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Environmental Efforts for Social Infrastructure Improvement in the Chubu Region

Road Project

Nature restoration

Restoring the natural environment to its original state Biotope creation

Biotope creation

Road construction has changed the environment where plants and animals live and grow. To restore the altered environment to its original state, biotopes have been created within interchanges. These biotopes are created by using forest topsoil generated during construction work and by replanting rootstocks of felled trees. With the passage of the years, a variety of indigenous fauna and flora have settled in the region, facilitating the restoration of the natural environment to its original state.









Efforts focusing on specific species Light-shielding measures to protect loggerhead sea turtles

Measures to prevent vehicle headlight glare from affecting the egg-laying behavior of loggerhead sea turtles

Moving illumination emitted from vehicle headlights and the like affects the egglaying behavior of loggerhead sea turtles (Caretta caretta). To prevent this problem, measures have been taken by such means as installing light-shielding plates.



Light-shielding not to affect turtles' egg-laving



Measures using louvered lighting

Since a road under construction faces the zone where loggerhead sea turtles lay eggs, the hatched baby turtles may become unable to locate and crawl back to the sea, due to the nearby road lighting. To prevent such effects, we have taken light-shielding measures, including the use of louvered lighting.







Building and Repairs Project

Environmental consideration Promoting the use of timber and environmental protection efforts

Promoting the use of timber

By promoting the use of timber, the Chubu Regional Development Bureau works on appropriate forest development and conservation, as part of its efforts to create a recycling-oriented society.



Timber used for structure

Example of Japan Pavilion in EXPO 2005 Aichi Japan

The EXPO 2005 AICHI JAPAN was an international exposition held in Japan from March 25 to September 25 in 2005. The Japan Pavilion was planned as an experimental pavilion that incorporated Japanese tradition and new technologies on the theme of a new prosperity in which people and nature coexist in harmony.

To construct the pavilion, four bundled columns were made of nine small-diameter logs from forest thinning. These four columns were then combined to create a pillar that could sustain a large-space structure. The pavilion also made effective use of composite wood members created by binding timber from forest thinning with an adhesive agent.

Among other features were rooftop gardening that used coconut-shell mats on which indigenous grass was planted, and the exterior panels made by laminating plates of Japanese larch(Larix leptolepis) together. Moreover, the wind tower "Solar Chimney" was employed, to enhance natural ventilation by letting outer air in.







Rooftop greened with indigenous plants

Development of eco-friendly government office buildings We strive to develop "green" government

office buildings, in order to promote environmental protection measures in the field of construction, giving consideration to the reduction of environmental impacts throughout the building lifecycle, from building planning, construction and operation to disposal.





Timber used for exteriors



Timber used for interiors

Columns used to set up a scaffold Bundled columns made of log from forest thinning



External wooden panels



Composite wood members



Solar chimney (wind tower)



Toward the Realization of a Sustainable Society Harmonized with the Environment

The Chubu Region of Japan retains abundant natural environments and ecosystems, encompassing mountains, including Mt. Fuji and the Japan Alps, rivers flowing from these mountains, and plains formed by the courses of the rivers. Entering an era in which global and local environments are inseparably related, in quest of sustainable development of the Chubu area, the Chubu Regional Development Bureau continues to work toward the realization of a sustainable society harmonized with the environment, through social infrastructure improvement.

Third Basic Environment Plan

Directions for future environmental policy development

Integrated improvements of the environment, economy and society, and formation of sustainable national land and nature from an environmental viewpoint, etc.

Plan by category

Third National Biodiversity Strategyof Japan Kyoto Protocol Target Achievement Plan Fundamental Plan for Establishing a Sound Material-Cycle Society



Nature Restoration

Creation of diverse waterfront environments with Kereppu spur dikes

The Kereppu spur dikes, made of brushwood, soil and stones, were constructed during the Meiji River Improvement Project (1887-1912). The purposes of the construction were to prevent riverbed scouring by moderating water flows so as to promote deposition of sediments, and thereby ensure the safety of levee revetments, and maintain the width and depth of low-flow channels. (The Kiso River Kereppu spur dikes zone was designated as a Civil Engineering Heritage by the Japan Society of Civil Engineers in fiscal 2000.)

More than 100 years after the dikes' completion, now a variety of aquatic and wetland plant communities have been formed in diverse riverbank environments, playing an important role as egg-laying sites or harboring places for aquatic animals



Wando environment located around 19.8 km upstream on the right bank of the Kiso Rive



Kiso River (around 24.0 km upstream on the right bank)

What is the Meiji River Improvement Project

In 1887, a project for improvement of the Kiso River downstream area was launched under the guidance of Johannes de Rijke, a Dutch engineer, to appropriately separate the Kiso-Sansen(lit. the Kiso Three Rivers i.e. the Kiso River Nagara River and Ibi River), which used to flow in a meshed pattern around estuaries, into three rivers, as they are in their present form. The Meiji River Improvement Project was completed in March 1912.





Kiso River in Showa 20s(1935–1944) (around 24.0 km upstream on the right bank) This photo is a reproduction of the Aerial photograph taken by US Army with its approval under the article 29 of The Survey Act. (Approval Number BU-FUKU No.68 2010 Geospatial Information Authority of Japan

Strategies toward sustainable development of the Chubu area

Creating an area that can pass on rich and diverse natural environments to future generations

Promoting global warming prevention and creating a recycling-oriented area



An institute that conducts research to realize harmonious coexistence between people and the natural environments of rivers and lakes



*Purpose The Aqua Restoration Research Center(ARRC) aims to conduct fundamental and applied research to conserve and restore the natural environments of rivers, lakes and the like, and to disseminate such research results widely.

COLUMN

*Experimental st

and ponds The ARRC has three experimental streams of 800 m in length, and six experimental ponds Using these streams and ponds, the ARRC conducts research into the interaction between organisms and river environments. The shapes of experimental streams can be changed, and the flow rates can be also controlled to simulate artificial floods.

*Open for the public to visit and tour the ARRC The ARRC has opened its experimental streams for the public to tour and visit. By making advance reservations visitors can participate in a one-to-two-hour tour guided by dedicated staff members, who outline the research done by ARRC and give explanation of the experimental streams.

*Environmental education programs

As a public research facility the ARRC also provides environmental education programs to give participants a better understanding of the river environment.

http://www.pwri.go.jp/team/kyousei/jpn/index.htm



Nature restoration Sea Blue Project

The Sea Blue Project (Sea Area Environmental Creation Project) is intended to improve the sea area environment, by making use of dredged sand or by other means. During the period from 1998 to 2004, a large amount of dredged sand was produced from the Nakayama Channel line improvement (shipping channel dredging) project. Conventionally, such dredged sand was used for land reclamation. However, since the early planning stages, the Sea Blue Project sought for ways to make effective use of the sand dredged from the Nakayama Channel line, for environmental improvement of the sea area. Consequently, the Japanese government and the Aichi Prefectural government (Department of Construction and Departments of Agriculture, Forestry, and Fisheries) worked together to utilize the dredged sand to improve the seabed qualities and fishing grounds in the Mikawa Bay. Specifically, the dredged sand was used to develop tidal flats and shallow water areas and to cover up organic sludge in 39 locations (approximately 620 ha.) in the Mikawa Bay.



Sea Blue Project locations







Research study

Ise Bay Environmental Monitoring System

In recent years, Ise Bay and Mikawa Bay have suffered massive death tolls among Manila clam and other biological resources, due to oxygen deficiency in the bottom water. Oxygen deficiency has become a great risk for marine life.

To improve the sea area environment in the Ise Bay, the Chubu Regional Development Bureau set up monitoring posts, enabling around-the-clock observation of water temperature, salt content, dissolved oxygen concentration and other water quality characteristics. The Bureau also operates the Ise Bay Environmental Monitoring System capable of real-time collection of observation results, which is open to the public.



Observation equipment (in the inner part of the bay)



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Observation equipment (in the bay center

I line	Item	Inner part of bay	Bay center	Bay mouth	Nakayama Channel lin
	Temperature[°C]	0	0	0	
	Water temperature [°C]	0	0	0	0
	Wind direction ['], wind velocity $[\mathrm{m/s}]$	0	0	0	0
	Tide level [m]		0	0	
	Wave height[m]		0	0	0
	Flow direction [*],flow velocity [m/s]		0	0	0
	Salinity concentration[PSU]	0	0	0	0
	DO (mg/l)	0	0	0	0
	Chlorophyll-a[mg/l]	0	0	0	
	Turbidity[FTU]	0	0	0	
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Monitoring poir



Observation equipment (in the bay mouth)

Environmental Consideration Marine environmental

preservation

With the purpose of marine pollution control, two vessels called "Seiryu-maru" and "Hakuryu" are in service. The Seiryu-maru is a dredger that can recover a large amount of oil spilt into the sea due to shipping accidents or other reasons. The Hakurvu is a vessel with functions to collect waste floating in Ise Bay and Mikawa Bay, and to treat oil spills.





Principal particulars Overall Length: 33.5 m, Full width: 11.6 m, Monohull width: 4.0 m, Depth: 4.2 m, Draft: 2.5 m, Gross tonnage: 198 GT, Vessel: Steel, twin-hulled ship, Speed: 15.1 kt, Main engine: 1,320 kW × 2 units

Waste collection function Skipper: 6 m (Width: 2.7 m), Container capacity: 25 m

A Park Project

Efforts in the Kiso Sansen **National Government Park Project**

The Kiso Sansen National Government Park, stretching over the three prefectures of Aichi, Gifu and Mie, was opened covering an area of 4.2 ha in 1987, marking the 100th anniversary of the Kiso-Sansen(lit. Kiso Three Rivers) improvement project. As of July 2010, the Park encompasses 11 locations with a total area of about 246 ha, attracting more than 9 million people annually. Kiso-Sansen refers to the Kiso, Nagara and Ibi Rivers, and these three rivers flow into Ise Bay. The respective districts along the rivers offer their distinctive river environments blessed with abundant biodiversity



Kiso-Sansen basin areas and national park locations

threespines sticklebacks were released into the pond. where they rapidly multiplied, reaching a number of about 800 in February 2010

experience events) directly with nat



Seirvu-maru, dredger with oil recovery syster







Oil recovery function Oil recovery pump: $250 \text{ m}^3/\text{h} \times 4$ units Recovered oil tank: 1,500 m³



Oil recovery function Recovery pump: 12 m²/h, Oil recovery tank: 20 m² Oil separation tank: 2.5 m²

Protection of rare species

Protecting species whose populations and habitats have dwindled

*Naked threespines stickleback(Gasterosteus microcephalus) $\langle {\sf Endangered species. A freshwater}$ fish living in slow-moving rivers with clean water. Its habitats include the Kiso three rivers.>

Kiso River Water Park has a Fureai Pond that contains shallow waters, providing an ideal habitat for naked threespines sticklebacks and other freshwater species. In fiscal 2001, 80 naked



Naked threespines stickleback

Environmental education

Promoting environmental awareness (organizing environmental education programs and nature-

Since 1998, the Kiso-Sansen Park has provided environmental education programs and materials for schools and citizens. In 2004, the Park started to organize events in enabling participants to enjoy communion

Nature event

Control of alien species

Controlling invasive alien species *Lance-leaved coreopsis(Coreopsis lanceolata) (Invasive Alien Species)

In rivers where Lance-leaved coreopsis (Coreopsis lanceolata) have multiplied, activities to remove the plant is underway with the participation of citizens, to protect Chinese cinquefoil (Potentilla chinensis Ser.), which is an endangered species, and other native plants living in dry riverbeds.



Citizens' activities to remove alien plant species (conducted on May 29, 2010

Vegetation and environmental preservation Activities to preserve and restore natural environments

though citizen participation *Creation of a forest that serves as a habitat for insects and birds

In the Mokumoku Paradise, members of a civic volunteer group "Moku-Para Club" work to manage a thicket, create a habitat for beetles and an environment that can attract kingfishers. and hold nature observation meetings



Creation of environment that can attract kingfishers