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# **Roles of Foundation for Riverfront Improvement and Restoration to promote nature-oriented river management**

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## **ABSTRACT**

Nature-oriented river works which launched in 1990 have been deployed all over Japan. However, a number of river works have not been executed as originally intended. The River Bureau of the Ministry of Land, Infrastructure, Transport and Tourism, therefore, formed the “Nature-oriented River Works’ Review Committee” to verify the present state of the nature-oriented river works and deliberate on the direction of nature-oriented river management in the coming years. In response to the Committee’s recommendations, the Bureau compiled guidelines to disseminate the nature-oriented river management.

The Foundation for Riverfront Improvement and Restoration set up the Support Center to promote the nature-oriented river management.

*Keywords:* nature-oriented river works, nature-oriented river management, Support Center

## **1. INTRODUCTION**

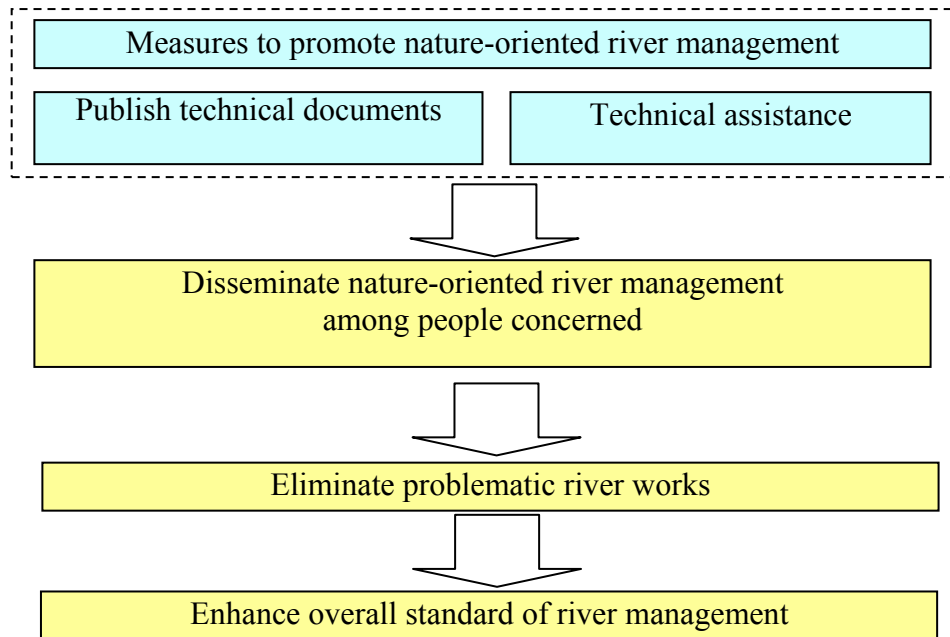
Since launching of “Implementation of ‘Nature-oriented river works’” issued by the River Bureau of the Ministry of Construction (present the Ministry of Land, Infrastructure, Transport and Tourism) in 1990, “Nature-oriented river works” have been conducted in Japan on a substantial scale to conserve or create natural riverine habitats and landscapes.

“Nature-oriented river works” have been promoted as pilot projects in the early stages, and undertaken as components of all river projects since 1997. Early projects focused mainly on site-specific remedies for conservation or restoration of water-edge zones. Today, the nature-oriented river works aim to deal with a broader range of efforts, giving more consideration to river space elements such as shallows, pools and riverside forests, and paying attention to the integrated planning of the entire river basin.

However, we are yet to obtain satisfactory outcomes from the efforts. A number of stereotypical projects without consideration of site-specific conditions and adopting mimic methods from the other river sections are still observed.

In September 2005, the River Bureau of the Ministry of Land, Infrastructure and Transport (present the Ministry of Land, Infrastructure, Transport and Tourism) formed the “Nature-oriented River Works’ Review Committee” to verify the present state of nature-oriented river works and deliberate on the direction of nature-oriented river management in the coming years. The Bureau conducted a study to review the past nature-oriented river works and redefine future river management measures. In response to the Committee’s recommendations, the Bureau formulated and promulgated the “Nature-oriented river works development basic guidelines” in October 2006, defining that nature-oriented river management is to conserve or create natural riverine habitats and diverse riverine landscapes, while taking harmony with people’s lives, the region’s history and culture into consideration.

The Foundation for Riverfront Improvement and Restoration (hereinafter referred to as the Foundation) conducted a research and study to prepare technical documents focusing on successful utilization of accumulated knowledge and expertise to eliminate problematic river works and promote nature-oriented river management. In the research, both successful and problematic case examples over the country were analyzed, and essential aspects and notabilia for nature-oriented river management were summarized. The Foundation organizes seminars utilizing the technical documents to support field engineers from local autonomous bodies aiming at diffuse river management technology for natural diversity.



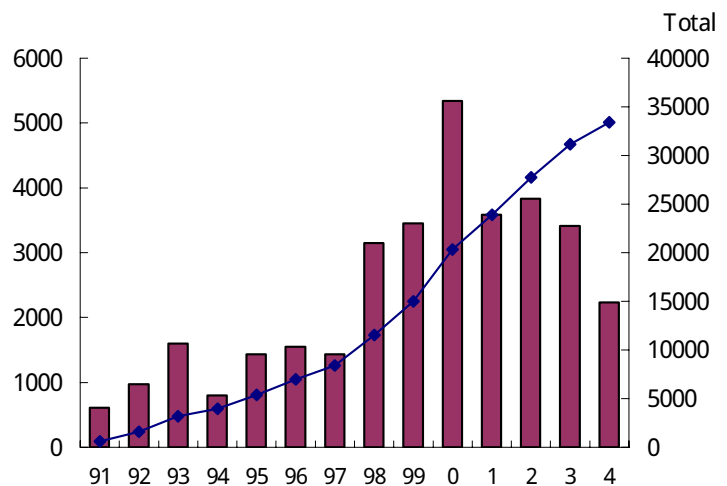
**Fig.1 Roles of "Foundation for Riverfront Improvement and Restoration" to promote nature-oriented river management**

## 2. PROBLEMATIC RIVER WORKS

Since the ministerial circular in 1990, various nature-oriented river works have been implemented in many parts of the country. According to fact-finding and follow-up surveys, in fiscal 1991, nature-oriented river works were carried out at about 600 projects. In fiscal year 2004, about 65 percent of 3,500 river works were carried out as nature-oriented river works.

Therefore comprehension for the necessity of "nature-oriented river works" has been disseminating.

However, although there are projects that reflect the concept of nature-oriented river works, there are also many projects that raise concern about possible degradation of the river environment by, for example, using standardized, invariable cross



**Fig.2 Number of nature-oriented river projects (National projects + subsidized projects)**

sections or a monotonic riverbed or water-edge design (Fig.3). It cannot be said, therefore, that nature-oriented river projects have been fully successful.



The case where channel is narrowed by revetment in shallow slope.



The case of river with fixed channel, although river boundary is wide enough.

**Fig.3 Problematic river works**

### **3. RIVER MANAGEMENT IN THE COMING YEARS**

River improvement, land development and urbanization efforts that gave priority to efficiency in flood control had a great impact on the natural environment of rivers. The deterioration of riverine habitat conditions and landscapes, thereby severing the long-established human-river relationship.

Nature-oriented river works involve efforts to restore river environments and rebuild the human-river relationship by carrying river works designed to be harmonious with the natural environment. The goal of river improvement cannot be achieved simply by putting together many natural and near-natural elements. What needs to be done is to try to make effective use of the characteristics and mechanisms of nature as much as possible.

After 15 years of efforts for nature-oriented river works, what began as model projects have now evolved into river works with a wider field of view and scope.

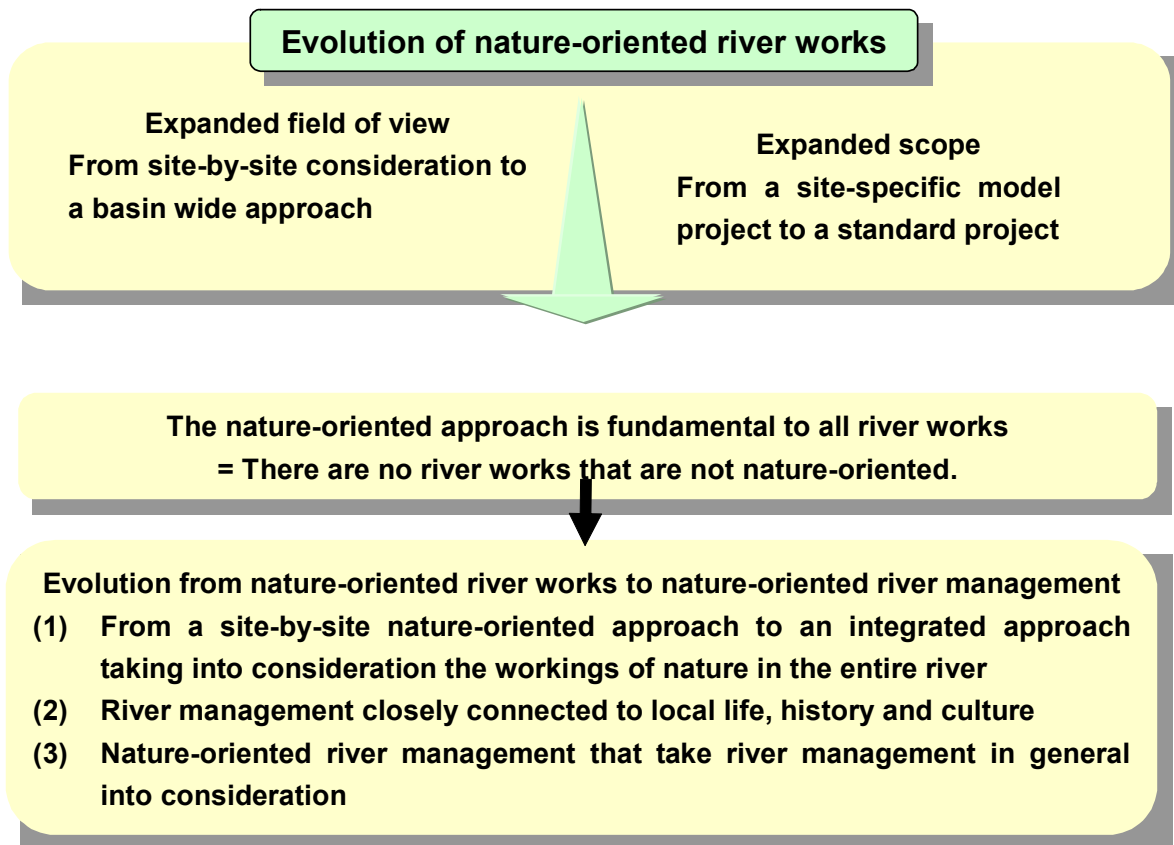
Today, the nature-oriented approach is fundamental to all river works to be implemented in all flood control and water utilization projects and in river management, and there can no longer be river works that are not nature-oriented. In order to start planning for river works in the coming years, it is necessary to make sure that this philosophy is fully understood by field personnel. It is now necessary to shed the old concept of nature-oriented river works as special model projects and redefine the nature-oriented approach as a universal form of river works or river management.

In order to implement such nature-oriented river management and enhance the standard of river management, it is necessary for all stakeholders to have a common understanding of three goals.(Fig4)

First, it is necessary to expand our field of view from a site-by-site nature-oriented approach to a basinwide approach that takes into consideration the workings of nature in the entire river basin.

Second, it is necessary to practice river management that is closely connected to local life, history and culture.

And third, it is also necessary to achieve nature-oriented river management that takes river management in general into consideration.



**Fig.4 From nature-oriented river works to nature-oriented river management**

#### **4. A ROLE OF FOUNDATION FOR RIVERFRONT IMPROVEMENT AND RESTORATION (SOME MEASURES OF THE SUPPORT CENTER)**

Under the new concept of the nature-oriented river management, the Foundation for Riverfront Improvement and Restoration plans to provide technical assistance enabling field engineers utilize technical knowledge from collected information and analyses of relevant projects. The Foundation has conducted studies, investigation and technical development on both the concepts and technical aspects since the nature-oriented river works was launched. These efforts have integrated into manuals and guidelines, and the Foundation has been disseminating them as useful tools for the field engineers, and also for further technical development.

On the other hand, the Support Center was set up in February, 2008, aiming at technical support of the nature-oriented river management.

Main activities of the Support Center are as follows:

- i) Publication of the technical documents for the nature-oriented river management.
- ii) Improvement and maintenance of data for the nature-oriented river management.
- iii) Human resource development for the nature-oriented river management.
- iv) Promotion of active public participation and cooperation.
- v) Regular monitoring and review for the nature-oriented river management.

#### 4.1 Publication of the technical documents for the nature-oriented river management.

So far technical documentation for nature-oriented river management was published, and the Foundation has sent information. For example, it published a book called “point book for nature-oriented river management (2007.9)” recently.

The Foundation aim supporting engineers, by dispatch or by publish advanced technical information.



**Fig.5 Point book for nature-oriented river management (2007.9)**

※ Complying contents of “Nature-oriented river works development basic guideline (in October 2006)” basic matters were brought together.

The Foundation is preparing for “Point book II” following the “Technical standard for river channel planning of small and medium rivers” promulgated on March 31, 2008. “Point book II” is a commentary on the technical standard.

Nature-oriented river management method applied to medium and small size rivers are shown such as the scheme drawing, longitudinal profile and cross section profile.

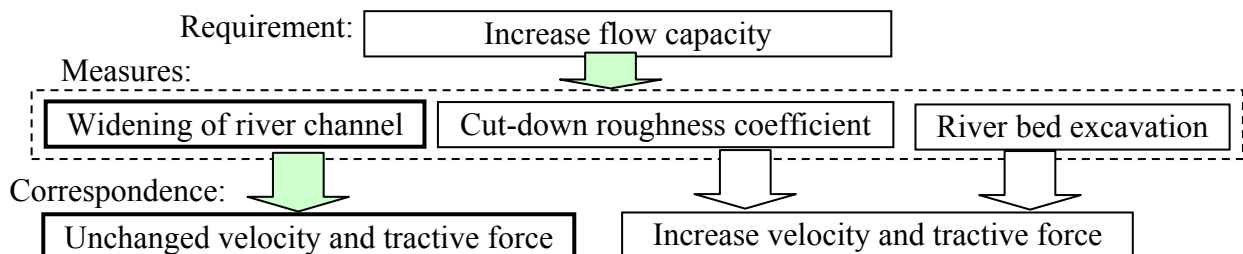
The main contents are as follows:

- A concrete commentary about technical criterion
- A procedure and attention points apply for criterion to river works
- Showing a study cases of maintenance

The “Point book II” introduces a principle that widening of river channel should be the primary measure to increase flow capacity under the nature-oriented river management rather than cut-down roughness coefficient or river bed excavation which may increase velocity and tractive force of river flow.(Fig6)

In the immediate future, the Foundation will publish the documents which summarized the method of building revetment and projects to become reference in.

These are gathered up as the point book series.



**Fig.6 Basic concept of medium and small river management**



The disaster by side erosion



The measures that widened river width

#### 4.2 Improvement and maintenance of data for the nature-oriented river management

Since the ministerial circular in 1990, various nature-oriented river works have been carried out in many part of the country. Those data were gathered and accumulated for database by The Foundation.

The database has been used for making technical documentation and to answer for question from field engineers.

In the future, the Support Center improve database for citizen use, in connection with the other data, for example National Census on River Environments.

#### 4.3 Human resource development for the nature-oriented river management.

Measures for human resource development, such as the introduction of a training program for administrators, construction consultants and engineers in the construction industry, are taken systematically.

And also establishment of information exchange between human networks using mailing list for improving technical skill are in progress.



Fig.7 Training scenery of planning river works for nature-oriented river management

#### 4.4 Promotion of active public participation and cooperation.

The Foundation has carried out various activities such as symposia and workshops to diffuse that nature-oriented river management.

For example “Good river symposia in Japan” symposiums had been carried out for two times. The first symposium, based on nature-oriented river works development basic guidelines (in October 2006), was held to improve the understanding level of engineers about contents and methods leading nature-oriented river management.

The second symposium, talked about methods of nature-oriented river management, the training method of the engineer and a promotion method for cooperation system between citizen and administrator concretely.

In the future, the Support Center will plan for workshops and a meeting for the studies so that nature-oriented river management can diffuse many aspects of various fields.



**Fig.8 Symposium scenery of the first**

And the Support Center also will give effort for establishment of the methods for better nature-oriented river management, while grasp various information from citizen and Non-Profit Organization (hereinafter as NPO).

#### **4.5 Regular monitoring and review for the nature-oriented river management**

At each of the planning, design, construction and maintenance stage, periodical checks for nature-oriented river management are carried out under the corporation of academic expert, citizens, NPO and field engineers.

And the Support Center will do follow-up for various projects.

### **5. SUMMARY AND CONCLUSION**

In order to promote the nature-oriented river management described earlier, there is a pressing need to take a combination of two types of measures described below.

1) First, measures should be taken to make effective use of knowledge and expertise accumulated in the field in connection with the minimum consideration mentioned earlier, in order to achieve the goal of eliminating problematic river works as soon as possible.

2) Then, technical studies should be conducted and measures to establish necessary institutional systems should be taken in order to raise the standard of river works and solve not only short-term problems but also medium- and long-term problems.

The Foundation expects significant contribution of the Support Center to disseminate the nature-oriented river management.