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## A Brief History of Mannoike

Mannoike can be rightly said Japan's largest reservoir for irrigation purposes and it said it was first constructed in the Taiho era (between 701-704AD) by Michimori Ason, Lord of Sanuki (today's Kagawa Prefecture). However, it was destroyed by floods in the 9<sup>th</sup> year of the Konin era (818 AD) by flood waters and Michinomabito, an emissary dispatched by the Imperial Court began reconstruction but encountered manpower and technical difficulties.

Subsequently, at the behest of Lord Kiyohara-no-Natsuno in the 12<sup>th</sup> year of the Konin era (821AD) the famous Buddhist monk Kukai (or Kobo Daishi who was originally from the area) was sent to oversee the reconstruction. Under his supervision, using techniques construction he studied in T'ang Dynasty China was completed in less than 3 months the large lake, approximately 8.25 km in area was completed.

As a reward for such fine work the Imperial Court awarded Kukai 20,000 copper pieces with which he established Kannoji temple on the causeway by the lake.

In the following years the lake built by Kukai was damaged and rebuilt many times but at the beginning of the Genryaku era (1184 AD) it was destroyed by flood waters and due to disturbances of the Kamakura and the Age of Civil War, the lake fell into a state of neglect. For about 450 years until, in the 2<sup>nd</sup> year of the Kan'ei era (1625 AD), Lord Ikoma of Sanuki appointed a vassal expert in civil engineering, one Nishijima Hachibee to rebuild the reservoir. When completed in 1631 AD, the water from the reservoir irrigated the fields of 44 villages in 3 counties.



Hasegawa Sataro

After that, the lake's wall was once again breached during the great earthquake in the first year the Ansei era (1854).

With support from Matsuzaki Shibuemon, Governor of Takamatsu Province, the weir was reconstructed by the headman of Enai village Hasegawa Sataro being completed in the 3<sup>rd</sup> year of the Meiji era (1870).

Later, in the 38<sup>th</sup> year of the Meiji Period (1905), the lake wall was raised by 0.87 metres and in the 3<sup>rd</sup> year of the Taisho Period (1914) all the sluices were rebuilt with concrete and granite and a brick water-intake tower. However the increasing demand for irrigation lead to further raising of the lake wall in 1929 by 1.51 metres and again in major works from 1942 by another 6 metres. Works were disrupted by the effects of World War two from 1945 until 1946, finally being completed in the 34<sup>th</sup> year of the Showa Period (1959) when the lake assumed it present size and structure holding about 15.4 million cubic metres of water.



Statue of Kukai (Kobo Daishi)

# Legends of Mannoike

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Like many other historic places, there are many stories associated with Mannoike. Amongst tales from the past and the present, one is the legend of the Dragon of Mannoike.

Along time ago, the dragon that lived in the lake was enjoying sunning himself in the disguise of a small snake. That day a Tengu (a long nosed goblin) from the land of Oumi (in present day Shiga Prefecture), disguised as a kite and searching for prey, spied the small snake and capturing it, took it back to the goblin's den in a grotto of Hirasan mountain in Oumi and threw the little snake in a cage.

Once again the tengu set out looking for more prey and this time, flying over Kyoto spied a young priest. Capturing him, he brought him back to his grotto where he imprisoned him in the same cage with the small snake before flying off again. Now the young priest was lucky enough to still have with him a small water bottle. Seeing his fellow prisoner looked just as thirsty, he kindly gave the small snake a drink. When the small snake had drunk his fill he began to transform back into his true form and in doing so tore apart the cage and freed the young priest. He then flew after the tengu which was again up to no good in the city of Kyoto. He found the tengu there, mischievously disguised as a monk and, it is said, coolly dispatched the wretched creature. (Also it is said that when a governor had the embankment of the lake taken down a huge one meter long carp emerged, fueling the myth of the dragon of Mannoike)



Mannoike from the air, looking towards the northwest.

## A Historical Summary of Mannoike

Date (Christian Era)	Date (By Japanese Era)	Historical Highlights
701~704	Taiho Era	Lord Michimori of Sanuki constructs the first recorded dike in what is now the Mannoike area.
818	9th Year of the Konin Era	Flood waters destroy the reservoir.
821	12th Year of the Konin Era	Michinomabito, an emissary dispatched by the Imperial Court began reconstruction but encountered difficulties. Subsequently, the famous Kukai (or Kobo Daishi) is sent in July to oversee the reconstruction which is completed in just 2 months.
851	1st Year of the Ninju Era	In Autumn of this year, floods again destroy the reservoir.
852~853	2nd~3rd Year of the Ninju Era	Lord Hiromune of Sanuki begins reconstruction that is completed in March of the following year. Construction involves 19,800 labourers using 120,000 rice straw bundles and 68,000 reed filled bags.
1184	1st Year of the Genryaku Era	On May 1st, the reservoir is once again destroyed by flooding. After this, during the Kamakura period and the disturbances of the Sengoku Jidai (The age of Civil War), for a period of 450 years the un-repaired reservoir is left in ruins. During this time, people come to live in valley where the reservoir stood, the village thus formed is known as Ikeuchi-mura (lit. the village in the lake).
1628~1631	5th~8th Year of the Kan'ei Era	After the unification of Japan by Shogun Toyotomi Hideyoshi, peace comes to the land. During the reign of the Shogun Tokugawa Iemitsu, the Lord of Sanuki, Takatoshi, the 4th Lord of the House of Ikoma instructs one of his vassals, Nishijima Hachibee to rebuild the reservoir. The water from the reservoir was supplied to 3 counties comprising 44 villages that produced 35,814 bushels of rice (approx 5300 tons) per year. This was 1/6th of the yield of the Sanuki Fief.
1849~1853	2nd~6th Year of the Kaei Era	At this time the sluiceways were constructed from wood so that even after reconstruction work in 8th year of the Ansei period, the lower sluiceway was replaced 6 times while the vertical sluiceways were replaced 12 times. Subsequently, the timber in the lower sluices was replaced by stone.
1854	1st Year of the Ansei Era	On then 9th of July a massive earthquake damages the lower sluiceway destroying the weir.
1869~1870	2nd~3rd Year of the Meiji Era	Repairs are delayed by the disorder of the fall of the Tokugawa Shogunate resulting in the headman of Enai, one Hasegawa Yoshiheiji, using his own funds to restore Mannoike until his death midway through reconstruction. With support from Matsuzaki Shibuemon of Takamatsu Province and Councilor Shimada Yasuo of Kurashiki Prefecture, the weir was reconstructed through the efforts then Enai village headman, Hasegawa Sataro and Izumi Torataro of Konzoji Temple.
1898	31st Year of the Meiji Era	At this time, the large rock formation in the Western corner of the weir was drilled to make a new lower sluiceway. (Water stored: 5.8 million m <sup>3</sup> , labourers required: 144,900, total construction cost: 4,073 yen)
1905~1906	38th~39th Year of the Meiji Era	The vertical sluice-pipes and the scaffolding towers are repaired (total construction cost: 10,300yen)
1914	3rd Year of the Taisho Era	The first works to increase the height of the weir (by 0.87m) as well as improvements to the spillways are carried out. (Water stored: 6.6 million m <sup>3</sup> , total construction cost: 16,761yen)
1927~1930	2~5th Year of the Showa Era	The water tower is built (total construction cost: 18,900yen)
1940~1959	15th~34th Year of the Showa Era	The second raising of the height of the weir (1.5m) as well as the construction of a new catchment canal (400m) to the Saitagawa are carried out by Prefectural works (Water stored: 7.8 million m <sup>3</sup> , total construction cost: 428,700yen)
1953~1969	28th~44th Year of the Showa Era	During the Great Drought in the 14th year the Showa Era (1939), the opportunity is taken to undertake Prefectural works to elevate the weir for a third time to 6 meters and to construct the Amagawa Aqueduct (4,668 m) to take water from the Dokigawa, thereby doubling the capacity of Mannoike to 15.4 million cubic meters. (total construction cost: 543,327 thousand yen)
		To increase the effective utilisation of the water drawn from Mannoike, special Prefectural works to consolidate the banks of the Kanakuragawa are carried out. (total construction cost: 639,122 thousand yen)

# A Summary Mannoike Statistics/満濃池概要

## ① Area of Distribution

2 Cities, 3 Towns. 2,735ha Cooperative membership 7,515 persons.

City/Town Name	Marugame City	Zentsuji City	Tadotsu Town	Kotohira Town	Manno Town
Area receiving supply	645 ha	864 ha	371 ha	259 ha	596 ha

## ② Present Condition

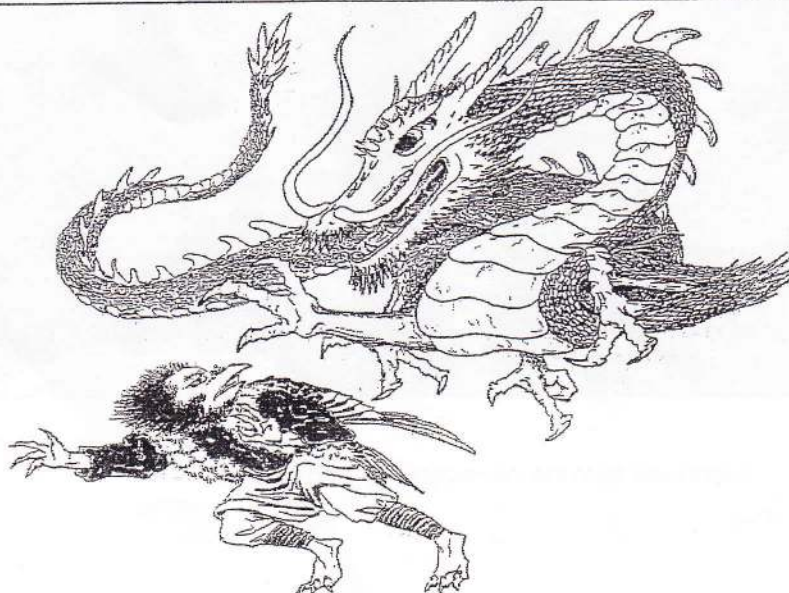
Formal Description	Arch-shaped Earthen Dike	Volume of water contained	15,400,000m <sup>3</sup>								
Dam Height	32.0m	Reservoir Area	138.5ha								
Dam Length	155.80m	Direct Run-off Area	1,280ha								
Dam Volume	218,000m <sup>3</sup>	Indirect Run-off Area	8,610ha								
Elevation	Embankment			149.00m	<table border="0"> <tr> <td>Saitagawa</td> <td>1,230ha</td> </tr> <tr> <td>Dokigawa</td> <td>6,700ha</td> </tr> <tr> <td>Korobishi</td> <td>680ha</td> </tr> </table>	Saitagawa	1,230ha	Dokigawa	6,700ha	Korobishi	680ha
	Saitagawa			1,230ha							
	Dokigawa	6,700ha									
Korobishi	680ha										
Full Water Level	146.00m										
Flood Level	147.00m										
Gradient	Up-stream	30%									
	Down-stream	25%									
Water Intake Tower and Sluiceway											
[Water Intake Tower]	Height:30m	Diameter of foundations:12m	Diameter of tower base:7.4m								
			Diameter at tower top:6.4m								
	Internal diameter:5m	Diameter of suction pipes:0.8m	Number of suction pipes:3								
[Lower Sluiceway]	Extension:197m	Incline:1/100	Cross-section width:1.2m								
			Height:1.5m								
	Description: Tunnel sluiceway Peak water flow per second:5m <sup>3</sup>										

## ③ Catchment Area and Available Water

Division	Area	Amount of rainfall	Discharge rate	Amount of available water
Catchment Area	3,000ha	191.1mm	30%	1,719,900m <sup>3</sup>

## ④ Catchment Amounts for Mannoike by Source

Division	Area	Amount of rainfall	Discharge rate	Catchment Amounts
Mannoike Direct Run-off Area	1,280ha	664.6mm	50%	4,253,440m <sup>3</sup>
Saitagawa Direct Run-off Area	1,230ha	664.6mm	50% (harvest rate 35%)	1,430,551m <sup>3</sup>
Supplementary Source Amounts	Korobishi	6,700ha		1,998,146m <sup>3</sup>
	Dokigawa	680ha		7,717,863m <sup>3</sup>
Totals	9,890ha			15,400,000m <sup>3</sup>



The Mannoike dragon takes revenge on the Tengu of Hirasan (By R Talbot)