A Blacksiton's fish owl living in a company-owned forest

Environmental Responsibility

The Nippon Paper Group contributes to the building of a sustainable recycling-oriented society by minimizing environmental impacts at every stage of its value chain.

* Please refer to page 62-69 of the Nippon Paper Intergrated Report 2020.
https://www.nipponpapergroup.com/english/ir/Integrated_Report_E2020_03.pdf#page=9

Materiality	Related Indicators	State of Efforts (fiscal 2019)
Climate change initiatives	Reduce greenhouse gas emission by 10% compared to the fiscal 2013 result	14% reduction
Promoting recycling	Increase waste recycling rate to 98% or higher	97.3%
Preserving biodiversity	Give consideration to biodiversity in company-owned forests by maintaining and continuing forest certification	Maintained and continued certification for 100% of company-owned forests

Policy and Management

We are putting in place a Group-wide environmental management system based on our Environmental Charter and engaging in environmentally friendly corporate activities.

Basic Stance

The Nippon Paper Group provides diverse products and services to society through the effective utilization of wood from trees, which are a renewable resource. At the same time, the Group also uses large amounts of energy, water and other resources in its business activities. At the same time, the Group also uses large amounts of energy, water and other resources in its business activities. For this reason, the Group believes that it is an important responsibility for us as a corporate group to push ahead with initiatives to reduce environmental impact, manage chemical substances, make effective use of water resources, preserve biodiversity, and combat climate change.
The Group has established the Nippon Paper Group Environmental Charter, based on which it engages in corporate activities that pay consideration to biodiversity across its entire value chain, from a long-term perspective, in order to contribute to the creation of a resource-circulating society.

The Nippon Paper Group Environmental Charter

(Established on March 30, 2001, and revised on March 30, 2007)

Philosophy

The Nippon Paper Group is committed to helping preserve the global environment over the long term and contributing to the development of a recycling based society by carrying out its corporate activities in recognition of the importance of biodiversity.

Basic Policy

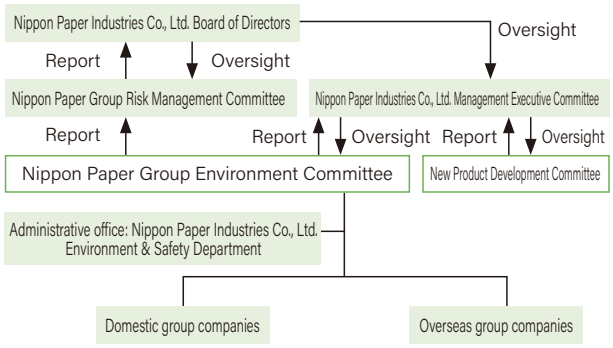
1. Act to counter global warming
2. Protect and develop forest resources
3. Increase use of recycled resources
4. Comply with environmental statutes and work to minimize our environmental impact
5. Develop environmentally friendly technologies and products
6. Engage in active environmental communication

Environmental Management Promotion Structure

The company has established a Risk Management Committee under the supervision of the Board of Directors of Nippon Paper Industries and headed by its president (see P.25).
The Nippon Paper Group Environmental Committee (which is chaired by the company's executive officer responsible for environmental issues) drives the practical implementation of the philosophy and basic policies of the Nippon Paper Group Environmental Charter by managing the progress of environmental action plans at each Group company.
It also assesses and considers environment-related risks and opportunities and reports to the company's Board of Directors through the Risk Management Committee.
The Management Executive Committee (MEC) deliberates and makes decisions on environmental policies and strategies with regard to risks and opportunities assessed and considered by the Environmental Committee. By reflecting these in Group business strategies, the MEC seeks to achieve growth for the Group while aiming to maintain a balance between environmental and economic aspects.
The company has also established a New Product Development Committee.
This committee utilizes Group technologies and resources and works to develop products derived from wood biomass that contribute to achieving the creation of a low-carbon society while meeting accurately to customer needs.

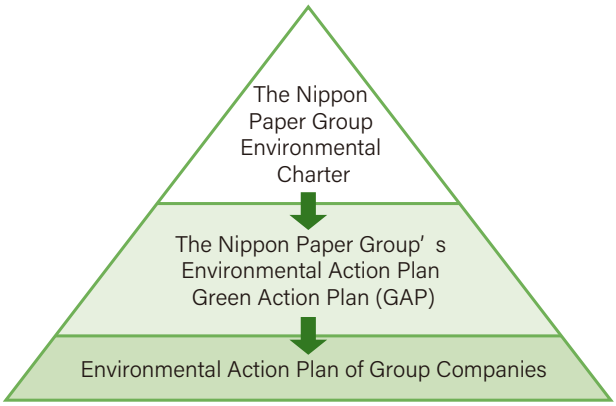
The Group is also enhancing its environmental management system through collaborations between its head office, mills and environment-related divisions. For example, the company has introduced a system that enables centralized management of the state of emissions of atmospheric pollutants emitted from the boilers at its mills, and is working to ensure legal compliance and reduce environmental impact through simultaneous monitoring both at head office and at the mills themselves.

System to Promote Environmental Management



Environmental Action Plan (Green Action Plan)

The Nippon Paper Group has established an environmental action plan—the Green Action Plan—in accordance with the six basic policies expressed in its Environmental Charter. Since the establishment of this action plan in 2006, the Group set quantitative and qualitative management targets every five years relating to response to climate change and all manner of other environmental issues, and carried out specific initiatives to achieve those targets.
Based on this, Group companies have each established their own environmental action plans to reflect their own individual business characteristics. Their efforts to fulfill these plans are improving our effectiveness towards achieving the targets of the Green Action Plan.



Green Action Plan 2020

https://www.nipponpapergroup.com/english/mt_pdf/Green%20Action%20Plan%202020.pdf

Introducing environmental management systems

In order to promote environmental management, the Group is introducing various environmental management systems, including ISO14001 and Eco-Action 21.Nippon Paper Industries has obtained ISO 14001 certification for 100% of its production locations (as of March 31, 2020).

Conditions with regard to ISO14001 and Eco-Action 21 certifications.

https://www.nipponpapergroup.com/english/csr/esg_data_packet.html

Strengthening Environmental Compliance

Two-Pronged Approach

The Nippon Paper Group is strengthening its environmental compliance from a preventive standpoint, using a two-pronged approach of establishing frameworks for preventing problems and ensuring that no problems are missed, and engaging in its business activities with a priority on legal compliance.
In fiscal 2019, the Group was not subject to any adverse dispositions with regard to compliance with environment-related laws, etc. (including fines, cancellation of licenses, or orders to suspend operations or use of equipment).

1. Building Systems to Prevent Problems

- Building a workplace that emphasizes the importance of the environment (environmental compliance training)
- Strengthening the system for identifying applicable laws and regulations
- Implementing measures from both the facility and technology perspectives

2. Establishing a Framework that Ensures All Problems are Covered

- Enhancement of environmental audits
- Enhancement of environmental management system
- Engaging in environmental communication and active information disclosure

Systems to Ensure that the Laws and Regulations to be Complied with are Identified

To respond accurately to wide-ranging and relatively frequent changes in environmental legislation, the Group has developed a framework which uses a legal and regulatory search system to search for and share information on revised laws and relevant trends, and ensure a reliable approach to legal compliance.

Introducing Equipment and Measurement Devices to Prevent Environmental Accidents

The Group identifies risks of environmental accidents and assesses both their probability and their potential impact on the environment, and accordingly introduces equipment and measuring devices necessary to prevent such accidents.Each Group company is engaged in continuous measures to prevent large-scale leaks of oil or chemical agents, including the installation of liquid containment barriers (oil fences, etc.) and measuring devices.

Environmental Audits Emphasizing Legal Compliance and Risk Control

Based on the "Environmental Management for Pollution Prevention," an action guideline for environmental management issued by the Ministry of the Environment (MOE) and the Ministry of Economy, Trade and Industry(METI), the Group conducts double-checking of compliance with laws and regulations through internal audits by each business site and environmental audits by the Head Office's environmental department. A system of mutual audits between Group companies has also been put in place as an additional step to enhance monitoring of risks.

Environmental Communication

The Group has also established the Nippon Paper Group Risk Communication Guidelines.The Group conducts environmental risk communication with residents and local government authorities in accordance with these guidelines.
In cases such as the installation of large-scale facilities, we also hold explanatory meetings beforehand to provide a better understanding of any environmental impact from installation work and operation of the installed equipment.

Responses to Opinions and Complaints

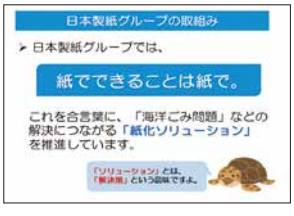
In addition to receiving opinions and inquiries via its website, the Nippon Paper Group has established a complaint and inquiry contact at each of its mills. We have also adopted environmental monitoring systems and take other steps to encourage input from local residents. When a complaint is received, we move swiftly to determine possible causes, and implement emergency and permanent solutions. We also explain to the person who lodged the complaint what happened and what we did to resolve the situation, so that they can be satisfied that we have responded appropriately.

Complaints	No.
Noise	8
Dust and mist dispersal	2
Odor	2
Vibration	1
Smoke	25*
Other	0
Total	38

* Between June and August 2019, there was a problem in which white smoke descended from the recovery boiler at Nippon Paper Industries Co., Ltd.'s Akita Mill. And for a while many complaints (including inquiries) were made by local residents.Explanations of the situation were given by Akita Mill, and inspections and maintenance of equipment are being conducted to resolve the problem.

Environmental Education and Training for Employees

The Nippon Paper Group provides basic to specialized environmental education covering topics such as wastewater treatment plant operation. In addition, the Group encourages employees to participate in external training and take advantage of other opportunities to gain pollution prevention qualifications and expertise.
To help elevate the environmental protection awareness of employees, we also hold the Nippon Paper Group Eco-Photo Contest and conduct environmental e-learning. These activities take place in the month of June – Environment Month in Japan.
In 2019, over 7,200 Group employees participated in our environmental e-learning program, which focused on the problem of marine plastic waste.



Environmental e-learning slides

Reduction of Environmental Impacts

Assessing environmental issues from multiple perspectives and reducing our environmental impacts

Basic Stance

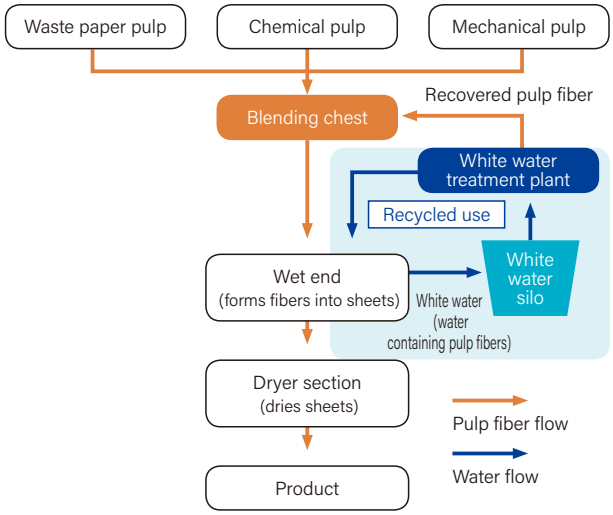
In supplying the products and services needed by society, it is impossible to eliminate the environmental impact of corporate activities.
However, as set forth in the Nippon Paper Group Environmental Charter, the Group can contribute to the creation of a resource circulated recycling-based society by minimizing these impacts by as much as possible.
At the same time as energy and water are used in the manufacturing process, wastes, greenhouse gasses, air pollutants such as sulfur oxides (SOx) and nitrogen oxides (NOx), and effluent containing organic substances are generated.
The Group has introduced equipment and technology to remove these substances and aims to reduce emissions to less than the legally mandated standards or those agreed upon with local governments, thereby reducing the environmental impact as much as possible.

Key Environmental Performance Indicators
https://www.nipponpapergroup.com/english/csr/esg_data_packet.html

Effective Use of Water Resources

The manufacturing of paper requires large volumes of water. One example is the wet end of the papermaking process, in which pulp fiber from woodchips and wastepaper is dispersed in water to eventually create thin sheets.
The Nippon Paper Group's papermaking process efficiently and effectively uses water resources, which are a form of natural capital. It does this by recovering "white water," which contains very fine pulp fibers from the wet end of the papermaking process, removing the fibers through a treatment process, and then sending the removed fibers to the pulp blending chest and returning the water to the wet end of the manufacturing process.
At present, we have received no information from local government authorities or residents to indicate that the mills operated by Nippon Paper Group companies are having an environmental impact as a result of their water intake, and water risks in Japan are low.

Water Recycling System



Controlling Chemical Substances

The Nippon Paper Group examines the chemical substances it uses in its production processes in accordance with its Chemical Substance Management Guidelines. We do this in exercising risk management that monitors how much of these substances we use and how much we release into the environment.
We disclose information on our management, release, and transfer of PRTR*-controlled substances to local stakeholders through environmental risk communications at each of our mills and other production sites. In fiscal 2019, the Nippon Paper Group released 141 tonnes of PRTR-controlled substances and transferred 80 tonnes.
With regard to polychlorinated biphenyl (PCB) waste stored Nippon Paper Industries which was announced in January 2019, the company is cooperating with local government authorities to process the waste appropriately.

* The Pollutant Release and Transfer Register (PRTR) is a system for monitoring the movement of chemical substances posing risks to human health or ecosystems. Under the PRTR system, businesses track the amounts of these chemicals they have released into the environment or transferred to other business locations and report this information to government authorities.

Amounts of substances subject to the PRTR Law released and transferred
https://www.nipponpapergroup.com/english/csr/esg_data_packet.html

Preventing Soil Pollution

The raw materials and chemicals used by Nippon Paper Group mills contain almost no heavy metals, trichloroethylene or other soil contaminants. Fiscal 2019 was another year in which there were no instances of contaminated soil generated at Group companies.

Preventing Noise and Vibration

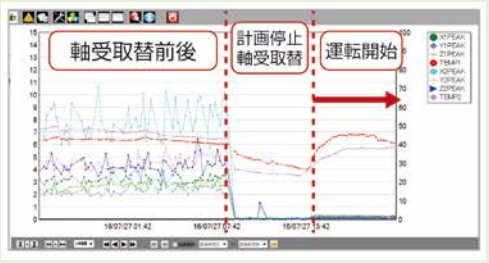
The Nippon Paper group is engaged in efforts utilizing IoT technologies to prevent the occurrence of noise and vibrations.

CASE Development and Introduction of "e-musen junkai®" (e-wireless patrol) system

Pulp and paper mills use large machines incorporating numerous motors and other rotating parts that generate noise and vibration.
Nippon Paper Industries and NIPPON PAPER UNITEC have developed—and are now operating—the "e-musen junkai®" (e-wireless patrol) system, which uses wireless sensors to constantly monitor equipment for signs of abnormalities. This system uses IoT technology to accumulate temperature and vibration acceleration data on machinery and equipment in operation. Analyzing trends in this data enables us to discover abnormalities early on. By discovering abnormalities at an early stage, this system helps to prevent the occurrence of equipment problems and avoid vibration, noise, and other causes of complaints. In addition to introducing this system at all NPI mills, we have also commenced sales to external clients, including customers in Thailand as of fiscal 2019 (see P.61).

An e-wireless patrol device installed on an electric drive motor at Shiraoi Mill.

An e-wireless patrol device*



An example of monitoring using the e-wireless patrol system

Climate Change Initiatives

* Please refer to Integrated Report, P. 62-69. https://www.nipponpapergroup.com/english/ir/Integrated_Report_E2020_03.pdf#page=9

Contributing to the creation of a low-carbon society through initiatives to reduce greenhouse gas emissions

Basic Stance

The issue of climate change carries a high degree of uncertainty. It is a difficult problem that will require long-term responses and countermeasures to tackle. Moving forward, the Nippon Paper Group will contribute to the creation of a low-carbon society by working both in the medium term to steadily reduce greenhouse gas emissions, and in the long term to attempt the challenges of mitigating and adapting to climate change.

Medium-term scope
- Improving productivity
- Introducing new technologies
- Management in the supply chain

Long-term scope
- Introducing innovative technologies
- Utilizing the Group's proprietary technology

Achieving the Creation of a Low Carbon Society

Organizational Structure to Respond to the Problem of Climate Change

In addition to the various impacts brought about by climate change due to the progression of global warming, the Nippon Paper Group also regards global developments and Japanese government policies based on the Paris Agreement as factors with an important impact on its management; and therefore engages in environmental management which seeks to maintain a balance between environmental and economic aspects.

As one aspect of its system for implementing environmental management (see P.40), the Group has established the Nippon Paper Group Environmental Committee, under the Risk Management Committee (headed by the president of Nippon Paper Industries) The committee assesses and considers risks and opportunities relating to climate change.

Based on these assessments and considerations, the Management Executive Committee (MEC) deliberates and makes decisions on policies and strategies regarding climate change. By reflecting these in Group business strategies, the MEC seeks to achieve growth for the Group while aiming to maintain a balance between environmental and economic aspects.

Medium-term initiatives

From a medium-term perspective, the Nippon Paper Group established an environmental action plan—the Green Action Plan—in 2006. Since the establishment of this action plan, we have set quantitative and qualitative management targets every five years relating to response to climate change and all manner of other environmental issues, and carried out specific initiatives to achieve those targets. (See Data Section)

Moving forward, with a view to 2030 and 2050, the Group will aim to minimize greenhouse gas emissions in accordance with its production structure, and work proactively to improve production efficiency and introduce new technologies.

From a long-term perspective, the Group will work to incorporate the progress of new, innovative technologies created through various development efforts—both in Japan and overseas—into its scenarios. The Group is In addition, the Group is actively developing cellulose nanofibers and new pulp and paper materials with added functionality, and will continue to contribute to the realization of a low-carbon society through the provision of products and services derived from woody biomass that accurately meet the needs of customers.

*Please also refer to P.62-69 of our Integrated Report 2020.

Nippon Paper Integrated Report 2020.
https://www.nipponpapergroup.com/english/csr/esg_data_packet.html

New Biomass Fuel Office established

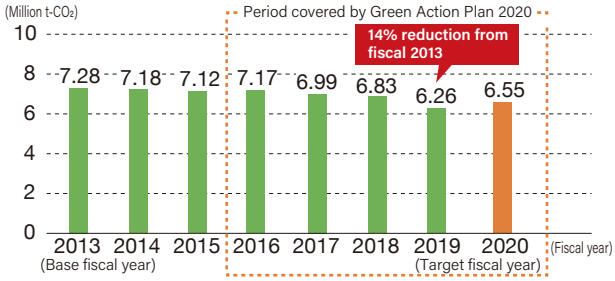
Nippon Paper Industries is investing its energies into the biomass power generation business, in order to cater to growing needs in the energy business field for a low-carbon society.

On April 1, 2020, the company established the new Biomass Fuel Office, under the Raw Materials Division's Forest Materials Department. Moving forward, the office will aim to actively advance the development and procurement of wood biomass fuels utilizing the advantages of the company's supply chain for sustainable wood resources, and procure sustainable fuels in response to climate change by gathering a wider range of information regarding renewable energy.

Reduction of Greenhouse Gas Emissions

In its environmental action plan—the Green Action Plan 2020 (see P.41)—the Nippon Paper Group has established the objective of reducing greenhouse gas emissions by 10% in comparison with the fiscal 2013 level. In fiscal 2019, the Group reduced our emissions by 14% in comparison with the fiscal 2013 level due to the beneficial effects of equipment consolidations / updates and other energy-saving investments, and continued efforts to shift to non-fossil fuel energy.

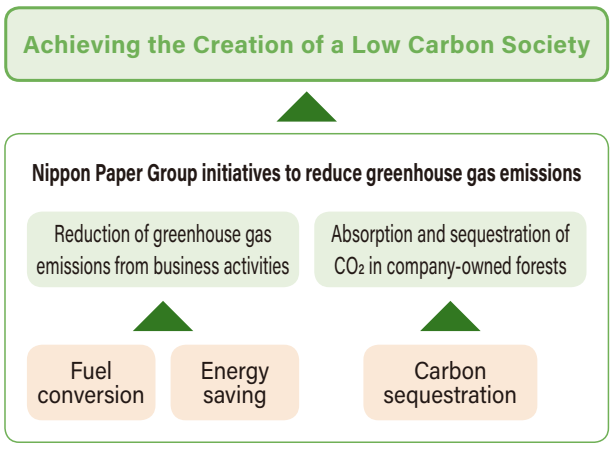
Progress of the Green Action Plan 2020 Environmental Action Plan
Greenhouse gas emissions*1 (Japan*2)



* 1 Sum total of Scope 1 and Scope 2 figures (for individual scope figures, see ESG data packet)
https://www.nipponpapergroup.com/english/csr/esg_data_packet.html
* 2 Companies subject to the Act on the Rational Use of Energy at consolidated and non-consolidated subsidiaries in Japan

The Three Pillars of Reducing Greenhouse Gas Emissions

Achieving the creation of a low-carbon society requires major reductions in greenhouse gas emissions. At the same time as making efforts based on the Japan Business Federation (Keidanren) and Japan Paper Association's Action Plan for a Low Carbon Society, the Nippon Paper Group is working proactively to reduce greenhouse gas emissions based on an understanding of its business characteristics, which include high energy consumption and ownership of forest resources.
Specifically, we are working to reduce greenhouse gas emissions at each stage of our value chain through three key initiatives: shifting to alternative fuels (fuel conversion), promoting energy saving in production and logistics processes (energy saving) and absorbing and fixing CO_2 through the appropriate management of company-owned forests (carbon sequestration).

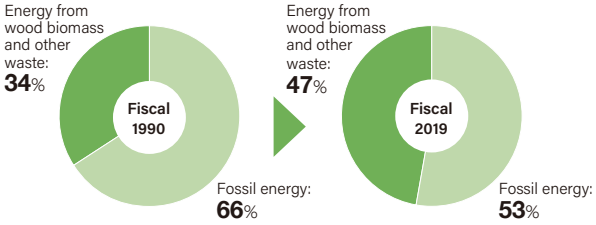


Fuel Conversion

The Group uses black liquor (produced as a by-product of the production of pulp) and construction waste materials as wood biomass fuels. At the same time, it appropriately procures wood biomass through its domestic and overseas wood biomass collection network for utilization as a renewable source of energy. So far, too, the Group has installed two types of boilers—high efficiency boilers, and boilers capable of burning construction waste and other biomass fuels, used tires, RPF* and other waste fuels. In fiscal 2019, the domestic Group's fossil energy usage ratio (calorie conversion) for its overall use of fuels fell to 53%. Moving forward, the company will continue to push ahead with fuel conversion initiatives and further reduce our use of fossil fuels.

* An abbreviation for "Refuse derived paper and plastics densified Fuel." RPF is a high-grade solid recovery fuel primarily composed of wastepaper and waste plastics, mostly from industrial waste for which material recycling is quite difficult.

Fossil energy usage ratio (calorie conversion) of all fuels used by the Nippon Paper Group (Japan)

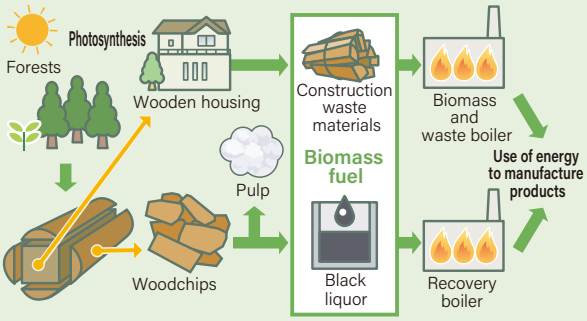


The Nippon Paper Group is one of the Leading Corporate Users of Wood Biomass Energy in Japan

The Group is working to increase its use of black liquor and other wood biomass fuels.
The amount of wood biomass energy used by the group in fiscal 2019 was equivalent to around 4%* of all non-fossil energy supplied in Japan (excluding nuclear and hydroelectric power). *

* Estimated by Nippon Paper Industries Co., Ltd. based on domestic primary energy supply data (finalized data for fiscal 2018) published by the Agency for Natural Resources and Energy

Forms of Biomass Energy Utilization at the Nippon Paper Group



CASE Use of Torrefaction Technology and Wood Biomass Fuels

Nippon Paper Industries Co., Ltd. has established a torrefaction technology which is useful in manufacturing new wood biomass fuel as an alternative to coal for thermal power stations. Torrefaction is a technology that carbonizes woody biomass at a relatively low temperature. This has been developed for the production of fuels which remain relatively high in calories, are easy to crush, and have developed a water resistance that makes them suitable for outdoor storage. The Company has established a torrefaction technology that contributes to the production of new woody biomass fuel to serve as an alternative to coal for thermal power generation.


New wood biomass fuel samples

CASE In-house Production of Solid Fuel from Waste

Nippon Paper Industries's Otake Mill converts the paper sludge*1 and wastepaper residues*2 produced in the manufacture of linerboard and corrugated medium (for containerboard) into solid form on site, and uses it as a form of energy to drive the mill itself. In fiscal 2019, the mill produced 4,200 BD tons*3 of fuel. Self-production of fuel from waste leads to reductions in coal usage, and also contributes to reducing the amount of waste sent for final disposal through the recycling of waste.

* 1 A sludge produced in the manufacture of paper. It contains mainly cellulose fibers and minerals drained during the paper dewatering / drying process.
* 2 Foreign matter produced when processing wastepaper.
* 3 As of April 2019, the mill has also begun accepting waste plastic refuse from the city of Otake as a raw material.


Equipment for producing solid fuel

Solid fuel produced from wastepaper residues

Promoting energy-saving in manufacturing and logistics processes

Rollout of Energy-saving Initiatives from the Paper and Paperboard Business at Japan and Overseas Locations

The Nippon Paper Group has been working continuously to implement energy saving at its paper mills in Japan for many years. We endeavor to increase the effectiveness of these efforts by seeking to share examples of effective initiatives with other mills. In recent years, energy-saving knowledge obtained through efforts at mills in Japan was also been applied at the paper mills of overseas Group companies in countries such as Australia and Thailand.

CASE Overseas Deployment of Energy-saving Examples in the Dryer Part

In recent years, Nippon Paper Industries Co., Ltd.'s Asahikawa Mill has achieved energy-saving benefits by working to reduce the amount of steam used in the dryer sections of its paper machines, which dry sheets of pulp and finish them into paper. This is to use chemicals to create a water-repellent film inside the hollow equipment to repel water condensation and increase the efficiency of heat transfer.
Based on this example, Siam Nippon Industrial Paper(Thailand) has adopted the same method, and is working to verify the energy-saving benefits of this approach.

Green Logistics

The Nippon Paper Group is working to implement green logistics that will lead to reductions in greenhouse gas emissions, from the two perspectives of improving loading efficiency and shortening transportation distances.

Achieving the Creation of a Low Carbon Society

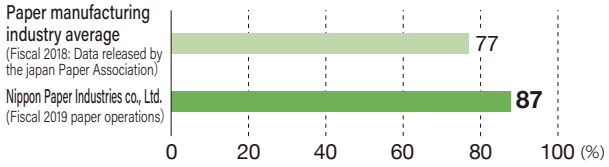
Logistics-related initiatives

- Improving loading efficiency
  - Promoting a modal shift to rail or marine transportation
- Shortening transportation distances
  - Pursuing direct delivery and joint delivery

From the perspective of improving loading efficiency, the Group is advancing its use of modal shift transportation, using mainly rail and non-international marine transport to move large volumes of cargo over long distances with every trip. Nippon Paper Industries is maintaining a high modal shift rate*, at 87% for its paper business.

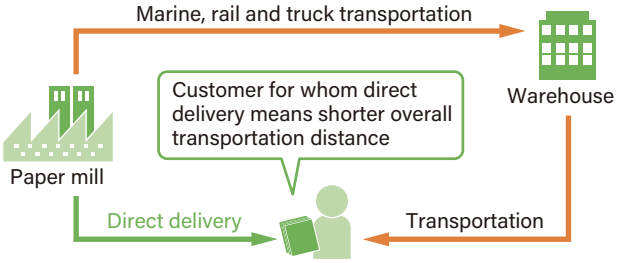
* The percentage of rail or marine (including coastal shipping and ferries) transport in general cargo transported over 500 kilometers.

Comparison of modal shift rates



The entire Group is also working together with logistics service providers to bypass warehouses and deliver products directly to customers. These efforts enable us to shorten overall transportation distances and increase transportation efficiency, contributing to the reduction of CO_2 emissions.

Reducing the total distance by direct delivery from paper mills



Obtaining Green Management Certifications

Under the Green Management Certification system, certifications are awarded and registered by the Foundation for Promoting Personal Mobility and Ecological Transportation. Companies that undertake at least a certain minimum level of initiatives based on the Green Management Promotion Manual are eligible for these certifications. Within the Group, 16 business locations of 8 Group companies have obtained* Green Management Certification. The Nippon Paper Group is actively implementing ecological driving, vehicle inspection and maintenance, reduction of vehicle disposal and waste generation, proper waste handling and recycling, and other practices consistent with green management.

* Of those locations that have obtained certification, 15 locations at 8 companies have obtained Green Management Certification Long-Time Commendation, which is awarded to business locations that have been certified and registered for 10 years continuously since the date of their initial registration (in the first year).

Green Management Certification logo
(Left: trucking business, right: warehouse business)

Green Management Certifications* (As of July 1, 2020)

Company
NIPPON PAPER LOGISTICS, Kyokushin Transport, Nanko Logistics Support, Hotoku, NP Unyu Kanto, NP Unyu Fuji, NP Unyu Kansai, and NP Unyu Iwakuni

* Consolidated and non-consolidated subsidiaries in Japan

Longer-length Toilet Paper Rolls for Improved Transportation and Storage Efficiency

The SCOTTIE® Flowerpack four-roll, triple-length (double), which was launched by Nippon Paper Crecia in 2016 (see P.64) was created through the application of technical development that has enabled toilet paper of up to three-times the previous length* to be wrapped onto a single roll, while at the same time maintaining product quality. In addition to saving space in the home and in stores, and reducing the amount of cores and packaging used, this also leads to a reduction in CO_2 emissions during transportation due to increased logistics efficiency. The rolls are also well-suited to use as supplies in readiness for disasters.

* In comparison with the SCOTTIE® Flowerpack 12-roll, double length,

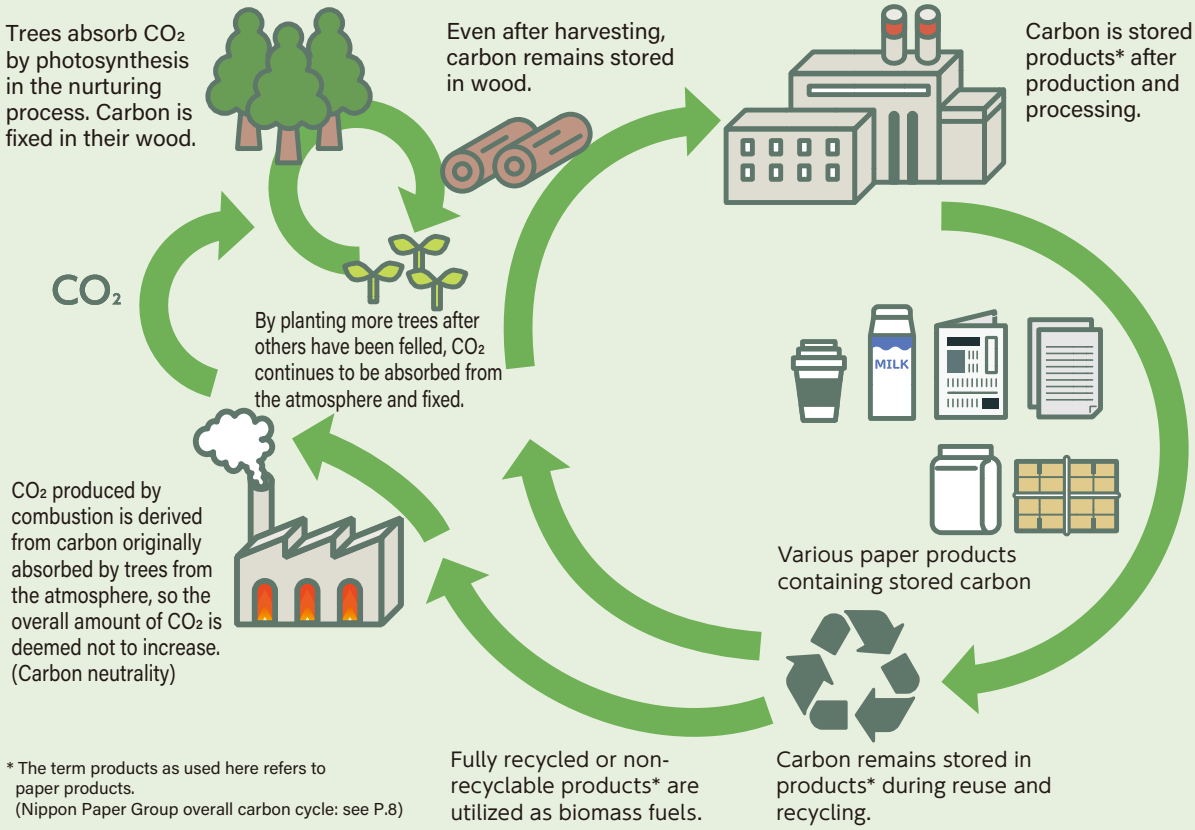
Absorbing and Sequestering CO_2 through Proper Management of Company-Owned Forests

Trees absorb and fix CO_2 in the body from the atmosphere. Forests are also referred to as a storehouse for carbon, and conservation of forests through appropriate management contributes to the fight against global warming.
The Nippon Paper Group manages 173thousand hectares of forests, consisting of 90thousand hectares in Japan and 83thousand hectares across four overseas countries (see P.34-38). Based on the concept of sustainable forest management, the Group appropriately manages these forests and maintains the CO_2 absorption and sequestration capabilities of the trees. Forests owned by the Group continuously fix approximately 32 million tonnes of CO_2.In this way, we are helping to prevent global warming by limiting the release of CO_2 into the atmosphere.

The Characteristics of Wood Resources: The Carbon Cycle

Trees, which the Group has been using for many years as a major raw material, are a renewable resource that can be planted and grown, and at the same time, they can continue to fix the CO_2 absorbed by photosynthesis as carbon.
After being harvested and processed into various wood-derived products, CO_2 is retained in a fixed state, and once it is used as a product, it can be reused and recycled appropriately, thus enabling CO_2 to be fixed for longer period of time.
Finally, they can be used as carbon-neutral biomass fuels, which do not cause an increase in atmospheric CO_2 concentration.

CO_2 absorbed from the atmosphere is continuously stored in products



* The term products as used here refers to paper products.
(Nippon Paper Group overall carbon cycle: see P.8)

Quantifying CO_2 Absorbed by Appropriately Managed Company-owned Forests as Credits and Contributing to Offsetting Initiatives

The J-credit system is a system under which the government certifies the amount of reduction and absorption of greenhouse gases such as CO_2 emissions as credits.
The Nippon Paper Group engages in appropriate management of its company-owned forests with the aim of achieving sustainable forest management. The greenhouse gas absorption effects of its partial tree thinning projects have been certified with J-Credits. The supply of these credits as forest-derived credits is contributing to attempts at carbon offsetting in local communities.

A forest where tree thinning projects have been certified under the credit scheme (Sudagai company forest, owned by Nippon Paper Lumber)

An on-site certification survey

Promoting Recycling

Contributing to the development of a recycling-based society

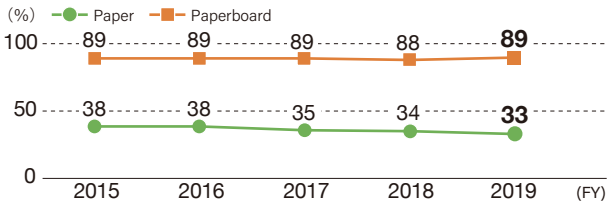
Basic Stance

In its Environmental Charter, The Nippon Paper Group highlights the basic policy of increasing the use of circulating resources and aims to contribute to the development of a sustainable resource circulating society.
The Group provides a variety of products through the effective utilization of wood from trees, which are a renewable resource, and engages in recycling by reusing these products as raw materials after use. At the same time, we are also advancing the circular resource usage of not only products themselves but also the byproducts generated in production processes as resources, with the aim of minimizing the volume of waste sent for final disposal.

Initiatives for Using Wastepaper

Despite efforts to secure forest resources as a raw material for paper through sustainable forest management, there is a limit to the possible volume of supply, and paper manufacturers continue to utilize wastepaper as an essential and indispensable resource. The price of wastepaper as a resource is affected by international market conditions. As demand for newsprint and printing paper has declined in recent years, there is a decreasing trend in the amount of waste newspaper generated in Japan, and it is becoming more difficult to procure sufficient amounts of wastepaper as a material. Despite this, the Group is continuing to further expand its use of wastepaper and working to develop technologies that will enable the use of types of wastepaper which are currently difficult to recycle.

Trend of used paper utilization rate in Japan



Closed Loop Initiatives

In order to make long-term, stable use of collected waste newspaper as a recycled resource and raw material for newsprint, Nippon Paper Industries has constructed a closed loop scheme in which it purchases wastepaper directly from newspaper companies, which are its customers.

Collection and Recycling of Paper Cups

In recent times, the problem of marine plastic waste has become the focus of increased media attention, and interest in paper materials is growing from the perspective of reducing the amount of disposable plastic used.Nippon Paper Industries collects paper cups used at its head office and recycles them into material for containerboard at its Kanto Mill (Ashikaga) Since this initiative was launched in September 2019, we have collected a total of around 100,000 cups (as of July 31, 2020).
In this way, we are advancing initiatives not only to convert materials into paper but also to collect and recycle paper cutlery (such as paper cups and plates), in cooperation with other companies and organizations.

Collection and Recycling of Paper Cups at Nippon Paper Industries (NPI) head office


Collected paper cups


Cups are transported to NPI's Kanto Mill (Ashikaga)


Cups are broken down at the mill


A new roll of containerboard

Paper-Pak Carton Collection and Recycling

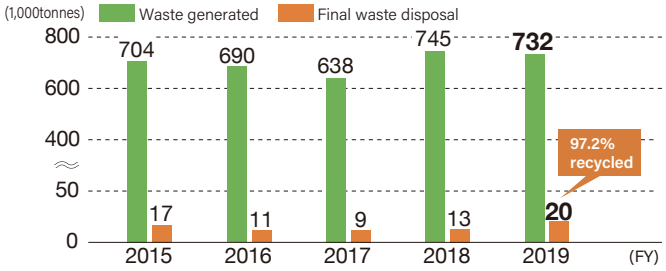
Nippon Paper Industries(NPI) is a member of the Committee for Milk Container Environmental Issues. The Committee has set the goal of increasing the paper beverage carton collection rate to at least 50% by 2020. In December 2019, the collection rate for fiscal 2018 was finalized at 42.5%, a decrease of 0.9 percentage points in comparison with the previous fiscal year.
The company is gradually installing Paper-Pak collection boxes at Group company sites and is working to increase employee awareness of Paper-Pak recycling.
In addition, the company has positioned the collection of paper cartons as an activity that enables society as a whole to make effective use of resources, and is working with collection companies to strengthen the efforts to promote recycling at various facilities and schools.
2017, the company has also commenced collection activities using a proprietary method, primarily in Nerima City, Tokyo. In fiscal 2019, three tonnes of Paper-Paks were collected and used as a raw material for household paper products.

An explanation of Paper-Pak collection and recycling at EcoPro 2019

Recycling Industrial Waste

In its environmental action plan—the Green Action Plan 2020 (see data section https://www.nipponpapergroup.com/english/csr/esg_data_packet.html) the Nippon Paper Group has set the objective of achieving a waste recycling rate of at least 98%.
In order to reduce the amount of industrial waste sent to landfill and other forms of final disposal, we have advanced initiatives such as revising production processes and making effective use of boiler ash as civil engineering material. As a result of these initiatives, in fiscal 2019, we achieved a recycling rate of 97.2%.

Progress in Implementing the Environmental Action Plan - Green Action Plan 2020
Waste generated and final waste disposal in Japan



Making and Selling CfFA® (Carbon-free Fly Ash), a Concrete Admixture that makes Effective Use of Coal Fly Ash

Nippon Paper Industries(NPI) is manufacturing CfFA®—a concrete admixture made from heat-modified fly ash, which is a byproduct from the coal-fired thermal power plant (a self-supply power generation facility) at its Ishinomaki Mill—and selling it as a construction material.
CfFA® consists of fly ash from which unburned carbon, which can have a negative effect on the quality of concrete, is removed. It has the characteristic of offering consistent quality. Until now, it has been used for earthquake recovery construction (bridges and seawalls, etc.) primarily in the Tohoku region of Japan, and in precast concrete and other concrete products, where it is adopted for increasing durability and prolonging the life of structures. Moving forward, NPI will continue in its aim of having CfFA® contribute to the development of infrastructure.


CfFA®

CfFA® was used in the bridge beams, arches and vertical supports at the JR Kesennuma Line Sakuragawa Bridge (Minamisanriku, Motoyoshi District, Miyagi)

Preserving Biodiversity

Advancing initiatives to ensure harmony with business activities

Basic Stance

The business activities of the Nippon Paper Group are largely dependent on and also have various impacts on forests, which nurture biodiversity. The Group recognizes that the sustainable use of forests is fundamental to the ongoing existence and advancement of our business.

The Nippon Paper Group's Environmental Charter (see P.40) states that the Group will engage in corporate activities that recognize the importance of biodiversity.

The Group established its Basic Policies on the Preservation of Biodiversity, established in April 2016, and is engaged in efforts to preserve biodiversity through its global supply chain.

The Group is working to preserve biodiversity through its main business activities, as well as activities utilizing its resources and technologies.

Preserving Biodiversity

Nippon Paper Group initiatives

Initiatives implemented in the conduct of our core business activities	Initiatives leveraging our resources and technologies
● Protection of forest biodiversity ● Reduction of environmental impacts of production activities	● Use of company-owned forests ● Use of proprietary technologies

Basic Policy on the Preservation of Biodiversity

(Established April 1, 2016)

Principle

The Nippon Paper Group, a corporate group to which forest resources are of fundamental importance, appreciates the natural gifts bestowed by biodiversity and, by preserving biodiversity, aims to help create a sustainable society that can continuously enjoy ecosystem services.

Basic Policy

1. Recognizing the protection of biodiversity as a critical social issue, we will work to pursue business activities that are in harmony with the sustainable use of ecosystem services.
2. In supply-chain management, we acknowledge the impacts on biodiversity of cross-border use of ecosystem services, and will manage our ecosystem service usage properly
3. In an effort to reduce environmental impacts on biodiversity, we will actively work to recycle and save resources.
4. We will promote the development of technologies, products, and services that contribute to the preservation of biodiversity and the sustainable use of ecosystem services.
5. Endeavoring to raise employees' awareness of biodiversity, and collaborating with stakeholders, we will contribute to the building of a society that nurtures biodiversity

Basic Policy on the Preservation of Biodiversity

Biodiversity surveys (Domestic company-owned forests and overseas conservation areas/protected forests)
Biodiversity surveys (Domestic company-owned forests and overseas conservation areas/protected forests)
Topography confirmation of riparian forests and other areas, fixed-point surveys of forest ecosystems, etc. Ex.)
Regular surveys in overseas protected area, surveys of Blakiston's fish owls conducted with the Wild Bird Society of Japan, ornithological and vegetation surveys in the company-owned Kitayama Forest in Shizuoka Prefecture

Particularly sensitive areas

<Japan>
Environmental forest areas :
Limiting logging and maintaining existing forest ecosystems
Riparian forests :
Preserving biodiversity by prohibiting logging
Protected areas :
Protection of the Blakiston's fish owl by prohibiting logging
<Overseas>
Conservation area / Protected forests* :
Preserving biodiversity by prohibiting logging
*Areas not designated for afforestation. Riparian forests are managed as part of these areas.

Matters to consider or confirm when performing forestry operations

<Japan> **Commercial forest areas**
Adjustment of Location and Timing for Forestry Operations
Preserving Blakiston's Fish Owl Habitat while Pursuing Forestry Operations
Presence of endangered species including in prefecture Red Lists*
<Overseas> **Performance of commercial operations that are considerate of local biodiversity**

*List of threatened animal and plant species.

Third-Party Sustainable Forest Management Validations

Forest certification programs
Forest certifications have been awarded to Nippon Paper Industries in recognition of its practice of biodiversity-friendly forest management in all of its company-owned forests in Japan and overseas.

Initiatives in Our Core Business Activities

The Nippon Paper Group works to reduce its impact on biodiversity in its manufacturing processes of paper and other products, such as by processing wastewater and reducing greenhouse gas emissions. In implementing sustainable forest management (see P.30-32), too, the Group conducts researches of biodiversity in its company-owned forests and engages in initiatives aimed at preserving that biodiversity.

CASE Preserving Blakiston's fish owl habitat while Pursuing Business Activities - Collaborating with the Wild Bird Society of Japan

In 2010, Nippon Paper Industries entered into an agreement with the Wild Bird Society of Japan where approximately 126 hectares of forestland owned by the company in Hokkaido was identified as a sanctuary for Blakiston's fish owl. This sanctuary is home to three confirmed braces of this endangered species.

In May 2015, we signed a memorandum of understanding* for the pursuit of business activities while preserving Blakiston's fish owl habitat in company-owned forests in Hokkaido. After collaborative surveys conducted in an atmosphere of mutual trust, we have clearly documented standards for methods and timing for continuing lumber production, while also protecting habitat and breeding activity, without establishing protected areas.

In 2020, the Group engages in activities to assist the breeding activities of Blakiston's fish owls by installing several artificial nesting boxes in company-owned forests in Hokkaido, in cooperation with the Wild Bird Society of Japan (see P.85).

*The Group was awarded the Biodiversity Action Award 2015 as part of The United Nations Decade on Biodiversity.

Fiscal Year	Survey Description
2010	Large trees suitable as Blakiston's fish owl habitat
2011	Bird species habitat
2012	Nesting survey focusing on white-tailed eagles and Steller's sea eagles, and an audio survey of nocturnal bird species
2013	Mammals and Blakiston's fish owl habitat
2014	Geographic activity scope of the Blakiston's fish owl
2015-	Blakiston's fish owl habitat, other bird species habitat

(Photo courtesy of the Wild Bird Society of Japan)

Blakiston's fish owl

Standing 70 to 80cm high and weighing 3 to 4.5 kg, Blakiston's fish owl is the world's largest owl, with a wingspan of 180 cm. Formerly numbering over 1,000 and found throughout Hokkaido, Blakiston's fish owls are now found mainly in the eastern parts of Hokkaido, with confirmed numbers of around 160, making up 70 braces. Blakiston's fish owl was identified as a national protected species in 1971, and placed on the Red List of critically endangered species by Japan's Ministry of the Environment.

CASE Conducting Biodiversity Research Overseas (AMCEL S.A, Brazil and Volterra S.A., Chile)

AMCEL S.A. (Brazil) owns approximately 300thousand hectares of land and has set aside 170thousand hectares as a conservation area. Volterra S.A. (Chile) owns approximately 19thousand hectares of forests and has designated about 5thousand hectares as protected forests. These conservation areas include forests of high conservation value and are home to large numbers of plant and animal species, some of which are rare or endangered.

Initiatives by afforestation companies in South America

Fiscal Year	Description
AMCEL S.A	
Regular water inspections	Installation of equipment for monitoring the quality and level of water in the afforestation area, and performance of regular water inspections
Wild animal and plant habitat researches in afforestation areas	AMCEL conducts habitat researches and monitoring of wild animals and fish in afforestation areas in a joint effort with multiple research institutions, including the Federal University of Paraná and the Federal University of Amapá.
Monitoring of vegetation in protected areas	AMCEL conducts continuous monitoring researches of vegetation in protected areas by outsourcing to the State of Amapá Environmental Research Organization.
Volterra S.A.	
Wildlife surveys in the company's Protected forests	Volterra conducts regular researches of animal life in protected forests, such as by installing cameras at fixed points. It checks on several rare mammal and bird species, such as the puma and the southern pudu, which is designated as a Near Threatened (NT) species. In 2019, the company launched a joint research project on rare animal life, with the University of Concepción.
Regular river surveys	To research impacts of forest operations on ecosystems, surveys of river water quality and biodiversity are performed on a regular basis in company-owned afforested areas.

AMCEL initiatives

Monitoring wild animal life

Monitoring Vegetation

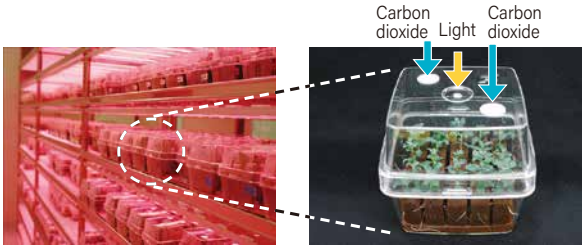
Volterra initiatives

A southern pudu (a Near Threatened (NT) species)

Checking water quality

Leveraging Proprietary Rooting Technologies

Nippon Paper Industries (NPI) has made use of its proprietary root forming technologies in the conservation of precious plant species through activities to preserve biodiversity.
The technology the company has developed creates an environment in which photosynthesis is vigorous and promotes plant rooting, making it possible to produce seedlings even for plants that have been difficult to root using conventional methods.
Utilization of this technology has enabled the propagation and nurturing of successor trees for endangered plant species and prominent cherry tree varieties in throughout Japan, contributing to the preservation of history and culture.



Even plant species that normally fail to root by cutting are able to root through the provision of a suitable environment

CASE Supporting the Activities of the Shirane-aoi wo Mamoru Kai

Shirane-aoi (Glaucidium palmatum: Japanese wood poppy) is designated as a "Threatened II" species for Gunma Prefecture. To protect this plant species, the Shirane-aoi Preservation Group was set up in December 2000, mainly at the initiative of Gunma Prefectural Oze High School and the residents of Katashina in Tone-gun, Gunma. As recognition of its achievements to date, it received the Greenery Day Minister of the Environment's Prize for Meritorious Service Related to the Natural Environment in April 2014.
On the part of the Nippon Paper Group, Nippon Paper Development —which manages Nippon Paper Industries's Sugenuma Forest—has supported the operation of the Shirane-aoi Preservation Group since its initial establishment, and has made a portion of the Sugenuma Forest available to the group as a restorative plantation site for Shirane-aoi. Since 2002, Group employees have participated as volunteers in planting, seed collection, and other activities.

Planting Japanese wood poppies

Case Study Eradicating Invasive Plant Species from Iriomote Island ~Cooperation with the Iriomote Island Ecotourism Association

In August 2017, Nippon Paper Industries(NPI) entered into an agreement with the Forestry Agency Kyushu Regional Forest Office Okinawa District Forest Office to carry out forest conservation activities such as the eradication of non-native plants on approximately nine hectares of national forest of Iriomote Island. It has since been engaged in such efforts through cooperation with the Iriomote Island Ecotourism Association, which conducts activities for conserving and ensuring the continuity of the nature and traditional culture of the island.
Iriomote Island is covered with highly diverse forests, including Japan's largest mangrove forest and subtropical broad-leaved trees, providing a habitat for precious animal and plant species such as the Iriomote wild cat, which has been designated a special national treasure (a Critically Endangered IA species). However, large numbers of invasive non-native plants have been found over an extensive area.
The company is therefore cooperating with the local people of Iriomote Island to eradicate non-native plant species such as the Bay Biscayne creeping-oxeye, and conducting continuous surveys to detect their reappearance; harnessing experience gained through many years of forest management of company-owned forests and activities for the conservation of Blakiston's fish owl (a Critically Endangered IA species) carried out in collaboration with the Wild Bird Society of Japan.

The Bay Biscayne creeping-oxeye* is propagating on the island

A removed Bay Biscayne creeping-oxeye

* A plant in the Asteraceae (sunflower) family which originated from the Americas, but was introduced throughout Okinawa for greenifying slopes and embankments, etc. It has strong propagating capabilities, and there are concerns over its impact on local ecosystems.