

# 中海自然再生 全体構想

## The General Plan for the Natural Restoration of Nakaumi



中海自然再生協議会

平成20年11月

The Nakaumi National Restratement Council  
November 2008

# 1 Introduction

Straddling Shimane and Tottori Prefectures, Nakaumi is Japan's fifth largest lake. Forming part of the Hii River catchment, Nakaumi and the neighboring Lake Shinjiko form the largest region of brackish water in Japan. Nakaumi previously supported an abundance of fish and shellfish - notably the ark shell (akagai or sarubogai) - which not only provided a rich diet for the people inhabiting its shores, but which also supported the local economy as large quantities of these fish and shellfish were shipped to Japan's major cities. Seaweed, which grew abundantly in the shallows, was harvested and used as fertilizer for crops such as sweet potato and cotton, which also thrived in the area. Nakaumi thus supported the inhabitants of the area who depended on the lake and lived in harmony with their natural environment.



Reaping of seaweed by boat



Sorikobune Boat for Ark shell gathering

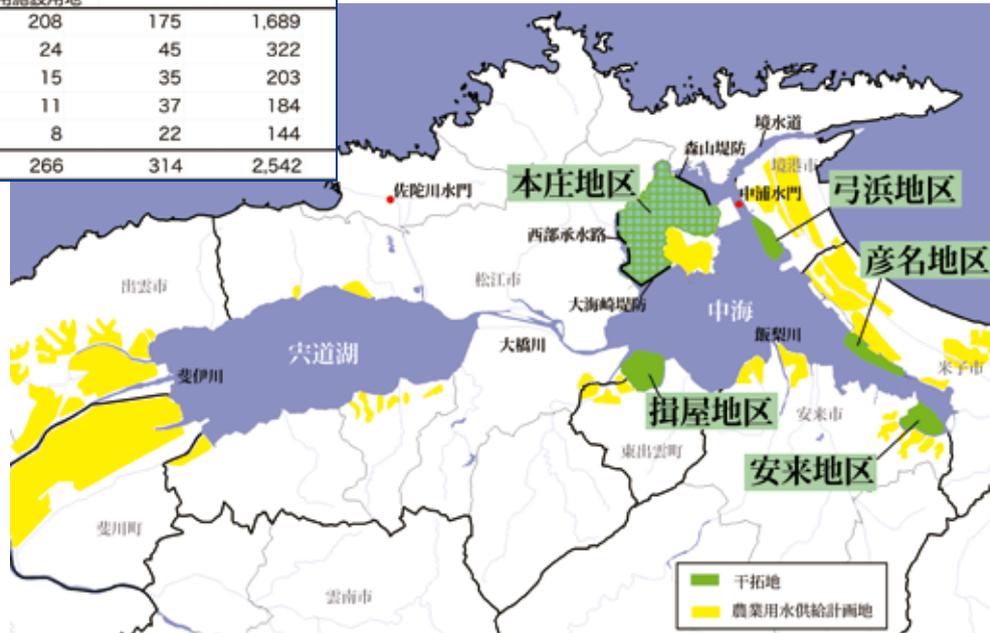


Swimming in Lake



Shellfish gathering by children

地区名	干拓面積 (ha)			計
	農地	宅地及び農業 用施設用地	その他	
本庄地区	1,306	208	175	1,689
掛屋地区	253	24	45	322
安来地区	153	15	35	203
彦名地区	136	11	37	184
弓浜地区	114	8	22	144
計	1,962	266	314	2,542



Plan for reclamation around Lake Nakaumi

However, approximately 50 years ago, the national government adopted a policy of large-scale land reclamation to increase food production, and for the next thirty years Nakaumi and the surrounding areas were subjected to extensive drainage and desalination projects. Eventually, changes in Japanese society prompted changes that resulted in these projects becoming obsolete; however, the damage to the natural environment was extensive and Nakaumi was left in a severely degraded state.

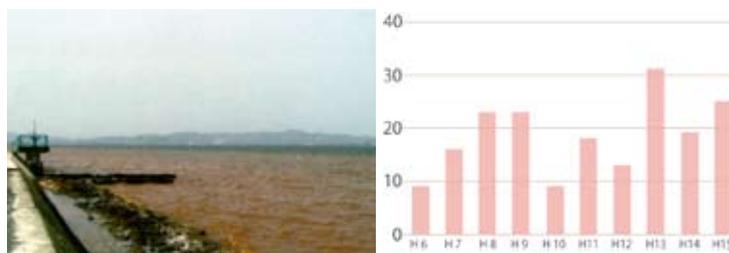


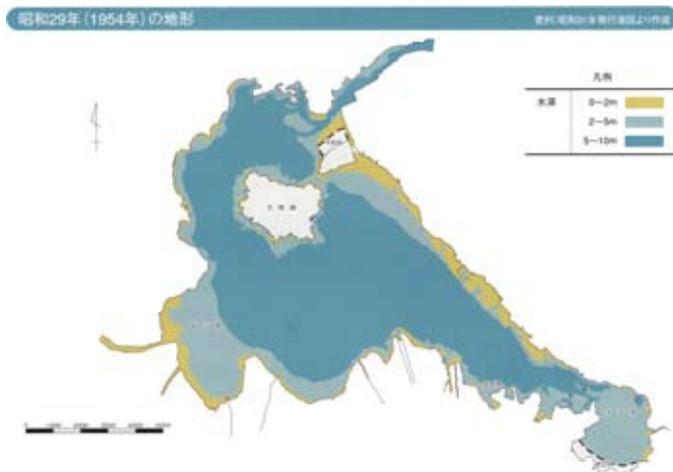
Photo of red tide in Nakaumi and its frequency



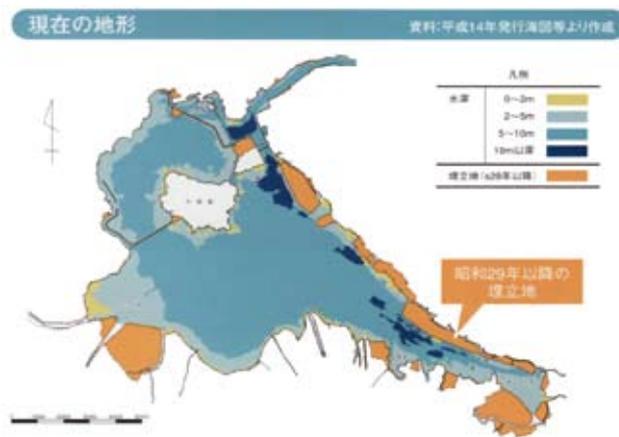
Vertical embankment



Black colored mud "Hedoro"



Previous bottom topography



Bottom topography at present

Those of us who have witnessed these changes firsthand, and who have become aware of the severity of the effects of environmental mismanagement, consider it our responsibility to restore, as far as possible, the natural state of Nakaumi when people coexisted with the lake. Our aim is therefore to pass this legacy on to our descendents as we anticipate the changes that may occur in society and in nature in the future. The Nakaumi Natural Restoration Council is engaged in ongoing discussions with interested and affected parties with the goal of reviving Nakaumi and the surrounding area through the participation of local citizens, local, regional and national government agencies, universities, and nonprofit organizations (NPOs). As a result of these activities, a General Plan has been formulated for the area.

President, the Nakaumi Natural Restoration Council  
 Katsumi Takayasu  
 November 2008

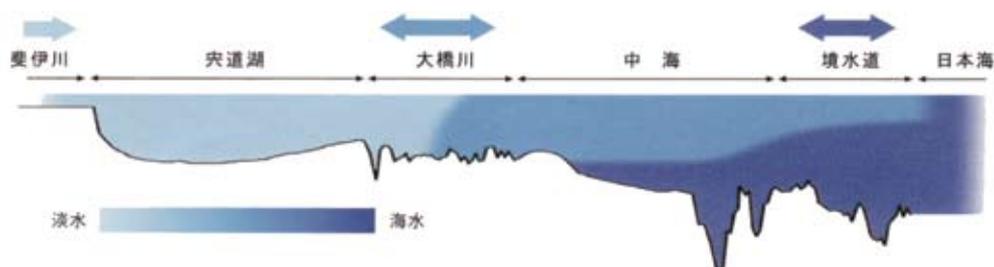
## 2 Overview of Nakaumi

Lakes Nakaumi and Shinjiko are located at the lower reaches of the Hii River. Approximately 450,000 people live in the surrounding area, which includes Matsue, Yonago and the other cities that form the economic hub of the central San'in region. In November 2005, Nakaumi and Shinjiko were awarded RAMSAR status and added to the RAMSAR Convention's List of Wetlands of International Importance, affirming their status as globally important wetlands.



Hii river and its drainage

Left hand side is Lake Shinji and right hand side is Lake Nakaumi



Typical bottom topography transect of Lake Shinji – Ohhashi river – Lake Nakaumi and Water Salinity

### 3 Background to Natural Restratement Efforts of Nakaumi

#### Establishment of the Natural Environment Restoration Center

The Natural Environment Restoration Center was established in March 2006 for the purpose of supporting restoration efforts in accordance with Japan's Nature Restoration Promotion Law (2002). The Center was created primarily through the efforts of members of the Study Group for the Natural Restoration of Yonago Bay, members of the Faculty of Education and Life and Environmental Science, the Interdisciplinary Faculty of Science and Engineering at Shimane University and other academic experts, environmental NPOs, and concerned citizens, in conjunction with various governmental agencies. Shortly after the opening the Center, a Natural Restoration Council Preparatory Meeting was convened with the aim of launching the Nakaumi Natural Restoration Council. In April 2007, the Natural Environment Restoration Center was formally recognized by the Japanese Government as an NPO.



Study meeting of natural restoration



Study tour around the lake

#### The Nakaumi Natural Restoration Council Preparatory Meeting

The Natural Environment Restoration Center hosted the First Natural Restoration Council Preparatory Meeting in August 2006. At the Fourth Meeting, it was decided to include the entire Nakaumi watershed in the restoration project and a commitment to participate in the activities of the Council was obtained from the relevant governmental agencies. On April 16, 2007, a month-long process of recruiting members and formulating the bylaws of the Council was initiated.

## Establishment of the Nakaumi Natural Restoration Council

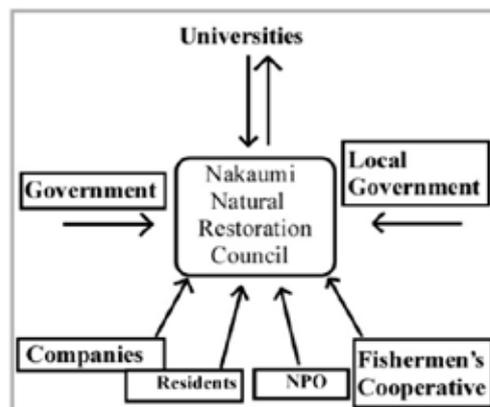
In June 2007, the Nakaumi Natural Restoration Council was formally established under the auspices of the Natural Environment Restoration Center as the 19th legally recognized council in Japan. Registered Council membership totaled 64 people, consisting of four group members, 35 individual members, 12 experts, and 13 members representing government and public entities.



Memorial lecture for Foundation Meeting



Foundation meeting of Nakaumi Natural Restoration Council



Organization of Nakaumi Natural Restoration Council (NNRC)

## 4 Objectives of the Natural Restoration of Nakaumi

Until around 1952, Nakaumi was a treasure trove of marine plant life, supporting vast seaweed and seagrass communities. Seaweed was either eaten by the local inhabitants or used as organic fertilizer. In addition, Nakaumi was known for its ark shell (akagai) harvest and its oyster farms; in 1948 the lake provided 51 % of Shimane Prefecture's inland seafood catch. With its abundant fisheries, Nakaumi was the primary source of food for much of the area's population. Until the late 1950s, the waters of Nakaumi were still clean, and the people living along its shores enjoyed fishing, swimming and boating in the lake.

However, in the period that followed, industrialization of the surrounding area and changes in the lifestyles of the local inhabitants led to extensive eutrophication and decreased water quality in the lake. Increased stagnation through construction of floodgate together with the extensive construction associated with various desalination projects also affected water quality.

The aim of our project is to restore Nakaumi to its 1950s state, when its waters were still sufficiently clean for both recreation and the provision of food in abundance. In doing so we intend to recover the fertile brackish water environment and restore ecosystem functioning. In addition, we hope to improve the sense of spiritual enrichment associated with the natural scenery of Nakaumi through reestablishing the natural environment and through employing sustainable utilization of the resources that once existed in and around the lake. In order to achieve this aim, the following general objectives of the restoration efforts have been proposed:

- i) Restoration and preservation of the lakeshore and the brackish water ecosystem
- ii) Environmental restoration through the improvement of water and sediment quality
- iii) Coexistence with, and sustainable use of, waterfowl
- iv) Promotion of environmental education of the younger generation to prepare them for future stewardship
- v) Creation of an environmentally sustainable society



Target area for restoration



Children's drawings intended to be good friends with Nakaumi part 1

## 5 Basic Approach to the Natural Restoration of Nakaumi

Compared to other restoration projects being undertaken and which are subject to the Nature Restoration Promotion Law, the area targeted for natural restoration by the Nakaumi Natural Restoration Council is vast (98 km<sup>2</sup>). Consequently, the restoration of Nakaumi will not only require the collaboration of the district surrounding the lake, but also the participation of the entire catchment, which extends from the forests in the upper reaches all the way to the Japan Sea.

Specific responses to environmental restoration, and to what extent these responses will be implemented, will depend on the local conditions of a particular restoration project. Consequently, the General Plan for the Natural Restoration of Nakaumi should be viewed as an overarching strategy that provides a long-term perspective on the overall direction of natural restoration efforts that need to be conducted through the implementation of separate plans in the region. The General Plan therefore articulates an ideal future condition) -- one that can be shared by everyone involved in the restoration effort -- of a lake that has been restored to its 1950s-state when its waters were sufficiently clean for it be used for both recreation and the provision of food in abundance. Insofar as all natural restoration efforts require (1) adaptable management based on scientific data and, (2) participation and cooperation among diverse actors, we recognize that the Nakaumi restoration project must adopt the following three perspectives articulated in the Nature Restoration Promotion Law;

i) Within the context of ecosystem recovery and rehabilitation of the surrounding natural environment that have either been damaged or destroyed by socioeconomic and other anthropogenic activities in the past, nature restoration efforts shall



Children's drawings intended to be good friends with Nakaumi part 2

be undertaken with the primary aim of maintaining and passing on a sound and bountiful natural environment to future generations. In doing so, we will realize a society that is in harmony with nature through the protection of the unique biodiversity of the region and contribute to the conservation of the global environment.

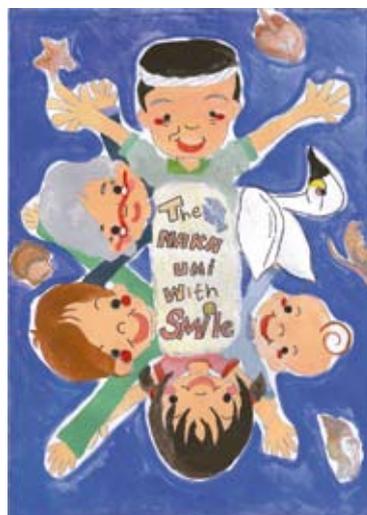
ii) In view of the objective of recovering ecosystems and other natural environments unique to the region, nature restoration shall be conducted with the participation and cooperation of diverse actors in the region, taking particular care to reflect the unique nature of the region in a totally transparent fashion.

iii) Nature restoration measures shall be conducted from a long-term, adaptable, and scientifically-sound perspective, fully considering the complex and dynamic characteristics of the ecosystems and natural environment of the region.

With these perspectives in mind, the Nakaumi Natural Restoration Program shall pay particular attention to the following four points:

i) Tasks associated with natural restoration efforts

The activities undertaken for the purpose of natural restoration shall clearly reflect the aforementioned three perspectives in that their goal is the recovery of ecosystems and other natural environments that have been damaged by previous projects and human activities. These nature restoration efforts shall include conservation -- the active preservation and maintenance of conditions in areas supporting healthy natural environments; restoration -- the recovery of the natural environment in areas where it has been damaged; creation of more suitable environment -- rehabilitation through the creation of large-scale green spaces, of environments in areas that are on the verge of losing functional ecosystems; and management required for long-term



Children's drawings intended to be good friends with Nakaumi part 3

monitoring and maintenance of the restored environments.

ii) Participation and cooperation of diverse actors

The Nakaumi Natural Restoration Effort, from the initial stage of devising a General Plan and survey through to the latter stages of long-term maintenance, shall be carried out with the active and voluntary cooperation of diverse actors in the region, including relevant government agencies, local public entities, local residents, nonprofit corporations and other private groups, and individuals with a specialized knowledge of the natural environment. Efforts shall be made to ensure transparency and promote the sharing of information among these actors. A natural restoration effort by definition has, as its objective, the restoration of specific ecosystems or other natural environments in a given region. Therefore, we shall first define the extent of our intended efforts -- what natural environment we intend to restore, how we intend to achieve this, and how the restoration programs will be executed. Moreover, determining the target of a recovery effort requires the consideration of various factors, such as the state of the ecosystem or natural environment being targeted, the demands of society on regional and national levels, and the technical feasibility of such restoration efforts. Therefore, in defining the target of our nature restoration efforts, we shall seek to obtain a society-wide consensus based on sharing among all concerned scientific and socioeconomic actors regarding the historical and extant status of the ecosystem and the industrial trends in the region.

iii) Implementation based on scientific knowledge

The Nakaumi Natural Restoration Effort shall be implemented on the basis of scientific knowledge. Through a knowledge of the ecosystems being considered combined with scientific assessments of the causes of damage to a specific area, we shall construct a sound basis of scientific knowledge with which to determine



Children's drawings intended to be good friends with Nakaumi part 4

the need for natural restoration in specific areas, we will establish targets for the restoration process, and identify the methods required to achieve those targets. This process must be conducted with due regard for the restorative power of nature and the delicate equilibrium of the ecosystems involved. We shall therefore undertake a thorough study of the methods required to affect the nature restoration process, including methods that are not restricted to conventional construction and repair, but that enlist nature's own capacity for self-healing and in doing so, achieve restoration of the environment with minimal intervention. Recognizing that ecosystem restoration is a long-term process and that restoration efforts by humans must strive to assist nature in this process, we shall undertake these activities in a patient and prudent manner. Furthermore, we shall apply the knowledge of local residents when utilizing the natural and human resources of the region so as to employ, and ascertain the efficacy of, natural restoration methods that are appropriate, robust, carefully thought out and in harmony with nature.

iv) Adaptive application

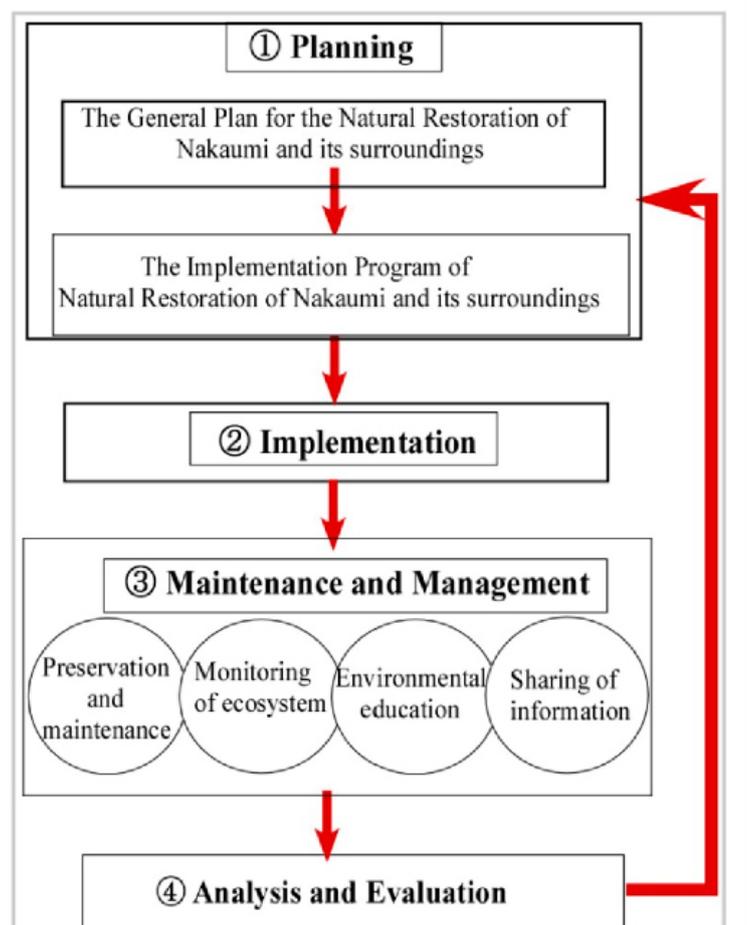
Recognizing that nature restoration efforts are concerned with ecosystems that are complex and constantly changing, we shall conduct a thorough survey of the affected ecosystems before embarking on this project. Thereafter, we will continue to monitor the recovery status of the natural environment after restoration work has been initiated, and subject these survey and monitoring results to scientific evaluation. These activities will facilitate the maintenance of consistent feedback throughout the restoration process.



Children's drawings intended to be good friends with Nakaumi part 5

## 6 Requirements for the Implementation of Natural Restoration Efforts

To implement the Nakaumi Natural Restoration Effort, the Council shall take the following steps: (i) Draft a General Plan. The Council shall first formulate a General Plan for the Natural Restoration of Nakaumi. Commentary and feedback shall then be sought from interested and affected parties on a draft proposal of a Natural Restoration Implementation Plan. The Council shall then, after thorough discussion, formulate the Natural Restoration Effort Implementation Plan. Based on the Implementation Plan, the Council shall then undertake to (ii) implement the plan and (iii) maintain and manage the catchment through environmental management, ecosystem monitoring, environmental education, and public outreach programs. The Council shall also (iv) analyze and assess the results obtained from the preceding steps to ensure that management of the system remains adaptable through the incorporation of feedback into the Implementation Plan. Throughout all stages of this process, we shall endeavor to maximize the sharing of information among Council members.



Implementation procedure of Nakaumi Natural Restoration Plan

## 7 Conclusion

A natural restoration effort is, by definition, an attempt to alter a complex system in which diverse factors interact with one another. As we implement our restoration plan in accordance with the General Plan, the natural environment of Nakaumi will respond in new ways. In the course of implementing this plan, we shall vigilantly monitor these changes to determine whether they reflect progress toward the attainment of our goal; a harmonious and sustainable coexistence with nature. The natural restoration of Nakaumi represents a novel attempt to restore, not only the natural environment itself, but also an environment in which both nature and humanity can coexist and thrive.

All photos and drawings are cited from the original “The General Plan for the Natural Restoration of Nakaumi” which is written in Japanese. No copies are allowed without permission of Nakaumi Natural Restoration Council (NNRC).

中海自然再生全体構想（英文版）について

協議会の委員でもある早稲田大学の井内教授が5月にガーナで開催された国際会議（29th Annual Meeting of the International Association for Impact Assessment, IAIA）のポスター発表（A Comprehensive Restoration Plan of Lake Nakaumi； Y.Inouchi, M. Aizaki, K. Takayasu, H. Kunii, T. Tokuoka）で全体構想の英訳をつくり、紹介されましたので、ここに掲載します（事前に了解が求められ、事務局として了承したものです。なお、この著作権は中海自然再生協議会で良いとことです）。井内教授によると、この学会は国際影響評価学会といい、規模が大きく、日本では環境アセスメント学会が対応機関とのこと、アセスは日本では“手続き”と受け取られているが、もっと崇高な理念のもとにあり、合意形成をどのようにして行くかが中心課題で、中海の運動はまさにそれに適合していると考えたのが発表する動機となったとのこと。（NPO 法人自然再生センター事務局 T）



中海の自然再生に関する情報は、ホームページ  
<http://nakaumi-saisei.sakura.ne.jp/>  
にも掲載しています。

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