

An aerial photograph of a wide, muddy river valley. A long, straight dam or bridge structure spans across the river. In the foreground, there is a large, green, oval-shaped area that appears to be a racetrack or a large sports field, surrounded by some buildings and parking lots. The surrounding landscape is a mix of green fields and brown, flooded areas. The sky is overcast with grey clouds.

Toward Realization of Community That Exists in Harmony with
Abundant Nature and Free from Flood Damage

Ichinoseki Retarding Basin Project

~ Kitakami River ~

Hiraizumi Town

Retarding Basin No.2

Ichinoseki area is located in the middle stream basin of Kitakami River and in the southern part of Iwate Prefecture. This area suffers frequent flood damage due to its geographic characteristics since ancient times.

Ichinoseki area sustained unprecedented disaster when massive floods stroke consecutively in 1947 and 1948 of the early postwar period. The number of people who were killed and missing stood at approximately 600, and this area was ravaged seriously. Following these damages, a grand project, Ichinoseki Retarding Basin Project, was planned and constituted the foundation of flood control of the Kitakami River.

The Retarding Basin consists of the main embankment that protects downtown from flooding, the small embankments that prevent middle/small flooding and strengthen efficiency in controlling, and retarding basins No. 1, 2 and 3.

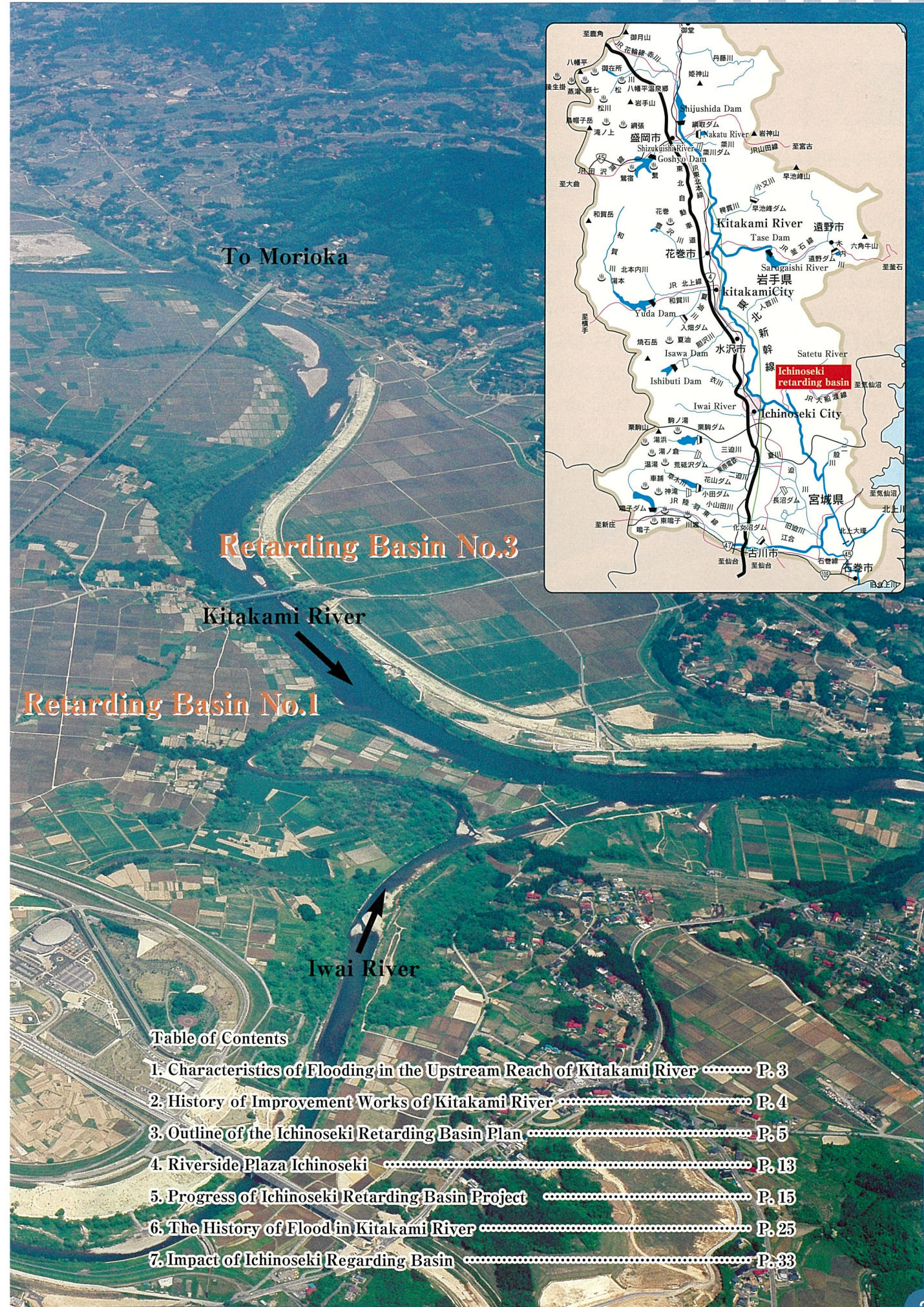
The Ichinoseki Retarding Basin Project is still in progress for early settlement of flood damage as well as for assisting the residents' life and regional development

JR Tohoku Line

Tohoku Shinkansen

Ichinoseki City

To Sendai



To Morioka

Retarding Basin No.3

Kitakami River

Retarding Basin No.1

Iwai River



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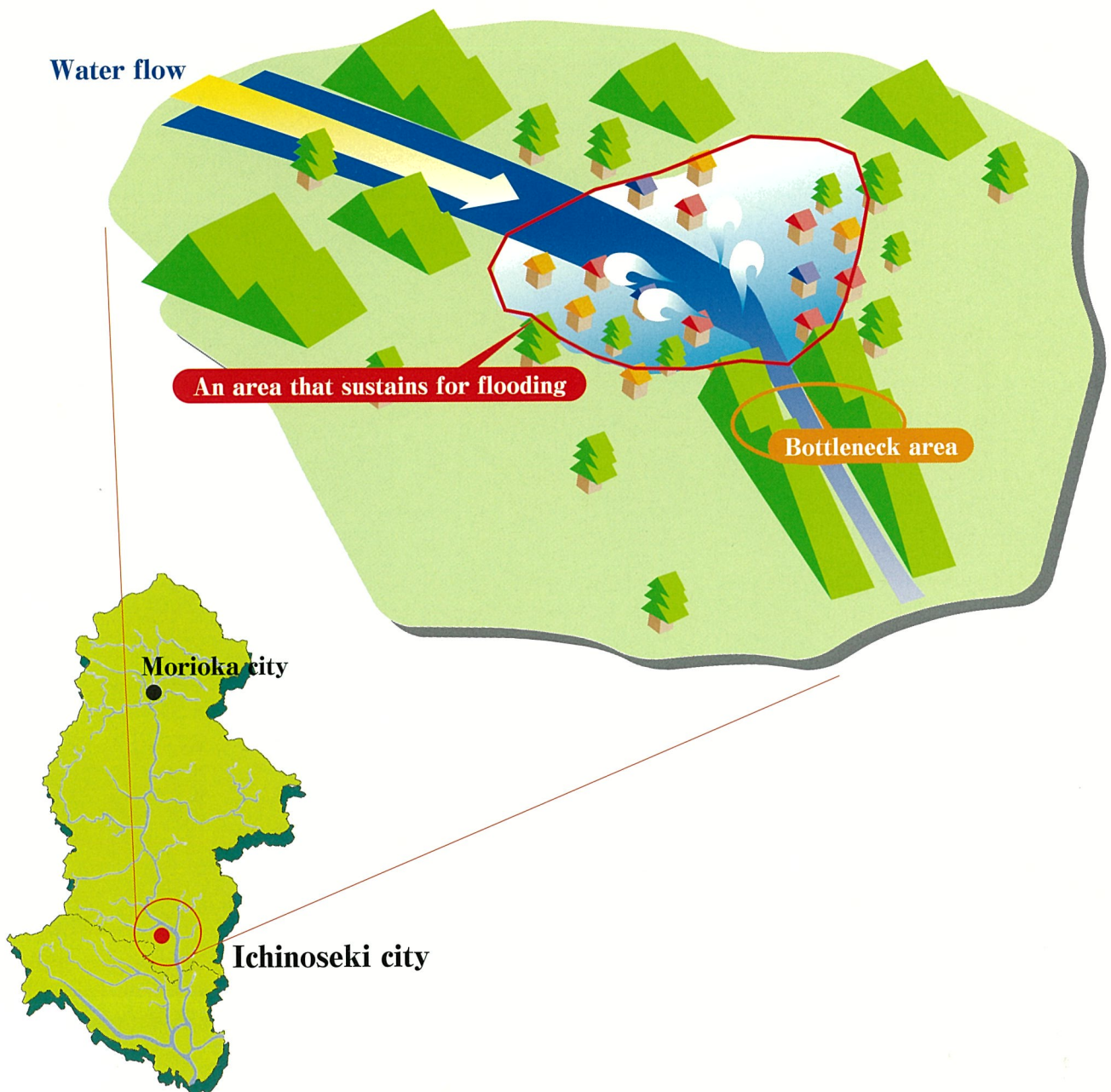
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1 Characteristics of Flooding in the Upstream Reach of Kitakami River

The Ichinoseki-Hiraizumi area along Kitakami River suffers frequent flood damage. Invaluable lives and properties were lost at every large flooding and farm products along the river were damaged almost every year.

Flood is frequently caused because a bottleneck with very narrow river width lies in the downstream district of this area. This bottleneck area extends for 28km to the border with Miyagi prefecture and its narrowest part is only about 100m.

Because the gradient of the river is low-pitched, a flow capability of the river is extremely low compared with its upper reach. This is why the water that is unable to drain away in this district overflows into the Ichinoseki-Hiraizumi area.



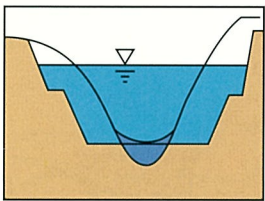
2 History of Improvement Works of Kitakami River

As Improvement Works of Kitakami River, low-water river works were implemented from 1880 until 1902, aiming for waterway improvement in the segment between Morioka and Ishinomaki estuary. Afterwards, a New Kitakami River(discharge channel) was excavated and the route destination of the Kitakami River has been changed from Ishinomaki Bay to Oppa Bay (completed in 1934). “Kitakami River Comprehensive Development Plan of Specified Sections” (called as Japanese T.V.A* or K.V.A: Kitakami River Comprehensive Plan) was instituted in December 1951 based on the Act for Comprehensive Development of the National Land and the five large dams (Shijushida, Gosho, Tase, Yuda, and Ishibuchi)were improved. The river improvement works in frequent flood-ravaged Ichinoseki-Hiraizumi area was started at the same time.

Mainly four methods are examined for reducing flood damage in the corresponding area.

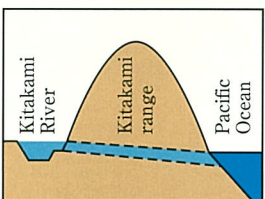
* T.V.A: Tennessee Valley Authority in the U.S.

The Methods for Protecting Ichinoseki-Hiraizumi area from flooding



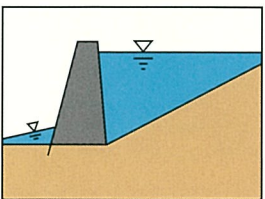
To widen the bottleneck

The water overflows in upstream area of the bottleneck and results to flood at flood time. This flooding can be avoided by excavation of the bottleneck area, but the construction may be extremely tough because the same width as the upstream are required to be excavated and river reaches of solid rocks stretch for 28 km. The rate flows at a time to downstream will increase and the river width needs to be also widened. Thus, this method takes a vast cost and a long construction period.



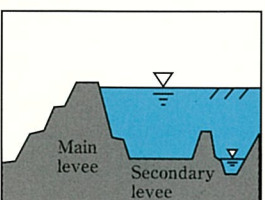
To divert flood flow

This method is to excavate a tunnel through Kitakami range for discharging the water that the bottleneck cannot handle into the Pacific Ocean. The tunnel may be 40 km in length and this method is impractical in consideration of cost and construction period. (Example: Total length of Seikan Tunnel is 53.85 km with approximate total construction cost of 700 billion yen)



Flood control by dams

Dams play an important role on flood control. They collect rain fallen in the upstream reaches to control the flow rate to discharge. Five large dams have been completed in the upper reaches of Kitakami River. Possible construction site for dam is restricted from geographic and topographical aspects. Thus we cannot completely rely on the dams for flood control.



To use retarding basin

This can be considered to be the best method, judging comprehensively from cost, construction period and influence on peripheral areas. It is possible to maintain the retarding function of the area that used to be a natural retarding basin as it was if this method is used. It shall be important to set up a plan for improvement works to protect lives and properties.

3 Outline of the Ichinoseki Retarding Basin

Following major flood damage by flooding in 1947 and 1948, construction of the Maikawa Retarding Basin (the current No. 2 and No. 3 retarding basins) was planned in February 1949 with release discharge of 400 m³/s, together with the five large dams, when the discharge amount was first revised. The release discharge was revised to 700 m³/s in 1953. The master construction plan for Kitakami River system was instituted in March 1973. In this plan, the Kozenji point (in Ichinoseki City) that is the standard point of Kitakami River was scaled in 100 years probability and the Ichinoseki Retarding Basin was planned to enlarge the Maikawa Retarding Basin in scale.

This plan aims at reducing the design flood discharge to 8,500 m³/s by controlling 4,500 m³/s with the dams and Ichinoseki Retarding Basin, against the reference flood discharge of 13,000 m³/s at the Kozenji point.

Ichinoseki Retarding Basin counts for 1,900 m³/s under control in the release discharge of 4,500 m³/s.

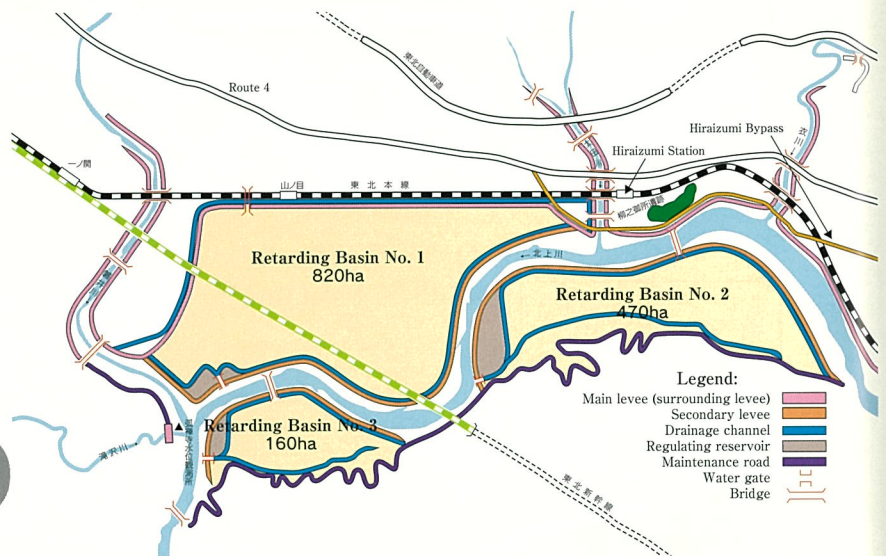
Ichinoseki Retarding Basin uses a double-line embankment system made up of an encircling embankment and small embankments and is made up of three retarding basins, No. 1 (820 hectares), No. 2 (470 hectares), and No. 3 (160 hectares).

Overflow into the retarding basins covers the amount larger than the one at floods which occur approximately once in ten years and is planned to be released at the same time in three retarding basins.

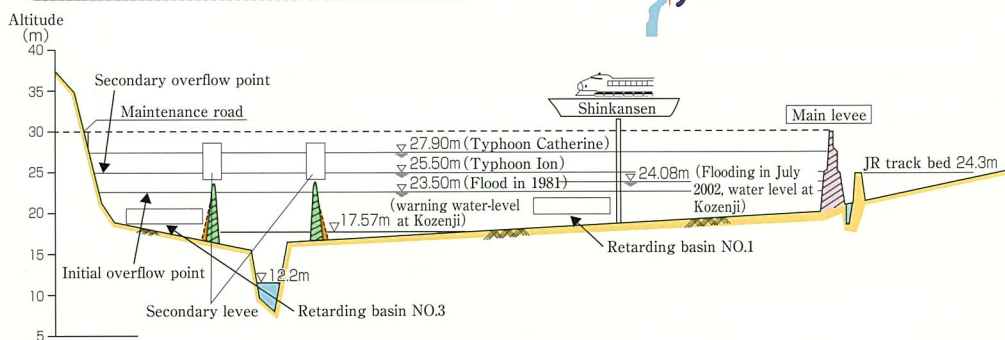
Major Work Types

- Banking 28,200m in total length
 - Water gate..... 3
 - Secondary levee 18,200m in total length
 - Compensation of houses 450
 - Maintenance road 14,900m in total length
- [Total project expense: 270 million yen (revised in 1995)]

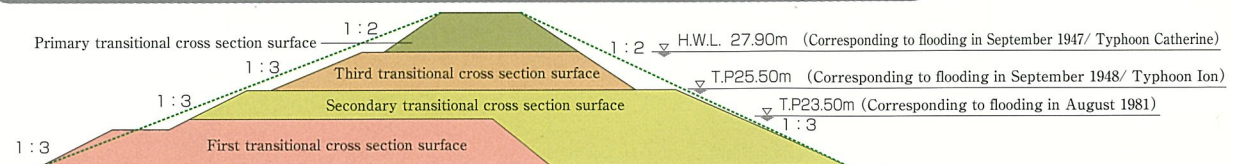
Plain view of Ichinoseki Retarding Basin Project



Cross-section pattern diagram for Ichinoseki Retarding Basin



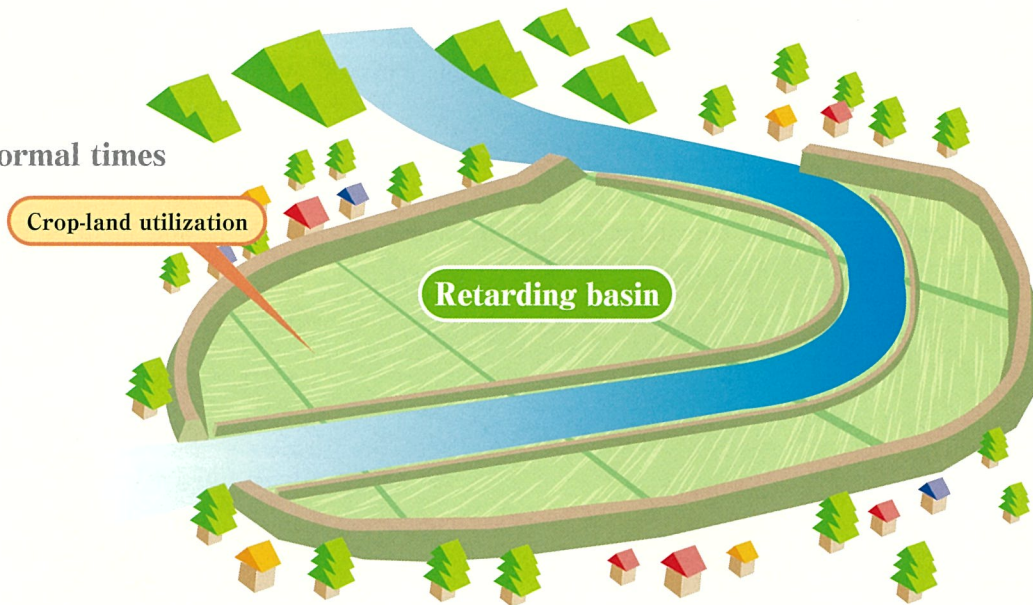
Standard section view of levee (in the vicinity of Kozenji observatory)



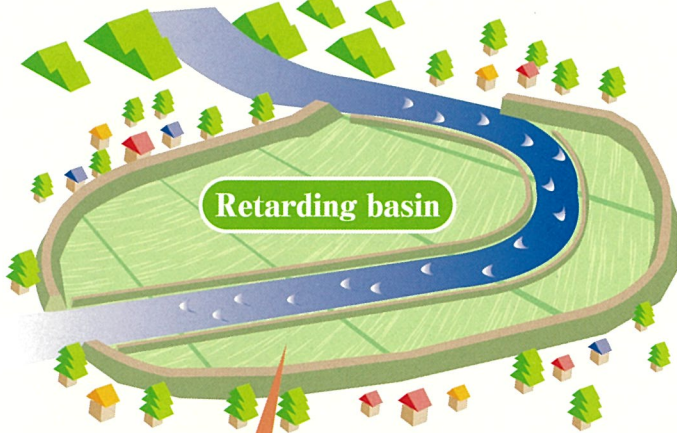
* A slope without stages in the upstream of Takadate Bridge

- 1** Flood control
- 2** Protection of downtown, etc. from flood damage
- 3** Land utilization in the retarding basin

● At normal times



● At middle/small-level floods



Flood damage protection for retarding basin with small embankment

● At large floods



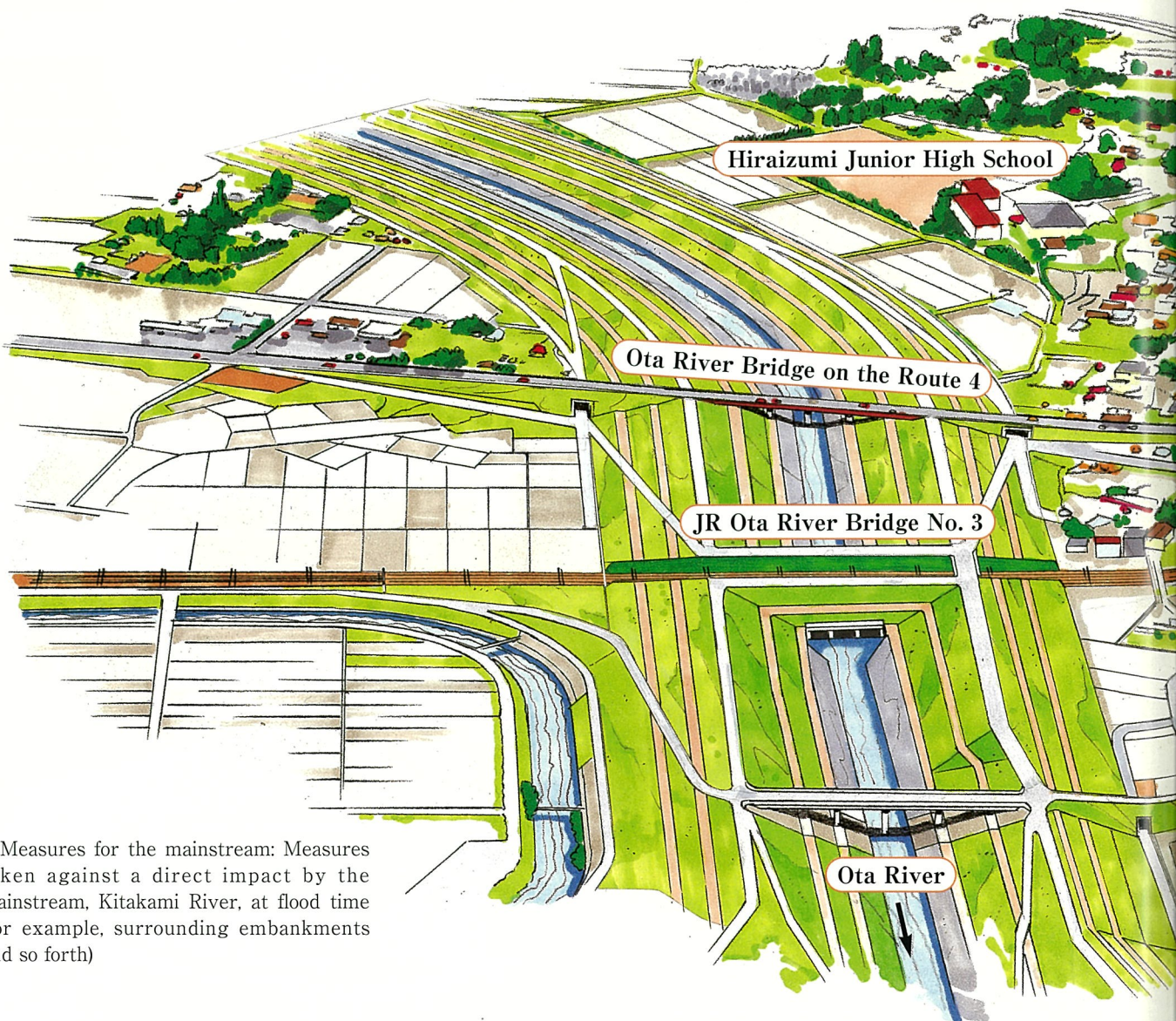
Flood damage protection for downtown, etc. with surrounding levee

(1) ※ Measures for the Mainstream* (Ota River, a tributary, where improvement construction is in progress)

The height of embankment at the right-bank of Ota River that is being improved together with the surrounding embankment was only the same as the primary transitional levee (T.P.23.50m corresponding to the flood in 1981). Moreover, the height of the embankment on the left bank of the river that directly protects Hiraizumi Town from floods was also the same. Aging of the JR Ota River Bridge No. 3 that was installed in 1890 was serious, and flow capacity under the bridge beam was approximately one third of the design inflow of Ota River as 290 m³/s. The flow capacity at Ota River Bridge on the Route 4 was also approximately one third of it. There was a danger of flood damage due to these low flow capacities condition.

The JR Ota River Bridge No. 3 had been a factor of danger and its reconstruction was commenced through consultation with JR East as Reconstruction Project of Particular Structure in the fiscal year 1998 and was completed in the fiscal year 2003. For the Ota River Bridge on the Route 4, the construction was commenced in the fiscal year 1997 and completed and in service in the fiscal year of 2002.

These reconstructions of two bridges have promoted a series of improvement together with bank raising of Ota River Embankment, surrounding embankments and Hiraizumi Embankment, and made it possible to protect downtowns of Ichinoseki City and Hiraizumi Town from flood.



※Measures for the mainstream: Measures taken against a direct impact by the mainstream, Kitakami River, at flood time (for example, surrounding embankments and so forth)

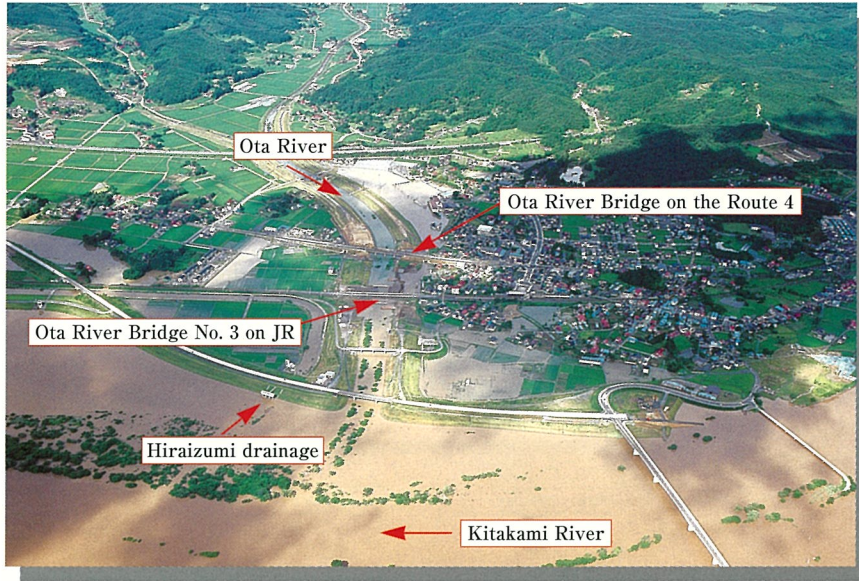


Photo taken in June 2002



Ota River Bridge No. 3 on JR Tohoku Line has been reconstructed and an overbridge has been completed/ Photo taken in April 2004

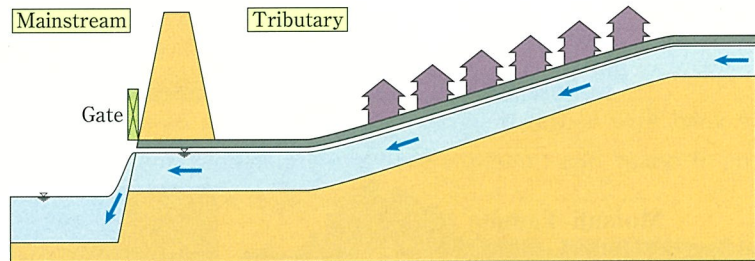
(2) Measures for Internal Water

The improvement of surrounding embankments has reduced flood damage caused by Kitakami River flooding. However, a phenomenon called “internal water” occurs when the water level of Kitakami River rises at flood time. As the sluiceway gates are closed for preventing reverse stream from Kitakami River into tributaries, water that is supposed to be drained cannot be pumped out to Kitakami River.

Mechanism of internal water

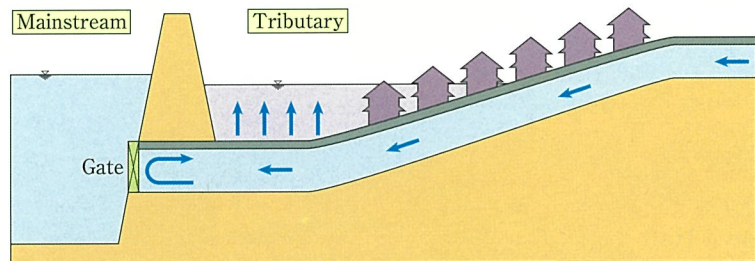
At normal times

Water flows smoothly from tributary to mainstream



At floods

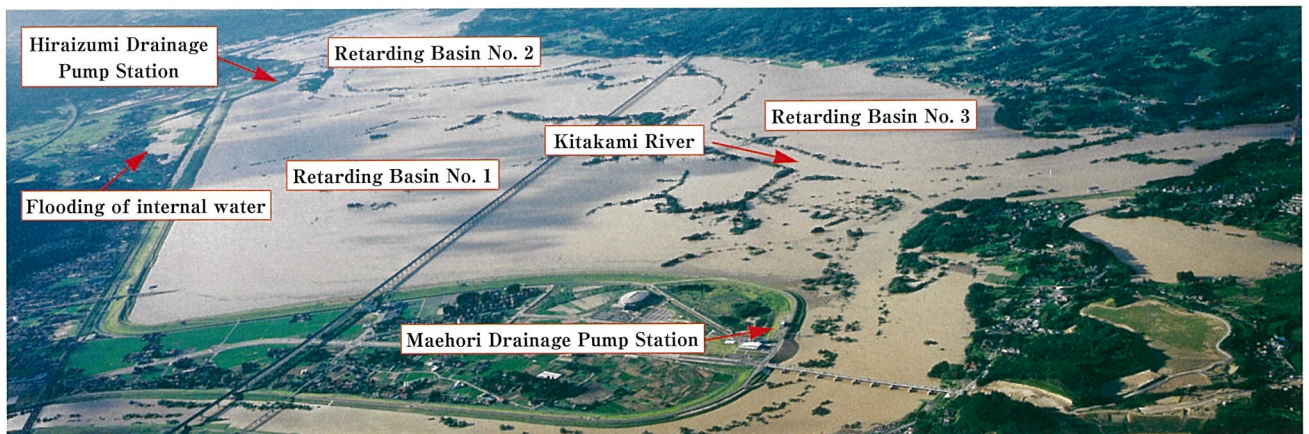
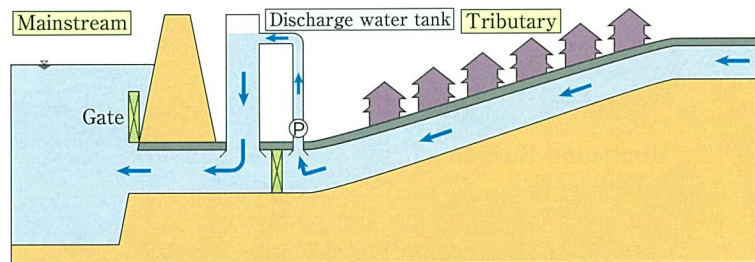
Once the gate is closed to prevent reverse stream from the mainstream at flood time, water in tributary is not pumped out and overflows when a flood occurs at tributary



What is drainage pump station?

Drainage

The pump forcibly drains out water that piles up in tributary

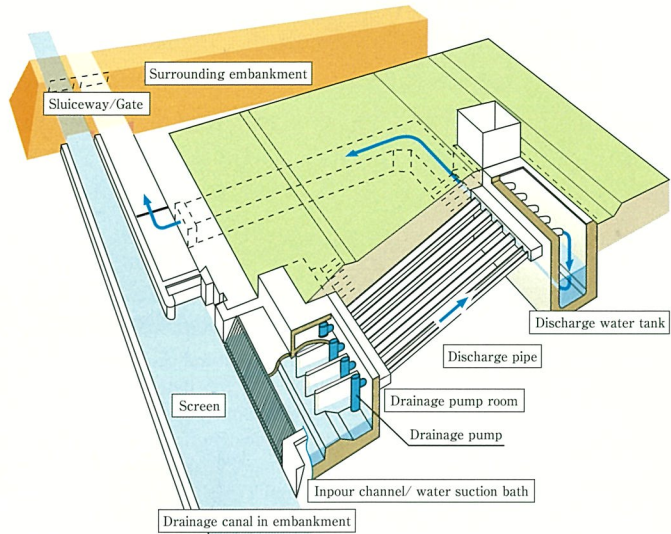


Bird's eye view of Ichinoseki Retarding Basin: Photo taken in July 2002

Maehori Drainage Pump Station

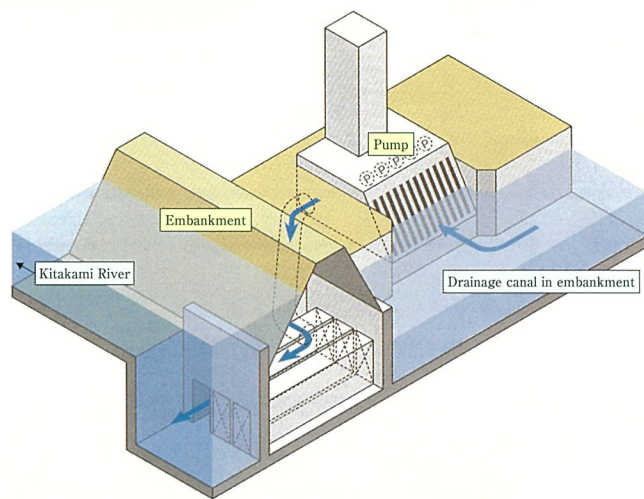
This pump station is capable of draining 7 m³/s of internal water. It is estimated that no internal water damage shall occur even in the case that it rains as much as at the flood time that occurred at the end of August 1998.

This facility was improved together with “Riverside Plaza Ichinoseki” which has the functions of Kitakami River Information Center and Central control center of Ichinoseki Retarding Basin. As it is located in the Ichinoseki Retarding Basin Memorial Park, its structures are built under the ground in full consideration of the surrounding landscape and environment.



Hiraizumi Drainage Pump Station

This pump station is capable of draining 5 m³/s of internal water using five pumps. It is estimated that no internal water damage shall occur even in the case that it rains as much as at the flood time that occurred at the end of August 1998.



Drainage Pumper truck

This truck is sent out to the sites of disaster such as river flood due to typhoon or concentrated downpour, or water-covered road, in order for drainage operation.



Drainage condition at the flood in August 2001 (Inside the Hiraizumi, in Hiraizumi Town)

(3) Changes in Ichinoseki Retarding Basin Project in Association with Yanaginogosho Remains

Hiraizumi Town in Nishi-Iwai County, Iwate Prefecture, where “Yanaginogosho Remains” are located, is a historical town that the glorious Fujiwara clan of Oshu area had lived at the end of Heian period. “Yanaginogosho Remains” was thought to be the governing place for Fujiwara clan at that period.

For the initial phase of the project, the embankments of Ichinoseki Retarding Basin and Hiraizumi Bypass on the Route 4 were supposed to pass through these remains. As the urgent research of the planned construction site prior to construction started in the fiscal year 1988 and the research proceeded, a lot of historical articles and remains were excavated, ensuring that this remains are the very “Yanaginogosho Remains.”

According to the result of this research, this remains were judged to be important on analyzing our country's history. Thus the location plan of embankments and bypass route were moved to the riverside, avoiding this remains area.

Background to the change of embankments and bypass route

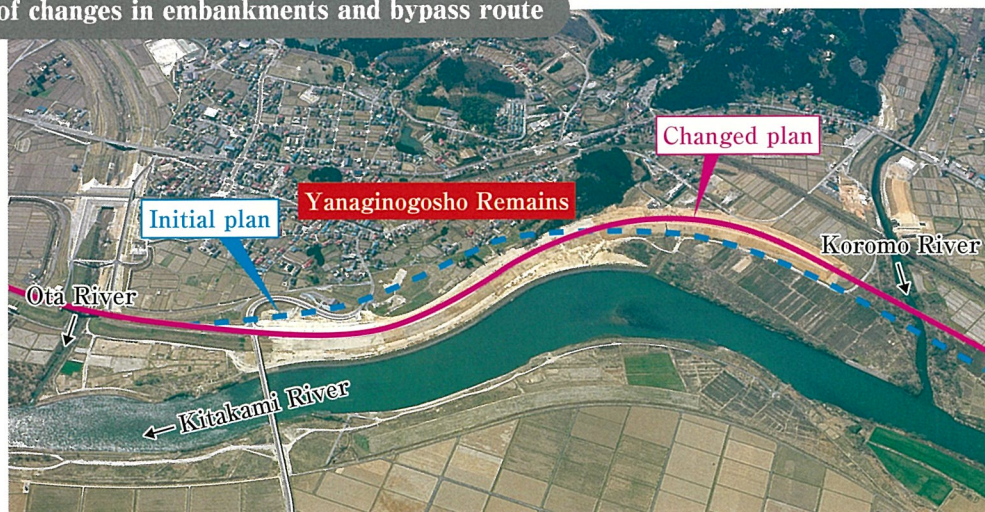
- June – July 1981 ◎Prior discussion for buried cultural property
- October ◎Hiraizumi Bypass town plan was determined. Acquisition of land required started.
- April 1988 ◎Excavation research was commenced.
- August ◎Excavation Research Instruction Committee for Hiraizumi Remains was established.
- November 1990 ◎Signature list of 200 thousand people were submitted to the Ministry of Construction, Agency of Cultural Affairs, Iwate Prefecture and Hiraizumi Town, requesting the “preservation of Yanaginogosho Remains.”
- December 1992 ◎The Excavation Research Instruction Committee for Hiraizumi Remains reported that the remains under research are the Hiraizumi Yakata (Yanaginogosho) that is described in Azumakagami.
- November 1993 ◎Preservation of Yanaginogosho was discussed in relation with Ichinoseki Retarding Basin Project and Hiraizumi Bypass Project.
(Iwate Prefecture→Tohoku Regional Construction Bureau)
- ◎Fundamental policy for changes in Ichinoseki Retarding Basin Project and Hiraizumi Bypass Project was released (by Tohoku Regional Construction Bureau).
- March 1995 ◎Town plan of Hiraizumi Bypass Route was modified.
- July ◎Improvement project of Kitakami River Upstream Basin (Ichinoseki Retarding Basin Project) was modified.
- October 1997 ◎Reconstruction of the prefectural road bridge “Takadate Bridge” was commenced.
Excavation of the left bank and temporary ground raising to the north of Takadate were implemented. Afterward, location modification to the riverside started in the fiscal year 2002.
- November 2004 ◎ Commemorative ceremony of reconstruction completion of the river facilities based on the preservation of Kitakamigawa/Yanaginogosho

〈Before ground raising〉

〈After ground raising〉



Drawing of changes in embankments and bypass route



Yanaginogosho Remains

As a result of excavation research for several years, a lot of remains and historical articles were discovered. The state of preservation was good in addition. When the research outcomes were examined, a possibility has arisen to restore the ancient living space in an important remains where Fujiwara clan of Oshu area was based in the latter half of twelfth century.



A scene of excavation



White porcelain vase with four ears excavated from a ruined well



Seal excavated from a ruined well

These excavated articles are exhibited in the Yanaginogosho Museum that was opened in November 1999.



4 Riverside Plaza Ichinoseki

Kitakami River Information Center “Ai-Port”

This facility transmits various information regarding climate, ethnic group, history, culture, nature, disaster, and flood control in Kitakami River area. Visitors are able to have an opportunity to learn and experience the wisdom of flood control in Kitakami River and its relation with community development in this facility.



Central control center of Ichinoseki Retarding Basin

This is a central facility for efficient and effective river control and integrates management of the facilities such as Nakasato and Hiraizumi land locks in Ichinoseki Retarding Basin, and Maehori and Hiraizumi drainage pump stations. This can also be used as the base for collecting/providing information and for flood protection activity at food time.



B1

**Investigation and study functions:
Reference room**

This introduces historical documents relating to Kitakami River to public.

1. Storage site for outdoor equipment
2. Service yard
3. Power generator room for drainage pump station
4. Power generator room for the building
5. Storage room
6. Underfloor pit
7. Passage
8. Collection room
9. Storage site for direct current power unit
10. Water receiving tank room
11. Fire pump room
12. Chemical cylinder room for extinction of flame
13. Ventilating machine room for power generator



1F

Learning function: Learning room

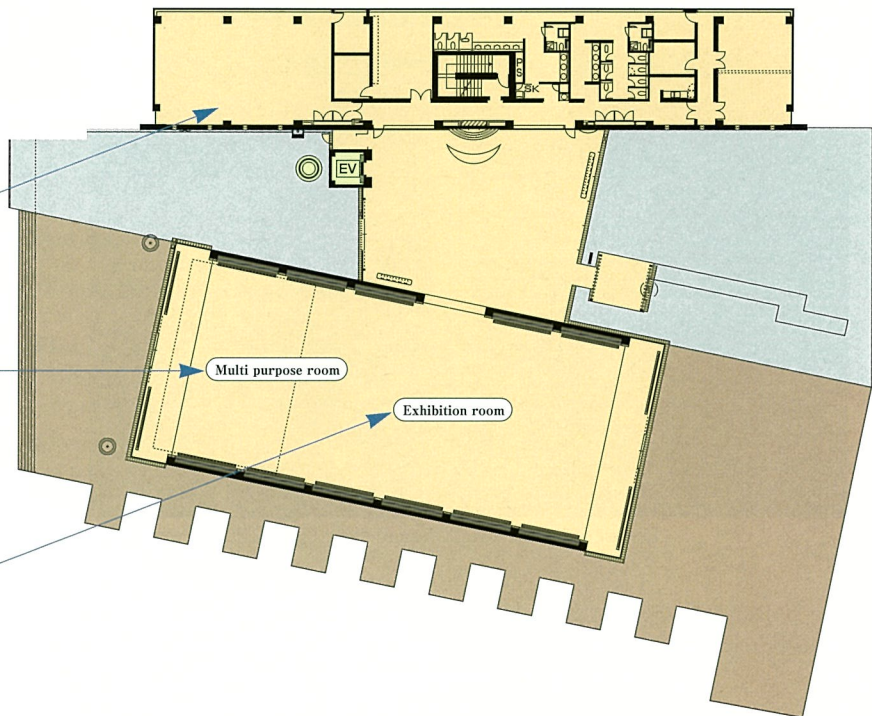
This can be used for various sessions and lectures

Partnership and communication function: Multi-purpose room

This is for promotion of partnership and communication in Kitakami River basin.

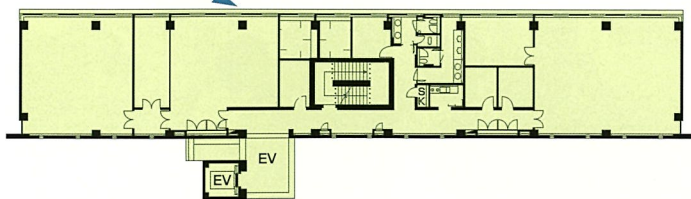
Function to provide information of Kitakami River: Exhibition room

Visitors are able to find the "present" of Kitakami River.



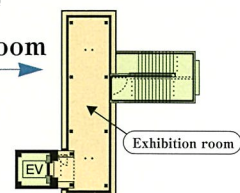
2F

Integrated control function



3F

Exhibition room



- ...Related to Kitakami River Information Center
- ...Related to Central control center of Ichinoseki Retarding Basin

5 Progress of Ichinoseki Retarding Basin Project

1972~1977

September 1947: Typhoon Catherine

1972

September 1948 Typhoon Ion

- Release in local level of Kitakami River Flood Control Project Plan (including draft plan and compensation policy) (May 23)
- Ichinoseki/Hiraizumi Council on Kitakami River Flood Control Countermeasure was established (November 21)

1973

- Ichinoseki Council on Kitakami Flood Control Countermeasure was established (March 28)
- Release in local level of master plan for improvement of Ichinoseki district (May 28)
- Landowners and leaseholders committee on Hiraizumi Town Retarding Basin Countermeasure was established (August 1)

1974

- Start of construction of Chitose Bridge (appurtenant work by Iwate Prefecture) (March 27)
- League against Ichinoseki District Retarding Basin was established (August 21)
- Relocation of houses in the Retarding Basin No. 2 started (July 24)
- Indignation meeting of the League against Ichinoseki District Retarding Basin (September 1)



Release in local level of Kitakami River Flood Control Project Plan



Release in local level of master plan for improvement of Ichinoseki district



Protest campaign against retarding basin project



Signing ceremony for those who are requested to relocate their houses

- Relocation of the houses in the area of Hiraizumi downstream embankment started (June 17)
- Discussion gathering for Kitakami River flood control (August 27)
- Relocation of the houses in the Retarding Basin No. 3 started (September 25)

1975

1976

- Ichinoseki City Council on Kitakami River Flood Control Countermeasure and League against Ichinoseki District Retarding Basin were dismissed (October 1)
- Relocation of the houses in the Retarding Basin No. 1 started (December 13)

1977

- Landowners and leaseholders committee on Excavation Site in Jingamori was established (November 9)

1978~1984

1978

1979

August: flood

- Commencement ceremony of reinforcing work on Iwai River embankment (December 19)

- Landowners and leaseholders committee on Koganezawa land development was established (February 19)
- Commencement ceremony of Ichinoseki Retarding Basin (May 14)
- Signing ceremony for Ichinoseki Retarding Basin (June 25)
- Start of construction of work bridge (Higashi Ohashi Bridge) (November 5)
- Start of soil picking at Sankai borrow pit (December 27)

1980

1981



一関遊水地起工式



Construction condition at drainage channel inside the embankment



Higashi Ohashi Bridge is completed



Short-cut channel for Iwai River is completed (temporary cross-section)

August: flood

● Hiraizumi Bypass town plan was determined (October 2)

- Start of construction of Maehori drainage sluiceway (September 26)
- Start of construction of drainage channel in embankment (Maehori construction section) (September 30)
- Work bridge (Higashi Ohashi Bridge) was completed (December 10)
- Memorandum for Jingamori borrow pit was signed (December 24)

- Short-cut channel for Iwai River is completed (temporary cross-section) (March 31)
- Start of construction of ground raising for Retarding Basin No. 1 (October 4)
- Start of construction of Nakasato land lock (December 7)

- Start of prior acquisition of the land required for surrounding embankment of Retarding Basin No. 1 (government bonds) (June 1)
- Start of construction of Hiraizumi Bypass

1982

1983

1984



Start of construction of Hiraizumi Bypass

1985~1992

1985

- Hiraizumi Town Liaison Council for buried cultural property was established (February 18)

1986

- Start of construction of Hiraizumi drainage sluiceway (September 2)

1987

- Start of construction of Hiraizumi land lock (August 14)
- Groundbreaking ceremony for Jingamori borrow pit (December 21)

1988

- Start of soil picking in Koganezawa (August 1)
- Settlement of discussion for Ota River according to the act on river, enforcement order Article 2-7 (August 24)
- Nakasato land lock was completed (September 30)
- Hiraizumi land lock was completed (November 8)

1989



Start of excavation research of Yanaginogosho Remains



Nakasato land lock



Commemorative ceremony for temporary closure of surrounding embankment (primary) in Ichinoseki district



Hiraizumi drainage sluiceway was completed.



Araida Bridge on Hiraizumi Town Road



Hitosuji Bridge on Hiraizumi Town Road

- Hiraizumi drainage sluiceway was completed. (February 28)
- Start of construction of Nakasato overbridge (October 21)
- Start of construction of Hitosuji Bridge on Hiraizumi Town Road (October 26)
- Start of construction of Araida Bridge on Hiraizumi Town Road (November 19)

September: flood

1990

- Start of construction of maintenance road in the Retarding Basin No. 3 (January 27)
- Signatures of 200 thousand people had been collected (November 9), Chusonji Temple

1991

- Settlement of additional discussion for Ota River according to the act on river, enforcement order Article 2-7, in relation with admission of Koganezawa River as first-class river (March 30)
- Completion of secondary temporary ground raising for surrounding embankment of the Retarding Basin No. 1
- "Ichinoseki Retarding Basin partnership gathering" in commemoration of 20 years of Ichinoseki Retarding Basin Project (September 16)
- Indignation meeting for promotion of Ichinoseki Retarding Basin Project (September 17)

1992

- Tree-planting ceremony at cherry blossom promenade in Retarding Basin (April 12)
- Closure ceremony of surrounding embankment in Ichinoseki Retarding Basin: closed for the countermeasure against flood of the scale in 1981, "Hardening by one thousand people" was held (September 25)
- Ichinoseki Retarding Basin Fair ' 92 in commemoration of 20 years since the launch of Ichinoseki Retarding Basin Project (October 25)



Completion of secondary temporary ground raising in Maehori district

1993~2000

1993

- Nakasato overbridge was completed (March 25)
- Drainage channel in the embankment was completed (April 30)
- Start of construction of Takizawa drainage sluiceway (November 17)

1994

- Settlement of discussion for the target facilities of railway construction that were required due to the river construction (August 1)
(Iwai River bridge, Ota River bridge No. 3, Koromo River bridge)

1995

- Conclusion of agreement regarding replacement construction of Ota River bridge on the Route 4 (March 31)
- Modification of river improvement plan in relation with Yanaginogosho preservation (July 4)
(The total project expense has been revised to 27 million yen.)
- Indignation meeting for the Ichinoseki Retarding Basin Project (July 26)
- Cancellation of Shimonohasi Bridge construction (July 31)

August: flood

1996

- Takizawa drainage sluiceway was completed (December 5)
- Start of improvement project of prefectural field in Retarding Basin No. 3

1997

- Indignation meeting for promotion of the Ichinoseki Retarding Basin Project (September 19)
- Symposium in commemoration of 50 years since the Typhoons Catherine/Ion struck (September 20)
- Conclusion of agreement regarding replacement construction of Takadate Bridge on prefectural road (October 1)
- Start of construction of Takizawa embankment (October 22)



Takizawa drainage sluiceway

Improvement project of prefectural field in Retarding Basin No. 3



Indignation meeting for promotion of the Ichinoseki Retarding Basin Project (September 19, 1997)



Transitional pumping ceremony of Maehori drainage pump station



Yanaginogosho Museum

- Start of improvement project of prefectural field in Retarding Basin No.2
- Commencement ceremony of Maehori drainage pump station and Riverside Plaza Ichinoseki (September 15)
- Takizawa embankment was completed (December 10)
- Conclusion of enforcement agreement regarding the replacement construction of Ota River Bridge No. 3 on JR Tohoku Line (February 22)
- Start of construction of Maehori drainage pump station (March 11)
- Start of construction of Hiraizumi drainage pump station (March 27)
- Transitional pumping ceremony of Maehori drainage pump station (July 30)
- Opening ceremony of Maehori maintenance road (Retarding basin road No.3 as Ichinoseki City road) (July 30)
- Transitional opening ceremony of Hiraizumi Bypass (November 11)
- Opening of Yanaginogosho Museum (November 11)

1998

August: flood

1999

- Partnership forum in Kitakami River Basin (February 18)

2000

- Round-table conference for utilization of Ichinoseki Retarding control basin (February 15)
- Start of construction of the right-bank embankment for Koromo River
- Completion ceremony of Maehori/Hiraizumi drainage pump station (June 26)
- Commencement ceremony of Kitakami River Information Center (June 26)
- Start of improvement project of prefectural field in Retarding Basin No. 1

- Forum at Kitakami River for improving the local river based on history and climate, in commemoration of 120 years of improvement of Kitakami River (November 18)

2001~2004

2001

- Settlement of discussion for Koromo River according to the act on river, enforcement order Article 2-7 (January 24)
- Signing for the return of the Jingamori borrow pit (March 3)
- H.W. L. was determined for Iwai River embankment and surrounding embankments (July 25)
- Resumption of Simonohashi Bridge construction (October 10)
- Opening ceremony of Shin-Takadate Bridge (December 21)
- Gathering in commemoration of 30 years of Ichinoseki Retarding Basin Project (September 6)

2002

- Ota River Bridge on the Route 4 was completed (March 22)
- Opening ceremony of Kitakami River Information Center (April 4)
- Hiraizumi/Takadate environment review committee has determined the proposal (April 24)
- Start of construction of river channel excavation and infilling of river that is required for Yanaginogosho preservation (June 3)
- Start of construction of Koromo River embankment (Hiraizumi Town/ Koromogawa Village) (September 7)
- Agreement of land substitution with field improvement in the Retarding Basin No. 3 (November 13)

July: flood



Gathering in commemoration of 30 years of Ichinoseki Retarding Basin Project (September 6, 2001)



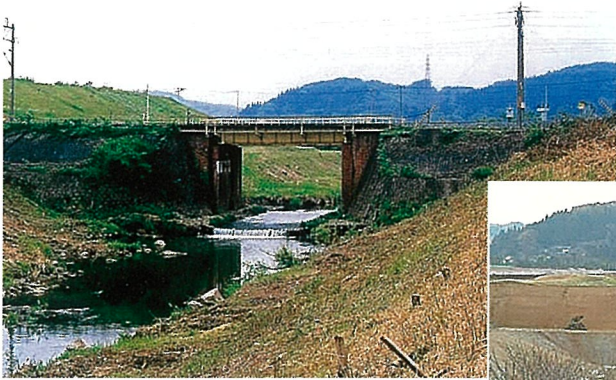
Vicinity of Yanaginogosho and Shin-Takadate Bridge (photo taken in May 2003)



Construction condition of river channel excavation and infilling of river that is required for Yanaginogosho preservation



Ota River Bridge on the Route 4 was completed (photo taken in April 2002)



Before reconstruction improvement of Ota River Bridge No. 3 on JR Tohoku Line



Construction condition of embankment after takeover from JR (photo taken in February 2004)

- Registration of Riverside Plaza Ichinoseki to the Ministry (February 5)
- Development of forest landing of Jingamori borrow pit was completed (March 24)
- Agency for Cultural Affairs requested cooperation regarding the scenery of Yanaginogosho area on the premise of the recommendation for the world's cultural heritage (June 26) (Replied our countermeasure policy to lower the road surface of double-purpose embankment) (July 29)
- Reassessment deliberation (continued) by the project assessment monitoring committee (October 2)
- Reconstruction of Ota River Bridge No. 3 on JR Tohoku Line and takeover of the completed overbridge (To the river control facility as Ota River siphon) (December 10)

2003

- Registration to the Ministry of Land, Infrastructure and Transport was completed regarding land substitution with field improvement in the Retarding Basin No. 3 (January 30)
- Koganezawa soil picking site was partially returned (March 2)
- Start of construction of Koromo River embankment (Maesawa Town) (September 28)
- Agreement of land substitution with field improvement in the Retarding Basin No. 2 (October 22)
- Commemorative ceremony of replacement completion of the river channel required for preservation of Yanaginogosho Remains (November 5)
- Conclusion of agreement for reconstruction of Koromo River Bridge on JR Tohoku Line (scheduled in December)

2004



Commemorative ceremony of replacement completion of the river channel required for preservation of Yanaginogosho Remains

6 The History of Floods in Kitakami River

September 1947

Typhoon Catherine

The Typhoon Catherine originated in the vicinity of Truck Islands on September 7, 1947 and caused severe damage mainly in Kanto and Tohoku regions. The heaviest rain was recorded at 3 p.m. on September 17. A heavy downpour started on September 15 in Iwate Prefecture and there was massive overflowing of Kitakami River, primarily in Ichinoseki City.

As for the damage caused by this flood in Iwate Prefecture, the number of deaths stood at 130, number of dwellings collapsed or washed away at 3,096 in total, and damage amount at approximately 5400 million yen at the time.



Omachi Street in Ichinoseki City

Damage caused by Typhoon Catherine in September 1947

Damage detail	Number
People who were killed	109
Missing people	103
The house were washed away by the flood	1,900
Completely destroyed houses and buildings	1,935
Partially destroyed houses and buildings	3,351
Flooded above floor level	26,126
Inundated below floor level	11,742
Damage amount	5,400million yen
Average rain precipitation in two days in upstream area of Kozenji	182mm
The maximum water level at Kozenji point	16.89m

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.



Vicinity of Uenohashi Bridge in Ichinoseki City

September 1948

Typhoon Ion

Only one year after the Typhoon Catherine struck, in September 1948, the Typhoon Ion originated in the vicinity of Marshall Islands grazed past Izu Oshima Island to Boso Peninsula on Sept. 16 and reached off the coast of Miyako at 3 a.m. on Sept. 17.

This typhoon caused severe damage mainly in Kanto and Tohoku regions again. Significant rise of stream was recorded at 猿ヶ石川 and Iwai River in Iwate Prefecture. Especially the level of the water in the Iwai River rose six meters in two hours and it resulted in collapse of embankment in Iwai River. The Ichinoseki area sank in muddy flow and the number of deaths stood at 393.



Ichinoseki area

Damage caused by Typhoon Ion in September 1948

Damage detail	Number
People who were killed	393
Missing people	316
The house were washed away by the flood	1,379
Completely destroyed houses and buildings	1,045
Partially destroyed houses and buildings	1,379
Flooded above floor level	16,019
Inundated below floor level	12,953
Damage amount	12,7billion yen
Average rain precipitation in two days in upstream area of Kozenji	159mm
The maximum water level at Kozenji point	14,89m

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.



Vicinity of Tatebe pharmacy in Omachi

August 1979

Flood

The rain caused by a front that extended east and west once stopped on August 4, 1979, but it started raining hard in the western part of Iwate Prefecture from the evening of Aug. 5 until 6^h. The rainy weather continued for seven days. The level of water in Kitakami River was decreased once on Aug. 5, but in the morning of 6, it started rising drastically again. The level of the water at Meiji Bridge and Asahi Bridge hit the maximum on this day. The level of the water in Kitakami River subsequently continued to be high and the rising of the water level gradually increased finally to overflow. A torrent sent by this overflow changed farmlands and roads into river and was strong enough to cut the traffic routes. This was the second-largest flood in the past 20 years after the one in 1958, with total damage amount of 11.1 billion yen.



Damage caused by flood in 1979

Damage detail	Number
People who were killed	0
Missing people	0
The house were washed away by the flood	0
Completely destroyed houses and buildings	0
Partially destroyed houses and buildings	2
Flooded above floor level	248
Inundated below floor level	846
Damage amount	11,1billion yen
Average rain precipitation in two days in upstream area of Kozenji	129mm
The maximum water level at Kozenji point	10,74m

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.



Vicinity of Nakasato in Ichinoseki City

August 1981

Typhoon No.15

As a typhoon moved toward the north on the Pacific Ocean and a low atmospheric pressure on the Sea of Japan approaches to Tohoku region, wind and rain grew strong in Iwate Prefecture in the evening of August 22, 1981. The typhoon directly struck Iwate Prefecture and caused destructive rainstorm.

The total amount of rainfall since it started raining was as the same as the Typhoon Ion in 1948. However, the level of the water at Kozenji (Ichinoseki City) was 12.5 m, which was 2.38 m lower than the time of Typhoon Ion. This is considered to be the impact by dams that have been constructed since 1948.



Ichinoseki City

Damage caused by Typhoon No. 15 in 1981

Damage detail	Number
People who were killed	4
Missing people	0
Completely destroyed houses and buildings	16
Partially destroyed houses and buildings	81
Flooded above floor level	946
Inundated below floor level	1,425
Damage amount	3,2billion yen
Average rain precipitation in two days in upstream area of Kozenji	148mm
The maximum water level at Kozenji point	12,51m



Ichinoseki City

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.

September 1990

Typhoon No.19

A large-scale Typhoon No. 19 that generated in the vicinity of Guam Island on September 13, 1990, reached the vicinity of Ichinoseki City in the morning of Sept. 20. The damage followed the continuous rain caused by the autumnal rain front since Sept. 17 in the southern part of the prefecture. The level of the water in Kitakami River did not stop rising in Sept. 20, which resulted in flooding in the several areas along the river. Approximately 3800 hectares of farmland in Iwate Prefecture were submerged, just before the harvest in autumn. The total damage amount was huge, approximately 20.3 billion yen.



Because the surrounding embankment was not closed, flood flow broke into the Sano district in Hiraizumi Town from the portion where the construction was not completed.

Damage caused by flood in 1990

Damage detail	Number
People who were killed	1
Missing people	0
Completely destroyed houses and buildings	0
Partially destroyed houses and buildings	4
Flooded above floor level	42
Inundated below floor level	18
Damage amount	20,3billion yen
Average rain precipitation in two days in upstream area of Kozenji	124mm
The maximum water level at Kozenji point	11,03m

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.



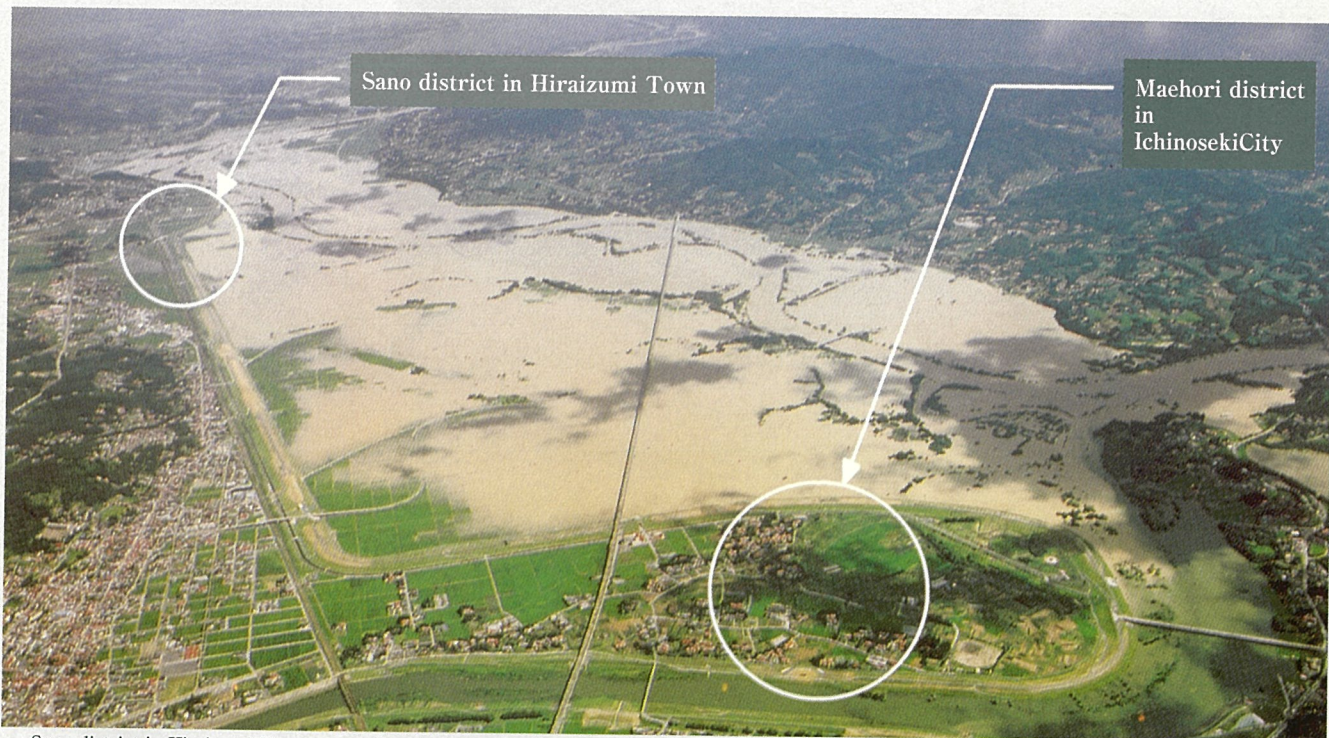
Surrounding embankment (Maehori district)

August 1995

Flood

A front hovered from August 2 to 7, 1995, and brought a heavy rain in the prefecture. Especially in the southern part, plenty of farmland was submerged by a torrent due to the rise of Kitakami River. Almost all areas in Retarding Basin of the downstream of Ichinoseki City were submerged. It caused a severe damage mainly to farm products.

Although there was a point where precipitation over 400 mm was observed, the scale of overflow was relatively small comparing to the precipitation. This was because the front moved and continuous rain was avoided. Major damages in Iwate Prefecture were as follows: 36 dwellings were flooded above floor level or inundated below floor level, and approximately 2800 hectares of farm products were damaged.



Sano district in Hiraizumi Town was relieved of submergence damage, since the surrounding embankment was closed, corresponding to the flood in September 1948.

Damage caused by flood in 1995

Damage detail	Number
People who were killed	0
Missing people	0
Completely destroyed houses and buildings	0
Partially destroyed houses and buildings	1
Flooded above floor level	8
Inundated below floor level	28
Damage amount	9,4billion yen
Average rain precipitation in two days in upstream area of Kozenji	116m
The maximum water level at Kozenji point	10,30m

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.



Prefectural road, Usuginu - Maikawa Line

End of August 1998 Flood

Due to the impact of a stationary front in Tohoku region and the Typhoon No. 4, the rain started on August 26, 1998 and continued for six days. The total precipitation in the upstream area of Kozenji water level observatory in Kitakami River recorded 223mm in average. The maximum level of water recorded 11.14m (altitude 21.71m) at the same observatory. This was the third-largest flood in scale after the ones in 1981 and 1987. Approximately 1950 hectares were submerged in the Ichinoseki Retarding Basins and approximately 144 hectares were flooded by the internal water.



Bird's eye view of Ichinoseki Retarding Basins from upstream side

Damage caused by flood in the end of August 1998	
Damage detail	Number
People who were killed	1
Missing people	0
Completely destroyed houses and buildings	1
Partially destroyed houses and buildings	32
Flooded above floor level	119
Inundated below floor level	346
Damage amount	24,2billion yen
Average rain precipitation in two days in upstream area of Kozenji	121mm
The maximum water level at Kozenji point	11,14m

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.



Ichinoseki City

July 2002

Typhoon No.6

A rainy season front that had become stationary in the Tohoku region and Typhoon No. 6 caused continuous rain from July 9, 2002 till July 11. The total precipitation in the upstream area of Kozenji water level observatory in Kitakami River recorded 166mm in average. The maximum level of the water recorded 13.51m (altitude 24.08m) at the same observatory. This was the third-largest flood in the post-war era, after the ones in 1947 and 1948.

23 dwellings were flooded in the vicinity of Ichinoseki Regarding Basins. The damage would increase to 646 dwellings to be flooded if there were no embankments there. The impact of improvement in Ichinoseki Regarding Basins can be significantly seen in this result.



Vicinity of juncture of Kitakami River and Koromo River

Damage caused by flood in April 2002

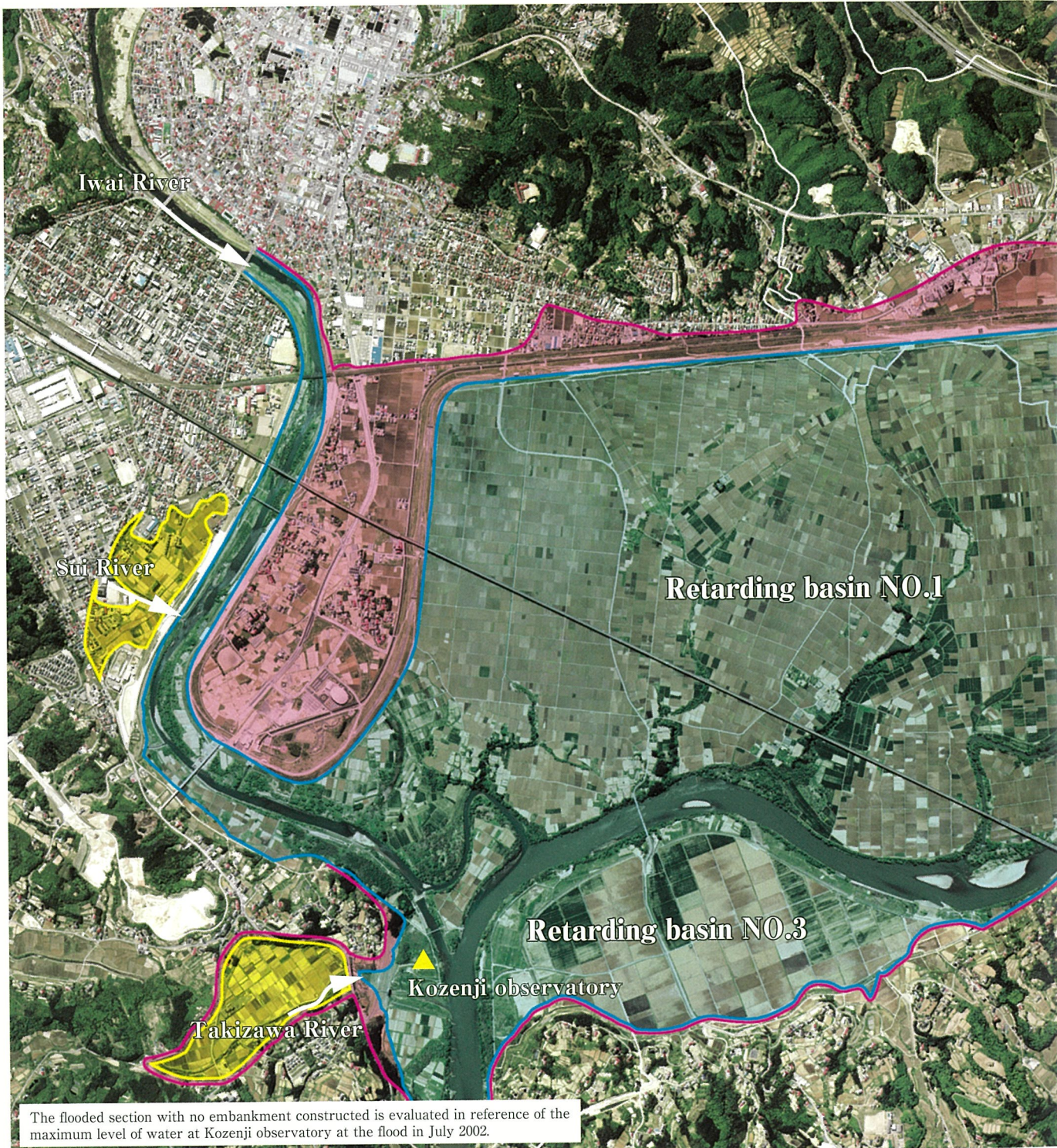
Damage detail	Number
People who were killed	2
Missing people	0
Completely destroyed houses and buildings	9
Partially destroyed houses and buildings	14
Flooded above floor level	881
Inundated below floor level	2,472
Damage amount	70,5billion yen
Average rain precipitation in two days in upstream area of Kozenji	158mm
The maximum water level at Kozenji point	13,51m

* This is the data gathered in entire Iwate Prefecture. * The water level is converted to the value measured at the present observatory.



Flooding condition on the Route 4 (view of Koromogawa Village from Koromo River Bridge)

7 Impact of Ichinoseki Retarding Basin

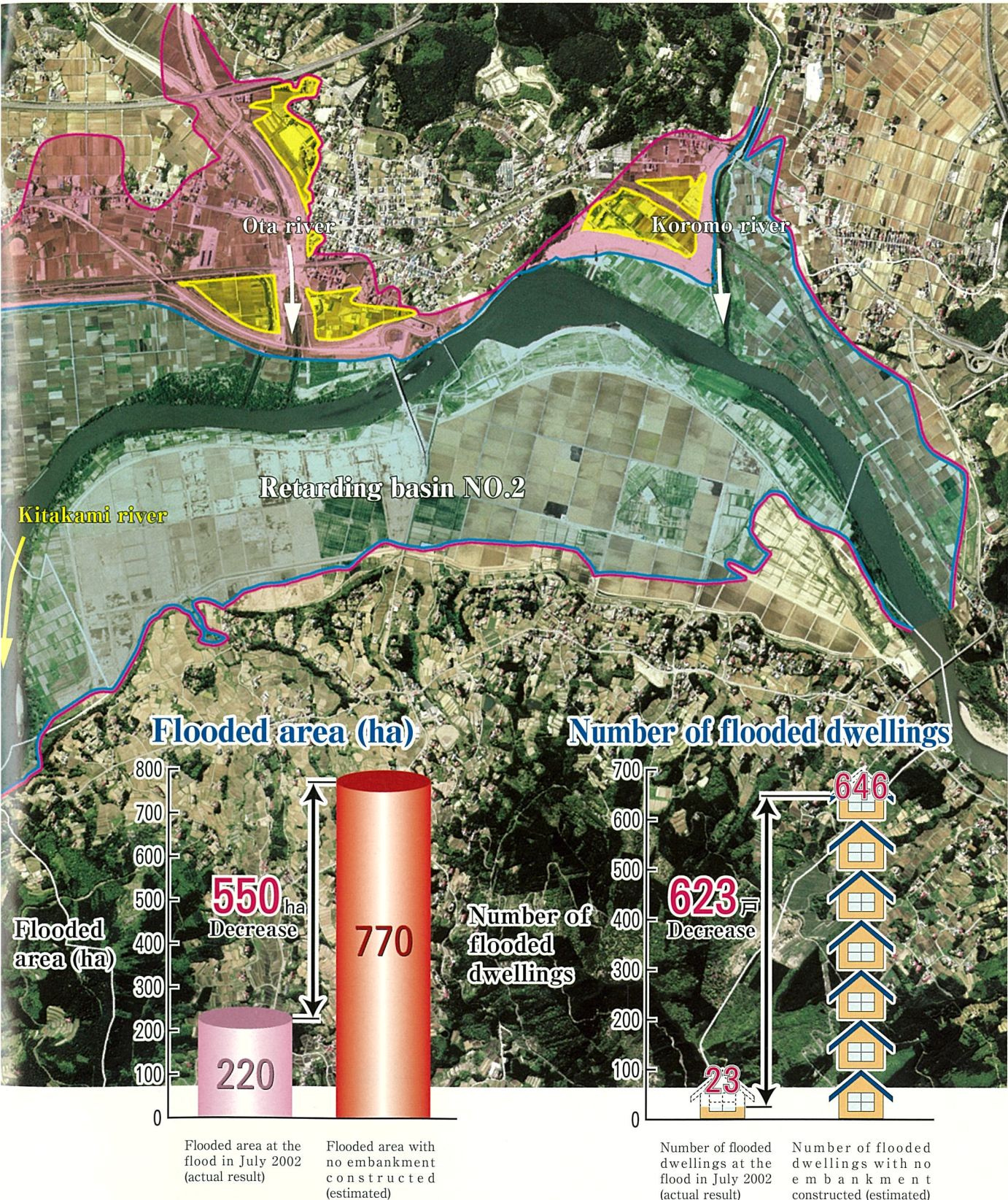


The flooded section with no embankment constructed is evaluated in reference of the maximum level of water at Kozenji observatory at the flood in July 2002.

- Flooded section by the flood in July 2002 (Typhoon No. 6)
- Flooded section by internal water at the flood in July 2002 (Typhoon No. 6)*
- Estimated flood section if no embankment was constructed in Ichinoseki Regarding Basin

* Internal water means a flood caused by overflow of tributaries (in this page, tributaries that flow into Kitakami River, Iwai River and Ota River)


When comparing the cases of the flood in July 2002 with the one estimated with no embankment constructed, it can be estimated that the embankment improvement has decreased drastic numbers of 550 hectares of flooded area and 623 of flooded dwellings.



* The flooded area does not include Ichinoseki Regarding Basin (1450 hectares).

* The number of flooded dwellings does not include the submergence by internal water.



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