Miq.	Myrtaceae		*Pan-jambhul*	T	+	+	+			+
1354	*Syzygium cumini* (Linn.) Skeels	Myrtaceae	Java plum	*Jambhul*	T	+	+	+		+	+
1355	*Syzygium jambos* (Linn.) Alston	Myrtaceae	Malabar plum	*Jamb*	T	+		+			+
1356	*Syzygium samarangens* (Blume) Merrill. & Perry	Myrtaceae	Wax Apple	*Safed-jam*	T						+
1357	*Syzygium malaccensis* (Linn.) Merrill. & Perry	Myrtaceae	Malacca Jam		T						+
1358	*Syzygium caryophyllatum* (Linn.) Alston	Myrtaceae	South Indian Plum	*Bhedsi*	T			+			+
1359	*Tacca leontopetaloides* (L.) O.K.	Taccaceae	Fiji Arrowroot	*Devkanda*	H	+	+	+			
1360	*Ervatamia alternifolia* (L.) Almeida	Apocynaceae		*Nag Kuda*	T	+					
1361	*Ervatamia divaricata* (L.) Burkill	Apocynaceae	Crape jasmine	*Ananta*	T	+					+
1362	*Ervatamia divaricata var. plena* Almeida	Apocynaceae			T						+
1363	*Tabebuia argentea* Britt.	Bignoniaceae	Silver Trumpet Tree		T					+	+
1364	*Tabebuia rosea* DC	Bignoniaceae	Pink trumpet tre		T		+				+
1365	*Tabebuia pentaphylla* (D) Hamsley	Bignoniaceae	Cuban Pink Trumpet Tree		T					+	+
1366	*Tagetes erecta* Linn.	Asteraceae	Marigold	*Jhenduphool*	S			+			+
1367	*Talinum paniculatum* (Jacq.) Gaertn.	Portulacaceae	Jewels of Opar		H						+
1368	*Tamarindus indica* Linn.	Caesalpiniaceae	Tamarind	*Chincha*	T	+	+	+		+	+

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1369	*Tamarix ericoides Rottl.*	Tamaricaceae	Erica Tamarisk	*Kadsherni*	S	+	+		+		+
1370	*Tamarix indica Roxb.*	Tamaricaceae	Indian Tamarisk	*jhabuk*	S	+					
1371	*Tamilnadia uliginosa (Retz.) Tirveng. & Sastre*	Rubiaceae	Divine Jasmine	*Tupkari*	S			+			
1372	*Tanacetum coccineum* (Willd.) Grierson	Asteraceae			H						+
1373	*Tectona grandis* Linn. f.	Verbenaceae	Teakwood	*Sag*	T	+	+	+		+	+
1374	*Tecoma stans* (L.) Juss.	Bignoniaceae	Yellow bells	*Ghanti ful*	T	+					+
1375	*Tecomella undulata* Seem	Bignoniaceae	Roheda	*Rakhtroda*	T						+
1376	*Tephrosia purpurea (Linn.) Pers.*	Fabaceae	Wild Indigo	*Unhali*	H	+	+	+			+
1377	*Tephrosia strigosa* (Dalz.) Santapau & Maheshwari	Fabaceae	Bristly Tephrosia		H		+				+
1378	*Teramnus labialis* (Linn.f.) Spreng.	Fabaceae	Blue Wiss	*ran-udid*	H	+	+				
1379	*Teramnus labialis var. mollis* (Wt. & Arn.) Baker	Fabaceae	Blue wiss	*ran-udid*	H	+	+				
1380	*Terminalia arjuna* (Roxb.) Wt. & Arn.	Combretaceae		*Arjuna*	T	+	+	+		+	+
1381	*Terminalia bellirica* (Gaertn.) Roxb.	Combretaceae		*Behada*	T	+	+	+		+	+
1382	*Terminalia catappa* Linn.	Combretaceae	Indian Almond	*Deshi badam*	T	+		+		+	+
1383	*Terminalia chebula* Retz.	Combretaceae	Myrobalan	*Hirda*	T	+	+	+		+	+
1384	*Terminalia paniculata* Roth	Combretaceae	Kindal Tree	*Kinjal*	T	+		+			+
1385	*Terminalia crenulata* Roth	Combretaceae		*Matti*	T	+	+				+

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1386	*Terminalia elliptica* Willd.	Combretaceae	Asan	*Ain*	T	+					+
1387	*Tarenna asiatica (L.) Kuntze ex K. Schum.*	Rubiaceae	Asiatic Tarenna	*Patale*	S	+	+				
1388	*Tetrameles nudiflora R.Br.*	Tetramelaceae	False Hemp Tree	*Jangali bhendi*	T	+	+				
1389	*Tetrastigma leucostaphylla* (Dennst.) Alston	Vitaceae			CL		+				
1390	*Themeda quadrivalvis* (L.) Kuntze.	Poaceae	Grader grass		G	+	+				+
1391	*Themeda tremula* (Nees ex Steud.) Hack.	Poaceae			G	+	+				+
1392	*Themeda triandra* Forsk.	Poaceae	Kangaroo grass		G	+	+	+	+		+
1393	*Theobroma cacao* Linn.	Sterculiaceae	Cocoa Tree		T					+	+
1394	*Thespesia Populnea* Soland.	Malvaceae	Indian tulip tree	*Bhendi*	T	+	+	+		+	+
1395	*Thevetia peruviana* (Pers). K Schum.	Apocynaceae	Mexican oleander	*Karantop*	T	+	+	+		+	+
1396	*Thuja Orientalis Linn.*	Cupressaceae	Chinese Arborvitae	*Morpankhi*	S						+
1397	*Thunbergia alata* Hook.	Acanthaceae	Black-Eyed Susan Vine		CL						+
1398	*Thunbergia erecta* (Benth.) T.Anders.	Acanthaceae	Bush Clock Vine		CL					+	+
1399	*Thunbergia fragrans* Roxb.	Acanthaceae	Sweet Clock-Vine	*Chimin*	CL	+	+	+			+
1400	*Thunbergia grandiflora* (Roxb. ex. Rottl) Roxb.	Acanthaceae	Bengal clock vine	*Neel lata*	CL			+			+
1401	*Tinospora glabra* (Burm.f.) Merrill.	Menispermaceae	Gulvel		CL		+	+		+	+
1402	*Tinospora sinensis* (Lour.) Merrill.	Menispermaceae	Malabar Gulbel	*Vhadli-amrutvel*	CL	+	+				+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1403	*Tonningia axillaris* (L.) Rafin.	Commelinaceae	Creeping Cradle Plant	*Bechka*	H	+	+				
1404	*Torenia bicolor Dalzell*	Linderniaceae	wishbone flower.	*Tarini*	H	+		+			
1405	*Torenia cordifolia* Roxb.	Linderniaceae	Indian Wishbone Flower	*Torni*	H	+	+	+			+
1406	*Tragia hispida* Willd.	Euphorbiaceae		*Khajkolti*	H		+				
1407	*Tragia Involucrata* L.	Euphorbiaceae	Climbing Nettle	*Agya*	Bu	+	+	+			
1408	*Trapa bispinosa Roxb.*	Trapaceae	Water Chestnut	*Shingoda*	AQ				+		
1409	*Trewia nudiflora* Linn.	Euphorbiaceae	False White Teak	*Petari*	T	+	+	+			
1410	*Trema orientalis* (L.) Blume	Ulmaceae	Indian Charcoal Tree	*Ghol*	T	+	+	+			+
1411	*Trianthema portulacastrum L.*	Aizoaceae	Desert Horse Purslane	*Pundhari-ghentuli*	H		+				
1412	*Tribulus terrestris L.*	Zygophyllaceae	Puncture Vine	*Gokharu*	H			+			
1413	*Trichodesma inaequale* Edgew.	Boraginaceae	Clasping-Leaf Borage	*Phulava*	H	+		+			+
1414	*Trichodesma indicum* Lehm.	Boraginaceae	Indian Borage	*Chota kalp*	H	+	+	+			+
1415	*Trichodesma indicum var. subsessilis* Clarke	Boraginaceae	Indian Borage		H	+					
1416	*Trichodesma indica var. amplexicaulis* Roth	Boraginaceae	Indian Borage		H	+	+				
1417	*Trichodesma zeylanicum* Brown	Boraginaceae	Camel Bush	*Kalp*	H	+	+				
1418	*Tricholepis glaberrima* D	Asteraceae	Smooth Tricholepis	*Dahan*	H	+	+				+
1419	*Tricholepis montana* Dalz. & Gibs.	Asteraceae	Dahan	*Dahan*	H	+	+	+			

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1420	*Tricholepis radicans* D	Asteraceae	Lahan	*Lahan*	H	+					
1421	*Trichosanthes anguina* Linn.	Cucurbitaceae	Snake Gourd	*Padawal*	CL		+	+			
1422	*Trichosanthes cucumerina* Linn.	Cucurbitaceae	Snake Gourd	*Ran padwal*	CL	+	+	+			
1423	*Tridax procumbens* Linn.	Asteraceae	Tridax Daisy	*Dagadpala*	H	+	+	+		+	+
1424	*Trigonella foenum-graecum* Linn.	Fabaceae	Fenugreek	*Methi*	H			+			
1425	*Triumfetta annua L.*	Tiliaceae	Orange Burr-Bush		H	+	+	+			
1426	*Triumfetta rhomboidea* Jacq.	Tiliaceae	Burr Bush	*Thinjhira*	H	+	+	+		+	+
1427	*Triumfetta pilosa Roth*	Tiliaceae			H	+	+				
1428	*Triumfetta pentandra A.Rich.*	Tiliaceae	Fivestamen Burrbark	*Nichardi*	H	+	+				
1429	*Turnera subulata* J. E. Smith	Passifloraceae	White Alder		H	+					+
1430	*Turnera ulmifolia* L.	Passifloraceae	Yellow Alder		H			+			+
1431	*Turraea villosa* Benn.	Meliaceae	Small honeysuckle tree	*Kapur bhendi*	S	+	+	+			+
1432	*Tylophora dalzellii* Hook.f.	Asclepiadaceae	Dalzell Ipecac	*Lahan Pitambari*	CL	+	+	+			
1433	*Tylophora indica* (Burm. f.) Merrill.	Asclepiadaceae	Indian Ipecac	*Bedki*	CL	+		+			+
1434	*Typhonium roxburghii* Schott.	Arecaceae	Dwarf Voodoo Lily	*Typhooni*	H			+			
1435	*Typha domingensis* Pers.	Typhaceae	Lesser Indian Reed Mace	*Pan-kanis*	H				+	+	+
1436	*Uraria picta* (Jacq.) Desv.	Fabaceae	Dabra	*Pitvan*	H	+	+				
1437	*Urena lobata* Linn.	Malvaceae	Caesarweed	*Vanbhendi*	S	+	+	+	+		+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1438	*Urena sinuata* Linn.	Malvaceae	Burr Mallow	*van bhendi*	S	+					
1439	*Utricularia babui S*.R.Yadav, Sardesai & S.P.Gaikwad	Lentibulariaceae	Babu Bladderwort	*Babu Jathari*	H	+		+			
1440	*Utricularia reticulata Sm.*	Lentibulariaceae	Net Veined Bladderwort	*Nili papni*	H	+		+			
1441	*Utricularia graminifolia Vahl*	Lentibulariaceae	Grass Leaved Bladderwort	*Khur papni*	H	+		+			
1442	*Utricularia striatula Sm.*	Lentibulariaceae	Striped Bladderwort	*Chirepapani*	H	+	+	+			
1443	*Utricularia stellaris L.f.*	Lentibulariaceae			AQ/H		+				
1444	*Vahlia digyna (Retz.) Kuntze*	Vahaliaceae			S		+				
1445	*Vallisneria spiralis* L.	Hydrocharitaceae	Straight Vallisneria		AQ					+	+
1446	*Meyna spinosa* Roxb. ex Link	Rubiaceae	Muyna	*Huloo*	T	+	+				
1447	*Ventilago maderaspatana Gaertn.*	Rhamnaceae	Red Creeper	*Khandvel*	S	+		+			
1448	*Verbascum chinense* (L.) Santapau	Scrophulariaceae	Chinese Mullein	*Kutki*	H	+	+		+		
1449	*Vernonia acuminata* (D.Don) Almeida	Asteraceae		*Bandar*	S		+				
1450	*Vernonia cinerea* Less.	Asteraceae	Little ironweed	*Sahadevi*	H	+	+	+			+
1451	*Vernonia elaeagnifolia* D	Asteraceae	Curtain creeper		Cr	+					+
1452	*Vernonia indica* Clarke	Asteraceae	Indian Vernonia		H	+	+				
1453	*Vigna dalzelliana* (O.Kuntze) Verdcourt.	Fabaceae			H		+				
1454	*Vigna radiata* (Linn.) Wilczeck	Fabaceae	Wild Moong	*Mug*	H		+				

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1455	*Vigna radiata var. sublobata* (Roxb.) Verd	Fabaceae	Wild Moong	*Halunda*	H	+	+	+			
1456	*Vigna unguiculata* (Linn.) Walp.	Fabaceae	Blackeyed Bean	*Chavali*	H	+	+	+			
1457	*Vigna vexillata* (Linn.) A. Rich	Fabaceae	Zombi pea	*Ranmug*	H	+	+	+		+	+
1458	*Vigna vexillata var. angustifolia* Baker	Fabaceae	Narrow-Leaved Zombi Pea	*Janglee Mung*	H	+	+				
1459	*Viscum articulatum* Burm. f.	Loranthaceae	Leafless Mistletoe	*Hadmodi*	S	+	+	+			
1460	*Vitex negundo* L.	Verbenaceae	Chaste Tree	*Nirgudi*	T	+	+	+		+	+
1461	*Wedelia biflora* D	Asteraceae	Sea Daisy	*Solanki*	H	+	+				+
1462	*Wedelia chinensis* (Osbeck) Merrill	Asteraceae	Chinese Wedelia	*Pivala-Bhangra*	H	+	+				
1463	*Wedelia urticifolia* D	Asteraceae	Nettle Leaved Wedelia	*Wadelia*	H	+	+				
1464	*Woodfordia fruticosa* (Linn.) Kurz	Lythraceae	Fire Flame Bush	*Dhayati*	S	+	+	+		+	+
1465	*Wrightia arborea* (Dennst.) Mabberley.	Apocynaceae	Woolly Dyeing Rosebay	*Pandu kuda*	T	+	+	+			
1466	*Wrightia tinctoria* Br.	Apocynaceae	Sweet Indrajao	*Kala kuda*	T	+	+	+			+
1467	*Wrightia religiosa* (Teijsm. & Binn.) Hook.f.	Apocynaceae	Water Jasmine		S						+
1468	*Xanthium strumarium* Linn.	Asteraceae	Common Cocklebur	*Shankeshrvar*	H	+	+	+			+
1469	*Xylia xylocarpa* (Roxb.) Taub.	Mimosaceae	Burma Ironwood	*Yerul*	T	+	+				
1470	*Yucca aloifolia* L.	Agavaceae	Spanish Dagger		S						+

Sr. No.	Botanical Name	Family	English Name	Marathi Name	Growth habitat	Hills	For	G-S-A	WL-FW	WL-C,Cr	Urban
1471	*Zephyranthes candida* Herb.	Amaryllidaceae	Rain lily White		H			+			
1472	*Zephyranthes carinata* Herb.	Amaryllidaceae	Rain lily Pink		H			+			+
1473	*Zingiber officinale* Ros	Zingiberaceae	Ginger	*Aale*	H						+
1474	*Zingiber neesanum* Graham	Zingiberaceae	Neesam Ginger	*Nisam*	H	+					
1475	*Zingiber cernuum* Dalz.	Zingiberaceae	Curved-Stem Ginger	*raan-ale*	H	+	+				
1476	*Zinnia elegans* Jacq.	Asteraceae	Common zinnia	*Gajara*	H		+	+			
1477	*Zizyphus glabrata (Heyne ex Roth) Wight*	Rhamnaceae			S		+				
1478	*Ziziphus mauritiana* Lam.	Rhamnaceae	Indian jujube	*Bor*	T	+	+	+	+	+	+
1479	*Ziziphus rugosa Lam*	Rhamnaceae	Wild Jujube	*Toran*	S	+	+	+			
1480	*Zizyphus caracutta Buch.-Ham. ex Roxb.*	Rhamnaceae	Kath Ber	*Katbor*	S	+	+	+			
1481	*Zizyphus oenoplia* (L.) Mill.	Rhamnaceae	Jackal Jujube	*Burgi*	S	+	+				+
1482	*Zornia gibbosa* Spanoghe	Fabaceae	Grasslike Zornia	*Naala barki*	H	+	+				+
1483	*Zornia diphylla* (L.) Pers.	Fabaceae	Trencilla		H	+	+				
1484	*Zornia disperma* Graham	Fabaceae	Eyelashes Shell Beans	*Barki*	H	+	+				

Names of native people across MMR inspired by the rich flora of the region

Sr. No.	Human Name	Gender	Plant with which related	
1	Aalu	Male	Potato	*Alocasia indica*
2	Aarati	Female		*Mimosa hamata*
3	Amrita	Female		*Nothapodytes nimmoniana*
4	Anjan	Male		*Memecylon umbellatum*
5	Anjani	Female		*Memecylon umbellatum*
6	Arjun	Male		*Terminalia arjuna*
7	Ashok	Male	Ashoka	*Polyalthia longifolia*
8	Bakula	Female		*Mimusops elengi*
9	Bakuli	Famale		*Mimusops elengi*
10	Chameli	Female		*Jasminum auriculatum*
11	Champa	Female		*Michelia champaca*
12	Chandan	Male		*Santalum album*
13	Chandana	Female		*Santalum album*
14	Chaphekar (Surname)			*Plumeria acuminata*
15	Chaudhari (Surname)			*Cissus quadrangularis*
16	Erande (Surname)			*Ricinus communis*
17	Ghosalkar (Surname)			*Luffa cylindrica*
18	Govardhan	Male		*Euphorbia hirta*
19	Gulab	Female/Male		*Rosa indica*
20	Hemani	Female		*Nymphaea pubescens*
21	Jai	Female		*Jasminum auriculatum*
22	Jui	Female		*Jasminum auriculatum*
23	Juikar (Surname)			*Jasminum auriculatum*
24	Kadam (Surname)			*Neolamarckia cadamba*
25	Kamlya	Male		*Nymphaea pubescens*
26	Kanchan	Female		*Bauhinia variegata*
27	Karande (Surname)			*Dioscorea bulbifera*
28	Kelkar (Surname)			*Musa paradisiaca*
29	Kinjal	Female		*Terminalia paniculata*
30	Kunda	Female		*Jasminum sambac*
31	Kunti	Female		*Murraya exotica*
32	Kusum	Female		*Schleichera oleosa*
33	Lata	Female		A climber plant
34	Madhu	Female		*Hiptage benghalensis*
35	Mahajan (Surname)			*Aglaia lawii*
36	Malati	Famale		*Quisqualis indica*

Sr. No.	Human Name	Gender	Plant with which related	
37	Nalini	Female		*Nymphaea pubescens*
38	Nana	Male		*Lagerstroemia parviflora*
39	Narsaya	Male		*Euphorbia antiquorum*
40	Neel	Male		*Indigofera tinctoria*
41	Oak (Surname)			*Quercus leucotrichophora*
42	Padval (Surname)			*Trichosanthes palmata*
43	Palash	Male		*Butea monosperma*
44	Prajakta	Female		*Nyctanthes arbor-tirstis*
45	Rohan	Male		*Soymida febrifuba*
46	Ruikar (Surname)			*Calotropis gigantea*
47	Sadaphule (Surname)			*Catharanthus rosea*
48	Savarkar (Surname)			*Bombax ceiba*
49	Shalmali	Female		*Bombax ceiba*
50	Shamika	Female		*Prosopis cinearia*
51	Shankar	Male		*Diplocyclos palmatus*
52	Shematya	Male		*Lannea coromandelica*
53	Shevale (Surname)			Algae
54	Shevanti	Female		*Chrysanthemum indicum*
55	Shirish	Male		*Albizzia lebbeck*
56	Solanki (Surname)			*Wedelia biflora*
57	Sonali	Female		*Erigeron sublyratus*
58	Sundari	Female		*Acacia chundra*
59	Tambat (Surname)			*Flacourtia latifolia*
60	Toran	Male		*Zizyphus rugosa*
61	Tulaskar (Surname)			*Ocimum tenuiflorum*
62	Tulsi	Female		*Ocimum tenuiflorum*
63	Varsharani	Female		*Monsonia senegalensis*
64	Walunj (Surname)			*Salix tetrasperma*
65	Zinnia	Female		*Zinnia sps*
66	Zipri	Female		*Polyscias sps*

Sites in MMR named after an affinity to local flora and fauna

Site name	Location	Name of flora/fauna	Latin name of plant	Remarks
Aapta	Panvel	Aapta	*Bauhinia racemosa Lamk.*	Village
Asangaon	Kasara - Karjat	Asana tree	*Bridelia retusa* (L.) Spreng.	Village
Babhali Naka	Thane	Babhul	*Acacia nilotica* L.	Naaka
Babulnath	Mumbai city	Babul	*Acacia nilotica* L.	
Bhendi Bazaar	Mumbai city	Bhendi, Portia tree	*Thesepsia populnea* (L.) Soland. ex Corr.	Locality
Bhokarvadi	Khalapur	Bhokar	*Cordia myxa* L.	Village
Bori	Pen Tehsil	Bor	*Zizyphus mauritiana* Lamk.	Village
Bori	Pen	Bor	*Zizyphus mauritiana* Lamk.	Village
Bori Bunder	Mumbai city	Bor	*Zizyphus mauritiana* Lamk.	Locality
Borivali	Mumbai city	Bor, Indian Jujube tree	*Zizyphus mauritiana* Lamk.	Locality
Byculla	Mumbai city	Bhaya, Indian Laburnum	*Cassia fistula* L.	Locality
Chikuwadi	Mumbai city	Chiku or Sapota Fruit	*Pouteria sapota*	Locality
Chinchpada	Pen	Chinch	*Tamarindus indica* L.	Village
Chinchbunder	Mumbai city	Chinch	*Tamarindus indica* L.	Locality
Cumballa Hill	Mumbai city	Lotus, Kambal	*Nymphaea* sp.	Locality
Fanaswadi	Mumbai city	Jackfruit, Fanas	*Artocarpus heterophylla* Lamk.	Locality
Gulmohar Road	Mumbai city	Gulmohar, Mayflower Tree	*Delonix regia* Boj.	Street
Jambhali Naka	Thane	Jambhul	*Syzygium cumini* (L.) Skeels	Naaka
Jambrung	Karjat	Jamb	*Syzygium malaccense* (L.) Merrill & Perry	Village
Kaaravi	Pen	Karvi	*Carvia callosa* (Nees) Bremek.	Village
Kalamb	Karjat	Kalamb	*Mitragyna parvifolia* Korth.	Village
Karanjtep	Pen	Karanj	*Pongamia pinnata* (L.) Pierre.	Village
Karle Khinda	Alibag	Karle	*Momordica charantia* L.	Ghat
Kelewadi		Plantain		Locality
Koleti	Pen Tehsil	Kholeta	*Barleria prionitis* L.	Village
Koleti	Pen	Kholeta	*Barleria prionitis* L.	Village
Koletivadi	Pen	Kholeta	*Barleria prionitis* L.	Village
Laburnum Road	Mumbai city	Laburnum tree	*Cassia fistula* L.	Street

Site name	Location	Name of flora/fauna	Latin name of plant	Remarks
Madmallah	Mumbai city	Coconut Palm, Maad	*Cocos nucifera* L.	Locality
Matheran	Matheran	Means 'Forest on forehead'		Mountain
Narveli	Pen	Narvel	*Naravelia zeylanica* (L.) D	Village
Nidi	Pen	Nigdi	*Vitex negun*do L.	Village
Nigade	Pen Tehsil	Nigadi	*Vitex negundo* L.	Village
Nigade	Pen	Nigdi	*Vitex negundo* L.	Village
Palas	Pen Tehsil	Palas	*Butea monosperma* (Lamk.) Taub.	Village
Palas	Pen	Palas	*Butea monosperma* (Lamk.) Taub.	Village
Palasdari	Karjat	Palas	*Butea monosperma* (Lamk.) Taub.	Village
Palasdhari	Karjat area	Palash, Flame of the Forest	*Butea monosperma* (Lamk.) Taub.	Lake, Locality
Papadi	Vasai	Papada	*Hotoptelea integrifolia* Planch.	Village
Parel	Mumbai city	Paral, Trumpet Flower tree	*Tabebuia rosea* L.	Locality
Tamarind Lane	Mumbai city	Tamarind, Imli	*Tamarindus indica* L.	Street
Tardeo	Mumbai city	Toddy Palm, Taad	*Borassus flabellifer* L.	Locality
Umbarde	Pen Tehsil	Umbar	*Ficus racemosa* L.	Village
Umbarde	Khalapur	Umbar	*Ficus racemosa* L.	Village
Umbare	Pen	Umbar	*Ficus racemosa* L.	Village
Umerkhadi	Mumbai city	Fig tree	*Ficus racemosa* L.	Locality
Wadala	Mumbai city	Vad or Banyan tree	*Ficus benghalensis* L.	Locality
Worli	Mumbai city	Wad or Banyan tree	*Ficus benghalensis* L.	Locality

	Common Name	Scientific Name	SEASON Best Seen	Urban	G-S-A	For	Hilly; > 250 mt	WL FW	WL -C
	Family: Papilionidae (Swallowtails)								
1	**Spot Swordtail**	*Graphium nomius (Esper 1798)*	S	Y	Y	Y	Y		
2	**Common Jay**	*Graphium doson (C. & R. Felder 1864)*	S, R			Y			
3	**Tailed Jay**	*Graphium agamemnon (Linnaeus 1758)*	AY	Y	Y	Y	Y	Y	Y
4	**Common Bluebottle**	*Graphium sarpedon (Linnaeus 1758)*	S, R	Y		Y	Y		
5	**Common Rose**	*Atrophaneura aristolochiae (Fabricius 1775)*	AY	Y	Y	Y	Y	Y	Y
6	**Crimson Rose**	*Atrophaneura hector (Linnaeus 1758)*	AY	Y	Y	Y	Y		
7	**Common Mime**	*Chilasa clytia (Linnaeus 1758)*	R			Y	Y		
8	**Blue Mormon**	*Papilio polymnestor (Cramer 1775)*	S, R	Y		Y	Y		
9	**Common Mormon**	*Papilio polytes (Linnaeus 1758)*	AY	Y	Y	Y	Y	Y	Y
10	**Lime Butterfly**	*Papilio demoleus (Linnaeus 1758)*	AY	Y	Y	Y	Y		
	Family: Pieridae (White & Yellows)								
11	**Pioneer (Caper White)**	*Belenois aurota (Fabricius 1793)*	PR		Y	Y	Y		Y
12	**Common Gull**	*Cepora nerissa (Fabricius 1775)*	S, PR	Y	Y	Y	Y	Y	Y
13	**White Orange Tip**	*Ixias marianne (Cramer 1779)*	R, PR	Y	Y	Y	Y		
14	**Yellow Orange Tip**	*Ixias pyrene (Linnaeus 1764)*	AY, PR	Y	Y	Y	Y	Y	Y
15	**Great Orange-Tip**	*Hebomoia glaucippe (Linnaeus 1758)*	R, PR	Y	Y	Y	Y		Y
16	**Plain Puffin**	*Appias indra (Moore 1857)*	R, PR			Y			
17	**Striped Albatross**	*Appias libythea (Fabricius)*	S, R		Y	Y			Y
18	**Chocolate Albatross**	*Appias lyncida (Cramer 1777)*	PR, S(once)			Y			
19	**Common Albatross**	*Appias albina (Boisduval)*	S, PR	Y		Y	Y		
20	**Psyche**	*Leptosia nina (Fabricius 1793)*	AY	Y	Y	Y			Y
21	**Common Jezebel**	*Delias eucharis (Drury 1773)*	AY	Y	Y	Y	Y	Y	Y
22	**Small Salmon Arab**	*Colotis amata (Fabricius 1775)*	AY (PR)	Y	Y			Y	Y
23	**Small Orange-Tip**	*Colotis etrida (Boisduval 1836)*	AY (PR)		Y				
24	**Common Wanderer**	*Pareronia valeria (Cramer 1776)*	S, R	Y	Y	Y	Y		Y

	Common Name	Scientific Name	SEASON Best Seen	Urban	G-S-A	For	Hilly; > 250 mt	WL FW	WL -C
25	**Common Emigrant**	*Catopsilia pomona (Fabricius 1775)*	AY	Y	Y	Y	Y	Y	Y
26	**Mottled Emigrant**	*Catopsilia pyranthe (Linnaeus)*	AY	Y	Y	Y	Y		
27	**Small Grass Yellow**	*Eurema brigitta (Cramer 1780)*	PR	Y	Y		Y		
28	**Spotless Grass Yellow**	*Eurema laeta (Boisduval 1836)*	S, R		Y	Y			
29	**Common Grass Yellow**	*Eurema hecabe (Linnaeus 1758)*	AY	Y	Y	Y	Y	Y	
30	**Three-spot Grass Yellow**	*Eurema blanda*	PR		Y	Y			
	Family: Nymphalidae (Brush-footed Butterflies)								
31	**Glassy Tiger**	*Parantica aglea (Stoll 1782)*	AY	Y	Y	Y	Y	Y	Y
32	**Dark Blue Tiger**	*Tirumala septentrionis (Butler 1874)*	AY			Y	Y		
33	**Blue Tiger**	*Tirumala limniace (Cramer 1775)*	AY	Y	Y	Y	Y		Y
34	**Plain Tiger**	*Danaus chrysippus (Linnaeus)*	AY	Y	Y	Y	Y		Y
35	**Striped Tiger**	*Danaus genutia (Cramer 1779)*	AY	Y	Y	Y	Y	Y	Y
36	**Common Crow**	*Euploea core (Cramer 1780)*	AY	Y	Y	Y	Y	Y	**Y**
37	**Double-Branded Crow**	*Euploea sylvester (Fabricius 1793)*	R, PR			Y	Y		
38	**Brown King Crow**	*Euploea klugii (Moore)*	R, PR		Y	Y			
39	**Tawny Rajah**	*Charaxes bernardus (Fabricius 1793)*	S, R		Y	Y	Y	Y	
40	**Black Rajah**	*Charaxes solon (Fabricius 1793)*	S			Y	Y		
41	**Common Nawab**	*Polyura athamas (Drury 1773)*	S, R	Y	Y	Y	Y		
42	**Anomalous Nawab**	*Polyura agraria (Swinhoe)*	S			Y			
43	**Common Bushbrown**	*Mycalesis perseus (Fabricius 1775)*	AY (PR)	Y	Y	Y	Y		
44	**Dark-Brand Bushbrown**	*Mycalesis mineus (Linnaeus)*	R, PR		Y	Y			
45	**Long-Brand Bushbrown**	*Mycalesis visala (Moore)*	R, PR	Y	Y				
46	**Bamboo Treebrown**	*Lethe europa (Fabricius 1775)*	R, PR		Y	Y			
47	**Common Fivering**	*Ypthima baldus (Fabricius 1775)*	AY	Y	Y	Y			
48	**Common Fourring**	*Ypthima huebneri (Kirby 1871)*	S, R, PR	Y	Y	Y	Y		
49	**Common Evening Brown**	*Melanitis leda (Linnaeus 1758)*	AY	Y	Y	Y	Y		
50	**Common Palmfly**	*Elymnias hypermnestra (Linnaeus 1763)*	S, R, PR	Y	Y	Y			

	Common Name	Scientific Name	SEASON Best Seen	Urban	G-S-A	For	Hilly; > 250 mt	WL FW	WL -C
51	**Common Leopard**	*Phalanta phalantha (Drury 1773)*	AY	Y	Y	Y	Y	Y	Y
52	**Tawny Coster**	*Acraea violae (Fabricius)*	AY (R, PR)	Y	Y	Y		Y	Y
53	**Commander**	*Moduza procris (Cramer 1777)*	AY	Y	Y	Y	Y	Y	Y
54	**Common Sailer**	*Neptis hylas (Linnaeus 1758)*	AY	Y	Y	Y	Y	Y	Y
55	**Short-banded Sailer**	*Phaedyma columella (Cramer)*	S		Y	Y	Y		
56	**Chestnut-Streaked Sailer**	*Neptis jumbah (Moore 1857)*	R, PR	Y		Y	Y		
57	**Common Baron**	*Euthalia aconthea (Cramer 1777)*	AY	Y	Y	Y	Y	Y	Y
58	**Gaudy Baron**	*Euthalia lubentina (Cramer 1777)*	S, R, PR			Y	Y		
59	**Baronet**	*Euthalia nais (Forster 1771)*	AY	Y	Y	Y		Y	Y
60	**Angled Castor**	*Ariadne ariadne Linnaeus 1763*	AY	Y	Y			Y	Y
61	**Common Castor**	*Ariadne merione (Cramer)*	AY	Y	Y			Y	Y
62	**Painted Lady**	*Vanessa cardui (Linnaeus)*	R, PR	Y	Y	Y			Y
63	**Grey Pansy**	*Junonia atlites (Linnaeus 1763)*	AY	Y	Y	Y		Y	Y
64	**Peacock Pansy**	*Junonia almana (Linnaeus 1758)*	AY	Y	Y	Y	Y		Y
65	**Yellow Pansy**	*Junonia hierta (Fabricius 1798)*	S		Y		Y		Y
66	**Chocolate Pansy**	*Junonia iphita (Cramer 1779)*	AY	Y	Y	Y	Y	Y	Y
67	**Lemon Pansy**	*Junonia lemonias (Linnaeus 1758)*	AY	Y	Y	Y			Y
68	**Blue Pansy**	*Junonia orithiya (Linnaeus 1758)*	S	Y	Y	Y			
69	**Great Eggfly**	*Hypolimnas bolina (Linnaeus 1758)*	AY	Y	Y	Y		Y	
70	**Danaid Eggfly**	*Hypolimnas missipus (Linnaeus 1764)*	AY	Y	Y	Y	Y	Y	Y
71	**Blue Oakleaf**	*Kallima horsfieldi (Kollar 1844)*	AY	Y	Y	Y	Y		
72	**Black Prince**	*Rohana parisatis (Westwood)*		Y					
	Family: Lycaenidae (Blues)								
73	**Red Pierrot**	*Talicada nyseus (Guérin-Meneville)*		Y	Y	Y			Y
74	**Common Pierrot**	*Castalius rosimon (Fabricius 1775)*		Y	Y	Y	Y	Y	Y
75	**Angled Pierrot**	*Caleta caleta Hewitson*	R, PR	Y		Y	Y		
76	**Zebra Blue**	*Leptotes plinius (Fabricus)*	PR		Y	Y			
77	**Malayan**	*Megisba malaya (Horsfield 1828)*	S			Y			

	Common Name	Scientific Name	SEASON Best Seen	Urban	G-S-A	For	Hilly; > 250 mt	WL FW	WL -C
78	**Common Hedge Blue**	*Acytolepis puspa (Horsfield 1828)*	AY	Y	Y	Y			Y
79	**Lime Blue**	*Chilades lajus (Stoll)*	AY	Y	Y	Y	Y		
80	**Indian Cupid**	*Everes lacturnus Godart*	S, R, PR	Y	Y	Y			
81	**Eastern Grass Jewel**	*Chilades putli*				Y			
82	**Plains Cupid**	*Chilades pandava*	S, R, PR		Y				Y
83	**Dark Grass Blue**	*Zizeeria karsandra Moore*	AY	Y	Y	Y	Y	Y	Y
84	**Pale Grass Blue**	*Pseudozizeeria maha (Kollar 1848)*	AY		Y		Y		
85	**Tiny Grass Blue**	*Zizula hylax (Fabricius 1775)*	S, R, PR	Y	Y	Y	Y		Y
86	**Gram Blue**	*Euchrysops cnejus (Fabricius 1798)*	AY	Y	Y	Y			Y
87	**Pointed Ciliate Blue**	*Anthene lycaenina (C & R Felder 1868)*	R, PR		Y	Y	Y		
88	**Forget-me-not**	*Catochrysops strabo (Fabricius 1793)*	S, PR		Y	Y			
89	**Peablue**	*Lampides boeticus (Linnaeus 1767)*	R, PR		Y		Y		Y
90	**Dark Cerulean**	*Jamides bochus Stoll 1782*	R, PR		Y	Y	Y		Y
91	**Common Cerulean**	*Jamides celeno (Cramer 1775)*	AY	Y	Y	Y			Y
92	**Common Lineblue**	*Prosotas nora (C & R Felder 1860)*		Y	Y	Y			
93	**Tailless Lineblue**	*Prosotas dubiosa indica (Evans)*	S, PR		Y		Y		Y
94	**Dingy Lineblue**	*Petrelaea dana (de Niceville)*	S, PR			Y			
95	**White-tipped Lineblue**	*Prosotas noreia (C & R Felder)*							
96	**Transparent 6-Line Blue**	*Nacaduba kurava*	MNP						
97	**Indian Sunbeam**	*Curetis thetis (Drury 1773)*	S, PR		Y	Y			
98	**Angled Sunbeam**	*Curetis acuta (Moore 1879)*	S, R, PR			Y	Y		
99	**Leaf Blue**	*Amblypodia anita (Hewitson)*	S, PR		Y	Y		Y	
100	**Large Oakblue**	*Arhopala amantes (Hewitson 1862)*	S, R, PR			Y	Y	Y	
101	**Western Centaur Oakblue**	*Arhopala pseudocentaurus (Doubleday)*	S, PR			Y	Y		
102	**Yamfly**	*Loxura atymnus (Stoll)*	S, R, PR	Y	Y	Y			
103	**Common Silverline**	*Spindasis vulcanus (Fabricius 1775)*	S, R, PR	Y	Y	Y	Y		Y
104	**Long-banded Silverline**	*Spindasis lohita (Horsfield 1829)*	S, R, PR	Y		Y			
105	**Common Shot Silverline**	*Spindasis ictis (Hewitson 1865)*	R, PR		Y				Y
106	**Peacock Royal**	*Tajuria cippus (Fabricius 1798)*	R		Y	Y			

	Common Name	Scientific Name	SEASON Best Seen	Urban	G-S-A	For	Hilly; > 250 mt	WL FW	WL -C
107	**Tufted White Royal**	*Pratapa deva (Moore)*	Nagla, 2007			Y			
108	**Monkey Puzzle**	*Rathinda amor (Fabricius 1775)*	R, PR			Y	Y		
109	**Cornelian**	*Deudorix epijarbas (Moore 1857)*	S, R, PR		Y	Y	Y		
110	**Redspot**	*Zesius chrysomallus (Hubner)*	Nagla, 2007			Y			
111	**Common Guava Blue**	*Deudorix isocrates (Fabricius 1793)*	R, PR	Y		Y			
112	**Slate Flash**	*Rapala manae (Hewitson)*	R, PR		Y	Y	Y		
113	**Indian Red Flash**	*Rapala iarbus (Fabricius 1787)*	R, PR		Y	Y			
114	**Indigo Flash**	*Rapala varuna (Horsfield)*	S, R, PR			Y	Y		
115	**Rounded Pierrot**	*Tarucus nara (Kollar)*	AY	Y	Y			Y	Y
116	**Common Acacia Blue**	*Surendra quercetorum (Moore)*	S, R, PR	Y	Y	Y	Y		Y
117	**Silverstreak Blue**	*Iraota timoleon (Stoll)*	S, R, PR			Y	Y	Y	
118	**Apefly**	*Spalgis epius (Westwood 1851)*		Y	Y	Y	Y		
119	**Plum Judy**	*Abisara echerius (Stoll) OR **bifasciata ??***	AY	Y		Y	Y		
120	**Large Guava Blue**	*Deudorix perse* Hewitson							
121	**African Babul Blue**	*Azanus jesous*	Rep MNP						
122	**Bright Babul Blue**	*Azanus ubaldus*	Rep MNP						
	Family: Hesperiidae (Skippers)								
123	**Brown Awl**	*Badamia exclamationis (Fabricius 1775)*	S, R, PR	Y	Y	Y			
124	**Orange Awlet**	*Bibasis jaina (Moore 1865)*				Y	Y		
125	**Common Awl**	*Hasora badra (Moore 1857)*	S, R, PR			Y	Y		
126	**Common Banded Awl**	*Hasora chromus (Cramer 1780)*	R, PR		Y	Y	Y		
127	**Plain Banded Awl**	*Hasora vitta (Butler)*	R, PR			Y	Y		
128	**Vindhyan Bob ENDEMIC**	*Arnetta vindhiana (Moore 1883)*	PR		Y	Y			
129	**Rice Swift**	*Borbo cinnara (Wallace 1866)*	S, R, PR	Y	Y	Y	Y		
130	**Moore's Ace**	*Halpe porus (Mabille 1876)*	S, R, PR		Y	Y			
131	**Chestnut Bob**	*Iambrix salsala (Moore 1865)*	R, PR		Y	Y	Y		
132	**Common Redeye**	*Matapa aria (Moore 1865)*	S, R, PR	Y	Y	Y			
133	**Conjoined Swift**	*Pelopidas conjuncta (Herrich-Schäffer 1869)*	R	Y	Y	Y	Y		
134	**Small Branded Swift**	*Pelopidas mathias*	AY	Y	Y	Y			

	Common Name	Scientific Name	SEASON Best Seen	Urban	G-S-A	For	Hilly; > 250 mt	WL FW	WL -C
135	**Indian Palm Bob**	*Suastus gremius (Fabricius 1798)*	R, PR	Y	Y	Y			
136	**Tamil Grass Dart**	*Taractrocera ceramas (Hewitson 1868)*	S, PR		Y		Y		
137	**Dark Palm Dart**	*Telicota ancilla (Herrich-Schäffer 1869)*	S, R, PR		Y	Y	Y		Y
138	**Grass Demon**	*Udaspes folus (Cramer 1775)*	S, R, PR	Y	Y	Y	Y		Y
139	**Golden Angle**	*Caprona ransonnetti (C & R Felder 1868)*			Y	Y	Y		
140	**Malabar Spotted Flat**	*Celaenorrhinus ambareesa (Moore 1865)*	R, PR		Y	Y	Y		
141	**Common Spotted Flat**	*Celaenorrhinus leucocera (Kollar 1848)*	S, R, PR			Y (NR)			
142	**Tricoloured Pied Flat**	*Coladenia indrani (Moore 1865)*	S, R		Y	Y			
143	**Fulvous Pied Flat**	*Pseudocoladenia don*	R, PR			Y			
144	**Common Small Flat**	*Sarangesa dasahara (Moore 1865)*	S, R, PR		Y	Y			
145	**Spotted Small Flat**	*Sarangesa purendra (Moore 1882)*	S, R		Y				
146	**Angled Flat**	*Tapena twaithesi (Moore 1881)*				Y	Y		
147	**Indian Skipper**	*Spialia galba (Fabricius 1793)*	R, PR	Y	Y	Y	Y		Y
148	**Straight Swift**	*Parnara guttatus*		Y	Y				
149	**Common Tinsel**	*Catapaecilma elegans*	Rep Yeur, Nagla						
150	**Giant Red Eye**	*Gangara thyrsis*	Rep SGNP, IIT						
151	**Dark Pierrot**	*Tarucus ananda*	Rep Yeur						
152	**Abnormal Silverline**	*Spindasis abnormis*	Rep Yeur			Y	Y		
153	**Pale Palm Dart**	*Telicota colon*	Rep MNP	Y					
	S = Summer (Mar-early June)								
	AY = All year								
	PR = Post Rains (Late-Sept-Nov)								
	R = Monsoon (June-end Sept)								

Database of Freshwater Bodies (Lakes - Ponds - Reservoirs - Natural & Human-made) in Greater Mumbai area of MMR							
LAKE/POND NAME	**LOCALITY**	**COORDINATES**	**Coordinates in LAT & LONG**	**Area-acres**	**Est Bird spp**	**Est Fish spp**	**Disturbance Lvl**
Tulsi Lake	SGNP	19.193365,72.911925	19°11'36″ N, 72°54'42.9″ E	340	30	22	3
Vihar Lake	SGNP	19.154411,72.912569	19°9'16″ N, 72°54'45.24″ E	c. 1700	75	25	2
Powai Lake*	SGNP	19.128018,72.904243	19°7'41″ N, 72°54'15.24″ E	525	70	55	2
Seepz Lake	Andheri east	19.122534,72.874793	19°7'21″ N, 72°52'29.22″ E	4	20	5	2
Shivaji Talao	Bhandup West	19.146785,72.949948	19°8'48″ N, 72°56'59.76″ E	NE	NE	5	1
Bhandupeswar kund	Bhandup East	19.145391,72.949187	19°8'43″ N, 72°56'57.06″ E	< 1	7	12	1
Ganpati Visarjan Lake	Mulund East	19.163431,72.963563	19°9'48″ N, 72°57'48.78″ E	NE	NE	5	1
Sheetal Talao	Kurla West	19.084081,72.881799	19°5'3″ N, 72°52'54.42″ E	NE	NE	7	1
Banganga Pond	malbar.hill	18.945436,72.793656	18°56'44″ N, 72°47'37.14″ E	NE	NE	4, 5	2
Meghwadi Talao	Jogeshwari East	19.138256,72.863281	19°8'18″ N, 72°51'47.76″ E	NE	NE	7.8	NE
Bandra Talao*	Bandra West	19.056865,72.83766	19°3'25″ N, 72°50'15.54″ E	7	8	14 - 15	2
Aarey Lake*	Goregaon East	19.147499,72.864407	19°8'51″ N, 72°51'51.84″ E	4	20	3	2
Chotakashmir Lake, Aarey	Goregaon East	19.161425,72.871413	19°9'41″ N, 72°52'17.04″ E	7	12	14 - 15	2
Goregaon Filmcity Lake	Goregaon East	19.158871,72.892613	19°9'32″ N, 72°53'33.36″ E	2	6	5	2
NITIE pond	near Powai	19.13781,72.901883	19°8'16″ N, 72°54'6.72″ E	NE	9	5	2
MNP Lake	Sion West	19.053042,72.862905	19°3'11″ N, 72°51'46.44″ E	NE	15	5	2
Sion Talao	Sion East	19.047464,72.865952	19°2'51″ N, 72°51'57.42″ E	NE	NE	5	2
RCF pond	Chembur		COULD NOT ACCESS	NE	NE	c. 10	NE
Airport Authority Grounds	Nr D N Ngr, Andheri West	19.117902N,72.830483E		NE	30	NE	NE

Database of Freshwater Bodies (Lakes - Ponds - Reservoirs - Natural & Human-made) in Greater Mumbai area of MMR							
LAKE/POND NAME	**LOCALITY**	**COORDINATES**	**Coordinates in LAT & LONG**	**Area-acres**	**Est Bird spp**	**Est Fish spp**	**Disturbance Lvl**
Juhu Airport Lake	Juhu, VilleParle	19.100232N,72.832468E		NE	30	NE	2
Juhu Airport - Smaller Lakes		19.092552N,72.832623E					
AnushaktiNagar Lake	Trombay	19.037647,72.91773	19°2'16″ N, 72°55'3.78″ E	NE	NE	6	2
Small Lake, Patlipada	Trombay Village	19.034336,72.945448		NE			2
Chandivali Lake	Chandivali	19.116756,72.900113	19°7'0″ N, 72°54'0.36″ E	8	5	7	2
Bhavans college	Andheri	19.124526,72.834855	19°7'28″ N, 72°50'5.46″ E	NE	14	8	2
Kharodi Talao	Malad Marve Road	19.195716,72.81322	19°11'45″ N, 72°48'47.58″ E	NE	12	5	2
Bhujavale Talao	goregaon	19.181611,72.837773	19°10'54″ N, 72°50'15.96″ E	NE	NE	NE	NE
3 - 4 small ponds	Madh area		Deteriorated in last 4 yrs	NE		NE	3
Vanala Talao	Madh	19.145857,72.798843	19°8'45″ N, 72°47'55.8″ E	NE	5	NE	NE
Killeshwar Temple Road	Madh Jetty Rd, Madh	19.139751N,72.791961E		NE	NE	3	NE
Khardala/Manori Talao	Manori	19.209546,72.783651	19°12'34″ N, 72°47'1.14″ E	NE	14	5,6	2
Sumalai Talao	Manori	19.221744,72.783448	19°13'18″ N, 72°47'0.36″ E	NE	11	5	2
Khajori Wadi, Gorai church	Gorai	19.240383,72.784692	19°14'25″ N, 72°47'4.86″ E	NE	6	5	2
Untitled	Gorai - Manori Rd	19.231312,72.781833	19°13'53″ N, 72°46'54.54″ E	NE	9	3	2
Panju Island - Pond		19.337107,72.846603	19°20'14″ N, 72°50'47.76″ E	NE	14	5,6	2
Kandharpada Village	Dahisar	19.257208,72.854333	19°15'26″ N, 72°51'15.54″	NE		7,8	2

Database of Freshwater Bodies (Lakes - Ponds - Reservoirs - Natural & Human-made) in Greater Mumbai area of MMR							
LAKE/POND NAME	**LOCALITY**	**COORDINATES**	**Coordinates in LAT & LONG**	**Area-acres**	**Est Bird spp**	**Est Fish spp**	**Disturbance Lvl**
			E				
Eksar Lake	Borivali	19.237821,72.844913	19°14'16" N, 72°50'41.64" E	NE			NE
Gaondevi lake	Borivali, Off LIC Rd/Link R	19.244101,72.838669	19°14'39" N, 72°50'19.2" E	NE		5,6	NE
Bandar Pakhadi Pond	Kandivli, former salt pans	19.210174,72.83206	19°12'37" N, 72°49'55.38" E	NE	NE		DNET
Charkop Talao	Kandivli	19.205382,72.818638	19°12'19" N, 72°49'7.08" E	NE	5	4	2
Charkop Talao - 2	Kandivli	19.210291,72.819507	19°12'37" N, 72°49'10.2" E	NE	14	3	2
Ganesh Visarjan Talao	JVLR, near Majas Depot	19.138256,72.86327	19°8'18" N, 72°51'47.76" E	NE	4	4,5	2
Talzan Charkop	Nr Talzan Hill		19 13 05.60N 72 48 52.34E	NE	36	11	2
SGNP.Dahisar river dam	Borivli East	19.228969,72.869259	19°13'44" N, 72°52'9.3" E	NE		3	2
Lokhandwala Lake*	Andheri West	19 08.638N 072 49.088E		5	50	NE	2
Shantaram Talao	Malad, WEH		Vanished in last 3 years				DNET
Mira Bhayander Marshes/Lakes	16 sites	Most have been lost to development in last 2 - 7 years					
Chenna area, Lake/Quarrying edge	Ghodbunder	19.270982,72.912011		NE	18	4	1,2
Chenna area - Lake/Pond II		19.270106,72.920921		NE	15	NE	1,2
Several lakes in Mill Estates	Entry Denied/Could not be accessed						

Database of Freshwater Bodies (Lakes - Ponds - Reservoirs - Natural & Human-made) in Thane & Raigad areas of MMR

LAKE/POND NAME	LOCALITY	COORDINATES	Coordinates (Lat Long)	Area-acres	Est Bird spp (5-22)	Est Fish spp	Disturbance Lvl
Masunda Lake	Thane West	19.193061N,72.975161E	19°11'35″ N, 72°58'30.54″ E	NE		18	2
Kacharali Lake	Thane, Chandanwadi - Naupada	19.196344N,72.967887E	19°11'47″ N, 72°58'4.38″ E	5		8	2
Makhmali Lake	Thane, Old agra road	19.198563N,72.971326E	19°11'55″ N, 72°58'16.74″ E	2.5		c. 12	2
Ambeghosale lake	Uthalsar, Thane	19.205037N,72.979345E	19°12'18″ N, 72°58'45.6″ E	7		10	2
Railadevi Lake	Nr Wagle Estate	19.189515N,72.957072E	19°11'22″ N, 72°57'25.44″ E	20		12	2
Haryali Lake	Kopri, Thane East	19.185685N,72.977479E	19°11'8″ N, 72°58'38.88″ E	2		9	2
Upwan Lake	Pokhran Road	19.22145N,72.955956E	19°13'17″ N, 72°57'21.42″ E	15		10	2
Gothivali Khadan Talao	Rabale	19.135752N,73.000664E	19°8'9″ N, 73°0'23880″ E	NE		6	NE
Kolshet Lake	Gaovdevi temple	19.238327N,72.992059E	19°14'18″ N, 72°59'31.38″ E	2.5		9	2
Siddheswar Lake	Panch pakhadi	19.201441N,72.968552E	19°12'5″ N, 72°58'6.78″ E	7		9	1,2
Devasar Lake	Majiwada-Manpada			1.2			
Diaghar Lake	Mumbra			< 1			
Jungila Lake	Ambedkar Nagar	19.219819N,72.976835E	19°13'11″ N, 72°58'36.6″ E	NE		8	2
Brahmala Lake	Kolbad	19.202849N,72.975183E	19°12'10″ N, 72°58'30.6″ E	1.3		12	2
Mafatlal Clny Lake 1	Kalwa	19.196294N,73.000621E		NE			2
Mafatlal Clny Lake 2	Kalwa	19.196927N,72.999784E		NE			2
Dawala Lake	Majiwada-Manpada			2.7		7	2

LAKE/POND NAME	LOCALITY	COORDINATES	Coordinates (Lat Long)	Area-acres	Est Bird spp (5-22)	Est Fish spp	Disturbance Lvl
Naar Lake	Owala -Moghatpada	19.276036N,72.96514E		2		8	2
Kawesar Lake	Waghbil, Ghodbunder	19.25187N,72.971814E		5		7	2
Kasarwadwali Lake	Kasarwadwali, Majivada	19.271726N,72.969823E		11		8	2
Datiwali Lake	Diva East	19.187547N,73.04102E		2		7	
Desai Lake	Kalyan Dombivli road			4		5	2
Kausa Lake	Mumbra West	19.165131N,73.02844E		3.7		6	2
Kharegaon	Kalwa	19.202403N,73.003914E	19°12'9″ N, 73°0'140880″ E	1.7		3	2
Phadkepada Lake	Mumbra			4		7	2
Turbhepada Lake	Ghodbunder			1			
Khardipada Lake	Khardigao, Mumbra West	19.160746N,73.032925E		2.7		6	2
Divasava Lake (Station)	Diva			1		4	2
Station Lake	Kalwa East	19.197175N,72.999558E	19°11'50″ N, 72°59'58.38″ E	NE		5	2
Kalwa Lake	Kalwa			5			
Shilfata Lake	Shilgao Mumbra			> 10		5	2
Khidkali Lake	Diva, near Shilphata	19.155668N,73.064693E	19°9'20″ N, 73°3'528900″ E	4		4	2
New ShivajiNagar Lake	Kalwa East	19.192463N,72.994623E	19°11'33″ N, 72°59'40.62″ E	< 1		4	2
Jail Lake	Near Thane jail	19.19983N,72.980289E	19°11'59″ N, 72°58'49.02″ E	3.5		4	2
Tungareswar-Chinchoti	PROBABLY MONSOONS			NE			2
Pelhar lake	Nalla Sopara	19.445419N,72.895006E	19°26'44″ N, 72°53'42″ E	NE		11	2
Gadeshwar lake	New Panvel	19.029665N,73.248146E	19°1'47″ N, 73°14'53.28″ E	NE		16 - 18	2
Charlotte lake	Matheran	18.980233N,73.261267E	18°58'49″ N, 73°15'40.56″ E	NE		3	2
Simpson tank	matheran			NE		2	2
Ghoni lake	Badlapur - MIDC Pipeline Rd	LAKE MUCH VANISHED		NE		NE	1,2

LAKE/POND NAME	LOCALITY	COORDINATES	Coordinates (Lat Long)	Area-acres	Est Bird spp (5-22)	Est Fish spp	Disturbance Lvl
Kakuli lake	Badlapur			NE		5	2
Bhoj Lake	off Neral-Badlapur Rd		19 07 23.97N, 73 14 06.93E	NE		7,8	2
Wavarli pond	Chowk - Karjat Rd	18 54.940N 073 17.650E		NE		5,6	2
Palasdhari lake	Karjat area	18.879346N,73.316574E		NE	24	5,6	2
Large lake off Karjat-Kondavne	Karjat Area (below Rajmachi)	18.884554N, 73.378222E	18 53 03.93N, 73 22 41.83E	> 50	22	6	2,3
Elephant Island Pond	Elephanta	18.961641N,72.932825E	18°57'42″ N, 72°55'58.14″ E	NE		NE	2
Reservoir nr Eden Farms	Off Chowk - Khalapur Rd	18.864382N,73.283229E		NE			2
Reservoir in Pen - Khalapur	Nr Hamrapur-Govirle	18.788292N,73.08481E		NE			2
Varsoli Talao	Alibaug	18.659846N,72.8721E		NE			2
Teenvira Lake	Alibag - Poynad Road	18 41 37.34N, 72 57 20.21E		NE			2
Large Reservoir	Alibaug area	18.696924N,72.950313E		NE			2
Ramdharneshwar Lake	Alibaug area	18 41 41.60N, 72 53 40.42E		NE			2
Bhivpuri Lake	Bhivpuri, off Karjat - Murbad Rd	18.951783N,73.415784E		NE			2
Kadav Lake	Karjat - Kashele - Murbad Rd	18 57 36.95N, 73 22 35.09E		NE			2
Bonkode Lake (coastal)	Koparkhairane - NaviMum	19 05 41.26N, 73 00 19.41E		NE			2
DAKC Lake	Koparkhairane - NaviMum	19 06 35.68N, 73 00 48.12E		NE			2
Nilje Lake	Nr Shilphata	19.166249N,73.080668E	19°9'58″ N, 73°4'504000″ E	NE		4	2

LAKE/POND NAME	LOCALITY	COORDINATES	Coordinates (Lat Long)	Area-acres	Est Bird spp (5-22)	Est Fish spp	Disturbance Lvl
Rewale Talao	Balkumb, Thane	19.218836N,72.983079E	19°13'8″ N, 72°58'59.04″ E	< 2			2
Dighe Talao	Dighe, Thane Belapur Rd	19.176849N,72.996855E	19°10'37″ N, 72°59'48.66″ E	NE		7	2
Mogliche Talav	Dighe	19.175095N,73.011532E	19°10'30″ N, 73°0'415140″ E	NE		4	2
Kausa Talao (Pali)	Pali, Kausa	19.16564N,73.028741E	19°9'56″ N, 73°1'434640″ E	NE		6.7	2
Varladevi Talao	Bhiwandi	19.278355N,73.056657E		NE			2
Dighe Talao	Dighe	19.17756N,72.996485E	19 10 39.19N, 72 59 47.34E	NE			2
Airoli Naka Talav	Airoli Naka	19.166107N,72.997499E	19°9'58″ N, 72°59'50.94″ E	NE		7	2
Kharigaon				NE			2
Bhoiwada Lake	Kalyan	19.238884N,73.121374E		6	10		1,2
Kala Talao	Beturkarpada, Kalyan City	19.244587N,73.130965E		c. 20			2
Ratale - Jail Road	Adharwadi, Kalyan City		Prob monsoon filled	12	10		1,2
Gauripada Lake	Kalyan Rural	19.251536N,73.148754E		5			2
Sapad Lake	Kalyan Rural	19 16 10.57N, 73 06 34.15E		5			2
Adavali Lake.	Kalyan - East. Rural	19.207672N,73.135868E		3			1
Nadivali Lake	Kalyan - East. Rural	19.213082N,73.123498E		3			2
Chaki-Nakka Lake	Kalyan - East Rural	19.223086N,73.126915E	Largely monsoon filled	5	5		1
Bhopar*	Dombivli surroundings		Series of waterbodies, marsh	1	c. 40		2
Balyani	Atali - Ambivali	Monsoon filled		1			NE
Ambivali	Atali - Ambivali	Monsoon filled		2			NE
Vadavli	Atali - Ambivali	Monsoon filled		3			NE
Atali	Atali - Ambivali	Monsoon filled		5			NE

LAKE/POND NAME	LOCALITY	COORDINATES	Coordinates (Lat Long)	Area-acres	Est Bird spp (5-22)	Est Fish spp	Disturbance Lvl
Patil Nagar Lake	Atali - Ambivali	Monsoon filled		1			NE
Manda Lake	Manda- Titwala	Monsoon filled		2			NE
Titwala Ganpati Mandal Lake	Manda- Titwala			6	8		2
Ganeshwadi Lake	Manda- Titwala			1.5			2
Katai Lake	Dombivli Rural			3			1
Usargarh Lake	Dombivli Rural			5			NE
Umroli Lake	Dombivli Rural			1.5			NE
Dawadi Lake	Dombivli Rural			4	4,5		1,2
Sonarpada Lake	Dombivli Rural			4			1,2
Vasar Lake	Dombivli Rural			7			NE
Bhal Lake	Dombivli Rural			5			2
Morbe Reservoir	Karjat - Matheran base			9 sq km	27	c. 12 - 15	2,3
Owe Dam	Navi Mumbai						2
Usgaon Reservoir	Nr Vajreshwari	19.472783N,73.011274E			25		2
Usgaon Reservoir - East	Nr Vajreshwar	19.471407N,73.015738E					2
Adoshi Dam	Khopoli area	18.759595N,73.322818E					2
Khambale pond	NE MMR	19.431968N,73.151409E					2
khandpa lake	Karjat - Kondavne area					12	2
Karav - Big Lake	E limits of MMR - Ulhas River	19.112569N,73.32284E					2

LAKE/POND NAME	LOCALITY	COORDINATES	Coordinates (Lat Long)	Area-acres	Est Bird spp (5-22)	Est Fish spp	Disturbance Lvl
Kudsaware - Ulhas River	E limits of MMR - Ulhas River	19.10304N,73.307862E					2
Ulhas River - Bridge	Kasav - Kusaware Rd	19.10233N,73.308849E					2
Karave Main Lake*	P B Road	19.028996N,73.007455E			54	9	2
Karave Small Pond	Nr Karavegaon	19.020952N,73.012095E					2
Belapur Talao		19.013193N,73.031557E					2
Agroli Talao		19.02149N,73.037345E					2
DPS Lake*	P B Road	19.004773N,73.018484E			38		2
Khargarh Valley Reservoir	Owe Dam	19.077318N,73.057194E					2
Yeoor Lake	Thane	19.223469N,72.949613E					2
T S Chanakya Marsh*	P B Road	19.014075N,73.006725E			43		2
Khandeshwar Lake - Panvel		19 00 39.06N 73 06 28.89E					2
Ballaleshwar Lake*	Panvel Lake	18.994076N,73.112791E			62		2
Nirmal Vighleshwar Lake*	NallaSopara	19 24.007N 072 46.811E			40		2

GPS Coordinates - II - Some Key sites visited during Project fieldwork

Site -(Trail, Wetland, Other Habitat)	Coordinates
Aarey - NewZealand Hostel area	19 03.386N 072 50.222E
Achole Talao - Vasai	19 24 33.21N 72 49 44.17E
Agashi Rd - Pond -- Virar area	19 27.780N 072 46.565E
AIR grounds- 1 - off Malad Marve Rd	19.18994N,72.810355E
Airoli Bridge - Western side	19.151128N,72.97868E
Airoli East - mangrove s - C Babbler	19.148812N,72.984286E
Akkarbhat Lake	19 25 41.41N 72 47 21.94E
Along Apta - Rasayni Rd	18 53.514N 073 09.670E
Apta Village, behing KBS	18 51.149N 073 07.637E
Arnala Seacoast - Virar - N MMRDA	19 27.149N 072 44.854E
Ballaleshwar Lake - Panvel area …	18.993878N,73.111954E
Nirmal-Vighaleshwar Lake - NallaSopara	19 23.974N 072 46.832E
Banyan Tree - Vihar Trail - SGNP	19 09.703N 072 54.144E
Belapur - Parsik Hills Top - 60 msl	19 01.142N 073 01.945E
Bhandup Pumping Stn (BPS) - Pt 1 Nr lagoon	19.14646N,72.964582E
Chalpeth area - Virar - good village birding	19 27.224N 072 46.579E
Chirner - along route - village	18 52.433N 073 02.928E
Chirner Area -I	18 51.473N 073 03.254E
Chirner Area - II	18 51.275N 073 03.233E
Chirner Area - III	18 50.969N 073 03.224E
Chirner Area - IV	18 50.861N 073 03.406E
Creek channel on Sion-Panvel Rd, b4 Kalamboli	19 02.175N 073 04.792E
Creek nr Rly Crossing >> Dastan Naka	18 55.591N 073 01.655E
Creek nr Vahal, west of NewAirport site	18 58.718N 073 02.242E
Creek west of Vahal, Sector 9	18 58.483N 073 01.261E
DastanNaka -marshes - nr Jasai, off Uran Rd	18 55.652N 073 01.014E
Elephanta - nr Mora Bandargaon, N end	18 58 01.55N, 72 56 28.17E
Esselworld Jetty	19.225806N,72.807738E
Expressway Start - Nr McDonalds	19 01.214N 073 06.205E
Fanaswadi-Khargar Hills - 225 msl	19 03.210N 073 02.797E
Fish yard, off Marve rd, b4 Dhariwali Tekdi	19.165499N,72.801182E
Gass Area - North end of Road, nr Nala Sopara end	19 23.592N 072 47.435E
Goari Jetty -	19.236382N,72.818831E
Gokhivare Talao - Vasai	19.401359N,72.84303E
Grassy - nr E end of JVLR	19 07.492N 072 55.907E
IIT, off Powai Lake - Nr Boat Club	19.1311N,72.911432E
In NewAirporte area - Brown Crake seen here	19 00.094N 073 03.644E
Jambulpada - B/w Waval and Veshvi-Chirner	18 56.038N 073 02.504E
Jumapatti, on Neral - Matheran route	19 00.254N 073 17.943E

GPS Coordinates - II - Some Key sites visited during Project fieldwork	
Site -(Trail, Wetland, Other Habitat)	**Coordinates**
Karave Pond - Palm Beach Road	19 01.752N 073 00.458E
Karnala Bird Sanctuary	18 53.598N 073 06.762E
Karnala Bird Sanctuary - Fort	18.882178N,73.119249E
Khandeshwar Lake - Panvel	19 00 39.06N 73 06 28.89E
Khargar E - Taloja Rd - Nr Golf Course	19 03.563N 073 03.850E
Khargar Hills - Plateau end - side road	19 02.387N 073 03.159E
Khargar Hills - Pt 1A	19 01.897N 073 03.038E
Khargar Hills - Pt 1B	19 02.674N 073 03.003E
Khargar Hills - Pt 4B - 325 msl	19.088461N,73.049169E
Khargar Hills - Pt 5B - c. 370 msl	19.091077N,73.048203E
Kharpada Jn, of Chirner and Karnala Main Highway	18 50.493N 073 05.546E
Koli Kopar - NewAirport site	18 59.408N 073 05.015E
Kopar - en route Nhava from JNPT Rd	18 57.724N 073 00.793E
Lokhandwala Lake - Andheri West	19 08.638N 072 49.088E
Malad Creek - nr Dhariwali Tekdi	19.162448N,72.808628E
Malad Creek - w side nr Dhariwali	19.155547N,72.806954E
Uran Road, marshes after Police Stn, before Funde	18 54.142N 072 58.320E
Arnala Road - Virar-Nalla - Marshes - I	19 26.731N 072 47.415E
Arnala - Virar area - Marshes - II	19 26.903N 072 47.211E
Morbe Reservoir, en-route Karjat	18.913432N,73.267908E
Naigaon-Vasai Link Rd, nr Tivri crematorium	19 22.147N 072 51.556E
NallaSopara Talao (Nalla Talao)	19 25.578N 072 46.935E
Neral - Karjat Jn - on Chowk - Karjat Rd	18 55.111N 073 19.166E
New Airport site - Chinwali	18 59.081N 073 05.254E
NewAiport area - Baobab near Pargaon	18 59.021N 073 04.466E
NewAirport 1 - Nr Ulwa - Dapoli-Targarh Rd	18 59.832N 073 02.886E
NewAirport 1 - Vaghiwali End - Nr Temple	19 00.493N 073 03.541E
NewAirport 3 - Kopar-Pargaon-Vaghiwali Rd Mangroves	18 59.671N 073 04.313E
New Airport site - Vaghivali village	19.00819N 73.05906E
New Airport site - Corner of creek	18.99454N 73.0718E
Nhava - near end of creek	18 57.723N 072 58.095E
Nhava - Gavan Phata, nr Jn of Uran Rd	18 57.719N 073 02.169E
Nirmal Vighleshwar Lake - NallaSopara	19 24.007N 072 46.811E
NallaSopara - Virar Jn - Nr Chakreshwar Talao	19 25.032N 072 48.065E
Dighode - along Chirner Road	18 54.060N 073 02.753E
Apta area - Nearr HCC, off Patalganga Rd,	18 50.926N 073 06.335E
Nr Jasai, on Uran Rd - SH54 -	18 56.096N 073 01.100E
Nr Jivdani - PirKunda - Virar	19 28.061N 072 52.448E
Nr Palaspa Phata - off Panvel - JNPT Rd	18 58.057N 073 07.863E

GPS Coordinates - II - Some Key sites visited during Project fieldwork

Site -(Trail, Wetland, Other Habitat)	Coordinates
Nr Vindhne - Chirner Rd	18 53.885N 073 02.800E
NRI Back Marshes - Palm Beach Road	19 00.497N 073 00.686E
Off NhavaKhadi Road	18.967064N,72.986834E
Dastan Naka - Veshvi - Chirner - On way	18 55.595N 073 01.392E
OWE Dam Reservoir - East of Khargarh Hlls	19.075817N,73.057387E
Panje - Uran area end, off Dongri Rd	18 54.354N 072 57.088E
Panvel Creek Bridge	19 00.164N 073 01.930
Papdi Talao - Vasai Virar area	19 21.319N 072 48.728E
Parsik Hills - 1	19.205544N,73.016102E
Parsik Hills - 2	19.202697N,73.016027E
Parsik Hills - 3	19.201N,73.015233E
Plot OPP Inorbit, LinkRd Malad	19 10.370N 072 50.182E
Polluted channels, pond in Taloje area	19 04.059N 073 05.062E
Polluted Crk - B/w Pali Chowk-Navda Gaon, Taloja area	19 02.769N 073 06.189E
Pond - NallaSopara area - VG	19 23.679N 072 47.136E
Pond along Chandansar Rd - Virar area	19 28.234N 072 50.327E
Ransai Dam - East	18.893959N,73.073947E
Ransai Dam - west	18.899922N,73.067526E
Retibunder - N - Nr to SatPool, Dombivli	19.235825N,73.073663E
Retibunder - S - Dombivli length along Ulhas River	19.228156N,73.067815E
Rly Crossing - from Dastan Naka - Veshvi - JNPT Rd	18 55.556N 073 01.440E
Satpala Lake - NallaSopara area	19 26.015N 072 46.747E
Satpool - S - Dombivli, along Ulhas River	19.235825N,73.073663E
Satpool area - along river, > Dombivli	19.239198N,73.08732E
Satpool -N	19.240961N,73.073459E
SGNP - Bamboo Hut Trail - St	19 12.651N 072 53.887E
SGNP - Culvert 56-Tulsi Rd	19 12.028N 072 54.251E
SGNP - Lake near NIC	19.228883N,72.869664E
SGNP - Shilonda Trail Mid	19 13.600N 072 53.247E
SGNP - Trail 3 - Start	19 10.326N 072 54.662E
SGNP - Trail 4 - Start	19 11.153N 072 54.724E
SGNP - Trail 5 - Start	19 11.915N 072 54.429E
SGNP - Tulsi Barrier	19 12.564N 072 53.952E
SGNP-Tr 2 Start - North	19 09.994N 072 54.101E
Vihar Lake - Dam, nr IIT side	19.139634N,72.908889E
Shirgaon Lake - Kumbharpada - Virar area	19.473147N,72.864354E
Taloja - Point Count - Unplanned	19 04.193N 073 05.208E
Thakurwadi, nr Lonivliwadi, from Shedung	18 58.414N 073 11.234E
Tivri Pond - Naigon-Vasai Link Road	19 22.769N 072 51.382E

GPS Coordinates - II - Some Key sites visited during Project fieldwork	
Site -(Trail, Wetland, Other Habitat)	**Coordinates**
Tulsi Lake - Dam edge	19 11.581N 072 54.711E
TWLS - Nr Top	19 26 41.76N, 72 55 21.00E
Umrale Lake, Nalla Sopara	19 25 26.44N 72 48 00.68E
US Club lawns, Colaba	18 54 00.34N, 72 48 39.53E
Usaran Talao, Rasayni -	18.907149N,73.148105E
Uttan area - Gorai	19.307903N,72.791119E
Vasai - Marshes nr Vasant Ngr	19 23.866N 072 50.146E
Vasai Fort - Jetty environs	19 19.767N 072 49.168E
Vashi Creekside, off Sector 10A	19.083797N,72.992456E
Vihar Lake Margin - W	19 09.552N 072 54.212E
Wavarli pond, on Chowk - Karjat Rd	18 54.940N 073 17.650E
Yeur Hills, in sgnp	19 13 43.68N, 72 56 22.51E
Kankeshwar, Near Top 376 msl - Alibaug area	18°44'31.01"N, 72°55'27.89"E
Khanivali	19.409976N,73.220186E
Gerase	19.387834N,73.27044E
Vehele	19.374393N,73.282371E
Palsoli	19.363138N,73.277864E
Ushid	19.337588N,73.280525E
Dahiwali	19.308511N,73.28649E
Momnoli	19.273757N,73.293314E
Chandap - Pimloli	19.181165N,73.331466E
Yeve - area	19.165924N,73.337002E
Karav - Big Lake	19.112569N,73.32284E
Kudsaware - Ulhas River	19.10304N,73.307862E
Ulhas River - Bridge	19.10233N,73.308849E
Small river meets Tansa	19.49554N,73.118353E
Tansa River	19.490974N,73.027309E

Some Key sites for Baobab tree in Greater Mumbai

Location	Coordinates
Mumbai Port Trust Garden	18° 54’ 37.45” N, 72° 49” 26.41” E
Jijamata Udyan	18° 58’ 42.81” N, 72° 50” 15.22” E
Jijamata Udyan	18° 58' 42.92" N, 72° 50' 6.61" E
Bhabha Hospital Bandra	19° 03’ 25.29” N, 72° 50” 02.66” E
Santacruz West	19° 04’ 52.90” N, 72° 50” 16.11” E
Ville Parle West	19° 06’ 02.85” N, 72° 50” 22.45” E
Juhu	16° 06’ 27.27” N, 72° 49” 33.49” E
Seepz	19° 07’ 36.39” N 72° 52” 46.36” E
Aarey Colony	18° 08’ 54.56” N, 72° 52” 54.31” E
Hiranandani, Thane West	19° 13’ 44.16” N, 72° 58” 28.58” E
Vasai Fort	19° 19’ 45.17” N, 72° 49” 07.55” E
Vasai Fort	19° 19’ 56.68” N, 72° 48” 54.77” E
Mulund East	19° 10' 17.22" N, 72° 57' 28.08" E
Mulund West, LBS Road	19° 10' 58.80" N, 72° 56' 53.58" E
Thane West, Talaopali	19° 11' 39.54" N, 72° 58' 25.44" E
Navy Nagar Area, Colaba	18 54 14.75N 72 48 55.81E
TIFR Colaba	18 54 26.26N 72 48 21.74E
Dhobi Talao, Nr St Xavier’s School	18 56 40.64N 72 49 49.10E
Mumbai University Campus, Fort	18.929404N,72.830434E
Manori	19.20867N,72.784215E

Areas in MMR deserving of protection measures from MMRDA:

The following are some of the sites in the MMR that require a concerted effort for conservation action.

Along Ulhas River:

A vast area between Coordinates:

19.198269N,73.023591E -- 19.187164N,73.025522E -- 19.235825N,73.073663E

East from Mumbra Flyover (East of RamNagar – Santosh Nagar) along Diva – Dombivli length of Ulhas River, up to Satpool is deserving of protection.
This involves an approximately 8.5 km length of the river, with an average surface area between River's southern edge and Rail route of 350 mt, reaching a max of c. 1 km and a min of c. 150 mt respectively.
Site contains a mix of mangrove, creek inlets, grass and scrub, with some degree of disturbance towards the NE fringes of this area, towards Reti Bunder.

Reasons for Protection: Only significant length left along the Ulhas River between Thane and Kalyan that has any remnant patches of secondary growth (the hugely vanishing grass-scrub habitat), marshy areas and freshwater bodies. Also, there is rich birdlife, with nearly 60 species reported, amid other biodiversity.
Disturbance: Encroachment, pollution, sand-dredging (towards eastern length)

Creeks of the region:

While CRZ applications ensure a level of protection to the mangrove creeks, much of this seems belated in the context of the MMR that boasts of the largest extent of mangrove creek vegetation amongst any large city. There is potential for bringing in significant stretches of creek lengths under more effective protection, perhaps as a Biosphere Reserve or a Sanctuary.

Thane Creek:

A) Bhandup Pumping Station Area: *See Map*

B) An approximately 4 km length of eastern side of Thane Creek, from Coordinates 19.047342N,73.00561E – 19.009764N,73.005438E. This is suggested because it not only includes variable quality of mangrove growth along the creek, but also patches of disturbed landscape (grass, secondary growth and open barren), along with the sprawling marsh near T S Chanakya. This ensures a good range of biodiversity of marsh and grass and scrub habitats. This is one of very few sites left in MMR affording an opportunity to protect such variables of habitats. (*Map attached*)

Malad Creek: Length from Reliance Sub-Stn/Yari Road – Millat Nagar north end

Lokhandwala Lake

Manori Creek

Talzan Hill

Nirmal – Vighleshwar Lake

Karave main Lake – P B Road

Bassein Fort Environs

Kaman/Mandvi Range

Prabalgad – The plateau and slopes contain perhaps the finest forest in the MMR

Upgradation of Protected status to the Matheran region.

The plateau forests of Matheran

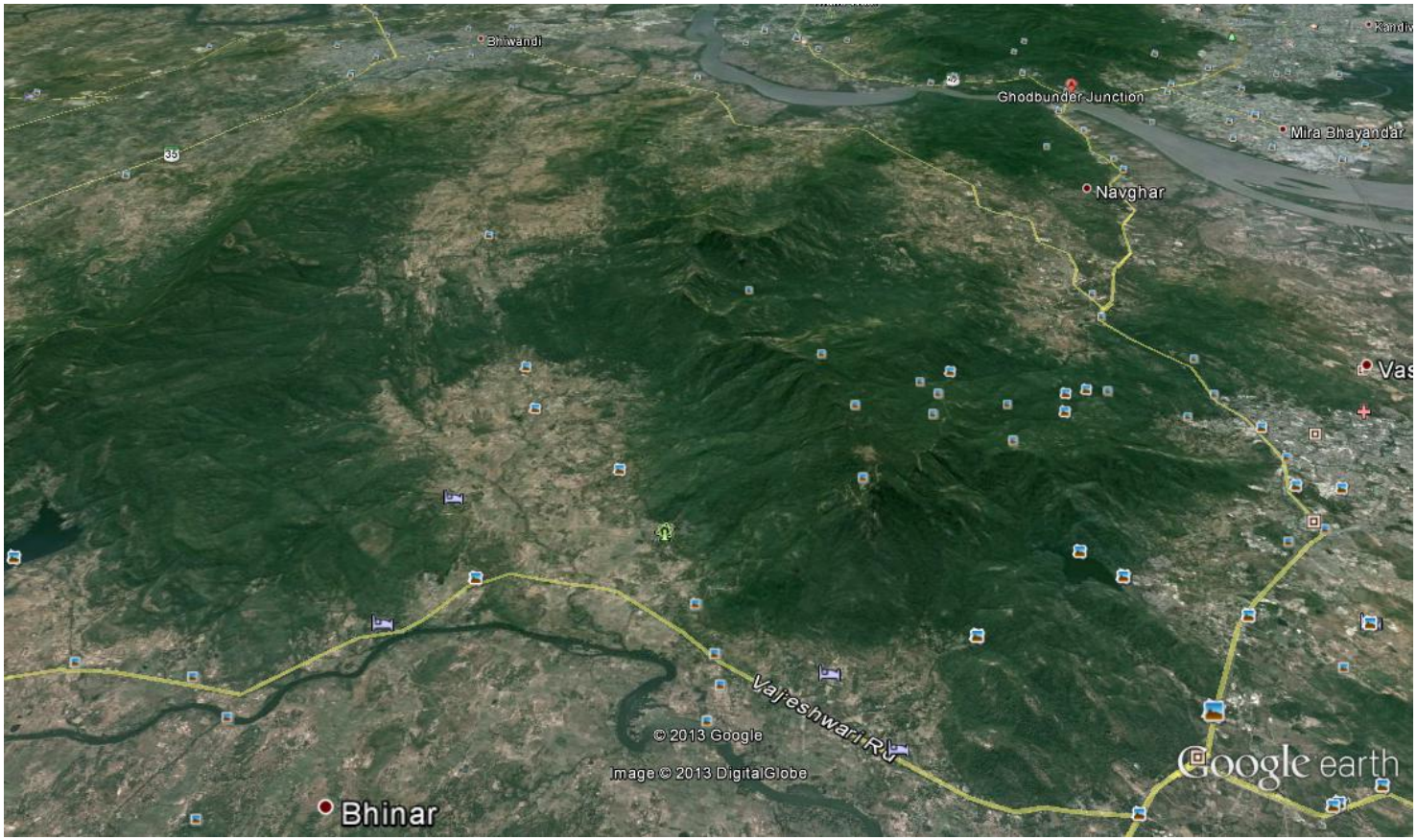
The ridges of Matheran Range – 250 mt and above – these could be brought under a Protected Area Network for they constitute a most unique habitat in the entire MMR

Kankeshwar Hill – Alibaug North – the richest biodiversity spot in the southern fringes of MMR; a near-isolated masiff that is also a critical passage and wintering area for a very large number of raptors (birds of prey).

Pockets of wetlands still surviving along the Uran Road

Pockets of Grass-Scrub along the E – NE limits of MMR (however, these need to be specifically identified in the wake of considerable disturbance and pressure on this habitat)

The following pages contain some of the Google Earth images of some key sites in MMR. It also includes some of the sites suggested for possible conservation action by the various agencies involved; such sites are high-lighted in some of the following map images.

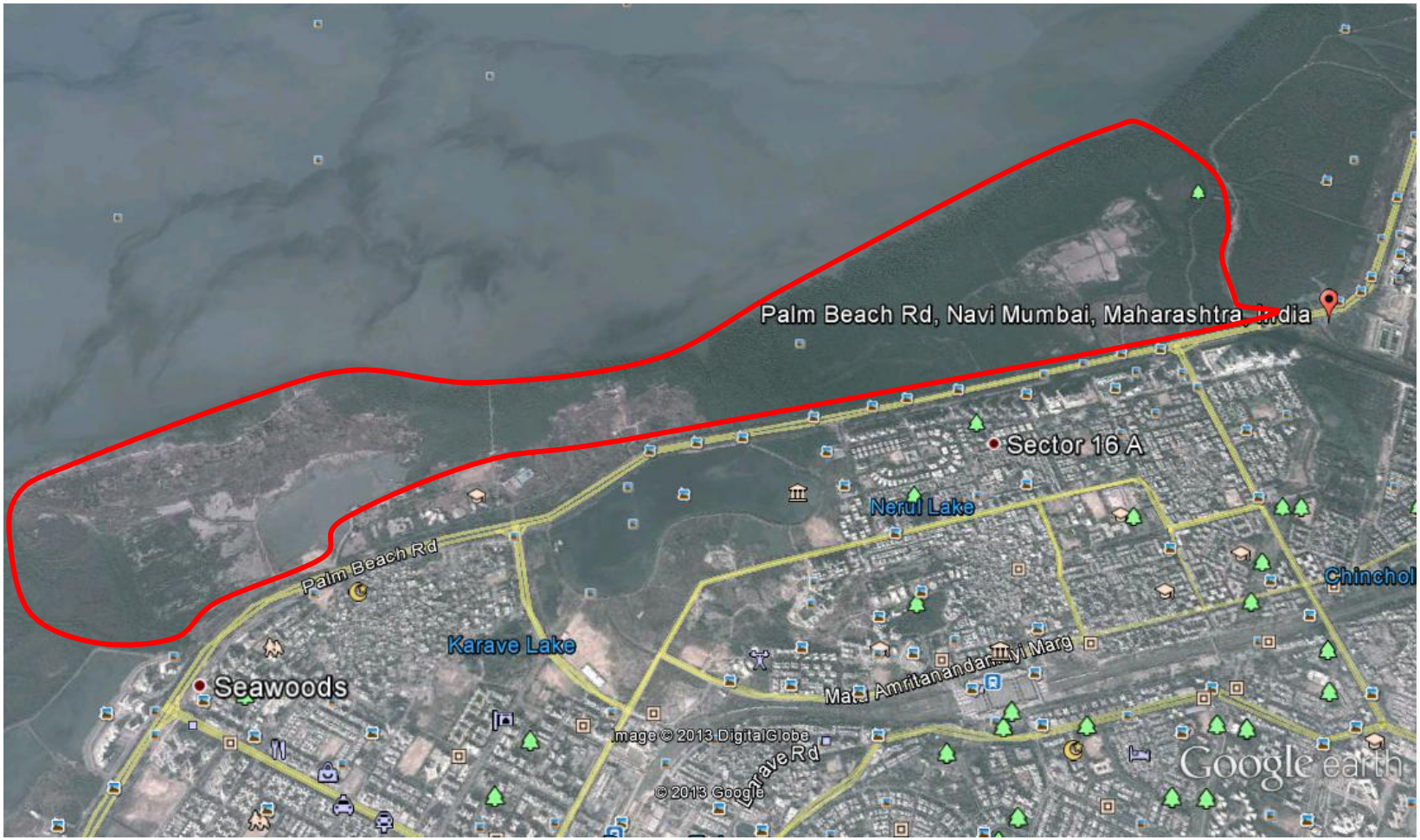


View looking south from Tansa River (foreground), with Mandvi/Kaman Range to left and TWLS to right. The Ulhas River/Bassein Creek can be seen to the top right and centre of the image

View looking south along an approx. 24 km length of Ulhas River, from its mouth along Bassein Creek, with Panju Island visible in foreground. The intense developmental pressure along the river's length is visible throughout the length of the river here, except along a 2.5 km length when the river/creek bifurcates the SGNP into two unequal halves; the smaller Nagla Block can be seen towards the left bottom of the image above.

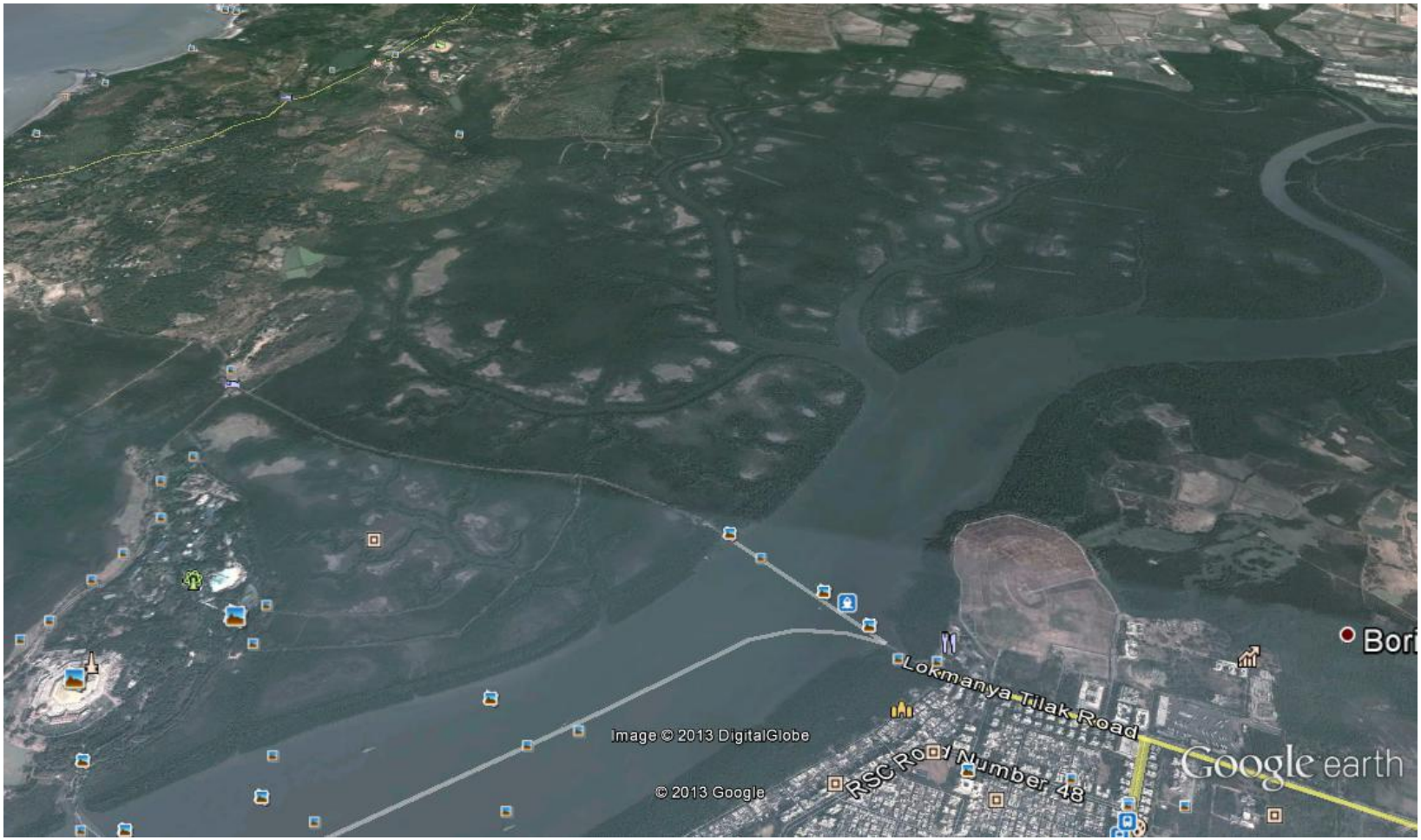
Looking North. A panoramic view of the central and northern parts of SGNP with the densely populated sprawl of Mumbai's western suburbs (left) and urban Thane (right) skirting the Protected Area. Tulsi Lake can be seen towards the bottom centre of the image. The Ulhas River/Bassein Creek is visible along the E – W length of the above image.

In Greater Mumbai, the area around **Bhandup Pumping Station** (within yellow marking) on the western margins of Thane Creek, just south of Airoli Bridge (to bottom of this image) is today amongst the most bird-rich sites in the MMR. This site requires effective conservation action.

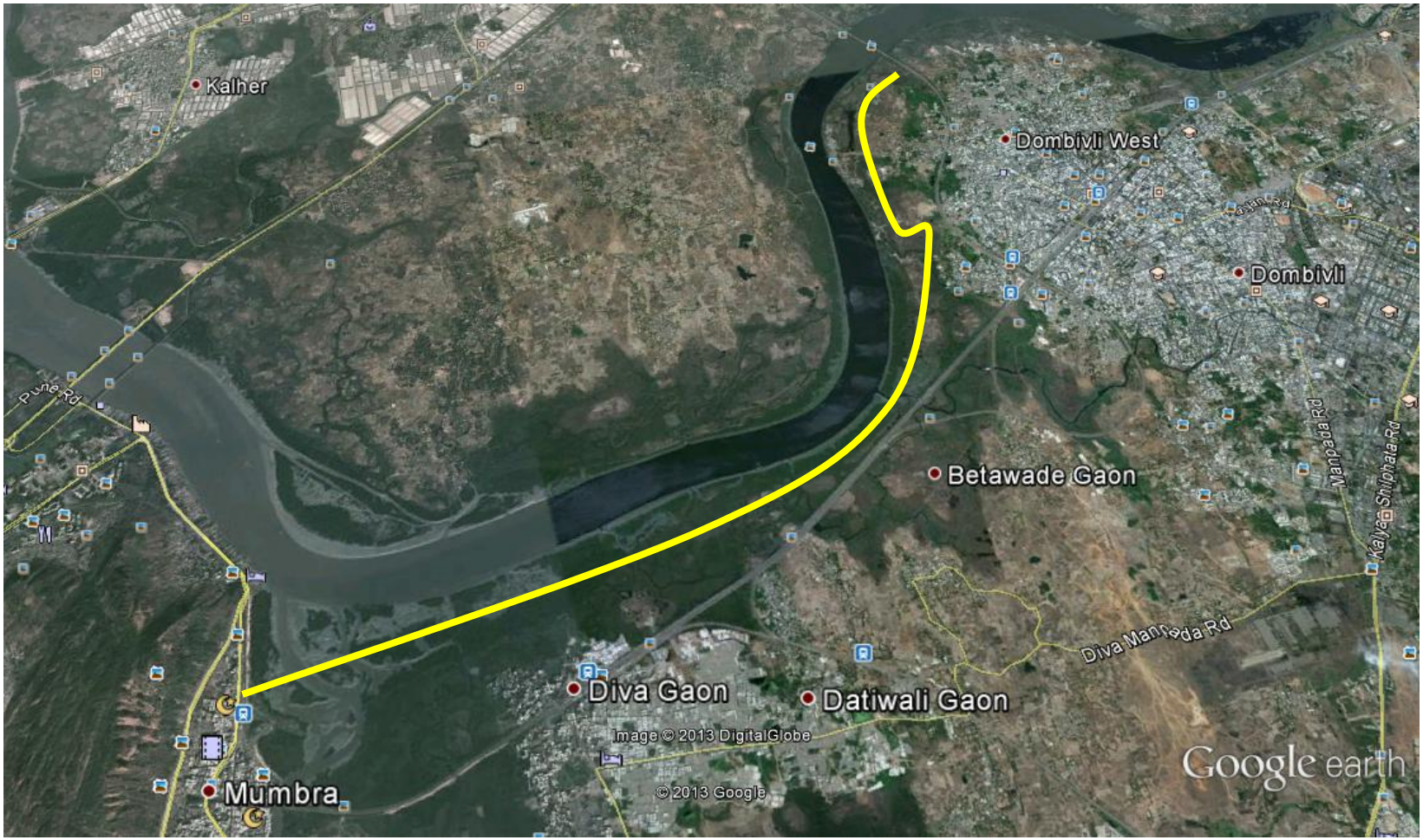


Map area showing the suggested stretch along Palm Beach Road that must be safeguarded with effective conservation action. This is a very bird rich stretch, and several mammals too are regularly reported.

Site along Malad Creek, between Millat Nagar and Lokhandwala Lake (Andheri West) offers the only opportunity for conserving a fine stretch along the otherwise much polluted and disturbed Malad Creek. Barren area along right bottom of image is a nearly 500 acre mangrove site that was filled up during late-1990's – early 2000's for a development project.

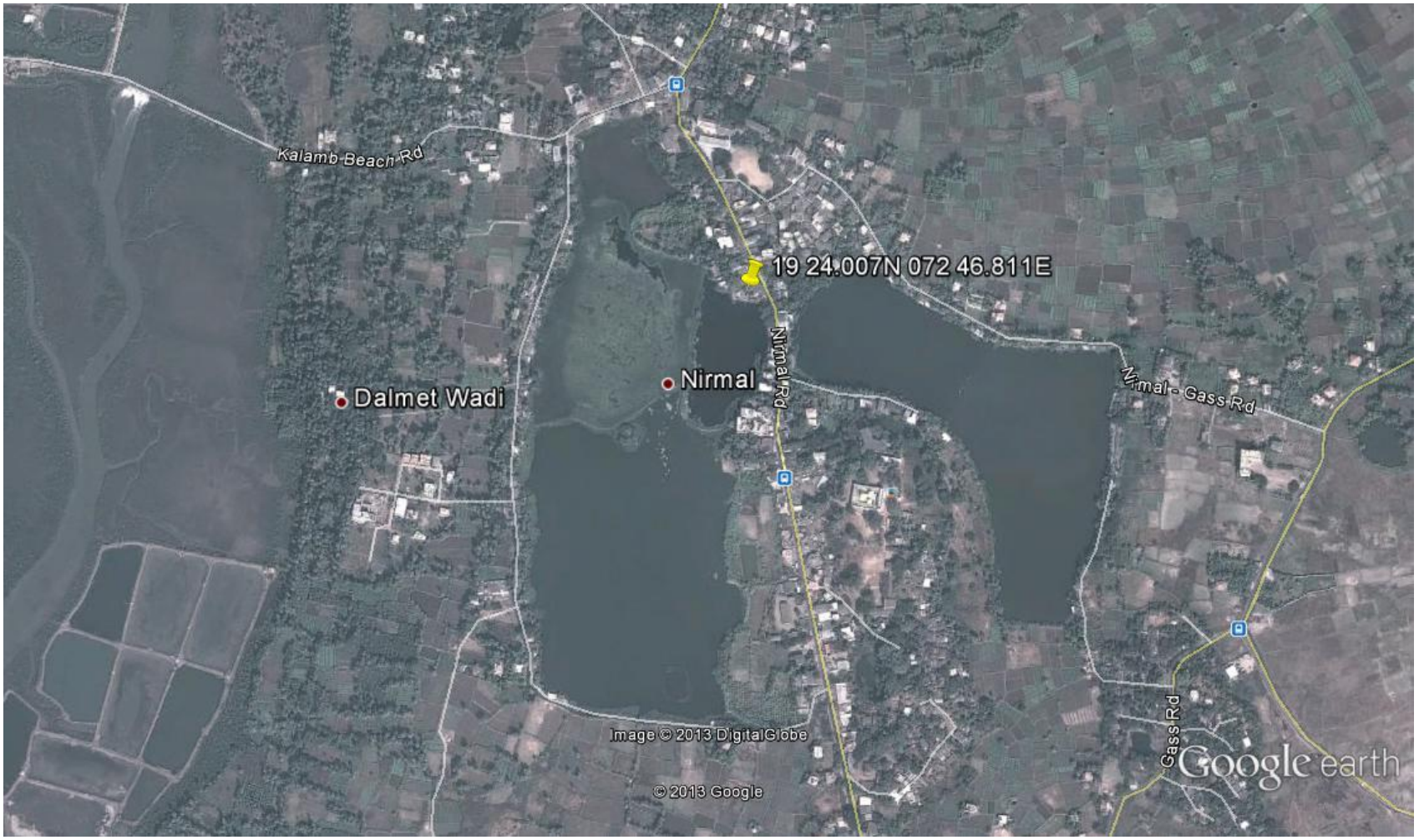


A length of the Manori Creek's western side, from just north of the jetty offers the best hope for safeguarding any habitat along this creek that has witnessed considerable developmental expansion along its entire length in recent years.



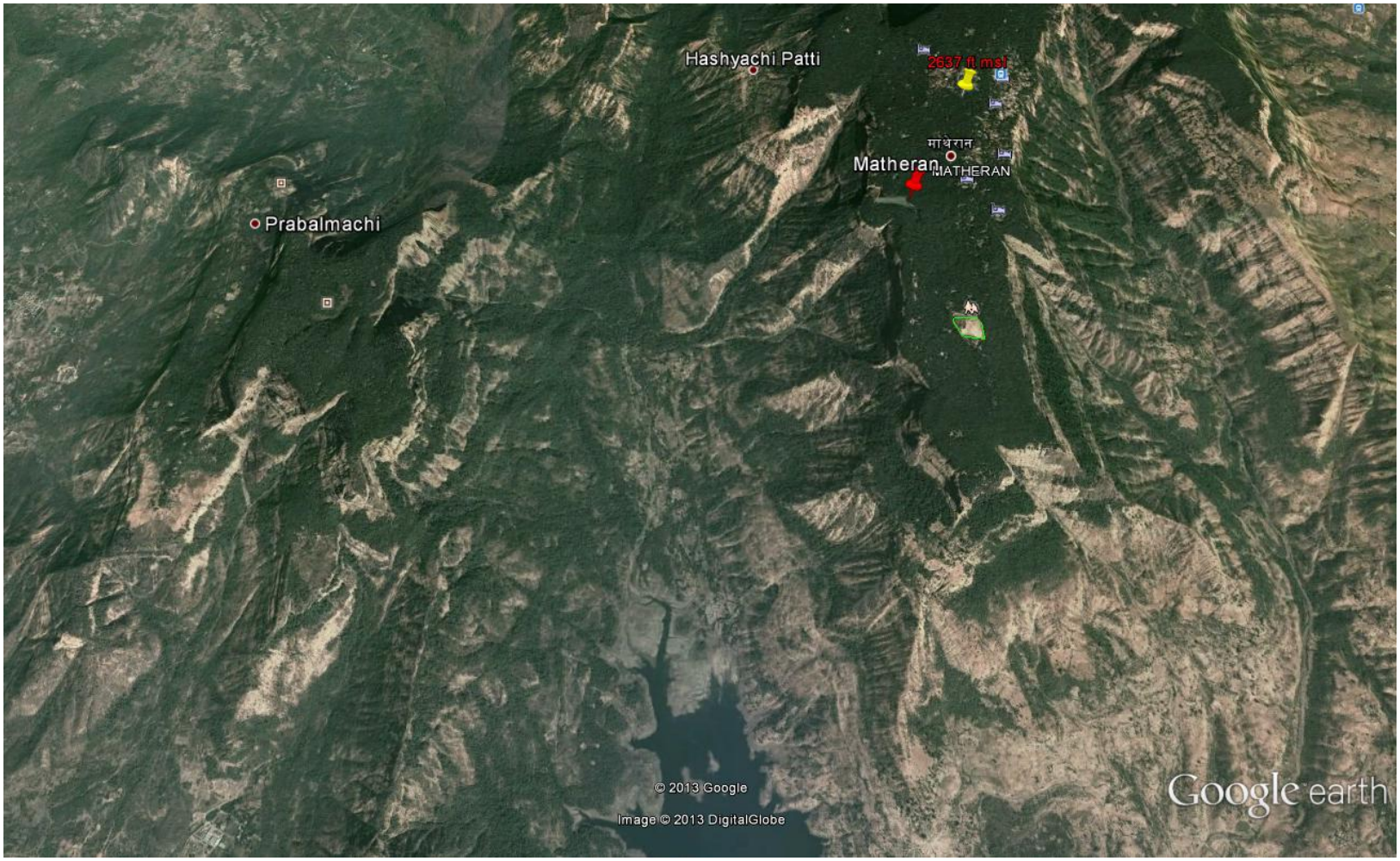
Map section showing the stretch (along yellow highlight) on the southern side of Ulhas River between Mumbra and Satpool(Dombivli) that deserves protection.

Panoramic view of Matheran Range, from Morbe Reservoir to right up to TAvli & Haji Malang in left, near Badlapur. The middle and higher reaches of this entire mountain range is a unique habitat in the MMR.



Nirmal (Vighaleshwar) Lake is a large waterbody in the northern fringes of MMR and requires effective conservation action

On the eastern side of Manori Creek, the **Talzan Hillock** was until recently a biodiversity hotspot in the MMR. Development has now reached the creek-edge and cause much disturbance and pollution all along. Even then, the isolated patch with the adjoining creek-margins offers scope for effective conservation action in this densely population sprawl of the NW suburbs of Greater Mumbai.



Prabalgadh (Prabalmachi) is a huge mountain rangeto the east and SE of the Matheran massiff. Today, the finest forest in MMR probably exists in the Prabalgadh area and must be declared a Protected Area, either together with or separate from the Matheran Range.

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