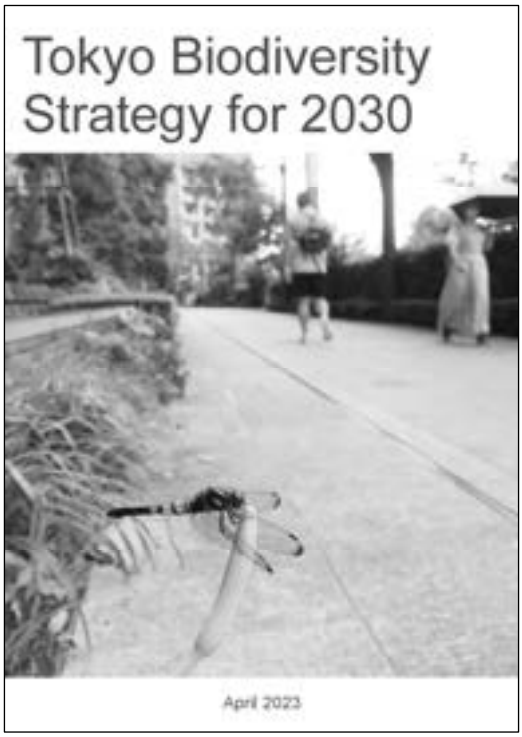
Tokyo Biodiversity Strategy for 2030

April 2023

＜About the Cover＞



Orthetrum melania (Selys, 1883) (female) resting on greening plant planted along the street (Chiyoda Ward, Tokyo)

As of May of 2021, the Tokyo Metropolis Prefecture recorded 108 species of dragonflies, which is the second most next to 120 species of Kagoshima Prefecture. Thus, a dragonfly features on the cover, being symbolized as the fact that it is clearly found that Tokyo has an extremely high level of species diversity despites its narrow and small area.

Although Orthetrum melania is not contained in “Red List of Threatened Species (Tokyo Red List)”, there is only a few wards where it thrives.

Into this cover, we have incorporated our thoughts that we aim at conserving and restoring the environment where diverse creatures can be closely observed throughout Tokyo including its central area and creating an affluent society in harmony with nature, together with the people of Tokyo.

Realization of an Environmentally Symbiotic, Prosperous Society that Continues to Benefit from Biodiversity

Biodiversity forms an important foundation which is essential for human life including food, water, wood and even regional culture.

Human activity has accelerated the global rate of wildlife extinction to an unprecedented speed. If this situation continues, we will eventually reach a crisis point where we will not be able to enjoy the bounty of biodiversity. While the loss of biodiversity has been posing major threats to humanity concurrently with further worsening climate crisis, a new global goal, called the “Kunming-Montreal Global Biodiversity Framework”, was adopted at the 15th Meeting of the Conference of the Parties (COP15) to the Convention on Biological Diversity in December 2022.

Despite being a metropolis with 14 million residents, Tokyo is a city unparalleled anywhere around the world that has actually diverse and abundant nature, ranging from the mountainous area of Okutama and the hilly area of Satoyama, to the greenery and waterfronts of the urban area, to the pristine nature of the islands.

However, during the high-growth period, deforestation due to urban development, a decrease in agricultural land including paddy fields and farmlands, and a decrease in tidal flats and shallow places have had a great impact on the biodiversity of Tokyo. Additionally, the alien species that were introduced by humans have been threatening inhabitation/growth of native creatures.

We must be mindful not only of biodiversity conservation within Tokyo, but of global biodiversity conservation. Our daily lives and corporate activities also have effect on global biodiversity through consumption and procurement.

In 2012, the Tokyo Metropolitan Government established the "TOKYO GREEN PLAN 2012 -City Biodiversity Strategy-", the first regional strategy based on the Basic Act on Biodiversity and has developed policies with the goals of ensuring both quality and quantity of greenery, creating new greenery, and raising public awareness through its use.

The newly revised “Tokyo Biodiversity Strategy for 2030” depicts our vision for Tokyo in 2050. Toward that, we have set realization of nature positive as the goal to be achieved in 2030, which means to put biodiversity on a path to recovery. Taking into consideration problems in Tokyo such as degradation of natural area and invasive alien species, and the impact Tokyo as a metropolis has on global diversity, we have established three basic strategies, “Conservation and Recovery of Biodiversity”, “Sustainable Use of Biodiversity” and “Understanding and Behavior Change regarding Biodiversity”, and action policies to achieve these strategies.

Based on this strategy and in cooperation with all entities including Tokyo’s citizens and businesses, private organizations such as NPOs and NGOs, and any entities including educational and research institutes, we will create a prosperous city that can continue to enjoy biodiversity’s bounty in the future.

April 2023

Koike Yuriko

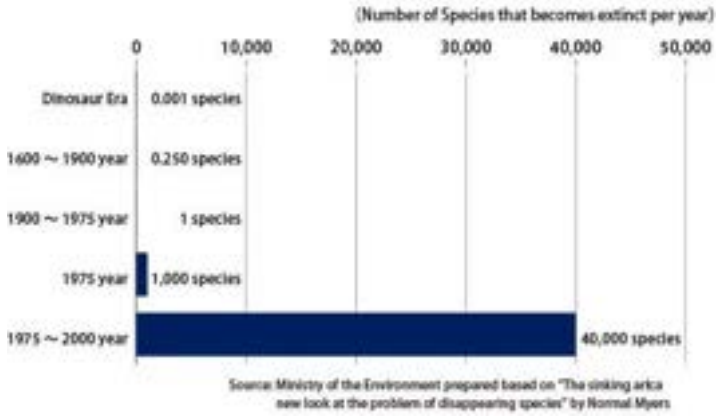
Governor of Tokyo

Contents

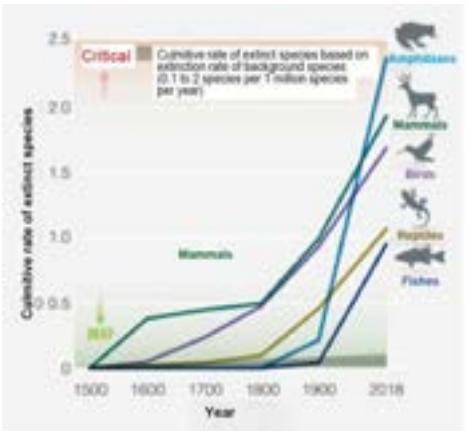
Chapter 1.
What Biodiversity is

1 Rapid Loss of Biodiversity on the Earth

It is said that the present age is “The sixth mass extinction period” when the species have been becoming extinct at the fastest speed ever since the appearance of life on the Earth, mainly because human activities have had impacts on them. In fact, as an impact from human activities is a major driver, the speed of species’ extinction on the earth has greatly deviated the conditions of the nature. Consequently, numerous creatures have been facing crisis.

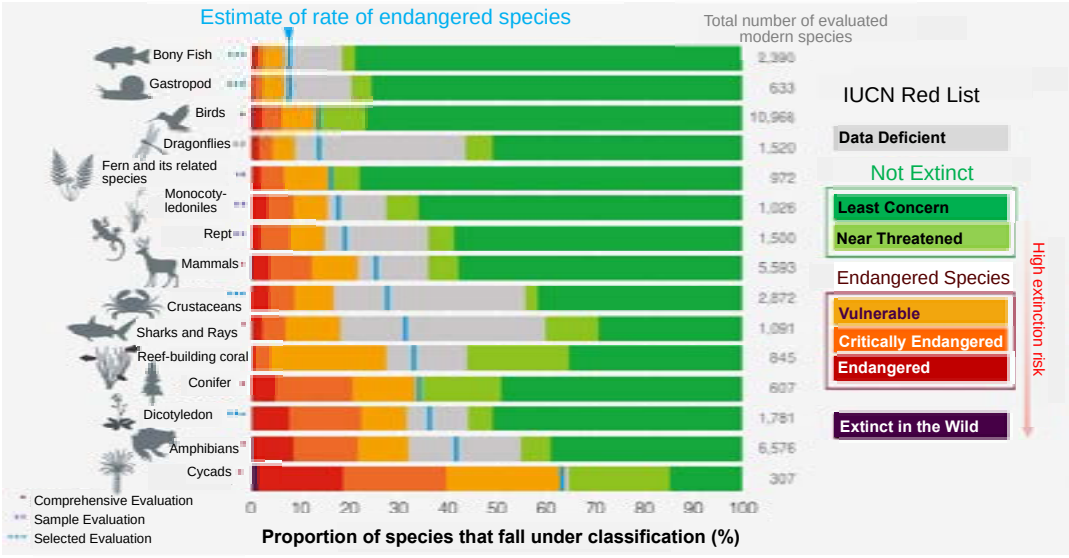


Extinction Speed of Species[1]



Extinction Rate after 1500[2]

Additionally, at present, among the species-group of investigated animals and plants, it is said that approximately 25% of species on average has already in extinction crisis.



Current Status of Global Extinction Risk of Different Species-Group[2]

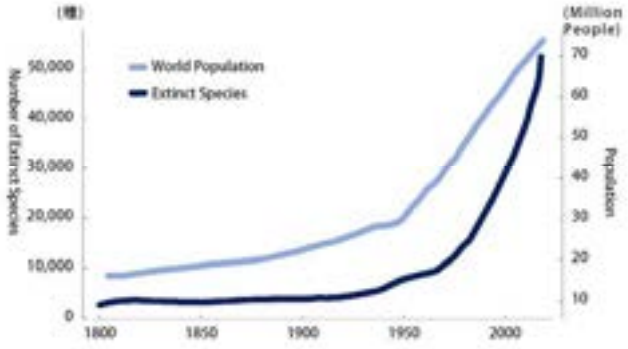
As not only extinction of species but also degradation of ecosystem as the source to produce biological resources has been rapidly deteriorating, it is necessary to minimize the impacts on global ecosystem from human activities.

However, even with science and technology, as there are many unknowns in the nature for human beings to understand, it has been impossible for them to curb the extinction of species and

1 2010 version: the Tokyo Metropolitan Government prepared based on Annual Report on the Environment, (Abridged and Illustrated for Easy Understanding), Sound Material-Cycle Society and Biodiversity in Japan (June of 2012, Ministry of the Environment)
2 Global Evaluation Report on Biodiversity and Ecosystem Service by IPBE, which is summarized for policymakers (March 2020, Ministry of the Environment)

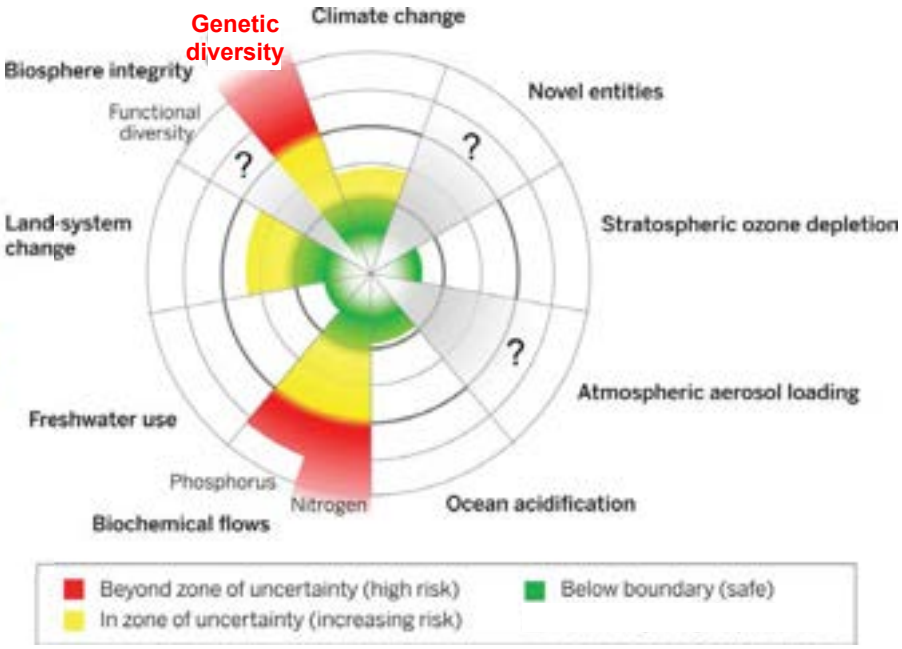
deterioration of ecosystem. In addition, while the world's population was 3.7 billion in 1970, it became more than doubled as 8 billion in 2022 only in 50 years, which has caused further more severe deterioration of global ecosystem.

According to Population Projections by UN, it is predicted that the world's population will reach 9.7 billion in 2050. Thus, if we continue our social system and life style, it is likely that we will fall into an unsustainable state on a global state and consequently we will not be able to benefit from biodiversity that supports our life in the future.



Increase in World's Population and Extinction Risk[3]

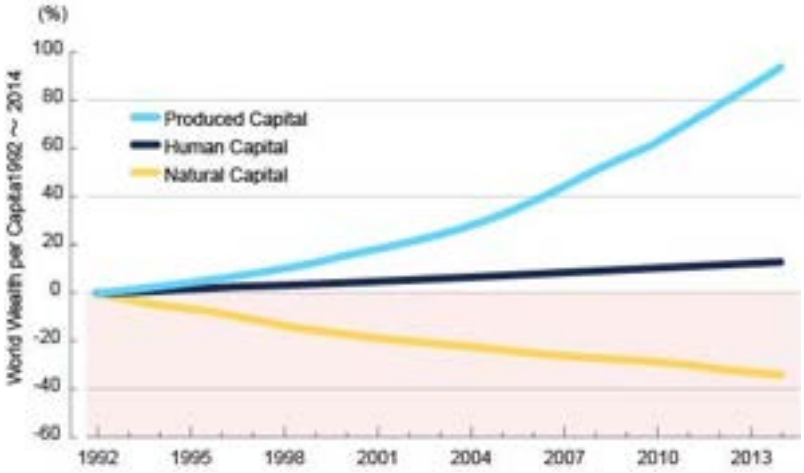
As an example of a method to objectively evaluate the impact on global system from human activities, there is a study called "Planetary boundaries". According to this study, in the case of crossing the boundaries regarding the items related to environmental changes on the Earth, that will cause irrecoverable change of natural resources on which human beings depend. Among the environmental elements subject to planetary boundaries, Genetic diversity, Phosphorus and Nitrogen are placed in the Zone of High Risk. As for Climate Change and Land-system change, there is an analysis that they have reached the Zone of Uncertainty/Danger.



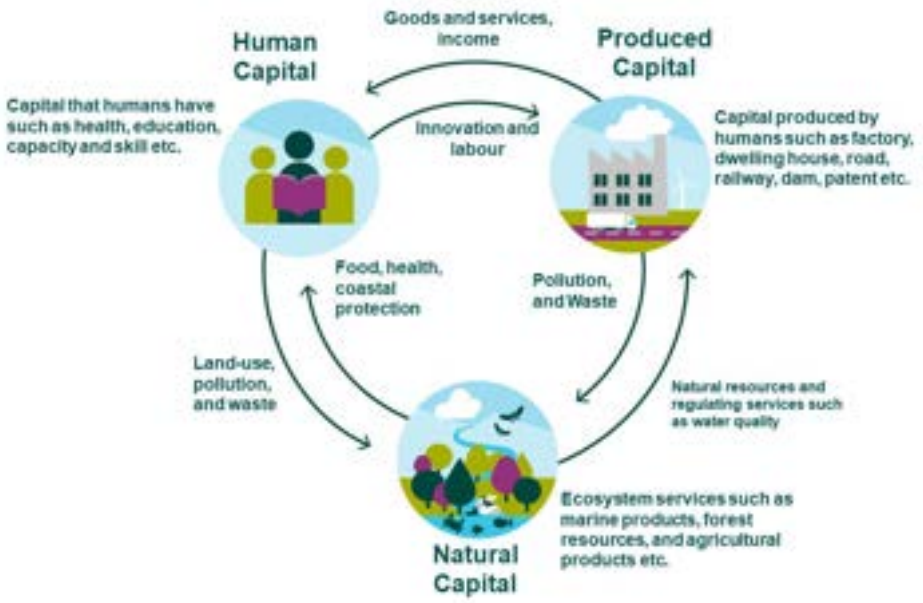
Status of the Earth According to Planetary Boundaries[4]

[3] Scott,J.M. (2008) Threats to Biological Diversity: Global I<Continental, Local. U.S. Geological Survey, Idaho Cooperative Fish and Wildlife, Research Unit, University of Idaho.
[4] The Tokyo Metropolitan Government processed based on Will Steffen et al. "Guiding Human Development on a Changing Planet".

This trend in extinction of species conforms to the decreasing trend in the world's stock (storage) of natural resources. The graph shown below indicates the estimate of per capita accounting value worldwide in the three categories of capital goods as produced capital, human capital and natural capital from 1992 to 2014. By these three capitals becoming integrated, the foundation of economic activities has been formulated. It indicates that the per capita value of natural capital has been decreased nearly by 40%, while the per capita value of produced capital has become doubled. It is supposed that natural capital has been damaged due to pollution and waste by produced capital and land use etc. for human capital.



Changes in worldwide inclusive wealth per capita and other indicators for 1992–2014[5]



Three Capitals and Their Interaction[6]

Thus, the impacts on global natural environment from human activities have been becoming more and more serious.

[5] Managi and Kumar (2018) Inclusive Wealth Report 2018
[6] Japanese-language version of The Economics of Biodiversity : prepared by the Tokyo Metropolitan Government based on the Dasgupta Review Abridged Version of 2021

2 What Biodiversity is

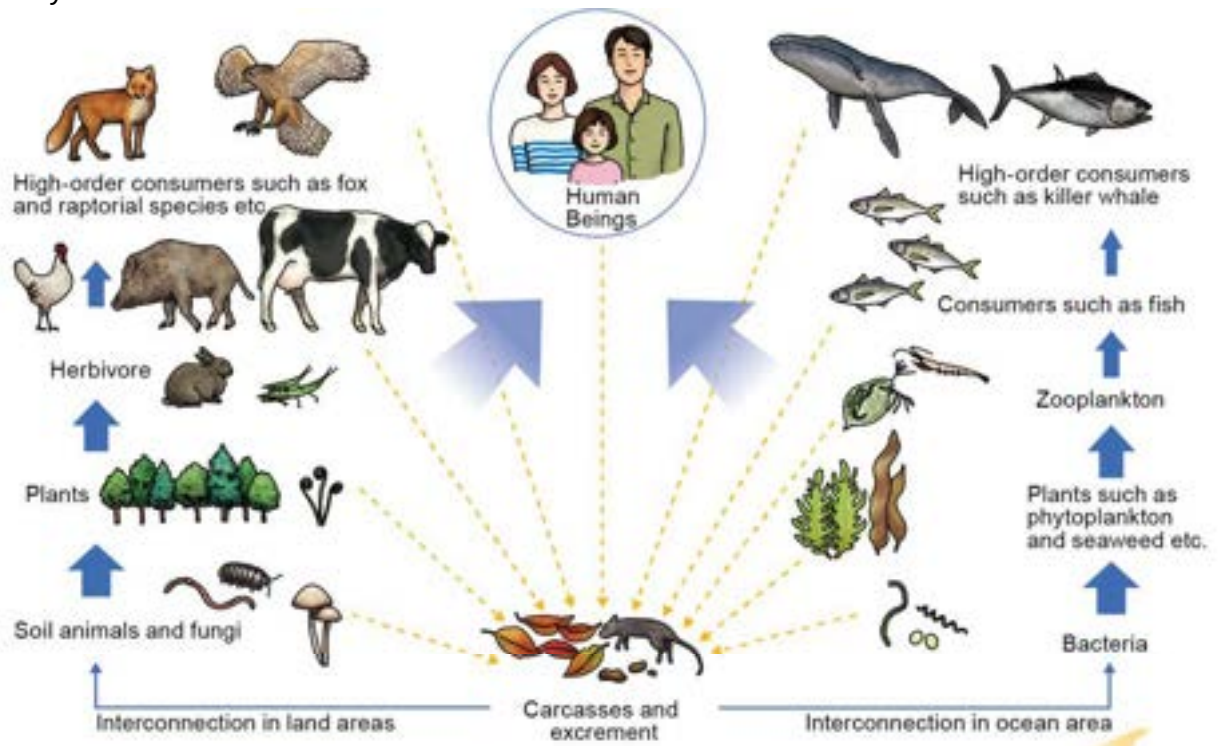
"Biodiversity" means that various creatures with unique "characters" have direct or indirect "interconnection" while utilizing their own characters in a variety of different environments. It is supposed that there are three levels of "Biodiversity"; that there are diverse species; that there are a variety of environments; and there are a variety of genes diversity even in the same creature.

(1) "Characters" and "Interconnection"

"Characters" mean that each individual has slightly different character and different resistance to diseases and environmental changes even in the same species. Additionally, each region has its unique nature and landscape, which represents formulation of natural features specific to each region connected with its culture.

"Interconnection" represents the connection within a food chain or ecosystem viewed from the relationships of "eat-or-to-be-eaten" or connection between ecosystems. Furthermore, there are various other connections with different scales such as the one of lives beyond generations, or the one between regions or between Japan and the world.

"Characters" and "Interconnection" have been produced through long history of evolving. Having such aspects, biodiversity supports lives of all creatures on the Earth and our living through various bounty.



Interconnection of Creatures

(2) Biodiversity of Three Levels

Ecological Diversity

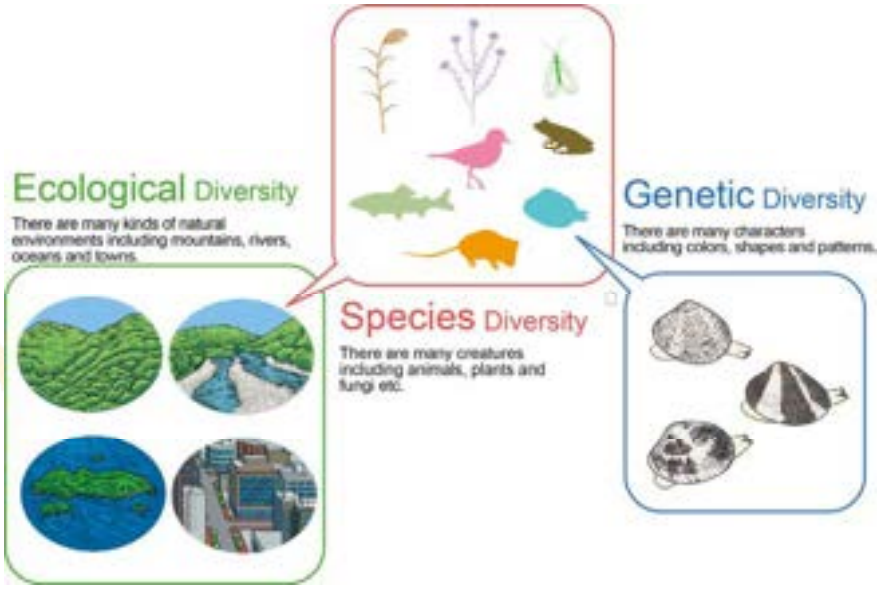
Ecological diversity means that various types of ecosystems including mountains, rivers, tideland and islands have their own natural environments. On the Earth, there are various environments from tropical zone to polar region or from coastal/ocean area to mountainous region, and their ecosystems have been historically formulated according to the environments of respective regions. As various kinds of natural environments exist, species diversity and genetic diversity has been secured.

Species Diversity

Species diversity indicates that various animals and plants, fungi and bacteria inhabit and grow. It is estimated that at least approximately 1.75 million species are known to exist and approximately 30 million species exist if unknown ones are included. It is considered that the more species exist, the more complex “connection of creatures” becomes and they become more flexible and resistant: impacts on ecosystems are suppressed and they will be restored to its original state even if the number of a part of species decreases due to environmental changes or human impacts.

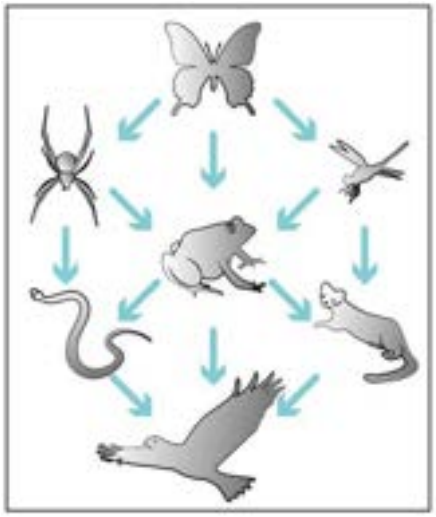
Genetic Diversity

Genetic diversity indicates that there are different genetic levels between individuals and populations even in the same species. For example, shells of Japanese short-neck clams and wings of Asian lady beetles vary due to difference of genes. It is also known that there are species such as Japanese killifish and primroses whose gene clusters are different depending on the regions. If genes of species were all identical, there would be a risk that they would become extinct due to specific diseases or change of climate. However, as respective individuals have different genes, they can increase their abilities to adapt themselves to all the environmental changes and thus halt the extinction of species.

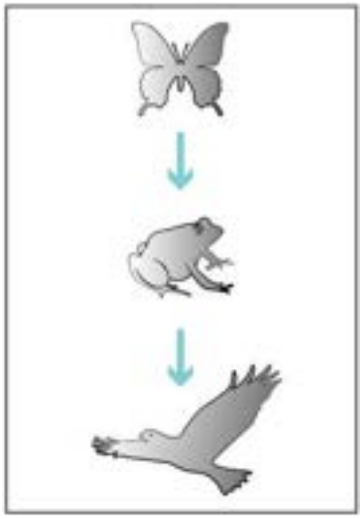


Biodiversity of Three Levels

[Advantage of Species Diversity][7]



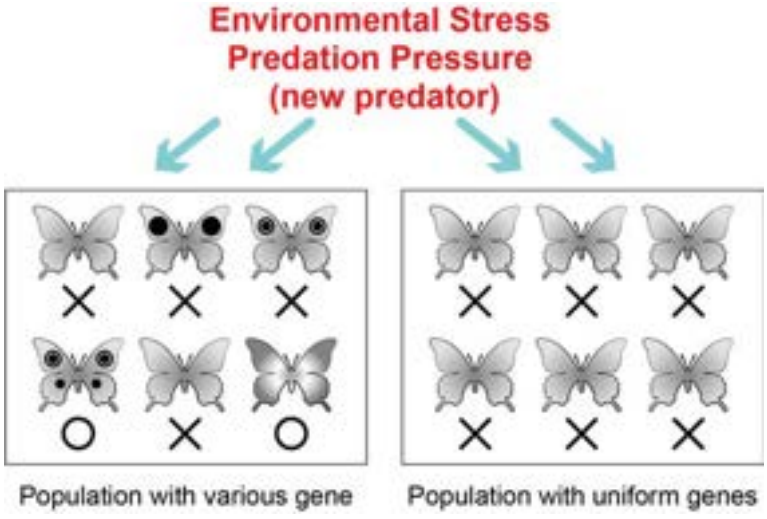
Ecosystem with species diversity



Ecosystem with poor species diversity

If an ecosystem consists of a large number of creatures, the food web would become more complex; for example, even if flogs become extinct, raptors as top predators can survive as the route of other food chains is maintained. On the other hand, in an ecosystem with a small number of creatures, the food chain would become more simple; if flogs become extinct, top predators would become extinct, which would result in upsurge of insects as primary consumers.

[Advantage of genetic diversity]



Even in a butterfly population with the same species, there are mutations in genes that govern patterns and colors of wings. Thus the individuals that can adapt themselves to environmental stress such as increase in the number of predators (in this case, the individuals with patterns for intimidation and protective coloring) will be able to survive and such population will be able to be maintained. On the contrary, genetically uniform populations would be forced to become extinct due to predation.

[7] :The Tokyo Metropolitan Government prepared based on Information/Knowledge and Opinion imidas Why Biodiversity is necessary？（https://imidas.jp/jijikaitai/k-40-045-09-07-g250 viewed on November 7 of 2022）

3 Blessings from Biodiversity (Ecosystem Services)

Biodiversity is the priceless thing that has been created in the long history of diverse lives on the Earth including human beings, which gives us blessings indispensable to our living.

Such bounty from biodiversity is called as “ecosystem services”. Ecosystem services have been classified into four services: “Provisioning services” such as food, wood, water or pharmaceuticals. “Regulating services” such as climate regulation, mitigation of disasters caused by heavy rainfall, and purification of water. “Cultural services” such as artistic/cultural inspiration obtained through experiencing nature and creatures, educational effect and rest and relaxation for body and soul. “Supporting services” such as oxygen generation by photosynthesis, soil formation and nutrient cycling.

Four Ecosystem Services

4 Four Crises of Biodiversity

It is supposed that ecosystem services essential for us to survive is driven by biodiversity. However, due to various drivers, biodiversity has been deteriorating all around the world.

Deterioration of biodiversity means decrease in the places for creatures to inhabit and grow and in the number of kinds of creatures. Additionally, deterioration of generic diversity which is specific to the region even for the same species, due to intercrossing with the individuals brought from other regions has become a problem.

"Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services, IPBES" is an intergovernmental organization in which experts on biodiversity participate, and it warns to the world that "approximately one million species will become extinct in the coming decades."[8] If this deterioration of biodiversity continues, we, human beings would not be able to enjoy various kinds of blessings from biodiversity.

Such deterioration of biodiversity has been caused by the following four crises:

Four Crises of Biodiversity[9]

[8] IPBES Global-Scale Assessment Report on Biodiversity and Ecosystem Services Summarized for Policymakers (March of 2020, Ministry of the Environment).
[9] Website of Ministry of the Environment (Photographs of Second Crisis and Third Crisis)

5 Recent Trend regarding Biodiversity

(1) Aichi Biodiversity Targets and Current Global Situations of Biodiversity

Based on the recognition that conventional efforts for conservation of specific regions and species are insufficient to conserve species, the Convention on Biological Diversity was proposed as an comprehensive framework for conservation and sustainable use of biodiversity and adopted in 1992. This Convention and the United Nations Framework Convention on Climate Change are calls as “twin conventions” whose signature were simultaneously initiated in the Earth Summit.

In the 10th Meeting of the Conference of the Parties to the Convention on Biological Diversity（COP10）held in Nagoya city of Aichi Prefecture in 2010, the Targets were agreed upon as the global goals based on the views as “human beings live together with the nature as a part of it” that have been developed for a long time in Japan. Additio0nally, in order to prevent loss of biodiversity, 20 individual targets were specified as the Aichi Biodiversity Targets, aiming at achievement in 2020.

However, as global biodiversity has been lost at an unprecedented rate in human history, Global Biodiversity Outlook 5 (GBO5) published by the Secretariat of the Convention on Biological Diversity in September of 2020 indicated severe results that there is none that has been completely achieved among such 20 individual targets.

Achievement Status of Aichi Biodiversity Targets[10]

Target No.	Contents	State of Achievement
1	Awareness of Biodiversity Increased	Unachieved
2	Biodiversity Values Integrated	Partially achieved
3	Incentive Reformed	Unachieved
4	Sustainable Production and Consumption	Unachieved
5	Habitat Loss Halved or Reduced	Unachieved
6	Sustainable Management of Aquatic Living Resources	Unachieved
7	Sustainable Agriculture, Aquaculture and Forestry	Unachieved
8	Pollution Reduced	Unachieved
9	Invasive Alien Species Prevented and Controlled	Partially achieved
10	Ecosystems Vulnerable to Climate Change	Unachieved
11	Protected Areas	Partially achieved
12	Reducing Risk of Extinction	Unachieved
13	Safeguarding Genetic Diversity	Unachieved
14	Ecosystem Services	Unachieved
15	Ecosystem Restoration and Resilience	Unachieved
16	Access to and Sharing Benefits from Genetic Resources	Partially achieved
17	Biodiversity Strategies and Action Plans	Partially achieved
18	Traditional Knowledge	Unachieved
19	Sharing Information and Knowledge	Partially achieved
20	Mobilizing Resources from All Sources	Unachieved

[10] The Tokyo Metropolitan Government prepared based on Global Biodiversity Outlook 5 (March of 2021, Ministry of the Environment).

(2) Viewpoints required in the International Society

As “Sustainable Development Goals (SDGs)” adopted by the UN General Assembly of 2015 are mutually linked, it is necessary to aim at solving multiple issues by a single action for issue solving.

IPBES has pointed out that current deterioration in biodiversity prevents achievement of goals in other fields, including starvation and health, and climate change, among 17 goals of SDGs[11].”The SDGs Wedding Cake Model” is the structure model to represent the concept of SDGs, which clearly demonstrates that biodiversity showing abundance in nature supports the lives of citizens of Tokyo and economic activities.

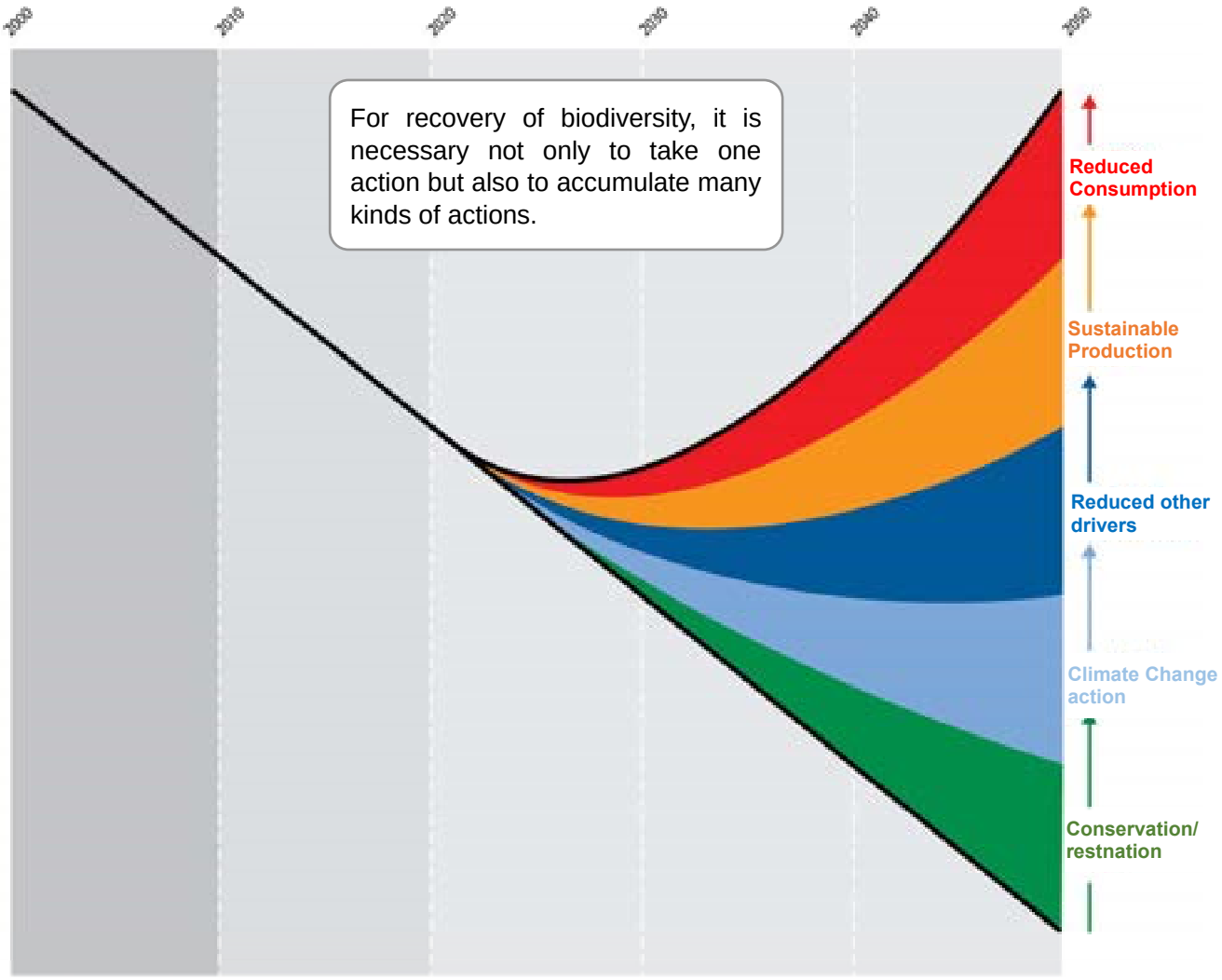
SDGs Wedding Cake Model[12]

Therefore, as biodiversity is deeply linked to our living, it is important for us to have viewpoints to solve various issues together with the issues of biodiversity as the basis.

[11] IPBES Global-Scale Assessment Report on Biodiversity and Ecosystem Services Summarized for Policymakers (March of 2020, Ministry of the Environment)

[12] The structural model that represents “Concept of SDGs developed by center director Johan Rockstrom of Stockholm Resilience Center. 17 goals of SDGs are roughly classified into three layers, which represents that they are closely linked by modeling them on the form of a wedding cake (the Tokyo Metropolitan Government processed the figure shown above based on the one created by Stockholm Resilience Center.)

Based on nonachievement of Aich Biodiversity Targets, Global Biodiversity Outlook 5 (GBO5) states that, for recovery of biodiversity, it is required to combine activities in various fields including the ones for indirect drivers such as production and consumption, as well as to combine ones for direct drivers such as conservation and reproduction of ecosystem.

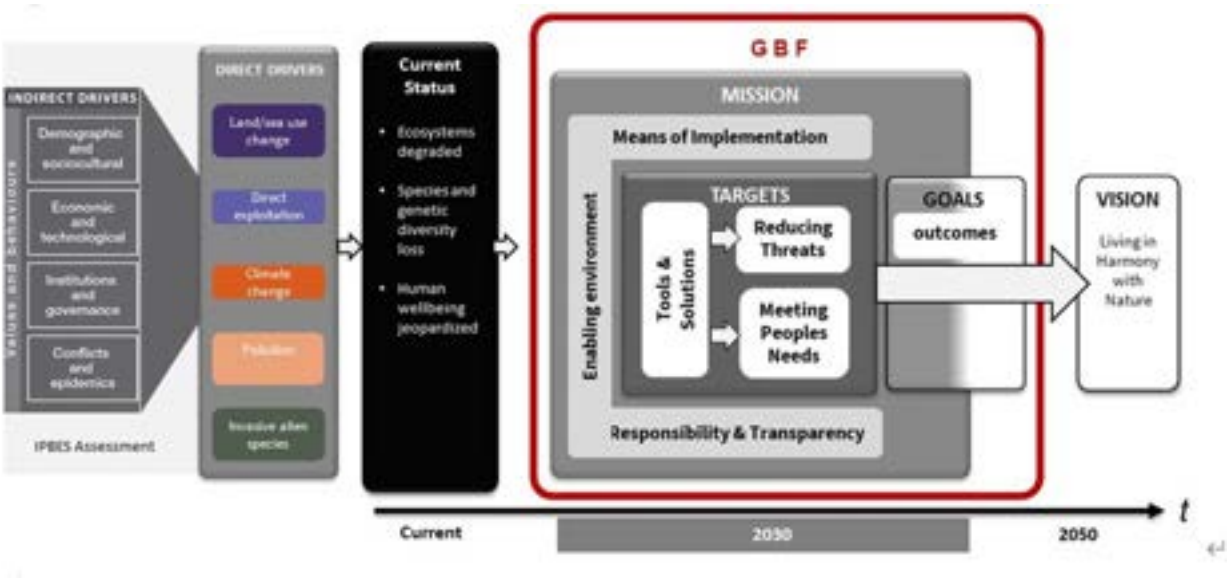


A portfolio of Actions to Reduce Loss and Restore Biodiversity[13]

[13] The Tokyo Metropolitan Government processed based on the figure of Global Biodiversity Outlook 5 (GBO5) (March of 2021, Ministry of the Environment).

(3) Kunming-Montreal Global Biodiversity Framework

The global goal which succeeds Aichi Biodiversity Targets and for which the year of 2030 is set as the target year is called as “Post 2020 Global Biodiversity Framework” and has been discussed. Due to the influence by spread of COVID-19 pandemic, as such discussion has been delayed, the 15th Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP15) was held by dividing into two parts after adjournment. The first part was held in Kunming City in China in 2021, in which the Kunming Declaration was adopted in order to emphasize on putting biodiversity on recovery path and the like. From December 7 to 19 of 2022, the second part was held in Montreal City of Canada, in which Post 2020 Global Biodiversity Framework was adopted as “Kunming-Montreal Global Biodiversity Framework” by going through procedures of consensus building.



Concept of Kunming-Montreal Global Biodiversity Framework[14]

Kunming-Montreal Global Biodiversity Framework holds up so-called “Nature Positive” to “to take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery” and set 23 global targets for achieving it, as the mission of 2030. As one of such targets, 30by30 target has been newly set to protect at least 30% of land and inland water areas and, coastal areas and ocean areas by 2030. In order to achieve 30by30, it is required that Other Effective area-based Conservation Measures (OECM) should be effectively conserved and managed in addition to conservation areas.

[14] The Tokyo Metropolitan Government prepared based on the materials of the Secretariat of the Convention on Biological Diversity.

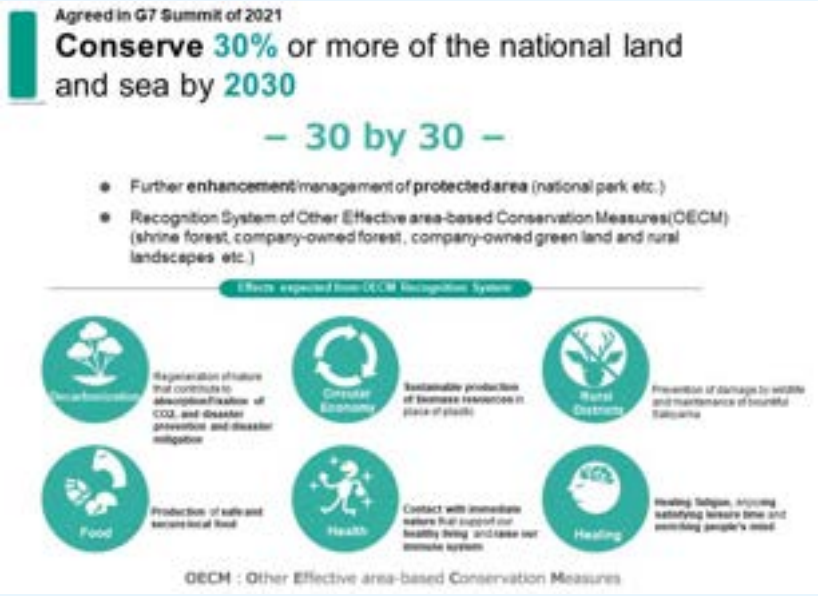
Column

OECM Other Effective area-based Conservation Measures

OECM（Other Effective area-based Conservation Measures）refer to the areas where biodiversity has been effectively conserved although such areas are not nature protected areas. Not only the places managed by nongovernment organizations such as the National Trust and Biotope aiming at conserving biodiversity, but also the areas that greatly contribute to conservation of biodiversity as a result of maintenance although its main purpose is not conservation of biodiversity including green land maintained by the Government and municipalities, rural landscapes and shrine forest and company-owned forest also fall under OECM.

Kunming-Montreal Global Biodiversity Framework adopted in December of 2022 indicated the target (30by30 target) aiming at effectively conserving 30% of land and inland water areas and coastal areas and ocean areas by 2030 as a healthy ecosystem, as the global target. However, the conservation areas in Japan remains merely around 20.5% of lands, and around 13.3% of the ocean areas. Therefore, Ministry of the Environment has published 30by30 roadmap and established setting/management of OECM other than the conservation areas in addition to expansion of conservation areas and improvement in quality of management, as central measures.

The following areas fall under the conservation areas of lands and inland water areas: natural parks (Natural Parks Act), natural conservation areas (Nature Conservation Act), wildlife sanctuary (Wildlife Protection, Control and Hunting Management Act), special green space conservation districts (Urban Green Space Conservation Act), and the conservation areas etc. which the Tokyo Metropolitan Government have designated by ordinances. In Tokyo, approximately 37% of lands have already been designated as the conservation areas at the bare mention of natural parks, natural conservation areas and special green space conservation districts. Hereafter, along with appropriate conservation and maintenance of such areas, as for OECM other than conservation areas, it is necessary to contribute to 30by30 targets such as promotion of registration in OECM national recognition system.



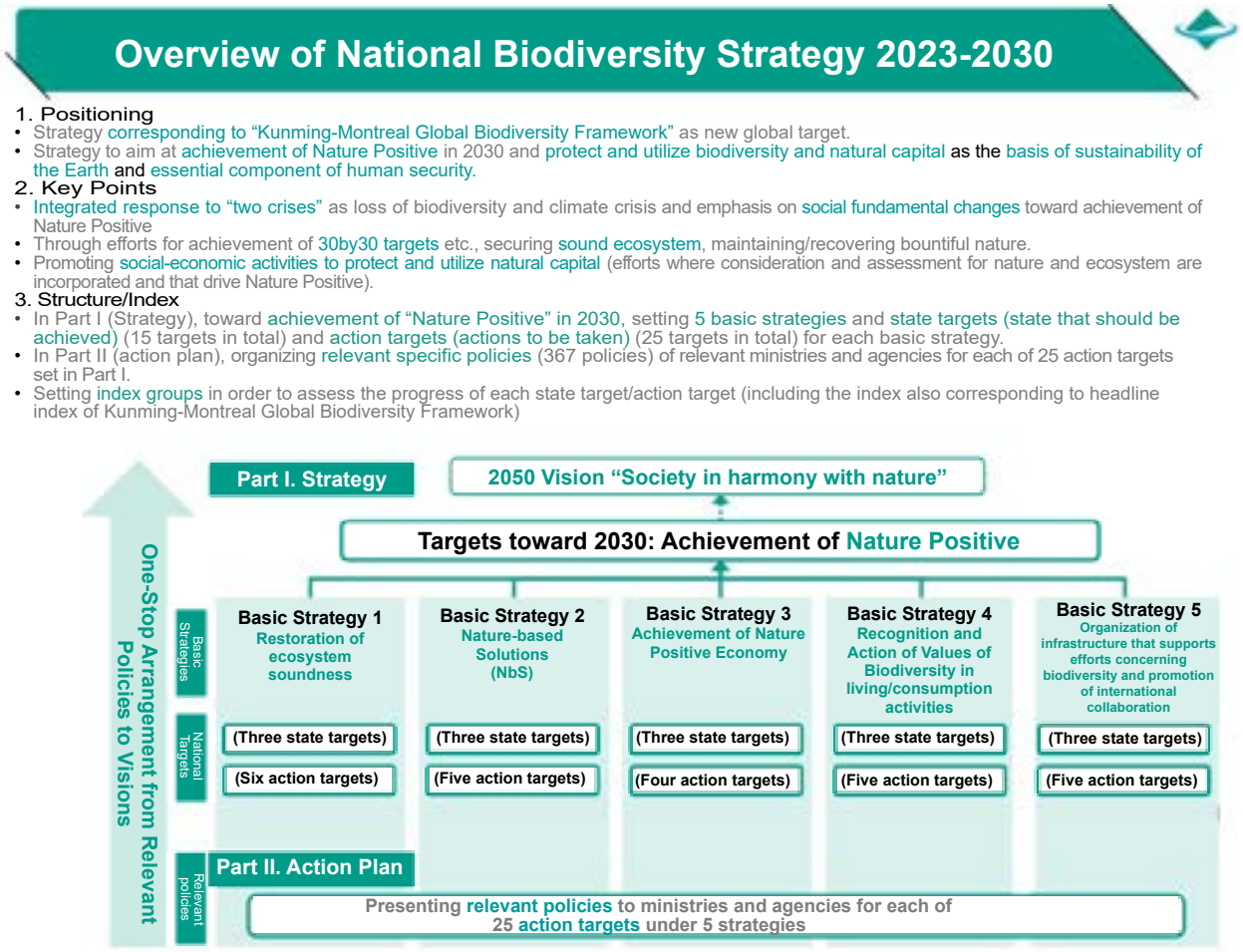
Basic Concept of 30by30 Roadmap[15]

[15] The Tokyo Metropolitan Government prepared based on the website of Ministry of the Environment, Basic Concept for establishment of the upcoming biodiversity national strategy (pointed to be discussed)

(4) National Biodiversity Strategy 2023-2030

In Japan, in order to conserve bountiful biodiversity and realize the society where people can harmonize with the nature whose blessings can be enjoyed for a long time to come, Basic Act on Biodiversity came into force in 2008. Based on this Act, the Government has established National Biodiversity Strategy.

Succeeding “National Biodiversity Strategy 2012-2020” established in 2012, cabinet decision was made for National Biodiversity Strategy 2023-2030 in March of 2023. Corresponding to “Kunming-Montreal Global Biodiversity Framework” as the global target of Convention on Biological Diversity, in National Biodiversity Strategy 2023-2030, setting 2050 vision as “Society in Harmony with Nature”, aiming at the goal toward 2030 “Achievement of Nature Positive”, it is the strategy to protect and utilize biodiversity and natural capital (=the basis of sustainability of the Earth/essential component of human security). It is determined that we will work on toward achievement of “2030 Nature Positive” in line with five basic strategies in order to put the nature on recovery path.



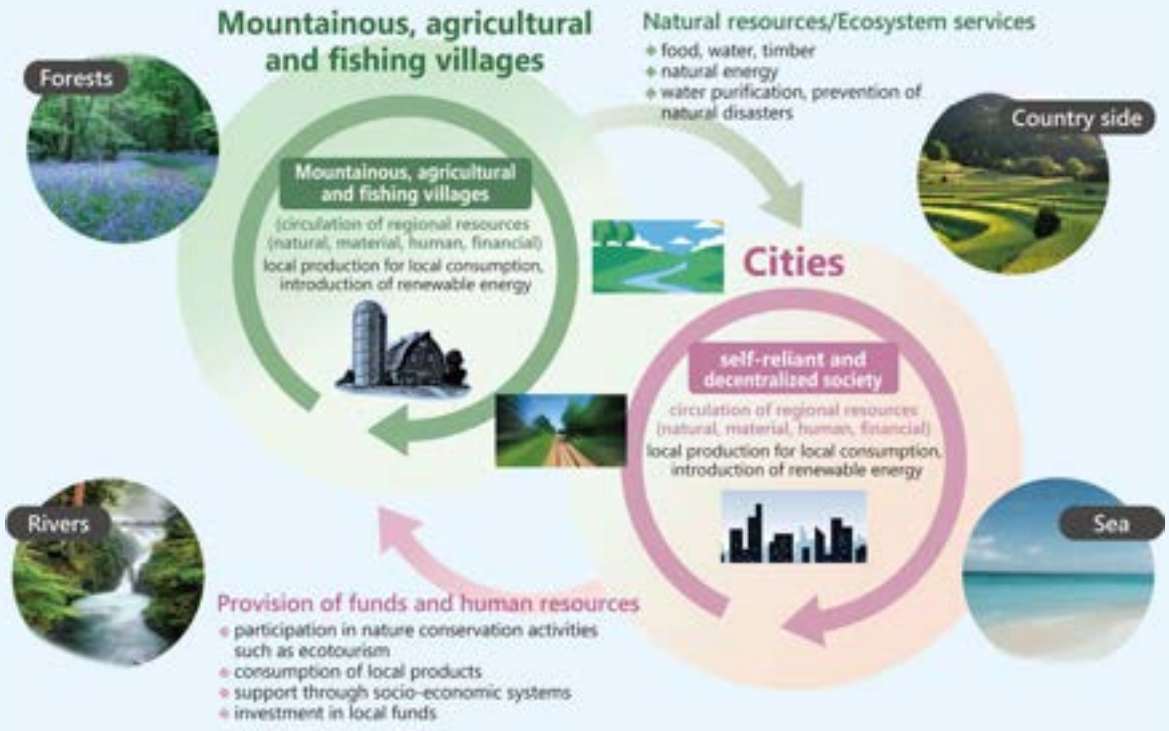
Overview of National Biodiversity Strategy 2023-2030[16]

[16] The Tokyo Metropolitan Government prepared based on the website of Ministry of the Environment, About Cabinet Decision “National Biodiversity Strategy 2023-2030” (March 31 of 2023).

Column Circular and Ecological Economy

National Biodiversity Strategy 2012-2020 presented the idea of “socio-ecological sphere” where the rural areas that supply blessings of nature and the cities that receive such blessings support mutually. The idea of “socio-ecological sphere” became the basis of “circular and ecological economy” which was advocated in the fifth Environmental Basic Plan of Japan (2018) and where the idea of SDGs to comprehensively solve multiple issues was utilized. “Circular and Ecological Economy” is the idea that the regions aim at being able to maximally demonstrate their vigor by mutually complementing the resources and supporting in accordance with their characteristics while each of them makes the best use of its resources including beautiful landscape and formulates independent distributed society.

As this idea is also established between urban areas within Tokyo and the rural areas with bounty nature including outside of Tokyo, it is important for the respective regions to build relationship to be able to mutually complement.



Circular and Ecological Economy [17]

[17] Based on the website of the Ministry of the Environment, Circular and Ecological Economy, https://www.env.go.jp/en/policy/cee/index.html

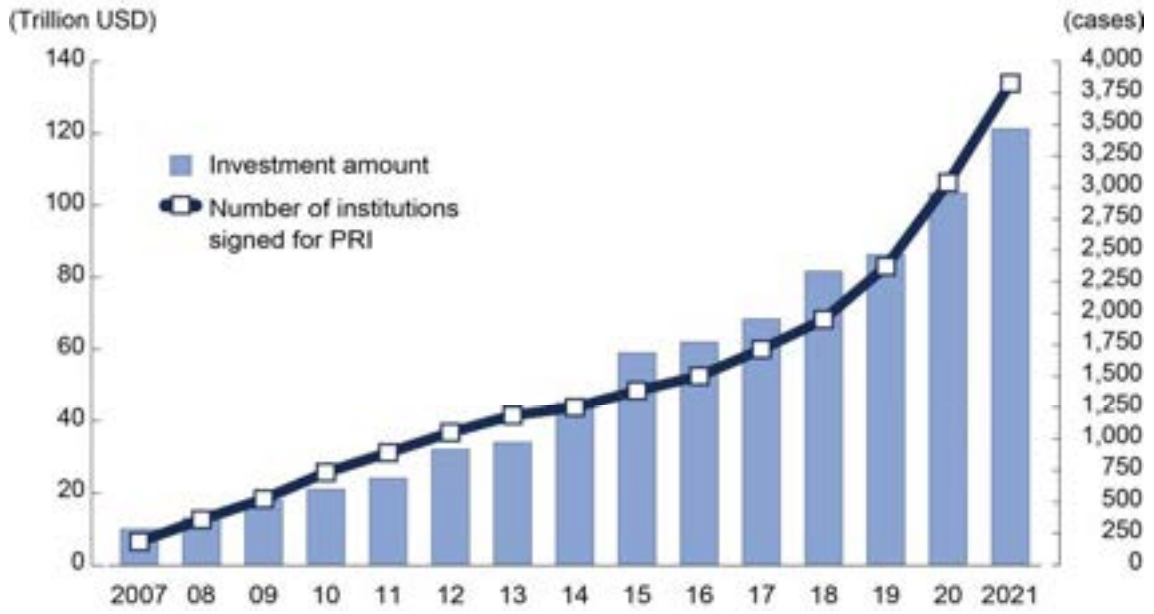
(5) Corporate Activities Which Financial Flow changes

Along with the activities for SDGs, from the viewpoint of consideration for sustainability, global corporate activities have been significantly changing.

In corporate activities, various projects have been implemented by using activity funds from financial institutions. Normally, while investors make investment decisions from corporate financial information, in recent years, they have been engaged in ESG investments that mitigate investment risks by taking sustainability of corporate management into consideration.

As E of ESG investment means Environment, according to the judgement that the corporations loading on environment would not be sustainable in the future, investors refrain from making investments to such corporations. Instead, there is a tendency that investments flow to the environmentally conscious corporations such as sustainable procurement. For example, in foreign countries, as well as some cases where the construction of coal-fired power plants that emit a large amount of CO2 as the cause of global warming was cancelled, some actions have started to be taken to make investments by evaluating the impact on biodiversity.

The number of investors who agree on ESG investments has been increasing year by year and thus such movement has also been accelerating in Japan. In the future, taking into consideration in addition to CSR activities which are different from the main businesses of the corporates, times will change to an era when biodiversity advanced through main businesses will be considered or the efforts that contribute to biodiversity will win more admiration.



Growth of ESG Investment Based on Principles for Responsible Investment (PRI)[18]

In various international conferences, it has been emphasized that people should make loss of global biodiversity zero and put biodiversity on recovery path by 2030. By taking this opportunity, financial markets and private-sector corporations have also been increasingly required not only to consider biodiversity but also to take actions to move toward recovery (Nature Positive). National Biodiversity Strategy 2023-2030 also cites “Achievement of Nature Positive Economy” as one of basic strategies.

In June of 2021, efforts for information disclosure regarding natural capital of corporations have been promoted including establishment of Task force on Nature-related Financial Disclosure (TNFD)

[18] The Tokyo Metropolitan Government prepared based on PRI website (https://www.unpri.org/)

to create the system to understand and disclose the degree of dependence and impacts on the nature by corporations by four organizations including United Nations Development Program (UNDP).

Additionally, while “Science Based Targets (SBTs)” [19] has already been promoted, development of setting method for “Science Based Targets for Nature” (SBTs for Nature) [20] has been underway toward publication of specific guidance after 2023. Besides, CDP[21] as an international NGO has previously ranked the answers by asking the corporations questions about environmental measures regarding three themes as “climate change”, “water security” and “forest”,it is aiming at newly adding and combining biodiversity reporting index.

Thus, from now on, it is expected that movement of financial flow to business for nature recovery will be accelerated in addition to the investment on “decarbonization” and “circular economy”. Tokyo also makes efforts to promote green finance leading to biodiversity conservation including issuance of Tokyo Green Bond and giving “Tokyo Financial Award” to financial businesses etc. that positively work on spreading ESG investments.

Amount of Green Bond Issued by Municipalities

State of Award Ceremony for Tokyo Financial Award

[19] Goal setting based on scientific evidence One of goal settings indicating that corporations work on environmental issues.
[20] Measurable, actionable and time limited goal based on the best science available that allow corporations to act along sustainable goals of society within the Earth’s boundaries, regarding the system where water on the value chain, biodiversity, lands and oceans are mutually linked.
[21] CDP is an international NGO whose headquarter is located in London, UK and which sends questionnaires to corporations and municipalities as an agent of institutional investors including pension funds etc. and a large-scaled customer companies, and release the contents of the answers and assign ratings.

(6) Post COVID-19 Society and Biodiversity

Report of UN[22] points out there is a possibility that COVID-19 is the zoonotic diseases derived from wildlife and that there is a tendency that such pandemic caused by the infection derived from wildlife will continue to be expanding.

As the background of such tendency, it is pointed out that there exists serious environmental destruction including development of roads, farmland and grazing land associated with deforestation, and mining operation of resources. The Report suggested that such human actions create a touch point of wildlife which has virus and bacteria as unknown pathogens existing in nature and contribute to creating more opportunities to come in contact with such virus and bacteria. In post COVID-19 Society, it is required to reconsider such relationship between human beings and nature.

In order to prevent pandemic outbreak, the idea of “One Health Approach” is gathering attention. It can be understood that human beings’ health is integral with that of animals including domestic animals and sound natural environment. For that purpose, it can be found that conservation of nature is becoming even more important.

Conceptual Diagram for One Health Approach[23]

Additionally, Tokyo heavily relies on blessings of biodiversity from outside of Tokyo. If supply chain is disrupted due to pandemic, there is the risk that Tokyo will not be able to receive such blessings sufficiently. Therefore, It is essential to mitigate such risk and aim at independence by reducing waste and increasing self-sufficiency rate.

Additionally, the stress caused by movement restriction for the purpose of preventing infection is becoming a problem. Under these circumstances, it is expected that people can maintain mental and physical health through outdoor activities in bountiful nature such as parks and green lands.

Keeping these points in mind, in post COVID-19 society, it is becoming further important to conserve immediate natural environments and use them sustainably.

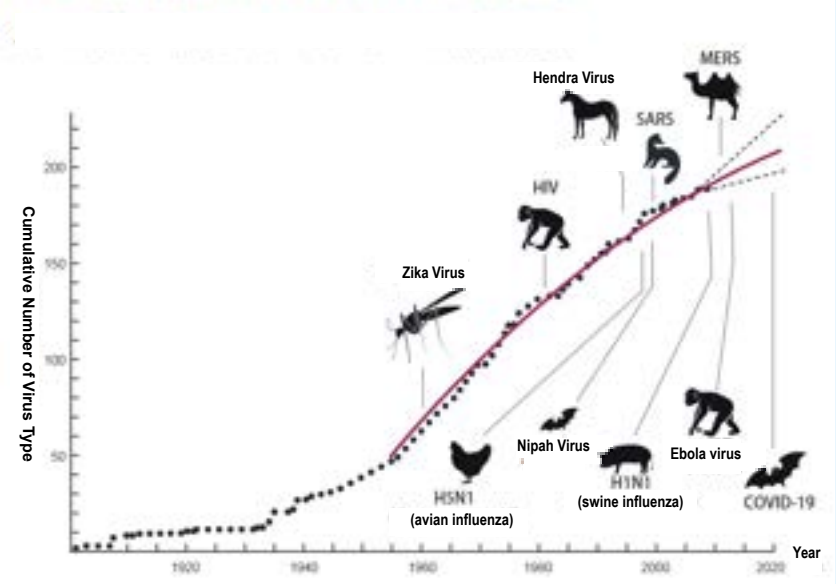
[22] PREVENTING THE NEXT PANDEMIC Zoonotic diseases and how to break the chain of transmission (July of 2020, United Nations Environment Programme (UNEP) and International Livestock Research Institute (ILRI)

[23] The Tokyo Metropolitan Government prepared based on PREVENTING THE NEXT PANDEMIC Zoonotic diseases and how to break the chain of transmission(July of 2020, United Nations Environment Programme (UNE) and International Livestock Research Institute (ILRI).

Column

Various Zoonotic Diseases

Zoonotic diseases refer to the infectious diseases from which both human beings and vertebrate animals other than human beings suffer. 75% of emerging infectious disease such as avian influenza is said to be zoonotic diseases.



Cumulative Number Found of Virus Whose Infections in Human Beings are Confirmed[24]

Additionally, there are other disease that fall under zoonotic diseases in Japan such as echinococcosis caused by parasites whose carrier are foxes and Sever Fever with Thrombocytopenia Syndrome (SFTS) as tick-borne disease.

According to recent studies, it is reported that population density of deer in Japan has been increased and their distribution has been expanding, and there is a concern about the possibility of increase in the number of ticks due to increase in the number of deer as well.

However, this should not be considered simply as a problem concerning increase in the number of deer. Spread of infectious diseases is not only caused by a single driver; it is considered that various drivers are relevant to such spread including climate change, change in the balance of ecosystem such as urbanization and change in human lifestyle[25].

[24] WWF Japan website, https://www.wwf.or.jp/
[25] Okabe, Watari, Yano, Maeda, Goka（2019）Wildlife management considering tick-borne diseases, particularly emerging infectious diseases, conservation ecology studies 24

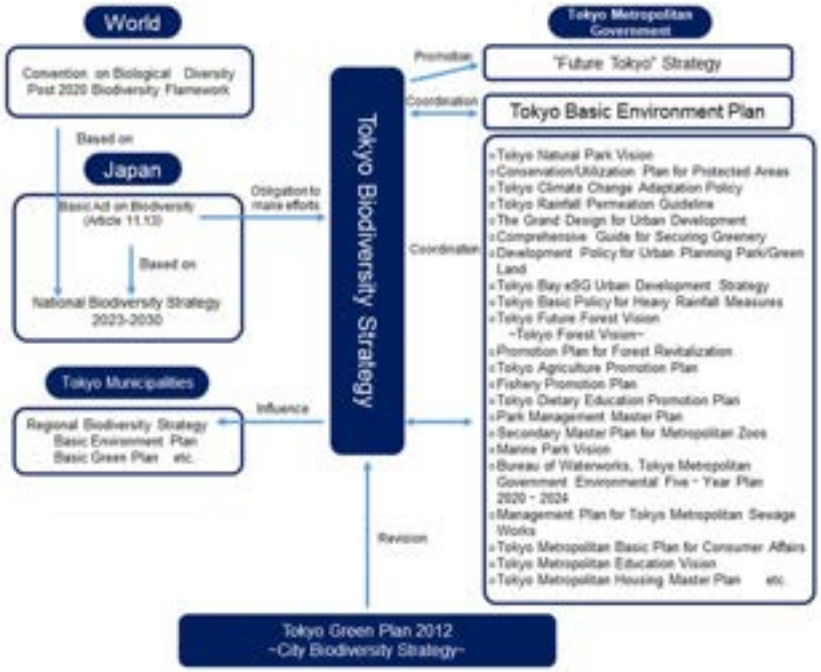
6 Basic Matters in Tokyo Biodiversity Strategy

(1) Positioning of Tokyo Biodiversity Strategy

This strategy is Tokyo Biodiversity Strategy (hereinafter referred to as “Regional Strategy”) based on Basic Act on Biodiversity, which represents a basic plan relating to “conservation and sustainable use of biodiversity” in Tokyo.

Furthermore, this is also the revised edition of “New Development of Green Policy~Basic Strategy toward Biodiversity Conservation” established by the Tokyo Metropolitan Government in May of 2012, the plans of Tokyo other than Regional Strategy shall be consistent this strategy relating to conservation and sustainable use of biodiversity.

Additionally, the policies described in this strategy shall promote “’Future Tokyo’ Strategy” (established in March of 2021) as the compass of the Tokyo Metropolitan Government.



Positioning of Tokyo Biodiversity Strategy

(2) Target Area

All the areas in Tokyo shall be targeted for this strategy; provided that, a part of neighboring prefectures and relevant areas etc. shall be covered as required.

(3) Period for the Plan

Period for Regional Strategy shall be nine years from 2022 to 2030. Future vision looking firmly to 2050 will be established as a long-term goal.

While this Strategy is targeted at FY2030, even after 2031, the global goals after 2031 shall be established after “Kunming-Montreal Global Biodiversity Framework” and until the next national biodiversity strategy is established succeeding it, we will continue to advance the relevant policies based on this strategy as the basic strategy of the Tokyo Metropolitan Government for conservation of biodiversity and its sustainable use.

Chapter 2.
Status Quo and Issues of Biodiversity of Tokyo

1 Characteristics of Biodiversity of Tokyo

The current biodiversity of Tokyo was generated over long periods and interaction between humans and nature.

Traditionally, many people have lived with nature in Tokyo with diverse topography and climate. As people use the nature for their daily activities, the nature has been transformed and created diverse ecosystems.

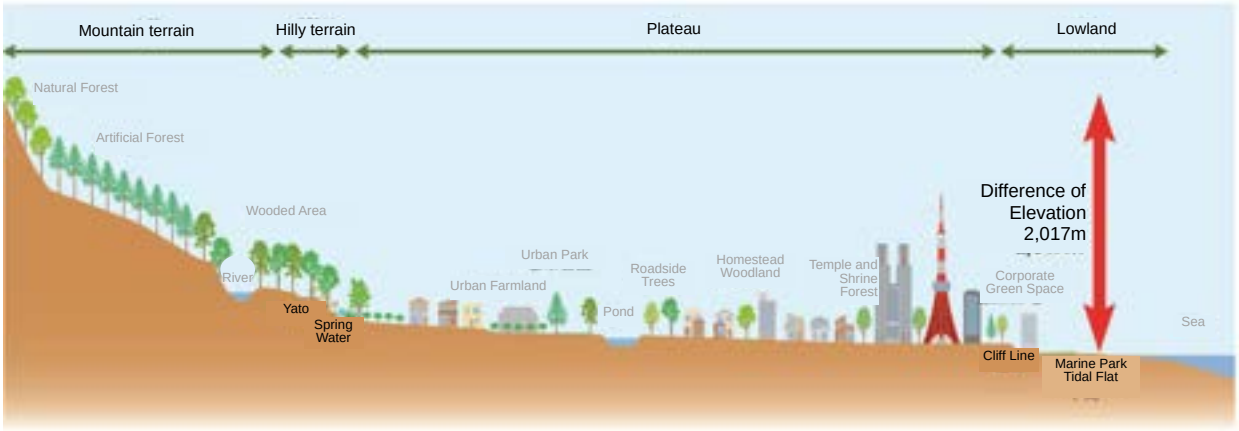
(1) Background of Biodiversity of Tokyo

Geographical/Meteorological Characteristics of Tokyo

Tokyo consists of the land part of the mainland and remote islands on the Pacific Ocean. Its length from east to west is approximately 1,600km and the one from the north to the south is approximately 1,700km, both of which rank as the longest in all the prefectures in Japan. As its altitude ranges from zero meter above sea level to approximately 2,017m of Mt. Kumotori, there is approximately 2,000m or more altitude difference. Accordingly, it is found that Tokyo is geographically large.

Horizontal Extent of Tokyo[26]

[26] Website of Bureau of Industrial and Labor Affairs, Tokyo Metropolitan Government. “Status of Fishery Industry in Tokyo”



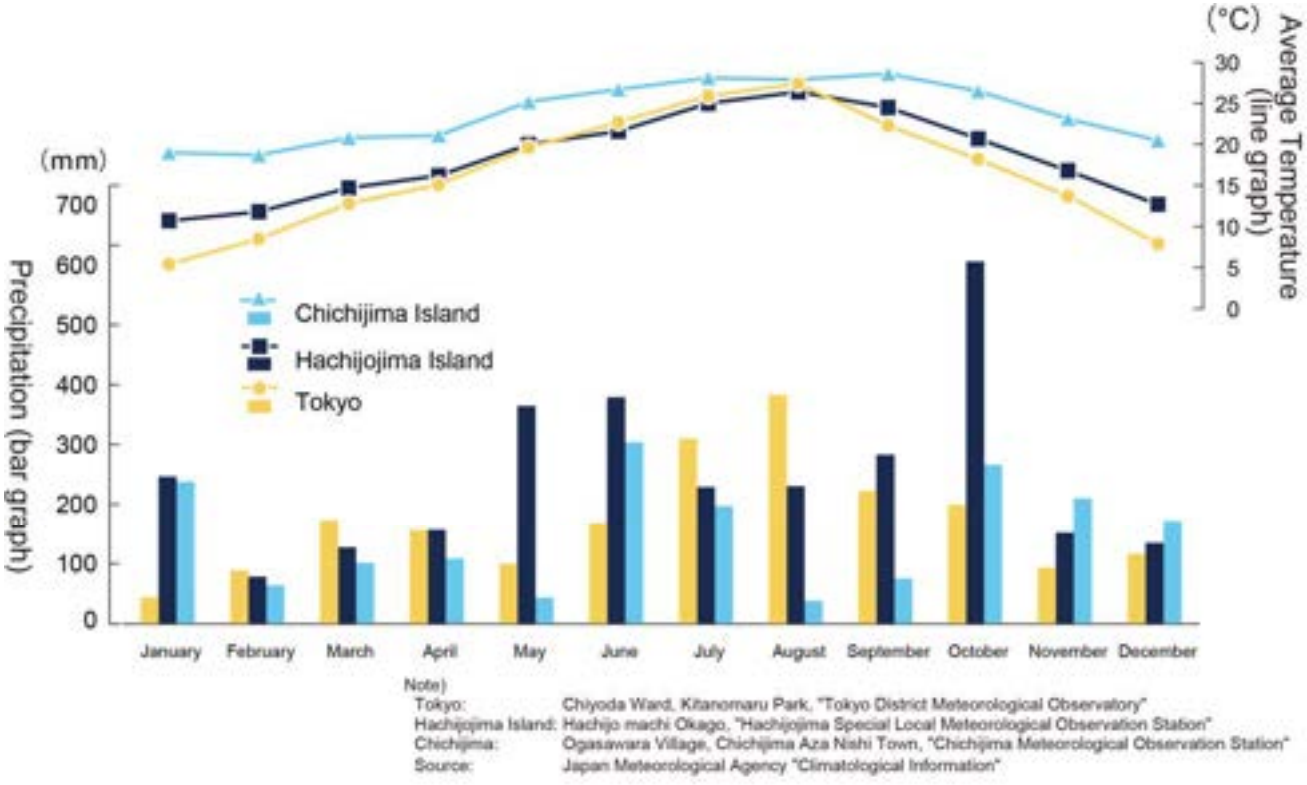
Cross-Section View from Mt. Kumotori to Port of Tokyo (image)

Vertical Extent of Tokyo

Tokyo has the climate zones ranging from the subarctic one (subalpine zone in the mountain terrain of the mainland) to the subtropical one (Ogasawara islands) and torrid zone (Okinotorishima island).

From the perspective of vegetation area, its areas from the lowlands to hilly terrain, the low mountains, and Izu islands are included in laurel forests zone. Most part of the montane zone belongs to summer-green broad-leaved forests zone, and the subalpine zone to subalpine coniferous forest zone. As Ogasawara islands are isolated from the mainland not only from the perspective from the climate zone, but also from the vegetation area, there are special vegetation, including hydrarch forests and subtropical dry scrub.

Due to such geographic and climate diversity, Tokyo has diverse ecosystems.



Average Temperature and Precipitation (2021)[27]

[27] Prepared based on “Statics of Living in Tokyo 2022”.

Overview for Topography of Tokyo

The mainland of Tokyo spreads in the southern west part of Kanto Plain as the largest plain in Japan and its west end reaches Kanto Mountains. Its island areas consist of Izu Islands in the north part, Ogasawara Islands in the south part.

The topography of Tokyo is roughly divided into mountain terrain, hilly terrain, plateaus, lowlands and island. The natural landscape have the characteristics summarized for each classification of the topography.

The mountain terrain was created by seabed sediment which was elevated during the period from the Paleozoic to the Mesozoic. In the deep valley, Tama River and Akigawa River flows, forming ravines. The mountain terrain in the westernmost part, including Mt. Kumotori are composed of sandstone and mudstone, while the one including Nippara on its east side contains cherts and limestone.

The plateaus have the plain topogra
Layer distributes. Especially, the qu
by Tama River, Iruma River, Arakaw
is called “Musashino Plateau”, whic
the topography of Tokyo. The easte
Plateau has a complicated shape to
erosion by medium sized rivers. At t
through historical movement of Tam
line, the cliff line including Kokubunj

The hilly terrain is the undulating topography where Kanto Loam Layer distributes on the old plateau, which has been losing its flat surface due to erosion and has complicated ridge and valley.

The lowlands are mai
deposits by rivers, whi
coastlines and landfills
eastern part of Tokyo s
River and the one alon

[28] “Standard Map, Shaded-Relief Map” (Geospatial Information Authority of Japan)
The Tokyo Metropolitan Government prepared based on（https://maps.gsi.go.jp/vector/#8/35.970227/139.730988/&ls=hillshade1%2C0.3%7C

Broad-Range Topography Surrounding Tokyo[28]

aphy where Kanto Loam adrilateral plateau divided va River and costal terrace h is a major component of rn part of Musashino oward the lowland due to the edge of the plateau na River and the coastal ji Cliff line is formed.

nly formed through sediment ich includes Man-made s as well as the plain in the spreading around Arakawa ng Tama River.

All the islands in this islands area are the marine ones that have never been connected with the continents. Among them, Izu islands are derived from volcanos that belong to Fuji Volcanic Belt ranging from the mainland, such as Mt. Fuji and Mt. Hakone etc. While Ogasawara Islands are also formed by volcanic activities, in recent years, no volcanic activity has been observed in Chichijima Island and Hahajima Island. On the other hand, there are some volcanic islands that have still been expanding, such as Nishinosima Island.

vstd2&disp=11&d=l)

Column

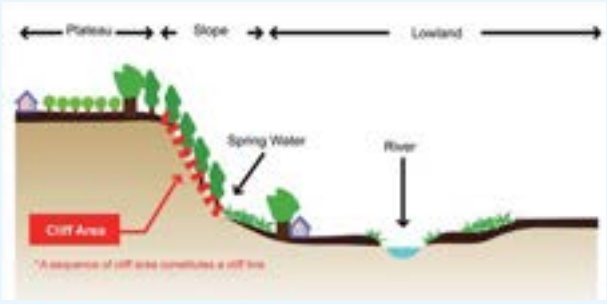
Cliff Line as the Framework of Tokyo's Greenery

The cliff line is a series of cliffs that have been generated by the erosional effect of the rivers such as Tama River and the sea of Tokyo Bay. In Tokyo, there are approximately 40 cliff lines, extending for approximately 230km and approximately 40% of them have been covered by greenery. The greenery of cliff lines preserves natural topography, exists in series in the cities beyond the borders of wards, towns and villages and forms the framework of Tokyo's greenery.

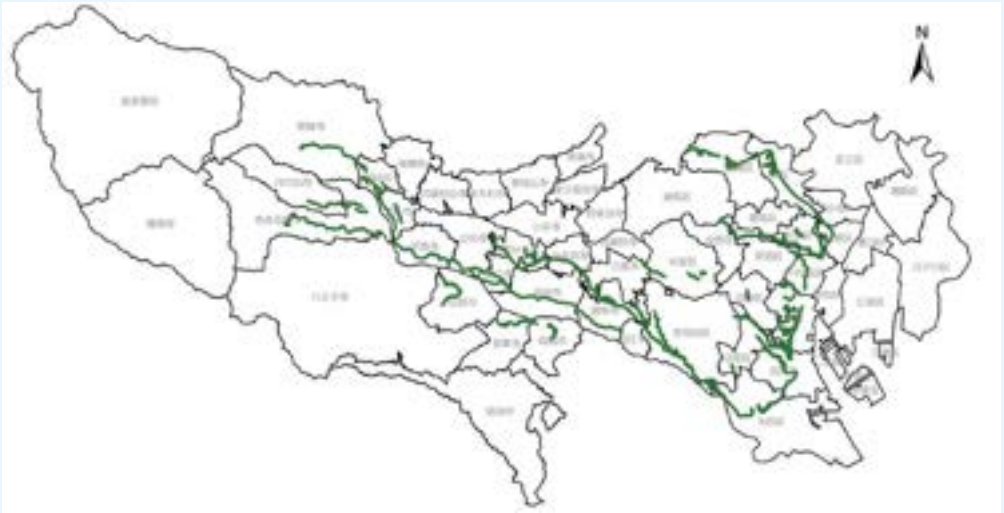
As the greenery of cliff lines exists between the lowlands and plateaus, it forms the natural environment with abundant diversity, such as wet soil and dry soil, the waterfront such as spring water, and vegetation with high naturalness etc. In such luxuriant natural environment, as plenty of wild birds and aquatic birds, fishes and plants etc. have been inhabiting and growing, rare animals and plants can be observed, some of which have been designated as endangered species.

Additionally, while cliff lines are called as "Hake" and "Mama" in the dialect of Musashino, they have been called by the name that are familiar with the local people, respectively.

Tachikawa Cliff Lines originated from Tama River (Tachikawa city)



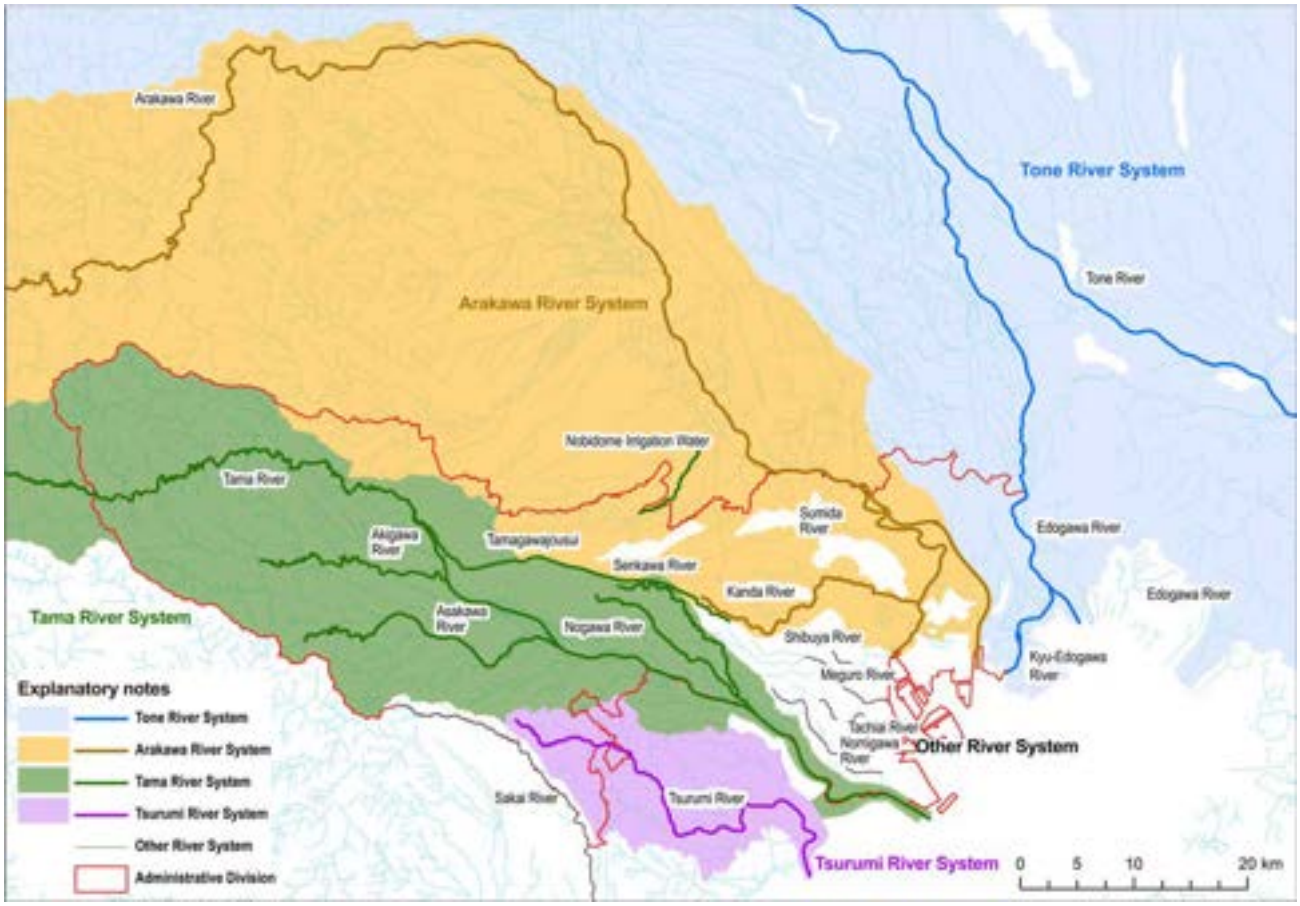
Sectional View of Cliff Lines



Position Diagram of Tokyo's Cliff Lines

Cliff lines are a series of greenery that extend beyond the borders of wards, towns and villages and their owners and administrators are highly diversified. Therefore, there are some local areas where a large number of industry-government-academia-private sector including corporations, government, universities and NPO move forward collaboration in order that the owners and administrators can establish the relationships and work together in promoting preservation and utilization of the cliff lines in the future.

The rivers of Tokyo are roughly classified into four Class A River Systems of Tama River Water System, Tsurumi River Water System, Arakawa River Water System and Tone River Water System and other Class B River System that flow directly into the sea.



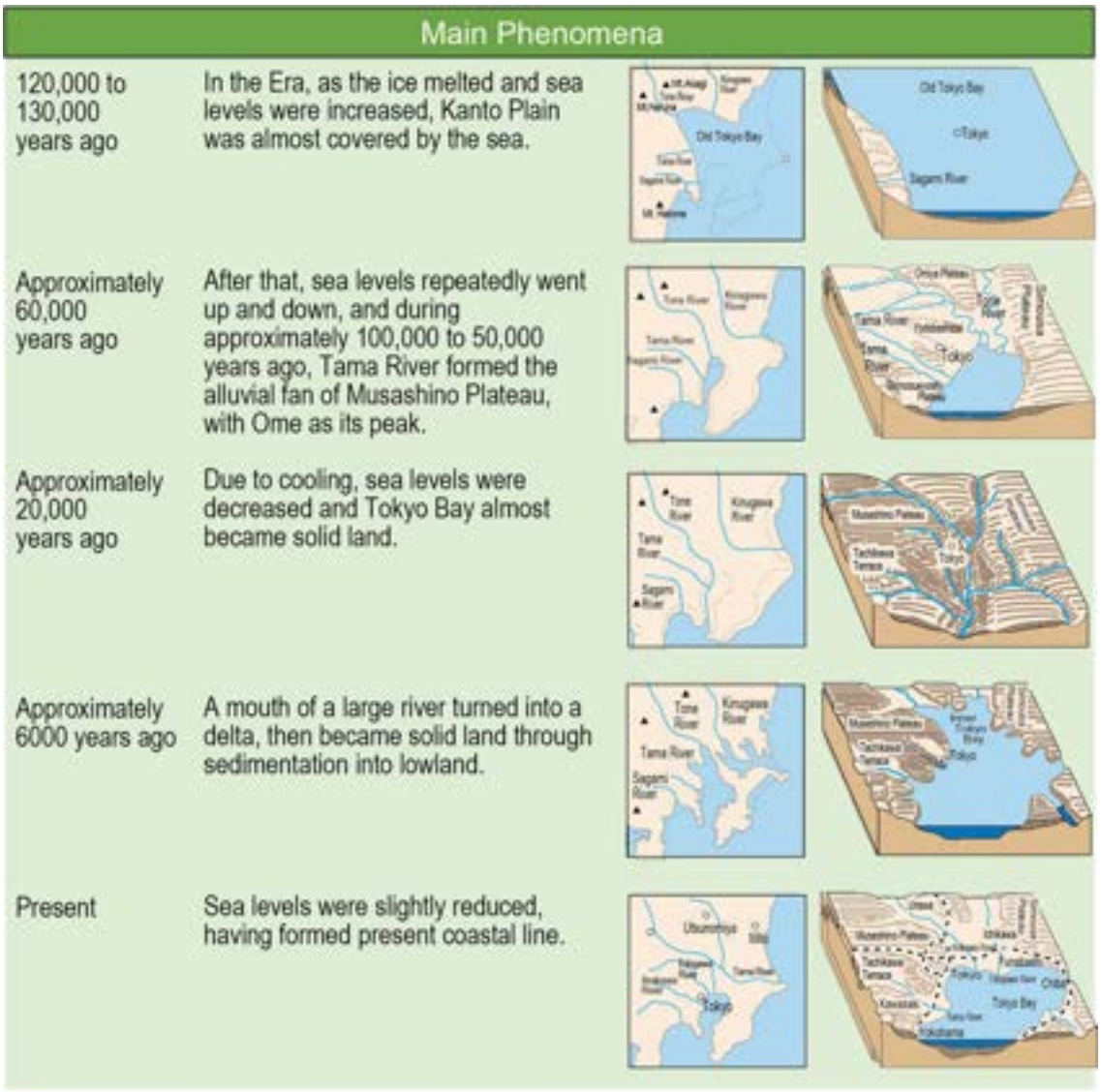
Main Rivers and Water Works in Tokyo

Topography Formation History

Approximately one million years ago, Kanto Mountains including Okutama was formed due to elevation. It is supposed that hilly terrain is also elevated triggered by the elevation of mountains.

On the other hand, Kanto Plain was under the sea 120,000 or 130,000 years ago. Subsequently, while the sea level repeatedly went up and down, the characteristic topography of Tokyo was created by the effects of Paleo-Tama River, including alluvial fan of Musashino Plateau whose top point is Ome and Kokubunji Cliff Line. Additionally, also in Tokyo, Kanto Loam Layer as volcanic ash such as Mt. Fuji and Mt Hakone thickly deposited over the years.

In Jomon Transgression of approximately 6,000 years ago, it is assumed that the sea level was 2 to 5 meter higher compared to the present one due to warming. Subsequently, the estuary of large rivers including Tone River turned into the land as a delta and thus the current lowland was formed.



Changes of Tokyo's Topography (Mainland)[29]

Izu Islands and Ogasawara Islands are the volcano-derived ocean islands formed on Philippine Sea along the subduction zone of the Pacific Plate. Among those, Volcanic island chain of Ogasawara Islands and Izu Islands are comparatively new active volcanos that belong to Fuji volcanic belt. On the other hand, while Mukojima Islands of Ogasawara Islands and Chichijima Islands were born approximately 48 million years and Hahajima Islands were approximately 44 million years ago due to submarine volcanic activities, no volcanic activity has been observed in recent years.

[29] The Tokyo Metropolitan Government prepared based on "Japan's Terrain-Characteristics and Origin" (Iwanami Shinsho, 1977) by Sohei Kaizuka

Column Fossil of Akishima Whale from 2 million years ago when Tokyo was once the sea

In August of 1961, Mr. Masato Tajima, who used to be an elementary school teacher, and his son found a fossil appearing from the riverbed of Tama River that flows through Akishima city. The bones of the fossil of the whale found made up almost complete individual, including cranial bone and backbone, whose total length was 13.5m, which were estimated as the fossil from approximately 2 million years ago when the area around Akishima city used to be the sea. The whale was named after the place it was found as “Akishima Whale”. Subsequently, in 2012, researchers began full-fledged research on it, and then, in 2018, they described in the paper that the whale is a newly discovered species.[30]

Replica of the Fossil of Akishima Whale
(Akishima City Education and
Welfare Center “AKISHIMAENSIS”)

Image of Akishima Whale

Column Jomon Transgression and Distribution of Shell Mound (Kai-zuka)[31]

Approximately 10,000 years ago, as the last glacial age ended, and the sea level rose because the polar ice sheet melted due to climate warming, the coastal lines moved forward inland.

This is called Jomon Transgression, whose peak was seen in approximately 6,000 to 5,000 years ago. It is assumed that the sea level of that time was 2 to 5 meter higher compared to that of the present. As the shallow cove was divided by complicated coastal lines, it has become a good habitat for fish and shellfish. As numerous fish bones and shells have been discovered in the shell mounds as the remains of that time, it is found from the distribution of shell mounds that fishes and shellfishes were important foodstuffs at that time and the costal lines of that time entered into the inner of the bay more deeply than the one of the present.

Distribution of Shell Mounds in
Jomon Period and Costal Lines

[30] TOKYO MX Website “Akishima Whale” determined as a new species-After 57 years https://s.mxtv.jp/mxnews/kiji.html?date=46512600
[31] Edited and written by Study Group for Agricultural Engineering History “Marking to the Earth”p56

Column Lowland along Tama River

In Tokyo, there are lowlands spreading along Tama River as well as in 23 wards area. These topographies of plains were formed by soil and sand, which Tama River has created by eroding the mountain terrain and hilly terrain of the upstream and have carried and deposited. The lowlands distribute mainly from the area around Fussa city to the downstream as Tama River, and to the tributaries as Asakawa River and Akigawa River. Along Tama River, there are narrow and long lowlands between Musashino Plateau and Tama Hills. In the banks of the river, although there used to be riversides (gravel riverside) with gravels and cobbles spreading, where the environment specific to rivers existed, such riversides have decreased.

In the lowlands along Tama River, people cultivated rice since old times by making use of spring water from below the cliff lines of river terrace formed by Tama River. It is supposed that development of irrigation channels by making use of the water of Tama River contributed to further flourishment of rice cropping in Edo Era. While such rice paddy fields have dramatically decreased, we can still see rural landscape in some areas. As well as cultivation of vegetables, green tea and wheat etc. and silkworm culture, as the sand gravel-like soil is well-drained and suitable for cultivation of fruits, pears (Tama River Pears) used to be cultivated. Additionally, while the downstream area from Setagaya ward to Ota ward, relatively larger reed beds are spreading, the tidal flats are formed at the estuary.

Lowlands spreading along Tama River (Tachikawa city, Hino city)

History of Relationships Between Humans and Nature Including Land Use etc.

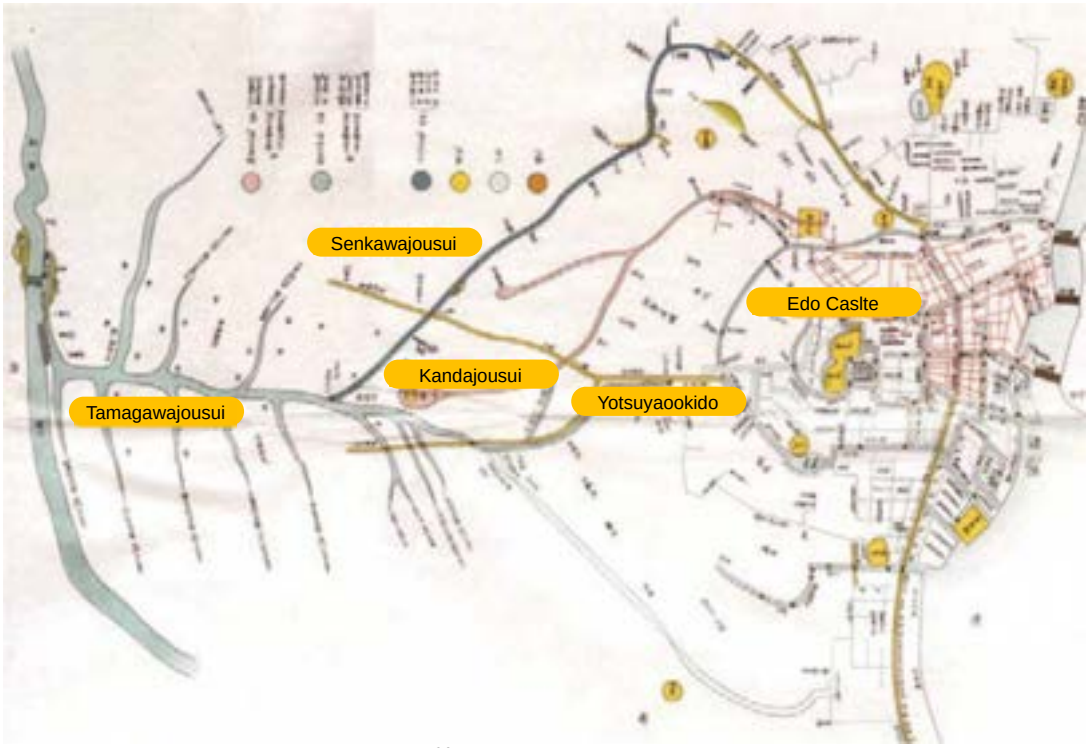
Most of the nature that still remains in Tokyo at present has been fostered by the relationships with humans after Edo Era. While it is important to conserve primeval natural environment, it is also essential to conserve the one that have been maintained through intervention by humans.

In Edo Era, as the population increased and the cities expanded, the natural environment surrounding Edo significantly changed. Despite the changes over the years from Meiji, Taisho to Showa Era, such natural environment has maintained its landscape due to people's use. However, during Rapid Economic Growth in the middle of Showa Era, such natural environment was dramatically reduced due to housing land development etc. On the contrary, in recent years, the initiatives to conserve and restore natural environment have been promoted, including increasing the number of parks and improving the quality of water etc.

Therefore, it is necessary for us to further promote conservation and restoration of Tokyo's biodiversity which has been thus creates and pass it down to the future generations.

① Nature that supported global metropolis Edo

In Edo and its environs, before Ieyasu Tokugawa entered into Edo, there were marshy areas found in various places. There are some straggling villages with small population and people used to cover their daily life water by making use of spring water and reservoir. Later, as the population become concentrated in Edo by Sankin-kotai (system for alternate attendance by daimyo in Edo) etc., plenty of water became necessary. Because of this, Shogunate Government developed water supply paths called Kanda Josui and Tamagawa Josui, by which people could secure their drinking water.



Picture of Edo Water Supply Paths[32] Picture around the end of Shotoku Era（1715-1718）

In the middle of Edo Era, development in lowlands and plateau were also promoted. Among hinterlands of Edo, cultivation of paddy-field rice and leafy greens flourished in lowlands and cargo shipment was developed using rivers and channels stretching out in a mesh pattern. Thus, Edo became “City of Water”. In plateaus, villages were created by making use of water diversion of Tamagawa Josui. Especially, development of new fields in Musashino changed its landscapes dramatically, from well-drained wild fields to farm fields and wooded areas which continued to exist until the modern age.

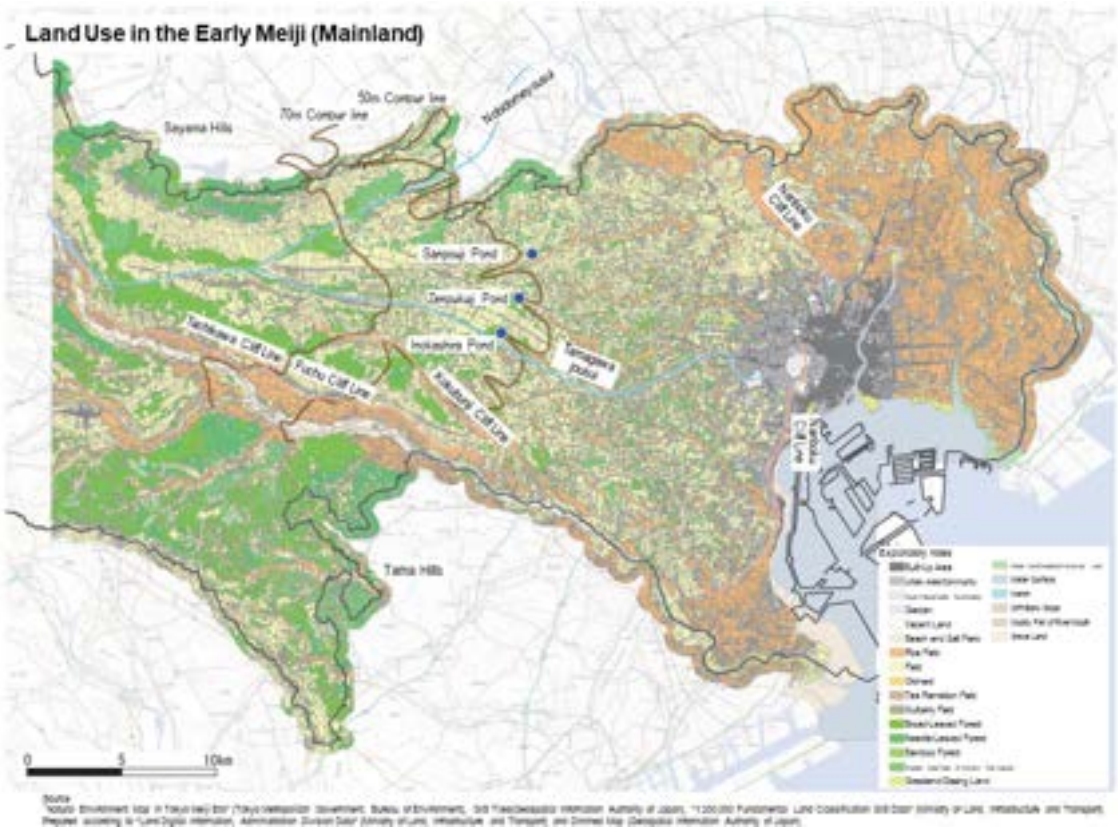
In forestry regions of Tama, logged timbers were floated in Tama River as rafts and carried to Edo. Additionally, production of charcoal and firewood flourished, which supported people’s daily living through their use for kitchen and heating. In Tokyo Bay (Edo-mae) and island areas, fishery industry flourished, by which marine products were supplied to Edo. Thus, various goods flew into Edo City from lowlands, plateaus, mountain terrain and islands etc.

Moreover, various cultures, such as Ukiyoe that draws natural landscapes, food culture including Tsukudani, and Edo-style horiculture were developed while harmonizing with nature.

[32] The Tokyo Metropolitan Government processed the picture included in “Tokyo City Draft History” kept at National Diet Library.

② Significant Changes in Natural Environment After Meiji Era

From Meiji Era to modern times, population in Tokyo had been on the rise. Especially, due to development of urbanization in Rapid Economic Growth Period, greenery in Tokyo was significantly decreased. Furthermore, as the demand for wood and charcoal declined due to fuel innovation, the natural environment that had been formed in the relationships with humans became neglected, and thus the quality of greenery such as wooded areas became deteriorated.



Land Use in the Early Meiji

While there had been little change in agricultural land areas in Tokyo during Meiji Era, after Taisho Era, because of population movement to the suburbs due to Great Kanto Earthquake and population increase, the urban area extended to the surrounding areas where the agricultural lands spread. After WWII, advancement of urbanization in Tama area contributed to decline in wooded areas, in conjunction with fuel innovation. In particular, in Rapid Economic Growth Period, a large-scale housing development was advanced, as a result, forests and agricultural lands were changed into residential lands. Even now, due to growing residential areas and inheritance, the nature of such forests and agricultural lands have been lost. In recent years, some greenery has been created in parks and roadside trees, corporate green zones, greenery in Tokyo has been on a decreasing trend from a long term perspective.

In the mountain terrain, due to increase in demand for wood for building construction after WWII, expansive afforestation measures were taken to plant conifer forests including cedar and Japanese cypress. However, decline in domestic forestry owing to the changes in social conditions, including imports of low-priced timber products, has led to forest devastation due to lack of care.

While rivers and channels had been used for water transportation, due to railway development after Meiji Era and road development after WWII, it was replaced with transportation by road.

Further, because of cleaning up of debris of Great Kanto Earthquake and sewage development in Rapid Economic Growth Period, a large number of medium-sized rivers and channels were reclaimed and became closed conducts, whose ground segments have been used as roads and green zones in these days.

In bay areas, because of demand for disposal of sediment and waste etc., tidal flats and shallow places were reclaimed. Due to such reclaim and deterioration of water quality, fisheries of Edo-mae declined. At present, harbor and port facilities, and parks have been developed on the lands created with landfills.

In Rivers of Tokyo and Tokyo Bay during Rapid Economic Growth Period, due to concentration of population and industries, deterioration of water quality became more serious. However, through subsequent development of sewage treatment facilities etc. the water quality of rivers was dramatically improved, and the one in Tokyo Bay to a certain degree.

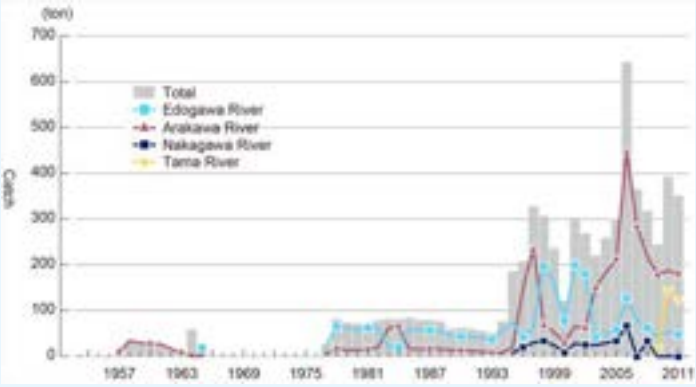
Landfill in Tokyo Bay Area[33]

[33] Website of Kanto Regional Development Bureau, Ministry of Land, Infrastructure and Transport: Transition of Tokyo Bay.

Column

Corbicula Japonica That Recovered in Brackish Water of the Inner Part of Tokyo Bay[34]

In sand and mud layer of the downstream of rivers where the impact of sea water can be observed including Arakawa River, old Edogawa River, Nakagawa River and Tama River, fishing for corbicula japonica which is familiar with its miso soup has been conducted from late autumn to winter and spring, which has been delivered as “Shijimi of Edo-mae” in Toyosu Market etc. The catch of corbicula japonica had drastically decreased for approximately 10 years since 1965 during Rapid Economic Growth Period to the degree that its name disappeared from statistical record. However, around 1977 the water quality was rapidly improved, its fishing was restarted in brackish water of Arakawa River and Edogawa River, and after 1995, its catch was dramatically increased. Thus, it is supposed that improvement of water quality helped such increase in its catch.

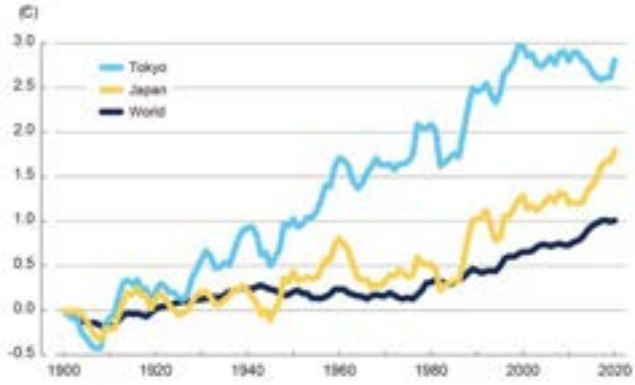


Fish Catches of Corbicula Japonica


Corbicula Japonica

Temperature Rise in Tokyo

The average temperature in central Tokyo has been increasing approximately 3 °C in the last 100 years. In Tokyo, as heat island phenomenon continues to occur due to advancement of urbanization etc., its temperature rise shows larger changes compared to those of global average and Japanese one.



Changes of Annual Average Temperature in Tokyo[35]

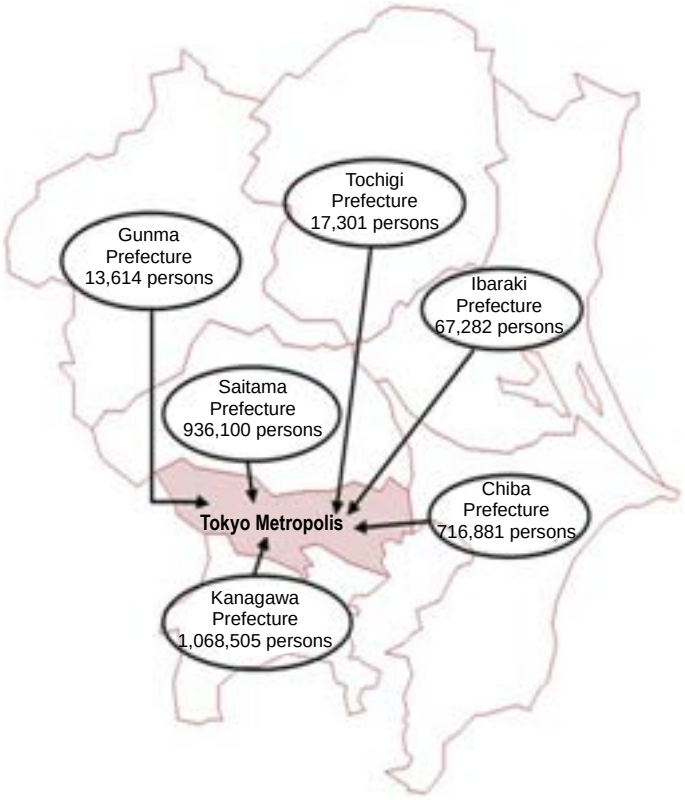
[34] Website of Tokyo Metropolitan Island Area Research and Department Center for Agriculture, Forestry and Fishery Center Inland Bay Survey in September of 2004 and Inland Bay Survey in December of 2013 (including graph and photos)
[35] The Tokyo Metropolitan Government prepared based on the data of the Japan Meteorological Agency. (deviation from 1900, moving average for 5 years).

Metropolis where people and corporations concentrate

The characteristics of Tokyo that is also related to its natural environment is that it is a metropolis where humans, goods, capital and information concentrate.

The population of Tokyo is reported as 14.03 million as of February 1 of 2023. As urbanization progresses in Tokyo, development of lands is still ongoing. The loads on natural environment due to excessive land use is becoming an issue. On the other hand, looking from another perspective, it can be understood that the bigger the population is, the more bearers there are to conserve natural environment.

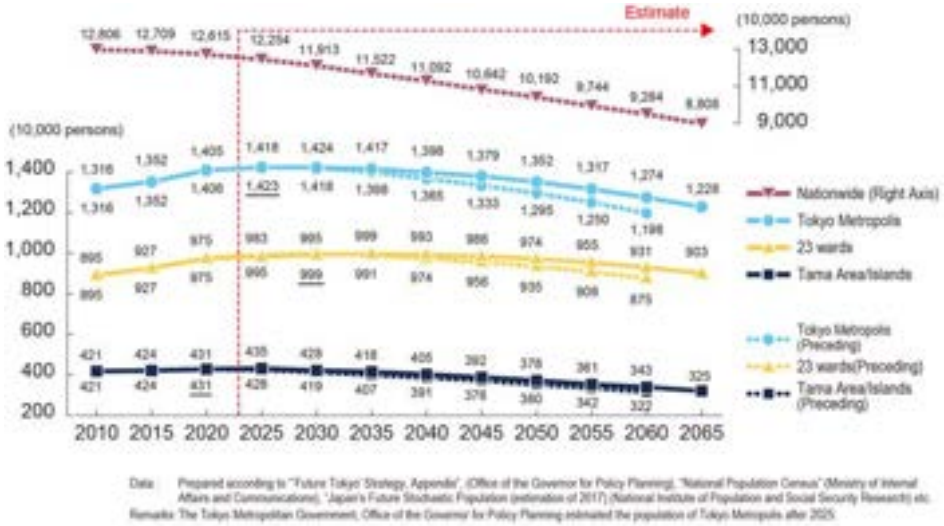
Additionally, as Tokyo consumes numerous resources, it imposes a large impact on natural environment inside and outside Japan through people's consumption activities. However, it is assumed that Tokyo has the potential to demonstrate positive effects for both Japan and other countries by replacing such consumption activities with the ones that consider biodiversity. Furthermore, as Tokyo has a large daytime population, ripple effect to other prefectures can be expected as transformation of behavior by people who commute to Tokyo proceeds.



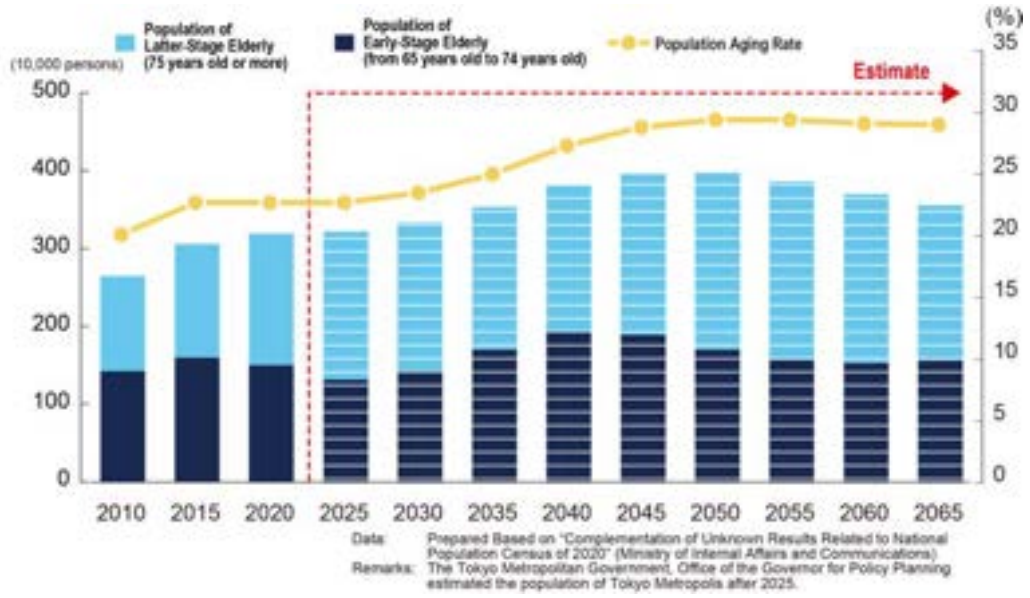
Daytime Population flowing into Tokyo Metropolis[36]

On the other hand, it is anticipated that the issues on declining birthrate and aging population will become more serious in Tokyo as well. It is estimated that the population of Tokyo Metropolis will be in the peak in 2030 as 14.24 million people and turn to decline after that. In 2065, compared to 2020, it is expected to decrease by approximately 10% to 12,28million. Additionally, it is estimated that population aging rate will be increased to 29% while youth population and working-age population will be decreased by 20%.

[36] Website of Tokyo Metropolitan Government Bureau of General Affairs, March 20 of 2018, Daytime Population of Tokyo Metropolis (population for workplace/commuting places).



Prediction of Change in Total Population of All parts of Japan, Tokyo Metropolis, Tokyo Metropolitan wards, Tama area/islands[37]



Changes in Population Aging Rate and Future Estimate[38]

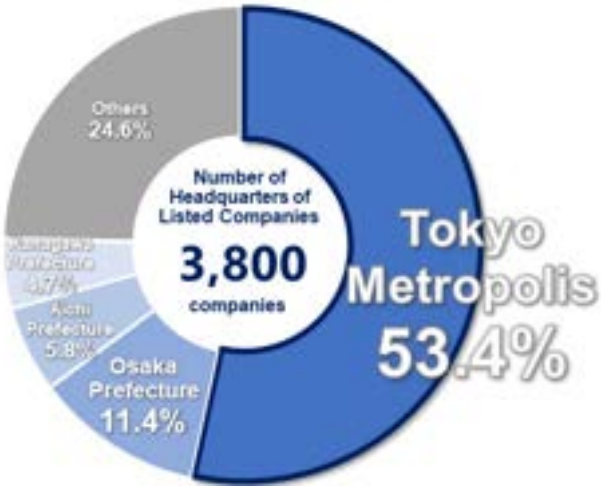
Since labor shortage for natural environment conservation will become more and more serious due to such population decline and declining birthrate and aging population, it is required to increase the population and secure people to take the lead in natural environment.

Also in economic activities, there is a characteristics in relationship with natural environment. In Tokyo where corporations cluster, numerous headquarters and global corporations have also been concentrated. Therefore, by promoting the initiatives for biodiversity in business activities of Tokyo, significantly positive ripple effects can be brought for inside and outside of Tokyo as well as for corporations in Tokyo. In the future, it is supposed that global corporations will mainly accelerate these initiatives by further proceeding international movement including ESG investment and disclosure of information related to nature.

[37] Prepared based on “Future Tokyo” Strategy version up 2023 annex (January of 2023, Tokyo Metropolitan Government).
[38] Prepared based on “Future Tokyo” Strategy version up 2023 annex (January of 2023, Tokyo Metropolitan Government).

In accordance with reform of corporative activities, if the activities of people working there can be changed, it is possible for them to have positive impacts on consumption activities in Tokyo as well.

In addition, Tokyo is the hub for movement of people and logistics with Port of Tokyo and Tokyo International Airport. With increasing globalization, introduction of alien species is becoming a major threat, due to movement of people and goods. Moreover, as we can see in recent global widespread of COVID-19, there are increasing risks in transfer of infectious diseases from abroad.



Locations of Headquarters of Listed Companies（2020）[39]

Port of Tokyo Container Terminal

Due to spread of remote working in COVID-19 catastrophe, as the lifestyle for working from home is being partly established, people have emerging alternatives to work by having their houses in the areas with abundant nature.

Besides, while restrictions are imposed on various activities due to COVID-19 catastrophe, people have increasing opportunities to contact with their familiar nature including parks and home gardens.

On occasion of COVID-19 catastrophe, as urban areas are adjacent to the areas with abundant nature in Tokyo, it is desirable for people to recognize the values of biodiversity by actively increasing the opportunities to feel more familiar with the nature.

[39] Prepared by Tokyo Metropolitan Government base on “Japan Company Handbook, 2021 New Year’s issue”.

(2) Status Quo of Biodiversity of Tokyo

Diverse Ecosystem of Tokyo

As we have seen so far, Tokyo has diverse topography and climate ranging from Mt. Kumotori and its peripheral that belongs to subalpine zone to Ogasawara Islands that belongs to subtropical zone. Further, especially because of the relationship between people and nature after Edo Era, its land use was dramatically changed. Thus, current ecosystem of Tokyo was formed in such a long history. While there are some issues, such as reduction of greenery due to development of land and deterioration in quality of greenery due to lack of care by humans, diverse and abundant ecosystems still remain in Tokyo.


[Natural Forest]


[Wooded Area]


[Homestead Woodlands]


[Temple and Shrine Forest]


[Urban Agricultural


[Artificial Forest]


[Spring Water]


[Irrigation Channel]

Greenery Rate

All Areas of Tokyo 52.5% (excluding Islands)

Wards Area 24.2%

Tama Area 67.8%

In 2018


[River]


[Yato]


[Cliff Line]

In mountain terrain, natural forests spread around Mt. Kumotori and its ridges, which are nearly primeval ones, and in the area with lower altitude, artificial forests of cedar and Japanese cypress occupy their large area. These areas are home to large mammals such as black bears and raptorial birds are living in these environments. Additionally, various areas in Okutama are dotted with the rock blocks with a mass of exposed limestone, where plants specific to limestones and land snails, and bats etc. inhabit and grow.

In hilly terrain, while there is a large decrease in greens, forests mainly composed of wooded areas spread, including sawtooth oak and konara oak that used to be utilized and maintained as fuelwood forest. In rural valley areas with classic landscape maintain valuable ecosystems where diverse living things inhabit and grow thanks to spring water and rural valley field.

In plateaus, in the spread of residential areas, parks and green lands are arranged, agricultural lands and woodlands being dotted, and liner greenery including rivers and irrigation channels, cliff lines and roadside trees distributing. Additionally, historical greenery remains including the environments where homestead woodlands, agricultural lands, wooded areas and irrigation channels are integrated and gardens of samurai residences and temple and shrine groves. While advanced urban functions concentrate in the east of plateaus, there are large-scale green lands including Imperial Palace and Meiji Shrine, and private green lands including corporate ones.

While urbanization is promoted in lowlands as well as in plateaus, agricultural lands, woodlands and homestead woodlands are dotted, other than large-scale green lands including Mizumoto Park and Hama-rikyu Garden. There are a lot of large rivers and canals, riverbeds and parks created by landfill. Additionally, there are artificial tidal flats and beaches in coastal areas.

In island areas, there are plenty of rare species as the descendants of living things that had been accidentally carried into ocean islands under isolated environments and then evolved into indigenous species for a long time etc., and thus each island forms characteristic ecosystem. While the characteristics of distribution of plants in Izu Islands have the common ones with the south part of the Fossa Magna area including Izu Peninsula, they have the ecosystems specific to islands. Additionally, in Ogasawara Islands, there are numerous indigenous species including land snails, whose ecosystems have been valued and thus registered as world natural heritage. Besides, there are also uninhabited islands with primeval nature.

l Land]

[Urban Park]

[Roadside Trees]

[Corporate Green Space]

[Tidal Flat]

[Seaweed Bed]

[Maritime Park]

[Coral Reef]

Column

Large-Scale Green Lands That Remain in Central Tokyo ～Creation of Permanent Forests～

Before Meiji Shrine is established, it is said that this area has the view like a wasteland where only one big fir tree stands, which became the origin of the name Yoyogi. As this area enshrines Emperor Meiji and Empress Dowager Shoken, its forest was planned so that evergreen broadleaves including chinquapin, oak and camphor tree mainly consist of this in the future by considering tree species best suited for “permanent forest” where people quietly offer prayers by anticipating 100 years from now.

Meiji Shrine was founded in 1920 and celebrated its 100th anniversary of enshrinement in 2020. Academic research have also been conducted regarding how this forest grows. According to the recent research, while there used to be approximately 120,000 trees of 365 species when the forest was originally created, there are 36,000 trees of 234 species at present. This is because the trees originally planted grew to be bigger as planned and natural selection has operated on them. At present, its ecosystem has shifted to the one of natural forest. In addition, it is reported that there are approximately 3,000 species, including rare plants and animals for Tokyo, as well as new ones, endangered ones.[40]


Varied tit


Japonica saepestriata

Living things Inhabiting the Forest

[40] Website of Meiji Shrine, Forest/Highlight https://www.meijijingu.or.jp/midokoro/

Column

Landscape of Musashino Since Edo Period

There is a remnant for development of new rice fields in Edo Era, mainly along Ome Street and Itsukaichi Street of Musashino Plateau.

What is distinct about development of new rice fields is its elongated strip type allotment of land. In strip type section, from the frontside facing the street, firstly the residence was arranged, and secondly cultivated land and lastly wooded areas.

At the residence, Japanese oak and Keyaki were mainly planted to prevent north wind in winter and bushes, including holly trees and Japanese laurels serving as screen, which formed homestead woodlands.

Beyond that, there are some waterways forked from Tamagawa Josui, and agricultural lands for various farm products spread further.

At the very back of the residence, wooded areas were arranged as the supply source of firewood and fallen leaves used for fertilizer.

While the landscapes composed of such homestead forests, waterways, agricultural lands and wooded areas are significantly reduced at present due to housing development, they play a significant role as the base of habits for living things as buried seeds of plants are left in homestead forests, as well as handing down their history to the next generation till now.

Strip Type Allotment of Land[41]

Homestead Forest and Agricultural Land Along Itsukaichi Street of Musashino Plateau

[41] Provided by Association of Kodaira Folktales

Tokyo's Living Things

There are 7,687 species of fauna and flora found in Tokyo, in "List of Tokyo's Wildlife (1998)" published in 1998. Their breakdown is as described in the table below: 5,370 species for the mainland, 2, 415 for Izu Islands and 1,916 for Ogasawara Islands.

Diversity for Species of Tokyo's Creatures[42]

Classification	Mainland	Izu Islands	Ogasawara Islands	Tokyo as a Whole
Plants	3,421	1,313	654	4,323
Pteridophyte	298	186	99	440
Seed Plants	3,123	1,127	555	3,883
Animals	1,949	1,102	1,262	3,364
Mammals	43	17	1	51
Birds	328	327	101	422
Reptilia	15	18	6	30
Amphibia	16	8	1	18
Freshwater Fish	90	(Not Subject to Research)	(Not Subject to Research)	90
Insects	1,457	732	1,048	2,648
Land Snails	(Not Subject to Research)	(Not Subject to Research)	105	105
Total	5,370	2,415	1,916	7,687

In 1998, as there are some taxonomic groups not subject to the survey or the ones whose inhabiting were found after the surveys due to inadequacy of the survey, it is expected that there will be further more species inhabiting.

For example, insects broadly distribute in Tokyo, ranging from the ones favoring cold climate to the ones favoring warm climate. There are also numerous well-known ones endemic to specific environmental elements, including limestone lands and spring water lands. According to the survey conducted by a private agency[43], it is recorded that there are over 10,000 species of insects alone.

In insects, regarding dragonflies, as of May of 2021, 108 species are recorded[44]. This is the second most following 120 species of Kagoshima Prefecture. Although Tokyo's area is small ranked as the 45th in all the prefectures in Japan, it can be assumed that it has extremely high diversity of species. On the other hand, as nine of such species have already been determined as extinct, it is found that diversity of Tokyo's species have been endangered. In Tokyo, it is becoming an issue to continuously conduct surveys in order to obtain such basic information and accumulate such information.

Platycnemis Floliacea Sasakii found in 1882 in the current Inokashira Onshi Park, which used to inhabit in the spring water land around Musashino Plateau, but has not been observed now.

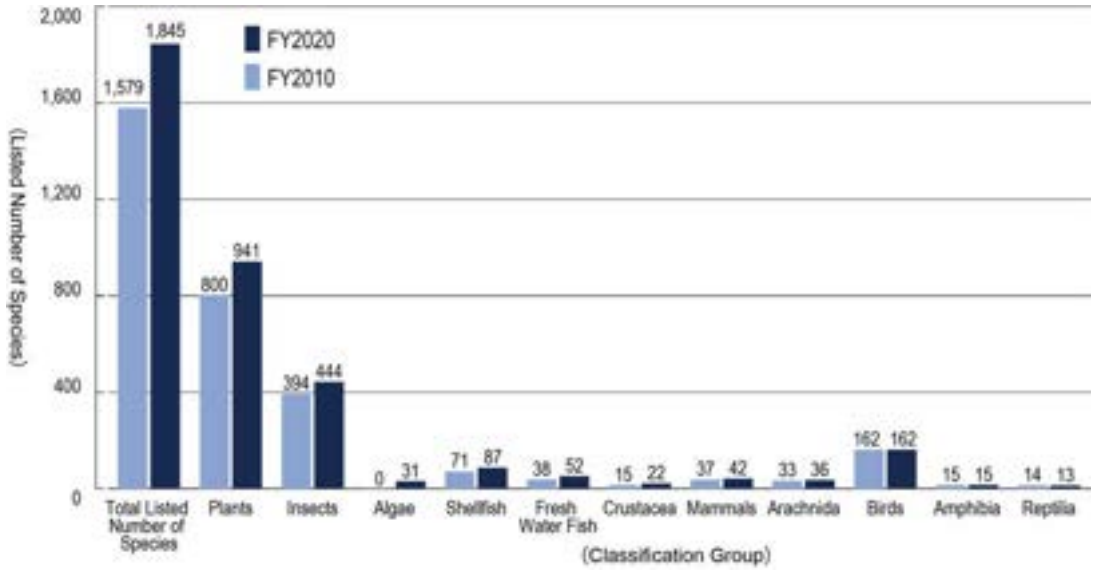
[42] List of Wildlife of Tokyo Metropolis (1998, Bureau of Environment Conservation, Tokyo Metropolitan Government)
[43] Project on list preparation for insects in Mainland of Tokyo, http://tkm.na.coocan.jp/index.html viewed on November 29 of 2022
[44] Dragonflies in Tokyo（2021 Author and editor: Hideto Kita, Supervisor: Shinichi Suda, Ikada-sha）p218

Red List of Threatened Species Tokyo

The Tokyo Metropolitan Government has prepared “Red List of Threatened Species Tokyo (Tokyo Red List) (hereinafter referred to as “Tokyo Red List”) as the list of endangered wildlife species since 1998. The one for the Mainland has been revised twice, and as for the islands areas once. The number of species on Tokyo Red List tends to increase whenever it is revised.

① Outline of Tokyo Red List (Mainland) 2020

In the revision of Tokyo Red List (Mainland) 2020, 447 species were newly listed. The species in the latest list include the living things that could be normally found until recent years, such as Misgurnus anguillicaudatus and Emberiza cioides.



Changes in the Number of Species on Mainland Red List[45] [46]

Erythronium japonicum (Mainland VU)

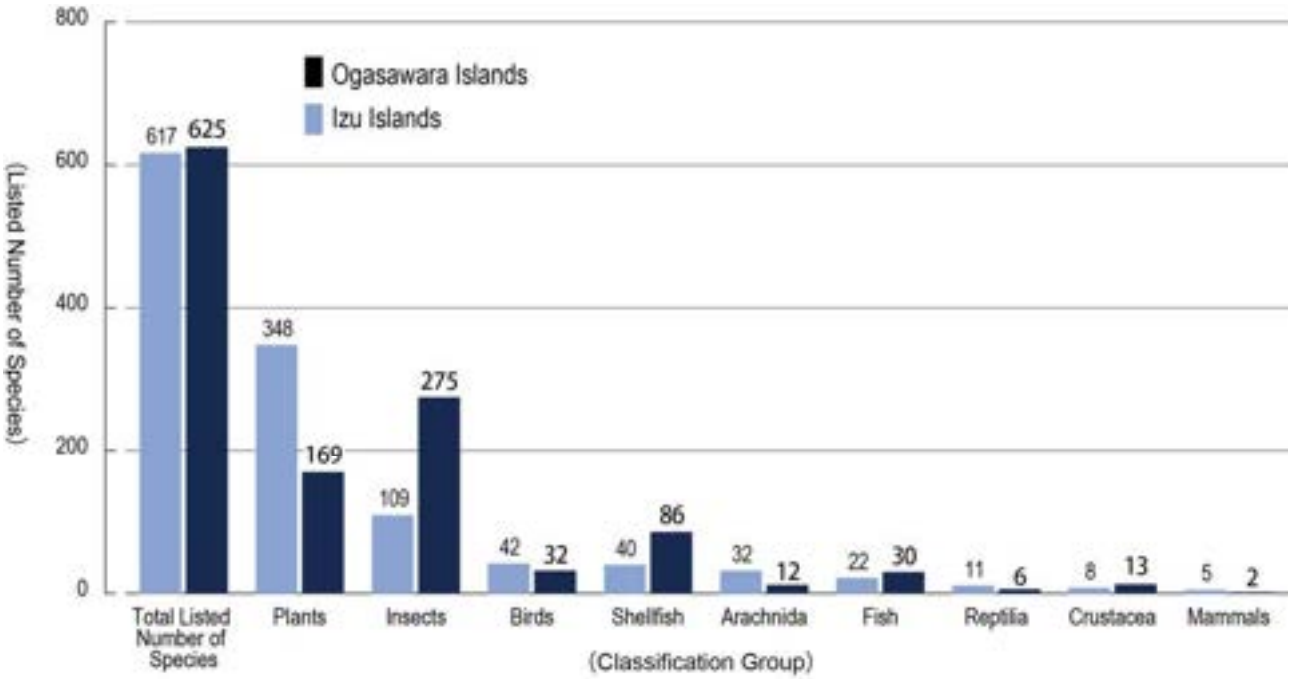
Owl (Mainland EN)

Representative Species On Tokyo Red List

[45] Red List of Threatened Species Tokyo (Mainland) (2010, Bureau of Environment, TMG)
[46] Red List of Threatened Species Tokyo (Mainland) (2020, Bureau of Environment, TMG)

② Outline of Tokyo Red List (Islands) 2011

In revision of Tokyo Red List (Islands) 2011, 278 species were newly listed in Izu Islands, 286 in Ogasawara Islands, which includes the ones listed due to alien species and deterioration of environments for inhabiting and growing species.



Number of Species on Islands Red List in Tokyo[47]

Calanthe izuinsularis x C. discolor (Islands CR)　　Ogasawara Greenfinch (Islands CR)

Representative Species On Tokyo Red List

[47] Red List of Threatened Species Tokyo (Mainland)～Tokyo Red List～2011 version [modified in June of 2011]
https://www.kankyo.metro.tokyo.lg.jp/nature/animals_plants/red_data_book/redlist2011.html

Column

Living things That Go by the Name of Tokyo

Tokyo has a lot of living things that go by the name of Tokyo, including Tokyo, Edo, Musashi, Tama, Takao and Ogasawara. These species include the ones endemic to Tokyo or the ones whose mainly distribute in Tokyo, a lot of which are listed as new species based on the specimens collected in Tokyo.

Among these, there are a lot of species listed in Tokyo Red List as endangered ones. All of the living things listed below are endangered species.

Asarum tamaense (Tamanokan-aoi)
(Mainland EN)

Viola yezoensis f. discolor
(Takaosumire)(Mainland NT)

Hemerocallis dumortieri var. musashiensis
(Musashinokisuge) (Mainland VU)

Pelophylax porosus porosus (Tokyodarumagaeru)
(Mainland EN)

Hynobius tokyoensis (Tokyosanshouo)
(Mainland EN)

Gymnogobius macrognathos
(Edohaze) (Mainland VU)

Hemicordulia Ogasawarensi
(Ogasawaratonbo) (Islands EN)

Column

Endangered Celastrina Ogasawaraensis

Celastrina ogasawaraensis is an endemic species that distributes in Ogasawara Islands, which has been designated as a natural treasure under Act on Protection of Cultural Properties, and a nationally endangered species of wild fauna and flora under Act for the Conservation of Endangered Species of Wild Fauna and Flora, as well as designated as critically endangered species IA (CR) of Red List of Ministry of Environment and Tokyo Red List.

Celastrina ogasawaraensis had been disappeared in Chichijima archipelagos by 1990s due to predation by green anoles as an alien species, damage by drought and typhoons, or impacts by development, and they had been able to be observed only in Hahajima Island in recent years.

While efforts had been made to grow and breed celastrina ogasawaraensis in Tama Zoological Park and Shinjuku Gyoen National Garden as ex-situ conservation[48], it became difficult to breed them due to decline in fertilized eggs, all the individuals grown died on August 25 of 2020.

While this species had not been observed even in Hahajima Island since June of 2018, as the ex-situ population disappeared, it has been critically endangered. As the number of other endemic species has been continuously decreasing due to predation by green anoles, it is necessary to further strengthen protective measures for such species.

(See: Website of TokyoZooNet)

Celastrina Ogasawaraensis (Islands CR)

[48] The process to protect living things out of their natural habitats and avoid their extinction by breeding them.

Important areas designated by laws and regulations

In Tokyo, there are important areas designated by laws and regulations from the perspective of biodiversity.

① Ogasawara Islands registered as a World Natural Heritage Site

As Ogasawara Islands are the marine ones that have never been connected with the continents, the living things there have undergone unique evolutionary process. Thus, the proportion of endemic species that inhabit only Ogasawara Islands in the world is significantly high. As their unique ecosystems is known as the Galapagos of the Orient and gained considerable global recognition, they were registered as a World Natural Heritage Site by United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2011.

Landscape of Ogasawara Archipelago

Bonin islands honeyeater (Islands VU)

Diversity of Land Snails[49]

[49] Annual Report on Environment, Recycling Society and Biodiversity, 2012 version (June of 2012, Ministry of Environment).

② Kasai Marine Park registered as a wetland under Ramsar Convention

In Kasai Marine Park (Edogawa Ward), diverse living things including mudskipper Periophthalmus modestus designated as an endangered species in Tokyo Red List, as well as flying-in of a lot of migratory birds every year.

As this park is also internationally important as an inhabit of aquatic birds, including scaups and great crested grebes, it was registered as the first site in Tokyo as a wetland under Ramsar Convention seeking for sustainable use with consideration to conservation of marshlands and ecosystems.

Kasai Marine Park as a Wetland under Ramsar Convention

Greater scaup

Great Crested Grebe

③ Minami-Ioto Island designated as a wilderness area

Minami-Ioto Island is designated as a wilderness area under Natural Conservation Act. The area is where truly wild situations have been maintained without being affected by human activities and the most strict protection regulations have been exercised in the system for natural conservation areas. Minami-Ioto Island has been an uninhabited island from the past up to the present, which has been isolated from anthropogenic impacts.

There are only five wilderness areas throughout Japan. Additionally, as Minami-Ioto Island is also designated as natural protected area under Act on Protection of Cultural Properties, which is a valuable wilderness area.

The surveys have been conducted by landing on the islands four times (1936, 1982, 2007, 2017); in the natural environment survey that was conducted for joint study by the Tokyo Metropolitan Government, Tokyo Metropolitan University and Japan Broadcasting Corporation (NHK) in 2017, new species of plants and land snails were discovered, in which it has become clear that the nature of the island is valuable.

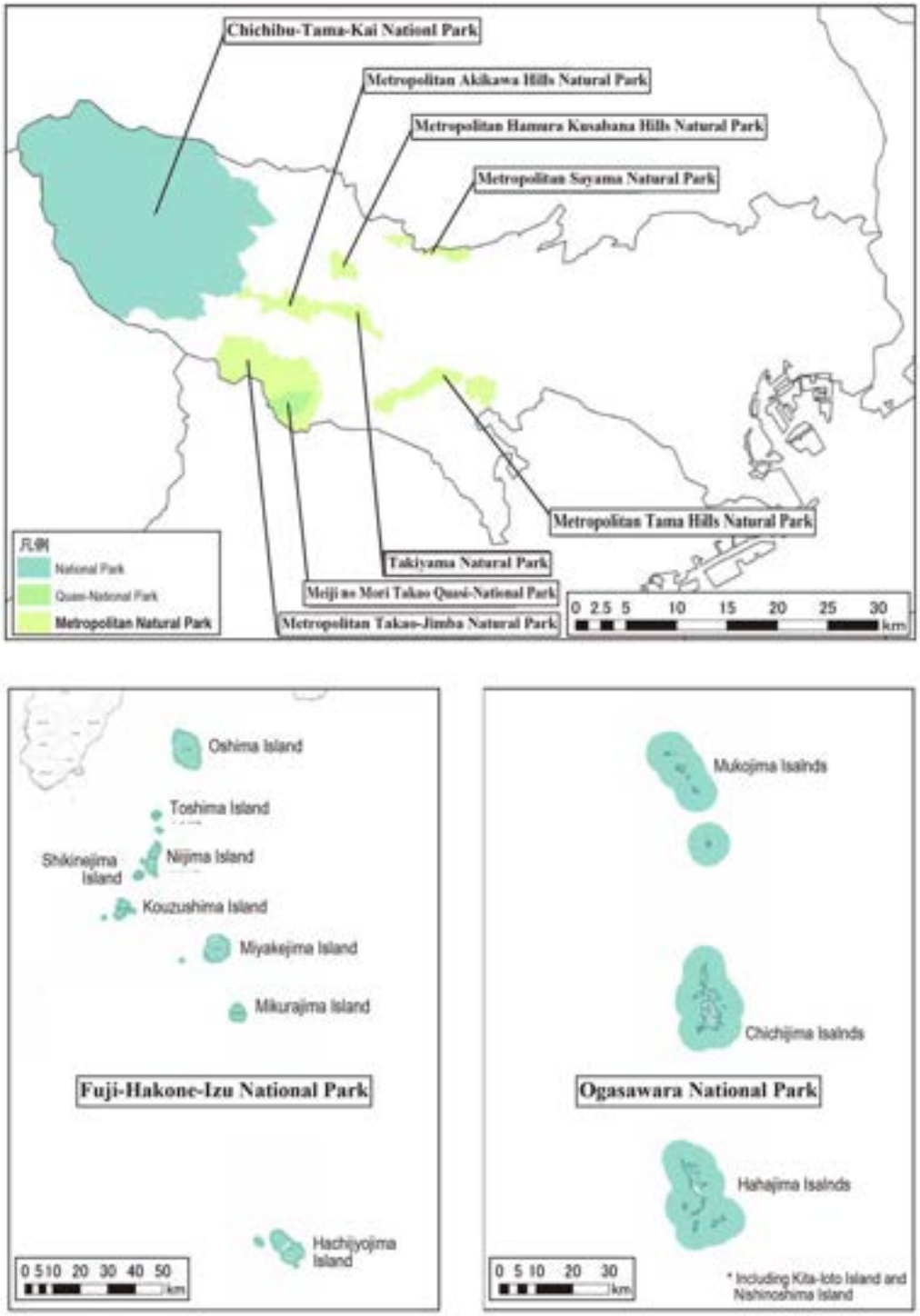
Minami-Ioto Island as a wildness area

④ Natural park

34 “Natural Parks” have been designated as the distinct natural scenic areas that represent Japan throughout Japan under Natural Parks Act. Among the systems to conserve natural environment by designating areas, it has the largest areas in Japan. Three of these Natural Parks are designated in Tokyo; Chichibu-Tama-Kai Natural Park, Fuji-Hakone-Izu National Park and Ogasawara Natural Parks.

There are 58 “Quasi-National Parks” designated as the national scenic areas equivalent to Natural Parks. In Tokyo, Meiji Memorial Forest Takao Quasi-National Park is designated.

When six Tokyo Metropolitan Natural Parks are added, approximately 36% of the areas of has been designated as natural parks, whose percentage of acreage of such areas are ranked the second largest in Japan.



Distribution of Natural Parks in Tokyo

⑤ Wildlife protection area

Wildlife protection areas are designated in order to protect wildlife, under Wildlife Protection, Control, and Hunting Management Act. In addition to hunting being prohibited in wildlife protection areas, certain developments are regulated in special protection zones. There are 86 wildlife protection areas in Japan and eight areas are designated as national wildlife protection areas in Tokyo. Other than the ones mentioned above, there are a lot of wildlife protection areas designated by Tokyo Metropolitan Government.

⑥ 500 Important Wetlands in Japan

In response to increasing national interest in decline and deterioration of wetlands, including marshlands and tidal flats, aiming at making it foundation to be registered under the Ramsar Convention and conserving important wetlands from the perspective of biodiversity, they have been selected by Ministry of Environment in 2001, among which eight wetlands have been selected in Tokyo.

⑦ Important Satochi-Satoyama for biodiversity conservation

Aiming at promotion of the initiatives to utilize conservation by diverse entities, by defining important Satochi-Satoyama areas (community based forest areas and the surrounding countryside) from the perspective of biodiversity, Ministry of Environment selected such Satochi-Satoyama areas in 2015. Eight Satochi-Satoyama areas have been selected in Tokyo.

⑧ UNESCO Biosphere Reserves

UNESCO Biosphere Reserves have the model areas that have bountiful ecosystems and where sustainable economic activities by utilizing local natural resources are promoted and it started its operation aiming at protection of biodiversity in 1976. The peripheral areas of Mt. Kobushi across Tokyo Metropolis, Yamanashi Prefecture, Saitama Prefecture and Nagano Prefecture are located at the source areas of some of the largest rivers including Arakawa River and Tama River etc.

Zoning Chart of Kobushi UNESCO Biosphere Reserves

While such Parks are located near the metropolitan areas, they have highly abundant and continuous nature, where valuable environments with rich biodiversity are broadly conserved. As the Kobushi areas are important ones for biodiversity conservation and their initiatives and research study for sustainable development and provision of educational sites are recognized by UNESCO in 2019, they were registered as a UNESCO Biosphere Reserves.

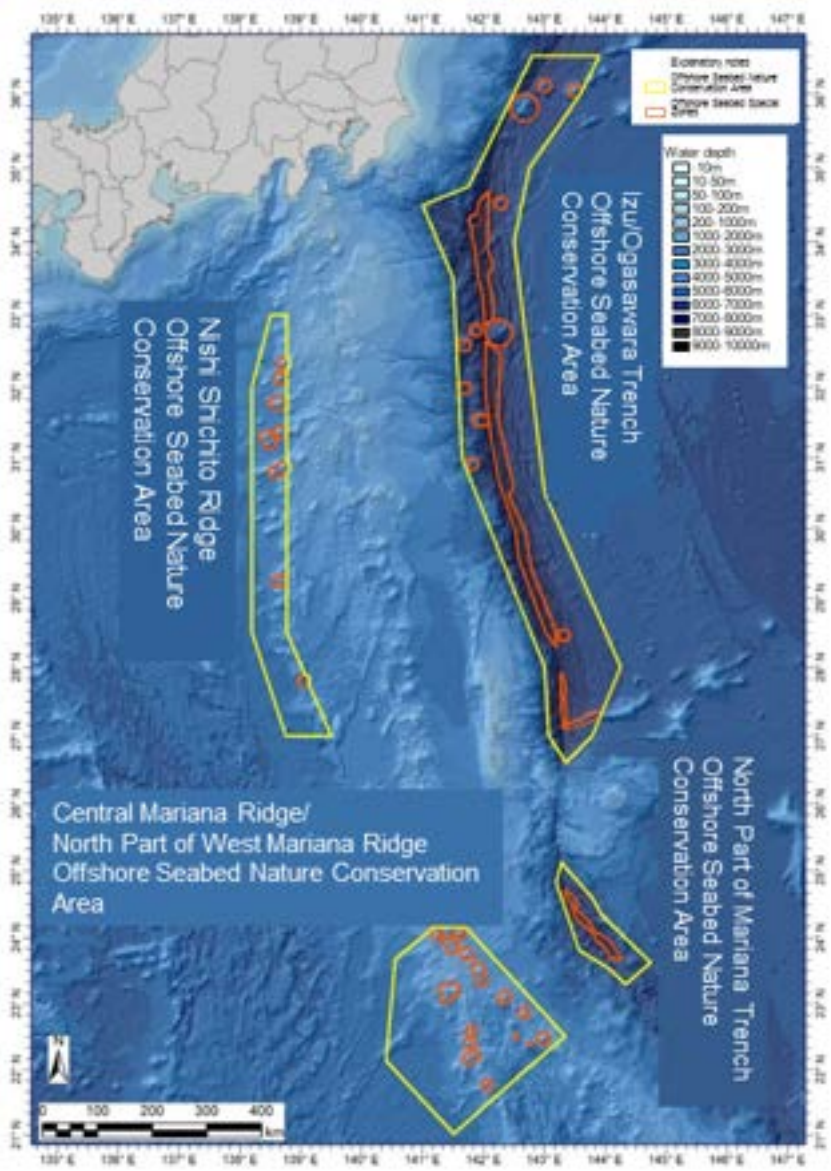
⑨ Japanese Geoparks

A geopark is a single, unified geographical area where sites and landscapes of geological significance are managed with a holistic concept of protection, education and sustainable development. At present in Japan, there are 46 areas recognized as “Japanese Geoparks” by Japan Geopark Committee (as of January of 2022). In Tokyo, there is Izu Oshima Geopark.

⑩ Offshore Seabed Nature Conservation Areas

Offshore seabed nature conservation areas are designated by Ministry of Environment under Natural Conservation Act, whose natural environment is recognized as being in an excellent condition.

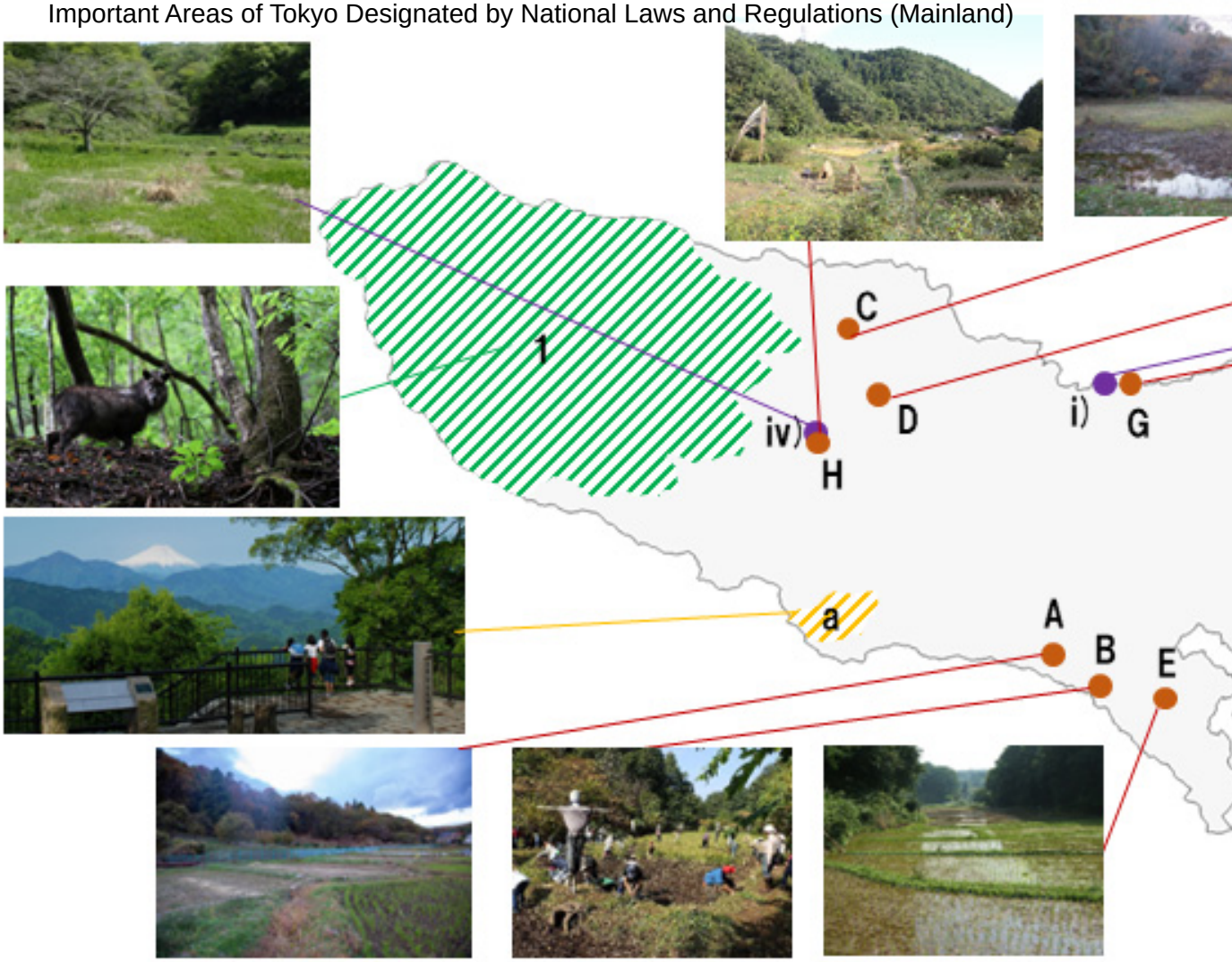
On January 1 of 2021, the following four sea areas that have the deepest ocean trench in Japanese EZZ (Exclusive Economic Zone) or the ocean areas where seamounts exist in high density were designated as offshore seabed nature conservation areas firstly in Japan.



Offshore Seabed Nature Conservation Areas[50]

[50] Website for Ministry of Environment, Regarding Designation of Offshore Seabed Nature Conservation Areas and Decision of Conservation Plan.

Important Areas of Tokyo Designated by National Laws and Regulations (Mainland)



National Park

Quasi-National Park

Government-Designated Wildlife Refuge

Important Wetlands 500

Important Satoyama Area

	National Park
1	Chichibu-Tama-Kai National Park
2	Fuji-Hakone-Izu National Park
3	Ogasawara National Park

	Quasi-National Park
a	Meiji no Mori Takao Quasi-National Park

	Boundaries of a Wilderness Area
b	Minami-Iotō Island

①
②
③
④
⑤
⑥
⑦
⑧

* Position information indicates an approximate representative one.

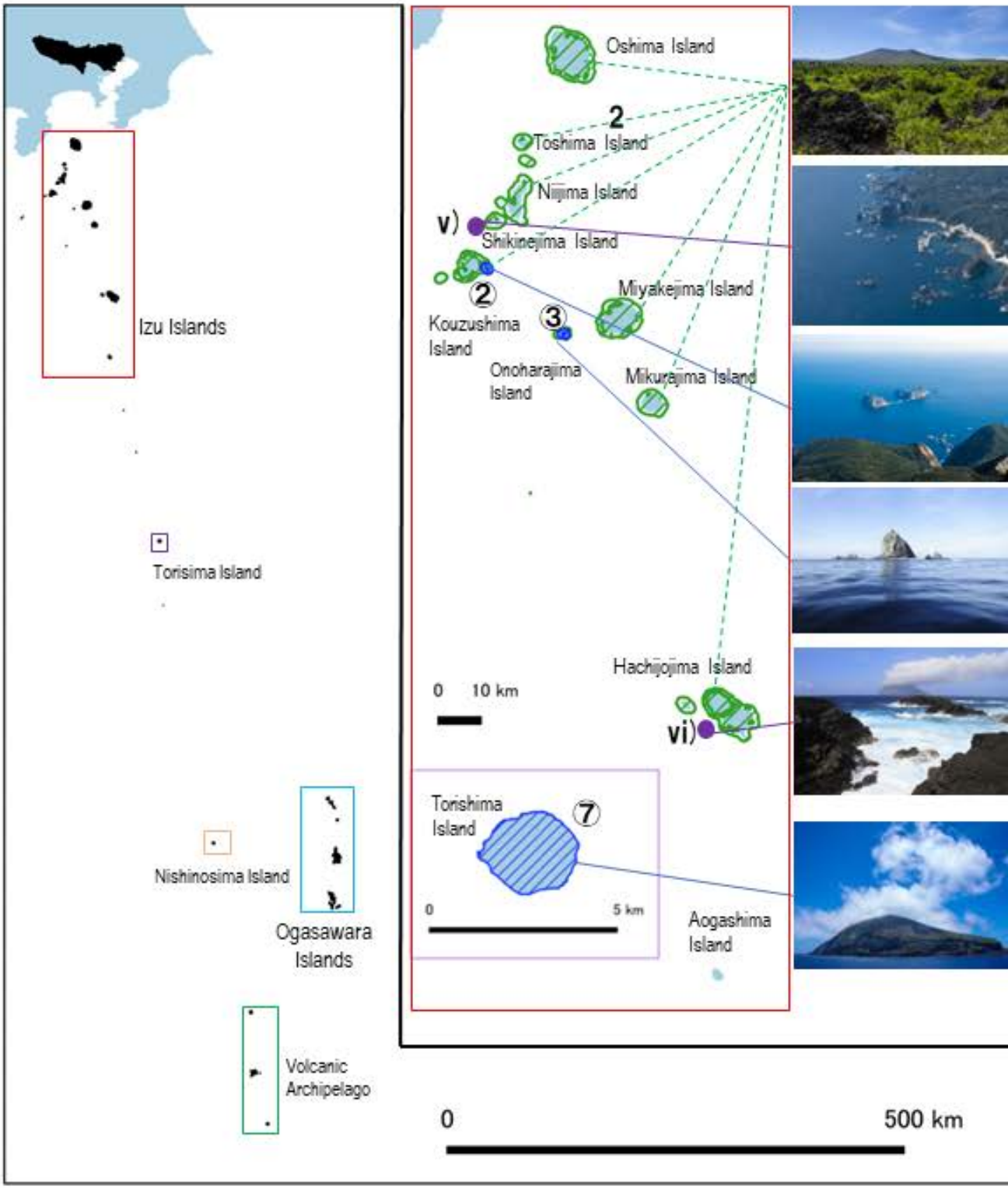
Tokyo (Mainland)

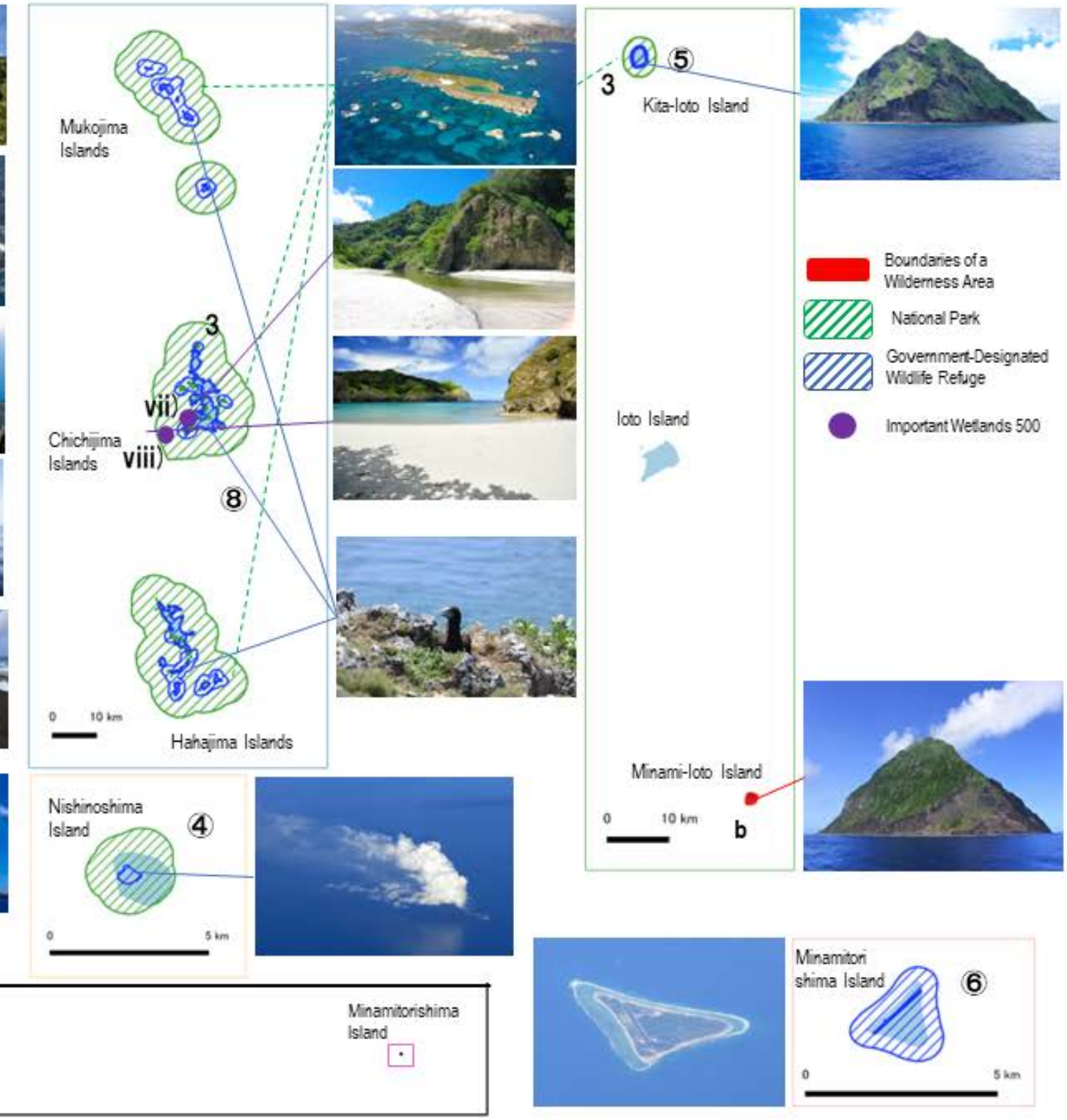
Government-Designated Wildlife Refuge
Kasai Offshore Sanmaisu
Tadanaejima Island
Onoharajima Island
Nishinosima Island
Kita-Ioto Island
Minamitorishima Island
Torishima Island
Ogasawara Islands

	Important Wetlands 500
i)	Wetland around Sayama Hills
ii)	Tidal Flat/Shallows of Tokyo Bay
iii)	Mizumoto Koaidame
iv)	Water Spring and Wetland of Tama Hills Zone
v)	Around Shikinejima Port
vi)	Coast around Hachijyojima Island
vii)	Interior Drainage of Ogasawara Islands
viii)	Sand Coasts of Surrounding Areas of Ogasawara Islands and Surrounding Shallow Water

	Important Satoyama Area
A	Tama Hills (Yugi District)
B	Nagaike Park
C	Ome Forest
D	Onita (Nagabuchi Hills)
E	Zushi Onoji Historic Conservation Area and Narabai Yato
F	Miwamachi no Mori
G	Throughout Sayama Hills
H	Yokosawaiiri Satoyama Conservation Area

Important Areas of Tokyo Designated by National Laws and Regulations (Islands)




Mukojima Islands
3
vii)
viii)
Chichijima Islands
8
0 10 km
Hahajima Islands
Nishinoshima Island
4
0 5 km
Minamitorishima Island
3
0
5
Kita-Ioto Island
Ioto Island
Minami-Ioto Island
0 10 km
b
Boundaries of a Wilderness Area
National Park
Government-Designated Wildlife Refuge
Important Wetlands 500
Minamitori shima Island
6
0 5 km

Column Sanctuary for Migratory Birds that Travel Around the World

As Tokyo Port is valuable as the connecting point for Japanese migratory birds, Tokyo Port Wild Bird Park was developed on the landfill as the sanctuary (protected area for wild birds) by the Tokyo Metropolitan Government in 1978. It is identified as the partnership site of "East Asian-Australasian Flyway Partnership[51]" since the number of flying-in Mongolian plovers satisfied the standard for partnership in 2000.

Tokyo Port Wild Bird Park
(Ota Ward)

Mongolian plovers

In Torishima Island, Albatross designated as Special Natural Monuments have been breeding. However, in order to surely repopulate Albatross for the fear of eruption, during 2008 to 2012, it was attempted to transfer some young birds of Albatross of Torishima Island, in order to disperse them to Mukojima Island that used to be their breeding area. Subsequently, one breeding pair was born in Mukojima Island, their young birds have been born every year since 2016. In addition, in two islands near Mukojima Island as well, their breeding could be observed. Through the first attempt to transfer and grow their young birds, it became possible to resume breeding of Albatross in Mukojima archipelago for the time in 80 years.

Furthermore, while black-footed albatrosses as the related species of Albatross that also breed in Japana and used to breed in Ogasawara archipelago and Torishima Island, they have been observed their breeding around Hachijojima Island as the northmost place in the world for their breeding in recent years.

Colony of Albatross in Torishima Island
(group nesting site)

(Source: Website of Public Interest Incorporated Foundation, Yamashina Institute of Ornithology)

Migration Pathway for Albatross

[51] East Asian-Australasian Flyway Partnership was concluded in order to establish international important habitats network for migration of birds by providing framework for international collaboration and cooperation of various entities related to conservation of migratory birds in East Asian-Australasian area. In 2000, it was formerly called "East Asian-Australasian Shorebird Site Network", in line with establishment of "East Asian-Australasian Flyway Partnership" in November of 2006, it was transferred to important habitats network based on new partnership.

Column Ogasawara Islands and Izu Islands where migratory whales breed

A humpback whale is an aquatic mammal that migrates a wide range, which spends summer in the North Pacific and migrates to low-latitude region for breeding in winter. Ogasawara Islands are breeding grounds for humpback whales , which are the places for mating and parenting. It is known that they migrate to Aleutian Islands and Kamtchatka offing approximately up to 6,000km in summer. In recent years, they can be observed in Hachijojima Island and Miyakejima Island.

Humpback Whale

2 Ecosystem Services in Tokyo

Our affluent lives and economic activities are built on ecosystem services as blessings of biodiversity. Especially, the global metropolis of Tokyo relies on the ecosystem services of the other regions in Japan and countries as well as the ones of Tokyo. This section will also describe the main ecosystem services that are provided from outside of Tokyo.

(1) Provisioning services

Provisioning services refer to the functions to supply the resources needed for our daily lives, such as food, wood, water and medicine etc.; for example, provisions including grains such as rice and wheat etc., vegetables, fruits, meat and fish are bio resources themselves and a prime example of blessings of biodiversity.

① Agricultural, forestry and fishery resources in Tokyo

There are also agricultural lands and forests in Tokyo where urban areas are spreading and as one of blessings of biodiversity, characteristic agricultural, forestry and fishery resources have been produced.

Agricultural and livestock products produced in Tokyo include livestock products such as Tokyo X, Tokyo Ukkokei and Tokyo Shamo[52], as well as vegetables and fruits etc. such as Komatsuna (Japanese mustard spinach), Ashitaba (Angelia keiskei) and Inagi pear, which have become Tokyo local brand. Furthermore, as traditional agricultural products, Edo Tokyo Vegetables[53] including Nerima daikon (Japanese white radish) have been produced.


Komatsuna (Japanese Mustard Spinach)

Ashitaba (Angelia keiskei)


Inagi pear


Tokyo X


Tokyo Ukokkei


Tokyo Shamo

[52] Website of Bureau of Industrial and Labor Affairs, Tokyo Metropolitan Government, TOKYO★Brand Agricultural and livestock products
[53] Vegetables originating from native species or native cultivation methods etc. from Edo Era to the middle of Showa Era.

As forest resources, lumber in Tama area including cedar and Japanese cypress etc. is produced. The production site of some of such lumber has been identified and supplied as “Tokyo’s wood, Tokyo tamasanzai” (hereinafter referred to as “Tamasanzai”.). As well as lumber, coal, charcoal, mushrooms and camellia oil are produced.

Camellia Oil as specialty of Izu Islands[54] [55]

Hinohara Village has launched the initiatives for wood biomass in order to reduce CO_2 emission by making use of the resources in the village that have not been utilized previously as energy. ”Hinohara Onsen Center, Kazumanoyu” utilizes thinned wood etc. as firewood fuel instead of fuel oil.

Firewood Boiler of Hinohara Onsen Center[56]

[54] Website of Bureau of General Affairs, Tokyo Metropolitan Government Tokyo Treasure Island
[55] Website of Bureau of Industrial and Labor Affairs Tokyo Metropolitan Government Certified Locally Sourced Food Products
[56] Website of Bureau of Industrial and Labor Affairs Wood of Tokyo, Role of Wood

Column Utilization of Tamasanzai and Forest Cycle

By making use of Tamasanzai, “Forest Cycle” is promoted to return its profits to activities for lumber production, log and utilize artificial forests, and then transplant and grow them. Through appropriate maintenance including tree thinning in the course of such forest cycle, which leads to growth of bottom weed, public functions are improved including watershed functions.

Additionally, from the perspective of reducing the load on overseas ecosystems due to lumber import as well, it is significant to utilize domestic lumber of Tokyo as one of the major consumption areas.

The Tokyo Metropolitan Government promote expanding use of domestic lumber including Tamasanazai.

Forest Cycle[57]

Artificial forest with its understory vegetation decaying due to insufficient thinning

Artificial forest with proper thinning

Regarding fishery resources, Tokyo is abundant in marine products obtained from Izu Islands and Ogasawara Islands, Tokyo Bay and Tama River; mainly fish and algae including Splendid alphosino that inhabit near the islands areas, and shellfish including Asari clams that inhabit the shallow ocean inside of Tokyo Bay, and Ayu (sweetfish) that inhabit freshwaters including Tama River system etc., are caught.

Splendid alphosin

Asari clam

Ayu (sweetfish)

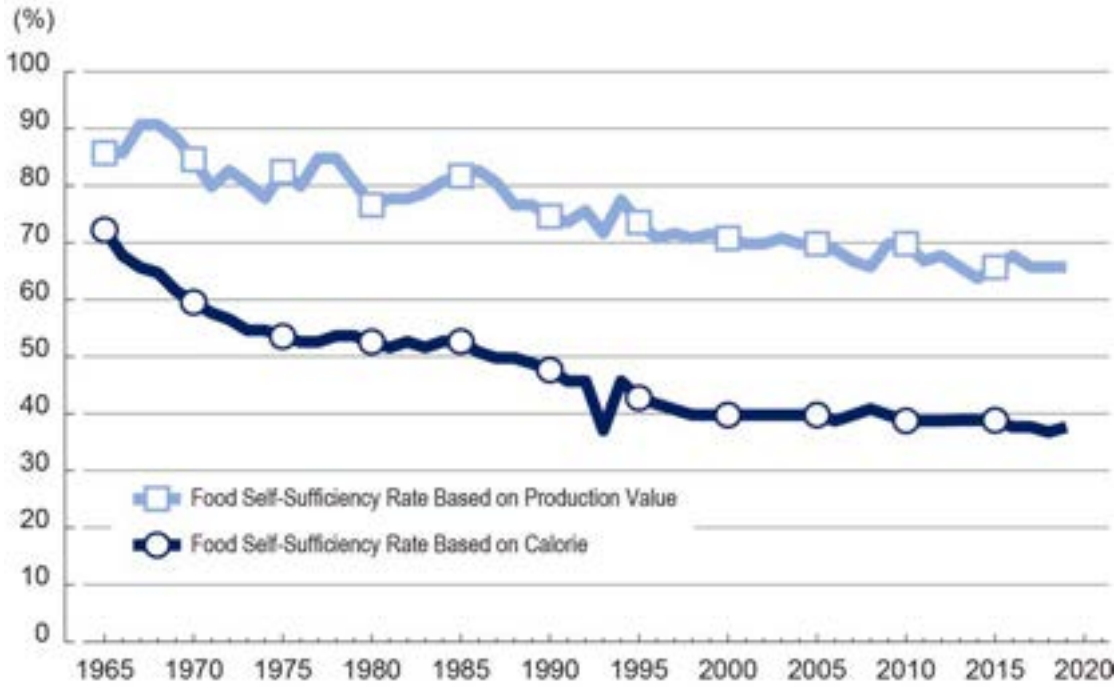
[57] Forest Revitalization Promotion Plan (June of 2021, Bureau of Industrial and Labor Affairs Tokyo Metropolitan Government)

② Blessings of food and lumber from outside of Tokyo

In the current society, it is becoming common for us to purchase various goods in stores or online, not to produce them by ourselves. Thus, people are apt to forget the fact that we depend on the blessings of biodiversity for our convenient livings. As Tokyo is a metropolis where approximately 14 million people live, we will never be able to make our livings without the blessings of biodiversity from outside of Tokyo.

Various Blessings of Biodiversity Supplied from Outside of Tokyo

As consumption of rice with high self-sufficiency rate has declined and the consumption of livestock products and oil and fat whose fodders and ingredients we source from overseas has increased, food self-sufficiency rate has been decreasing. In recent years, while such rate remains flat, the food self-sufficiency rate on a caloric basis has been only 38%. Especially, the food self-sufficiency in Tokyo is less than 1% (in 2018, on a caloric basis), which means that we rely on the blessings of biodiversity from outside of Tokyo for more than 99% of food.

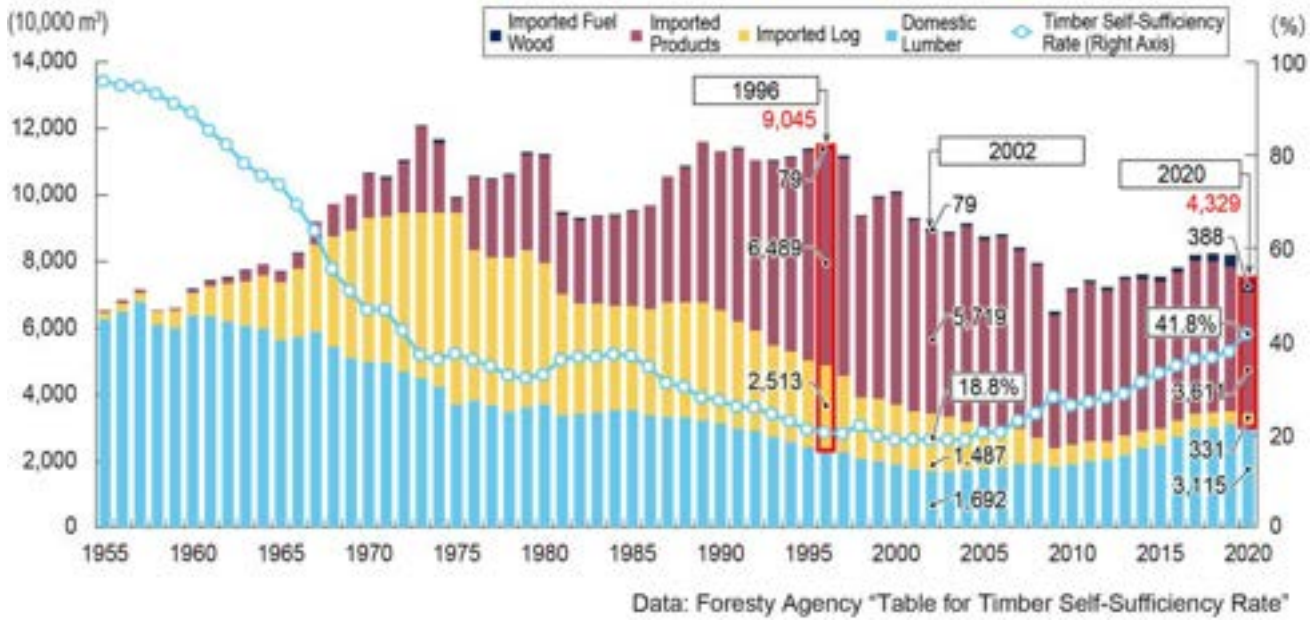


Changes in Food Self-Sufficiency Rate after 1965 in Japan[58]

[58] Website of Ministry of Agriculture, Forestry and Fisheries prepared by Tokyo Metropolitan Government based on Graph of Food Self-Sufficiency Rate in Japan.

Supply of domestic lumber tends to increase, bottomed out in 2002 as 16.92 million ㎥, having marked 31.15 million ㎥ in 2020.

While self-sufficiency rate of lumber in Japan tends to increase from 18.8% of 2002 to 41.8% of 2020, 58.2% of lumber has been imported. Japan mainly imports log from the States, lumber from Canada, plywood from Indonesia and Malaysia, and woodchip from Vietnam.



Changes in Supply of Lumber and Self-Sufficiency Rate of Lumber[59]

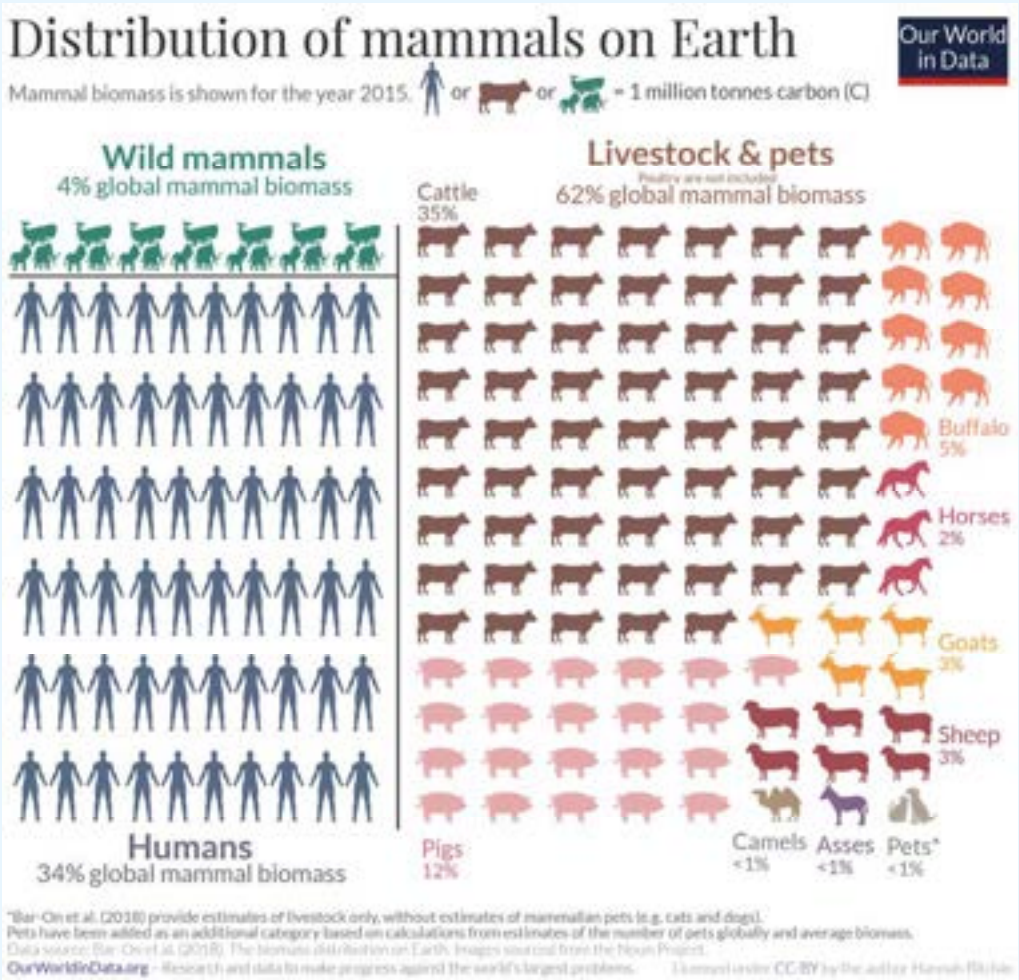
[59] The Tokyo Metropolitan Government prepared based on Annual Report on Forest and Forestry in Japan FY 2021 (2022, Forestry Agency)

Column More Humans Compared to Wild Mammals ~Distribution of Mammals on the Earth~

The figure below shows the global biomass of mammals in 2015 by classifying into humans, livestock and wild animals. Each icon is equivalent to one million tons of carbon. These figures include wild mammals both on the land and in the ocean, which account for only 4 %.

On the other hand, human biomass alone accounts for 34% in the world, which is nearly 10 times of that of wild mammals. Also, domestic cattle mainly for human food has almost the same biomass.

While it is assumed that there are approximately 6,000 species of mammals on the earth, it is found that only humans as one species have a significant impact on the entire species.



Distribution of Mammals on the Earth

③ Water resources

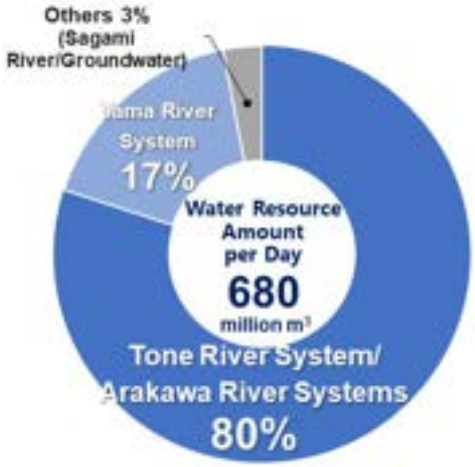
The rain that falls on forests flows into rivers, and is used for tap water and agricultural water.

In Tokyo, the rain that fell on the upstream of Tama River is taken as tap water from Ozaku

Intake Weir and Hamura Intake Weir etc. Forests for tap water resource maintained by Tokyo spread across Kosuge Village, Tabayama Village and Koshu city of Yamanashi Prefecture as well as Okutama town of Tokyo Metropolis, whose range measures approximately 30.9 km from east to west, approximately 19.5 km from north to south, and approximately 25,000 ha (as of April of 2021). This accounts for approximately 50% of the basin area that spreads in the upstream of Tama River.

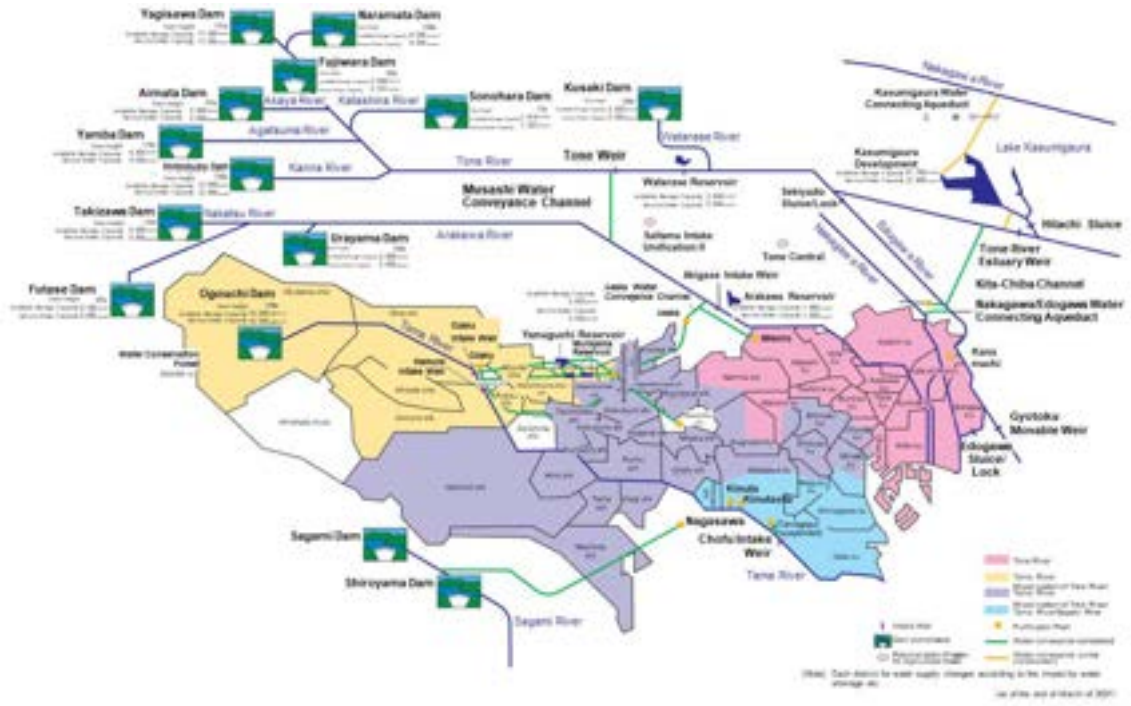
Location Map of Forest for Tap Water Source in Upstream of Tama River[60]

At present, tap water to approximately 97%[61] of water supplied population is supplied by metropolitan waterworks (Tokyo Metropolitan Government Bureau of Waterworks). While most of water resources of metropolitan waterworks used to depend on Tama River system until 1950s, in order to respond to subsequent rapid increase in demand for tap water, such water resources have increasingly depend on Tone River/Arakawa River Systems, which currently account for 80% of tap water resources in Tokyo. Additionally, other than metropolitan waterworks, some municipalities mainly utilize underground water etc. as tap water resources.



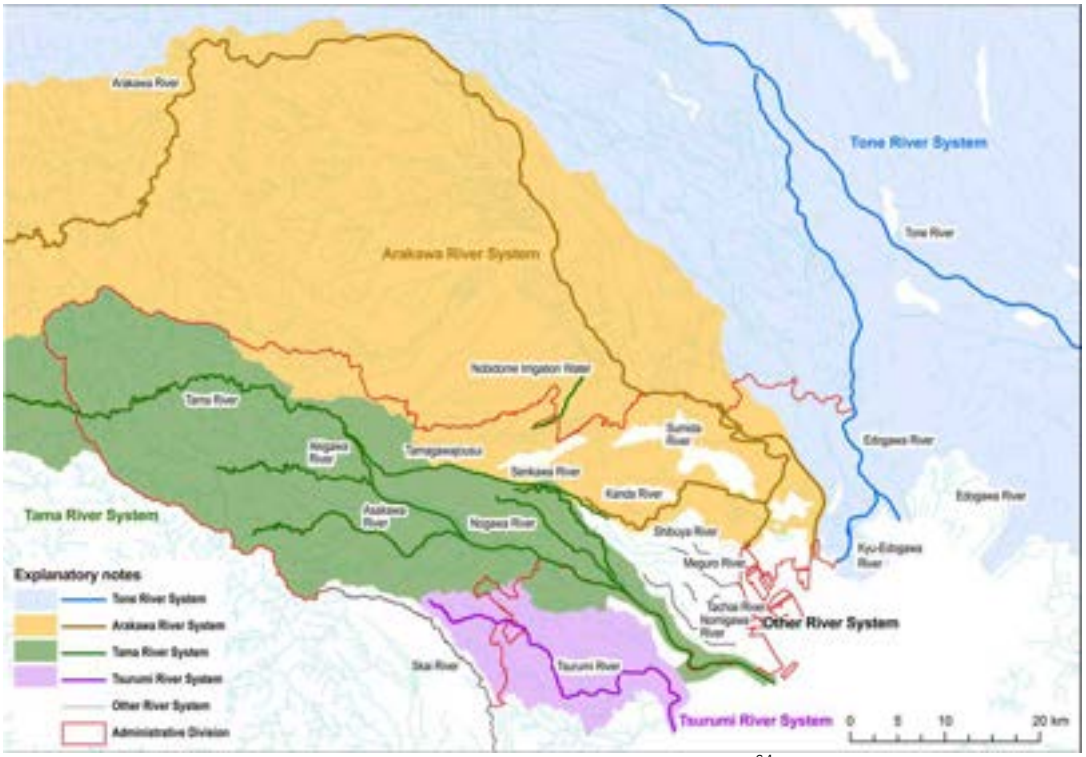
Ratio of Tap Water Resources by River Water System In Metropolitan Waterworks[62]

[60] Water Resources Forests～Water Resources Forest Created by Everyone～（Bureau of Waterworks, Tokyo Metropolitan Government）
[61] Waterworks of Tokyo Metropolitan Government, 2021 version（Bureau of Welfare and Public Health）
[62] Prepared based on Outline of Waterworks by Bureau of Waterworks Tokyo Metropolitan Government FY2021 version (2021, Bureau of Waterworks Tokyo Metropolitan Government).



Outline of Water Resources and Service Areas by River Water System[63]

Additionally, agricultural water is mainly taken from rivers in Tokyo. Agricultural water is mainly taken from Tama River System, and also form Arakawa River System, Tsurumi River System and Sakaigawa River System.



Major River Water Systems in Tokyo[64]

[63] Website for Bureau of Waterworks Tokyo Metropolitan Government Introduction of Waterworks
[64] Prepared by the Tokyo Metropolitan Government based on Land Digital Information of Ministry of Land, Infrastructure, Transport and Tourism.

Column

Development of Fishway in Rivers

In some rivers, structures including weirs and dams etc. are established in order to secure agricultural water and electricity. As these structures have a large fall, they hinder movements of aquatic lives including fish etc. Especially, since migratory fish such as Ayu and Oncorhynchus masou migrate back and forth between rivers and the sea in their life history, they run up and descend the rivers depending on the season. Therefore, in order to facilitate mitigation of such aquatic lives, fishways have been established for the structures with a large fall.

Fishway to connect upstream and downstream of Shiromaru Dam of Tama River[65]

Fishway established in Hino Irrigation Weir of Tama River[66]

④ Medical Resources

Animals and Plants, and microorganisms usable as the ingredients of pharmaceuticals and cosmetics, agricultural chemicals, and dye etc. have been utilized as medical resources.

For example, the antibiotic penicillin was discovered from blue mold, which is famous as the medication used to treat tuberculosis.

Additionally, Tamiflu as anti-influenza medicine was developed using shikimic acid using the compound of illicium verum seed (star anise) as its ingredient.

Thus, there are a lot of pharmaceuticals and cosmetics, agricultural chemicals that are produced by utilizing animals and plants, and microorganisms.

⑤ Genetic resources

Among genetic characteristics of various living things, the ones useful for humans if applied to selective breeding for agricultural products and pharmaceuticals are called genetic resources.

Most of the food products including grains, vegetables, fruits and meats that support our dietary life and the above-mentioned medical resources have been produced by selecting and crossbreeding numerous living things around the world. It can be understood that genetic resources of various living things are utilized for such products and resources.

[65] Website of Bureau of Construction, the Tokyo Metropolitan Government, Development of Rivers
[66] Website of Bureau of Industrial and Labor Affairs, Development of Fish Pathways of Agricultural Irrigation Dam (Tama River System).

Column

<Biomimicry> Velcro Tape Created by Applying Cocklebur

The characteristics of living things have been utilized for various technologies by being mimicked. This is called biomimicry and there are many instances found in our daily lives.

As a typical example, Velcro Tape was developed by being inspired when it is found that cocklebur sticks to clothes.

This is also one of provisioning services.

One Example of Biomimicry: Velcro Tape Created by Applying Cocklebur

(2) Regulating Services

Regulating services refer to the functions to bring about a healthy and safe living environment for people, such as absorbing carbon dioxide, reducing heavy rain damage. This means that biodiversity contributes to adaptation to climate change and mitigation thereof.

If we are going to artificially produce such functions, it actually cost an enormous amount. Therefore, recently, the concept of NbS (Nature-based Solutions) and green infrastructure for which diverse functions that nature have are used to solve social issues including improvement of regional attractiveness and residential environment, disaster prevention and disaster mitigation, has been adopted.

① Absorption of carbon dioxide

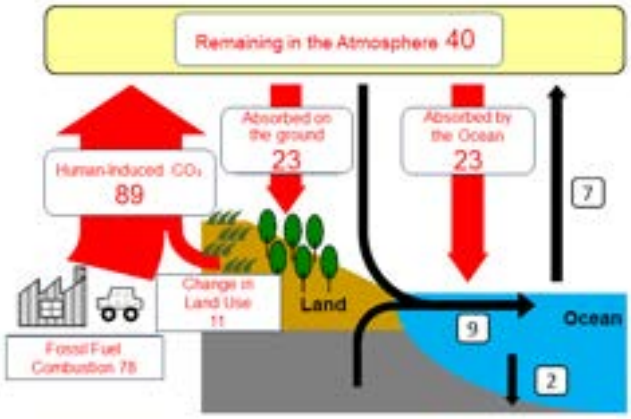
Climate has been adjusted by natural “greenhouse gas” which keeps the temperature to be able to maintain lives. Carbon dioxide as major greenhouse gas is absorbed by plants through oxygen generation by photosynthesis and stored as organic matter within biomass and soil.

Between ocean and atmosphere, carbon dioxide is constantly exchanged. On average in the entire ocean, ocean absorbs carbon dioxide from atmosphere.

Furthermore, marine creatures such as coral and phytoplankton can also store carbon dioxide within their bodies. Also, it is assumed, coral reef in island areas of Tokyo and a vast ocean that such island areas face contribute to absorption of carbon dioxide.

However, in the future, if the global warming increases, it is expected that the capacity of the ocean to absorb carbon dioxide will be reduced[67].

Large-Scale Green Space that Remain in the Central Tokyo



* The figures in this chart indicates the carbon balance (100 million tons of carbon): black for the pre-industrial ones, and red for the ones in 2000s,

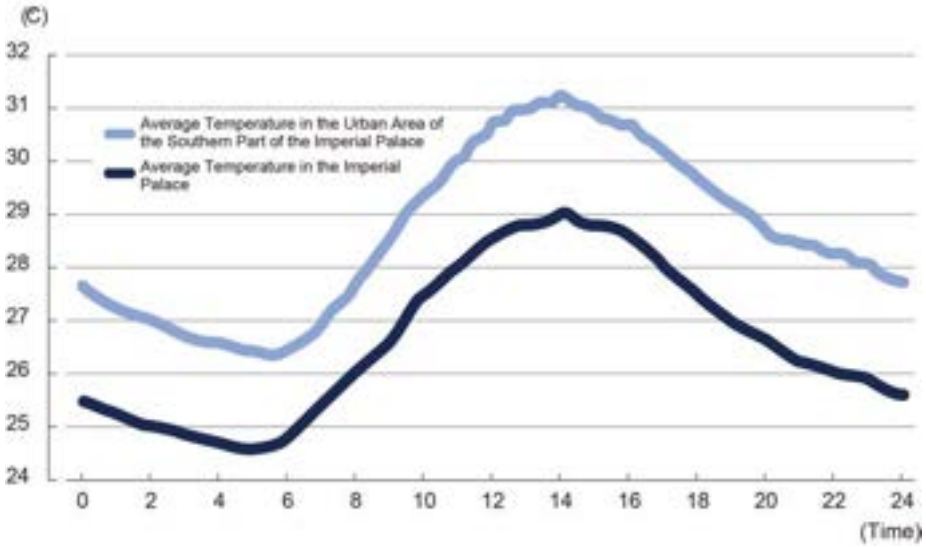
Pattern Diagram of CO_2 between Land and Ocean[68]

② Improving quality of urban environment

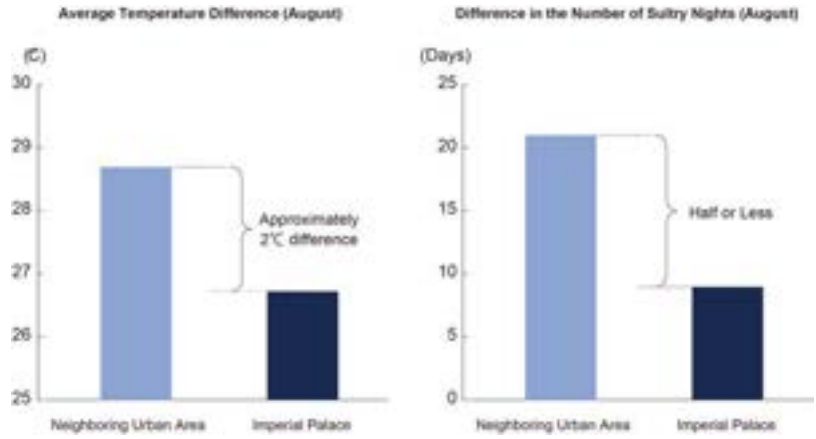
Green spaces where the plants including trees grow have the functions to adjust the quality of urban environment, including mitigation of heat island phenomenon and thermal environment, reduction of air pollution and noise.

[67] The Japan Meteorological Agency, Distribution of Absorption/Emission of Carbon Dioxide by the Ocean.
[68] The Japan Meteorological Agency, Oceanic Carbon Cycle.

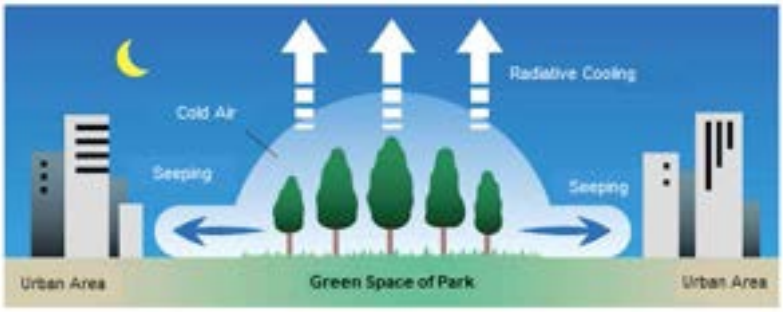
For example, in summer of 2006, in Imperial Palace, as it has a large-scale green space, it marked cool island effect, by which temperature there is 2 to 2.2°C lower compared to the one of its neighboring urban areas. Further, while the number of sultry nights in August was 21 in its neighboring urban areas, the one in Imperial Palace was 9, which is less than half compared to the one in its neighboring urban areas.



Average Values of Daily Changes in Temperature Inside and Outside of Imperial Palace
(From August 3 to 31 of 2006)



Differences in Temperature etc. Between Imperial Palace and Neighboring Urban Areas[69]



Mechanism for Cold Air-Seeping by Parks and Green Spaces in Urban Areas[70]

[69] The Tokyo Metropolitan Government prepared based on website of Ministry of Environment, “Observation Results of Cool Island Effect in Imperial Palace”.
[70] Guidelines for Heat Island Control Measures Revised Version (March of 2013, Ministry of Environment)

③ Disaster Mitigation

Ecosystems including forests, coral reef, seaweed beds etc. can contribute to mitigation of impacts by natural disasters, such as storm wind and typhoon, flood, tsunami, landslide etc.

One of multiple functions that forests have is disaster prevention. In order to demonstrate this function sufficiently, protection forests have been designated. In Tokyo, there are approximately 19,000ha of protection forests that account for 25% of its forest areas. While there are many types of protection forests, soil run-off prevention forest, landslide prevention forests, shifting send prevention forests, windbreak forests, tidal wave and salty wind prevention forests, drought prevention forests, rock fall prevention forests and fire prevention forests can be positioned as the forests to prevent disaster.

Windbreak Forest
(Niijima Village, Maehama)[71]

The concept of trying to utilize the functions of natural environment for disaster mitigation is called Eco-DRR (Ecosystem-based Disaster Risk Reduction).

While rainwater runs off residential land and paved surface without infiltration, effects for disaster prevention and mitigation can be expected in green spaces and agricultural land because of rainwater infiltration and alleviation of runoff.

Tokyo Metropolitan Government establishes many facilities for rainwater storage and infiltration in the green spaces of metropolitan parks and cemeteries mainly in plateaus.

Rainwater Storage and Infiltration Facility Established in Tokyo Metropolitan Nogawa Park (Mitaka City)

[71] Website of Bureau of Industrial and Labor Affairs, Tokyo Metropolitan Government, Protection Forest of Tokyo Metropolis

Column Efforts for River Basin Management that Adopt Concept of Green Infrastructure

The lowland in the eastern part of Tokyo refers to the downstream parts of Arakawa River heading from Kanto Mountains and Echigo Mountains and Edogawa River of Tone River basin.

In recent years, as there are concerns about further frequent occurrence and aggravation of flood, it is also expected that Ministry of Land, Infrastructure, Transport and Tourism needs to promote flood control measures (river basin management) that alleviate flood by taking into consideration the entire picture of river basin.

Tone River has Watarase Retarding Basin of 33 km^2 over the border of four prefectures of Ibaragi Prefecture, Tochigi Prefecture, Gunma Prefecture and Saitama Prefecture, which plays a in reducing the flow volume by storing a part of such flow volume in the event of rapid high water.

Additionally, in Arakawa River as well, the regulating basin using the riverbed and retarding basin in Iruma River watershed as the tributary river of Arakawa River are projected.

Other than the above-mentioned, it is expected as comprehensive river management from a wide perspective of the entire basin to promote coordination with stakeholder organizations regarding conservation of functions of rice fields to temporarily store rainwater and make it permeate underground and conservation of the ones of forests to make rainwater permeate into the ground mainly through the agency of forest soil and then make it flow out slowly[72].

As these initiatives for river basin management can be considered to adopt the concept of green infrastructure and Eco-DRR (disaster prevention and disaster mitigation that utilize ecosystems), Tokyo also benefits from outside of Tokyo in regulating services.

Watarase Retarding Basin in Normal Time

Watarase Retarding Basin during Flood
(Source: website of Ministry of Land, Infrastructure, Transport and Tourism. Kanto Regional Bureau)

[72] River Development Plan for Arakawa River System [Section Directly Administrated by MOC] (Proposed change) (Changed in July of 2020) (Ministry of Land, Infrastructure, Transport and Tourism. Kanto Regional Bureau)

④ Water Purification

Tidal flats and hydrophyte communities have water purification functions, including absorption of nitrogen and phosphorus by plants, capture of organic matters by bivalves and decomposition of nitrogen compound by bacteria.

In Tokyo, tidal flats in coastal area such as Sanmaisu of Kasai Marine Park and hydrophyte communities such as reed bed in Tama River and Arakawa River are distributed.

Kasai Marine Park East Beach (Edogawa Ward)

Tidal Flat and Reed Bed of Rokugo of Tama River (Ota Ward) [73]

⑤ Pollination

Pollination refers to the role to help alternation of generations by helping pollinate plants, and the animals such as honeybees etc. that perform pollination are called pollinators.

Pollinators contribute to increase in the yield of farm products by helping pollinate them. As the farm products consumed in Tokyo are mostly supplied from outside of Tokyo, it can be said that we rely on pollination function in producing areas outside Tokyo.

In recent years, on the roof floors of buildings in urban areas, efforts have been promoted to raise honeybees that demonstrate pollination functions for plants in vegetable gardens and parks.

Additionally, while most of pollinators are insects, birds including Brown-eared Bulbul and Japanese White-eye, and Bonin Fruit Bat are also the pollinators that inhabit Tokyo.

Japanese Honeybee

Japanese White-eye

[73] Living things and Vegetation of Nature Trail of Ota Ward “Trail of Rivers and Tidal Flats” (March of 2019, Ota Ward)

(3) Cultural Services

Cultural services refer to the functions to nourish our spirit including artistic and cultural inspiration, educational effects, physical and mental peace, religion, tourism recreation etc. through contact with nature and fauna.

Biodiversity is involved not only in the current culture but also in the cultural activities in Tokyo that last for a long time since ancient times. For example, Mt. Takao serves as the mountain for asceticism, whose nature of Mt. Takao serves as the place for training, and in some other cases, temple and shrine forests are the objects of worship serving as groves of village shrines and sacred trees.

Fire-Walking Festival of Mt. Takao

Our immediate nature including rivers and parks in various places provide places for valuable environmental education to Tokyo residents and elementary and junior high school students. In Tokyo, there are a lot of natural parks and metropolitan parks, which serve as places for various kinds of activities and tourism resources such as mountain climbing, stroll, camp, appreciation of natural landscape, natural observation, photography, fishing and forest bathing etc.

A lot of culture cultivated in Tokyo mainly after Edo Era has not only benefited from the living things themselves but also produced from artistic inspiration given by nature. For example, traditional crafts such as Edo Fishing Rods, Tokyo Fine-Pattern Dyeing and Kihachijo Fabrics, traditional culture such as falconry and duck hunting, dietary culture such as Fukagawa-meshi (rice bowl with clams) and sake brewing and, garden culture that continues from Daimyo garden and horticulture that has generated cherry blossoms of Yoshino cherry.

Additionally, a lot of traditional art in various regions including Kagura in Nishitama, Kabuki and Rakugo deal with nature and living things as their origin and subjects.

There are also a lot of literary works and nursery rhymes that deal with nature and living things of Tokyo as their subjects. Today, one of the subjects of “My Neighbor Totoro” as a famous Japanese animation film (Studio Gibuli, 1988) is considered to be the nature of Sayama hills.

Whale Watching (Ogasawara)

Hands-on activities in immediate nature

Fukagawa-meshi

Column Living things Which Has Become Motif of Ukiyoe of Edo

There are a lot of Ukiyoes that use nature and living things as motifs including bird-and-flower paintings.

The picture show at right is “Susaki and Jumantsubo Plain near Fukagawa”, a masterpiece in a One Hundred Views of Edo by Hiroshige Utagawa, a famous Ukiyoe artist in Edo Era. Edo Bay and a marsh of Fukagawa spread in front and Mt. Tsukuba can be seen in the distance. Grassland of common reed or cogongrass and an area covered by Japanese Black Pine being drawn, the flying raptor seems to be a Golden eagle. A Golden eagle is a raptor that widely distribute worldwide and requires grasslands. In Japan, while Golden eagle can been seen only in mountain terrain, it is supposed that there are grasslands spreading around the whole area of Fukagawa in Edo Era, which are their habitat.

This Ukiyoe has proved that the costal line in those days was located nearby Fukagawa, and also depicted the natural conditions in Edo Era as well as artistic value.

Thus, there are many traditional crafts etc. that were inspired by living things in Edo Era.

Ukiyoe of Hiroshige Utagawa:
Susaki and Jumantsubo Plain near Fukagawa

(Source: possessed by Tokyo Metropolitan Central Library, Special Collections Room)

Column Culture of Mushi-Kiki

In Japan, “Mushi-kiki” used to be held to enjoy listening to the sounds of insects. In Mt. Mitake of Ome City, some volunteers have held “Gathering to listen to sounds of Kantan (Oecanthus longicauda)” in September every year since 1956 and it monument has been also built[74].

In addition, at Takaosan Yakuo-in Temple in Hachioji City as well, “Gathering to listen to sounds of Kantan (Oecanthus longicauda) as the king of chirping insects” has been held in September every year.

Kantan (Oecanthus longicauda) commonly known as a chirping insect

Column Nature and Literature of Tokyo

In Manyoshu and Kokin Wakashu, nature of Musashino is expressed as materials.

Especially, a lot of literary works have developed in Edo. Many of them such as Haiku and Senryu use nature and living things as motifs.

As haiku is mostly expressed by using nature as its subject, a lot of living things are listed in Saijiki. Basho Matsuo and Issa Kobayashi who played active roles in Edo as haiku poets have left a lot of haikus using living things as motifs.

“Musashino”, an essay written by Doppo Kunikida in 1898, depicts beauty of scenery of wooded areas and poetry in those days.

74 Yuzo Kashiwada, Pray for Insects, Insects Memorial, Pilgrimage to Shrines and Temples (Soshin sha, 2019)

Column Nature and Music of Tokyo

In Tokyo, many pieces of music have been composed using living things as motifs.

”Hana” is a chorus music by Rentaro Taki, which was published in 1900 and whose words were written by Hagoromo Takeshima and expresses cherry blossoms etc. set in Sumida River of spring.

”Haru no Ogawa” is authorized by the Ministry of Education, which is published in 1912 and whose words were written by Tatsuyuki Takano, expressing nature in the branch of Shibuya River (Shibuya Ward) and a lot of living things featuring in it.

The words of “Yuyake Koyake” published in 1919 were written by Ukou Nakamura, using crows of Kamiongata Town of Hachioji City (a part of the west Hachioji City at present) as a motif.

In the recent pop music, “Sakura-zaka”, a hit of 2000, written and composed by Masaharu Fukuyama is supposed to sing Sakurazaka (line of Yoshino cherry) of Ota Ward, Numabe.

Column Musashi-Mitake-Jinja Shrine Deifying A Japanese Wolf

Musashi-Mitake-Jinja Shrine is located at the top of Mt. Mitake (elevation: 929m) of Ome City.

Nihonshoki states that, at the time of Eastern Expedition by Yamato Takeru, he was led by a white wolf when he got lost having been wrapped in cloud. The wolf came to be affectionately called “Oinusama” and has been still strongly worshipped as the god to avoid theft and protect from various disasters. Although komainus that strengthen the defense of the shrine come in Chinese lions as a pair of A-Un in most cases, komainu in main hall of Mt. Mitake and the one in Okuchimagamisha Shrine in the back of it take the shape of wolves.

In Mt. Mitake, it is said that wolves and people used to live in harmony with each other and wolves could be really appreciated as they ate harmful animals that damaged crops. Although Japanese wolves (canis lupus hodophilax) have become extinct, their traces still remain.

(See: website of Musashi-Mitake-Jinja Shrine)

Komainus in Main Hall of Musashi-Mitake-Jinja Shrine that Take the Shape of Wolves.

Komainu in Okuchimagamisha Shrine that Takes the Shape of Wolf

Column "Kihachijo Fablics" as Silk Fablics of Hachijojima Island

"Kihachijo Fablics" known as one of the best three types of pongee in Japan is a traditional craft produced by natural plant dyeing and handweaving that have been passed down from old times in Hachijojima Island of Izu Islands. It is woven by using the naturally grown plants as dye and silken threads dyed by three colors of yellow, reddish yellow and black. It is recorded that the silken fabrics were presented under the name of yellow pongee from Hachijojima Island in Muromachi Era, and has come to be widely known as daily wear after Edo Era.

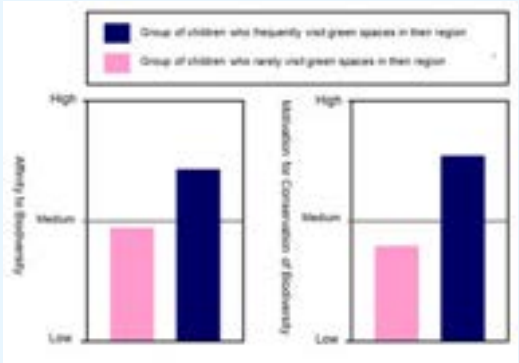
(See: website of the Tokyo Metropolitan Government, Tokyo Labor Bureau.)

Kitahachijo Fabric

Jointhead Arthraxon as Raw Material of Yellow Dye

Column Health Fostered by Environment with Abundant Biodiversity

While relationships between humans and nature have been becoming weaker due to lost opportunities resulting from urbanization and a decrease in biodiversity and lost motivation resulting from changes in mode of entertainment, health benefits that nature have been scientifically clarified and it is supposed that nature can contribute to health promotion in various forms.



Raising children's conservation awareness through nature experiences

Additionally, it has been found that the education utilizing experience in nature and natural environment is effective to cultivate independence and imagination, non-cognitive skill which is represented by communication skill of children, and the children who frequently visit local green spaces have more familiarity to biodiversity and motivation to conserve biodiversity[75].

It is considered that nature experience is not luxury but a necessity for health and children's growth.

[75] Soga *et al.* (2016) International Journal of Environmental Research and Public Health 13 (6), 529

Column Vegetables Collected from Various Regions to Edo

In Edo Era, due to influence by Sankin-kotai, Daimyo came to bring the seeds of vegetables of their hometowns to Edo and cultivate them in Tokyo. Besides, as various seeds were brought in from all over Japan, many kinds of vegetables flourished in climate and natural features of Edo. This also means to cover shortage of vegetables and to be self-sufficient due to rapid increase in Edo's population. Consequently, it can be said that Tokyo benefited from biodiversity of various regions.

Such vegetables have still taken root in Tokyo and some of them have become traditional Edo Tokyo vegetables. Thus, Edo Tokyo vegetables can be understood as genetic resources and also as cultural services regarded as results of horticulture.

As the fifth shogun, Tsunayoshi Tokugawa glimpsed living of peasants during his stay in Nerima, he ordered the seeds from Owari and encourage them to cultivate such seeds in order to make their living easier. Nerima Radish that grew large in soft soil where volcanic ash soil is deeply accumulated and climate and natural features of Edo became popular and came to be brought back to people's hometown as homecoming gifts from Edo. Still, some kinds of radish whose root are supposed to be Nerima Radish can been found in various regions.

Nerima Radish

Naruko Uri and Fuchu Goyo Uri refer to Oriental melon, which was valued and called "Mizugashi" in Edo Era when there are little sweets. As the first shogun, Ieyasu Tokugawa authorized cultivation of such melons by calling over peasants from Makuwa Village, Mino Province (current Motosu City of Gifu Prefecture) where melons of good quality are produced, there used to be official fields around current Kitashinjyuku and Fuchu City at present.

Oriental Melon

(See: "Story of Edo Tokyo Vegetables" by Michishige Otake)

Column Effectiveness of Greenery in Urban Areas

In Tokyo, while greenery such as wooded areas and farmlands etc. has been on a decreasing trend due to development etc., greenery in urban areas provide us with various blessings; for example, there are various effectiveness including food supply, air mitigation of air pollution and climate change, reduction of disaster risk including flood, improvement of biodiversity etc. Thus, the cities where greenery is maintained including trees, farmlands and grasslands could be more sustainable and resilient.

Furthermore, it is clear that the cities filled with greenery lead to health and mental healing. In addition, the scenery filled with greenery contributes to increase in asset value and business including tourism. According to Food and Agriculture Organization of the United Nations (FAO), it is expected that trees produce twice or three times the values of their investment values to plant and maintain them throughout their lives.

Recently, it has become clear that humans instinctively desire more to “connect with nature” rather than to be in an artificial environment. The procedure of spatial design by utilizing such humans’ desire for nature is called biophilic design, in which greenery is adopted in offices and is expected to enhance degree of happiness, productivity and creativity.

Greenery in Central Metropolis
(Hibiya Park)

Office Where Biophilic Design
Is Introduced

(4) Supporting Services

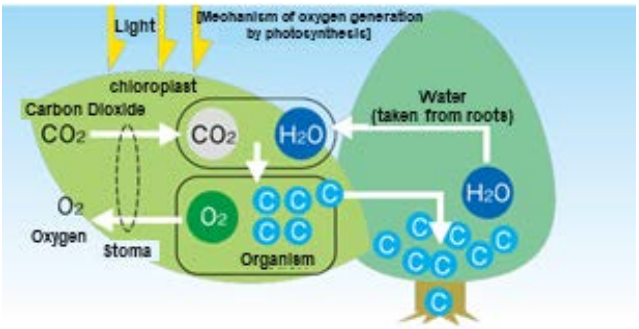
Supporting services refer to the functions to support other three ecosystem services as the basis for the survival of all life based on natural material cycles, such as oxygen generation by photosynthesis, soil formation, nutrient cycling, and water cycling.

① Provision of habitats for a variety of fauna

All the living things including humans are supported by a lot of other ones constituting ecosystems and environment for them to inhabit and grow: for example, Mountain Hawk-eagle of raptor inhabiting forests feeds on animals such as hares and environments for their breeding are high trees of conifers.

② Oxygen generation by photosynthesis

Oxygen is essential for breathing of living things including human, which is generated by sunlight, carbon dioxide and water through oxygen generation by photosynthesis of plants.



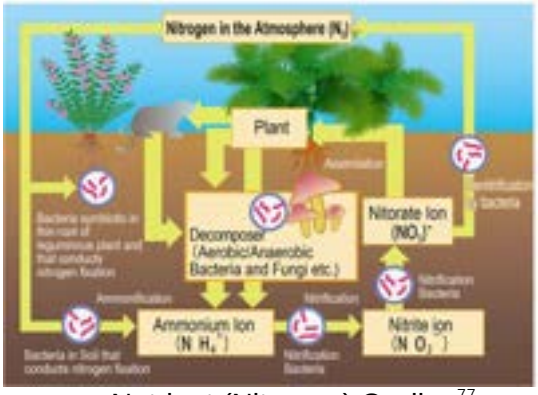
Mechanism of oxygen generation by photosynthesis[76]

Oxygen generation by photosynthesis of plants

③ Maintenance of soil productivity and nutrient cycling

Quality of soil is determined by properties of base rocks, living things (soil organisms and microorganisms), topography, and climate. It is said that, if the biodiversity of soil is abundant, it will have influence on the nutrient cycling, the soil becomes more productive and output of farm products will be increased.

[76] Website of Forestry Agency



Nutrient (Nitrogen) Cycling[77]

Leguminous plant (Vigna angularis var. nipponensis)
That Fixes Nitrogen in the Atmosphere

Soil Animals including Earthworm and Decomposer Including Mushroom
That Play Important Roles for Soil Formation

[77] The Tokyo Metropolitan Government prepared base on the figure on the website of Ministry of Environment

3 Issues Facing Biodiversity in Tokyo

Biodiversity in Tokyo has issues of the impacts caused by direct factors such as change in land-use due to development, invasion of invasive alien species and climate change etc., and indirect ones such as our sense of values and consumption behavior etc. behind such direct ones.

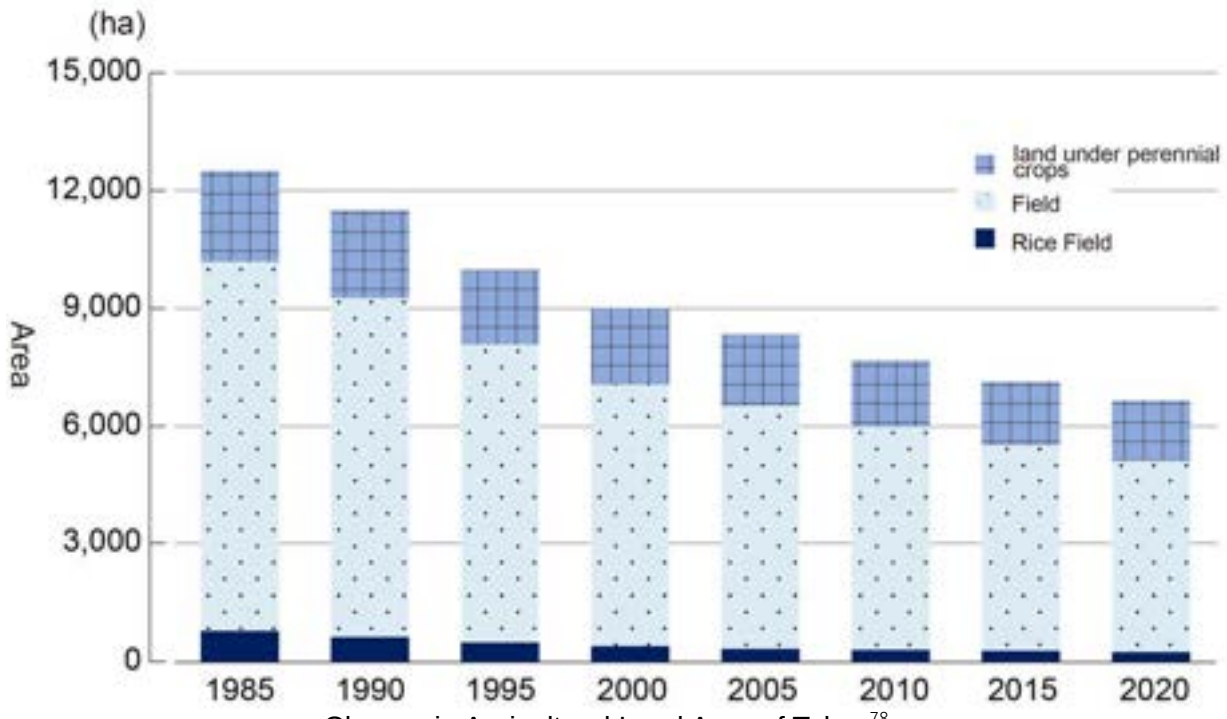
(1) Impacts on biodiversity in Tokyo due to direct factors

First crisis in Tokyo (the impact of development and other human activity)

The first crisis refers to a decrease in the habitats of living things and the decrease and extinction of species due to development, overexploitation, and overuse.

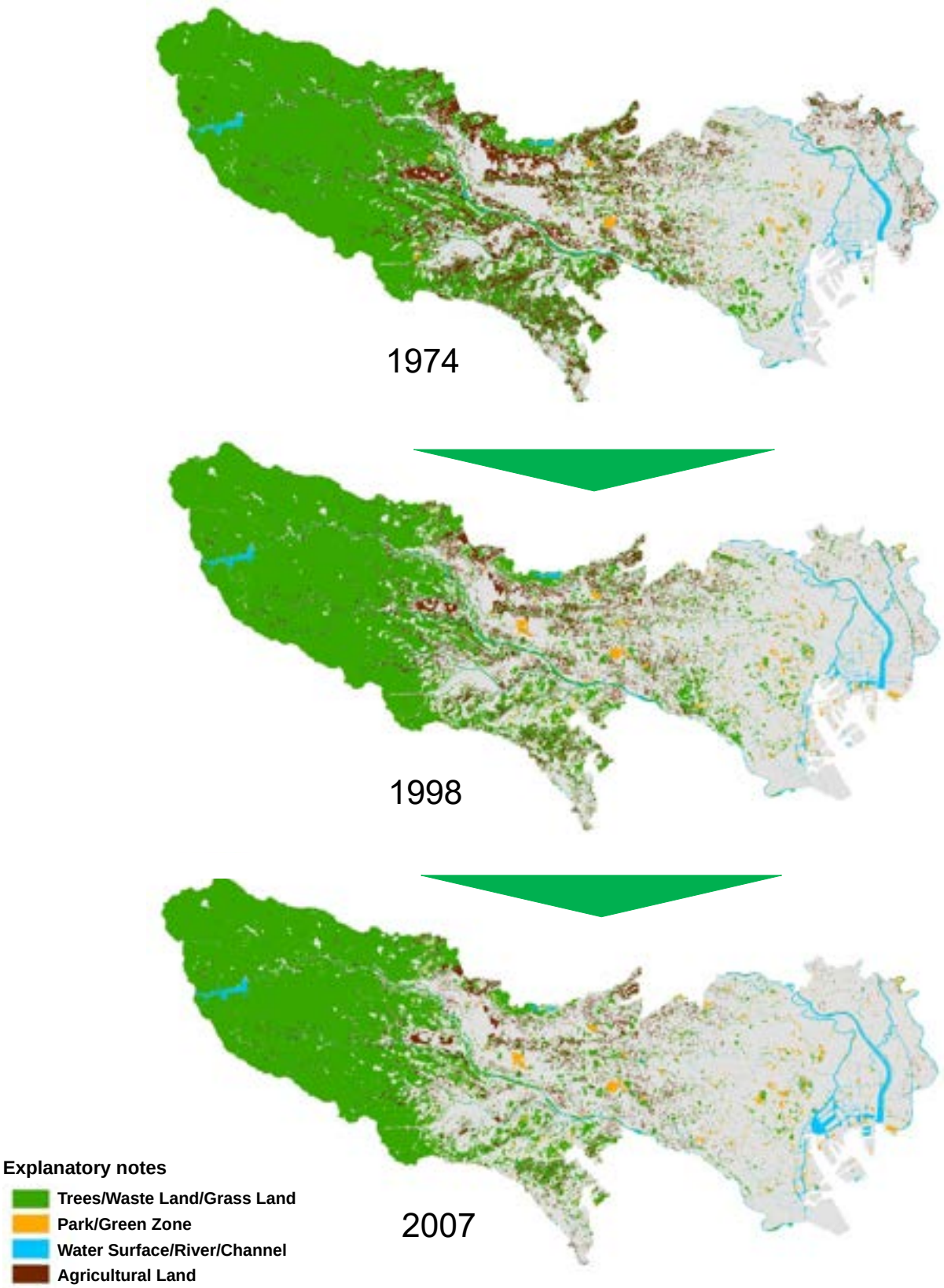
Biodiversity in Tokyo has been greatly affected by deforestation due to development, a decrease in agricultural land, such as paddy fields and dry fields, and reduced tidal flats and shallow areas. Such impacts were prominent mainly during rapid economic growth period, and subsequently they were slowed down but still continue to exist.

Additionally, while the habitats of living things had been deteriorating remarkably, water quality of rivers have been significantly improved such as sweetfish having returned to Tama River etc. subsequently. On the other hand, Tokyo Bay still faces the issues such as red tides due to eutrophication etc. and occurrence of oxygen deficient water mass etc. Besides, we can still see alteration of habitats for rare wild fauna and flora, and the over-collection and robbing of individual organisms.



Change in Agricultural Land Area of Tokyo[78]

[78] The Tokyo Metropolitan Government prepared base on land area survey of website of Ministry of Agriculture, Forestry and Fishery.



Change in Greenery of Tokyo[79]

[79] Prepared based on data of Existing Vegetation Chart Research

In 1950　　In 2021

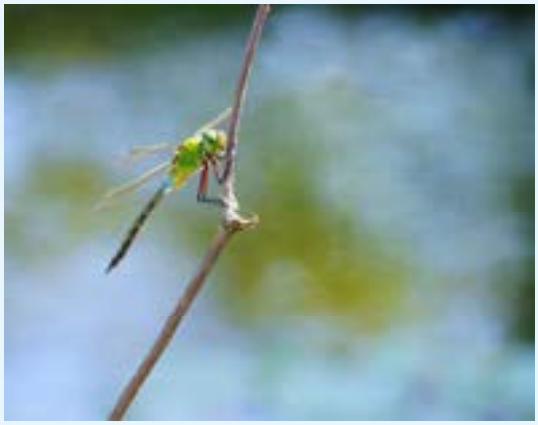
Scenery of Musashino (near Yahara Intersection of Nerima Ward)
That Significantly Changed Due to Development of High Economic Growth Period

Column Familiar Living Things That Has Vanished from Central Tokyo during the Period of Rapid Economic Growth

Economic development and changes in industrial structure of Japan dramatically changed natural environment of Japan, having resulted in reduction of wildlife around us and endangering many species. Particularly, the rapid economic growth after WWII has caused nature including wooded areas in urban areas to disappear due to rapid population concentration, and the habitats of wildlife to decline due to expansion of rural areas and development of forest lands in suburban areas etc. Additionally, as environmental pollution including air pollution and water pollution has also become a factor to deteriorate habitat environment of wildlife, in Tokyo, familiar living things including Fireflies, Dragonflies, Migratory locust and Japanese raccoon dog could be hardly seen rapidly in the central Tokyo from 1955 to 1965.

On the other hand, in recent years, due to improvement of air pollution and water pollution and development of parks and green spaces, while Lesser Emperor, Migratory locust and Japanese raccoon dog have come to be able to be seen, there are a lot of living things that remain unable to be seen in the central Tokyo such as Japanese firefly.

Japanese Firefly



Lesser Emperor

Migratory Locust

Japanese Raccoon Dog

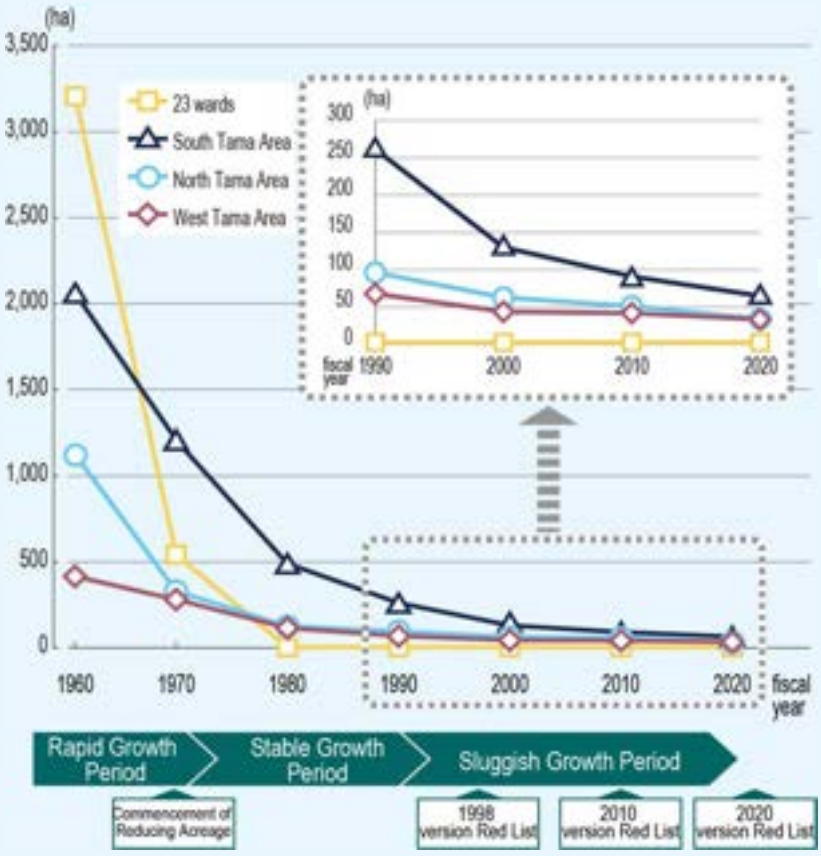
Living Things That Disappeared from the Central Tokyo during Rapid Economic Growth Period

Column Reduction in Paddy Fields and Wetlands and Its Impacts on Living Things

Paddy fields in Tokyo rapidly decreased with urban development during rapid economic growth period, as a result, especially in 23 wards, most of them had been lost by 1980. Even in Minami-Tama, such downward trend still continues.

Decrease in paddy fields has become a main factor of extinction of aquatic plants and aquatic insects: extinction risk of frogs (Tokyo daruma pond frog, EN etc.) has been increasing year by year, and all 15 species of existing ampbians that inhabit paddy fields have come to be added on Tokyo Red List. While Oriental weatherfish (freshwater fish, DD) that inhabit paddy fields and wetlands had been considered as normal species, there has been a concern that they are at risk of extinction in recent years.

Furthermore, in Tokyo Red List (Mainland) 2020 version published in April of 2021, in addition to decrease in areas of satoyama due to urban development etc., satoyama that had fostered various living things have been degraded such as increase in unused paddy fields and aridification of wetlands, which has been pointed out as the cause of decrease in reduction of a lot of species of wildlife.



Transition of Paddy Field Acreage per Region of Mainland[80]

Tokyo Daruma Pond Frog

Oriental Weatherfish

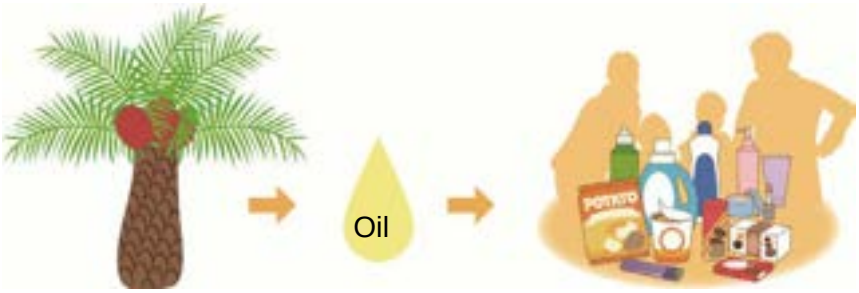
Satoyama Where Paddy Fields and Wooded Areas spread

[80] The Tokyo Metropolitan Government prepared base on Statistical Yearbook of Agriculture, Forestry and Fisheries of Tokyo (Kanto Regional Agricultural Administration Office, Ministry of Agriculture, Forestry and Fisheries) and Statistical Survey of Farm Products(Statistics Bureau, Ministry of Internal Affairs and Communications)

As the characteristics of Tokyo in the first crisis, it is pointed out that living of Tokyo residents and business activities have great impacts on global biodiversity through consumption and procurement because Tokyo is a global metropolis. Especially, it relies for a large part of lumber and food on imports : for example, some of shrimps have been cultivated by cutting down mangrove woods of Southeast Asian countries. As tropical rainforests with abundant ecosystems were cut down with no consideration for environment in order to produce palm oil as food or the raw materials of detergent and soap, habitats of wildlife including orangutans have been destroyed and carbon dioxide stored in forests and soil have been emitted into the atmosphere.

According to Food and Agriculture Organization of the United Nations (FAO), the forests in the world have been reduced by 47,000 ㎢ annually, most of which has been caused in tropical regions[81]. It is said that approximately 90% of forest reduction has been caused by expansion of farmlands and grazing lands[82]. There is a study report showing that annual reduction of the areas of tropical regions related to agricultural products and lumber consumed in Japan is equivalent to the ones of Tokyo Metropolis of 2,158 ㎢[83].

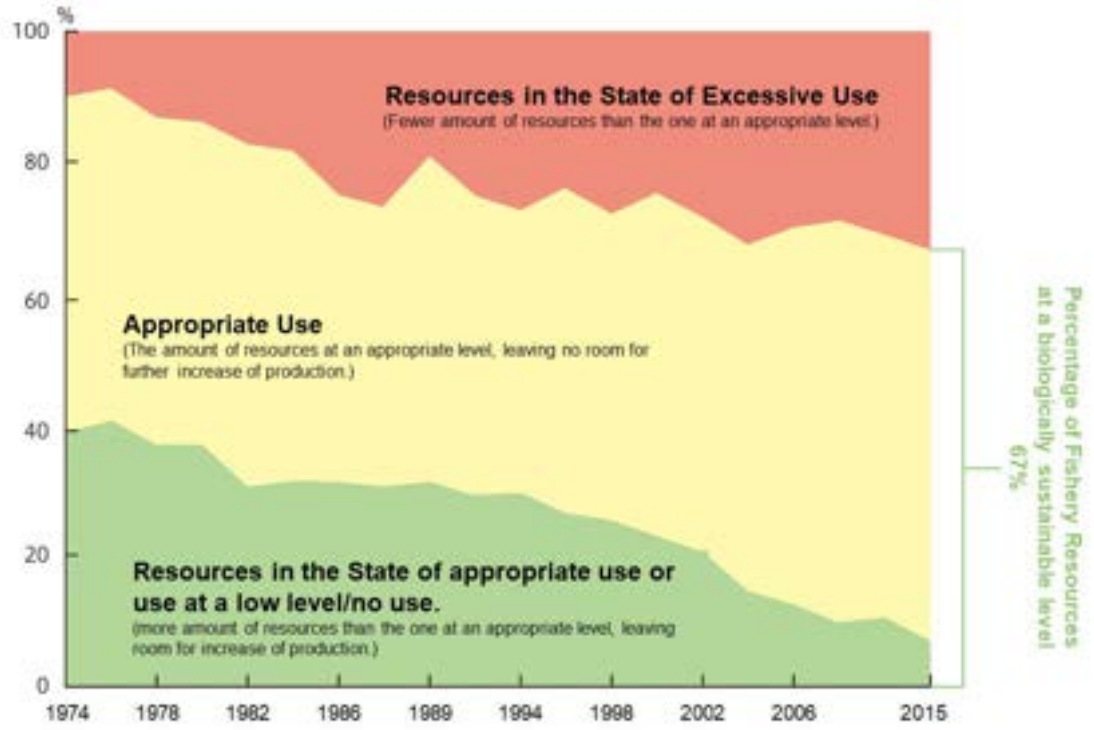
Plantation of Oil Palm expanding in island of Borneo of Malaysia[84]



Various Products Produced from Palm Oil

[81] Global Forest Resources Assessment 2020（2020, FAO）
[82] FAO Remote Sensing Survey reveals（2020, FAO）
[83] Nguyen and Kanemoto(2021) Mapping the deforestation footprint of nations reveals growing threat to tropical forests
[84] WWF Japan website, https://www.wwf.or.jp/

Moreover, while Japan is a world-leading consumer nation of marine resources, according to FAO, the rate of fishery resources at a sustainable level among global marine fishery resources is on a decline trend and the fishery resources that have been overused is on the increase. Additionally, over exploitation of Japanese eels and Pacific bluefin tuna inside and outside of Japan causes not only to exhaust fishery resources but also to endanger such species.



Status of Global Fishery Resources[85]

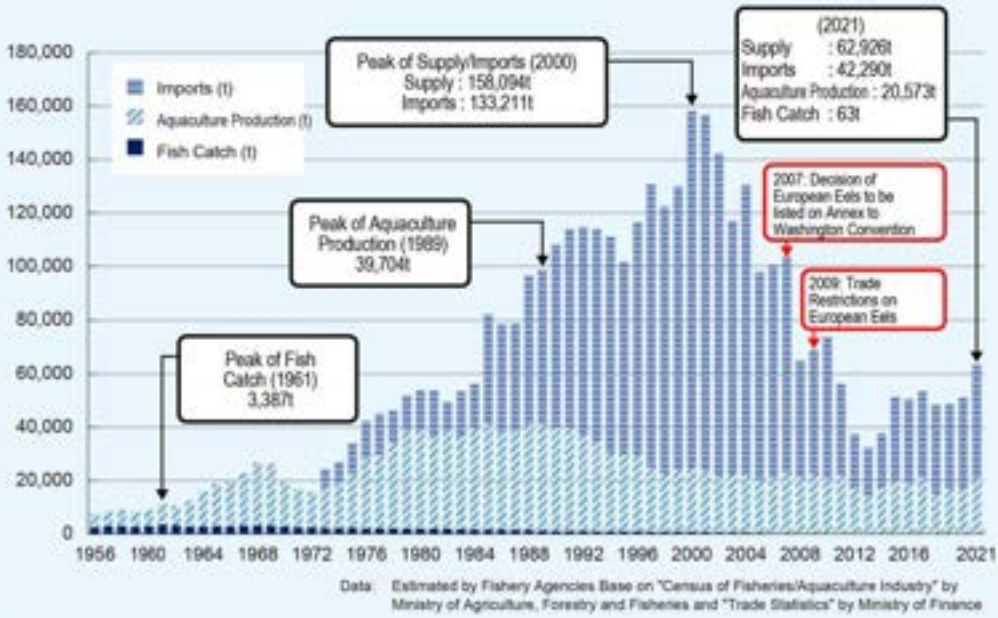
Japanese Eel and Pacific Bluefin Tuna listed in IUCN Red List[86]

[85] Fishery Promotion Plan (2021, Bureau of Industrial and Labor, Tokyo Metropolitan Government)
[86] IUCN Redlist Website http://iucnredlist.org

Column Endangered Japanese Eel

As domestic catch of glass eels has been at a low level and on a decline trend after the years from 1975, its shortage has been made up for by imports. As the cause of decrease in the gathering amount of glass eels are pointed out as follows: changes of marine environment, deterioration of habitats and overfishing of glass eels. Japanese eel are designated as “Endangered (EN)” in IUCN Redlist. Moreover, as other eels have been caught due to decrease of Japanese eel, most of species of eels have come to be endangered.

Japanese Eel listed in IUCN Redlist



Changes in Supply of Eels in Japan[87]

[87] Website of Fishery Agencies (July of 2022) Status and Measures on Eels

Second Crisis in Tokyo (the impact of reduced care afforded to the natural environment)

The second crisis refers to the deterioration of the quality of nature due to reduced care afforded to the natural environment.

For example, as the management of wooded areas continues to be abandoned due to decline in demand of firewood and deciduous forests are replaced by dense evergreen forests, having resulted in changes of ecosystems, plants and insects that favor bright forest floors are declining.

As agricultural cultivation has been abandoned in Yatoda, amphibians and aquatic insects etc. including Tokyo salamander etc. which inhabit farmlands have declined due to development of thick growth of trees and aridification.

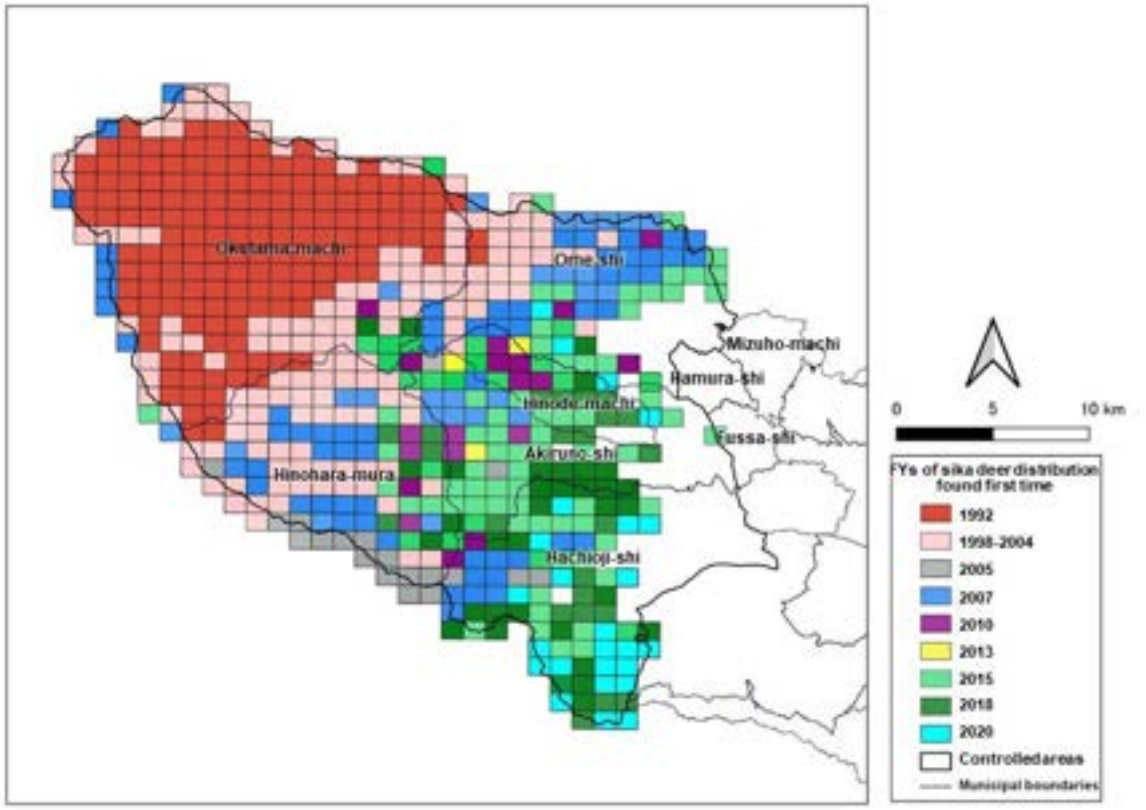
Additionally, due to decrease of hunters, wild animals such as Sika Deer and Wild boars have been increasing in mountain areas and hill areas, having had various impacts such as feeding damage for agricultural products and trees. Sika Deer in particular overeat trees, alpine plants and forest floor plants, bringing about serious problems, such as a decrease in rare alpine plants, deterioration of habitats for living things, and lessening of the mitigating effects of plants against landslides.

Feeding damage by Sika Deer
(Right side of central fence/Mt. Mitou)

Abandoned Yatoda

Sediment runoff on bare land
2004 (Okutama Town Oodawa)

Group of wild bores coming down to human settlements



Expansion of Sika Deer Distributional Ranges in Tokyo[88]

[88] Partially processed based on the 6th Class II Deer Control Plan (April of 2022, Bureau of Environment, the Tokyo Metropolitan Government)

Column Satoyama landscapes where abundant ecosystems have been maintained by human care

Satoyama landscapes refer to the areas formed by communities and secondary forests surrounding them, farmlands, ponds and grasslands mixed with them, which can be found mainly in Tama area in Tokyo.

Satoyama landscapes had been formed and maintained through care afforded by various people, associated with agriculture and forestry. For example, in wooded areas, in order to make inside of the forests brighter by sunlight, it is necessary to provide “care” including “thinning” of trees and “undergrowth mowing”. While such “care” having been afforded, people in the old days have benefited from the nature including firewood as fuel, fallen leaves as compost and bamboo grass as the material of farm tool etc.

Thus, through continuous utilization and maintenance of satoyama landscapes, various environments including wooded areas and paddy fields, farms, reservoirs and channels, and grasslands have been collected in a mosaic shape, consequently having formed extremely important areas as inhabits for diverse living things.

Additionally, satoyama landscapes play a significant role, from the perspective of formulating good landscapes, watershed cultivation, creation of places to contact with nature and cultural inheritance, other than as supply of natural resources including food and lumber and habitats for living things.

Accordingly, while satoyama landscapes have abundant ecosystems, maintenance of satoyama environment in favorable condition is threatened because “care” have no longer been afforded as it used to be, having resulted in abandonment of cultivation and deterioration of wooded areas. It is necessary to conserve and regenerate satoyama landscapes of Tokyo through collaboration and cooperation among diverse entities in secondary nature such as satoyama landscapes as well as to protect pristine nature through designation as protected areas.

Satoyama Landscapes Whose Abundant Ecosystems Have been Maintained throuth “Care”
(Zushi-Onoji Historical and Environmental Conservation Area)

Column Ecosystem Changes Due to Feeding Damage by Sika Deer

In Okutama area, various wild animals including Sika deer have inhabit as a part of forest ecosystem since early times, which are invaluable for the residents of Tokyo as symbols of abundant forests.

However, sika deer that represent large mammals have been expanding their habitats nationwide in recent years and cause damage to forest ecosystems and agriculture and forestry, which is also the case in Tokyo.

The more predation pressure Sika deer put, the less the plants eaten by them become, which cause vegetation to change such as increase in the plants that they do not eat. Additionally, there would be changes in birds and insects that have connection with such plants, leading to impacts on the entire ecosystems.

In addition, a large-scale topsoil erosion would easily be caused by vegetation removal due to decrease in undergrowth, it is likely to pose direct impacts on our living as well.

Sika deer that eats forest floor plants

Column Rapidly Spreading Japanese Oak Wilt ~Ambrosia beetle (Platypus quercivorus)

There is a wood disease call “Japanese Oak Wilt” which has become a problem in Tokyo in recent years. Platypus quercivorus as a forest pest enters into a trunk, which causes it to wither by propagating fungus (Raffalea quercivorus) and inhibiting the functions of trees to absorb water.

While Platypus quercivorus is supposed to have inhabited in Japan since early times, it is said that damage has been caused by them due to changes in connection with wooded areas by humans. In wooded areas, trees had been regularly thinned to use them as firewood and charcoal.

However, as people use less firewood and charcoal due to spread of gas, wooded areas have not been left uncut. As Platypus quercivorus has habit to be attracted by big trees and thus Japanese Oak Wilt has become rampant because Oak and kunugi grew big trees.

As a fundamental measures for Japanese Oak Wilt, it is said to be effective to rejuvenate forests through renewal of wooded areas.

Tree damaged by Japanese Oak Wilt

Source: Forestry and Forest Products Research Institute

Female Adult of Ambrosia Beetle (Platypus quercivorus)

Third Crisis in Tokyo (the impact of things brought in by humans)

The third crisis refers to the impact of alien species, chemical substances etc. brought in by humans from home and abroad.

① Alien species

It has been pointed out that ecosystems are adversely affected by alien species, as they prey on native species, deprive them of their habitats, and cause genetic pollution by crossbreeding with them.

For example, it has been pointed out as follows: Common Raccoon and red-eared slider that had been kept as pets go wild and have impacts on native species. Due to release of alien species including Largemouth bass, native species have been decreased as they have been eaten by such alien species. Additionally, fire ants and red imported fire ants, etc. can hitch a ride along with imported materials from the port of Tokyo or elsewhere, and pose a threat not only to native ecosystems but also to the human body.

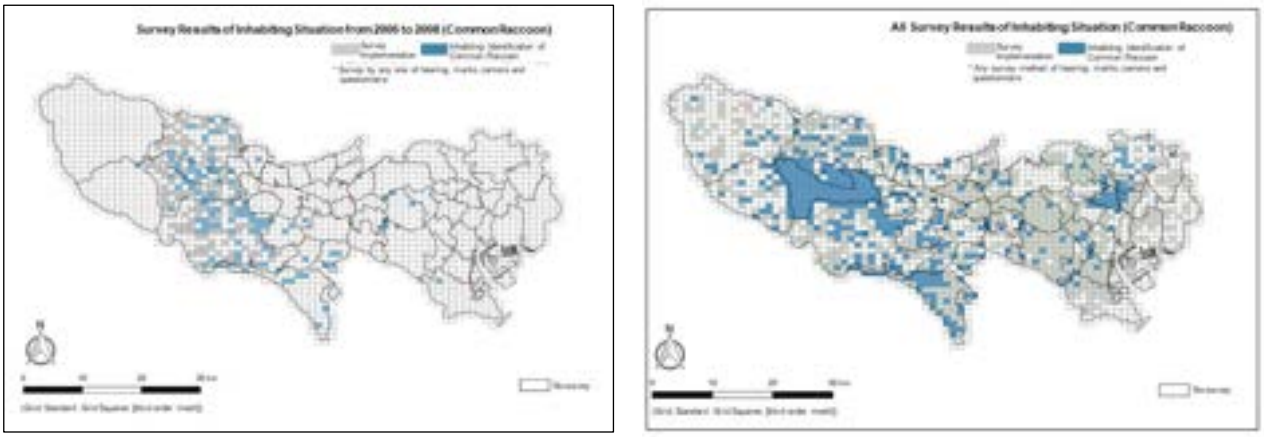
Other than the above-mentioned, there are invasive alien species invading around us, such as red swamp crayfish that are familiar with us actually having great impacts on ecosystems.

A green anole preying on Chrysochroa holstii, a protected species

The island areas have the characteristics that a lot of native species inhabit and grow in small areas and there are originally fewer predators as natural enemies. This is called as island ecosystem, which is extremely weak to invasion of alien species and whose problem would become more serious. As its representative examples, there are feeding damage of Streaked Shearwater caused by feral cats in Mikurajima Island and Toshima Island of Izu Islands, the one of plants caused by feral goat in Ogasawara Islands, and the one of native species caused by green anoles, which have caused problems with high urgency.



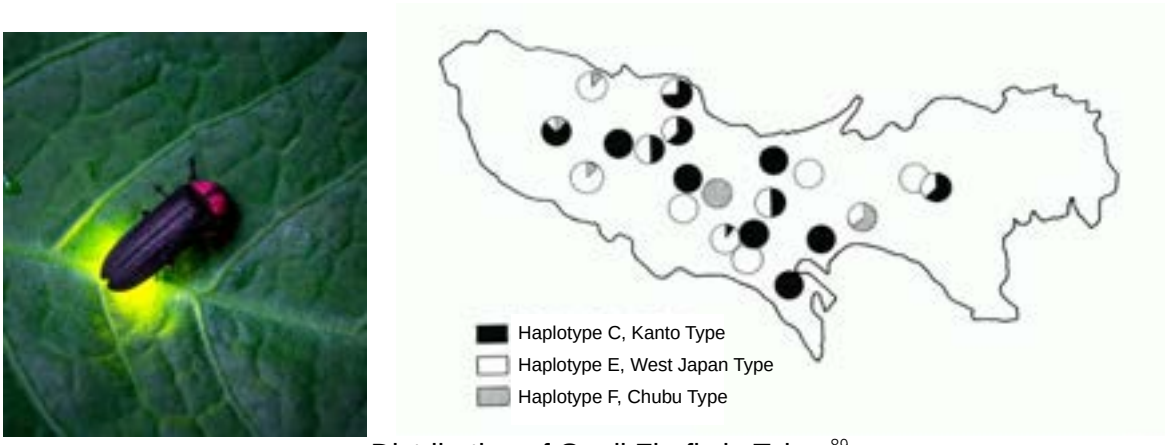
Feeding Damage Caused to Tokyo salamander by Common Raccoon



Habitat Distribution of Common Raccoon According to Research Information from 2006 to 2008 and 2016 to 2019

Genetic contamination may be caused by things brought in by humans from other regions in Japan as well as imports from abroad. For example, in Tokyo, due to introduction of Genji firefly from the west Japan, some ecological changes are found including light emission interval due to genetic change.

Additionally, it is likely to bring in the genes that have not existed in Tokyo and to cause genetic contamination by growing the plants that would not otherwise grow in Tokyo naturally and the same species being planted at different places, care should be taken upon planting such species.



Distribution of Genji Firefly in Tokyo[89]

[89] Based on Three Principles of Transplantation in Protection and Restoration of Fireflies, based on the results of genetic research in Tokyo Metropolis, Hirofumi Suzuki (2001)

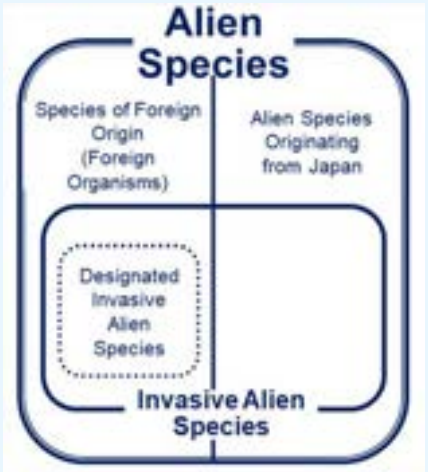
Column Various Alien Species[90]

"An alien species" refers to a species introduced (moved) by human activities beyond the limits of its native geographic range into an area in which it does not naturally occur.

While alien species are often considered to represent the living things brought in from other countries (the alien species originated from abroad) , even a native species could be an alien species in the case where its original distribution area is a part of Japan and it is introduced (moved) into the area in Japan where it does not naturally distribute. Such alien species are called "domestic alien species".

Additionally, the alien species that have significant impacts on ecosystems, agriculture, forestry and fishery, and human health are called "invasive alien species", among which the living things designated based on "Invasive Species Act (Act on the Prevention of Adverse Ecological Impacts Caused by Designated Invasive Alien Species) are called designated invasive alien species.

* The species of migratory birds and the ones of fish and plants drifting with the ocean current do not fall under alien species as they move through the power of nature.



[90] Ministry of Environment, Ministry of Agriculture, Forestry and Fisheries, List of Alien Species to Prevent Damage to Ecosystem

Column Red-Eared Slider and Red Swamp Crayfish Designated as Designated Invasive Alien Species[91]

As red-eared slider and red swamp crayfish are invasive alien species originated from the north America, which significantly change waterside ecosystem including decrease in native species due to feeding damage and cause damage to agricultural products, the necessity for tightening of regulations had been pointed out.

However, as they are our familiar living things, they have been commonly kept at home and in school. If they had been designated as designated invasive alien species and the regulations (prohibition of breeding etc., importing and transferring etc., and release) were applied, it was likely that a lot of individuals that had been already kept would have been released outside and damage to ecosystems had been expanded to the contrary. Thus they had not been designated as designated invasive alien species.

Therefore, in the revised Act on the Prevention of Adverse Ecological Impacts Caused by Designated Invasive Alien Species that will be fully enforced from April 1 of 2023, based on the characteristics for each designated invasive alien species, the mechanism has been revised so that their breeding and transferring of such species can be not uniformly regulated, but the one for the purpose of importing, release, sales or distribution can be mainly regulated. Taking into such revision of the Act, red-eared slider and red swamp crayfish will be designated as Designated Invasive Alien Species and subject to the new regulations from June 1 of 2023 (scheduled).

In order to prevent damage by alien species as well as red-eared slider and red swamp crayfish, it is extremely essential ① not to “import” the alien species which have a possibility to cause damages to ecosystems in Japan, ② not to “release” the ones which have been kept and cultivated and ③ not to “spread” the ones which already exist outside to other areas.

Red-Eared Slider

Red Swamp Crayfish

[91] Ministry of Environment, on Cabinet Decision for Ordinance to conditionally designate Trachemys Scripta and America crayfish as Designated Invasive Alien Species (January 20 of 2023)

② Marine Plastic Litter

It is reported that there are direct impacts to marine life due to intake of plastic waste flowing into rivers and the ocean, their tangling to fishing net and intake by mistaking such waste for feed. In addition, as it is reported that chemical substances contained in plastic and the ones absorbed to plastic are accumulated in the bodies of the living things including seabirds and fish etc., it is feared that such plastic waste might pose a threat to marine ecosystems.

Scattered Litter including Plastic on the Riverside around the Mouth of Arakawa River[92]

③ Chemical Substances

Due to release of the chemical substances produced by humans into the nature, such chemical substances may affect ecosystems. The heavy use of chemical substances, such as pesticides and chemical fertilizers etc. is affecting insects and microorganisms, leading to the threat to connection of ecosystems, and the deterioration of soil and groundwater etc.

[92] Final report on Policy toward Sustainable Use of Plastic (October 8 of 2018, Tokyo Metropolitan Government Council for Waste)

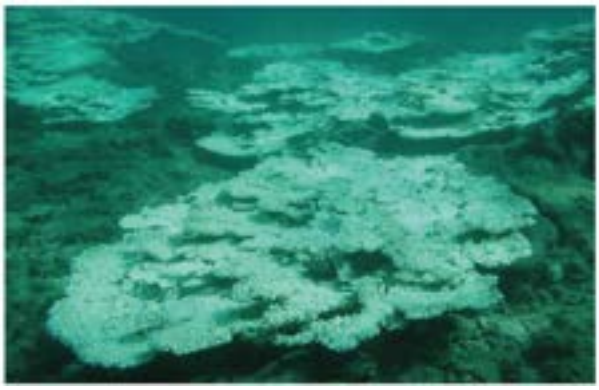
Fourth Crisis in Tokyo (the impact of changes in the global environment)

The fourth crisis refers to the impact of changes in the global environment, including global warming, acid rain, and the depletion of the ozone layer.

Especially, global warming of 2°C is predicted to cause 5% of global living species to be threatened to become extinct and 99% of global coral reef to go extinct[93], and thus it is said that it will have significant impacts on ecosystems.

Prediction of risk to ecosystems by global warming of 1.5°C and 2°C [94]

Subject	Risk	Temperature Rise of 1.5℃	Temperature Rise of 2℃
Terrestrial Ecosystem	Loss of Habitats	6% of insects, 8% of plants and 4% of vertebrates will lose half of their habitats.	18% of insects, 16% of plants and 8% of vertebrates will lose half of their habitats.
	Melting of Permafrost	Limiting to temperature rise to 1.5℃ will prevent melting of permafrost of 1.5 to 2.5 million ㎢ for centuries.	
Marine Ecosystem	Loss of Sea Ice	After stabilization of temperature rise, sea ice of the Arctic Ocean will be lost with the possibility of at least once in approximately 100 years.	After stabilization of temperature rise, sea ice of the Arctic Ocean will be lost with the possibility of at least once in approximately 10 years.
	Loss of Coral Reef	70~90% will be additionally lost.	99% or more will be lost.
	Loss of Catch	Global catch in the ocean will be lost by approximately 1.5 million ton.	Global catch in the ocean will be lost by approximately 3 million ton.



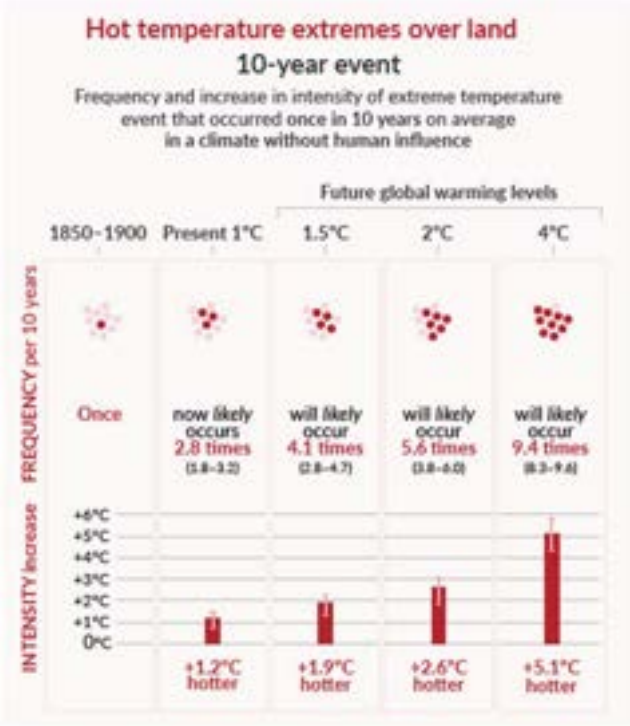
Bleaching Coral

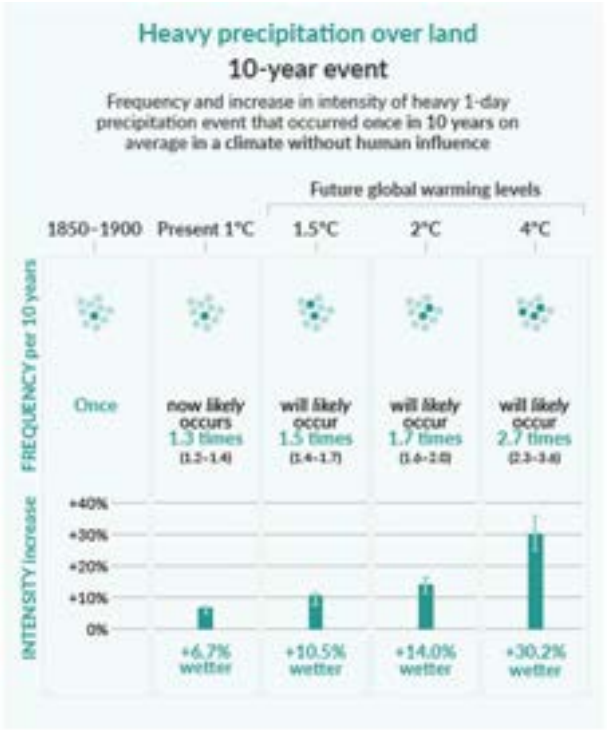
Decrease in Crop Production due to Drought

Additionally, as the global average temperature rises, increase in occurrence probability of extreme high temperature and heavy rainfall in land areas, and ocean acidification will be predicted. Thus, various climate changes due to global warming have a significant impact on the provisioning services, such as a decrease in crop production and fish catches, in addition to direct impacts on ecosystems. It is predicted that climate change impacts will become even more pronounced in the next several decades if global warming continues at this rate.

93 IPBES Global Assessment Report on Biodiversity and Ecosystem Services, IPCC(Intergovernmental Panel on Climate Change) “Special Report on Global Warming of 1.5 ˚C”

94 Institute of Global Environmental Strategies, “Special Report on Global Warming of 1.5 ˚C” Handbook~Background and Future Visions~”(revised versions).
https://www.iges.or.jp/jp/publication_documents/pub/policyreport/jp/6693/IGES+IPCC+report_FINAL_20200408.pdf





Projected Changes in Extremes are Larger in Frequency and Intensity with Every Additional Increment of Global Warming [95]

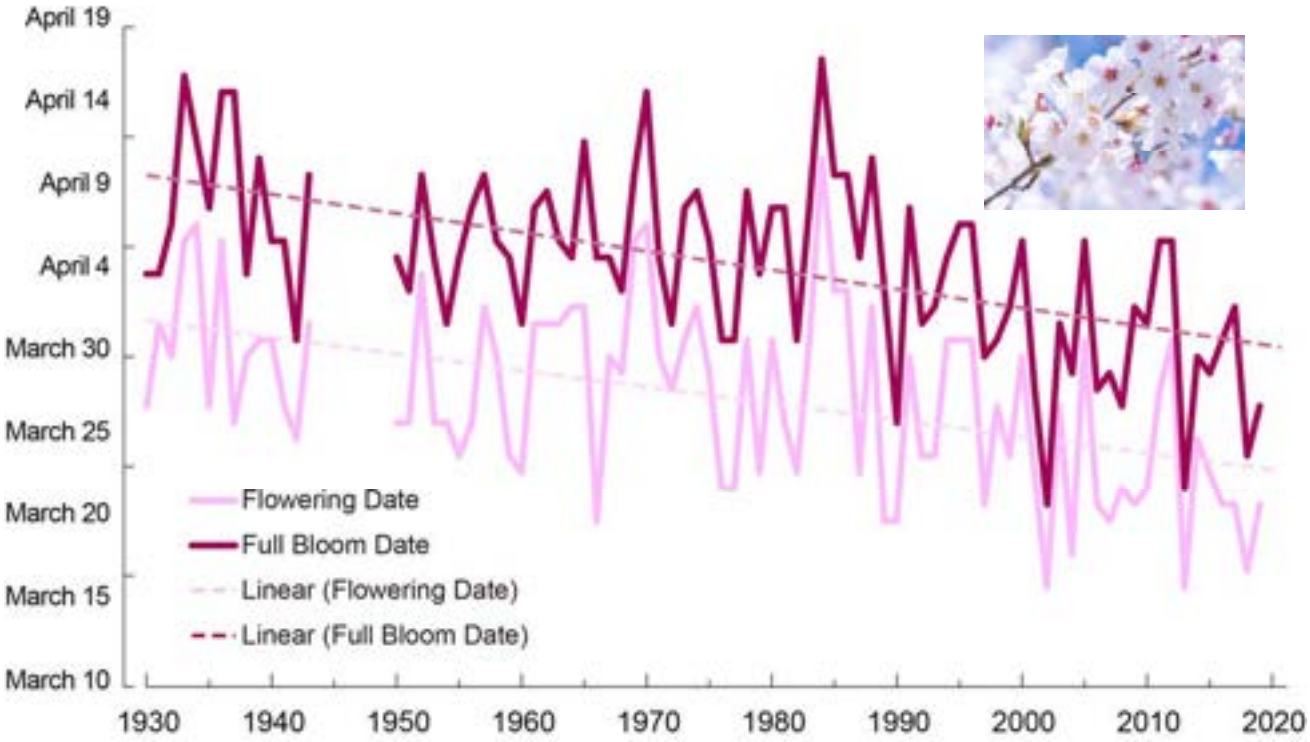
In Tokyo, moving-in by living things in the southern regions, and changes in phenology including plants' blooming season and flying-in period of migratory birds have been found.

For example, Blackish cicada and Great Mormon as the insects that had originally inhabited to the south of Tokyo have come to be able to settle in Tokyo due to warming, and bleaching of coral due to water temperature rise and earlier blooming of Yoshino cherry are also found as the changes caused by warming, which is likely to cause unexpected changes in ecosystems in the future.

Blackish cicada which has come to be found in Tokyo

Great Mormon which has come to be found in Tokyo

[95] Processed by the Tokyo Metropolitan Government based on provisional translation of The Working Group I Contribution to the IPCC Sixth Assessment Report, Climate Change 2021: Physical Science Basis, Summary for Policymakers (SPM) (May 12 of 2022 version).



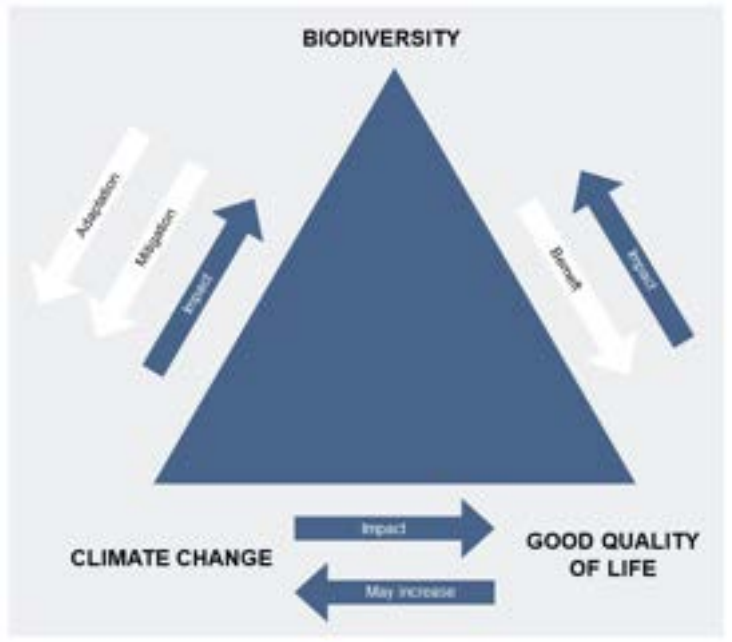
Change of Bloom Date of Yoshino cherry in Tokyo [96]

At present, we have been living in the world whose temperature is 1°C higher compared to the pre-industrial one. IPCC points out that it is required to reduce CO_2 emissions by 48% compared to the one in 2019 by 2030, and to almost zero around by 2050, in order to curb the temperature rise due to global warming to 1.5°C.

[96] Prepared by the Tokyo Metropolitan Government based on the data of the Japan Meteorological Agency.

Column Linkage between Biodiversity and Climate Change

Biodiversity and climate Change have a close relationship. IPBES-IPCC Co-Sponsored Workshop Report on Biodiversity and Climate Change[97] states that the goals for biodiversity and the ones for climate change are mutually related and achievement of these goals are essential for people's living of good quality.



* Blue arrows represent interactions that are predominantly threats, white arrows predominantly opportunities

Relationship between Climate Change, Biodiversity and Good Quality of Life

Climate change is the fourth crisis of biodiversity and a direct factor for loss of biodiversity. It is supposed that the climate change impacts are likely to become even more pronounced in the second half of this century at the current rate of global warming, leading to the factor of the biggest loss of biodiversity and also have significant impacts on our living that benefits from ecosystem services.

On the other hand, biodiversity contributes to mitigation of and adaptation to climate change through regulating services. For example, as natural environments including forests and green lands with abundant biodiversity have regulating functions for climate to absorb CO_2 through oxygen generation by photosynthesis, they can mitigate climate change.

Furthermore, as such environments also have disaster regulating functions, such as control of rainwater infiltration and soil erosion, they can contribute to adaptation to climate change.

Upon promoting all the initiatives related to nature, it is necessary to consider relationship between biodiversity and climate change, additionally their relationship with people's living of good quality.

[97] Overview of IPBES-IPCC Co-Sponsored Workshop Report on Biodiversity and Climate Change (June 21 of 2021, Ministry of Environment)

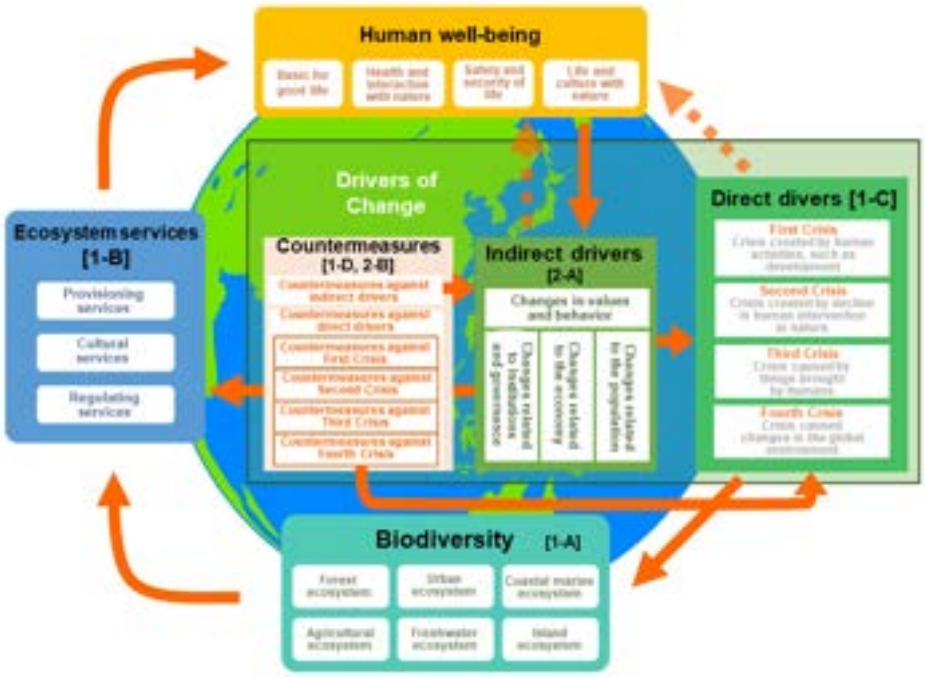
(2) Impacts on Biodiversity through Indirect Factors

In the background of four crises as direct factors of changes of biodiversity, there are the elements related to human activities: “changes in the industrial structure”, “people’s interest in nature”, and “consumption and production”, and additionally people’s values and behaviors underlying them. As these elements have indirect impacts on biodiversity, they are called “indirect factors”.

Using “consumption and production” as an example, in some cases, the materials of the products and buildings that use wood around us use timber produced in forests abroad as their raw materials. Upon production of timber, excessive thinning beyond resilience of forests would cause the problems such as loss of multiple functions of forests leading to loss of habitats and increase in disaster risks.

In this case, while logging of forests for the purpose of timber production constitutes the direct factor, our “production and consumption” does the indirect one. Not only “production and consumption” but also increase in demand of timber due to increase in population contribute to the indirect factor.

Thus, loss of biodiversity and deterioration of ecosystem services have been caused by complicated interaction between direct factors and indirect ones.



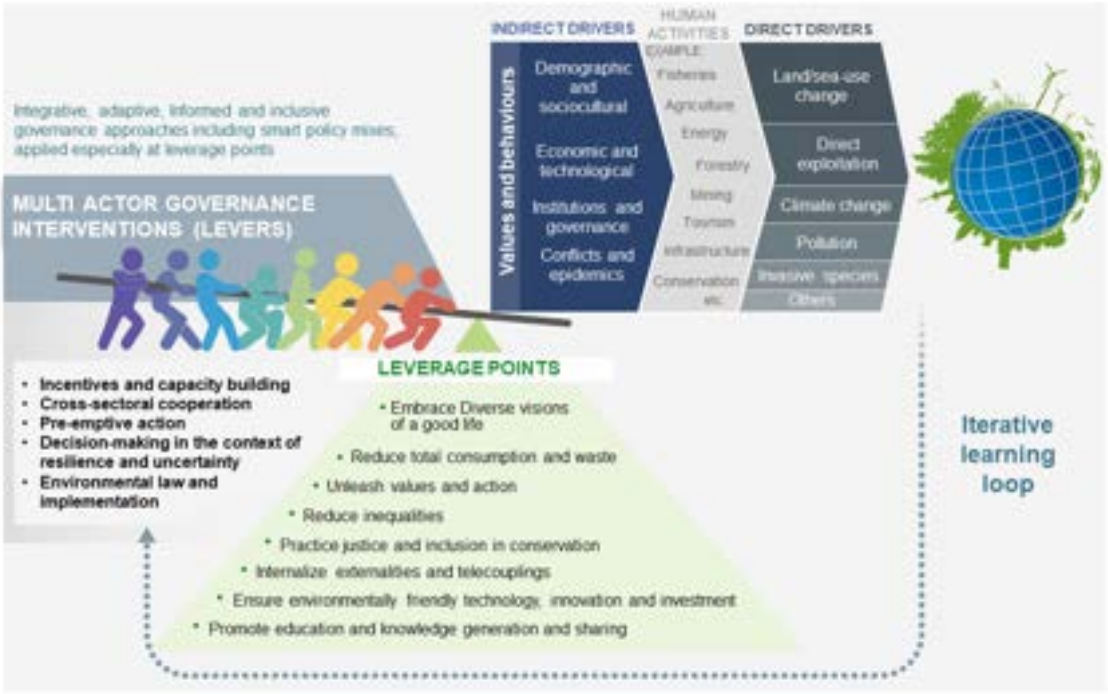
Biodiversity and Ecosystem Services and Their Drivers[98]

Based on such characteristics, in order to solve the problems related to biodiversity, it is pointed out that we have to not only take measures to the direct factors, but also implement “transformative change” that will fundamentally change the indirect factors behind them, or in other words, our society, economy, and way of life.

[98] Comprehensive Assessment of Biodiversity and Ecosystem Services in Japan 2021(Japan Biodiversity Outlook 3, JBO3) Summarized Report for Policymakers（March 19, 2021, Ministry of Environment）

Upon implementing efforts (interventions) aiming at social transformation, there are “leverage points” as key points to be focused on in order to yield exceptionally large effects. IPBES presents eight points including “lowering total consumption and waste”, and “promotion of education and knowledge generation and sharing” etc. In the future, it is necessary to strengthen approach to the indirect factors through efforts for these leverage points.

Additionally, upon making efforts, changes in behavior not only by the government but also by various entities including business operators and NPO are considered to be essential.



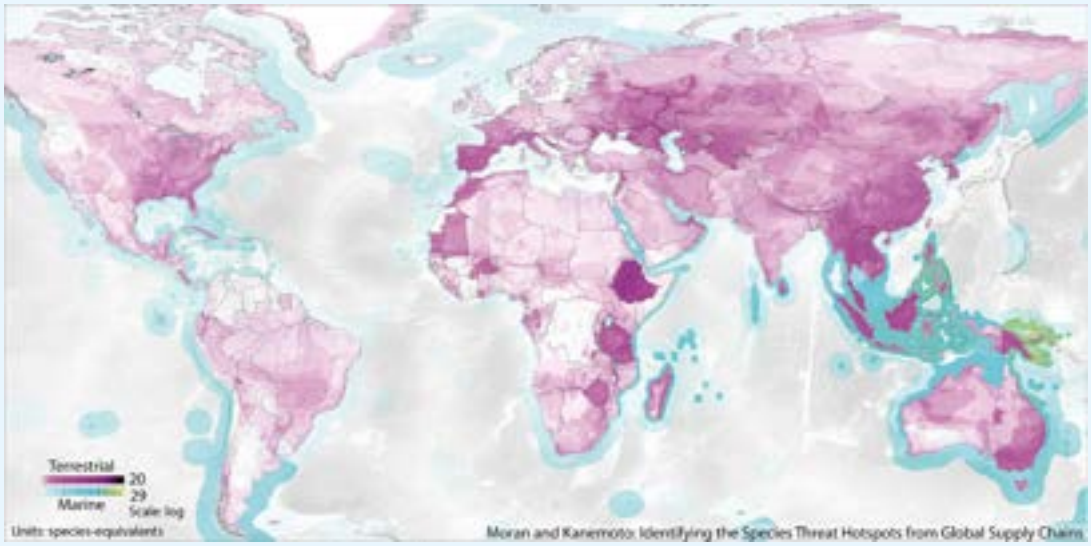
Transformative Change in Global Sustainability Pathways [99]

[99] Summary for policymakers of the global assessment report on biodiversity and ecosystem services (March of 2020, Ministry of Environment)

Column Telecoupling~Emphasized Indirect Impacts~

Our consumption of what is produced in remote places, for example, agricultural, forest and fishery products produced abroad, have impacts on biodiversity in the places where such products are produced. On the contrary, when changes occur to the biodiversity of the places of production, we would also have impacts on our consumption activities that receive its blessings. Thus, these interaction between the consumption activity in a certain area and the natural environment of remote area is called “telecoupling”. It is reported that such interaction has been becoming stronger due to increase in trade volume and globalization of supply chain.

Tokyo is one of key hubs for global economy where people, goods, money and information flow, and consumption of resources in Tokyo has been heavily involved in ongoing global loss of biodiversity. Being aware of that, we should promote shift to sustainable consumption and production.



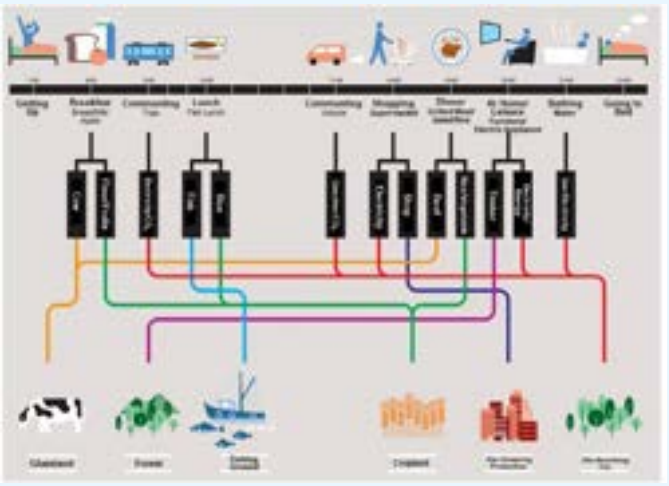
Global Species Threat Hotspot Linked to Consumption in Japan[100]

[100] Daniel Moran, Keiichiro Kanemoto; Identifying the Species Threat Hotspots from Global Supply Chains
The figure indicates as follows: in land areas, the darkest purple part shows that 20 species are endangered, and in the ocean areas, the yellow part does 29 species are endangered. Compared to in the States, in the specific areas including south-eastern Asia, there are more significant impacts by consumption in Japan.

Column Ecological Footprint

While our living has been supported by various natural resources shown in the figure below, we have few opportunities to be aware of the linkage in our daily lives. Therefore, although we often consider the issues including global warming, ocean pollution due to plastic waste, water pollution and food crisis as global ones, most of them have been caused by accumulation of our individual lives as consumers.

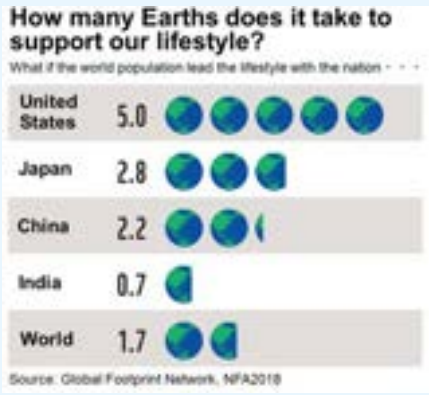
There is a method called “Ecological Footprint” to visualize and quantify the loads imposed to the environment by our lives as consumers. By utilizing Ecological Footprint[101], to what degree global, national or municipal consumption behaviors exceed the amount of natural resources that the Earth can produce can be quantified. In order to maintain the living of people in the world, the calculation indicates as follows: we have already required 1.7 earths. If people in the world maintain the same level of the living with Japan, 2.8 earths would be required, and if they maintain the same level of the living with Tokyo, 3.1 earths.

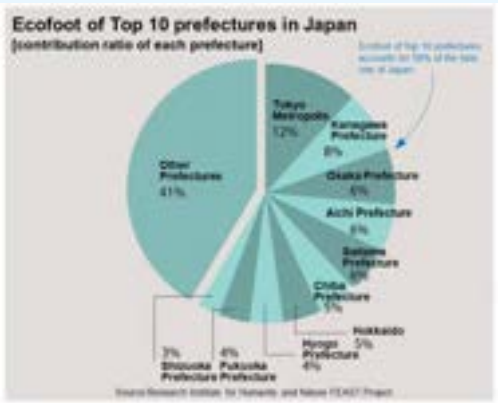


Relationship Between Living and Natural Resources

Further, for example, from the viewpoint of sustainable consumption including “waterfootprint” that represents consumption amount of water resources, there are multiple sections that cannot be covered by Ecological Footprint.

It is essential to behave by understanding that our living level significantly exceeds the amount of natural resources that the Earth can produce.





Source: WWF Japan website (https://www.wwf.or.jp)

[101] Ecological footprint means "footprints trampling on the ecosystem"

Chapter 3.

Future Vision for Tokyo

1. Basic Principle

The global environment and the biodiversity to support it are something irreplaceable created over long periods through a variety of lifeforms, including human beings. As nature cannot be controlled freely by humans, it might sometimes be a threat as a disaster or an infectious disease. For this reason, we humans should treat nature with respect.

On the other hand, it not only provides us with what is essential for our lives but also serves as the source to enrich our living.

Additionally, for sustainable development of Tokyo, it is necessary to realize a prosperous society that will enable us to continue to benefit from biodiversity. Especially, in Tokyo as a metropolis, it is required for us to have perspective to consider not only biodiversity in Tokyo but also biodiversity on a global scale.

Based on these circumstances, the basic principle for Tokyo Biodiversity Strategy shall be presented as follows:

Aiming for an environmentally symbiotic, prosperous society that will respect nature, consider sustainability on a global scale, and continue to benefit from biodiversity.

Central Tokyo Viewed from Okutama

2. Future Vision for Tokyo of 2050

The year of future vision in Tokyo Biodiversity Strategy has been specified as 2050 as the goal year of Kunming-Montreal Global Biodiversity Framework. Taking into consideration the basic principle that states that we can continue to benefit from biodiversity, future vision for Tokyo shall be indicated for each ecosystem service:

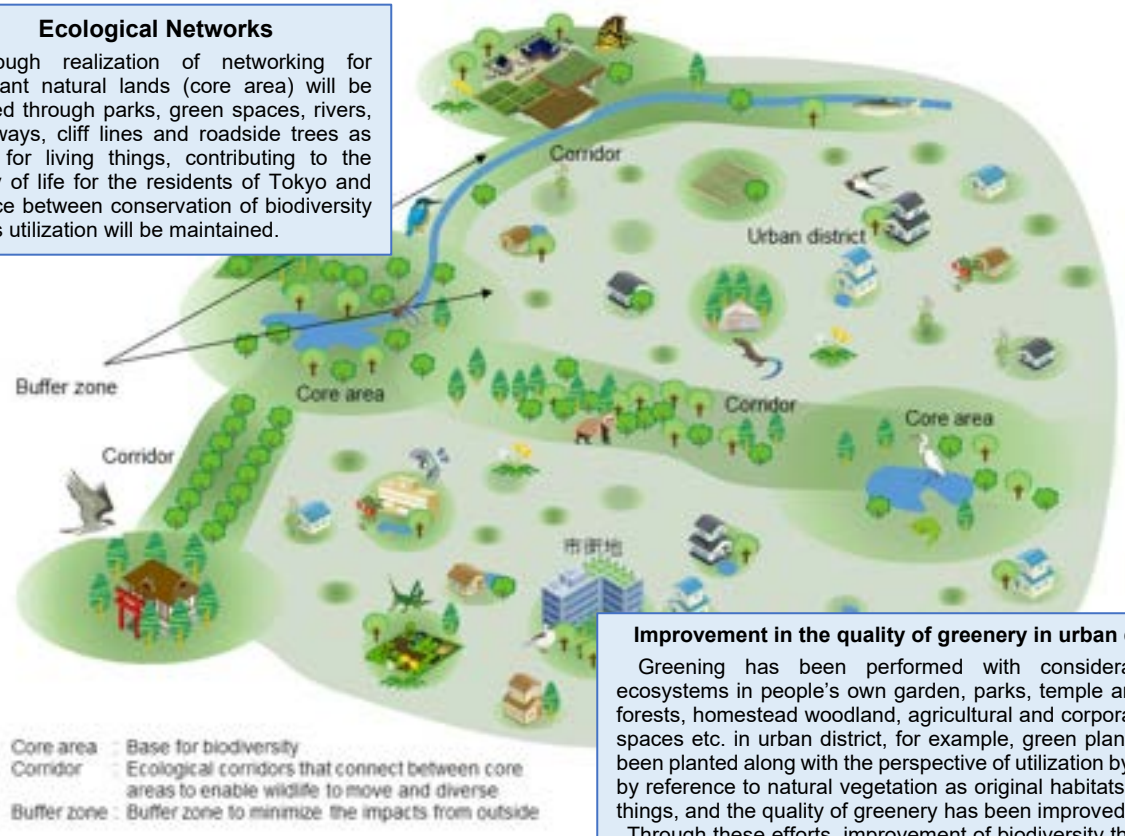
Visions of Tokyo for Each Ecosystem Service

Additionally, Tokyo's vision specific to a metropolis in addition to that for each ecosystem service includes:

[Conservation and sustainable use of biodiversity established throughout Tokyo]

Ecological Networks

Through realization of networking for important natural lands (core area) will be realized through parks, green spaces, rivers, waterways, cliff lines and roadside trees as paths for living things, contributing to the quality of life for the residents of Tokyo and balance between conservation of biodiversity and its utilization will be maintained.



Improvement in the quality of greenery in urban district

Greening has been performed with consideration for ecosystems in people's own garden, parks, temple and shrine forests, homestead woodland, agricultural and corporate green spaces etc. in urban district, for example, green plants having been planted along with the perspective of utilization by humans by reference to natural vegetation as original habitats for living things, and the quality of greenery has been improved.

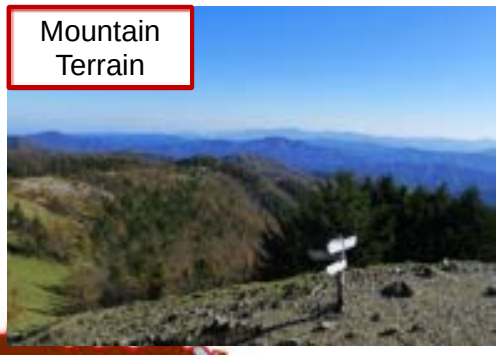
Through these efforts, improvement of biodiversity throughout urban spaces will be improved, contributing to the quality of living of the residents of Tokyo and balance between conservation of biodiversity and its utilization will be maintained.

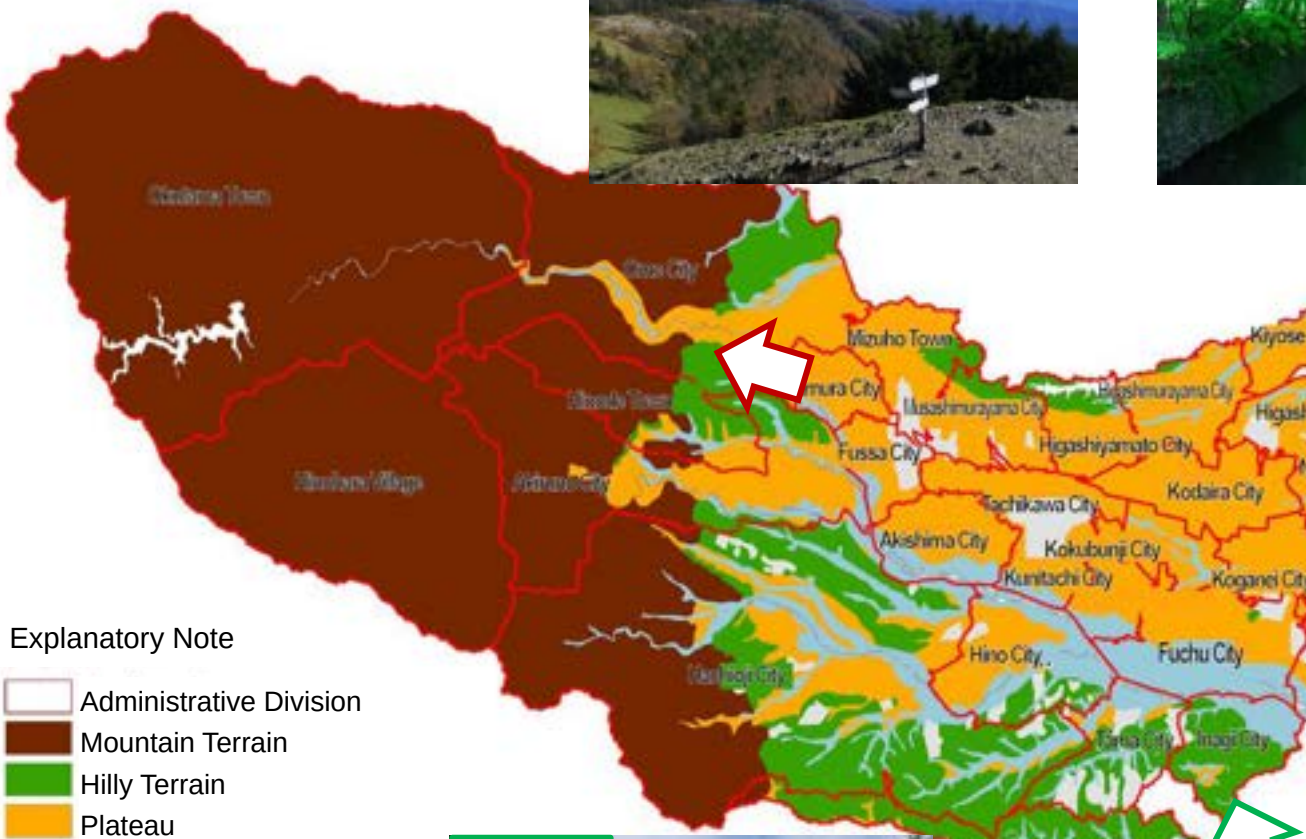
[Behavior changes in place taking account of biodiversity not only in Tokyo but also across Japan and on a global scale]

Through behavior changes in place taking account of biodiversity not only in Tokyo but also across Japan and on a global scale, relevant conservation of biodiversity and sustainable use through consumption behavior etc. will be promoted, resulting in establishment of sustainable society for economy in Tokyo and living of the residents of Tokyo as well.

3. Visions for Each Topographical Classification in T

Topography of Tokyo is divided into mountain terrain, hilly terrain, plateaus, lowlands and islands, each of which has characteristics of different biodiversity. Therefore, it is required to promote the initiatives according to the characteristics for each topography classification. On the following pages, images of visions for the relationships between residents, workers and visitors, and nature shall be described for each topographical classification.





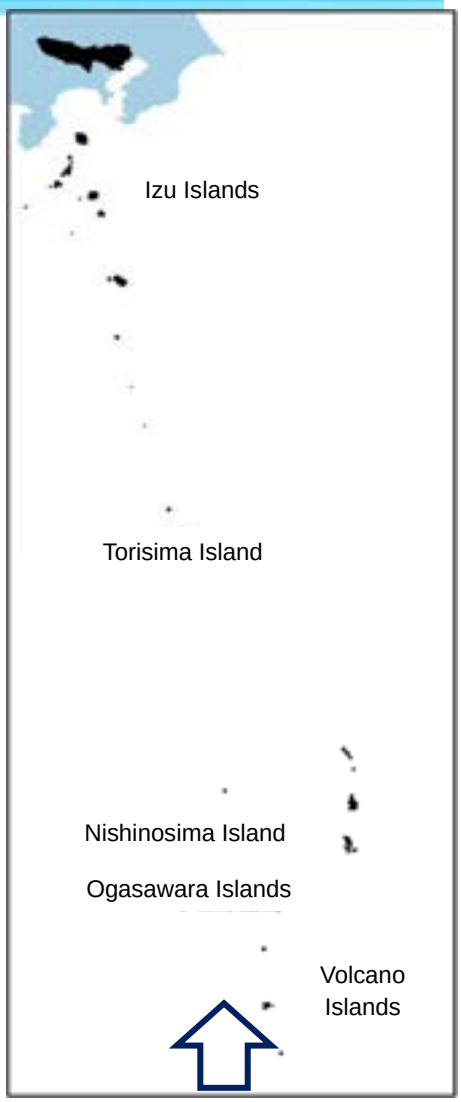
Explanatory Note

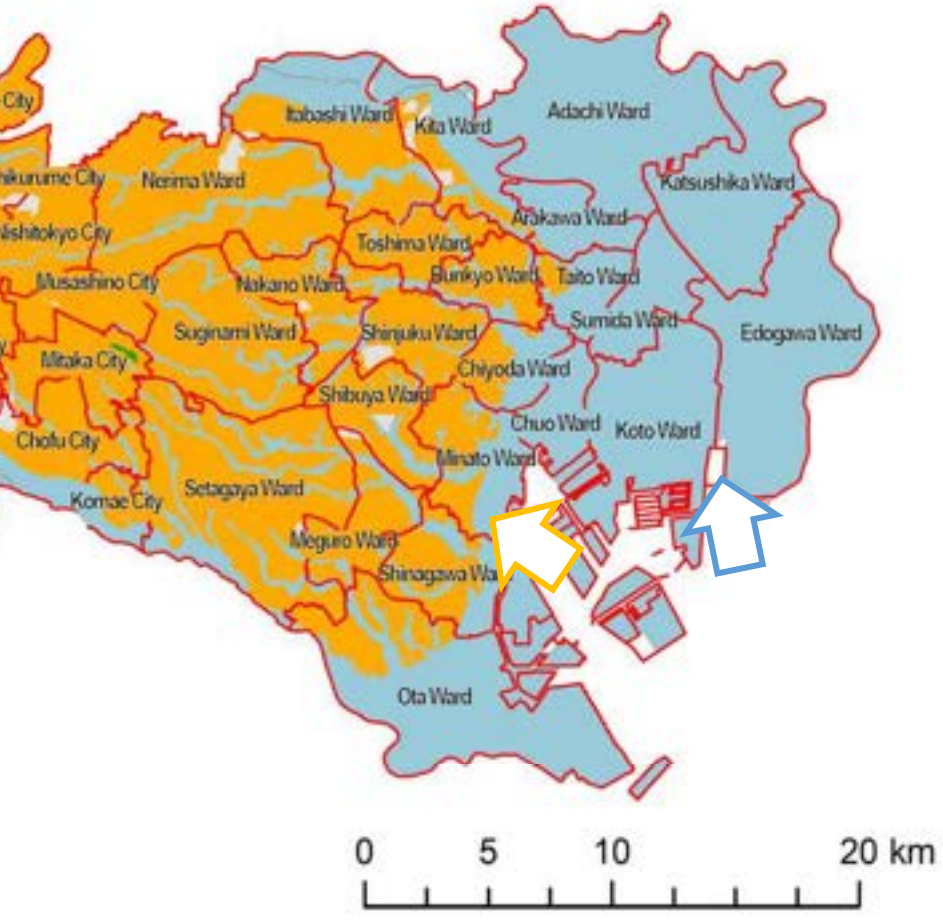
- Administrative Division
- Mountain Terrain
- Hilly Terrain
- Plateau
- Lowland
- Artificially Changed Land

* The illustrations for each topographical classification on the following pages show the images of vis

okyo

Lowland





Islands

sions viewed from the directions of the above-mentioned arrows.

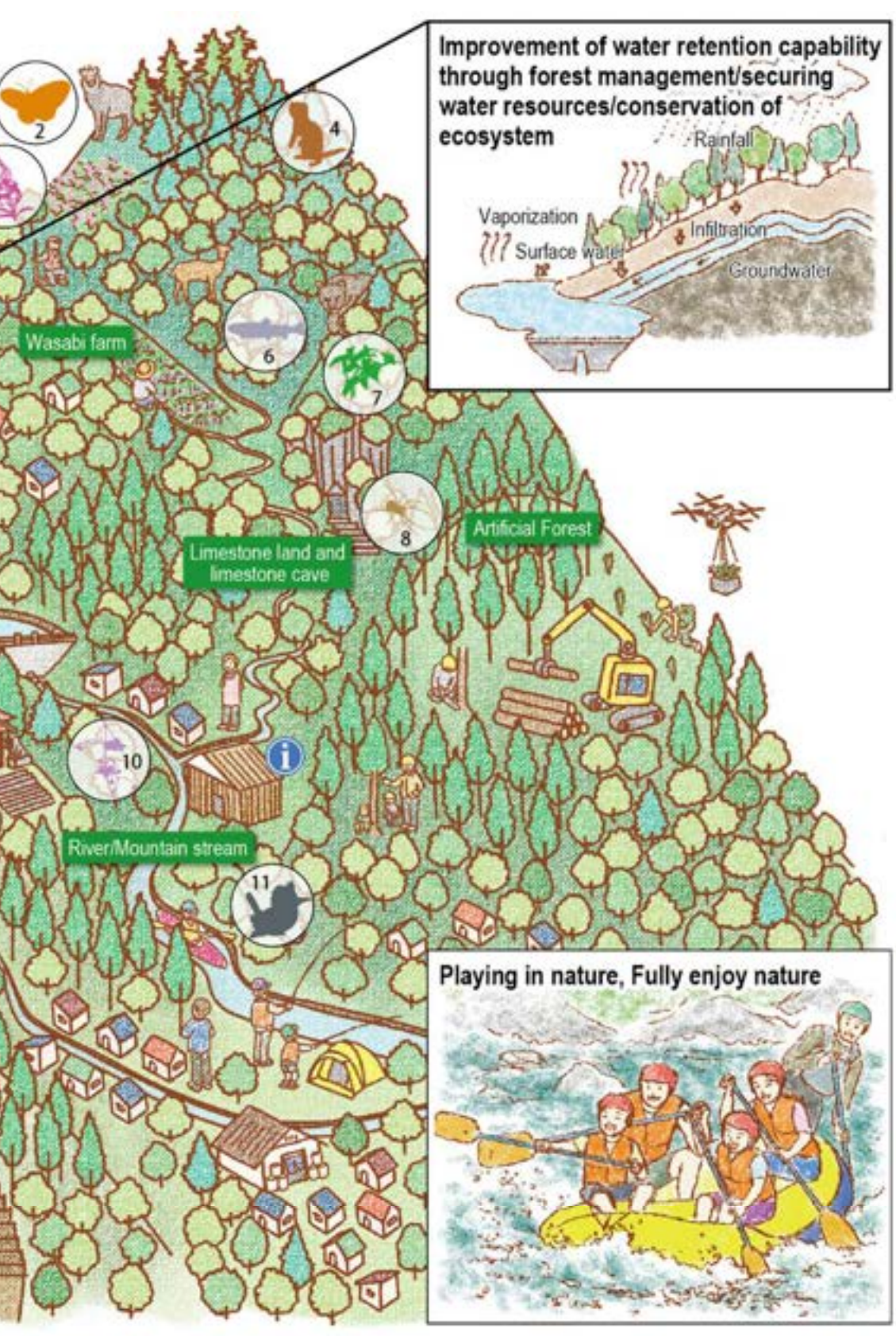
Visions for Mountain Terrain

The illustration for each topographical classification mainly describes the latest endangered species listed on Red List of Threatened Species, seeking for the state where Wildlife Species in Serious Need of Conservation in Tokyo specified by TMG stably inhabit and grow in 2050. Upon selecting individual species, places for living things have been allocated with expectation that they will survive or revive and such places will become their habitats in 2050, as well as paying attention not to be significantly biased to classification group including mammals and birds. Additionally, such selection has been performed, not only by focusing on the species of living things but also by paying attention to the perspective that their habitats for fauna have been maintained and recovered.

Reference
Japanese serow(VU)

13.
Sq

*The above descriptions in parentheses are the categ



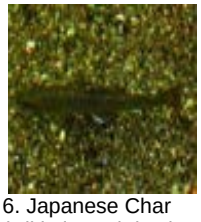

1. Mountain Hawk-Eagle (EN)


2. Dark Green Fritillary (EN)


3. Fireweed (EN)


4. Shorttail Weasel (VU)


5. Japanese Dormouse (○)


6. Japanese Char (Nikkoiwana) (CR)


7. Betula chichibuensis (EN)


. Japanese Flying uirrel (○)


12. Mt. Takao Viola (Takaosumire (NT)


11. Crested Kingfisher (EN)

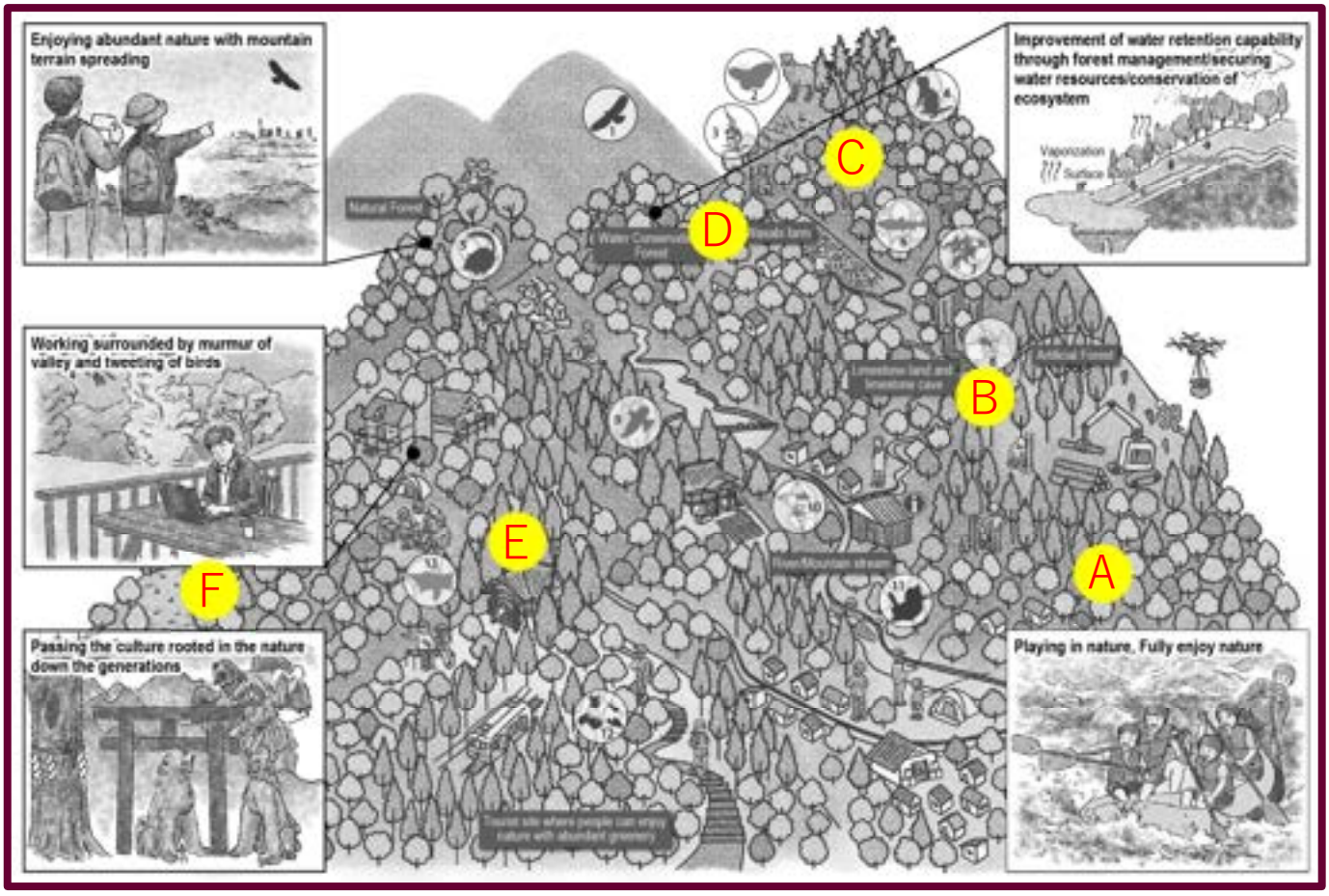

10. False Anemone (EN)


9. Oriental Dollarbird (CR)


8. Nesticus shinkaii (VU)

ories that represent the degree of being endangered in “2020 Red List of Threatened Species Tokyo (Mainland)”. (see p205).

[Explanation on Images for Visions of Mountain Terrain]



A

As the percentage of broad-leaved trees and forests with needle-leaved and broad-leaved trees will be increased, the plants in mountain terrain are rich in diversity. The more diverse the plants become, the more diverse the habitats of fauna become. These forests will become habitats for a lot of native birds and insects.

B

In artificial forests, “forest cycle” will be advanced by thinning, utilizing, transplanting and growing trees. In “forest cycle”, the cutting-edge technologies including ICT and drone will be introduced. Furthermore, these forests will also become the places for people to contact with nature such as participation in conservation projects by the residents of Tokyo and corporations etc.

C

As large mammals including Asian Black Bear mainly inhabit deep mountains, there will be less conflict with humans. In the ridge around the top of Mt. Kumotori, due to decline in damage to vegetation by sika deer, a field of alpine flowers including Fireweed that used to spread will be recovered.

D

Wildlife and humans will co-exist by implementing guided tours to observe wildlife and utilizing wild game as valuable tourism resources.

E

Shrines and temples are historically and culturally important places which have deep connection with nature such as making nature itself as the object of worship etc. Around their main halls, there will be large sacred trees, where living things that inhabit hollow trees including Japanese Giant Flying Squirrel and Japanese Flying Squirrel inhabit.

F

The places where there used to be grasslands spreading such as Mt. Jinba will be revived. Along with the landscapes of natural environment where the plants that used to be observed including leopard flower, the living things which used to inhabit grasslands will come back.

Major Issues and Visions for Mountain Terrain

Maintenance/Recovery for Multifaceted Functions of Forests

[Major Issue]

In the forests of Tokyo, as the percentage of artificial forests including Japanese cedar and cypress is high, which has caused pollinosis. Besides, habitats for living things have been deteriorating and water retaining capacity has been declining as inside of some of forests has become dark and forest floor vegetation has been lost due to lack of maintenance.

[Visions]

Wood made in Tama will be utilized, forestry revitalized and forests properly managed, as well as remained natural forests being properly conserved and a part of artificial forests that had been devastated being like forests with needle-leaved trees and broad-leaved trees. Consequently, multifaceted functions including conservation of water resources, prevention of landslides and habitats for living things will be maintained and recovered.

Forest that has become brighter through thinning

Nursery school where people can feel the warmth of wood

Tourism Recreation in Harmony with Nature

[Major Issue]

In popular regions, there are issues occurred, including impacts on animals and plants, and due to concentration of users and insufficient propagation of rules around mountain trails and hinderance of comfortable usage environment.

[Visions]

Usage rules for natural parks will be propagated as well as advancement of understanding about various appeals of mountain terrain in Tokyo by the residents of Tokyo, to avoid excessive concentration of users to specific places and courses.

In order to facilitate safe and comfortable use by everyone, mountain paths etc. will be properly managed and recovery of vegetation and conservation of forests in the vicinity will be promoted.

Patrol by rangers and awareness for usage rules

Enjoying mountain climbing while following usage rules

Proper Management of Wildlife

[Major Issue]

As the number of sika deer has increased and their habitats have expanded due to decline in hunters and amount of snowfall, forests with poor low-cover vegetation have been spreading, impacts on ecosystems have been expanding and feeding damage on planted young plants and agricultural products continue to be caused. Additionally, the habitats of Asian Black Bear has been expanding and they have been increasingly and frequently appearing in the vicinity of houses at the foot of mountains.

[Visions]

As well as conservation of sound ecosystems through recovery of forest floor vegetation due to proper management of sika deer, risk of sediment disasters and damage on agriculture and forestry will be mitigated. Additionally, due to creation of buffer zones between Asian Black Bear and the vicinity of houses, separation from humans will be proceeded.

Forest ecosystem recovered through proper population management of sika deer

Field of flowers of Mt. Kumotori in the past whose recovery is expected

Conservation of Rare Species

[Major Issue]

Rare species including Mountain Hawk-Eagle that inhabit in the forests of mountains with high naturalness and Paeonia obovata that inhabit in bright deciduous broadleaf forests have been endangered due to human activities, including devastation of forests as their habitats and photographing at nesting sites, and harvesting for horticultural purpose.

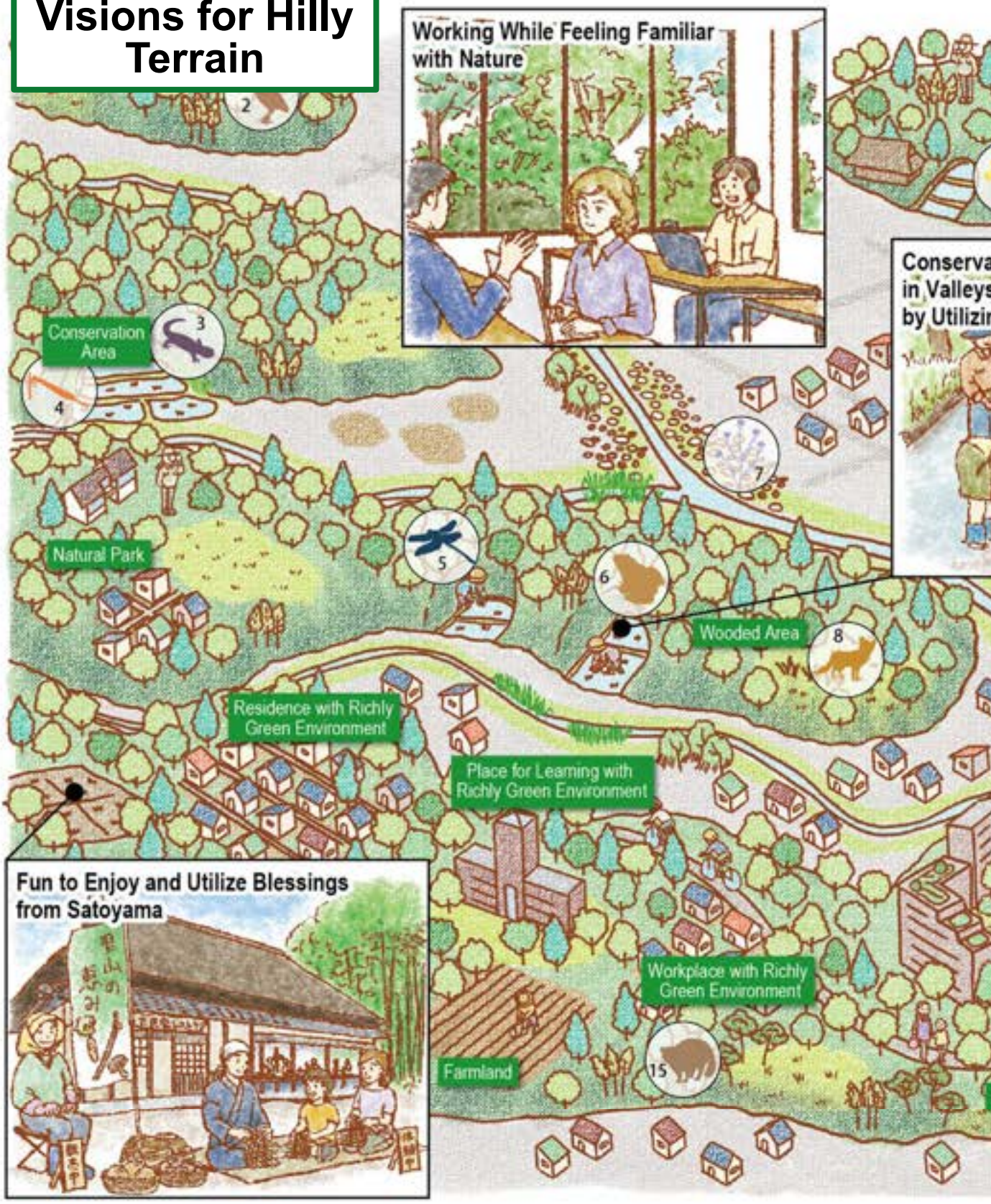
[Visions]

As how to build relationships between humans and wildlife and usage rules at the time of trekking will widely propagate, simultaneously with grasping basic information through continuous monitoring and advancement of conservation of rare species based on scientific knowledge, entry into nest sites and illegally digging up plants will be prevented and the risk of their extinction will be overcome.

Restriction of damage caused by illegal digging up of rare plants by patrol activities

Aiming at revival of Oriental Dollarbird of Mt. Takao

Visions for Hilly Terrain



* While the vicinity of Tama River is classified as lowland, its middle reaches are introduced by illustration of hilly terrain.

* The descriptions at right in parentheses are the categories that represent the degree of being endangered in “2020 Red List of Threatened Species Tokyo (Mainland)” (see p205).

15. Badger (○)

14. Far Eastern Brook Lamprey (CR)


1. Nabalus Tanakae (CR)


2. Japanese Night Heron (EN)


3. Tokyo Salamander (EN)


4. Mortonagrion selenion (CR)


5. Tanypteryx pryeri (EN)


6. Tokyo Daruma Pond Frog (EN)


7. Aster kantoensis (EN)


8. Red Fox (○)


9. Eusphingonotus japonicus (EN)

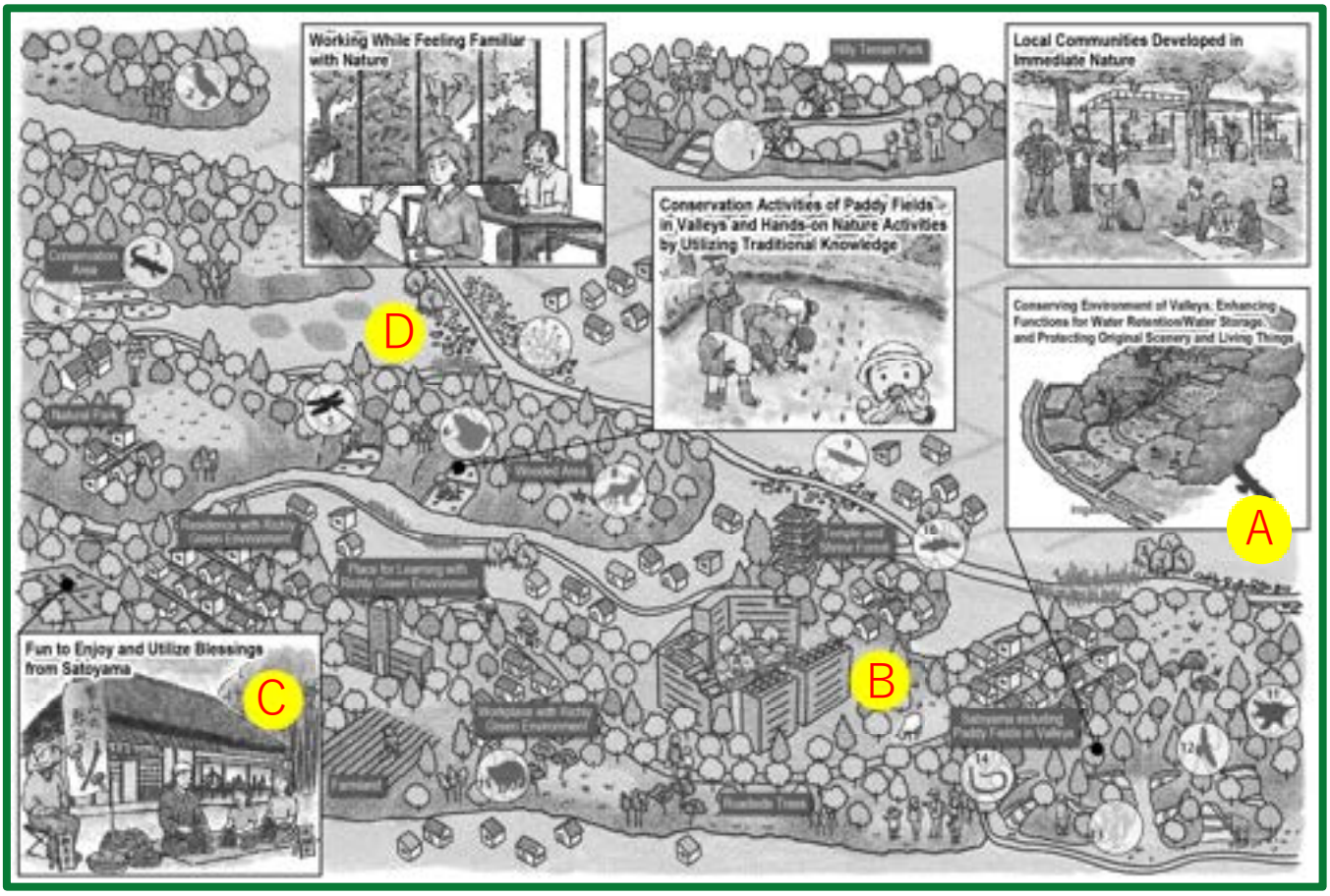

10. Gymnogobius sp. (DD)


11. Japanese Giant Flying Squirrel (○)


12. Grey-Faced Buzzard (CR)


13. Duck-lettuce (CR)

[Explanation on Images of Visions for Hilly Terrain]



A

In the valley as the characteristics of hilly terrain, diverse ecosystems based on complicated land use, including paddy fields, reservoirs, wooded areas and irrigation channels that remain by humans' care will be conserved together with traditional knowledge. Rare living things of Tokyo will inhabit the ecosystem of these valleys in hilly terrain, and their values as green infrastructure including rainwater infiltration and water-retaining functions will be enhanced.

B

In wooded areas that remain in hilly terrain, sprout update will be actively performed and demand for felled wood will be newly created in the regions. In wooded areas that have become brighter, diverse living things will be revived. Additionally, grasslands will be recovered and meadowy living things will come back. For grassland management, living things including goats etc. will be utilized and such grasslands will provide opportunities to feel familiar with living things.

C

The blessings of nature in satoyama including firewood and mushrooms obtained in wooded areas will be utilized, local resources including hands-on experience of bamboo work will be effectively utilized through traditional culture inheritance and local nature will be conserved.

D

On the riverside of Tama River, characteristics environment of riverside with rolling gravel and pebbles will be regenerated and conserved, where rare living things including Aster kantoensis and Eusphingonotus japonicus will inhabit and grow. Additionally, in Tama River Lowland, paddy fields that have been significantly declining in Tokyo will remain as an essential element of ecosystem.

Major Issues and Visions for Hilly Terrain

Conservation and Recovery of Ecological Network of Greenland

[Major Issue]

As green lands have been segmented by felling trees due to development of residential land, inhabits for fauna have been declining.

[Visions]

Familiar living things will come back due to advancement of recovery for network where living things can inhabit (ecological network) as well as conservation of green lands such as natural parks, conservation areas and metropolitan parks etc.

Metropolitan park as the base of ecological network (Takiyama Metropolitan Park)

Humans and Ecosystem of valuable valley is conserved and humans and nature are in symbiotic relationship (Yokosawairi satoyama conservation area)

Control of Alien Species

[Major Issue]

As the alien species including Common raccoon have increased, feeding damage to agricultural products has occurred as well as predation of native species including rare ones and competition with native species. In water areas, increase in invasive alien species including Largemouth bass, red ear slider and Parrotfeather and release of domestic alien species etc. have become problems.

[Visions]

Alien species will be no longer released outside and Impacts on ecosystems specific to regions and feeding damage to agricultural products will be controlled, by promoting countermeasures to control alien species.

Common raccoon that has a great impact on ecosystem specific to the region

Tokyo salamander that is expected to be restored by control of alien species etc.

Conservation of Satoyama Landscapes

[Major Issue]

In valley topography of hilly terrain in Tokyo, as natural environments specific to satoyama landscapes have been lost due to abandonment of care by humans for paddy fields in valleys, firewood forests, pampas grass fields and reservoirs etc., various living things decreased.

[Visions]

By activation of conservation and revitalization activities by diverse entities including the residents by Tokyo, businesses and the government etc., due to increase in new demand as farmlands for hands-on activities of farmlands and advancement of resource cycle through use of firewood etc., satoyama environment will be recovered and diverse living things will return and functions for water conservation/water storage through restoration of marshlands will be enhanced.

Restoration activity for abandoned paddy fields in valleys in hilly terrain by utilizing traditional knowledge

Grey-Faced Buzzard highly ranked in ecosystem is revived by conservation and restoration of satoyama environment

Conservation of Rare Species

[Major Issue]

Due to human activities including development of natural lands and overexploitation/illegal digging etc., decline in approach to nature in satoyama landscapes and impacts by alien species etc., Tokyo salamander and dogtooth violet that inhabit and grow in satoyama landscapes have been endangered.

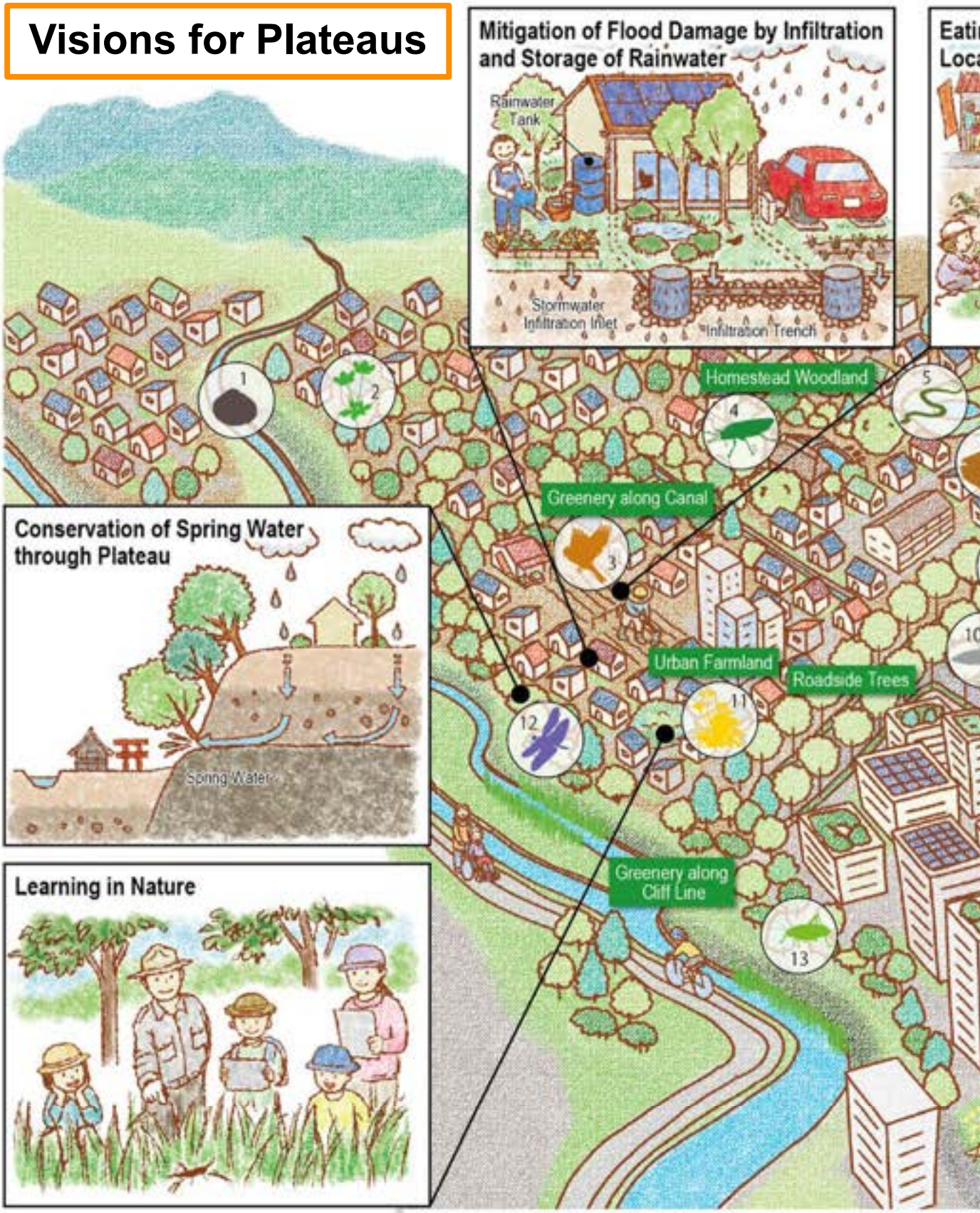
[Visions]

Overexploitation/illegal digging etc. will be prevented as well as basic information being understood through continuous monitoring survey and provision of information for living things by the residents of Tokyo. Additionally, through establishment of technologies for conservation based on scientific knowledge and promotion of development of human resources who take the lead of conservation activities, rare wild species will overcome the risk of extinction.

Monitoring survey for wild fauna and flora

Dogtooth violet growing in colonies by proper floor vegetation management

Visions for Plateaus



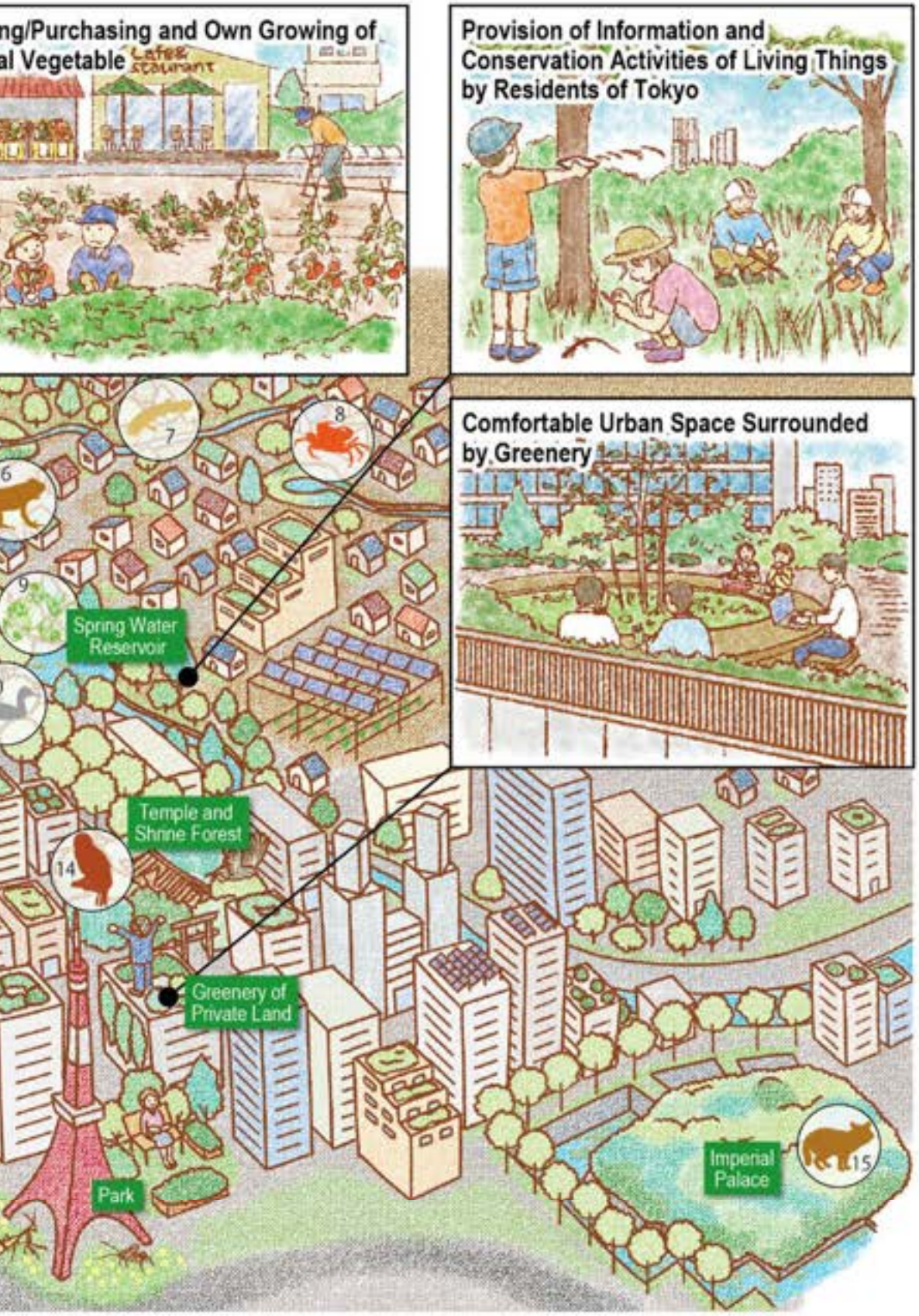
* The descriptions at right in parentheses are the categories that represent the degree of being endangered in “2020 Red List of Threatened Species Tokyo (Mainland)”. (see p205).

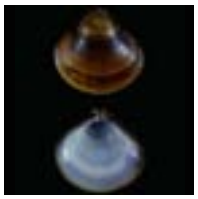
15.Japanese Raccoon Dog (○)

14.Brown Hawk Owl (CR)

13. Giant Katydid (EN)

12. Rhyother… fuliginosa (N…




1. Asian Clam (CR+EN)


2. Soft Windflower (NT)


3. Skylark (VU)


4. Jewel Beetle (NT)


5. Tiger Keelback (VU)


6. Japanese Brown Frog (EN)


mis
T)


11. Hemerocallis dumortieri var. musashiensis (VU)

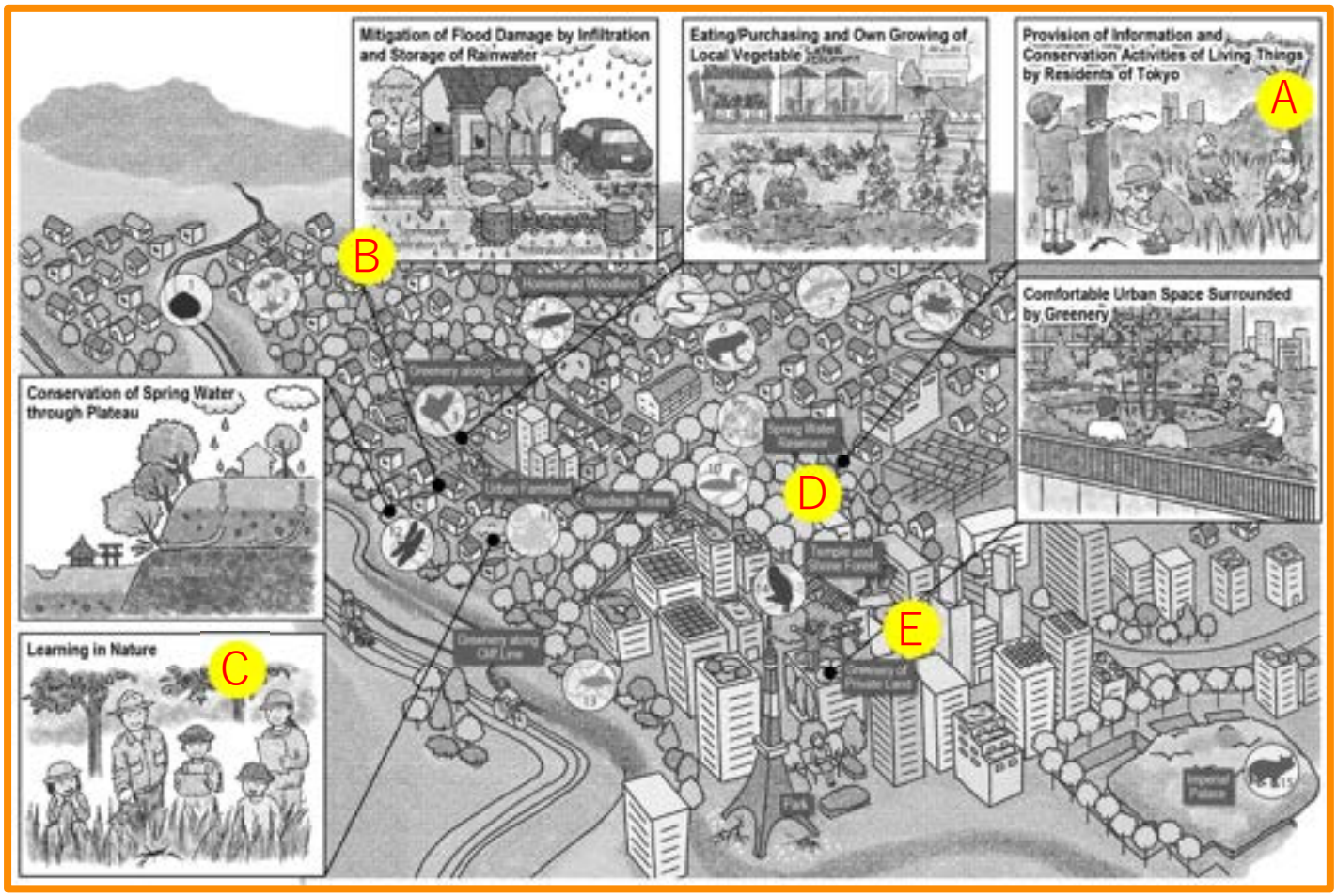

10. Dabchick (NT)


9. Nitella mirabilis var. inokasiraensis (CR+EN)


8. Japanese Freshwater Crab(*①②)


7. Hotoke Loach (EN)

[Explanation on Images of Visions for Plateaus]



A

”Citizen science” will be widely spread to take photos of living things in immediate nature and to provide information for living things with database related to natural environment such as “Ikimono Log”.

B

Storage of rainwater and installation of infiltration facilities will be promoted as well as enjoying planting native species and enjoying vegetable gardens by utilizing spaces such as home gardens, Through these initiatives, as well as creation of environment where insects and birds visit throughout the city, mitigation of flood damage and cultivation of groundwater will be promoted by expanding infiltration area of rainwater in Tokyo.

C

In parks, people will be able to explore the nature environment and observe living things together with Urban Park Ranger※ and the environments to learn about nature will be developed.

* In New York, “Urban Park Rangers” have been assigned.

D

Inokashira Pond, Zenpukuji Pond and Sanpouji Pond which used to be called “Three Major Spring-Fed Reservoirs of Musashino” of Musashino Plateau on 50m contour line will revive and they will be highly estimated as natural resources to activate the regions as well as becoming valuable inhabits for living things.

E

Ecological network where birds fly in will be formed through expansion of ecologically friendly corporate green spaces triggered by redevelopment by private sectors, and connection with integrated greenery including large-scale green spaces and cliff lines.

Major Issues and Visions of Plateaus

Conservation and Recovery of Ecological Network of Greenery

[Major Issue]

Although relatively large-scale greenery remain in central Tokyo, greenery remaining in cliff lines etc. has been further segmented because of advancement of development into residential properties. Due to lack of management of trees etc. and decrease in grasslands bright forests and living things inhabiting grasslands have been declining.

[Visions]

In addition to conservation and recovery of ecological network centered on cliff lines/conservation areas/parks and rivers/canals/spring water, and roadside trees, creation of new greenery by corporations that obtain environmental certification will be promoted and familiar living things will come back.

Connection of Greenery of Cliff Lines as the axis of ecological network (Kokubunji Cliff Line)

Private Greenery spreading urban area where Japanese Pygmy Woodpecker fly in with consideration for living things (garden of Japanese Pygmy Woodpecker)

Recovery of Ecosystem Specific to Regions

[Major Issue]

As well as predation damages to native living things such as Frogs etc. and damages to agricultural products have been caused by alien species including Common Raccoon. Additionally, in the ponds of parks, not only the impacts by alien species originated from abroad including Largemouth bass and Bluegill, red swamp crayfish, and red-eared sliders but also by alien species originating from Japan brought from other regions, issues including predation against native aquatic organisms and competition, and genetic disturbance have been caused.

[Visions]

Invasive alien species will be controlled and rare living things will be safeguarded. Furthermore, in parks etc., participation by citizens in draining of water and cleaning of pond bottom, and subsequent monitoring will activate and ecosystem specific to regions will revive while protectors of immediate nature will be increasing.

Draining of water and cleaning of pond bottom in collaboration with citizens in Inokashira Pond

Inokashira Pond where ecosystem specific to regions rare restored

Utilization of Functions for Rainfall Infiltration that Plateaus of Tokyo Have

[Major Issue]

As trees and farmlands have been decreasing due to advancement of urbanization and grounds have been covered with buildings and asphalt, rainwater has been directly flowing into rivers and public sewerage. Since infiltration of rainwater into ground has been hindered, spring water has been decreasing.

[Visions]

By utilizing excellent drainage of plateau in Tokyo and infiltrating rainwater, the loads on rivers and public sewerage will be reduced, which contributes to mitigation of flood damage.

Additionally, rainwater will be sufficiently cultivated and spring water will be reviving. Especially, three major spring-fed reservoirs of Musashino will be conserved as the base.

Rain Garden where rainwater in the vicinity is collected and infiltrated (Setagaya Municipal Kamiyoga Park)

Valuable natural springs that remain in urban area (Masugata no Ike Natural Springs)

Integral Conservation of Greenery of Homestead Woodlands/Wooded Areas/Farmlands/Irrigation Water etc.

[Major Issue]

Due to impacts by urbanization etc., greenery that remain in plateaus including homestead woodland, wooded areas, farmlands and irrigation water etc. have been reduced year by year, and their role habitats for living things in urban areas and functions to infiltrate rainwater have been lost.

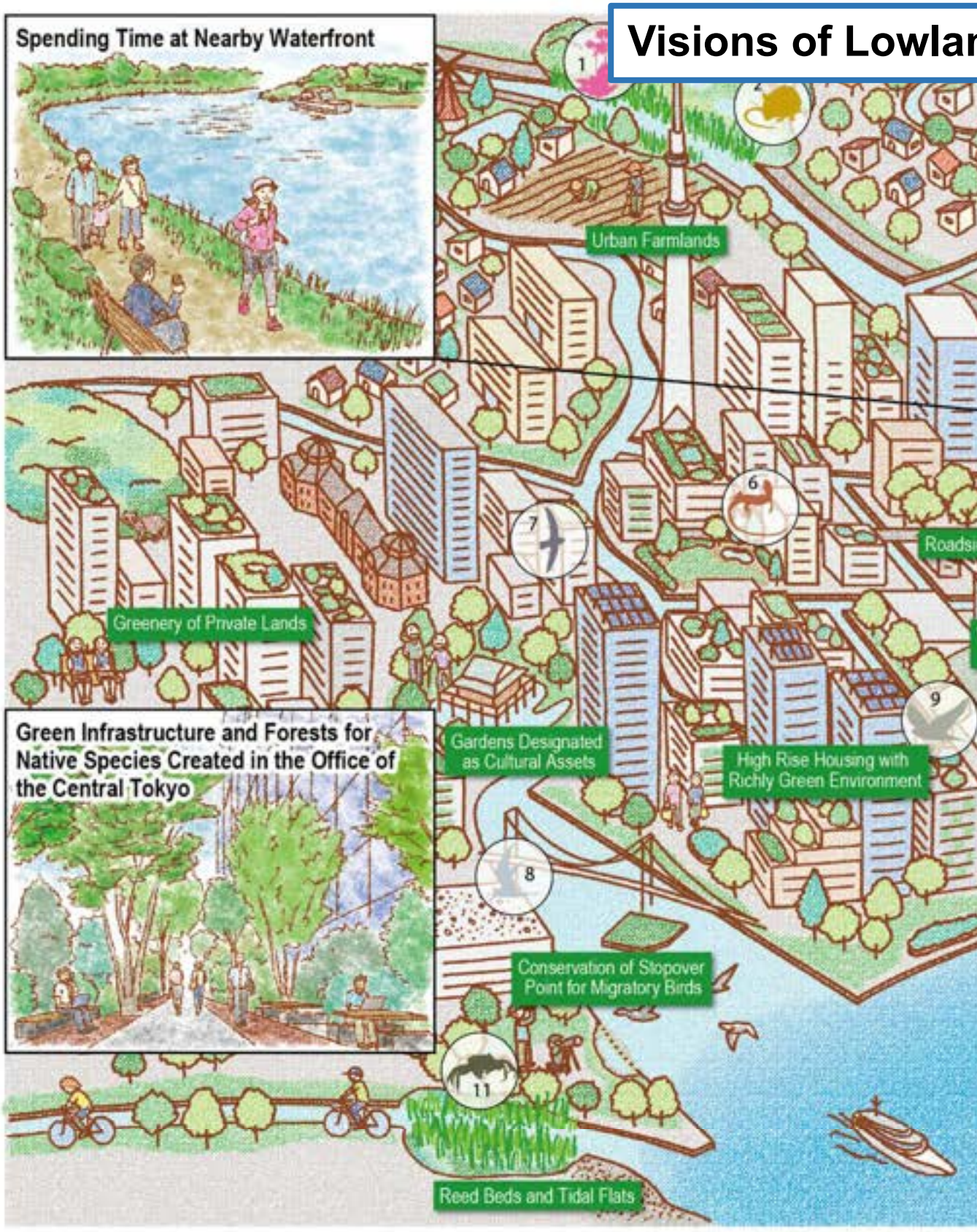
[Visions]

Through initiatives by diverse entities, greenery including homestead woodlands, wooded areas, farmlands and canals etc. will be integrally conserved, and not only habitats for living things but also functions of water infiltration will be maintained. In farmlands, as well as fostering the persons to take the lead of agriculture, local agricultural products will be spreading as local brand as well as expansion of opportunities of diverse experience for farmwork.

Homestead Woodland as the base of Biodiversity (Shimohoya 4 chome Greenery Conservation District)

Farmland offering farm experience where people can produce vegetables through instruction by farmer.

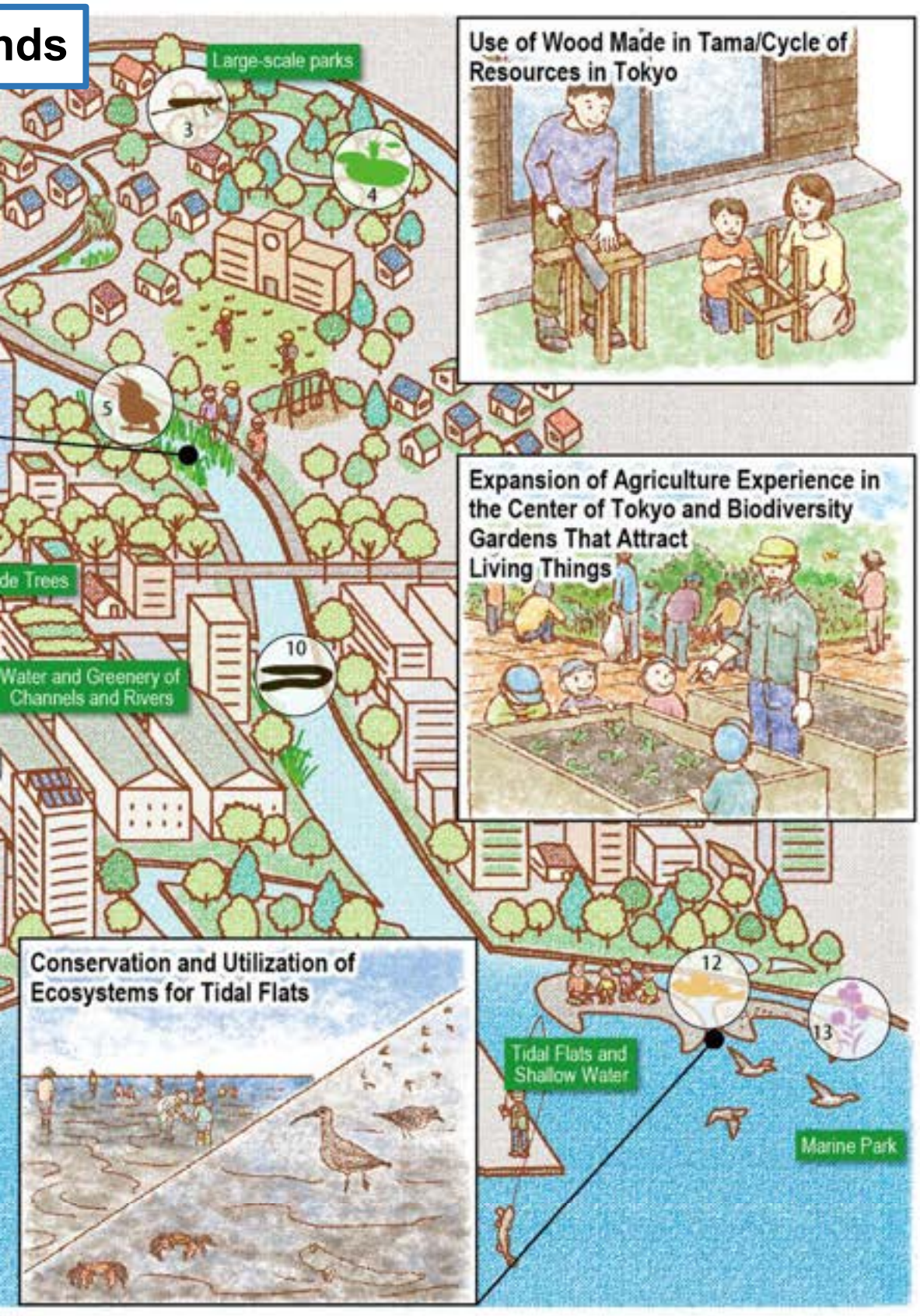
Visions of Lowlan



* The descriptions at right in parentheses are the categories that represent the degree of being endangered in “2020 Red List of Threatened Species Tokyo (Mainland)”. (see p205)
* For the living things in lowlands, category classification of 23 wards shall be adopted.


13. SeaAster (EN)

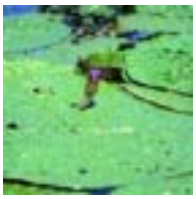

12. Mudskipper (CR)




1. Japanese primrose (EX)


2. Harvest Mouse (DD)


3. Copera tokyoensis (CR)

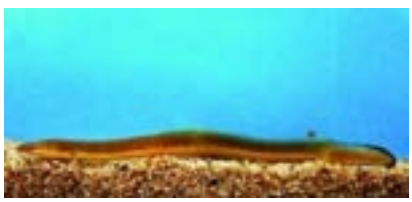

4. Prickly water lily (CR)

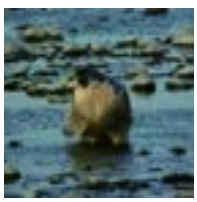

5. Great reed warbler (CR)


6. Japanese grass lizard (CR+EN)


7. House Swift (VU)

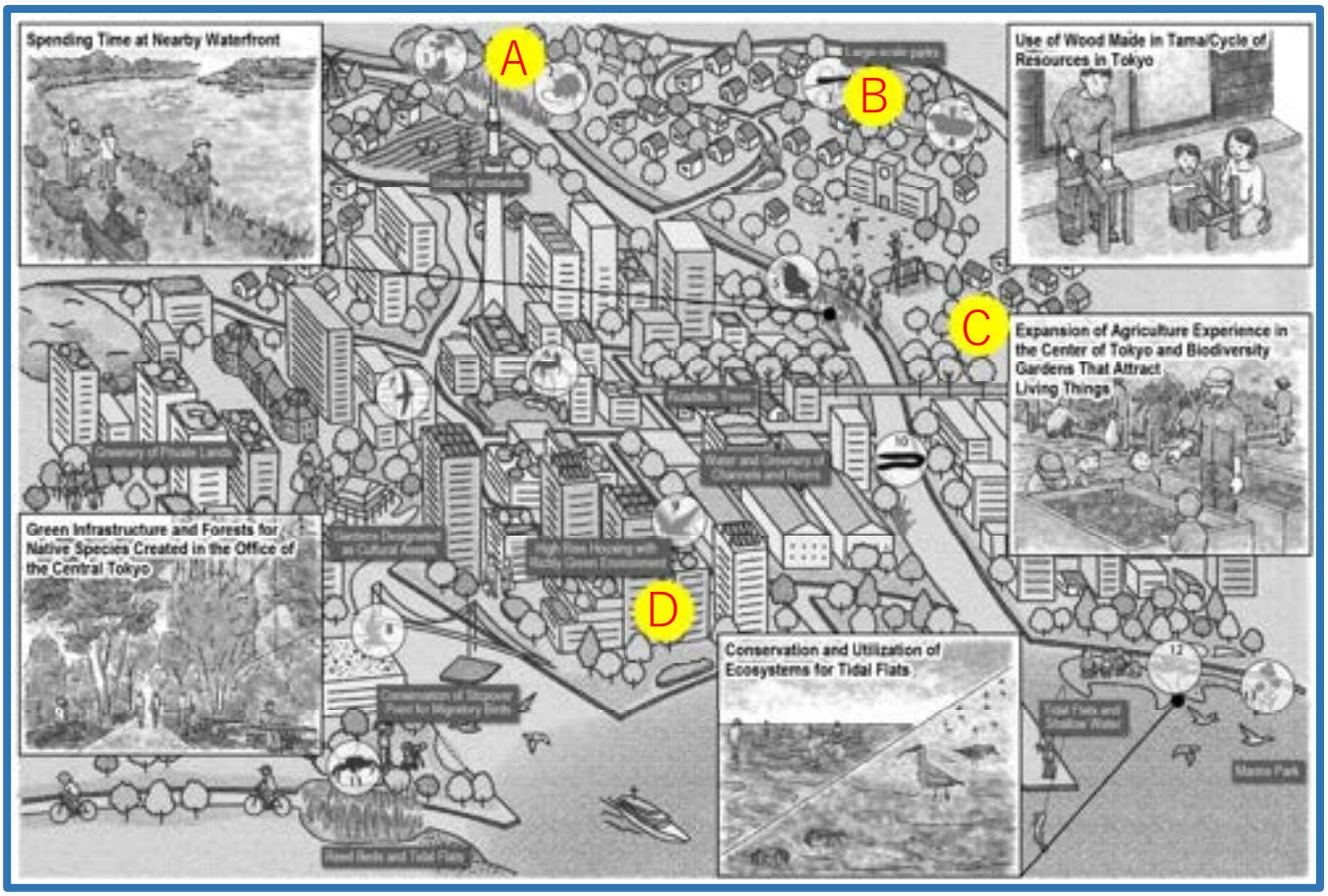

11. Helice tridens (*①②)


10. Japanese Eel (EN)


9. Peregrine Falcon (EN)


8. Little Tern (EN)

[Explanation on Images for Visions of Lowlands]



A

Flood plain wetlands environment will be restored as green infrastructure on dry river bed including Arakawa River and habitats for the living things that used to be observed including Harvest mouse and Japanese primrose will come back.

B

Copera tokyoensis that was firstly discovered in the past is an endangered species (CR), whose reliable record has been discontinued recently. In the future, it will be able to be observed again as the species that represents flood plain wetlands of alluvial plains in the eastern part of Tokyo.

C

The opportunities for children to touch soil will be increasing, including expansion of the places where people can participate in experiencing agriculture and bioecologically friendly flower gardens that will be able to be habitats for living things, even in urban areas of lowlands with a few wide lands.

D

Initiatives to maintain habitats of raptors will be promoted, as well as expansion of corporate green spaces created in groups of high rise buildings due to redevelopment, and symbiotic society with living things highly ranked in ecosystem including Peregrine falcon will be realized.

Major Issues and Visions for Lowlands

Conservation and Restoration of Ecological Network of Greenery Left in Urban Area

[Major Issue]

While there were habitats for rare species including Harvest mouse etc., in marshlands, only a little greenery has been left for habitats of rare species. Additionally, while relatively large-scale greenery remain, they have been isolated.

[Visions]

Conservation and restoration of ecological network centered on greenery and rivers including metropolitan parks and marine parks etc. has been promoted. Initiatives for biologically friendly greening and for attraction of living things to greenery will be expanded. By securing ecosystem to connect water areas and land areas, diverse greenery, rivers and channels created will be mutually supplemented, which will create abundant ecosystem.

Corporate Greenery with Consideration for Ecosystem in the center of Tokyo（Koto Ward）

In the waterway established along the river, diverse living things including Brackish water crab and small fish etc. inhabit（Sumida River）

Conservation and Restoration of Tidal Flats and Shallow Water of Coast

[Major Issue]

Although vast tidal flats and shallow water had been spreading in the past and there were rich fishing grounds, only a few of such tidal flats and shallow water remain due to promotion of landfill.

[Visions]

Conservation and restoration of tidal flats and shallow water that remain in Tokyo such as Tokyo Port Wild Bird Park, the mouth of Tama River, including Kasai Marine Park registered under the Ramsar Convention have been promoted as the hot spots for living things and also as international stopover points and the places to pass the winter for migratory birds.

Water Birds Flying in a Park (Kasai Marine Park）

Little tern seen in tidal flats and shallow water of the coast

Conservation of Urban Farmlands and Increase in Opportunities to Experience Agriculture

[Major Issue]

As agricultural lands in urban areas have been decreasing year by year, their roles as habitats for living things have been lost.

Additionally, in the vicinity of Tama River where there used to be a lot of paddy fields, as a few remaining paddy fields have been fragmented, aquatic insects inhabiting those environments have been significantly decreased.

[Visions]

Through local production for local consumption of local ingredients and utilization as hands-on environmental learning and allotment gardens, agricultural lands including paddy fields will be conserved and initiatives to facilitate agricultural experience will be expanding as well as maintenance of functions of habitats for living things.

Paddy Field that has both functions of habitats for diverse living things and green infrastructure (Tama River Lowland)

"School of Rice Field" Rice-Planting (Koto Ward)

Control of Alien Species

[Major Issue]

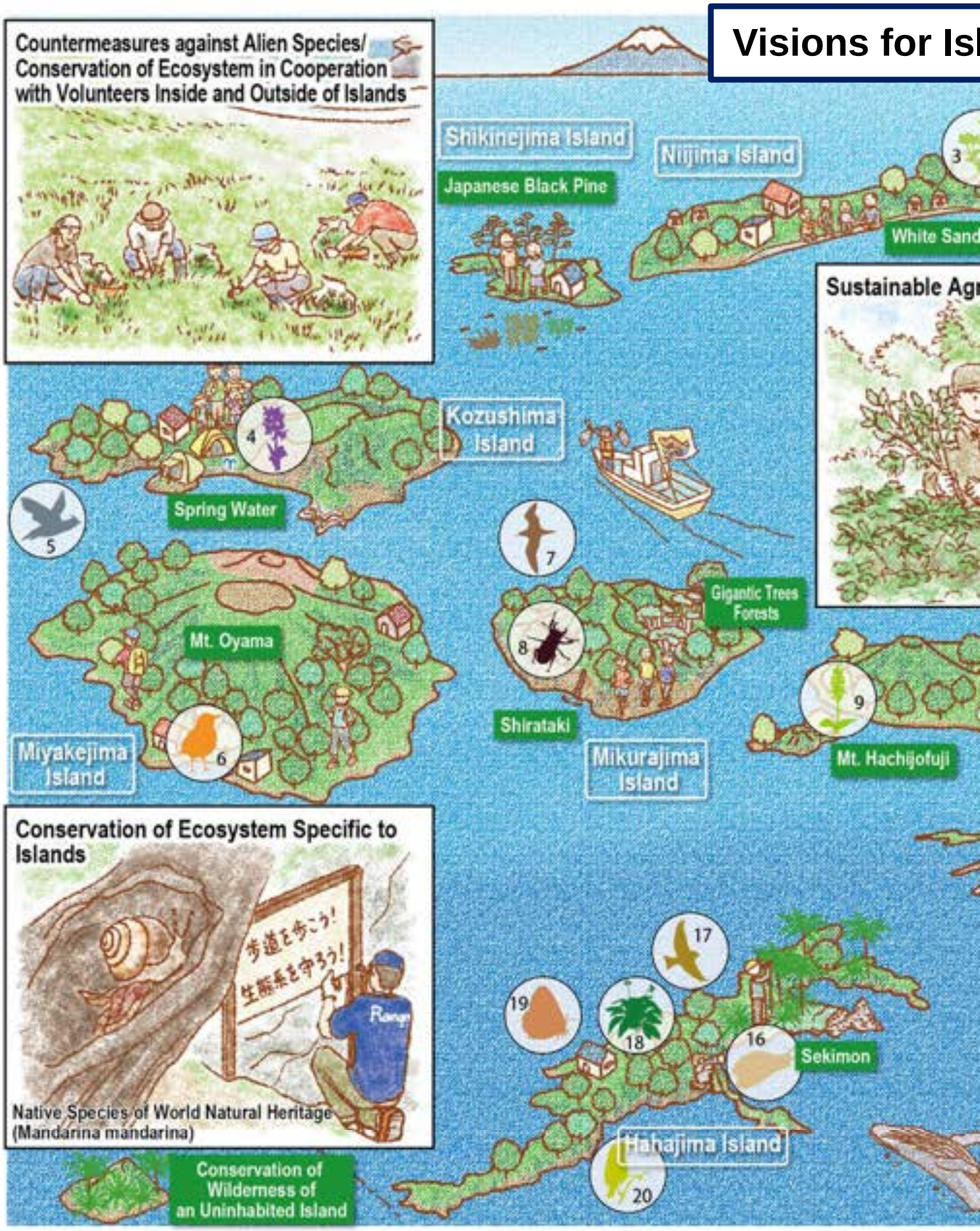
In rivers, due to impacts by designated invasive alien species, domestic alien species and foreign ones etc. including Smallmouth bass, habitats of native fish has been threatened. In Port of Tokyo etc., due to invasion by Red imported fire ant etc. together with imported materials, it is likely to cause the risk for human bodies as well as impacts on native ecosystems.

[Visions]

Along with advancing control of invasive alien species, by promoting public awareness also of the impacts by domestic alien species and seeking for prevention of their release etc., habitats for native fish will be improved. In Port of Tokyo etc. thorough preventative measures for invasion of dangerous alien species that have not settled in Tokyo will be promoted.

Restoration of Ecosystem through draining of water and cleaning of pond bottom (Mizumoto Park)

Invasion Survey of red imported fire ants at a container yard on a regular basis




20. Bonin White-Eye (VU)


19. Celastrina ogasawaraensis (CR)


18. Calanthe hoshii(CR)

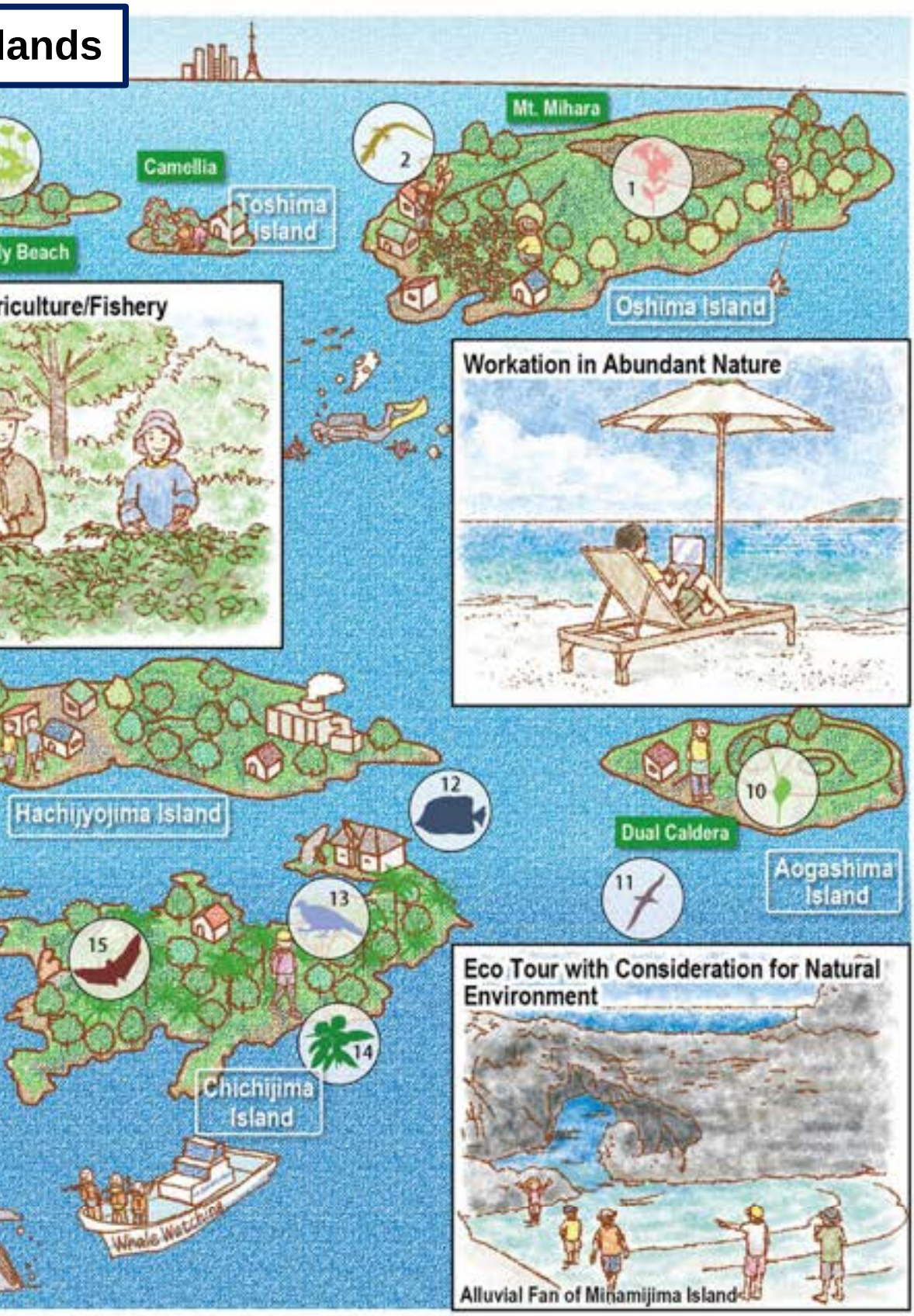

17. Ogasawara Greenfinch (CR)


16. Boninosuccinea ogasawarae(CR+EN)


15. Bonin Flying Fox (EN)


14. Melaste tetramerun tetramerun

* The descriptions at right in parentheses are the ca




1. Lilium auratum var. platyphyllum (VU)

2. Okada's Five-lined Skink (EN)


3. Parnassia palustris var. izuinsularis (VU)


4. Calanthe izuinsularis × C. discolor(CR)


5. Japanese murrelet (VU)


6. Izu thrush (EN)


7. Streaked shearwater (NT)

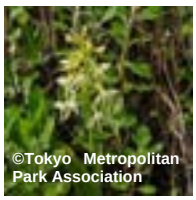

oma
n var.
n (CR)


13. Red-headed Wood Pigeon (CR)


12. Wrought iron butterflyfish (*)


11. Albatross (CR)


10. Ophioglossum kawamurae (EN)

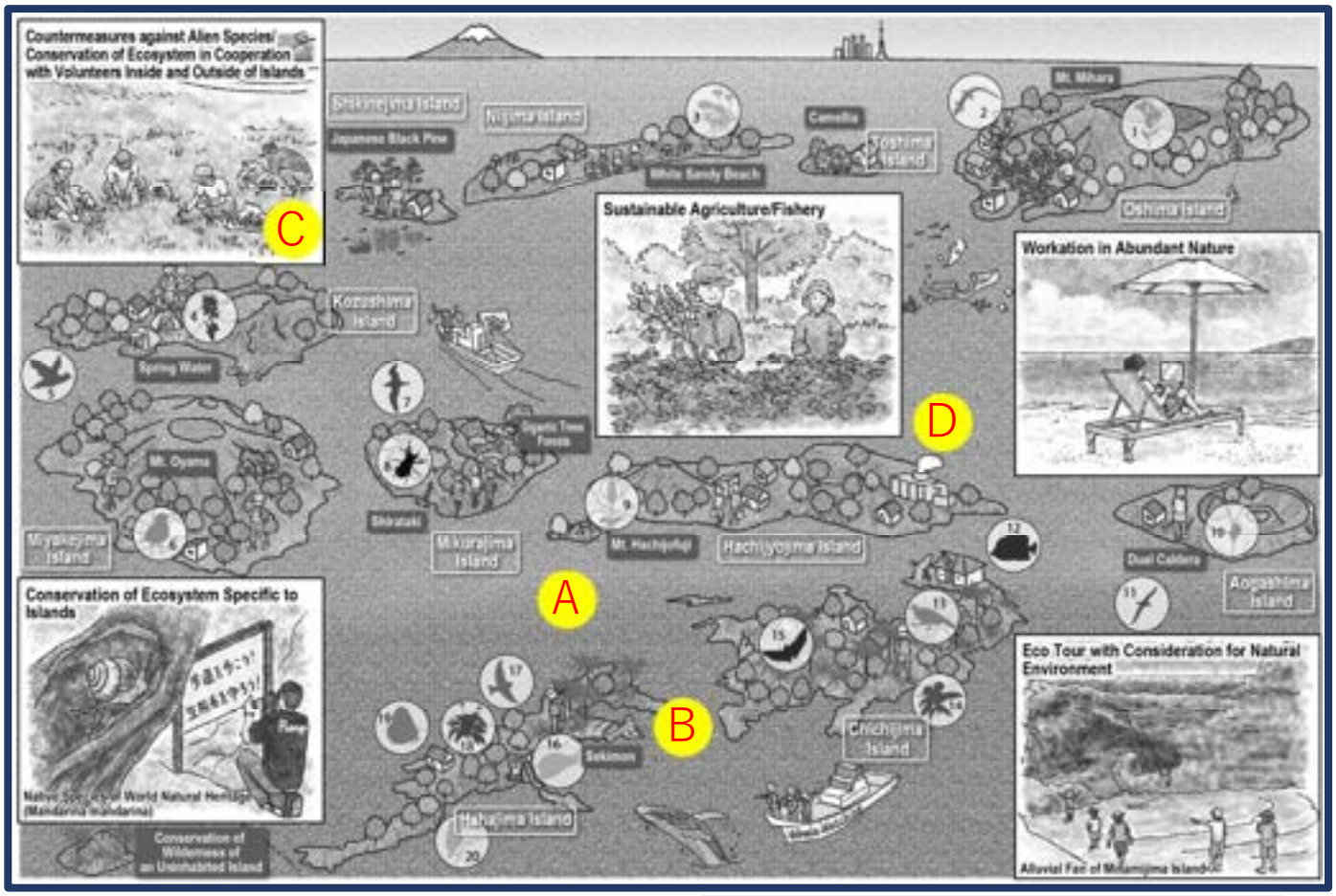


9. Platanthera okuboi Makino (CR)


8. Lucanus gamunus (*)

ategories that represent the degree of being endangered in “2011 Red List of Threatened Species Tokyo (Islands).” (see p205)

[Explanation on Images for Visions of Islands]



A

As Ogasawara Islands and Izu Islands are said to be the marine ones that have never been connected with the continents, the living things there have undergone unique evolutionary process and have characteristics that there are many endemic species specific to the regions. At present, the endemic species whose number has significantly decreased at present due to impacts by alien species will be inhabiting like they used to be and social value of biodiversity in Ogasawara Islands and Izu Islands will be increasing.

B

In islands, irreplaceable landscapes will be formed and maintained based on unique landform and geologic, and biodiversity.

For example, bright deep blue ocean of Ogasawara Islands is characteristics, which is called “Bonin Blue” named after “Bonin” that represents Ogasawara Islands. Around Ogasawara Islands, beautiful Bonin Blue ocean with abundant ecosystem will continue to be spreading in the future.

C

In islands, valuable ecosystems may be significantly deteriorated due to overuse by tourists and bringing domestic and foreign alien species from mainland. Accordingly, by promoting ecotourism, balancing the use of tourism will be sought while conserving valuable nature.

D

In each region, introduction of reusable energy facilities with consideration for biodiversity will be proceeded (geothermal generation etc.). By expanding utilization of such reusable energy, emission of greenhouse gas due to combustion of fossil fuel will be controlled and climate change measures that contribute to biodiversity risk will be promoted.

Major Issues and Visions for Islands

Conservation and Utilization of Natural Environment of Islands

[Major Issue]

Island areas are in diverse climate zones ranging from the temperate zone to subtropical one, where there are a chain of islands with unique landform and landscapes originated from volcanic activities and where there are concerns about the impacts on their ecosystems due to use of the islands while demand for hands-on tourism is high.

[Visions]

While maintaining ecosystems and natural landscapes specific to islands in a sustainable manner, people will be able to enjoy them.

Minamijima Island with its vegetation is restored through introduction of ecotourism (Ogasawara Islands)

Culture and History Fostered in Islands

[Major Issue]

While there are numerous islands with individualities including excellent natural environment and culture and specialties related to nature, their connection with biodiversity is known by no means.

[Visions]

Culture and history connected with each island and their connection with biodiversity will be spreading.

Food culture fostered in an island with few herbivores (Angelica keiskei of Izu Islands)

Specialties produced from bountiful ocean (kusaya of Izu Islands)

Conservation of Endemic Species/Rare Species and Control of Allien Species

[Major Issue]

While Izu Islands and Ogasawara Islands are abundant in endemic species, their ecosystems are vulnerable and most of their endemic species there have been endangered due to invasion by alien species and harvesting. Actually, Celastrina ogasawaraensis as endemic species has had a great impact from a green anole, resulting in a significant decrease in their number.

[Visions]

As basic information on rare species etc. is enhanced and initiatives not to bring in alien species and measures for alien species that have already been settled are promoted, damage to endemic living things and ecosystems are controlled. In Ogasawara Islands, they will be properly safeguarded as World Natural Heritage.

Izu Islands

Active volcano where there are a lot of remains of its eruption (Miyakejima Island, Mt. Oyama)

Izu thrush (state's natural monuments)

Mikurajima Island, Gigantic Tree of Japanese chinquapi

Okada's Five-lined Skink

Reeves's Muntjac of Oshima Island (designated invasive alien species)

Prosopocoilus hachijoensis

Ogasawara Islands

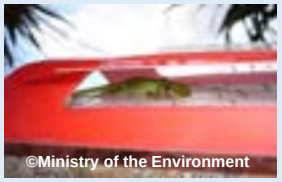
Red-headed Wood Pigeon (state's natural monuments)

Alluvial Fan of Minamijima Island

Boninosuccinea punctulispira (state's natural monuments)

Sekimon of Hahajima Island

Boninthemis insularis (state's natural monuments)



Green anole captured by a trap (designated invasive alien species)

Chapter 4.

Targets and Basic Strategies Toward Achievement of Visions

1 2030 Targets to Achieve Visions for Tokyo

Based on “Kunming-Montreal Global Biodiversity Framework” and “National Biodiversity Strategy of Japan 2023-2030”, 2030 Targets suitable to achieve Visions of Tokyo for 2050 shall be set as follows:

Biodiversity will be put on a path to recovery by all entities that aim for an environmentally symbiotic, prosperous society, working together to promote the conservation and suitable use of biodiversity. (Achieving a nature-positive framework)

Nature positive refers to “a goal and a movement to halting and reversing biodiversity loss in order to halt loss of nature by 2030 and put on a path to recovery setting 2020 as a baseline”. The Tokyo Metropolitan Government will aim at achievement of nature positive as 2030 Target.

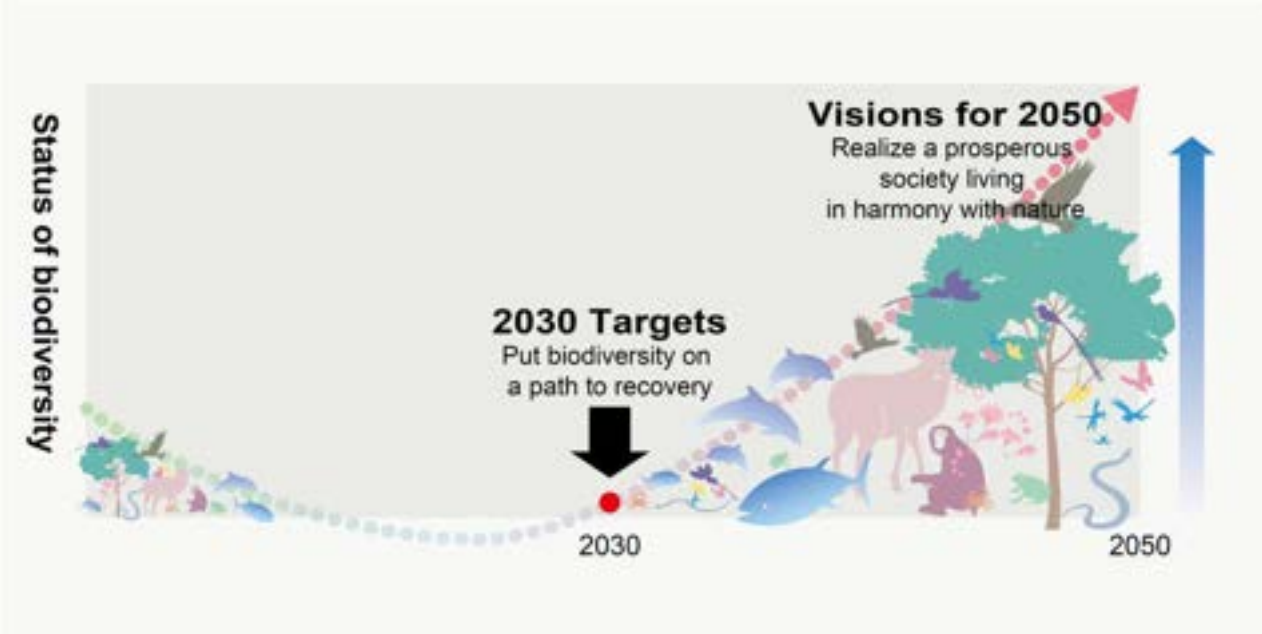


Image of achieving a nature-positive framework

2 Basic Strategies Toward Achievement of 2030 Targets

In order to achieve 2030 Targets, the blessings of biodiversity should be used in a sustainable manner and communities building should be promoted where luxuriant nature of Tokyo can be handed down to future generation along with the value of biodiversity being respected. On the other hand, as it is difficult to build such communities only by the administration, a variety of entities including Tokyo residents, businesses, private bodies including NPO and NGO etc. and education and research institutes etc. are required to collaborate and cooperate to advance the efforts with consideration for different and diverse values depending on genders and generations etc.

Therefore, upon various entities' advancing efforts, along with setting three basic strategies as the guideline, 10 action policies shall be set to be linked with three basic strategies. Additionally, the applicable period for these strategies shall be 9 years from FY 2022 to 2030.

Three Basic Strategies

Basic Strategy I

Promoting the conservation and recovery of biodiversity, handing down the luxuriant nature of Tokyo to future generations

Based on basic information for nature of Tokyo, the luxuriant nature of Tokyo shall be handed down to future generations by seeking for restoration of the biodiversity that has already been deteriorated, along with by promoting conservation of good biodiversity that still remains at present.

Basic Strategy II

Using the blessings of biodiversity in a sustainable manner, utilizing the functions of nature to improve the lives of Tokyo residents

The blessings of biodiversity inside and outside of Tokyo shall be utilized in a sustainable manner and also utilized for improvement of the lives of Tokyo residents, such as healing and charm, revitalization of local communities, disaster prevention and mitigation, regulation of climate.

Basic Strategy III

Recognizing the value of biodiversity, changing that idea into actions that address global issues as well as those in Tokyo

Enabling each and every Tokyo resident to recognize the value of biodiversity and treat it as vital shall turn all actors' actions into those dealing with issues across and throughout the world as well as in Tokyo.

10 Action Policies Linked with Basic Strategies

Action Policy 1	Conservation of Local Ecosystems and Habitats for a Variety of Fauna
Action Policy 2	Conservation of Rare Wild Fauna and Flora, and Measures for Alien Species
Action Policy 3	Building Appropriate Relationships between Humans and Wild Animals
Action Policy 4	Collection, Storage, Analysis, and Dissemination of information on the Natural Environment
Action Policy 5	Use of Tokyo's Natural Bounty (Provisioning Services)
Action Policy 6	Use of Functions of Nature to Encourage Disaster Preparedness and Mitigation (Regulating Services)
Action Policy 7	Use of Nature to Ensure a Comfortable and Enjoyable Life (Cultural Services)
Action Policy 8	Promotion of Understanding of Biodiversity
Action Policy 9	Development of Human Resources to Support Biodiversity
Action Policy 10	Behavior Change Which Will Consider and Contribute to Not Only the Environment of Tokyo But Also the Global Environment

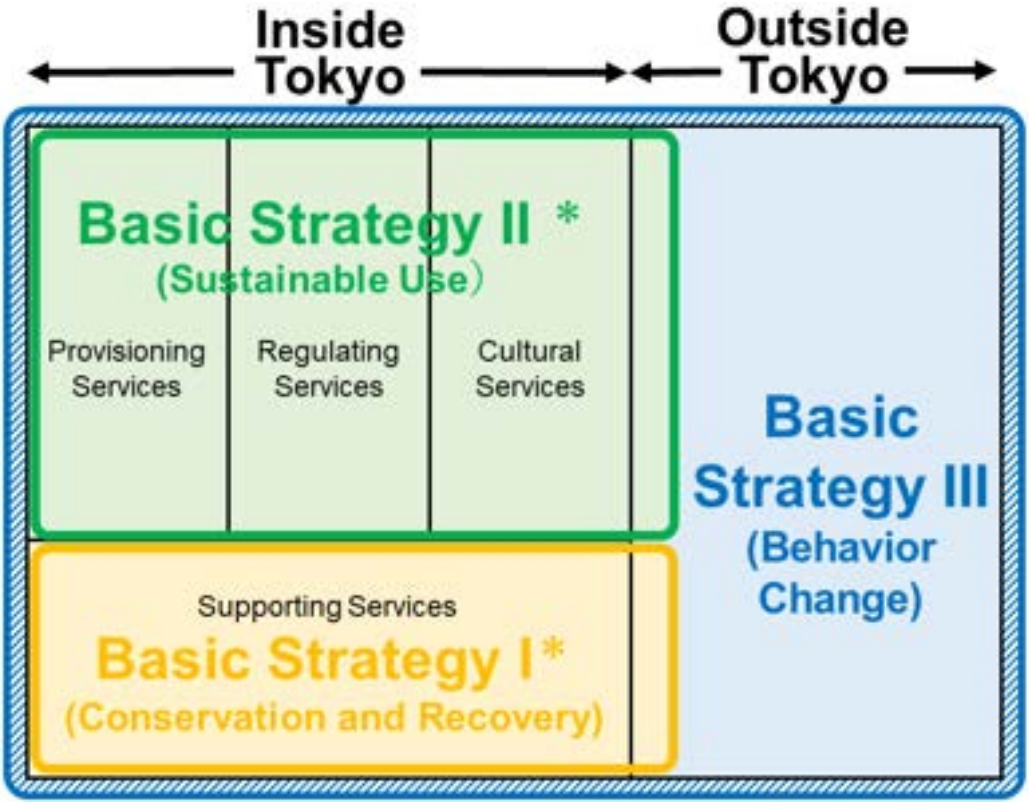
[Visions for each ecosystem services and their relationships with basic strategies (image)]

The basic strategies are classified into Ⅰ, Ⅱ and Ⅲ with consideration of Visions for Tokyo for each ecosystem services indicated in Chapter 3.

Basic Strategy I shall aim at maintenance and improvement of supporting services as the base of ecosystem services, centering on “conservation and recovery of biodiversity”.

Basic Strategy Ⅱ shall aim at improvement of lives of Tokyo residents by maximizing provisioning services, regulating services and cultural services, centering on “sustainable use of biodiversity”.

Basic Strategy III shall aim at promoting actions that consider the challenges for outside of Tokyo and those on a global scale as well as those in Tokyo, centering on “understanding and behavior change related to biodiversity”.



*1 While Basic Strategy I and II are basically organized for inside of Tokyo, some of neighboring prefectures and relevant regions etc. may be included as required.
*2 From the perspective of utilizing ecosystem services from outside of Tokyo, Basic Strategy III is subject to change in consumption behavior in Tokyo that affects that of outside Tokyo as well.

Visions for each ecosystem services and their relationships with basic strategies (image)

3 Action Targets for Each Basic Strategy

In order to achieve 2030 target for the entire Tokyo, it is required for various entities to steadily promote three basic strategies in collaboration and cooperation. Accordingly, we will set action targets for each basic strategy that can be easily understood by Tokyo residents and businesses etc. and they can work on together.

Action Targets of Basic Strategy I

In order to promote conservation and recovery of biodiversity, in addition to initiatives related to securing habitats for fauna of greenery and waterfront etc. and improvement of quality of greenery, it is required to promote the ones focusing on conservation of individual species

Action Target 1. Biodiversity Upgrade Areas: 10,000+

In order to conserve and recover biodiversity, the following perspectives are required: “properly conserving and managing the existing nature including forests and satoyama landscapes etc.”, “ensuring the existing greenery that is threatened to be lost due to development etc. to avoid no more loss” and “newly expanding the greenery including parks and green spaces etc.”. Therefore, by “conserving and managing natural land”, “ensuring new greenery”, and “opening new parks and green spaces”, the area where maintenance and improvement of habitats for fauna and ecosystem services are sought shall be placed as “biodiversity upgrade area”. Additionally, as the administration. 10,000ha will be realized by 2030, by combining ”the area aiming at maintaining and improving the quality of greenery” and “the area ensuring and expanding the quantity of greenery”. Furthermore, efforts by not only the administration but also private sector etc. such as OECM (Other Effective area-based Conservation Measures) shall be expressed as “+(plus)” and be set as the target that can be pursued together with a variety of entities.

■ Conservation and Management of Natural Land (the perspective of maintaining and improving the quality of greenery by conservation and management of natural land)

Forests properly managed by thinning

Satoyama restored by proper conservation and management

■ Newly Secured Greenery (the perspective of ensuring the existing greenery that is threatened to be lost due to development etc.)

Kokubunji City, Green spaces around Koigakubo Irrigation Canal

Suginami ward, Ogikubo 1 chome/Narita-nishi 2 and 3 chome district (landscape of homestead woodland and orange grove)

■ Opening New Parks and Green Spaces (the perspective of expanding parks and greenery provided for humans' use)

Metropolitan Takaido Park Newly Opened in 2020

Umi-no-mori Park scheduled to be open at the end of FY2024 (image)

Action Target 2. ZERO Wild Extinction Action

As of 2030, Target shall be set as implementation of initiatives in collaboration with a variety of actors to conserve and restore declining wildlife so that the species that newly become extinct in the wild will vanish.

Ogasawara Greenfinch which is artificially grown and for which reproductive activities are conducted in Ogasawara Islands. (Islands CR)

Exterminating work of Water speedwell[102] as alien species

[102] Exterminating work of Water speedwell as alien species to protect Undulate speedwell (Veronic undulala) Wall as native species by the participants of a hands-on program for satoyama conservation activities, (Experience Nature in Tokyo-Satoyama)

Action Targets of Basic Strategies II

Biodiversity has various values that contribute to solve social issues including food supply and disaster prevention, and stress reduction in green spaces etc. as well as habitats for living things. In order to use such blessings of biodiversity in a sustainable manner and utilize the functions of nature for improvement of living of Tokyo residents, it is necessary for the entities including the administration, businesses and private organizations to promote various efforts that will lead to Nature-based Solutions (NbS) together (with regard to NbS, see P179).

Action Target　Promotion of Tokyo-NbS Action ~ Tokyo as A City Supported by Nature

By treating the period up to 2030 as “fixing period of NbS”, implementing initiatives as NbS by each entity will be set as the target. By organizing effects and results as NbS, disseminating the cases inside and outside of Tokyo, and “visualizing” various values of the nature, we will promote the efforts for NbS by each entity.

Kasai Marine Park

Corporate Green Spaces in the Central Tokyo

Action Targets of Basic Strategy III

In order to advance conservation and sustainable use of biodiversity, it is important more than anything else for each and every Tokyo resident to treat the biodiversity crisis as vital and move to action with consideration for and contribution to biodiversity.

Action Target　Biodiversity Actions Taken by All Tokyo Residents~Individual’s Actions Change Society

By focusing on conservation activities and consumption behavior and promoting the behavior with consideration for and contribution to biodiversity, consideration with and contribution to biodiversity by all Tokyo residents will be set as a target. We will grasp Tokyo residents’ behavior by performing regular questionnaire surveys as its index.

Additionally, through promotion of efforts with consideration for and contribution to biodiversity, not only by Tokyo residents but also by businesses and private organizations etc. and all the entities that act in Tokyo, we will aim at realization of biodiversity actions taken by all Tokyo residents.

Participation in Conservation Activities

Consumption Behavior with Consideration for Biodiversity

4 System for Efforts in Tokyo Biodiversity Strategy

Efforts system in this Strategy toward achieving Visions for Tokyo 2050 are shown as follows:

Basic Principle

Visions for Tokyo 2050

2030 Targets toward Realization of Visions

Three Basic Strategies

Basic Strategy Ⅰ

Promoting the conservation and recovery of biodiversity, handing down the luxuriant nature of Tokyo to future generations

Basic Strategy Ⅱ

Using the bounty of biodiversity in a sustainable manner, utilizing the functions of nature to improve the lives of Tokyo residents

Basic Strategy Ⅲ

Recognizing the value of biodiversity, changing that idea into actions that address global issues as well as those in Tokyo

Action Targets for Each Strategy

1. Biodiversity upgrade areas:10,000+

2. Zero Wild Extinction Action

Promotion of Tokyo-NbS Action~Tokyo as a city supported by nature

Biodiversity Actions Taken by All Tokyo Residents ~Individual's Actions Change Society

10 Action Policies

1. Conservation of Local Ecosystems and Habitats for a Variety of Fauna
2. Conservation of Rare Wild Fauna and Flora, and Measures for Alien Species
3. Building Appropriate Relationships between Humans and Wild Animals
4. Collection, Storage, Analysis, and Dissemination of information on the Natural Environment
5. Use of Tokyo's Natural Bounty (Provisioning Services)
6. Use of Functions of Nature to Encourage Disaster Preparedness and Mitigation (Regulating Services)
7. Use of Nature to Ensure a Comfortable and Enjoyable Life (Cultural Services)
8. Promotion of Understanding for Biodiversity
9. Human Resources Development to Support Biodiversity
10. Behavior Change to Consider/Contribute the Global Environment as well as that of Tokyo

Detailed Course of Action

5 Main Efforts Made by Entities for Each Strategy

In order to promote the efforts for biodiversity, it is required for various entities including Tokyo residents, businesses, private organizations including NPO and NGO etc. and education and research institutes etc. as well as the administration to steadily promote such efforts in collaboration and cooperation. Therefore, in order to realize the visions, main efforts by each entity are published.

They are organized into five entities including ① the administration, ② Tokyo residents, ③ businesses, ④ private organizations (NPO, NGO and citizen groups etc.) and ⑤ education and research institutes (including experts.). The efforts by the entities other than the Tokyo Metropolitan Government are published as the main efforts of each entity expected by the Tokyo Metropolitan Government.

Additionally, in the efforts by the administration, the efforts only made by the Tokyo Metropolitan Government and those only by municipalities will be described as [TMG]or [Municipalities].

Basic Strategy I
Promoting the conservation and recovery of biodiversity, handing down the luxuriant nature of Tokyo to future generations

Action Policy 1 Conservation of Local Ecosystems and Habitats for a Variety of Fauna

1-1 Conserving and expanding important areas for biodiversity conservation

In Tokyo, urban development and reduced care afforded by humans have led to the shrinkage of important areas for biodiversity conservation. Therefore, it is required to expand the conserved and maintained areas including natural parks, conservation areas, water conservation forests, and parks and green spaces as well as conserving and managing them. In order to conserve the habitats for diverse living things, it is required to improve the quality of greenery with consideration for biodiversity as well as to ensure the quantity of greenery.


Mosaic topography of valleys in hilly terrain

■ Efforts by the Administration

- Designating or making publicly-owned additional conservation areas based on the Tokyo Metropolitan Nature Conservation Ordinance, and work with rangers and volunteer groups to appropriately conserve the natural environment in Tokyo, including natural parks, conservation areas, and water conservation forests. [TMG]

- By thinning degraded plantation forests to turn them into forests with needle-leaved and broad-leaved trees, and ensuring habitats for wild birds and beasts through the designation of wildlife sanctuaries, safeguarding the forest environment that serves as the basis for biodiversity conservation in Tokyo. [TMG]
- Opening new Tokyo Metropolitan parks and marine parks, expanding greenery that has strong sustainability prospects, and promoting the conservation of biodiversity in existing greenery as well. [TMG]
- Expanding waters in natural park areas and designate marine park areas in cooperation with the national government, and appropriately conserving the habitats for fauna in waters through the preservation and creation of tidal flats and seaweed beds, and coral reef as well as the preservation and maintenance of coasts with consideration for aquatic organisms. [TMG]
- Along with encouraging “Other Effective area-based Conservation Measures (OECM)” to register for OECM certification system of the national government, supporting the efforts for preservation and expanding the areas where greenery is ensured and its appropriate conservation and management is performed. (biodiversity upgrade area)
- By development of parks and green spaces and conservation of natural land etc., conserving local biodiversity. [Municipalities]

■ Efforts by Tokyo Residents

- In important areas for biodiversity including conservation areas and parks and green spaces, and waterfront areas, actively participating in conservation activities performed in cooperation with citizens.
- Upon utilizing natural parks and conservation areas, as vegetation may be damaged by trampling, trying not to get out of mountain trails and hiking trails.

■ Efforts by Businesses

- In collaboration with the administration and NPO etc., implementing conservation activities by employees in conservation areas.
- By regarding green spaces and waterfront areas in building sites etc. as Other Effective area-based Conservation Measures (OECM) and registering them for OECM certification system of the Government, continuing to conserve them in the future.

■ Efforts by Private Organizations

- Planning and implementing conservation activities by citizen volunteers in conservation areas, parks, green spaces, and corporate green spaces in collaboration with the administration and businesses.

■ Efforts by Education and Research Institutes

- By regarding green spaces and waterfront areas in the sites of schools and universities, and research institutes etc. as Other Effective area-based Conservation Measures (OECM) and registering them for OECM certification system of the national government, continuing to conserve them in the future.
- Passing on importance of conservation of biodiversity of the regions to the next generations who will inherit the future.
- Providing advice on conservation activities of conservation areas, and parks and green spaces from specialist standpoint.

1-2 Forming Ecological Network


Tamagawa josui

Due to development activities, green spaces as the base of biodiversity have been isolated and the ones remaining on cliff lines have been further fragmented. In order to enable the living things to move, by considering linkage between habitats for fauna and their appropriate arrangement, it is required to ensure natural environment to be conserved and formulate ecological network. Therefore, the efforts will be required to conserve, reproduce and create wooded areas, parks, green spaces, cliff lines, agricultural land, rivers, roadside trees waterways, canals and corporate green spaces etc. and to enhance continuity of habitats for living things.

Efforts by the Administration

- By developing and conserving parks, green spaces, agricultural land, rivers, waterways, roadside trees, greenery along cliff lines, enhancing the linkage between the habitats for fauna.
- Supporting the efforts to conserve the efforts and realize the networking of fragmented greenery, along with encouraging to register Other Effective area-based Conservation Measures (OECM) to OECM certification system of the national government.
- Ensuring the continuity of biodiversity by valuing the green connection with neighboring local governments.

Efforts by Tokyo Residents

- By participating in volunteering activities to conserve parks, green spaces, agricultural land, rivers, waterways, roadside trees, greenery along cliff lines, contributing to forming ecological networks to connect waterfront areas and greenery.

Efforts by Businesses

- Along with avoiding fragmenting green spaces and waterways as much as possible upon development, ensuring migratory path for living things in case of fragmentation.
- In order to secure habits for diverse living things and migratory paths, conserving and creating green spaces and waterfront areas in building sites etc. and contributing to forming ecological networks.

Efforts by Private Organizations

- Planning and operating volunteering activities to conserve parks, green spaces, agricultural land, rivers, waterways, roadside trees and greenery along cliff lines and contributing to forming ecological networks to connect waterfront areas and greenery.

Efforts by Education and Research Institutes

- Contributing to forming ecological network by conserving and creating green spaces and waterfront areas in the sites of schools etc. and contributing to forming ecological networks.
- Conducting research and study from specialist standpoint and giving land managers suggestions on which area requires creation and conservation of ecological network including Tokyo and its neighboring prefectures.

Column

Urban Development with Consideration for Biodiversity in Otemachi/Marunouchi/ Yurakucho Area[103]

Otemachi, Marunouchi and Yurakucho area adjacent Outer Gardens of the Imperial Palace and Hibiya Park are the exceptional business districts with abundant greenery in the world.

In this area, located in the middle of the central Tokyo, through an integrated approach from national and private organizations, network of high quality with consideration for biodiversity has been formed.

Specifically, through roadside trees and greening of privately owned public spaces, forming extensive ecological networks with outside of the districts such as connection the Imperial Palace with Hibiya Park as the core of greenery has been sought.

Upon greening, by considering conservation of biodiversity, efforts have been made so that multilayered vegetation structure consisting of flowering plants, shrubs and trees is formed.

Marunouchi Nakadori Street
as a Tree-Lined Road

Hotoria Square in front of
Ote-Mon Gate of the Imperial Palace

[103] The Advisory Committee on Otemachi-Marunouchi-Yurakucho Area Development (March of 2021) Otemachi-Marunouchi-Yurakucho Area Town Development Guideline 2020.

1-3 Conservation and creation of familiar greenery in urban districts

Due to the impacts by growing residential areas and inheritance, homestead woodland, wooded areas, and agricultural land are diminishing, having led to the fragmentation and shrinkage of green spaces in the urban districts of Tokyo. It is required to improve the quality of biodiversity to enable the entire urban districts to become habitats for fauna by promoting conservation and creation of familiar greenery including residents' own gardens as well as parks, green spaces, temple and shrine forests, homestead woodland, agricultural land and corporate green spaces, not only in the areas as the base of biodiversity but also in the urban districts.


Creation of Greenery at the Resident's Own Garden

Efforts by the Administration

- Supporting the efforts for conservation in Other Effective area-based Conservation Measures (OECM) and contributing to conservation and creation of familiar greenery in the urban districts.
- Through the efforts by diverse entities, promoting conservation of greenery in the urban districts including homestead woodland, wooded areas and agricultural land etc.
- Promoting efforts to improve biodiversity by making the most of limited spaces, such as greening with native species and creating waterfront areas corresponding to the districts including city parks, roadside trees, public facilities and residential areas.
- Improving water quality in the Tokyo Bay and rivers by implementing such measures as dredging sludge accumulated in rivers and canals, and contribute to conservation and improvement of the waterfront environment as a habitat for aquatic organisms, along with improving combined sewerage and development of advanced treatment plants etc. [TMG]

Efforts by Tokyo Residents

- Creating habitats for birds and insects while enjoying gardening, such as planting native species corresponding to the districts in the residents' own gardens and balconies.
- Creating green spaces with consideration for local ecosystems at the time of acquiring houses.
- Participating in the activities to greenery such as parks, green spaces, rivers and private green spaces etc. in collaboration with citizens.

Efforts by Businesses

- Promoting greening with consideration for ecosystems such as planting native species corresponding to the districts in the sites of business facilities and factories.
- Regarding green spaces and waterfront areas in building sites etc. as Other Effective area-based Conservation Measures (OECM), continuing to conserve them in the future.

Efforts by Private Organizations

- Aiming at improvements in biodiversity in corporate green spaces with consideration for ecosystems.
- Planning and implementing conservation activities in collaboration with the administration and citizens etc. in familiar greenery including parks, green spaces, and corporate green spaces.

■ Efforts by Education and Research Institutes

- Passing on importance of conservation of biodiversity of the regions to the next generations who will inherit the future.
- Providing advice on conservation of familiar greenery from specialist standpoint.
- Conducting research and study about effects on humans relating to environment, health and disaster prevention in familiar greenery.

Column

Inviting Living Things to Residents' Houses and Balconies

As the central Tokyo is the district lined with buildings and residences, there are not so many large-scale green spaces compared to in the suburbs. However, if it is possible to create the spaces on the top roof of buildings, in balconies of high rise apartments, and gardens of houses which living things can visit, a lot of places will be able to be created where living things can rest and breed. Although each greenery of the residents' houses and balconies is small, it is expected that biodiversity in the entire urban space will be able to be improved by increasing the density of scattered greenery.

[Considerations]

Planting trees for feeding and forage to invite wild birds and insects.

Securing the places suitable for drinking water and spawning by establishing waterfront even in a small scale.

Avoid using the plants including designated invasive alien species that are likely to have impacts on local biodiversity.

Examples of a balcony to invite living things

1-4 Consideration for Biodiversity and Creation of New Greenery During Development


The Ichigaya Forest

Due to advancement of a large scale development in various places, forest trees and farmlands have been decreasing. While we can find the greenery being created such as parks, green spaces, roadside trees, and corporate green spaces, greenery in Tokyo has been on decline. Therefore, it is necessary for us strive to actively create ecologically-friendly green spaces and waterfront areas at the time of development and to continue improvement of quality of biodiversity through research and conservation activities for local living things in addition to appropriately avoiding or reducing their impacts on biodiversity due to development.

■ Efforts by the Administration

- Appropriately examining development projects based on ordinances, including the Tokyo Metropolitan Nature Conservation Ordinance and Tokyo Metropolitan Environmental Impact Assessment Ordinance etc., avoiding or reducing their impacts on biodiversity, and creating greenery. Additionally, promoting ecologically-friendly greening by for example planting native species suitable for each region based on its guidelines [TMG].
- In public works and facility renovations etc. implemented by the administration, actively striving to create ecologically-friendly green spaces and waterfront areas in addition to striving to avoid and reduce their impacts on biodiversity, even if they are not subject to laws and ordinances.
- Utilizing Urban Redevelopment Systems to encourage efforts that will contribute to the conversation of habitats for living things both in and outside development areas.

■ Efforts by Tokyo Residents

- Cooperating with monitoring surveys of living things and conservation activities to conserve biodiversity in the green spaces created by businesses.
- Focusing on whether development have the contents with consideration for biodiversity from the standpoint of Tokyo residents.

■ Efforts by Businesses

- In the case of development and alteration of land use, considering in order of priority, firstly avoidance of development and land alteration, secondly reduction of areas for development and alteration, and thirdly compensation measures, by understanding the status of inhabits of living things ,landscapes, and importance of conservation value.
- Upon development, striving to actively create green spaces and waterfront with consideration for ecosystem, including planting native species suitable for local areas as well as avoidance and reduction of impacts on local ecosystems.
- Striving to create greenery with consideration for ecosystems, such as aiming at EDO-MIDORI Registered Green Spaces that Tokyo Metropolitan Government promotes, civil certificates such as ABINC, JHEP, SEGES.

Efforts by Private Organizations

- Cooperating with monitoring surveys of living things and activities to conserve biodiversity in the green spaces created by businesses.

Efforts by Education and Research Institutes

- Providing advice on effective conservation measures for biodiversity at the time of development from specialist standpoint.

Column

Takeshiba Tidal Flat ~ Efforts in Tidal Flats Created by Redevelopment

We can find a lot of efforts to create new greenery due to redevelopment businesses of the central Tokyo, tidal flats have also been reproduced in the bay areas.

In the redevelopment in Takeshiba district, conserving and reproducing continuous environment where diverse living things including shellfish and crustaceans that used to inhabit in the Tokyo Bay can inhabit by reproducing tidal flats have been sought on the waterfront adjacent to Hama-rikyu Garden. Since 2020, by setting reproduced Takeshiba Tidal Flat as the field, activities for environment education have been implemented in collaboration with educational and research institutes, aiming at reproducing the Tokyo Bay that used to be an abundant Edo-mae sea.

Takeshiba Tidal Flat Adjacent to Hama-rikyu Imperial Villa

Column Environmental Certification Systems Dealing with Consideration for Urban Greenery and Biodiversity

The Environmental Certification Systems including Eco-Mark Certification is the system to externally promote environmentally-friendly corporations and products as one of environmental considerations in corporative activities etc. by the corporations' making voluntary efforts for environmental considerations and then third-party organizations' certificating such cooperative activities etc.

In recent years, there are various environmental certifications that deal with consideration for urban greenery and biodiversity. As major environmental certifications relating to biodiversity and greening, there are SEGES, JHEP and ABINC etc., which are the systems to objectively certificate the following matters regarding green spaces created by corporations etc.; multifaceted values including biodiversity, contents of efforts and degree of contribution to society and environment. Additionally, the environmental evaluation for these environmental certifications also have the aspect of voluntary environmental assessment.

■ SEGES (Social and Environmental Green Evaluation System)

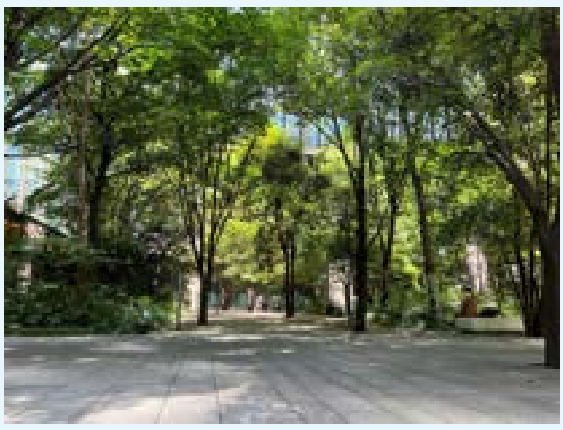
It is the system to evaluate and certification for excellent greenery with high degree of contribution for society and environment, which has been developed in order to support voluntary greenery conservation and creation activities of corporations etc. along with the changes of social environment after 1990s. It has been certified by Public Interest Incorporated Foundation, Organization for Landscape and Urban Green Infrastructure.

■ JHEP (Japan Habitat Evaluation and Certification Program)

It is the system to quantitatively evaluate and certificate efforts that contribute to conservation and restoration of biodiversity, which has been developed aiming at contribution to sustainable social construction. It has been certified by Public Interest Incorporated Foundation, Ecosystem Conservation Society-Japan.

■ ABINC (Certification of Business Establishments in Harmony with Living things)

It is the system to evaluate and certificate factories and commercial facilities etc. that work on creating greenery with consideration for biodiversity, which was developed aiming at promotion symbiosis between nature and humans toward realization of Aichi Targets which were adopted in COP10 and goals of Biodiversity Strategy Plan. It has been certified by General Incorporated Association, Association for Business Innovation in Harmony with Nature and Community.



Forest of Otemachi of Otemachi Tower that Have Been Certified as SEGES and ABINC (Chiyoda Ward)

Action Policy 2 Conservation of Rare Wild Fauna and Flora, and Measures for Alien Species

2-1 Conservation of Rare Wild Fauna and Flora

Diversity of species is the most basic indicator to indicate the status of biodiversity conservation. In Tokyo, 1,845 species have been selected as Red List species in the mainland and 1,242 ones in islands, among which 207 ones in the mainland and 57 ones in islands have already become extinct. In order to avoid further extinction of rare living things in Tokyo, it is necessary to promote more efforts including information collection of wild fauna and flora in Tokyo and conservation of their habitats.


Sea Aster

■ Efforts by the Administration

- Collecting and understanding the latest information on wild fauna and flora in Tokyo, and conducting basic surveys as required to update the Red List etc. on a regular basis. [TMG]
- Designating important natural lands for biodiversity where rare wild fauna and flora inhabit and growing as protected areas and promoting the efforts toward conservation and restoration of biodiversity. [TMG]
- In the case where rare wild fauna and flora are threatened to become extinct, protecting and breeding them through ex-situ conservation as well. [TMG]
- Providing municipalities with technical and financial support concerning biodiversity conservation including conservation of rare species etc. [TMG]
- Providing actors in the activities with technical support and develop human resources in order to effectively promote conservation activities for rare species through cooperation between citizens, and encouraging collaboration between actors in the activities.
- Conducting natural environment survey for each region on a regular basis, taking conservation measures for rare species and promoting adaptive management for conservation of their habitats. [municipalities]

■ Efforts by Tokyo Residents

- In the case of observing living things in Tokyo including rare species, registering such species to the database of the administration etc.
- Even in case of finding rare species in natural land, trying not to bring them back home. Additionally, never spreading position information on SNS.
- In the case of finding any activities for conservation of rare species conducted by local community, actively participating in them.

Efforts by Businesses

- Working on conservation of biodiversity in natural land in Tokyo as habitats of rare species in collaboration with NPO etc.
- Conserving habitats of rare species in the sites of business facilities and factories.
- In land for new business project, conducting research on whether such project might cause damage of habitats of rare species or loss of biodiversity and taking measures to conserve them.

Efforts by Private Organizations

- Intermediary supporting organizations including NPO etc. will support collaboration between a variety of entities including local citizen groups, business operators and the administration etc. and conduct surveys on living things and conservation activities for them in cooperation with such entities.
- NPO and local citizen groups will conduct conservation activities of habitats for conservation of rare species under the guidance of specialists.

Efforts by Education and Research Institutes

- Passing on importance of conservation of rare species to the next generations who will inherit the future.
- Conducting research and study on the status of habitats of living things of Tokyo including rare species, and suggesting the measures to conserve biodiversity from specialist standpoint.
- Collecting and managing samples related to information on living things of Tokyo.

Column

Efforts by Zoos In Order to Avoid Extinction of Birds endemic to the Ogasawara Islands

Tokyo Metropolitan Zoos (Tama Zoological Park, Ueno Zoological Gardens and Inokashira Park Zoo) have been working on protection and breeding business for red-headed wood pigeons designated as a natural monument endemic to Ogasawara Islands and classified as Critically Endangered (CR) of Ministry of Environment and Red List of Threatened Species Tokyo. As of 2006, its wild population quantity was estimated as 40 or less in the entire Ogasawara Islands. Three red-headed wood pigeons were caught in Chichijima Island in 2001, and after starting breeding them, the number of breeding has reached 30 in 2019.

Additionally, Ogasawara Greenfinch classified as Critically Endangered (CR) of Ministry of Environment and Red List of Threatened Species Tokyo also inhabit only in Ogasawara Islands, which have been regarded as subspecies of Oriental Greenfinch. However, it has been pointed out that Ogasawara Greenfinch could be an independent species which was divided into a separate group 1,000,000 or more years ago. While Ogasawara Greenfinch used to inhabit throughout Ogasawara Islands, they only breed in a part of Hahajima Island groups and Minami-Ioto Island of Volcano Islands, and it has been estimated that breeding population quantity has been decreased up to around 100 and threatened to become extinct. For this species, we have been working on captive breeding in feeding facilities in Ogasawara Islands as ex-situ conservation. Although Ueno Zoological Gardens has not conducted protection and breeding directly, we have been providing support for on-site raising in captivity such as establishing technologies for captivity and breeding by utilizing Oriental Greenfinch as related subspecies, conducting research and study on their preference of feed etc., raising awareness to the public and borrowing goods for breeding.

Red-Headed Wood Pigeons Breeding in Tama Zoological Park

Oriental Greenfinch Being Raised in Captive in Ueno Zoological Gardens

Column

Decline of Streaked Shearwater in Izu Islands

Even if we express the impact on endangered species in a word, various factors have been complicatedly intertwined.

Streaked shearwater is a rare species designated as Near-Threatened Species in Tokyo Red List (islands). It is known to breed in Mikurajima Island and Toshima Island of Izu Islands and Mikurajima Island is especially known as the largest breeding ground of such species in the world. In 1970s, while it was estimated that 1,750,000 to 3,500,000 streaked shearwaters bred, it has been rapidly declined to approximately 100,000 in recent years[104]. As the cause of such decline, it is supposed that there is a significant impact of predation by feral cats as an alien species (house cats that went wild) and rodents. However, not only that, marine pollution due to hazardous substances and oil efflux accidents also constitutes one of the impacts. Other than these, impacts of secondary damage have been pointed out such as their death because of having been attracted by artificial light of night lighting and then fallen down, traffic accidents after falling down and feeding damage by feral cats etc. Additionally, the accidents have also been reported where prevention fences for falling rocks became traps and then such species have been trapped to death.

In order to protect decreased Streaked shearwater, Mikurajima Village has been conducting “business to find foster homes for cats” to transfer feral cats to foster homes outside the island in cooperation with private veterinary doctors and groups as one of measures for increasing feral cats in Mikurajima Village.

As there are various causes for decline in Streaked shearwater other than the issues on feral cats, it is required for various entities including the administration, business operators, private groups, Tokyo residents, and research and educational institutions etc. to promote the efforts for conservation in collaboration and cooperation with each other.

Streaked shearwater

Cats Waiting for
Getting Adopted by Foster Homes

[104] Website of National Research and Development Agency, Forest Research and Management Organization, Forestry and Forest Products Research Institute.

2-2 Promoting Measures Against Alien Species, Which Cause Damage to Ecosystems and Humans


Red Swamp Crayfish

In Tokyo, the issues have been caused such as predation of native species including rare ones, conflict and hybridization with native species, feeding damage to agricultural products, and harm to humans, due to impacts by invasive alien species, including common raccoon, red swamp crayfish, red imported fire ants, Reeves's muntjac and green anole etc. Especially in islands, as their ecosystems are vulnerable, it is important to take measures for alien species including the ones originating from Japan. In order to prevent further spread of alien species, it is necessary to promote measures against alien species including control and monitoring through collaboration by various entities.

■ Efforts by the Administration

- Understanding and taking into account the latest trends for effective measures against alien species by understanding damage by alien species and conducting monitoring surveys of habitat conditions etc.
- Reducing damage caused by invasive alien species, which affect ecosystems and human lives and bodies through capture and other means, and paying attention not to use alien plants that damage ecosystems when planting in a range of projects.
- In order to help promote measures against alien species through cooperation between citizens, collaborating with NPOs and experts etc. to develop human resources involved in such measures and raising awareness of effective control techniques as well as educating the public regarding importance of such measures against alien species and promoting citizens' understanding and cooperation.
- Raising public awareness of the proper care of animals to ensure that pets are not abandoned.
- In the islands with unique ecosystems vulnerable to the invasion of alien species and closed water bodies, such as ponds and swamps, working to detect invasion at an early stage through border measures for the prevention of damage.
- Providing municipalities with technical and financial support concerning conservation of biodiversity including measures against alien species etc. [TMG]

■ Efforts by Tokyo Residents

- Providing care for our pets throughout their lives, and in the case where it becomes difficult, striving to find new owners and not abandoning them.
- For the fear of genetic disturbance, not releasing and expelling the living things brought from other regions in Japan as well as alien species originating from abroad, and not using invasive plant species that cause damage on ecosystems upon planting such as gardening.
- Not releasing the alien species caught by fishing etc.
- Actively participating in the events to control alien species hosted by the administration and NPO etc.

■ Efforts by Businesses

- In order to prevent spread of designated invasive alien species through business activities, conducting thorough research and monitoring for prevention of spread and taking the initiatives to take measures against alien species in the sites of business facilities and factories.

- For the fear of genetic disturbance, not releasing and expelling the living things brought from other regions in Japan as well as alien species originating from abroad.
- From the perspective of prevention of spread of alien species in Japan and excessive hunting and poaching in the places of origin, calling for not to sell without careful consideration or abandon, and to provide care for pets originated from abroad and rare animals and plants throughout their lives..

■ Efforts by Private Organizations

- Contributing to measures against alien species by understanding damage by alien species and conducting monitoring surveys for habitats conditions, and collecting basic information on living things of Tokyo.
- Holding the events that encourage a lot of Tokyo residents to participate in activities to control alien species in collaboration with the administration and specialists.
- NPOs etc. that act locally will deepen information collaboration with adjacent actors and promote effective measures against alien species through collaboration with them.

■ Efforts by Education and Research Institutes

- Passing on importance of measures against alien species and the impacts on ecosystems by release and expel of living things from perspective of biodiversity to the next generations who will inherit the future.
- Providing advice on measures against alien species that cause damage to ecosystems and humans from specialist standpoint.
- Conducting research and study on the current status of genetic disturbance of native species due to release of living things outdoors.

Column

Common Raccoon and Masked Palm Civet as Alien Species Spreading in Tokyo

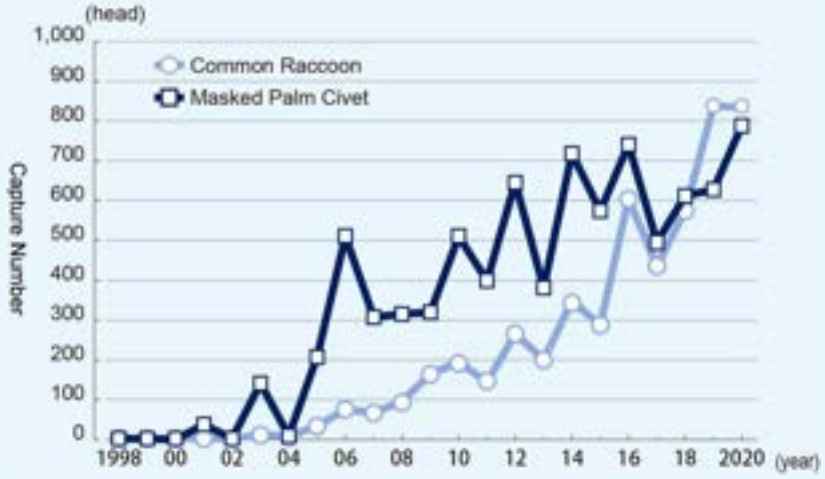
In Tokyo, a lot of damages to ecosystems, the ones to living environment and the ones to agriculture have been caused by common raccoons designated as designated invasive alien species and masked palm civets selected as the alien species for which comprehensive measures are required .

As for damages to ecosystems, in particular, significant damages have been caused to amphibians by common raccoon; in hilly terrain of Tama area, it is reported that they have preyed on amphibians including Tokyo salamanders designated as endangered species. Additionally, they have also caused a lot of damages to living environment including breakage of buildings due to their intrusion onto houses and fouling by excreta, and damages to agricultural products, mainly to fruits and vegetables.

Furthermore, it is known that they are likely to carry multiple zoonotic diseases including rabies and echinococcus. Additionally, as the pathogens that cause serious infectious diseases to pets from both species, caution is required to such infectious diseases in urban districts where there is a higher risk of direct and indirect connection between common raccoon or masked palm civet and pets. As both species are supposed to widely spread in mainland, it is essential to work on the efforts in an integrated manner throughout Tokyo, through collaboration among the Tokyo Metropolitan Government, municipalities and NPO etc.

Common Raccoon
Its land of origin is North America. The captive populations that were imported as the pets and then escaped or were abandoned have bred in Japan.

Masked Palm Civet
Its land of origin is Southeast Asia, Southeastern part of China and Taiwan etc.
There is a record that such species was brought from Borneo in Edo Era in the ancient times and used to be imported for fur during wartime as well.



Changes in Capture Number of Common Raccoon and Masked Palm Civet in Tokyo Metropolis

Action Policy 3 Building Appropriate Relationships between Humans and Wild Animals

3-1 Protection and Management of Wild Animals and Coexistence Between Humans and Wild Animals

In recent years, damages to agricultural, forestry, and fishery products by wild animals including sika deer and wild boars and their impacts on ecosystems have become issues and such conflicts between humans and wild animals have been related to devastation of satochi-satoyama, decline in the number of hunters and impacts by global warming etc. each other. Additionally, as humans and wild animals get closer due to development, it is expected that outbreaks of zoonotic diseases will continue to be on an expanding trend. In order for coexistence between humans and wild animals, it is required to appropriately protect and manage wild animals.


Sika deer

■ Efforts by the Administration

- Capturing wild animals for the purpose of preventing damage to agricultural, forestry, and fishery products and living environment, capturing as part of population control wild animals that have a significant impact on ecosystems, or protecting such animals by segregating them from humans.
- Identifying the latest trends on wild animals and conduct monitoring surveys to reflect the results in our measures.
- With the exception of birds and animals that cause damage to Tokyo residents, rescuing injured or diseased birds and animals to return them to the wild. [TMG]
- Conducting surveillance for zoonotic diseases to identify the outbreak status of infectious diseases. [TMG]

■ Efforts by Tokyo Residents

- From the perspective of One Health, deepening our understanding necessity to maintain appropriate relationship with wild animals.
- Keeping appropriate distance between humans and wild animals by avoiding feeding to wild living things. Additionally, not leaving attracting substances including fruits of trees and food waste.
- In order to prevent infectious diseases, in the case of finding a suspicious corpse of wild animal, contacting the administrator without needlessly touching it.

■ Efforts by Businesses

- Not leaving attracting substances including fruits of trees and food waste that will be feeding for wild animals.
- Striving not to allow wild animals to create nest sites carelessly by appropriately managing sites and buildings etc. of business facilities.

■ Efforts by Private Organizations

- Cooperating with monitoring surveys of wild animals in collaboration with the administration.
- Passing on the participants about how to keep an appropriate distance between humans and wild animals in the field of hands-on natural activities etc.

■ Efforts by Education and Research Institutes

- Passing on coexistence with wild animals to the next generations who will inherit the future.
- By conducting surveys on distribution status of wild animals and studies on protection and management, measures for damages and the ones for coexistence relating to wild animals, providing advice on them from specialist standpoint.

Action Policy 4 Collection, Storage, Analysis, and Dissemination of Information on the Natural Environment

4-1 Collection, Storage, Analysis, and Dissemination of Information on wild fauna and flora and ecosystems in Tokyo


Okutama Visitor Center

As one of the backgrounds that conservation of biodiversity and activities toward sustainable use do not advance, there is the fact that natural environment information on wild fauna and flora and ecosystems has not sufficiently identified, so current evaluation based on scientific findings is insufficient and effective conservation activities have not been conducted. It is required to identify the status of the nature of Tokyo and connect it with appropriate conservation and public awareness through collaboration among the entities including the administration, private groups, and educational and research institutions etc. by utilizing information owned by such entities.

■ Efforts by the Administration

- Enhancing the collection, storage, analysis, and dissemination of information on the natural environment and striving to promote conservation measures by conducting basic surveys of living things and the natural environment in Tokyo in cooperation with a variety of entities.
- Based on the result of basic surveys of natural environment, continuing periodic monitoring surveys focusing on species that serve as indicators, understanding changes in the natural environment in each region over the long term, and sharing relevant information widely.
- Striving to centralize the natural environment information of Tokyo, and based on such information, exploring and realizing the development hubs that have functions to disseminate the attractiveness of Tokyo's nature by making use of digital content. [TMG]

■ Efforts by Tokyo Residents

- Becoming interested in familiar living things and natural environment and observing what kind of living things exist around us.
- Registering information obtained through observation of familiar plants, insects and wild birds to the database of the administration etc.
- Participating in the surveys of living things conducted by the Tokyo Metropolitan Government, municipalities and other groups etc.

■ Efforts by Businesses

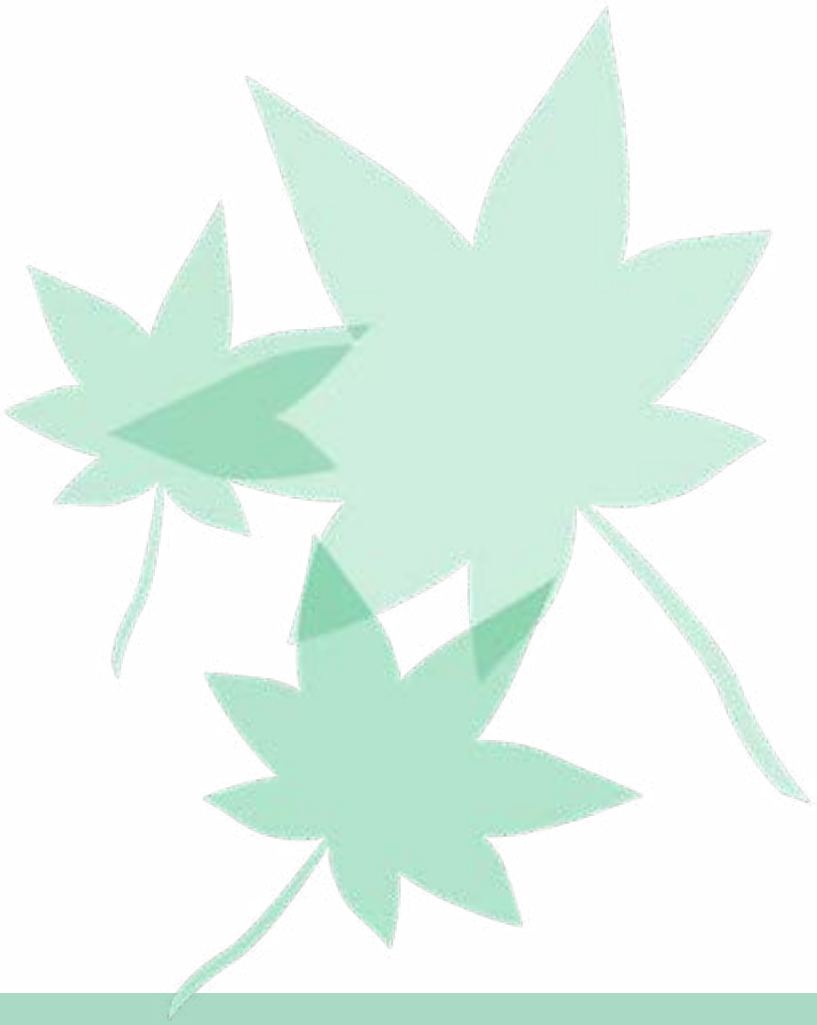
- Focusing on living things and natural environment in the sites of business facilities and factories and conducting the initiatives including implementation of regular surveys and natural observation meetings etc.
- Providing the administration etc. with information on habitats of wild fauna and flora obtained by surveys etc.

Efforts by Private Organizations

- Intermediary supporting organizations including NPO etc. will support collaboration between a variety of entities including local citizen groups, business operators and the administration etc. and conduct surveys of living things in cooperation with such entities.
- Conducting surveys of living things and providing the administration etc. with information on habitats of wild fauna and flora obtained by surveys etc.

Efforts by Education and Research Institutes

- Passing on the importance of basic surveys on biodiversity to the next generations who will inherit the future.
- Providing advice on survey procedures in the field of natural environment from specialist standpoint.
- Providing the administration with habitats information of wild fauna and flora obtained by surveys and research etc. as well as collecting and managing samples related to information on natural environment of Tokyo.



Basic Strategy II
Using the Blessings of biodiversity in a Sustainable Manner, Utilizing the Functions of Nature to Improve the Lives of Tokyo Residents

Action Policy 5 Use of Tokyo's Natural Bounty (Provisioning Services)

5-1 Promoting Sustainable Forestation and Local Production and Consumption of Wood

As a part of Tokyo's forests has become dark due to lack of adequate management for them etc. and their understory vegetation has been lost, decline in multiple functions including deterioration of habitats of living things and reduction in water retaining capacities has been concerned. Additionally, most of artificial forest in Tama area remains unutilized and has been increasing in accumulating quantity. It is required to promote sustainable forest circulation that provides multifaceted functions through revitalization of forestry and appropriate management of forests, and expanding of demand for domestically produced wood including Tamasanzai (Tama lumber).


Forest of Tama Area

■ Efforts by the Administration

- Establishing a sustainable forest circulation that provides public functions, including the conservation of water resources, by retaining and developing foresters who will take the initiative in forest maintenance and expanding the use of wood made in Tama area. [TMG]
- Proactively using Tamasanzai for public facilities and works, and promoting the use of Tamasanzai and other domestically produced wood by taking advantage of opportunities in housing construction. [TMG]
- By developing and managing forests across the entire upper basin of the Tama River, contributing to the stabilization of the river flow rate, conservation of the Ogouchi Reservoir, and preservation of biodiversity, passing on the luxuriant nature environment to the next generation. [TMG]
- Implementing activities etc. to contribute to forest development in the luxuriant nature area by utilizing forest environment transferred tax, and taking the initiative in utilizing Tamasanzai in the facilities owned by municipalities. [Municipalities]

■ Efforts by Tokyo Residents

- Considering use of Tamasanzai upon housing construction.
- Supporting afforestation of Tokyo and conservation of water conservation forests as volunteers.

Efforts by Businesses

- Expanding use of domestically produced wood including Tamasanzai by taking advantage of opportunities of construction and equipment purchases.
- Using firewood and wood chips produced in the forests of Tokyo as heat source of local bathing facilities etc.
- Making use of wild animals as tourist attractions that enhance local attractions, including restaurants etc. that utilize hands-on eco tour and gibier.
- Contributing to afforestation of Tokyo and conservation of water conservation forests by participating in the forests of companies.

Efforts by Private Organizations

- Conducting development of forests including planting and weeding, thinning and building of sidewalks in collaboration with the administration and forester holders.
- Promoting development of forests of wooded areas including hilly terrain and encouraging Tokyo residents to make effective use of produced lumber in collaboration with the administration and forester holders.

Efforts by Education and Research Institutes

- Actively utilizing domestically produced wood including Tamasanzai in the field of education including schools.
- Conducting research and studies on the measures to conduct cycle use of forest resources and promote coexistence of local economy and conservation of biodiversity and providing advice on such measures from specialist standpoint.

Column *Afforestation by Residents of Minato Ward" as Exchange Program between Minato Ward and Akiruno City

From FY2007, "Afforestation by Residents of Minato Ward" as exchange program between Minato Ward and Akiruno City started as a part of countermeasure against global warming. Minato Ward has borrowed city-owned forest of approximately 22 ha from Akiruno City and revived it as the forest to absorb carbon dioxide.

Additionally, the forest of Minato Ward residents is also utilized as the hub of nature observation and environmental learning and conduct the activities of thinning and hands-on tree planting etc. in the forest for Minato Ward residents, targeted at Minato Ward residents. The wood thinned from forests produce in the course of maintenance is utilized in a variety of businesses of the Ward, including interior materials and furniture of facilities owned by the Ward, such as kindergartens, elementary schools and junior high schools, and eco plaza etc., and materials to maintain and manage play tools for nursery schools and parks.

Forest of Minato Ward Residents after Thinning

Interior of Eco Plaza for Which Wood thinned from Forests is Used

5-2 Promoting Agriculture with Consideration for Agricultural Land Conservation and Biodiversity


Farmland in Urban district

As the farmlands including paddy fields and plowed fields etc. have been declining year by year, not only the role as habitats of living things but also multifaceted functions including rainwater infiltration etc. has been lost. Additionally, excessive use of pesticides and chemical fertilizer is supposed to be the factor to threaten biodiversity. Therefore, it is required to conserve local farmlands by retaining and training farmers and enhancing the values of local agricultural products of Tokyo and to promote sustainable agriculture with consideration for biodiversity including reduced use frequency of chemical pesticides and reduced use of pesticides.

■ Efforts by the Administration

- By conserving productive green land and developing farms for various purposes, such as allotment gardens, conserving and utilizing the agricultural land and spaces remaining in urban districts, and encouraging the retention and training of new farmers.
- Increasing the value of local agricultural products in Tokyo to promote local production and consumption.
- Supporting producers working on environmentally friendly agriculture with the reduced use of chemical pesticides and fertilizers to encourage the production of agricultural products with consideration for biodiversity. [TMG]
- By restoring abandoned paddy fields in valleys in hilly terrain in cooperation with private organizations, conserving the paddy fields as habitats for living things.
- Conserving and utilizing the agricultural land and spaces remaining in urban districts by conserving productive green land and developing allotment gardens. [Municipalities]
- Increasing the value of local agricultural products in Tokyo and promoting local production and consumption. [Municipalities]

■ Efforts by Tokyo Residents

- Enjoying growing pesticide-free vegetable farming in our garden, allotment garden and agricultural land for hands-on agriculture.
- Through local production and consumption, such as purchase of local seasonal vegetable and fruits, contributing to conservation of local agricultural lands, food self-sufficiency ratio in Tokyo, CO2 reduction associated with transport of food, and community activation etc.
- Actively purchasing “Tokyo Metropolitan Government Eco Agriculture Product“ with the certified mark of Tokyo Metropolitan Government and organic agricultural products and specially cultivated agricultural products[105] etc..

[105] The cultivation method in which agricultural products cultivated with 50% or less of the number of uses of reduction-target agrichemicals and 50% or less of nitrogen components contained in chemical fertilizers, compared to those used conventionally to produce vegetables in the area.

Efforts by Businesses

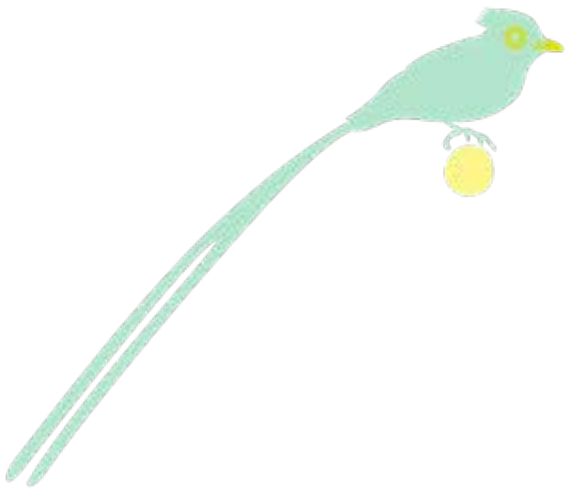
- Reducing use of chemical pesticides and chemical fertilizers and producing agricultural products with consideration for biodiversity.
- Actively trading “Tokyo Metropolitan Government Eco Agriculture Product“ with the certified mark of Tokyo Metropolitan Government and organic agricultural products and specially cultivated agricultural products etc.

Efforts by Private Organizations

- Contributing to conservation of plowed land and paddy field, and irrigation through operation of community farmlands etc.
- By restoring abandoned paddy fields in valleys in hilly terrain in cooperation with the administration, conserving the paddy fields as habitats for living things.

Efforts by Education and Research Institutes

- By providing food ingredients made in Tokyo for school lunch and university cafeterias etc., contributing to local production and consumption and public awareness of food ingredients made in Tokyo.
- We will provide suggestion through research and studies on multifaceted functions demonstrated by urban agriculture, including conservation of biodiversity, and storage and infiltration of rainwater as well as supply of agricultural products.



5-3 Sustainable Management of Fishery Resources in Tokyo

Fish catch of Tokyo has been on a decreasing trend over the long term due to decrease in migratory fish including bonito, and loss of seaweed because of rising sea temperatures. Additionally, there has been an issue of feeding damage of Edo-mae sweetfish caused by Common cormorant and non-native fish such as large-mouth bass. In order to sustainably utilize fishery resources of Tokyo in the future, it is required to appropriately manage fishery resources, take measures against feeding damage by Common cormorant etc. and disseminate marine eco-labels.


Splendid Alfonsino

Efforts by the Administration

- To promote the resource management of major fish species, such as splendid alfonsino, enhancing surveys and evaluations and back up the efforts of fishermen who are engaged in resource management. [TMG]
- Efforts will be promoted to control common cormorants that eat native fish, exterminate alien species, and clean up rivers and coasts to conserve fishing ground environments. [TMG]
- Encouraging the adoption of marine eco-labels, such as MEL and MSC[106], to enable businesses and consumers to selectively consume marine products with consideration for resources and the environment.

Efforts by Tokyo Residents

- Trying not to release exotic fish to the river including large-mouth bass that eat Edo-mae sweetfish. Additionally, we will try not to release exotic fish that we catch.
- Upon fishing, enjoying fishing with consideration for biodiversity, such as releasing small fish, paying attention for excessive fishing, bringing garbage including plastic bags, empty cans and leftover food etc.
- Selecting the products and services with marine eco-labels, such as MSC and MEL.

Efforts by Businesses

- While paying attention to trends of fish catch and resources, appropriately conserving and managing fishery resources.
- Selecting and supplying the products and services with marine eco-labels, such as MSC and MEL.
- Cleaning up rivers and coasts to conserve ecosystems and fishing ground environments.
- Actively selling and using fishery products produced in Tokyo and cooperating in local production and consumption.

[106] A mechanism for labeling marine products so that consumers can selectively purchase those that have been caught or produced with consideration for the sustainability of ecosystems and resources. The MEL certification is operated by the Marine Eco-Label Japan Council while the MSC certification is operated by the Marine Stewardship Council headquartered in the UK.

Efforts by Private Organizations

- Calling for to avoid releasing exotic fish that eat native fish and the ones that are likely to advance genetic hybridization.
- Preventing outflow of plastic waste to rivers and oceans through nature observation of beach and cleanup events of riversides etc. and conserve habitats of living things.

Efforts by Education and Research Institutes

- By providing food ingredients with marine eco-labels, such as MSC and MEL for school lunch and university cafeterias etc., implementing food education.
- Providing advice on resources management of waters and environment conservation from specialist standpoint.

Action Policy 6 Use of Functions of Nature to Encourage Disaster Preparedness and Mitigation (Regulating Services)

6-1 Promoting Green Infrastructure that Contributes to Disaster Preparedness and Mitigation


Rain Garden (Setagaya Ward)

Multifaceted functions by nature have been decreased such as increased risk of landslide disasters and flooding due to decline in water retaining and infiltration functions triggered by lack of adequate management of forests, devastation of satochi-satoyama, and decrease in forests and agricultural lands. Additionally, the ground has been covered by asphalt and concreted due to urbanization, which causes heat island phenomenon. It is required to promote green infrastructure for which functions that natural environment have such as rainwater infiltration functions and transpiration from plants are utilized for solutions of various social issues including disaster preparedness and mitigation etc.

■ Efforts by the Administration

- By thinning and pruning forests and water conservation forests in the Tama area and conserving valleys in hilly terrain in satoyama landscape, contributing to prevention of the runoff earth and sand, the alleviation of flood risks by conserving water resources, and improvements in biodiversity.
- Promoting improvements in rainwater infiltration and storage, the mitigation of the heat island effect, and measures against the heat by appropriately conserving and managing the nature environment that have multifaceted functions such as parks, green spaces, and agricultural land, developing rain gardens, and promoting rainwater infiltration at building site.
- Promoting the initiatives for rainwater infiltration and rainwater storage in the entire river basin through aids etc. to control rainwater that flow out sewerage and rivers.

■ Efforts by Tokyo Residents

- Contributing to expansion of rainwater infiltration area by setting rainwater infiltration pit in addition to planting in our own gardens.
- Participating in volunteer activities to conserve parks, green spaces, rivers and private green spaces etc.

■ Efforts by Businesses

- Appropriately conserving and managing the nature environment that have multifaceted functions such as green spaces and water front in the sites of business facilities and factories and promoting rainwater infiltration and rainwater storage.

- Upon development, not only avoiding and reducing the impacts on ecosystems but also actively creating green spaces and waterfront.
- Actively introducing rooftop greening and wall greening on the buildings of business facilities and factories and contributing to mitigation of heat island phenomenon.

■ Efforts by Private Organizations

- Contributing to reduction of flooding risk by water retaining and storage functions that satoyama have and improvements of biodiversity by promoting to conserve valleys in hilly terrain in satoyama landscape in collaborations of concerned parties.
- Aiming at improving biodiversity in corporate green spaces with consideration for ecosystems in collaboration with businesses.
- Planning and implementing conservation activities by volunteers in familiar greenery such as parks and green spaces, and passing on importance of multifaceted functions that the nature have through events.

■ Efforts by Education and Research Institutes

- Passing on importance of multifaceted functions that the nature have through the initiatives of Green Infrastructure to the next generations who will inherit the future.
- Providing advice on multifaceted functions that the nature have and procedures of Green Infrastructure from specialist standpoint.

Column

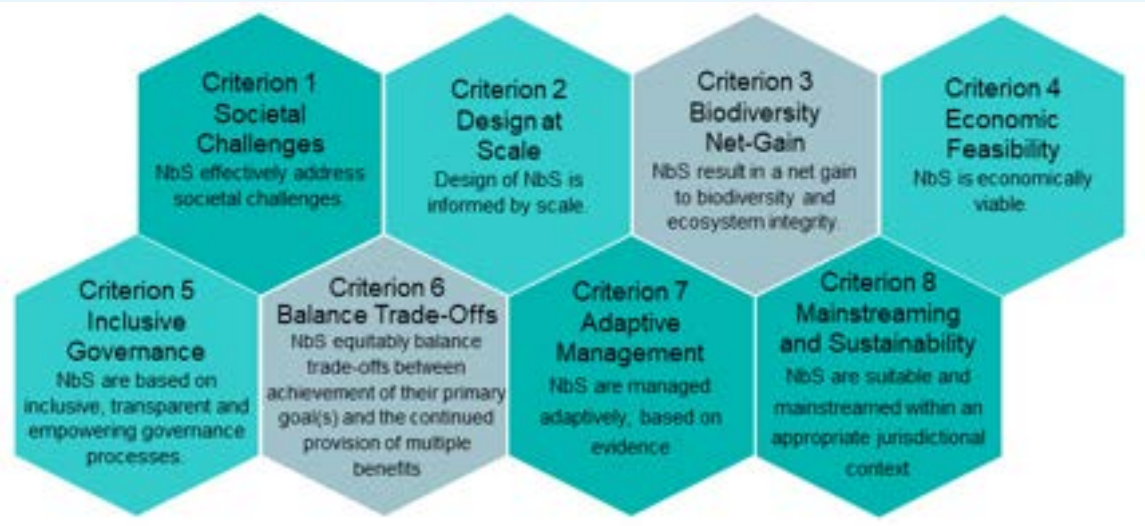
Nature-based Solutions (NbS)

The approach to solve various social issues through the sustainable use of the functions of nature is called as “Nature-based Solutions, NbS”. IUCN (International Union for Conservation of Nature and Natural Resources) defines NbS as “actions to protect, sustainably manage, and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits”.

Conceptual Diagram of Definitions for NbS (IUCN2020)

NbS includes Green Infrastructure, Eco-DRR (Ecosystem based Disaster Risk Reduction) and EbA (Ecosystem-based Adaptation) etc., and it can be said that it is just a concept that plays a role as “an umbrella” to integrate them.

Additionally, as NbS addresses social challenges including climate change and natural disasters and contribute to both human well-being and biodiversity benefits, even the initiative utilizes the functions that nature have, in the case where it causes loss of biodiversity, it does not fall under NbS.



8 Criteria of NbS in Global Standards of IUCN (IUCN2020)

Additionally, as similar concepts there are “Nature-derived solutions” including wind power and solar power generation and “Nature-inspired solutions” as innovative design, materials and structures etc. inspired by nature including biomimicry etc., although they do not fall under definitions of IUCN.

Column

Efforts to Promote Green Infrastructure in Tokyo

Green infrastructure is a nature-based initiative to create sustainable and attractive national land, cities, and regions in both structural and non-structural aspects, such as social infrastructure development and land use. As a variety of efforts for green infrastructure are also promoted in Tokyo, some of them are introduced here.

In the land of Jindaiji Garden of Chofu City where sale and conversion of agricultural land due to lack of successors of urban farmland is an issue, trees of Japanese zelkova that represent mixed forests of Musashino are conserved, and a rain gardens for rainwater infiltration, and pesticide-free urban farms have been developed along with houses and restaurants, improvement of asset value in the site and local rainwater infiltration functions will be sought for.

Jindaiji Garden

Marunouchi Street Park[107]

In Marunouchi Street Park of Chiyoda Ward, with natural turf laid along the street in the central Tokyo, the multi-functionality of greenery greatly contributes to improving the comfort of the city, such as increase in stay time of a lot of people, increase in sales of surrounding restaurants and reduction in surface temperatures.

In a house complex named Chaleureux Ogikubo of Suginami Ward, reconstruction helps build a green network, and contributes to biodiversity by conserving existing trees, transplanting trees and creating greening environment composed of mixed forests etc. Additionally, effects of around 1°C temperature reduction can be found due to mitigation of heat island phenomenon by top roof greening and wall greening and construction plan utilizing breeze paths.

Chaleureux Ogikubo[108]

[107] OMY Area Management Association

[108] Urban Renaissance Agency Environmental Report Cities, Residences and Environments 2021

Action Policy 7 Use of Nature to Ensure a Comfortable and Enjoyable Life (Cultural Services)

7-1 Promoting Health and Educational Benefits that Makes Use of Local Natural Resources

Activities for interaction with nature including hands-on nature activities, nature observation meetings, and agriculture experience provide the opportunities to improve health and to deepen the interest in and understanding of biodiversity as well as to provide people with mental comfort. It is required for Tokyo residents especially children who have few opportunities to contact with nature to increase the opportunities to be able to become familiar with nature in their daily lives in addition to learning at schools and in local communities.


Activities to Contact With Nature

■ Efforts by the Administration

- Through the appropriate maintenance and management of natural parks and conservation areas, creating opportunities to allow its residents to closely contact with nature and contribute to promoting the health of Tokyo residents and improving non-cognitive skills of children.
- Through provision of enriched lives and comfort for people who live and work in Tokyo, and development and management of parks, green spaces, and allotment gardens that serve as lively opportunities with diversity to get people close to nature including sports, cultural activities and experiences of agricultural activities etc., creating a comfortable and high-quality living environment that allows them to feel close to nature in their daily lives, and contributes to health and education.
- Promoting tourism with consideration for biodiversity by for example encouraging ecotourism in the islands, and disseminating information on attractiveness specific to a region or cultural aspects that are rooted in local nature as well. [TMG]

■ Efforts by Tokyo Residents

- Creating opportunities to contact with nature with children in raising them.
- Actively participating in hands-on nature activities, nature observation meetings, and agriculture experience planned by the administration, businesses and private organizations etc.
- Experiencing diverse attractiveness of Tokyo's nature and cultural aspects that are rooted in local communities while considering biodiversity by actively participating in eco tours etc.
- Actively performing workation and remote work in nature.

Efforts by Businesses

- Creating opportunities to contact with nature for Tokyo residents by opening company-owned green spaces to them.
- Providing citizens with opportunities for agriculture experience by opening and operating agricultural land for hands-on agriculture.
- Giving full consideration to avoid impact on living things and natural environment in the case where we plan and operate the projects that utilize local natural resources including tourism etc.

Efforts by Private Organizations

- Aiming at utilizing local parks, green spaces, waterfront and agricultural land etc. as the places for environmental learning and nature experience activities and activating local communities.
- Calling for creating the places for nature observation meetings and nature experience activities for all generations in familiar nature of each local area and calling for participation in them.

Efforts by Education and Research Institutes

- Utilizing diverse nature of Tokyo as the places for environmental education and nature experience activities, creating school yard biotope and kindergarten yard biotope with consideration for biodiversity, developing the places to closely contact with nature including appropriate management of such places, and utilizing them for environmental education.
- Conducting research and studies on the relationship between nature experience and conservation of biodiversity, such as nature experiences in childhood leading to foster awareness of biodiversity conservation.
- Passing on importance of actions with consideration for natural environment through opportunities of environmental education and nature experience activities at school to the next generations who will inherit the future.
- Conducting research and studies, and providing advice on coexistence between conservation and utilization of natural environment, such as eco-tourism, common nature experience activities, and Circular and Ecological Economy etc.

7-2 Conserving and Passing on History and Culture Making Use of Local Natural Resources

The blessings of biodiversity trigger to generate a variety of cultures including cultural properties, food, landscapes and worship etc. While such blessings enrich our lives, such history and cultures have been lost in Tokyo due to decline in nature and the persons who take care of it. Therefore, it is required to promote to conserve and pass on history, culture and traditional knowledge rooted in local nature through public awareness of traditional food culture of Tokyo, landscapes of agriculture including homestead woodland and conservation of satochi-satoyama etc.


Agricultural Scenic Area (Nerima Ward)

Efforts by the Administration

- Conserving paddy fields in valleys in hilly terrain, wooded areas, and reservoirs through traditional farming methods, and conserve and pass on beautiful scenery, history, culture, and luxuriant ecosystems of satoyama landscape.
- Raising public awareness of the traditional food culture of Tokyo to pass it on to the next generation.
- Conserving agricultural landscapes where agricultural land and homestead woodland remain together as well as nature integrated with historical heritage sites and promoting to register them to OECM.
- Appropriately protecting and managing natural monuments designated as cultural properties, and passing on history and culture linked to local nature.

Efforts by Tokyo Residents

- Participating in volunteering activities to conserve paddy fields in valleys in hilly terrain, wooded areas, and reservoirs that utilize traditional knowledge, contributing to conservation of environment of valleys in hilly terrain of satoyama landscape, and learning about traditional farming methods and culture.
- Contributing to understanding and passing on of food culture of Tokyo by eating “Edo Tokyo vegetable” originating from native species or cultivation methods of ancient times etc. and processed food specific to Tokyo that is produced by traditional procedures etc.
- Researching and learning connection between local natural environment and culture and passing it on for many generations.

Efforts by Businesses

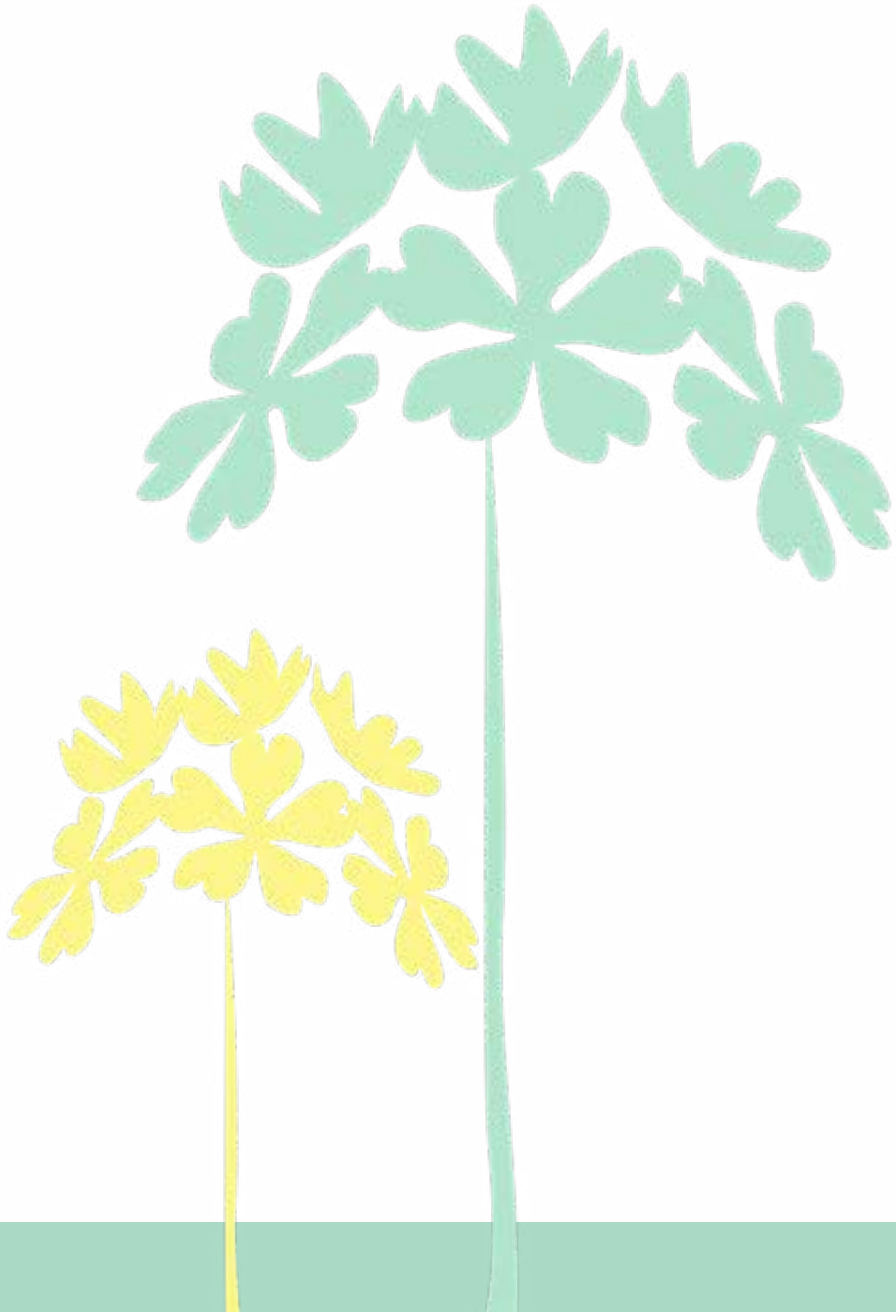
- Finding food culture and traditional knowledge rooted in local nature as the values of tourism resources and contribute to conserve and pass on such culture and knowledge.

Efforts by Private Organizations

- Planning and implementing volunteering activities related to conservation and restoration of satoyama that utilize traditional knowledge in collaboration with the administration etc.
- Encouraging healthy elderly people who have knowledge and techniques of traditional farming methods and handwork to play active roles in the efforts to conserve biocultural diversity.

■ Efforts by Education and Research Institutes

- Conducting research and studies on traditional culture and knowledge, techniques and food culture rooted in local people and livings and pass on their connection to the next generation who will inherit the future as well in an easy-to-understand way.

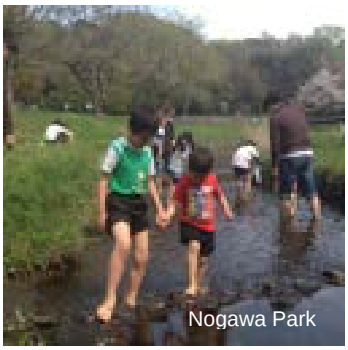


Basic Strategy III
Recognizing the Value of Biodiversity, Changing That Idea into Actions that Address Global Issues As Well As Those in Tokyo

Action Policy 8　Promotion of Understanding of Biodiversity

8-1 Promoting Understanding of Biodiversity by All Actors

Understanding, interest and awareness of biodiversity in Tokyo unfortunately remains at low levels. In order to conserve and restore biodiversity and use its bounty in a sustainable manner, Tokyo residents and other actors need to correctly recognize the origin, value and status quo of biodiversity, and deepen their understanding and interest in it. Therefore, it is required to promote understanding of biodiversity in all actors by disseminating value and importance of biodiversity in various scenes including daily living and economic activities etc.


Nogawa Park
(Provided by：Nature Conservation Society of Japan)

■ Efforts by the Administration

- The Internet and related facilities will be used to raise awareness of biodiversity, and the understanding of biodiversity will be deepened in the lives and economic activities of Tokyo residents through TMG's initiatives and plans in various fields with consideration for biodiversity.
- Actively raising awareness of places and events in Tokyo where people can enjoy observing living things and experiencing nature and agriculture.
- In order to facilitate collaboration between municipalities that have similar issues, constructing network between municipalities, making the activities more efficient through sharing information and technologies and aim at promotion of broad activities.
- To prevent visitors from concentrating too heavily in specific places or overusing mountain trails on natural land, disseminating information on the attractiveness of Tokyo's diverse nature and raising public awareness of the rules for visiting natural parks and Tokyo Metropolitan parks. [TMG]
- Supporting formulation and revision of local biodiversity strategies based on the Kunming-Montreal Global Biodiversity Framework for municipalities. Additionally, promoting collaboration and cooperation between a variety of parties concerned including corporations that actively advance the initiatives for biodiversity etc., and considering the development of a hub that have functions to collect and provide necessary information including organizations that work on conservation of biodiversity and human resources information and to provide advice, and aiming at its realization. [TMG]
- Establishing regional biodiversity strategy or revising it based on the Kunming-Montreal Global Biodiversity Framework. [Municipalities]

Efforts by Tokyo Residents

- Becoming interested in familiar nature and changing of the seasons and seeking for what kind of living things and nature exist around us.
- Actively participating in seminars related to biodiversity and hands-on nature programs implemented by the administration and NPO and NGO etc., telling about what we have learned about biodiversity to our family members and friends and looking for and then implementing what we can contribute to biodiversity in our work and lives.
- We will learn about importance of biodiversity while following usage rules in natural parks, parks and green spaces and enjoying nature.

Efforts by Businesses

- In business activities including product sales and CSR activities, enhancing the initiatives to consider and contributing to biodiversity and sharing its value and importance with our employees.
- Actively opening up and disseminating information on our efforts to consider and contributing to biodiversity to consumers and users through the website and SNS.
- Upon implementing the initiatives to consider and contribute to biodiversity, aiming at realizing more effective ones including collaboration with NPO etc. with expertise.

Efforts by Private Organizations

- Planning and holding seminars and events related to biodiversity targeted at Tokyo residents and businesses.
- Upon implementing the initiatives to consider and contribute to biodiversity, providing support businesses in order to make such initiatives more effective from specialist standpoint.
- Disseminating biodiversity crisis that has been occurring inside and outside Japan and the initiatives that Tokyo residents and businesses can work on, respectively.

Efforts by Education and Research Institutes

- Encouraging to understand importance of biodiversity and passing on value of biodiversity in our familiar regions to the next generations that will inherit the future.
- Conducting research and studies on conservation of sound biodiversity as the basis of Tokyo residents' lives and economic activities and providing advice from specialist standpoint.

Column

First Step for Conservation of Biodiversity

Conserving Biodiversity. It means to realize “a sustainable, environmentally symbiotic, prosperous society” that will enable human society to continue to exist and us to continue to benefit from biodiversity. Therefore, it will be started from a small step as individual transformation of lifestyle.

Why don’t we start from what we can do from today for conservation of biodiversity? Let’s start taking just one step and enjoy it!

<In our daily lives>

- Take an interest in our familiar nature in towns such as green and living things while taking a walk and commuting.
- Make a replacement purchase to energy-saving products for the purpose of mitigation of climate change.
- Use goods carefully and reuse them and actively recycle unnecessary goods.
- Avoid overbuying, cooking too much and reduce food waste.
- Bring your own shopping bag and your own container and try to create as little plastic litter as possible.
- Eat local food and taste seasonal one.
- Select eco-friendly products with eco-label.
- Make sure to responsibly keep your pet to its end without releasing outside or abandoning it.
- Avoid “importation”, “release” and “spreading” of alien species.

Public Awareness Poster by Ministry of Environment

<In your hobbies and play>

- Visit uncrowded sea, mountains and rivers and realize bounty and functions of nature.
- Contact with nature and living things by visiting parks with nature and zoos, aquariums and botanical gardens etc.
- Feel natural wonder and change of seasons, and share it with people around you by photos, drawings, writing and SNS etc.
- Create the places for birds and insects to visit while enjoying gardening in your balcony and garden.

<In local activities>

- Join local activities in order to protect “connection” with living things, nature and culture.
- Join volunteering activities for natural environment conservation held in local communities.


(Provided by: Nature Conservation Society of Japan)
Playing with Fallen Leaves in a Park


(Provided by: Nature Conservation Society of Japan)
Observation Meeting on the Sea Shore

Action Policy 9　Development of Human Resources to Support Biodiversity

9-1 Promoting Environmental Education and Human Resource Development in the Field of the Natural Environment


Development of Environmental Human Resources

Due to aging of human resources that have led volunteer activities to conserve natural environment and change of consciousness because of people's lack of interest in nature, there is a lack of human resources to protect natural environment of Tokyo. While biodiversity has been rapidly lost inside and outside Tokyo, importance of biodiversity has not been recognized and such loss has not been connected with behavioral change. Therefore, it is required to advance development of human resources to promote conservation of natural environment and environmental education to connect with behavioral change by all generations as well as children.

■ Efforts by the Administration

- In natural land such as a variety of parks, green space and waterfront, botanical gardens and zoos, and hubs where people can learn about various natural land biodiversity in Tokyo, encouraging natural environment education and nature experience activities.
- Developing human resources who will safeguard Tokyo's nature and use it in a sustainable manner, such as green volunteers and nature guides.
- Retaining and developing people who will take the lead in the agriculture, forestry, and fisheries industries in Tokyo and traditional techniques that are rooted in nature.
- Promoting public awareness of traditional knowledge and local knowledge that has been preserved while utilizing natural environment, pass such knowledge on to the next generations and promoting environmental education and human resource development
- Planning and managing events for environmental education and hands-on nature activities in parks and green spaces etc. in collaboration with NPO etc. [Municipalities]
- In municipal facilities, implementing public awareness of biodiversity and providing lectures for environmental learning. [Municipalities]

■ Efforts by Tokyo Residents

- Participating in environmental education on biodiversity planned by the Tokyo Metropolitan Government, municipalities and NPO etc. and deepening our understanding in order to implement what we have learned in our daily lives.
- Visiting botanical gardens, zoos, aquariums, museums and facilities for environmental learning and creating opportunities to contact with nature and living things by participating in activities and events which encourage children to become interested in biodiversity.
- Participating in conservation activities that utilize traditional knowledge and local knowledge, learning about traditional agricultural methods and culture and deepening understanding for biodiversity.

Efforts by Businesses

- Persons in charge of corporations and their employees will participate in events for environmental education on biodiversity and deepen understanding in order to facilitate implementation of corporate activities and lives with consideration for biodiversity.
- Opening corporate green spaces as the places for hands-on nature activities and nature observation to Tokyo residents and creating environments where they can learn about biodiversity.
- Implementing hands-on nature activities targeted at local children and contributing to development of human resources in the field of natural environment through CSR activities of companies in collaboration with NPO etc.

Efforts by Private Organizations

- Implementing effective environmental education and hands-on nature activities which encourage Tokyo residents to change their behaviors in collaboration with the administration and businesses etc.
- Planning effective programs for environmental education and hands-on nature activities, actively accepting lecturers for career development and university students for internships and contributing to development of human resources in the field of natural environment.

Efforts by Education and Research Institutes

- Passing on the efforts for conservation of biodiversity and its sustainable use to the next generations that will inherit the future.
- Providing environmental education by utilizing create parks, green spaces, school yard biotope and kindergarten yard biotope that are properly managed, and implementing conservation activities with kindergarten children, school children and students.
- Providing advice on behavior change with consideration for biodiversity from specialist standpoint.

Column Hubs for Environmental Education Related to Biodiversity

Tokyo as a Metropolis has a large population and many bases for environmental education and nature experience activities related to biodiversity.

Activities for environmental education activities have been intensively carried out in metropolitan zoological parks, metropolitan botanical gardens, metropolitan aquariums, metropolitan gardens, metropolitan parks and marine parks managed by the Tokyo in cooperation with volunteers.

In Tokyo, approximately 80,000 ha of natural parks (national parks, quasi-national parks and Tokyo Metropolitan natural parks) have been spreading, where Tokyo Metropolitan Government volunteers provide outdoor classes and usage guidance in cooperation and collaboration with guides at visitor centers etc.

Additionally, by setting conserved areas designated by Tokyo as the field, the Tokyo Metropolitan Government and Public Interest Incorporated Foundation Tokyo Environmental Public Service Corporation have been carrying out a hands-on program for satoyama conservation activities, which includes forest maintenance, craft workshops, and rice paddy activities in familiar community-based forest areas.

Moreover, environmental education and hands-on nature activities have been actively carried out in cooperation with Tokyo residents and citizens' groups at a local government level, based in municipal hometown museums etc.

Other than these, centering on the rivers including Tama River, a lot of waterfront fun schools have been registered, aiming at enhancement of hands-on natural activities by Ministry of Land, Infrastructure, Transport and Tourism, educational experts or citizens' groups.

Experiencing Rice Threshing in Satoyama Conservation Area

Action Policy 10 Behavior Change Which Will Consider and Contribute to Not Only the Environment of Tokyo But Also the Global Environment

10-1 Consideration of Biodiversity in Economic Activities and Consumption Behavior

The globalization of supply chain from production to consumption has caused local economic activities and consumption behavior to indirectly affect biodiversity not only in Japan but also throughout the world. Especially, as Tokyo is one of major hubs of global economy where humans, goods, money and information flow, consumption of resources in Tokyo significantly impacts on loss of biodiversity that has been progressing throughout the world. Therefore, it is required for various actors to be engaged in economic activities and consumption behavior with consideration for biodiversity.

Efforts by the Administration

- Reducing environment load by promoting green purchasing and encouraging the expanded use of environmentally certified or biodiversity-friendly products.
- Promoting green finance that will also leads to biodiversity conservation.

Efforts by Tokyo Residents

- Actively purchasing environmentally certified or biodiversity-friendly products.
- Actively purchasing “Tokyo Metropolitan Government Eco Agricultural Product” with the certified mark of by the Tokyo Metropolitan Government, organic agricultural products and special cultivation agricultural products etc.

Efforts by Businesses

- Financial institutions will actively promote investments and loans for the corporations and projects that promote businesses that consider and contribute to biodiversity.
- In supply chains, efforts to restore biodiversity will be promoted in addition to the ones to reduce negative impacts on biodiversity.
- Producers will produce the environmentally friendly products and commodities in lifecycle and provide them to the market. Additionally, retailers will actively obtain certification for the products that have certification system and enable consumers to select environmentally certified products.

- Upon business activities, reducing environmental load through promotion of green purchase etc. and procuring environmentally certified or biodiversity-friendly products.
- Through the opportunities of product sales and service provision, distributing values and importance of biodiversity to consumers and users.

■ Efforts by Private Organizations

- Promoting awareness-raising concerning biodiversity-friendly consumption behavior.

■ Efforts by Education and Research Institutes

- Passing on importance of biodiversity-friendly economic activities and consumption behavior to the next generations that will inherit the future.
- Conducting research and studies on positive and negative impacts on global biodiversity provided by consumption and procurement in lives of Tokyo residents and economic activities.

10-2 Contribution to Biodiversity by Promoting Sustainable Resource Management

It is said that approximately 8,000,000 tons of plastic waste flow into the sea throughout the world and such plastic waste has caused harm to marine life and threatened marine ecosystem. Furthermore, while Tokyo depends on outside of Tokyo for most of food, it has generated a large amount of food waste. Therefore, it is required to mitigate load on biodiversity to inside and outside Tokyo by promoting the efforts of further sustainable resource management including reduction of plastic waste and food waste generated in Tokyo.


Marine Plastic Waste

Efforts by the Administration

- Realizing sustainable use of resources, exploring sustainable “consumption and production” in Tokyo and implementing initiatives to achieve it. [TMG]
- Implementing measures to mitigate the load on global biodiversity by reducing plastic and food waste.

Efforts by Tokyo Residents

- Leading a life free of single-use plastic by bringing and our own shopping bags and our own bottles, and utilizing reuse, sharing and selling by measure etc.
- Cooperating with appropriate separation and elimination of household waste and actively purchasing and utilizing remanufactured goods produced by recycling.
- Reducing food waste due to overbuying and leftovers in our daily lives and also living a life with consideration for global biodiversity.
- To say nothing of avoiding careless throwing away garbage generated by ourselves and leaving it outside, by recycling what is recyclable, participating in voluntarily picking up trash and the events for picking up trash.

Efforts by Businesses

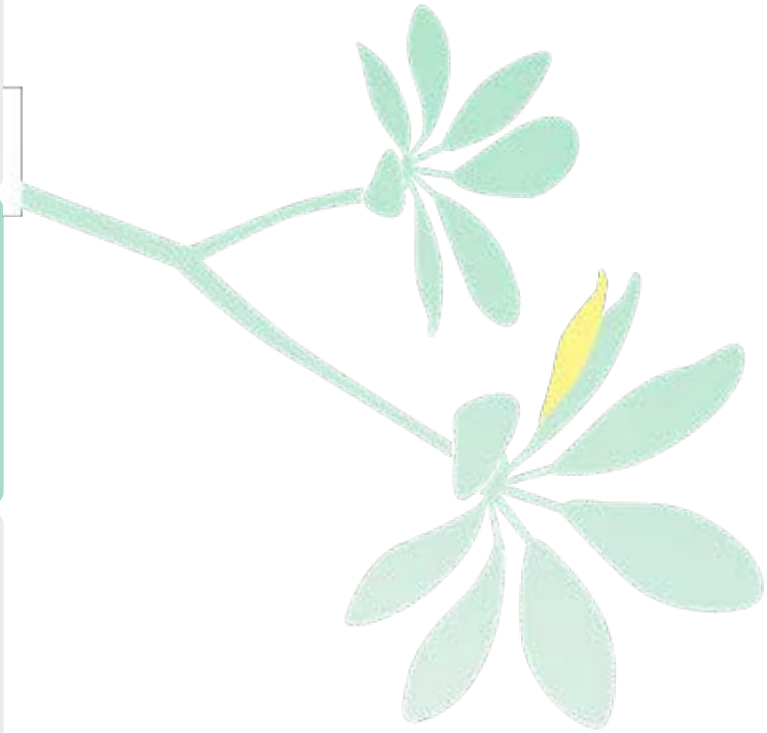
- Actively promoting reuse, sharing and sales by measure, promoting optimizing collection and transportation routes and implementing horizontal recycling by technological innovation, and reducing consumption of single-use plastic.
- Understanding occurrence status of food waste in business activities and aiming at its reduction, and implementing the efforts leading to reduction of food waste including donating left food to food banks etc.
- By rationalizing use of avoidable plastic and reducing wasted resources thoroughly, in case of need of one-way container packaging and products, properly switching to recyclable resources whose sustainability has been identified.

Efforts by Private Organizations

- Raising public awareness of lives without use of single-use plastics through events.
- Striving to reduce food waste in corporations and at home through activities of food bank and food drive etc.

Efforts by Education and Research Institutes

- Passing on importance of plastic waste and reduction of food waste to the next generations that will inherit the future.
- Conducting research and studies about the impacts on global biodiversity due to use of resources and the ones on marine ecosystem by plastic waste.



10-3 Balancing Climate Change Measures and Biodiversity Conservation

In order to mitigate the climate change impacts as one of crises of biodiversity, climate change measures must be strongly promoted. On the other hand, as the efforts for both climate change measures and biodiversity conservation influence measures each other, it is required for each actor to promote the efforts and behavior to contribute to solutions for both challenges with consideration for synergistic effects and trade-off.

Efforts by the Administration

- Promoting initiatives toward “Carbon Half”, a plan to halve greenhouse gas emissions in Tokyo by 2030 to realize a “Zero Emission Tokyo” that will contribute to achieving net zero CO_2 emissions worldwide by 2050. [TMG]
- Aiming at achieving net zero CO_2 emissions by 2050 and realization of environmentally symbiotic society, and promoting various initiatives that will help meet both challenges in light of the relationship between climate change measures and biodiversity conservation.
- Collecting and distributing information on the changes in distribution areas of living things and phenological changes of living things related to climate changes.

Efforts by Tokyo Residents

- Leading environmentally-friendly lives every day to contribute to realization of net zero CO_2 emissions by 2050 and environmentally symbiotic society.
- Cooperating with monitoring on the changes in distribution areas of living things and phenological changes of living things.

Efforts by Businesses

- Promoting environmentally-friendly business activities to be able to contribute to realization of net zero CO_2 emissions by 2050 and environmentally symbiotic society.
- Considering biodiversity upon implementing climate change measures including introduction of renewable energy etc.

Efforts by Private Organizations

- Raising public-awareness of the impacts on biodiversity by global warming.
- Implementing events to recognize the changes in distribution areas of living things related to climate changes, and cooperating with monitoring.
- Promoting various initiatives from the standpoint of balancing climate change measures and biodiversity conservation.

Efforts by Education and Research Institutes

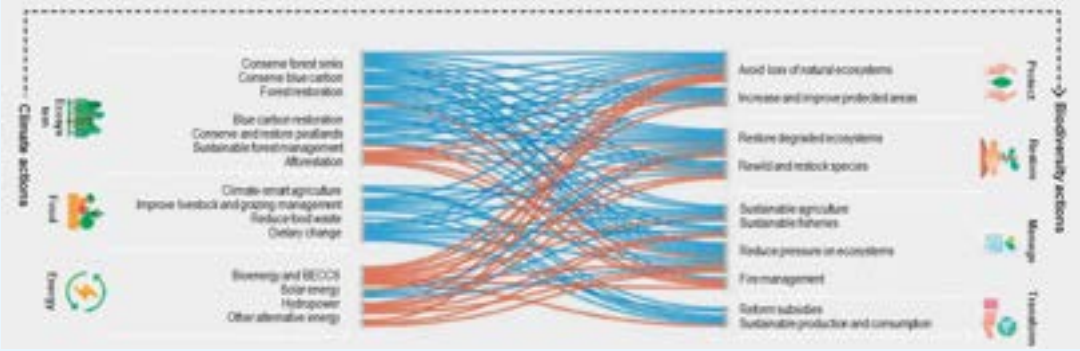
- Passing on importance of balancing climate change measures and biodiversity conservation to the next generations that will inherit the future

- Conducting research and studies on relationship between global warming and biodiversity.
- Providing advice on mutual impacts by climate change measures and biodiversity conservation from specialist standpoint.

Column Relationship between Biodiversity Conservation Measures and Climate Change Measures

Biodiversity conservation and measures for mitigation and adaptation measures for climate change have mutual relationship.

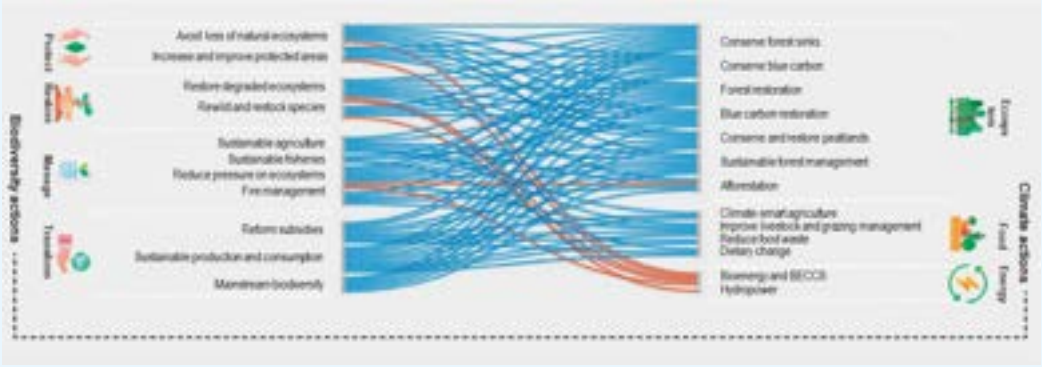
The measures only focusing on mitigation and adaptation measures for climate change are likely to directly and indirectly on nature and nature blessings.



Sankey Diagram Mapping the Effects (Positive and Negative) of Actions to Mitigate Climate Change on Actions to Mitigate Biodiversity Loss

Source：IPBES-IPCC CO-SPONSORED WORKSHOP REPORT ON BIODIVERSITY AND CLIMATE CHANGE (2021)

On the other hand, in many cases, the measures focusing on protection and restoration of biodiversity significantly contribute to climate change mitigation. Moreover, further more effects can be expected for the measures with consideration for both biodiversity and climate.



Sankey Diagram Mapping the Effects (Positive and Negative) of Actions to Mitigate Biodiversity Loss on Actions to Mitigate Climate Change

Source：CO-SPONSORED WORKSHOP REPORT ON BIODIVERSITY AND CLIMATE CHANGE (2021)

Blue lines represent positive effects, while orange lines represent negative effects. This network of interaction is evolving as many of the solutions are still in the ideation phase or have not yet been deployed at any sizable scale. Likewise, the strength of interactions may shift over time as the scale of solutions moves beyond the threshold at which unforeseen interactions, positive or negative, may occur.

Examples for Relationship between Biodiversity Conservation Measures and Mitigation and Adaptation Measures for Climate Change

Chapter 5

Promotion System and Progress Management

1 Promotion System

Biodiversity is closely connected with our livings and economy. In order to maintain sustainability of such livings and economy, it is necessary to have the voluntary and collaborative initiatives by all actors related to nature of Tokyo and global nature used by Tokyo residents. Therefore, the regional strategy will be advanced by the following promotion system for the purpose of collaboration with a variety of persons concerned.

Promotion and Review of Policies based on advice from persons with relevant knowledge and experience

In Tokyo Metropolitan Government Natural Environment Conservation Council Planning Group, we will promote and review the policies while receiving advice from persons with relevant knowledge and experience from comprehensive perspective.

(Provisional Name) Establishment of Promotion Committee in Biodiversity Regional Strategy Agency within the Tokyo Metropolitan Government

Based on “Review Meeting in Biodiversity Regional Strategy” which was established for revision of this Strategy, we will newly establish “(Provisional Name) Establishment of Promotion Committee in Biodiversity Regional Strategy Agency” and promote biodiversity-related policies in collaboration with the agencies concerned within the Tokyo Metropolitan Government.

Collaboration with departments and divisions concerning biodiversity in municipalities

We will exchange information on biodiversity conservation and sustainable use with municipalities in Tokyo and promote policies in collaboration with such municipalities.

Development of system to support collaboration with a variety of entities

We will establish network with facilities and groups related to biodiversity in Tokyo, promote collaboration and cooperation with various persons concerned to facilitate promotion of initiatives in collaboration with businesses and NPO etc. and examine and realize development of hubs that have functions to collect and provide necessary information including information on natural environment, groups that work on biodiversity conservation and information on human resources and to provide advice.

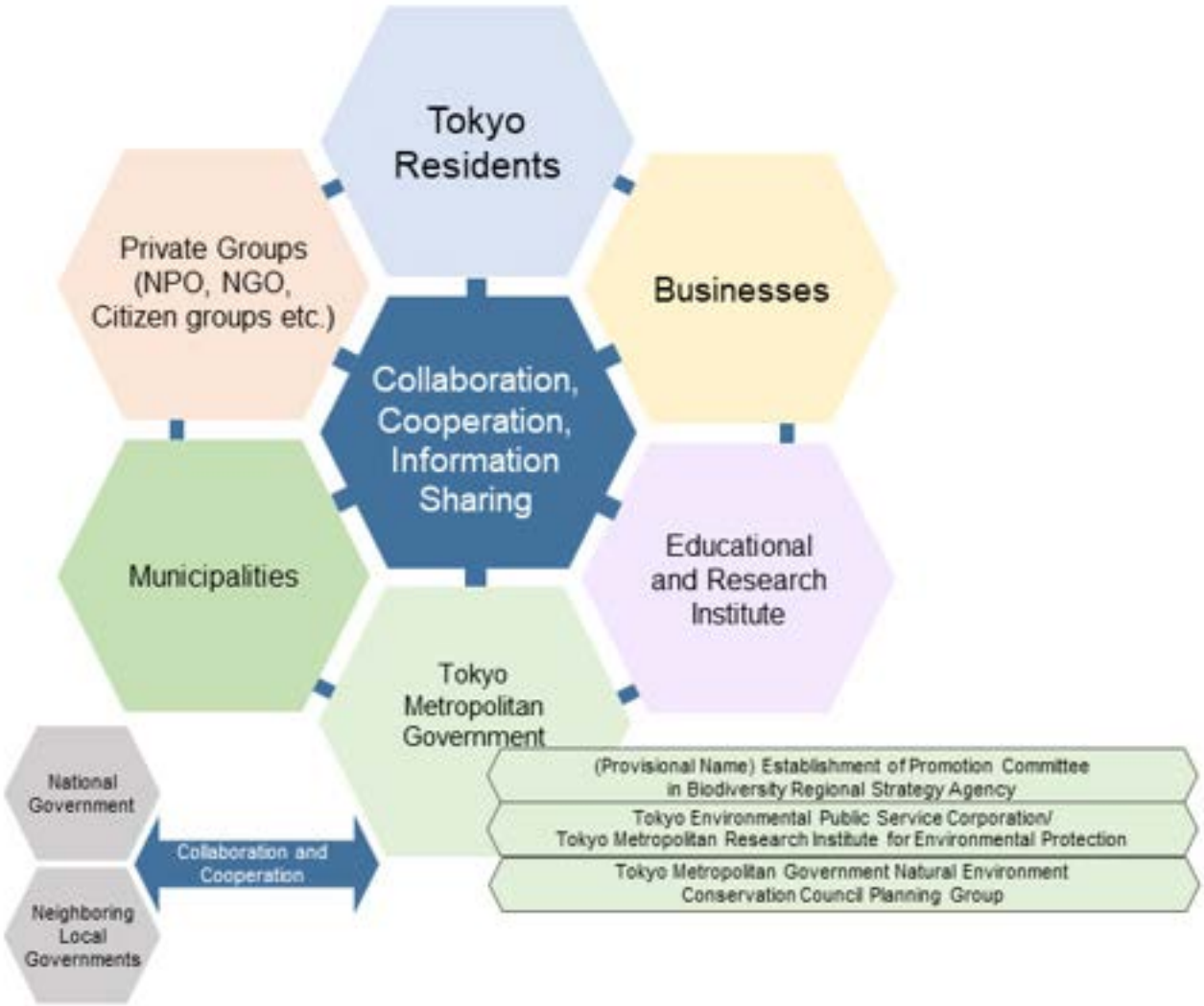


Image of Collaboration and Cooperation by a Variety of Entities

2 Progress Management

Upon promotion of this Strategy, by reporting implementation status of the initiatives on biodiversity proceeded by the Tokyo Metropolitan Government to the Tokyo Metropolitan Government Natural Environment Conservation Council Planning Group, verifying and evaluating the directivity of the initiatives based on the opinions of the persons with relevant knowledge and experience, we will conduct progress management of regional strategy.

Progress Management by PDCA Cycle

Aiming at steady progress management and review of this Strategy, we will continue improvement by PDCA cycle as Plan, Do, Check and Review Initiatives.

- Review of initiatives based on verification results

- Revision of regional strategy
- Planning of initiatives based on action policies

- Verification of initiatives
- Organization of improvements and challenges

- Implementation of initiatives by entities, including the administration, Tokyo residents, businesses, private groups (NPO, NGO, citizen groups etc.), educational and research institutes (including experts) etc.

Formulation of the Tokyo Biodiversity Strategy for 2030 Action Plan

By summarizing the initiatives of the Tokyo Metropolitan Government based on this Strategy as “Tokyo Biodiversity Strategy for 2030 Action Plan” (hereinafter referred to as “Action Plan”.), we will publicize progress status on the website of the Tokyo Metropolitan Government, Bureau of Environment every fiscal year. In order for steady progress management and review of individual policy of the Tokyo Metropolitan Government, we will verify evaluate the Action Plan, and review it as required.

Review of regional strategy

This Strategy will be reviewed based on re-revision of international goals or revision status of National Biodiversity Strategy of Japan on the occasion of 2030 as the target year of Kunming-Montreal Global Biodiversity Framework. However, as changes in social conditions are assumed, we will review it as required.

Reference

1 SDGs 17 Goals and Icons

1 No Poverty
End poverty in all its forms everywhere

2 Zero Hunger
End hunger, achieve food security and improved nutrition and promote sustainable agriculture

3 Good Health and Well-Being
Ensure healthy lives and promote well-being for all at all ages

4 Quality Education
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

5 Gender Equality
Achieve gender equality and empower all women and girls

6 Clean Water and Sanitation
Ensure availability and sustainable management of water and sanitation for all

7 Affordable and Clean Energy
Ensure access to affordable, reliable, sustainable and modern energy for all

8 Decent Work and Economic Growth
Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

9 Industry, Innovation and Infrastructure
Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

10 Reduced Inequalities
Reduce inequality within and among countries

11 Sustainable Cities and Communities
Make cities and human settlements inclusive, safe, resilient and sustainable

12 Responsible Consumption and Production
Ensure sustainable consumption and production patterns

13 Climate Action
Take urgent action to combat climate change and its impacts

14 Life Below Water
Conserve and sustainably use the oceans, seas and marine resources for sustainable development

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

16 Peace, Justice and Strong Institutions
Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

17 Partnerships for the Goals
Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

2 Categorization of Red List of Threatened Spieces Tokyo

Category Name	Mark	Basic Concept
Extinct	EX	The species which is identified to have inhabited in the past in the relevant areas but is considered to have already become extinct including those in captivity or cultivation.
Extinct in the Wild	EW	The species which is identified to have inhabited in the past in the relevant areas and to survive in captivity or under cultivation but considered to have already become extinct in the wild.
Critically Endangered + Endangered	CR+EN	The species which have difficulty in surviving in the wild in the case where pressing factors that have brought the current situations continue to act.
Critically Endangered	CR	The species which is highly likely to become extinct in the wild in the immediate future.
Endangered	EN	The species which is highly likely to become extinct in the wild in the near future although to a lesser extent than those in Critically Endangered.
Vulnerable	VU	The species which is considered to certainly shift to the rank of “Critically Endangered＋Endangered” in the near future in the case where pressing factors that have brought the current situations continue to act.
Near Threatened	NT	The species that have elements to be ranked higher according to changes in inhabitation conditions, although the degree of risk is little at present.
Data Deficient	DD	The species which does not have information enough to judge its rank, although it has attributes that can be easily shift to the category of threatened species according to changes in environmental conditions.
Species requiring attention	*	Although the species has not reached to Near Threatened level, as its population is relatively small and could be easily reduced due to the following reasons (selection reasons from ① to ⑥) attention needs to be paid for its trend. <Selection reasons> ①There is a risk of decrease in the population size of the species due to reduction or deterioration of habitats. ②There is a risk of decrease in the population size of the species because of shrinkage and isolation of the population Due to restriction or fragmentation of habitats ③While the population size of the species has been maintained through artificial environmental consideration, there is a risk of decrease in the population size of the species in the case where such artificial environmental consideration is lost. ④There is a risk of decrease in the population size of the species due to impacts by alien species. ⑤As the species requires special environmental conditions in its total or partial life cycle, in the case where such special environments are lost, there is a risk of decrease in the population size of the species ⑥ Although the population size of the species has been regained due to restoration of the environments that used to be deteriorated, as the status of such environments are unstable, there is a risk of decrease in its population size.
Unranked	○	The species that does not fall under the categories mentioned above, although its habitats are confirmed in the relevant area.
No Data	—	Although there is a possibility that the species inhabits (used to inhabit) in the relevant area, no reliable record or information could be obtained.
Non-distribution	・	The species that is believed not to have been distributing in the relevant area originally due to ecological and geological history reasons. However, as for birds, even if there are confirmation records, in the case where the region is not determined to be their main habitat, such birds were treated as non-distribution.

3 Appeal for Opinions (Public Comments)

Application Period for Appeal for Opinions

From July 26 to August 26 of 2022

Implementation Method

Publicizing revision on Tokyo Biodiversity Strategy (interim report) on the website of Tokyo Metropolitan Government, Bureau of Environment.

Implementation Results

Total number of persons who submitted opinions 25 persons, Total number of opinions 130 opinions

Summary of Opinions and Approaches by the Tokyo Metropolitan Government

The approaches by the Tokyo Metropolitan Government to the opinions it have received have been publicized on the following website.

The website of the Tokyo Metropolitan Government, Bureau of Environment
(https://www.kankyo.metro.tokyo.lg.jp/index.html)

4 Consideration Process for Revision on Tokyo Biodiversity Strategy

Date	Name	Contents
December 17, 2019	Tokyo Metropolitan Government Natural Environment Conservation Advisory Council (main council)	Points for advisory Overview of revision on Tokyo Biodiversity Strategy
December 17, 2019	1st Study Meeting for Revision on Biodiversity Strategy	Consideration of directivity for revision on Tokyo Biodiversity Strategy
February 5, 2020	2nd Study Meeting for Revision on Biodiversity Strategy	Consideration of directivity for revision on Tokyo Biodiversity Strategy
February 28, 2020	3rd Study Meeting for Revision on Biodiversity Strategy	With regard to natural characteristics of Tokyo
Due to spread of COVID-19 pandemic, holding of Study Meetings were suspended.		
November 27, 2020	4th Study Meeting for Revision on Biodiversity Strategy	Status quo and issues of Tokyo biodiversity Future visions of Tokyo
February 28, 2021	5th Study Meeting for Revision on Biodiversity Strategy	Status quo and issues of Tokyo biodiversity Future visions of Tokyo
June 30, 2021	6th Study Meeting for Revision on Biodiversity Strategy	Consideration of the zero draft of revision on Tokyo Biodiversity Strategy (draft)
Implementation of appeal for opinions on future visions of Tokyo ＜from August 5 to October 10 of 2021＞		
November 11, 2021	7th Study Meeting for Revision on Biodiversity Strategy	Overview of results of appeal for opinions Structure and description contents of Tokyo Biodiversity Strategy
February 17, 2022	8th Study Meeting for Revision on Biodiversity Strategy	Consideration for revision on Tokyo Biodiversity Strategy (preliminary draft)
March 28, 2022	9th Study Meeting for Revision on Biodiversity Strategy	Consideration for revision on the targets of Tokyo Biodiversity Strategy
June 24, 2022	10th Study Meeting for Revision on Biodiversity Strategy	2030 Targets Consideration for revision on Tokyo Biodiversity Strategy (interim report) (preliminary draft)
July 25, 2022	Tokyo Metropolitan Government Natural Environment Conservation Advisory Council (main council)	Report on revision on Tokyo Biodiversity Strategy (interim report) (draft)
Appeal for opinions (public comments) to revision on Tokyo Biodiversity Strategy (interim report) <from July 26 to August 26 of 2022>		
November 24, 2022	11th Study Meeting for Revision on Biodiversity Strategy	Overview of results for appeal for opinions (public comments) Consideration for revision on Tokyo Biodiversity Strategy (preliminary draft for report)
December 26, 2022	Tokyo Metropolitan Government Natural Environment Conservation Advisory Council (main council)	Consideration for revision on Tokyo Biodiversity Strategy (report)

5 Study Organization for Revision on Tokyo Biodiversity Strategy and Member List

(honorifics omitted)

Organization	Category for selection	Name	Name of title	Remarks
Study Meeting for Revision on Biodiversity Strategy	Members of Tokyo Metropolitan Government Natural Environment Conservation Council Planning Group	Ayumi Arai	Professor of Tokyo University of Agriculture	
		Nobuo Onaka	Member from Tokyo resident	Served until June of 2021
		Ikuyo Saeki	Associate Professor of University of Tsukuba	Chairperson (serving as Chairman from July of 2021)
		Masakazu Suzuki	Honorary professor of University of Tsukuba	Chairperson (served as Chairman until June of 2021)
		Seiji Tsuji	Member from Tokyo resident	Served until June of 2021
		Isao Haga	Member from Tokyo resident	Serving from July of 2021
		Kanae Hosono	Member from Tokyo resident	Serving from July of 2021
	Temporary Members of Tokyo Metropolitan Government Natural Environment Conservation Council Planning Group	Tomohiro Ichinose	Professor of Keio University	
		Akio Shimomura	Professor of Kokugakuin University	Serving from July of 2021
		Shinichi Suda	Research Project Collaborator of The University Museum, The University of Tokyo	
	Technical Advisor	Hiroshi Ishihara	Head of Planning Section, Keidanren Committee on Nature Conservation	Served from December of 2019 to February of 2022
		Yumiko Tsuruta	Counselor of (Public Interest Incorporated Foundation) Nature Conservation Society of Japan (NACS-J)	
		Hatsuo Sato	Representative Director of Incorporated Non-profit Organization Council for Outdoor & Nature Experiences	
		Rumi Sato	Representative Director of Incorporated Non-profit Organization Green Connection TOKYO	
		Makoto Haraguchi	Counselor of (General Incorporated Association) Japan Business Initiative for Biodiversity	
		Kazuo Yoshida	Acting Secretary-General of Keidanren Committee on Nature Conservation	Serving from October of 2020

※Names of titles when the members were appointed.

6 Glossaries

Japanese ”a" column

Subalpine Coniferous Forest Zone

In Tokyo, the zone(vegetation zone) is seen in subalpine zone of 1,800 m or more above sea level mainly including Mt. Kumotori and coniferous forests focusing on Abies veitchii Lindl, Picea jezoensis var. hondoensis and Tsuga diversifolia etc. inhabit.

Urban Park Rangers

Urban Park Rangers are the rangers of NCY Park Services to help New Yorkers and visitors of all ages to discover and explore NYC’s natural world through environmental education, outdoor recreation, wildlife management, and active conservation, who have more than 40 years and more history since 1979.

Class A river systems and Class B river systems

Class A rivers: Rivers that are part of river systems considered to be particularly important for the maintenance of the land or national economy. These rivers are designated by the Minister of Land, Infrastructure, Transport and Tourism.

Class B rivers: Rivers that are part of river systems, not part of Class A rivers, but considered to be particularly important for the interests of the public. These rivers are designated by the governors of prefectures. Management of these rivers is conducted by the governors of prefectures.

Genetic Resources

Generic resources are the raw materials derived from all organisms including plants, animals and microorganisms and have realistic or potential values, which are used for development of pharmaceutical products and breed improvement in agricultural products and include not only the ones having been used currently but also the ones that will be potentially used.

Water footprint

Water footprint is the method to measure quantitively potential environmental impacts related to water use in the entire lifecycle from cultivation and production of raw materials, manufacturing, process, transportation, distribution, consumption, waste and recycling.

Rainwater Infiltration/Rainwater Infiltration Inlet

Rainwater infiltration refers to rainwater infiltrating into the ground.

Rainwater infiltration inlet is a bucket shaped “inlet” buried in the ground in order to receive rainwater flowing from rain gutter etc., which has the structure to infiltrate rainwater from the hole on the side or on the bottom into the ground. By installing rainwater infiltration inlet, not only the amount of ground water and spring water can be recovered but also flood damages can be reduced due to mitigation of rainwater amount flowing into sewerage pipe and rivers upon heavy rainfall.

Rainwater Storage

Rainwater storage refers not to have rainwater flow out but to store by taking the time. By developing rainwater storage facilities such as a rain garden etc. Rapid discharge of rainwater into the sewage is prevented at the time of torrential rain.

Nutrient Cycle

Nutrient cycle refers to the material cycle of nutritive salts including nitrogen and phosphorus etc. in ecosystems and on a global scale.

Ecotourism

Ecotourism refers to the tourism that aims at leading to values and importance of region-specific attractiveness including natural environment, history and culture to tourists being understood and conserved by communicating such attractiveness across the entire community. The basic principles of Ecotourism Promotion Act are “conservation of natural environment”, “tourism promotion”, “regional development” and “utilization of tourism as opportunities for environmental education”.

Eco-Mark

Eco-mark refers to ecological label attached to the products that have been certified as having less burden on the environment and helpful for environment conservation throughout their lifecycle from “production” to “disposal” in a variety of goods (products and services).

Ecological Network

Ecological Network refers to the network of ecosystems to safeguard connection between habitat spaces of living things and their proper arrangement by organically link these by setting the areas with excellent natural environments as their core.

Ecological Footprint

Ecological footprint refers to ”the footprint that stamps ecosystems”, one of the methods to visualize and quantify the burden on the environment imposed by humans’ consumption lives. It is possible to express how much the consumption amount by humans exceed the amount of natural resources that the earth can produce as the number.

Edo Tokyo Vegetable

Edo Tokyo vegetables refers to the vegetables of the native species of Tokyo or the ones originating from traditional cultivation methods etc. from Edo Era to the middle of Showa Era (in the first half of 1940s) most of whose seeds and seedlings had been home raised or secured by neighboring seed agencies.

EDO-Midori Registered Green Spaces

The system by which the Tokyo Metropolitan Government registers and publicizes green spaces that are actively planting native species and working to conserve biodiversity.

Japanese “ka” column

Marine Terrace

Stepped flat areas seen near the shore, which were formed by relative and intermittent upheaval of the old sea bottom; some became flat by accumulation of deposit on the shallow sea bottom, while others became flat by erosion of the seashore by waves.

Cliff line

The cliff line is a series of cliffs that have been generated by the erosional effect of the rivers such as Tama River and the sea of Tokyo Bay for a long time. As the greenery of cliff lines preserves natural topography, exists in series in the cities beyond the borders of wards, towns and villages, it forms the framework of Tokyo’s greenery. Additionally, there are natural resources including a plenty of spring water and fauna and flora under the cliff lines, the greenery of cliff lines are valuable spaces for Tokyo as highly urbanized place.

Leverage Point

A leverage point refers to the point to produce large effects by small force likened to leverage. IPBES suggest the points at which intervention should be targeted in order to bring about social transformation. Leverage points are important to address a wide range of societal challenges including achievement of SDGs etc. as well as restoration of biodiversity through transformative change.

Draining of Water and Cleaning of Pond Bottom

Draining of water and cleaning of pond bottom in urban areas refers to temporarily draining water of ponds in the parks and exposing the bottom soil. By exposing the bottom soil to air by lowering water level, improvement of water quality can be expected and a variety of measures related to biodiversity including collection of garbage, extermination of alien species and restoration of aquatic plants.

Alien Species

Alien species refers to all species of living things including the ones artificially introduced out of the past and present distribution areas and became wild. Among such alien species, the ones that pose great impacts on the local natural environments and are likely to threaten biodiversity are called invasive alien species.

Invasive Alien Species Act

It is an abbreviated title of Act on the Prevention of Adverse Ecological Impacts Caused by Designated Invasive Alien Species and came into effect in June of 2005. The purpose of this Act is to prevent adverse impacts on ecosystems, human lives and bodies and agriculture, forestry and fisheries caused by designated invasive alien species and, doing so, to help stabilize and improve lives of the citizenry through contributions to conservation of biodiversity, human safety and sound development of agriculture, forestry and fisheries. It designates alien species originating from abroad that causes problems as designated invasive alien species and regulates its raising, growing, storing, carrying, importing, and other handling and controls it and the like.

River Terrace

The stepped topography that has elongated distribution in the basin of rivers. When the basin of river is elevated, the river flows by eroding a part of the conventional river bottom and the former river bottom remains as a flat surface which is one step higher than the flow channel. When elevation occurs intermittently several time, stepped terrace land is formed. On the surface of river terrace, the gravels and sand that used to spread on the river bottom distribute, and furthermore, Kanto loam layer deposit on such surface.

Carbon Half

Carbon Half refers to 50% reduction in greenhouse gas emissions. Tokyo Metropolitan Government declares 50% reduction in greenhouse gas emissions (compared to the ones in 2000) by 2030.

Summer-Green Broad-Leaved Forest Zone

The zone (vegetation) where broad-leaved trees whose leaves fall in winter grow. It is found in the northern part of temperate zones with significant seasonal changes and it consists of Japanese zelkova, chestnut trees and konara oak in Tokyo.

Subtropical Dry Scrub

The forest where endemic plants grow that have achieved evolution, such as changing their leaves into small and thick ones according to dry weather and making their height lower in order to avoid strong winds along the sea. It distributes mainly in Chichijima Island and Anijima Island of Ogasawara Islands.

Kanto Loam

Kanto Loam refers to the loam formed by volcanic ashes accumulated from Mt. Fuji and Mt. Hakone etc. (clay, silt and soil substances mixed with sand). Kanto Loam layer is the stratum where Kanto Loam accumulates, which has characteristics with a large permeability as there are gaps due to unique aggregated structure and widely distribute in plateaus and hilly terrain of Tokyo.

Climate Change Framework Convention

It is the abbreviation of “United Nations Framework Convention on Climate Change”. It is the convention which has an ultimate purpose of stabilization of greenhouse gas concentrations and in which international framework to prevent a variety of adverse impacts brought by global warming is

specified. It came into effect in March of 1994. The contracting states are obligated to establish the lists for emissions and absorptions of greenhouse gas and plan of countermeasures for global warming for each state.

Brackish Water

It is the area where river water and seawater are mixed together and is the transition belt of freshwater zone and seawater zone. It refers to the water zone with 0.5‰ to 30‰ of salt.

Green Infrastructure

It is an approach to utilize the diverse functions of natural environment as alternative means or supplementary means of artificial infrastructure and promote useful measures for natural environment, economy and society as a part of social capital development.

Green Purchasing

It refers to purchasing products and services whose environmental load is as low as possible from the business operators that strive to reduce environmental load by sufficiently considering necessity of purchasing and environment as well as quality and prices.

Green Finance

Among ESG finance, it refers to the funding to “E” contributing to solving environment issues, especially including reduction of greenhouse gas emissions and investment to renewable energy businesses etc.

Cool Island Effect

Massed greenery and waterfront in urban areas have cooling effects due to evapotranspiration and is known to have the effects to mitigate heat island of urban areas as “Cool Island” to lower the temperature compared to the one of surrounding urban areas.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

United Nations Educational, Scientific and Cultural Organization (UNESCO) is a specialized agency of United Nations based on the Constitution of United Nations Educational, Scientific and Cultural Organization“ (UNESCO Constitution) adopted in 1945. Its purpose is to promote international cooperation related to education, science and culture and contribute to world peace and safety.

Food and Agriculture Organization of the United Nations (FAO)

Food and Agriculture Organization of the United Nations (FAO) is a specialized agency of United Nations established in 1945. Its purpose is to improve nutrition level and living level of people of various countries, improve production and distribution of food and agricultural products and improve living conditions of residents of farm villages.

Endemic Species

When distribution of a certain species of living things is limited to a certain area, such species is called an endemic species. In marine islands distant from the continent such as Ogasawara Islands, there are many endemic species due to isolation by the sea.

Kunming-Montreal Global Biodiversity Framework

It refers to global goals related to new biodiversity on the succession of Aichi Targets, adopted in the 15th Conference of the Parties to the Convention on Biodiversity held in Montreal of Canada (COP15) held in December of 2022.

Japanese “sa” Column

Renewable Energy

It refers to the energy that always exists in nature as a part of earth resources such as solar power, wind power, geothermal energy, unlike fossil energy as limited resources such as petroleum, coal and natural gas, which contributes to energy security, as it can be produced domestically without greenhouse gas emissions.

Satochi-Satoyama

Satochi-Satoyama is locate in the middle of wilderness and urban areas, which consists of settlements and secondary forests surrounding them, farmlands, reservoirs and grasslands mixed with them and can be found mainly in Tama area in Tokyo.

Supply Chain

It refers to the connection of supply process including production, process and distribution, from extraction of resources as raw materials to delivery to the end consumers as products. Domestic production activities have impacts on the environments inside and outside of Japan through supply chain. It is required to construct sustainable supply chain in order to utilize natural resources in the future.

Surveillance

It refers to systematical collection, analysis and interpretation of data required for planning, implementation and assessment of measures against diseases and prompt and regular return of the results thereof through continuous monitoring of incidence of diseases and their transition etc., which is used for prevention and control of diseases.

Hydrarch Forest

It is the forest with trees that reach up to 20m that distribute in the cloud belt with a high altitude of Hahajima Island of Ogasawara Islands, which consist of Elaeocarpus photiniaefolius and Planchonella obovata etc.

Gibier

Meat of wild birds and mammals including wild boars, deer and bears etc. obtained as food ingredients by hunting is called gibier in French.

Act on Conservation of Endangered Species of Wild Fauna and Flora

”Act on Conservation of Endangered Species of Wild Fauna and Flora” (Act on Conservation of Species) came into effect in April of 1993 in order to conserve endangered species of wild fauna and flora. This Act prescribes the measures necessary to conserve wild living things that inhabit and grow in Japan or the rare ones originating from abroad. As for rare wild living things that inhabit and grow in Japan, among the species that are threatened to become extinction listed in Red List of Ministry of Environment (Critically Endangered+Endangered, Vulnerable), the ones whose inhabitation and growth situations are interfered by human impacts are designated as nationally rare species wild fauna and flora and take measures necessary for conservation such as carrying out restrictions on handling individuals, safeguard of habitats and businesses for protection and breeding etc.

Dredging

It refers to removing deposited sludge and earth and sand on the bottom of ports, bays and rivers. It is conducted in order to secure water depth required for water purification and vessel navigation etc.

Laurel Forest

It refers to the forest whose dominant species are evergreen broad-leaved trees including Japanese chinquapin and evergreen oak and located at the places from subtropical zone to warm-temperate zone.

Food Self-Sufficient Rate

It refers to the rate of food produced in Japan that accounts for the food supplied throughout Japan.

The index that indicate the rate of domestic production to the calorie supplied to Japanese people (total supplied calorie) focusing on energy (calorie) as basic nutritive value is called calorie-based food self-sufficiency rate.

The index that indicate the rate of domestic production to the production value of food supplied to Japanese people (supplies for domestic consumption of food) focusing on economic value is called production-value-based food self-sufficiency rate.

Zoonosis Diseases

Zoonosis diseases refer to the infectious diseases that both humans and vertebrate animals other than humans suffer from by identical pathogens.

Forest Environment Transfer Tax

Since 2019, it has been transferred to municipalities and prefectures as financial resources for forest maintenance by municipalities by being divided in line with objective standards according to areas of private artificial forests, workers engaged in forestry and population.

Water Resource Conservation Function

Water resource conservation function of forests consists of the functions including storage of water resources, mitigation of flood and water purification and refers to functions of forests to level flow of rainfall into rivers or create delicious water.

Marine Eco-Label

It refers to the system to display the label on the products to fishery products caught and produce with consideration for ecosystems and sustainability of resources, in order that consumers can select to purchase such products. The representative ones include MEL certification and MSC certification.

Closed-Loop Recycling

It refers to the recycling to produce identical products by using used products as raw materials; or example, production of plastic bottles by using used ones as raw materials.

Ex-situ Conservation

It refers to the method to avoid extinction of living things by protecting and breeding them outside of their natural habitats. It is also called conservation outside habitats.

Basic Act on Biodiversity

The purpose of Basic Act on Biodiversity is to conserve abundant biodiversity and to realize a society living in harmony with nature where human beings can continue enjoying benefits therefrom in the future by promoting policies related to conservation and sustainable use of biodiversity in a comprehensive and systematic manner. It was established in May of 2008 and enforced in June of the same year.

In Basic Act on Biodiversity, basic approaches necessary including basic principles related to conservation and use of biodiversity, establishment of national biodiversity strategy, preparation of white papers and 13 basic policies that the Government should implement upon promoting biodiversity policies were presented.

Additionally, responsibilities of local governments, businesses, citizens and private bodies as well as the Government and obligations to make effort for establishment of regional biodiversity strategies by prefectures and municipalities are prescribed in the Act.

National Biodiversity Strategy 2023-2030

National basic plan related to conservation and sustainable use of biodiversity based on Convention on Biological Diversity and Basic Act on Biodiversity. After establishing the first national biodiversity strategy in 1995, it has been reviewed five times and National Biodiversity Strategy 2023-2030 was approved by the Cabinet in March of 2023.

Convention on Biological Diversity (CBD)

Convention on Biological Diversity is the convention adopted in 1992 in accordance with United Nations Conference on Environment and Development (the Earth Summit) due to increasing sense of crisis to global ongoing extinction of species in 1980s and loss of biological resources essential for survival of

human beings etc. Its purposes are “conservation of biodiversity”, “sustainable use of its components”, and “fair and equitable sharing of benefits arising from the use of genetic resources”.

Regional Biodiversity Strategy

Basic plan related to conservation and sustainable use of biodiversity. Obligations to make effort for establishment of regional biodiversity strategies by prefectures and municipalities are prescribed in Basic Act on Biodiversity.

Biomimicry

It also refers to biomimetics. It means the techniques to mimic products, organs and functions of living things and conduct artificial design and synthesis by obtaining hints from them.

Principles for Responsible Investment (PRI)

They are the principles for investment that indicate that ESG elements could influence investment performance and promote to incorporate ESG elements into investment. They were led by then United Nations Secretary-General Kofi Annan, United Nations Global Compact (UNGC) and United Nations Environmental Program (UNEP) Finance Initiative served as the secretariat, and established by the group of international institutional investors and launched in 2006. The number of signatories has been expanding from 63 at the year of launch to over 5,000 as of 2022.

Alluvial Fan

It refers to the fan shaped topography spreading whose top is the point where rivers flow out from mountain terrain to plain. As the flow of rivers become suddenly gentle and their carrying capabilities diminish, sand and gravels are deposited.

Japanese “ta” column

The Sixth Mass Extinction

There were five times of “mass extinction” when a lot of living things become extinct at the same time, during which it is supposed that a lot of living things including trilobites and dinosaurs and that such extinction was caused by environmental changes including volcanic eruption and meteorite impact etc. While such extinction in natural conditions takes several tens of thousands years to several hundreds of thousand years, the current extinction having been caused by human activities has been advanced at an extraordinary pace compared to in the past, which is calls “The Sixth Mass Extinction”.

Circular and Ecological Economy

The "Circular and Ecological Economy" is a concept that aims to maximize the vitality of each region by forming a self-reliant and decentralized society while maximizing the use of regional resources such as beautiful natural scenery, and by complementing and supporting each other's resources according to regional characteristics. The fifth Basic Environmental Plan (2018) proposed "Circular and Ecological Economy" utilizing the SDGs' concept of integrated improvements to multiple issues.

Global Biodiversity Outlook 5 (GBO5)

Global Biodiversity Outlook 5 (GBO5) is a report that analyzes the existing research results and data related to biodiversity, including the previous GBOs, the national report submitted by countries and IPBES assessment and analyzes achievement status of Strategy Plan for Biodiversity 2011-2020 and Aichi Targets. It became basic data to provide scientific information for consideration process of Kunming-Montreal Global Biodiversity Framework adopted in December of 2022.

Local Production for Local Consumption

Local production for local consumption refers to consume locally what is produced locally. Local production for local consumption of food brings positive effects for improvement of food self-sufficiency rate and effects to reduce environmental road such as reduction of CO2 emissions through reduction of so-called “Food Mileage”.

Chert

It refers to a sedimentary rock whose main component is silicon dioxide. It is often composed of silicon dioxide precipitated in sea water or gathered shells of living things including diatom and Radiolaria etc. There are many chert layers in the stratum of Paleozoic Era of Japan, which include fossil of silicon dioxide Radiolaria. It has been utilize as stone materials for decoration and used to be utilized as flint in old times.

Telecoupling

It refers to interactions that occur between consumption activities at a certain area and natural environment at a distant area. For example, consumption of products that use imported agriculture, forestry and fishery products and overseas natural resources as raw materials have impacts on the overseas natural environment. On the contrary, if overseas natural environment changes, such changes also have impacts on consumption activities in Japan. In recent years, due to increase in amount of trade and globalization, such interactions have been strengthened.

Traditional Knowledge/Regional Knowledge

Traditional knowledge refers to conventional knowledge and wisdom that have been handed down through many generations. Regional knowledge refers to the knowledge and wisdom specific to regions that have been fostered by the people living in the region. Convention on Biological Diversity and Nagoya Protocol recognize close connection between traditional local communities etc. and biological resources and specify equitable sharing of benefits arising from use of traditional knowledge. It is supposed that while management methods suitable for regional conditions by local communities etc. are in harmony with and contribute to conservation of biodiversity, knowledge associated with management has been lost.

Tokyo Metropolitan Government Eco Agricultural Product (Tokyo Metropolitan Government Eco Agriculture Product Certification System)

"Tokyo Metropolitan Government Eco Agriculture Product Certification System" is a system that the Tokyo Metropolitan Government certify the agricultural products produced by reducing chemical pesticide and chemical fertilizer. The agricultural products certified by this system are attached with certification mark as "Tokyo Metropolitan Government Eco Agricultural Product" and sold in direct sales etc.

Tamasanzai as trees of Tokyo

The lumber grown in Tama area in Tokyo and produced in the district is called "Tamasanzai". The ones that are produced in properly maintained forest in Tama area and whose production sites are proved by "Tamasanzai Certification Council" become "Certified Lumber".

Designated Invasive Alien Species

Alien species (alien species originating from abroad) that have or are likely to have adverse impacts on ecosystem, human life and body, and agriculture, forestry and fisheries are designated as Designated Invasive Alien Species.

Designated Invasive Alien Species are limited to living ones and include eggs, seeds and organs etc.

Specially-Cultivated Agricultural Products

They refer to the agricultural products which are cultivated with 50% or less of the number of uses of reduction-target agrichemicals and 50% or less of nitrogen components contained in chemical fertilizers, compared to those used conventionally to produce vegetables in the area (reduction-target agrichemicals that are conventionally conducted in various areas and use status of chemical fertilizers).

Soil Formation

Soil is composed of organic materials including rock eluvium and remains of living things. Soil is formed through rocks and remains of living things as base materials having impacts including climate, plants and soil organisms, and topography etc. Micro-organisms including soil organisms such as earthworm, collembolan and mite and bacteria, fungi and protozoan etc. play a significant role.

Japanese "na" column

National Trust

It refers to an activity by which citizens safeguard their familiar nature and historical environment purchase by their own money and hand down to the next generation.

Japanese Oak Wilt

It is a wood disease that withers konara oak and Chinese evergreen oak, which has become a problem in Tokyo in recent years. Platypus quercivorus as a forest pest enters into a trunk, which causes it to wither by propagating fungus (Raffalea quercivorus) and inhibiting the functions of trees to absorb water.

Nature Positive

Kunming-Montreal Global Biodiversity Framework suggested to halt and reverse biodiversity loss and take urgent actions to put biodiversity on a path for recovery" as 2030 mission. This concept is called "Nature Positive". National Biodiversity Strategy 2023-2030 established in 2023 set realization of Nature Positive as a target.

Japanese "ha" column

Biophilic Design

Biophilic Design refers to the method of space design that reflects the concept of biophilia that "humans have inherent need 'to seek connections with nature'". By reflecting this concept as space design, it is supposed that "increase in happiness level", "improvement of productivity" and "improvement of creativity) can be expected.

Biomass

It refers to organic resources derived from organisms, including lumber, food waste, livestock wastes and sewage sludge etc. (excluding fossil resources), converted from the concept of mass(mass) of biological resources (bio). While fossil resources are limited resources that have been accumulated for hundreds of millions of years, as biomass is recyclable resources generated by plants' photosynthesis, there is a characteristics that the amount of CO_2 in the atmosphere is not increased in human lifecycle (carbon neutral). Accordingly, if the energy and products derived from petroleum could be effectively replaced with biomass, CO_2 emissions could potentially be reduced.

Haplotype

It is a kind of genotype and refers to the base sequence (genetic information) of haploid of gene (gene inherited from either of parents). It is used for system analysis of local groups and becomes essential information to conserve diversity of gene.

Biotope

It refers to a geologically minimum unit with environmental conditions where specific assemblage of living things can live. It is a German compound word whose etymology is bio (life, living things) and topos (place, space) in Greek. In Japan, it is often used as a general term to indicate spaces for living things created by environmental restoration and it is found that school biotope and kindergarten biotope, and biotope creation to restore local familiar environment by the administration and citizens can be seen spreading throughout Japan.

Heat Island Phenomenon

It refers to the phenomenon that urban experiences locally high temperature. The temperature becomes higher toward the central area of the city compared to the suburbs and it was

named as heat island because the shape of isotherm looks like an island.

Non-cognitive Abilities

While cognitive abilities refer to intellectual abilities including knowledge, skills and thinking skill etc., non-cognitive skills include motivation, will, abilities to become conscious and overlook and abilities to cooperate with others etc., which is fostered during infancy, school period and puberty. Hands-on nature learning and education utilizing natural environment are effective to cultivate non-cognitive abilities. Additionally, cognition and non-cognition are considered to be related and support mutually.

Hypoxic Water Mass

Water Mass in oxygen deficiency that is caused by oxygen consumption when massive dead cells of plankton that sank to the bottom of the sea and organic substances within sludge were decomposed with the bacteria. It occurs in summer when it is difficult for seawater to circulate between upper layer and lower layer.

In Tokyo Bay, especially inner part of Tokyo Bay, hypoxic water mass is formed in a wide range and for a long time every summer, which is one of the causes to impede habitats of aquatic organisms.

Eutrophication

It refers to the phenomenon where concentrations of nutrient salts such as nitrogen and phosphorus etc. in the water of lakes and mashes and sea areas are increased and production activities of phytoplankton etc. in the water become increased. Excessive eutrophication causes the red tide where planktons abnormally emerge.

Fossa Magna

Fossa Magna means “great cave” in Latin. It refers to belt-shaped area that crosses the central part of mainland nearly from south to north, where volcanic activities are active. It is supposed that western margin is Itoigawa-shizuoka tectonic line, while the western side has the width up to Kanto Mountains.

Food Bank/Food Drive

Food Bank refers to the activities by NPOs etc. to accept the food having difficulties for regular sales although its quality has no problem from food manufacturers for free and provide such food to various welfare facilities, groups and poor individuals without charge or the group that conduct such activities.

Food Drive refers to the activities to collect remaining food at home and donate such food to local Food Bank etc.

Planetary Boundary

Limit of the Earth (Planetary Boundary) was proposed by Johan Rockström etc., the director of Stockholm Resilience Center of Sweden, as one of the methods to objectively evaluate the impact on global system from human activities. According to their research results, it is pointed out that Genetic diversity, Phosphorus and Nitrogen are placed in the Zone of High Risk, and as for Climate Change and Land-system change, there is an analysis that they have reached the Zone of Uncertainty/Danger.

Plantation

It refers to a large-scaled farmland which is mainly located in the tropical zone and subtropical zone and is engaged in mass-production of a single special agricultural product including oil palm, coffee, gum and cotton flower etc.

Protection Forest

Protection forest refers to a forest designated by the Minister of Agriculture, Forestry and Fisheries or prefectural governors in order to achieve specific public interest purposes including watershed cultivation, prevention of landslide and other disasters, prevention and formation of living environments etc. In protection forests, tree trimming and change of land character etc. have been restricted in order to secure functions of forests according to respective purposes.

Japanese “ma” column

Buried Seeds

They refer to the seeds with in a dormant state while maintaining germinability in soil. Some of them maintain their life time of 100 years or more in soil and then germinate again. In some cases, even the plants have no longer seen at present, their buried seeds that used to inhabit in homestead forest that survive for a long time may remain.

Musashino Plateau

It refers to the plateau which spreads in the area surrounded Arakawa River and Iruma River in the north, and Tama River in the south.

Japanese “ya” column

Yato/Yatoda (Vally/Paddy Fields in the Valley)

Yato (Valley) is a recessed, gentle topography formed by erosion of hilly terrain. In the valley properly taken care and maintained by humans, diverse environmental elements including forests, grasslands, marshlands, reservoirs and channels etc. are arranged in a mosaic shape, which are habitats for abundant biota. On the bottom of gentle valley of valley, marshlands by spring water distribute, which is often utilized as paddy fields and is called Yatoda (Paddy Fields in the Valley).

Japanese ”ra” column

Ramsar Convention

Ramsar Convention is the convention relate to wetlands which was adopted in the international conference held in Ramsar of Iran on February 2 of 1971. While its formal name is “The

Convention on Wetlands of International Importance Especially as Waterfowl Habitat", being associated with its adopted site, it is generally called "Ramsar Convention".

In this Convention, in order to promote conservation of internationally important wetlands and fauna and flora which inhabit there, each contracting state designate one or more internationally places within its territory, register them to the secretariat of the Convention and it prescribes the measures etc. that each contracting state should take for conservation of wetlands and promotion of their wise use.

Land Snails

They refer to shellfish including snail whose main living space is land. Their shapes are suitable for living on the land as shellfish as they have functions to prevent drying including thick shells and mucous membranes, and lungs. As their mobilization abilities are low and they are weak for environmental changes such as drying, they cannot go over the sea or drying areas and speciation occurs to many of them through local separation. In Ogasawara Islands, 95 species of land snails excluding alien species have been confirmed, among which 88 species are endemic ones.

Rain Garden

It refers to vegetation space to temporarily stores the rainwater that falls on the asphalt and roofs and infiltrate such rainwater over time and is also called "Ameniwa". By developing a lot of small-scale green lands in garden of residences, squares, planted zones and roofs of buildings etc., they prevent rainwater rapidly flowing into sewage at the time of torrential rain. Additionally, through creation and conservation of ecosystems, a variety of effects by such rain gardens have been confirmed, such as restoration of wild living things in urban area and mitigation of heat island, improvement of water quality and provision of places for residents' community.

Resilience

It refers to the concept to indicates abilities to recovery of social system and ecological system against natural disasters and climate change. As a general term, while it indicates abilities to recover in the case where people face difficulties and has been used in all fields including psychology, it has come to be used in disaster management and environment in recent years. In ecological meaning, it means that natural ecosystem has environmental stability such as restoring abilities or flexibility.

Red List

Red List refers to the data indicated the status quo of wild living things at the risk of extinction for each category that represents the degree of risk. While it is prepared by International Union for Conservation of Nature and Natural Resources (IUCN) on the international level, it is prepared by Ministry of Environment on the national level, and by each local government including the Tokyo Metropolitan Government on prefectural level.

Japanese "wa" column

Workation

It is a coined word of Work and Vacation. It refers to work by utilizing remote work while enjoying leisure time in the different places from ordinary workplace, such as resort areas, hot spring and national parks etc.

One Health Approach

It is the concept that the persons concerned collaboratively work on the resolutions for cross-sectional issues related to hygiene of humans, animals and environment. As human beings' health is integral with that of animals including domestic animals and sound natural environment, conservation of nature is becoming even more important in order to reduce infectious diseases and protect humans' health as well.

Abbreviation

30by30 (Thirty by Thirty)

It refers to the goals to effectively conserve 30% or more of land and sea as sound ecosystems by 2030. It is presented as major targets of Kunming-Montreal Global Framework.

CDP

CDP is an international NGO whose headquarter is located in London of England. As agents for institutional investors of pension fund etc. and large-scale customer enterprises, by sending questionnaires to companies and local governments, it disclose the contents of their answers and assign ratings for them.

CSR (Corporate Social Responsibility)

It refers to corporate actions to take responsibility for the impacts of the companies' businesses in order for they coexist with society and environment and seek for sustainable growth.

EbA

Utilization of biodiversity and ecological services as a part of comprehensive adaptation strategies against climate change is called "Ecosystem-based Adaptation (EbA)". Adaptation measures utilizing ecosystems include prevention of landsides by developing forest, reduction of damages by typhoons and storm surge by conservation of coral reef and development of coastal disaster prevention forests and mitigation of heat by transpiration of trees and green shade etc.

Eco-DRR (Ecosystem-based Disaster Risk Reduction)

Ecosystem-based Disaster Risk Reduction (Eco-DRR) refers to the concept to avoid use and development of natural disaster-prone land, to reduce possibilities of suffering from disasters and to create disaster-resistant areas by sustainable management, conservation and reproduction of ecosystems.

ESG Finance (ESG Investment)

It refers to investment and lending with consideration for information on environments, society and governance of companies (non-financial information) as well as financial information. It enables investors and financial institutions to conduct medium to long term assessment and it is expected that ESG Finance will lead to sustainable growth of companies and economic society. Among ESG finance, the investment with consideration for ESG is called ESG investment.

IPBES

IPBES refers to Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES), which is an intergovernmental organization established in April of 2014 as platform to scientifically assess the trend related to biodiversity and ecosystem services and to strengthen connections between science and policies. As of June of 2021, 137 nations participate in IPBES and researchers from all over the world participate in preparation of its reports. Due to examples of IPCC that promote similar activities in the field of climate change, it may be called IPCC of biodiversity version.

IPCC

IPCC refers to Intergovernmental Panel on Climate Change (IPCC), which is an intergovernmental organization established in 1988 by United Nations Environmental Program and World Meteorological Organization. Several thousand researchers participate in preparation of its reports. From scientific, technological and social economic standpoint related to global warming, it provide policy makers with comprehensive assessment.

IUCN

IUCN refers to International Union for Conservation of Nature and Natural Resources. It was established in 1948 and consists of nations, governmental organizations and international and domestic non-governmental organization members. In cooperation with organizations of United Nations including United Nations Environmental Program (UNEP), United Nations Educational, Scientific and Cultural Organization (UNESCO), and World Wide Fund for Nature (WWF), it protect wildlife, conduct research and study concerning natural environment and natural resources and provide support for developing areas etc., and regularly publicize red lists etc. that cover wildlife in the world that is threatened to become extinct.

NbS

Nature-based Solutions (Nbs) refers to the concept to sustainably use the functions that nature have and link such functions to solutions for diverse societal challenges. In the definition of IUCN, it states that “Nature-based Solutions are actions to protect, sustainably manage, and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits”. It is an approach to address societal challenges including climate change and natural disasters and contribute to both human well-being and conservation of biodiversity.

OECM

Other Effective area-based Conservation Measures (OECM) refers to the areas that consequently lead to contribution to conservation of natural environment by the area that have been conserved by the efforts of private entities etc. and management whose purpose is not conservation as well.

SBTs for Nature

Science Based Targets for Nature, SBTs for Nature refers to measurable, actionable and time-bound targets, rooted in the best available science that allow companies to act along social sustainability targets within planetary boundaries, with regard to system where water, biodiversity, land and ocean on the value chain mutually relate.

SDGs

Sustainable Development Goals (SDGs) is a set of international development goals from 2016 to 2030, which is described in the 2030 Agenda for Sustainable Development (the 2030 Agenda) unanimously adopted by the contracting states of the UN Sustainable Development Summit held in September 2015 building, on the succession of Millennium Development Goals (MDGs). It consists of 17 goals and 169 targets and pledges “Leave no one behind” on the earth.

TNFD

Taskforce on Nature-related Financial Disclosures (TNFD) refers to an international organization established in order to construct risk management and disclosure framework of companies relating to natural capital etc. TNFD was conceived in 2019 World Economic Forum Annual Meeting as the framework following Taskforce on Climate-related Financial Disclosures (TCFD), aiming at constructing information disclosure framework related to nature related risk from viewpoint of making flow of funds shift to nature positive.

Provision of Photographs and Data
(Japanese syllabary order, titles omitted)

As the following persons provided photographs and data, we would like to express our sincere gratitude by listing their names.

(Individuals)
Kaoru Uchiyama, Michishige Otake, Nariko Oka, Kazuo Kasuya, Koji Kataoka, Hideto Kita, Chisato Suzuki, Jun Nakajima, Keisuke Nagai, Yukio Horiguchi, Ai Yagi, and Hitoshi Watanabe

(Groups)
Akishima City, Asama Shrine, Izu Oshima Geo Park Promotion Committee, Ome City, Ota Ward, Ogasawara World Heritage Centre, Green Wise Co., Ltd., TAKENAKA CORPORATION, Fujikura Ltd., Ministry of the Environment, Japan Meteorological Agency, International Union for Conservation of Nature and Natural Resources (IUCN), Ministry of Land, Infrastructure, Transport and Tourism, Geospatial Information Authority of Japan, Kokubunji City, National Diet Library, Kodaira Folktale Association, Kobushi UNESCO Biosphere Reserve Promotion Council, Japan Wildlife Research Center, Forestry and Forest Products Research Institutes, Setagaya Ward, OMY Area Management Association, Tokyu Land Corporation, Bureau of Construction Tokyo Metropolitan Government, Tokyo Metropolitan Park Association, Bureau of Port and Harbor Tokyo Metropolitan Government, Bureau of Industrial and Labour Affairs Tokyo Metropolitan Government, Tokyo Metropolis Nature Protection Instructor (Tokyo Rangers), Bureau of Waterworks Tokyo Metropolitan Government, Office of the Governor for Policy Planning Tokyo Metropolitan Government, Bureau of General Affairs Tokyo Metropolitan Government, Tokyo Metropolitan Islands Area Research and Development Center for Agriculture, Forestry and Fisheries, Bureau of Urban Development Tokyo Metropolitan Government, Tokyo Development Foundation for Agriculture, Forestry and Fisheries, Tokyo Metropolitan Library, Tokyo Zoological Park Society, NPO birth, Nishi Tokyo City, Nippon Koei Co., Ltd., The Nature Conservation Society of Japan, Wild Bird Society of Japan, Nerima Ward, Study Group on History of Agricultural Land Development in Japan, Ministry of Agriculture, Forestry and Fisheries, Hachioji City, Mitsui Sumitomo Insurance Company Limited, Minato Ward, Mori Building Co., Ltd., Yamashina Institute for Ornithology, Forestry Agency, Urban Renaissance Agency, and WWF Japan

April 2023 Environmental Document No. 35039

Tokyo Biodiversity Strategy 2030

Edited/Published by Planning Section, Natural Environment Division,
Bureau of Environment, Tokyo Metropolitan Government
8-1 Nishishinjyuku 2-chome, Shinjuku-ku, Tokyo 163-8001
TEL (03) 5388-3548
https://www.kankyo.metro.tokyo.lg.jp/en/index.html


TOKYO
METROPOLITAN
GOVERNMENT