Chapter I
Environmental Impact Assessments on Biodiversity and Contact with Nature

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Japan's Basic Environment Law (Law No. 91), enacted in 1993, recommends that environmental impact assessments be carried out as part of basic measures for environmental conservation. This formed the basis for the later enactment of the Environmental Impact Assessment Act (Law No. 81) in 1997.

The Environmental Impact Assessment Act stipulates procedures and approaches designed to ensure that environmental impact assessments are carried out appropriately and smoothly for large-scale projects that could have a serious impact on the environment. It requires that the project proponent conduct in advance proper surveys, forecasts, and evaluations of the impact that implementation of the project may have on the environment, inviting the opinions of the general public, local governments, and those with the authority to grant approvals and licenses in consideration of the views of the Minister of the Environment, in order to ensure that appropriate consideration is given to environmental conservation via procedures for reflecting these opinions in the approvals and licensing related to the project. It specifies 13 types of projects subject to environmental impact assessments, among them roads, dams, railways, airports, and power plants. A government ordinance was also issued to define for each of these categories the scope of projects with sufficient scale to potentially have a serious impact on the environment.

General concepts for selecting the required environmental impact assessment items as well as the survey, forecast, and evaluation methods for specifically advancing the Environmental Impact Assessment Act are defined in polices formulated via ministerial ordinances issued by the competent minister for each of the project categories defined in the government ordinance. Concepts that are common to all project categories are defined in "The Basic Matters relating to the Guidelines etc. to be Established by the Competent Minister in Accordance with the Provisions of the Environmental Impact Assessment Act" (the "basic matters). These basic matters are listed under four categories, three of which are environmental components subject to environmental impact assessments (maintenance of sound condition of natural components of the environment, ensuring biodiversity and systematic conservation of the natural environment, and beneficial contact between people and nature) and one (environmental loads) that cuts across all three of these categories in order to appropriately grasp the amount of load placed on the environment. The basic matters were later revised in June 2013 in the wake of the Fukushima Daiichi nuclear disaster to include a fifth category, radioactive materials in the general environment. Table 1-1 shows environmental components for each of these five categories.

Table 1-1. Scope of environmental components subject to the Environmental Impact Assessment Act

Maintenance of sound condition of natural components of the environment	Air quality	Ambient air quality, offensive odors, noise and infrasound, vibration, other
	Water quality	Water, sediment, groundwater, other
	Soil quality and other environmental components	Topography/geology, ground, soil, other
Ensuring biodiversity and systematic conservation of the natural environment*	Plants, animals, ecosystems	
Beneficial contact between people and nature*	Landscapes, places for activities with nature	
Environmental loads	Waste, greenhouse gases, etc.	
Radioactive materials in the general environment	Radiation quantity	

*Environmental components covered in this guide

Here, “natural components of the environment” includes a wide variety of elements that make up the natural environment, among them air, water, and soil. These are not only the components important for protecting human health and conserving the living environment in terms of the seven major forms of pollution (atmospheric pollution, water pollution, soil pollution, noise, vibration, ground subsidence, and offensive odors), but also components important for properly preserving the natural environment (hydrologic cycles, topography, geology). In addition to ambient air quality, noise and infrasound, vibration, and offensive odors, the “air quality” category includes an “other” designation for environmental components related to atmospheric and spatial conditions, such as wind damage. The “water quality” category includes water, sediment, and groundwater as well as an “other” category for things like thermal effluent and river discharge volume. The “soil quality and other environmental components” category lists topography/geology, ground, soil, and an “other” category that includes shading, shadows cast by windmills, and so on.

Ensuring biodiversity and systematic conservation of the natural environment (“biodiversity”) includes plants, animals, and ecosystems in recognition of the importance of conserving biodiversity and the ecosystems made up of diverse lifeforms that support it.

Beneficial contact between people and nature (“contact with nature”) includes landscapes—a concept that recognizes human beings as subjects in the sense that nature providing us with benefits is itself a critical component of the environment that must be preserved—as well as places where people can engage in activities with nature.

Environmental loads refers to identifying the amount of environmental impact something has. It includes waste and greenhouse gases, with the former including byproducts like soil displaced as a result of construction and other recyclable resources in addition to standard waste products.

Radioactive materials in the general environment is defined as “radiation quantity” in the sense that the status of environmental pollution from radioactive materials depends on the aggregate radiation from the different radioactive nuclides contained in various environmental components.

This guide will focus on plants, animals, and ecosystems that are part of the environmental components listed under “biodiversity”, and the landscapes and places for activities with nature components listed under “contact with nature”.

Note that the environmental components listed under “maintenance of sound condition of natural components of the environment” and “environmental loads” are separately covered in the *Technical Guide to Environmental Impact Assessments: Air Quality, Water Quality, Soil Quality, and Environmental Loads*, while radioactive materials in the general environment are covered in the *Technical Guide to Environmental Impact Assessments: Radioactive Materials*.

Reference: Environmental impact assessment systems under local governments

Local governments have their own unique environmental impact assessment systems. All of Japan’s prefectures and most of its cities designated by government ordinance have established these systems according to their local ordinances, and even non-designated cities, towns, and special wards are starting to set up environmental impact assessment programs based on their bylaws and guidelines.

Local government systems tend to target small-scale projects and other project categories that fall outside the scope of the Environmental Impact Assessment Act. They are tailored to local conditions and may involve the holding of public hearings to collect feedback from residents or the establishment of deliberation councils made up of experts and the like. The environmental components subject to environmental impact assessments under these local systems also include factors not targeted for environmental conservation under Japan’s Basic Environment Law in the Environmental Impact Assessment Act, such as disasters, traffic safety, community splits, electromagnetic interference, and cultural assets (other than those related to the natural environment). In this way, systems are being set up according to regional conditions from an environmental component standpoint as well.

1. Characteristics of biodiversity

1-1. Importance of biodiversity in environmental impact assessments

Japan is a long country running north-south, which places it across a broad range of climate zones ranging from subarctic Hokkaido to subtropical Okinawa. This results in a variety of landforms, geological conditions, and soil types—as well as differences in the way people use the land—which in turn gives the country an incredible amount of biodiversity. It is therefore comprised of biological communities containing species that reflect the various local environments and of diverse ecosystems whose characteristics match those local environments as well.

Article 14-2 of the Basic Environment Law stipulates as an objective "the protection of biodiversity, such as the diversity of ecosystems and wildlife species, and the orderly conservation of the various features of natural environment, such as forest, farmland, and waterside areas in accordance with the natural and social conditions of those areas." This is what is included in the scope of "environmental conservation" under the Environmental Impact Assessment Act. The Environmental Impact Assessment Act therefore calls for ensuring biodiversity and the systematic conservation of the natural environment, listing plants, animals, and ecosystems and components targeted for environmental impact assessments. Surveys, forecasts, and evaluations as well as investigations into environmental mitigation measures therefore target plant and animal species or communities that are important (primarily from a scientific perspective or because they are rare), focal habitat areas, and so on. Environmental impact assessments are also carried out on the ecosystems that form the basis for these targets.

1.1.1. Characteristics of plants and animals

Given Japan's diverse ecosystems, its plant and animal characteristics span a broad range of taxonomic groups, making it home to an extremely varied collection of species. A good number of those species are facing the threat of extinction, however, with 3,596 included on the 2015 Red List issued by the Ministry of Environment. Therefore, when it comes to the plants and animals that are environmental components in environmental impact assessments, the degree of impact on (1) the distribution and the habitat/growth status of species that are critical (either for scientific reasons or because they are rare), (2) the distribution of critical communities, and (3) the distribution of focal animal habitats should be identified. Animals should be assessed in terms of nesting areas for sea turtles or critical species on the Red List or similar registers, sea turtle nesting areas, bat colony habitats, firefly habitats, migration grounds for migratory birds, and other focal habitats. Plants targeted for assessment include those on the Red List as well as marshland vegetation and other plant communities that either the national or local governments have designated as important.

One of the characteristics of plants and animals that needs to be taken into consideration when conducting environmental impact assessments is that it is often difficult to identify them and collect information with on-site surveys. This is due multiple factors, among them the extremely limited timeframes during which target species can be identified, the huge fluctuations in how habitats are utilized at different times of year, and the difficulty of accurately identifying target species whose populations are already so limited in number. In addition, there are many cases where the plant and animal ecology itself is unknown or it is unclear how it will respond to project implementation, which frequently makes forecasts unreliable. To further complicate things, the habitat/growth status of plants and animals frequently relies on basic environmental conditions, relationships with other species, historical trends, and other factors. For this reason, a project's impact on plants and animals goes beyond direct changes to their habitats to include the fracturing or fragmentation of a network of habitat sites as well as indirect impacts on those habitats via the physical or chemical environment in the form of sound, light, wind, waves, the amount and flow of water, water quality, soil, and so on. In short, there are a tremendous number of factors that need to be considered.

1.1.2. Characteristics of ecosystems

Ecosystems can be roughly divided into terrestrial ecosystems, inland water ecosystems (lakes, marshes, rivers, and so on), and marine ecosystems (primarily coastal areas) based on the basic features of the environment. Each of these ecosystem categories has their own unique characteristics, yet function in close relationship to

one another. Terrestrial ecosystems like forests have their own topography and geological features that make up the basic environment, plus a basic structure created by the vegetation that grows there, the animals that use them and make them home, the flow of matter and energy through them, and so on. Inland water ecosystems like lakes, rivers, and marshes have a basic environment whose major structural features come from factors like the flow of water and the movement of earth—and these water flows as well as water quality are in turn affected by the condition of terrestrial ecosystems. Marine ecosystems have a basic environment that is primarily determined by the condition and flow of seawater as well as the makeup of the seafloor, but they are also closely tied to terrestrial and inland water ecosystems via the hydrologic cycle and the circulation of matter. For example, as a terrestrial environment changes (as in forest growth), it also impacts inland water and marine ecosystems through the soil it supplies over the long term. Table 1. 1-1 summarizes the characteristics of each type of ecosystem .

Ecosystems can also be categorized and understood or defined at various spatial scales. Large ecosystems (such as deciduous broad-leaved forests consisting mainly of beech trees) result from factors like elevation, differences in vegetation, or the gradient or drift of rivers. Small ecosystems (such as caves, areas of sulfurous volcanic activity, and ecosystems around spring-fed ponds) can arise in response to unique topography, geological features, soil, sediment, moisture conditions, and so on. Each ecosystem also has a different distribution of plants and animals based on geographical and historical factors, so the fact that their functions and structure can change depending on the area is another characteristic.

In short, some of the main characteristics of ecosystems that need to be taken into consideration when conducting environmental impact assessments are: (1) ecosystems whose different basic environments result in divergent characteristics are connected to and depend on one another, (2) ecosystems can be understood/defined at different scales, and (3) ecosystems are affected by a variety of physical and chemical environments just as plants and animals are. It is also important to note that ecosystems maintain a dynamic state of equilibrium (for example, in terms of matter circulation or the flow of energy) based on the interplay of the environment and the living things within the system, food chains, and so on as they repeatedly undergo disruption and recovery. The fact that typhoons or even rarer occurrences like volcanic eruptions or other unexpected natural phenomena can dramatically change ecosystems and result in a long-term recovery process must also be taken into account. For example, when looking at an ecosystem that is maintained via characteristic disruptive action to a river or coastline, it is important to consider the impact that the project may have on those natural and inherent disruptive forces. In this way, the studies, forecasts, and evaluation methods used in an environmental impact assessment should be selected based on the characteristics of each ecosystem involved and their reciprocal relationships.

Table I. 1-1 Characteristics of different ecosystems

Ecosystem	Characteristics
Terrestrial ecosystems	Primary production in terrestrial ecosystems mainly involves vascular plants with foliage (trees and grasses), with each ecosystem made up of a unique layered vertical foliage structure (production structure). The vertical structure of this foliage produces a variety of discontinuous environments within the ecosystem in both the horizontal and vertical directions, and a variety of distinctive species may exist in each ecosystem. The existence of these diverse species is maintained according to food chains that start with primary production, but compared to aquatic ecosystems (including marine areas), grazing food-chains contribute less to the matter cycle (a maximum of 12–13% except in cases of herbivore outbreaks), with a majority of matter dying and falling to the earth where plant and animal remains decompose instead (this is called a detritus food-chain). Still, terrestrial ecosystems are maintained through the coexistence of a variety of species, and internal grazing food-chains are a critical factor in supporting the mechanisms by which those species coexist. Terrestrial ecosystems also have distinctive structures and functions based on their various species compositions, which result from the basic environment (the air, water, topography, geological features, and so on) as well as the ways in which humans interact with them. For this reason, unique landscapes may arise through the combination of various ecosystems in response to the basic environment. These ecosystems have a mutual relationship in which dynamic equilibrium and change in any one of them impacts the others. Certain species may also travel through more than one ecosystem, many of them having a home in each. This makes it critical to understand the compound environmental characteristics that are

	formed across multiple ecosystems.
Inland water ecosystems	Inland water ecosystems include bodies of water and the terrestrial or transitional zones related to those bodies of water, which means they contain both land and water components. They therefore are home not only to species that rely on water, but also those that live in the transitional zone or those that only rely on the water for part of their life cycles—in other words, living things that depend on the continuities between water and land. This characteristic is what drives the diversity in inland water ecosystems. Water level, water quality, water temperature, daily fluctuations in river flow rate, seasonal changes, and yearly transitions are just some of the critical components that make up inland water ecosystems. Changes in river flow rate and water level produce transitional zones, while the movement of soil, for example, brings with it a variety of other substances. This leads to a diverse array of basic environments that have different effects at different sites. Bodies of a certain depth that contain large amounts of water (such as natural or dammed lakes) are made up of thermoclines which go through drastic seasonal changes in water temperature that have a major effect on the distribution of aquatic organisms. The tides affect the hydrology of river mouth areas, which are extremely diverse ecosystems featuring complex interactions that involve both inland water and marine characteristics. Changes in the basic environment that occur due to unexpected fluctuations, such as dramatic rises water level during typhoons, are also critical to these ecosystems. River flooding, ocean waves hitting lakes and marshes, or droughts that bring water levels below normal alter riverbed composition, water quality, and sediment and disturb river bottom or lakeshore plant life. At the same time, however, there are certain plants and animals whose existence depends on sudden changes like these. Riparian (riverside) forests, for example, are home to plant communities that are regenerated during flood levels that occur once every few decades. Certain fish populations interact during floods to enhance genetic diversity and increase the hardiness of the group. Erosion and deposition in rivers, lakes, and marshes forms the topography that serves as the foundation for plant and animal life in these ecosystems. Erosion creates new basic habitats by cleansing the sediment or wearing away the surface of pebbles and gravel, for example. Deposition can shape coastlines or change riverbed composition. Geographical and genetic isolation in inland water ecosystems can result in the formation of distinctive ecological systems, that includes isolated species or populations. For example, species or populations that that only travel through river channels (such as freshwater fish) may find those channels blocked over the course of geologic history and end up only in certain bodies of water or with a disjunct distribution.
Marine ecosystems	Ocean areas, particularly those whose primary production is mainly supported by offshore phytoplankton, generally have ecosystems that experience rapid turnover (production speed/biomass) compared to land ecosystems that depend on trees or other large plants for primary production. Put another way, marine ecosystems are large “flow” ecosystems undergoing constant change, while terrestrial ecosystems are “stock” ecosystems supported by stable plant communities. At the same time, while terrestrial ecosystems have prominent detritus food changes that originate with large plants, one of the features of marine ecosystems is the prominence of their grazing food chains. That said, coastal areas that contribute greatly to seaweed production have characteristics that resemble those of terrestrial areas. At the same time, the phytoplankton that are the basic producers and the zooplankton that are the main primary consumers are always moving with the ocean currents, meaning that many other living things move with them. This means that many marine organisms change their feeding habits and/or morph over the course of their growth cycles (floating, swimming, bottom-dwelling, attached, and so on). Another feature of marine ecosystems is that because there are no stable, long-term plant communities in the oceans like there are on land, the distribution of marine animals is largely determined by factors like the makeup of the seafloor (how solid it is, for example) and the physical and chemical environmental components of the open sea and inland waters. Coastal areas, which are often the site of project implementation and therefore a

	marine ecosystems subject to environmental impact assessments, are ecotones (transitional areas) rich in biodiversity. The environment in intertidal areas, for example, which are repeatedly exposed and submerged as the tides go in and out, forms beltlike zones that are each home to numerous plant and animal species adapted to those specific conditions. River mouths, where saltwater and freshwater meet, as well as tidal flats, seaweed beds, and coral reefs are examples of shallow-water ecosystems—each consisting of their own basic environments and biological communities. These areas are also notable for their strong connection to the land, as many get their nutrient salts and soil from rivers or underwater springs. When conducting environmental impact assessments on marine ecosystems, it is important to take these characteristics into account, considering factors such as geological features, makeup of the seafloor, variability due to waves and currents, the makeup of transitional areas, matter cycles and energy flows, the life cycles and growth of plants and animals, seasonal transitions, and the relationships between predators and prey when looking at the target marine areas.

1-2. Recent trends affecting biodiversity

One of the major shifts affecting biodiversity in recent years was the establishment of the Basic Act on Biodiversity (Act No. 58 of 2008). Given that biodiversity is both fundamental to the survival human beings and a source of diversity among cultures, and that it is facing critical threats both within Japan and around the world, the purpose of this law is to conserve its richness and help realize a society that coexists with nature and where human beings can continue enjoying the benefits of biodiversity for years to come—while also helping to conserve the global environment.

At the Convention on Biological Diversity and Conference of the Parties 10 (CBD/COP 10) held in October 2010, a long-term goal of creating a world where people lived in harmony with nature was set as a long-term target, while taking efficient and urgent action to halt the loss of biodiversity by was set as a short-term target. These were included as part of new global targets for 2011 and beyond, adopted as the Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets ("the Aichi Targets"). Given the outcomes of COP 10 and the experiences learned during the Great East Japan Earthquake that struck in March 2011, Japan went on to formulate the National Strategy for the Conservation and Sustainable Use of Biological Diversity (2012–2020) in 2012 as a legally binding plan based on the Basic Act on Biodiversity that defined its new principles for living in harmony with nature. The vision defined under this national strategy is that "by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people", while its strategic goal is for each country to achieve its national targets aimed at reaching the Aichi Targets by 2020. In this way, the strategy serves as a roadmap for the achievement of the Aichi Targets. It also lays out a grand design for national land that looks ahead a century from now, using this as a guidepost for formulating the initiatives that need to be largely implemented by 2020. These take the form of five basic strategies: (1) mainstreaming biodiversity in our daily lives, (2) reviewing and rebuilding relationships between people and nature in local communities, (3) securing linkages between forests, the countryside, rivers and the sea, (4) taking action from a global perspective, and (5) strengthening scientific foundations and utilizing them in policies. The national strategy also lists four factors threatening biodiversity, which are outlined in table 1. 1-2). Japan is also looking into formulating ecosystem-specific strategies, such as a Strategy for the Conservation of Marine Diversity and a Ministry of Agriculture, Forestry and Fisheries Strategy for the Conservation of Biodiversity—each listing critical items for the conservation and sustainable use of natural resources.

Some of the other key basic laws on the natural environment that were established or revised in Japan are the Basic Act on Ocean Policy (Act No. 33 of 2007), the Fisheries Basic Act (Act. No. 89 of 2001), the Forest and Forestry Basic Act (Act No. 161 of 1964), the Food, Agriculture and Rural Areas Basic Act (Act No. 106 of 1999), the Basic Act on the Water Cycle (Act No. 16 of 2014). Revisions have also been made to related laws like the Forest Act (Act No. 249 of 1951), the River Act (Act No. 167 of 1964), and the Coast Act (Act No. 101 of 1956), and Japan is in the process of putting together region-specific plans based on these pieces of legislation.

Around the time that the Basic Act on Biodiversity was established, the Japanese government was also moving forward with efforts to put together and revise related laws like the ones listed in table I. 1-3. Japan is

currently looking at the National Strategy on Biodiversity and related documents to help decide the scope of critical environmental factors that needed to be considered as basic items in environmental impact assessments as well. Properly conducting environmental impact assessments in Japan requires a solid grasp of the current status of biodiversity and ecosystems as well as of related systems and frameworks.

The areas that are protected under these systems and frameworks and similar information has largely been released to the public in recent years as electronic map data, and most related documents are available in digital form as well. They are particularly important when going through the Document on Primary Environmental Impact Consideration procedures (see chapter II), which are based on the surveys this existing documentation. It is critical to make full use of these resources even when environmental impact assessments are conducted during the project implementation stage in order to fully understand regional characteristics as well as ensure that surveys, forecasts, and evaluations are efficient and effective.

There have also been integrated projects in recent years in the agriculture, forestry, and fisheries industries as well as those that combine disaster preparation, for example, with environmental restoration. These projects incorporate trial efforts to conserve regional biodiversity and should serve as a valuable reference for initiatives designed to maximize the impact of environmental mitigation measures taken under environmental impact assessments.

The National Plan for Adaptation to the Impacts of Climate Change is a November 2015 cabinet decision that states the importance of considering conservation, restoration, and creation of natural environments in such a way that ensures that adaptation measures do not themselves cause adverse environmental impacts and of utilizing the many functions of natural environments according to specific purposes and regional characteristics. More work still needs to be done, however, and scientific research is now moving forward for the purpose of addressing gaps in our understanding and technology so that we can better predict and assess the impact that climate change is having on our species and ecosystems.

Table I.1-2. Four threats to biodiversity

Threat #1	• Human activity (e.g. development) Human activity impacts natural environments by damaging or destroying habitats through excessive hunting, fishing, or gathering (for recreational or commercial purposes), land reclamation, and other forms of development.
Threat #2	• Environmental threats due to habitat shrinkage Secondary forests and grasslands that have fallen into disuse cause ecosystems to become unbalanced, threatening the extinction of the plants and animals native to Japan's rural *satochi* and *satoyama* areas. Meanwhile, regional ecosystems are also being heavily impacted by growing populations of animals like deer and wild boar.
Threat #3	• Exotic species introduced by humans Exotic species pray on native species, take over their habitats, and cause genetic disturbances through crossbreeding. There are also chemical substances that are toxic to plants and animals and thus negatively impact ecosystems.
Threat #4	• Climate change Global warming is a major problem that transcends national boundaries. With average temperatures rising between 1.5 and 2.5 degrees Celsius, ice is melting earlier in the season, alpine regions are shrinking, and ocean surface temperatures are rising. These and other related factors are said to threaten some 20–30% of the world's plant and animal species with extinction.

Table I.1-3 Overview of key systems and frameworks on biodiversity and their relevance to environmental impact assessments

Framework	Overview	Relevance to EIAs
Basic Act on Biodiversity (Act No. 58 of 2008)	This act outlines basic concepts to guide Japan's biodiversity policies, including basic principles on biodiversity conservation and use, the formulation of a national biodiversity strategy, preparation of white papers and 13 basic policies to be implemented by the national government. Its stipulations include obligations at the	This act calls for a reduction in environmental impacts related to biodiversity during the business plan formulation stage and more.

Framework	Overview	Relevance to EIAs
	national and local government level as well as for businesses, citizens, and nongovernmental organizations.	
Nature Conservation Act (Act No. 85 of 1972)	The provisions of this act stipulate fundamental items for conservation of the natural environment. It also includes those on implementation of basic environmental conservation surveys as well as designations of national environmental conservation areas with the aim of comprehensively promoting proper natural conservation efforts.	Natural parks, natural environmental conservation districts, and similar areas require particular attention when conducting environmental impact assessments, and these pieces of legislation should serve as foundational references.
Natural Parks Act (Act No. 161 of 1957)	This act aims to protect outstanding natural landscapes, encourage efforts towards enhanced usage, promote citizen health, recreation, and education, and help maintain biodiversity by designating natural parks and stipulating park planning and other provisions aimed at conservation and/or usage of these areas.	
Act on the Promotion of Nature Restoration (Act No. 148 of 2002) and the Act on the Promotion of Regional Cooperation for Biodiversity (Act No. 72 of 2010)	The provisions of this act promote nature restoration policies and encourage coordination among diverse regional actors in activities to conserve biodiversity.	Because this law stipulates the promotion of natural environment conservation and restoration activities It is likely that the sites of activities based on it are critical in terms of conserving local biodiversity. The results of activities to conserve biodiversity also serve as important case examples when considering environmental mitigation measures.
Wildlife Protection and Hunting Act (Act No. 88 of 2002)	This act designates wildlife sanctuaries in areas that are particularly critical for the protection of wildlife. It was revised in 2014 for the purpose of implementing drastic countermeasures to optimize wildlife habitat conditions, as deer and other animals have been causing increasing damage to ecosystems as well as to the agriculture and forestry industries in recent years.	This act specifies wildlife species targeted for conservation as well as legally-defined invasive alien species. Depending on regional and project characteristics, it may be necessary to look at the need for related surveys, forecasts, and evaluations as well as include these factors when considering environmental mitigation measures.
Invasive Alien Species Act (Act No. 78 of 2004)	This act regulates the importation and breeding of plants and animals defined as invasive alien species and stipulates control measures in order to prevent damage to ecosystems, industry (agricultural, forestry, and fisheries), and to protect human life and prevent injury from invasive alien species.	
Endangered Species Act (Act No. 75 of 1995)	This act is designed to protect endangered wild animal and plant species by nationally designating endangered wild fauna and flora within Japan as well as critical habitat areas, regulating the treatment of individuals in those populations, protecting their habitats, and carrying out projects to protect and increase their numbers.	The species and areas designated under legislation like this define the critically important plant and animal species as well as critical habitat areas and populations that are subject to surveys, forecasts, and evaluations during environmental impact assessments. The designation of species and the like under these laws are revised as needed, so it is important to get access to the latest information.
Red List/Red Data Book (national and local government bodies)	The Ministry of the Environment regularly reviews its Red List (the latest edition is the 2015 MOE Red List) and encourages updates to Red Data Books. Every prefecture issues region-specific Red Data Book, and Red Data	

Framework	Overview	Relevance to EIAs
	Books are also issued by certain local governments and NGOs for critical geological formations, ecosystems, and populations.	
Act on Protection of Cultural Properties (Act No. 214 of 1950)	This act designates particularly valuable plants and animals as Natural Monuments or similar cultural assets.	
Forest Conservation System	This system designates certain nationally-owned forests and fields (e.g. as virgin forests) for the purpose of contributing to the maintenance of natural environments that are made up of forest ecosystems, the protection of wild plant and animal species, the protection of genetic resources, the development of forest practices and management techniques, the promotion of scientific research, and so on.	
Ramsar Convention (went into force in Japan in 1980) World Heritage Convention (accepted by Japan in 1992), Migratory Bird Convention (US, Russia, Australia, China)	These conventions stipulate critical plant and animal species as well as sanctuary areas.	
UNESCO Biosphere Reserves (MAB, geoparks)	This stipulations of this program are designed to conserve biospheres (primarily core regions) as well as promote research and ecotourism in these areas.	The existence of critical geological formations and ecosystems that are likely to be subject to conservation under environmental impact assessments may be stipulated under this program.
National Strategy on Biodiversity 2012–2020 (2012)	The National Strategy on Biodiversity is a basic national plan for the conservation and sustainable use of biodiversity. It is based on the Convention on Biodiversity (which Japan signed in 1993) as well as on the Basic Act on Biodiversity.	The National Strategy on Biodiversity discusses the importance of environmental impact assessments.
Regional strategies on biodiversity	Regional strategies on biodiversity of basic plans for the conservation and sustainable use of biodiversity stipulated by regional and local government bodies. They are based on the Basic Act on Biodiversity.	These strategies often list natural environment areas that are likely to be subject to conservation under environmental impact assessments as well as other regions that require particular consideration when conducting EIAs.

Reference: From "National Biodiversity Strategy of Japan 2012-2020: Roadmap towards the Establishment of an Enriching Society in Harmony with Nature" (Ministry of the Environment 2012), Section 4: Environmental Impact Assessments and Other Measures

"For the conservation of biodiversity, it is extremely important to give consideration to environmental conservation prior to formulating and implementing large-scale projects that are expected to have significant environmental impacts. Therefore, the Environmental Impact Assessment Act (put into force in June 1999) provides that proponents of such large-scale projects shall survey, predict and assess the likely environmental impacts prior to project implementation and reflect the results of the assessment in the contents of the

project, thereby ensuring appropriate consideration for environmental conservation. The law also requires that the project proponents shall report and publish the results of environmental conservation measures, etc. after the project implementation. In addition, almost all prefectures and cabinet-order designated cities (major cities) have their own environmental impact assessment systems stipulated in their regulations, which require that fine-tuned environmental impact assessments should be conducted by taking into account the environmental conditions and other conditions of each local area.

The government established the "Basic Guidelines" based on the law, which are common guidelines for all types of projects subject to the law concerning the methods for carrying out environmental impact assessments. The guidelines ensure biodiversity conservation by setting out the following guidelines. At the project planning stage, the project proponent should in principle create multiple plans concerning the location, etc. of the project, and conduct comparative assessments that are part of the consideration process for the avoidance or reduction of critical environmental impacts. At the stage of considering the detailed contents of the project, items that the project proponent is required to assess include the "protection of biodiversity and systematic conservation of the natural environment" and "rich interaction between people and nature." In the assessment of these items, the project proponent is required to incorporate better environmental consideration into the project contents by assessing not only the fauna and flora that are important from academic or scarcity-value viewpoints and outstanding natural landscapes, but also places where people can interact with nearby nature and familiar living organisms that characterize the local ecosystems. In addition, with regard to environmental conservation measures, the guidelines provide that the project proponent should first consider avoiding or reducing environmental impacts, and then consider compensation measures for still remaining environmental impacts, such as the creation of the same type of environment as the one that would be lost because of the project.

Since it is important to introduce environmental consideration at an early stage of a project, it is necessary to consider creating a strategic environmental assessment system, which incorporates environmental consideration into the formulation and implementation of superordinate plans and policies that precede the stage of considering the site, size and other details of individual projects."

Reference: National Strategy for the Conservation and Sustainable Use of Biological Diversity (2011–2020)

Strategic Plan for Biodiversity 2011–2020

- Vision (2050)
  - "Living in harmony with nature"
  - By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.
- Mission (2020)
  - Take effective and urgent action to halt the loss of biodiversity

The Aichi Biodiversity Targets

Target #1	People are aware of the value of biodiversity and the steps they can take to conserve and use it sustainably
Target #2	Biodiversity values have been integrated into national and local plans and are being incorporated into national accounting, as appropriate, and reporting systems
Target #3	Incentives, including subsidies, that are harmful to biodiversity are eliminated or reformed and positive incentives are developed and applied
Target #4	Stakeholders at all levels have implemented plans for sustainable production and consumption
Target #5	The rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced
Target #6	Marine resources are managed and harvested sustainably
Target #7	Areas under agriculture, aquaculture and forestry are managed sustainably
Target #8	Pollution has been brought to levels that are not detrimental
Target #9	Invasive alien species are controlled or eradicated
Target #10	Negative pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized
Target #11	At least 17 percent of terrestrial and inland water, and 10 percent of coastal and marine areas are conserved through protected area designations and similar measures
Target #12	The extinction and decline of threatened species has been prevented
Target #13	The genetic diversity of crops and livestock is maintained, and genetic erosion has been minimized
Target #14	Ecosystems that provide essential services are restored and safeguarded
Target #15	Contributions have been made to climate change mitigation and adaptation through the restoration of at least 15 percent of degraded ecosystems
Target #16	The Nagoya Protocol on ABS is in force and operational
Target #17	Each party has developed and commenced implementing an effective and participatory biodiversity strategy
Target #18	Traditional knowledge is respected and mainstreamed
Target #19	Knowledge and scientific technologies related to biodiversity are improved
Target #20	Resources for effectively implementing the Strategic Plan have been increased substantially from current levels

Recent years have brought the development of various technological tools that can be utilized for environmental impact assessments on biodiversity. Table III. 1-28 list some of the main ones. In addition to the technological tools on this list that are actually being used for environmental impact assessments, there are also those that contribute to better survey efficiency, less uncertainty, and more objectivity, which improves the sophistication of the assessments. There are also tools that have not yet been put into actual practice very many times, but are expected to produce a good track record as they are further tested (see chapter 3 for details on how each of these technologies is used).

More basic environmental data is being collected all the time. Results of studies like the National Survey on the Natural Environment conducted by the Ministry of the Environment and the Regional Monitoring Promotion Project for Critical Ecosystems (Monitoring Site 1000) are made publicly available online and in other formats, various information on local natural environments is being stored in databases, map information is being put together, there is an increasing amount of information (literature) on the characteristics and dynamics of plants, animals, and ecosystems, and there is more data on the movement of earth and water. Tools for analyzing this data and information infrastructure (e.g. logs of living things) designed to collect resident data, for example, are being put together, while other systems are being built or studied for the purpose of carrying out environmental mitigation measures unlike these implemented in the past (such as seed banks or conservation outside natural habitats). More case examples of environmental mitigation measures are becoming available and more are being classified according to project type or environmental component and released—so it is critical that project proponents make use of this information.

It is also ideal to actively utilize this information in environmental impact assessments in the interest of adopting workable and better technologies. That said, evaluation methods need to be selected according to the accuracy of forecast results for individual environmental components or follow-up survey results from other projects. Also, because the speed of technological development has increased so markedly in recent years, it is important to consider whether it is possible to use new technologies that allow for more accurate assessments rather than sticking with the same methods over a long period of time.

2. Characteristics of contact with nature

2.1 Importance of contact with nature in environmental impact assessments

Article 14 of the Basic Environment Law states that one of the purposes of formulating basic policies for environmental conservation is “to maintain rich and harmonious contacts between people and nature”, thus establishing contact with nature a central pillar of conservation efforts. The Environmental Impact Assessment Act also includes landscapes and places for activities with nature within the scope of its environmental components. These examples point to the benefits that nature provides human beings and establish that content as an environmental component that must be preserved and passed down to future generations.

2.1.1 Characteristics of landscapes

Landscapes exist in relationship to the people (subjects) viewing them. They include not only the vistas that make up the local landscape, but also values that people assign to them—the love, pride, peace, and comfort that people take in their hometowns. Environmental views also include the historical and cultural background that goes into them. The concept of a “landscape” is one that is rooted in earth or the land itself, expresses the essential features or characteristics of a place, and is reflected in the lifestyles, activities, and culture of the people who are tied to that area.

Article 2 of the Landscape Act (Act No. 110 of 2004) states that “a good landscape is produced by the harmony between the nature, history and culture of the area and people's lifestyles and economic and other activities” and that “a good landscape of an area is closely related to peculiar characteristics of the area”.

When considering landscapes for environmental impact assessments, it is important to consider them not only as visual phenomena (nothing more than visual points of interest and the vistas that connect them), but as spaces that include familiar places where people go about their lives. It is also important to see them as visual environments that arise from natural conditions as well as social conditions (the local history, culture, and so on).

When treating landscapes as an environmental component within environmental impact assessments, it is important to have a good understanding of how they differ from other components. The following lists their special characteristics and relevant considerations.

- It is difficult to evaluate landscapes using a cookie-cutter approach, since each landscape has distinctive features that are unique to the local community or region.

- Landscapes have developed over long periods of time through the interactions between people and nature, so there needs to be an awareness of the value imbued in their history—not just their visual characteristics.

- Local residents and others have an intuitive understanding of landscapes based on their visual characteristics, so when determining the impact of a project, it is important to develop shared awareness and mutual understanding.

- It is important to keep in mind that projects subject to environmental impact assessments tend to be large in scope, which means that they can have a major impact on landscapes and do damage that cannot easily be undone.

- In some cases, projects can actually generate new perspectives or landscape resources, which means they need to be considered from the perspective of creation as well as conservation.

Landscape EIAs need to be able to address nearby scenes (surrounding landscapes) as well. This is done by understanding not only the visual changes that the project might bring to the target landscape and its sights, but also including surveys, forecasts, and evaluations driven by an awareness of the values associated with those features as well.

2.1.2 Characteristics of places for activities with nature

Places for activities with nature are more than just physical locations. They are the spaces that are created when people use those sites to interact with nature through various activities. For this reason, it is important to first understand what those activities are when addressing places for activities with nature in environmental impact assessments.

Places for activities with nature may be the site of countless types of activities. People may simply observe or enjoy the natural landscape, engage with it through various forms of recreation depending on the type of site, collect or harvest natural resources, travel through it by climbing or hiking, or use equipment to enjoy it as in skiing or cycling. For this reason, “places for activities with nature” is a category that includes not only campsites, walking paths, swimming areas, or other outdoor recreation sites equipped with facilities and known to the public, but also woodlands, grasslands, groves surrounding village shrines, streams, ponds, and other natural sites that may or may not have associated facilities or even names. In short, any natural environment that supports human activity falls under “places for activities with nature”.

Environmental impact assessments that target places for activities with nature need to be able to address nearby natural areas and places for daily contact with nature. This is done by understanding not only the condition of the places that support human activity and the status of those activities, but also including surveys, forecasts, and evaluations driven by an awareness of the value that those activities bring people. It is also necessary to consider ways in which construction or other project activities may affect people’s access to the places in which they normally engage in outdoor activities.

2.2 Recent trends concerning contact with nature

Table I.2.1 lists legal frameworks (such as the Landscape Act, the Ecotourism Promotion Act (Act No. 105 of 2007) and the Act on the Promotion of Environmental Conservation Activities through Environmental Education (Act No. 130 of 2003)) that have helped make the importance of familiar natural settings part of people’s everyday awareness in recent years. These frameworks make protecting rich interactions between people and nature a critical core concept when it comes to conserving the environments that allow people to enjoy the benefits of nature and are used to implement forecasts and evaluations for many projects subject to environmental impact assessments involving contact with nature.

Environmental impact assessment items related to contact with nature can be difficult to assess quantitatively, but they are usually easy to assess intuitively without the need for expert knowledge or codified standards. For this reason, it is important to take steps to sufficiently communicate with local residents and other stakeholders when conducting environmental impact assessments.

Table 1.2-1 lists key systems and frameworks on conserving landscapes and places for activities with nature as well as their relevance to environmental impact assessments.
In addition, it is also necessary to consider ecoparks (biosphere reserves) designated under UNESCO’s Man and the Biosphere Programme (MAB), geoparks designated by UNESCO and Japan Geopark Committee, Globally Important Agricultural Heritage Systems, and other efforts to conserve traditional industries, sights, land use, cultures, and landscapes that make use of distinctive natural or regional environments.

Table I.2-1 Overview of key systems and frameworks on landscapes and places for activities with nature and their relevance to environmental impact assessments

Framework	Overview	Relevance to EIAs
Landscape Act (Act No. 110 of 2004) and townscape ordinances	This act promotes the formation of quality landscapes in cities as well as rural agricultural, fishing, and mountain villages through the formulation of landscape plans and the comprehensive implementation of other policies.	This act can be used as a basic reference for environmental impact assessments, as local government agencies are formulating landscape plans while gradually studying important scenic spots, landscape resources, and the like.
City Planning Act (Act	This act stipulates frameworks for land use	This act can be used as a basic reference for

No. 100 of 1968)	and urban development in city areas (including the designation of urban planning zones and the formulation of city master plans).	environmental impact assessments, as it designates landscape areas, areas of scenic beauty, and so on.
Natural Parks Act (Act No. 161 of 1957)	This act aims to protect outstanding natural landscapes, encourage efforts towards enhanced usage, promote citizen health, recreation, and education, and help maintain biodiversity by designating natural parks and stipulating park planning and other provisions aimed at conservation and/or usage of these areas.	Natural parks, natural environmental conservation districts, and similar areas require particular attention when conducting environmental impact assessments, and these pieces of legislation should serve as foundational references.
Nature Conservation Act (Act No. 85 of 1972)	The provisions of this act stipulate fundamental items for conservation of the natural environment. It also includes those on implementation of basic environmental conservation surveys as well as designations of national environmental conservation areas with the aim of comprehensively promoting proper natural conservation efforts.	
Act on Protection of Cultural Properties (Act No. 214 of 1950)	This act designates five categories of cultural properties (including historic, scenic, and natural monuments as well as traditional structures) and stipulates measures to protect them.	This act can be used as a basic reference for environmental impact assessments, as it designates traditional structure conservation areas, important cultural landscapes, historic/scenic/natural moments, and other cultural properties.
Urban Green Space Conservation Act (Act No. 72 of 1973)	This act promotes the greening of urban areas and the formation of urban parks in order to preserve green spaces in cities.	This act can be used as a basic reference for environmental impact assessments, as it designates special green space conservation areas and the like.
Ecotourism Promotion Act (Act No. 105 of 2007)	This act stipulates a comprehensive framework for ecotourism that creatively engages local communities while taking environmental conservation into account.	This act can be used as a basic reference for environmental impact assessments, as it designates special natural tourism resources and the like.
Act on the Promotion of Environmental Conservation Activities through Environmental Education (Act No. 130 of 2003)	This act stipulates basic principles for the promotion of environmental conservation and education activities while also listing critical items for motivation enhancement and cooperative initiatives to encourage the provision of more opportunities for people to experience nature.	This act can be used as a basic reference for environmental impact assessments on activity sites and the like, as it promotes the creation of spaces for school education or NGO activities as well as opportunities for people to experience managed natural settings.
Act concerning Special Measures for the Preservation of Historic Natural Features in Japan's Ancient Capitals (Act No. 1 of 1966)	This act stipulates measures for the appropriate preservation of historic natural features as shared national cultural assets in ten cities, towns, and villages designated as ancient Japanese capitals.	This act can be used as a basic reference for environmental impact assessments, as it stipulates historic natural preservation zones, special historic natural preservation zones (urban plans), and the like.
Act on Maintenance and Improvement of Traditional Scenery in Certain Districts (Act No. 40 of 2008)	This act aims to maintain, improve, and pass on to future generations quality environments (historic scenic beauty) featuring historical structures such as castles, shrines, Buddhist temples, and the surrounding traditional residences that capture the distinctive charm, atmosphere, and appearance of a place.	This act can be used as a basic reference for environmental impact assessments, as it designates critical districts for plans to maintain and improve historic scenic beauty and the like.
Act on the	This act stipulates suburban green zones in	These acts can be used as basic references

Conservation of Suburban Green Zones in the National Capital Region (Act No. 101 of 1966) and Act on the Arrangement of Conservation Districts in the Kinki Area (Act No. 103 of 1967)	the Tokyo and Kinki areas for the purpose of maintaining and promoting good mental and physical health among urban residents while conserving cultural properties, green spaces, tourist resources, and the like.	for environmental impact assessments, as they designate suburban green zones and special suburban green zone conservation areas (as stipulated by governors).
Productive Green Land Act (Act No. 68 of 1974)	This act preserves quality urban environments with steps towards the systematic conservation of remaining agricultural areas in cities.	This act can be used as a basic reference for investigating activities for contact with nature, as it designates productive green land and community farming areas.
Act on Promotion of Development of Community Farms (Act No. 44 of 1990)	This act aims to develop quality urban environments and revitalize rural districts by encouraging the establishment of community farms and securing areas for residents to engage in healthy, relaxing activities.	
Act Concerning the Utilization of National Forest Land (Act No. 246 of 1951)	This act designates certain nationally-owned forests and fields that have outstanding natural scenery or are ideal for forest healing, nature observation, outdoor sports, or similar activities as “recreation forests”.	This act can be used as a basic reference for environmental impact assessments, as it designates recreation forests and similar areas.
Forest and Forestry Basic Act (Act No. 161 of 1964)	This act defines “forests shared with people” as those ideally suited as sites for environmental conservation, forest recreation, or environmental education.	This act can be used as a basic reference for environmental impact assessments, as it designates “forests shared with people” and similar areas.
World Heritage Convention (accepted by Japan in 1992)	This convention lists natural assets of special importance that are designated as World Heritage Sites and require conservation as shared inheritances of the world’s people.	This convention can be used as a basic reference for environmental impact assessments, as it contains a list of World Heritage Sites.
Globally Important Agricultural Heritage Systems	This UN Food and Agricultural Organization (FAO) program designates globally important lands that are used for agriculture, are historic in their development or constitution, and of cultural/scenic significance and/or rich in biodiversity with the aim of preserving them for future generations.	These documents can be used as basic references for environmental impact assessments, as they designate Globally Important Agriculture Heritage Systems, ecoparks (biosphere reserves), and geoparks.
UNESCO Biosphere Reserves	This program designates biosphere reserve areas for the purpose of harmonizing the preservation and sustainable use of ecosystems. These areas are also considered promising as educational sites for local sustainable development.	
Geoparks	These naturally abundant environments (which may include important geological strata, rocks, geological features, volcanos, fault lines, etc.) are either recognized as natural heritages under the Global Geoparks Network or as Japan geoparks under the Japanese Geoparks Network.	

As with biodiversity, a variety of important technological tools that can be utilized for environmental impact assessments on contact have been developed in recent years. Those that make use of information and communication technologies (ICT) in particular are likely to be quite promising.

Geographic information system (GIS) technologies are already being used for visual analyses (various landscape and accessibility analyses) and to create images that predict landscape changes. Computer graphics technologies are used to create animations as well. These technologies will likely become easier to use in the future, and there is also great potential for the use of virtual reality technologies as well.

These tools not only help improve the accuracy of forecasts and save labor for project proponents, but also have the potential to be useful vehicles information exchange among stakeholders during environmental impact assessment procedures.