Measures to make Horikawa River Limpid

Implementation by Nagoya City

Feb.18th 2017

Greenification & PublicWorks Bureau
River Plannning Div.
Waterworks and Sewerage Bureau
Sewerage Plannning Div.

Points of the Report

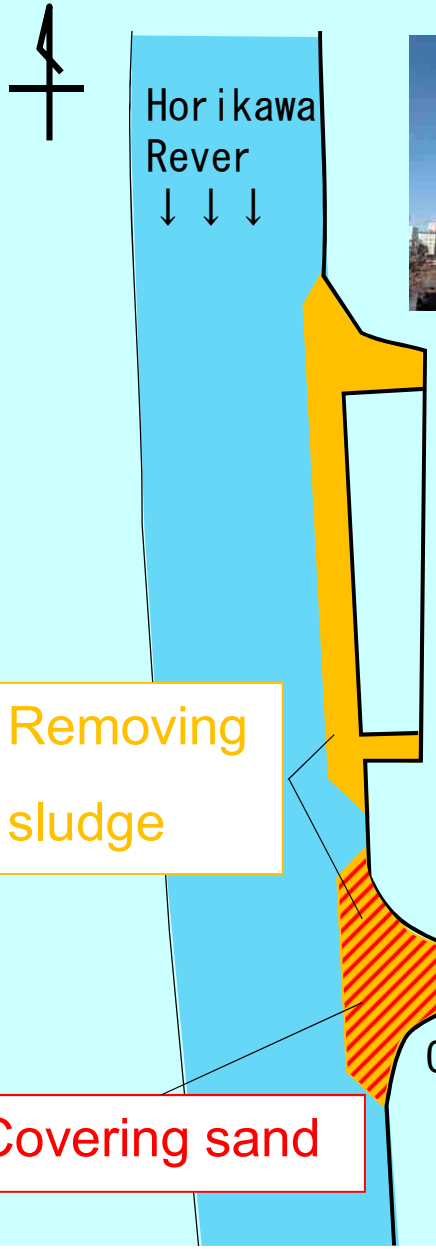
- Implemented measures (by Mar.2017)
  - ・Sludge was removed near the pier of Naya Bridge（Jan.2017）
  - ・Shallows and deeps were made at downstream of Meoto Bridge（ Jan.2017 ）

- Planned measures (by Mar.2018)
  - ・Clarification of Horikawa Rever at Gojobashi area
    Expansion of covering sand area
    （From Habashita Bridge to Nishiki Bridge）
  - ・Measures against stench at Shin-Horikawa River

Removing sludge near the pier of Naya Bridge

Redevelopment project of Naya Bridge east urban district

Completion scheduled in Jun, 2017
It is expected that many people will Gather on this occasion.

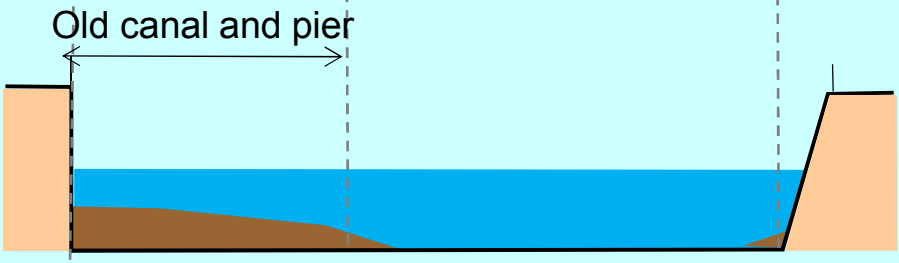


Old canal・Pier

The width is wider than others, and sludge tends to be piled up.

A cross-sectional view

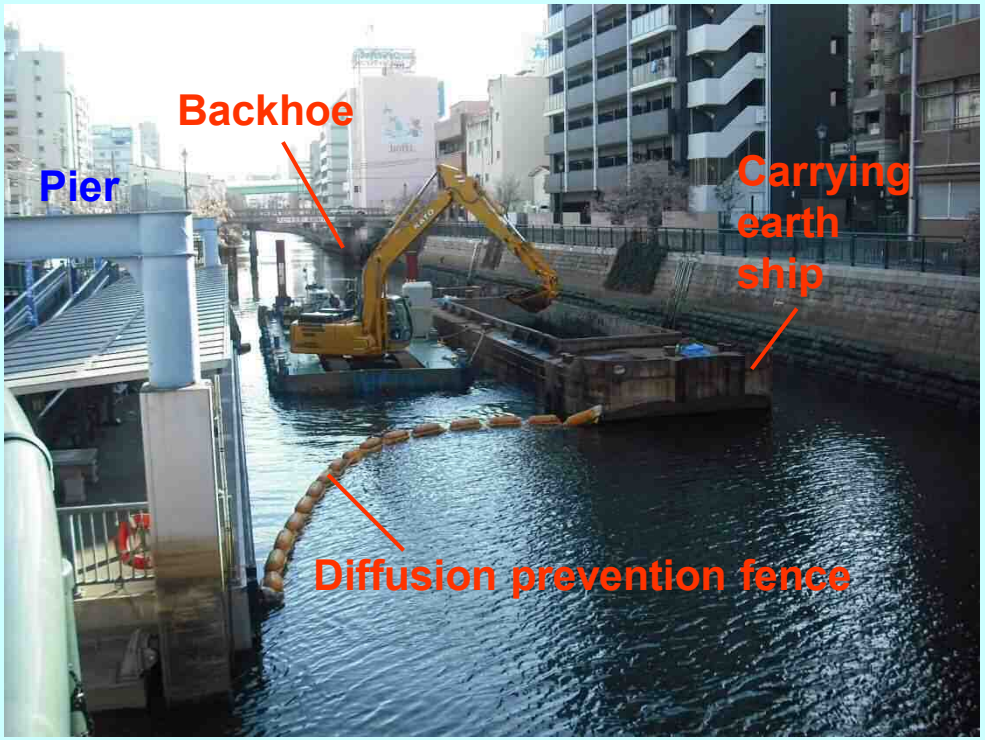
The cross-sectional view at the old canal and the pier



■Removing sludge at Naya Bridge area

～Removing sludge ～

◆Construction appearance



Removal amount is about 300m^3

Removal of Sludge in Naya Bridge area

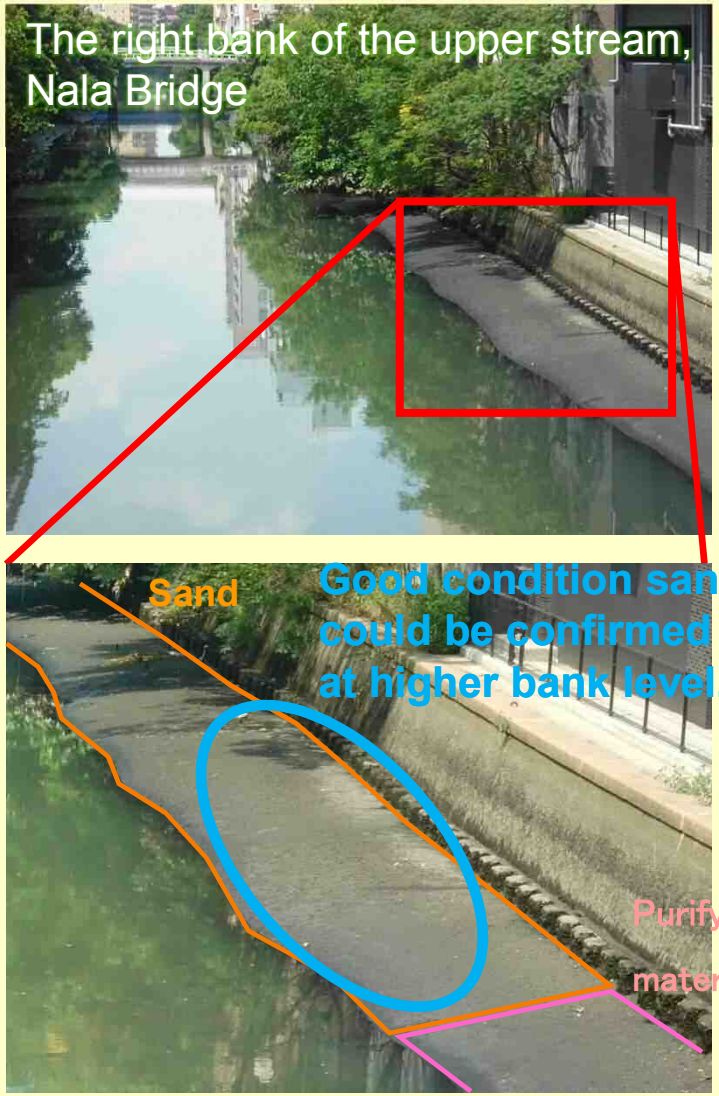
～ Covered sand　on the old canal ～

◆Covered sand

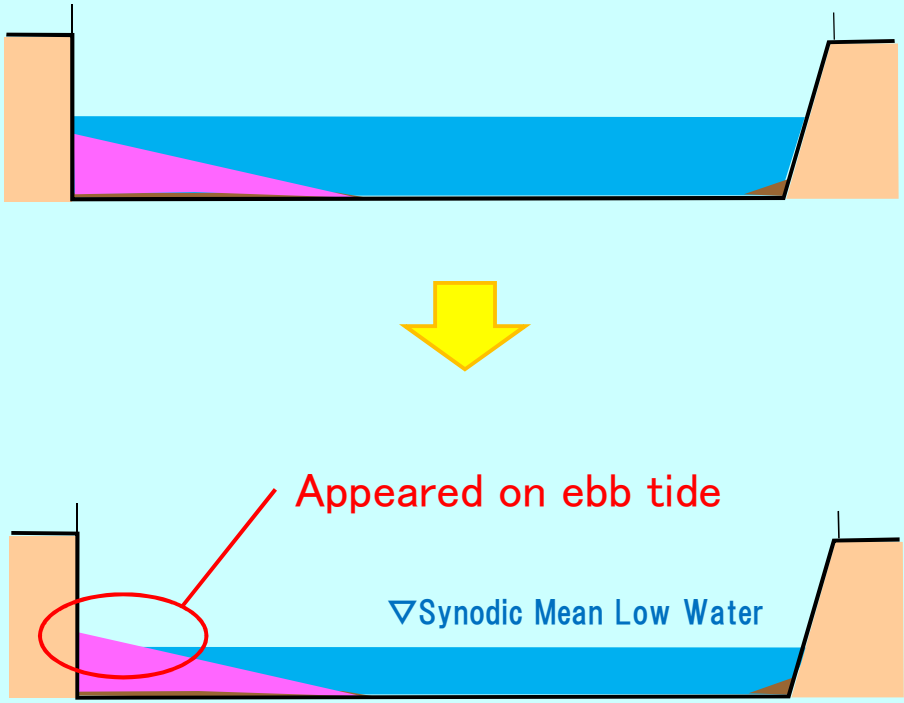
Removal of Sludge in Naya Bridge area

～ Covered sand　on the old canal ～

The last meeting
（Experiment in Gojyo Bridge area）



To suppress of sludge redeposition, we decided to the height of sand making use of experiment in Gojyo Bridge area.



Improvement of water quality

◆ Making shallows and deeps

Setting wooden piles and ripraps generates variable stream on the river for enforcing river's self-purification function with growth of plants.

fish spawning and plants' seed ashore

change of stream

Improvement of water quality

Installed in 2010
(Meoto Bridge～Kurokawa No.1 Bridge)

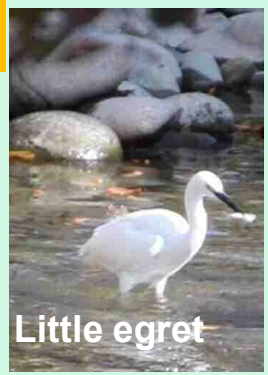
Installed in 2012
(Downstream of Kurokawa No.2 Bridge)

Installed in 2013
(Upstream of Kurokawa No.2 Bridge)

Installed in 2015
(Downstream of Ruriko Bridge)

Some of the creatures
seen in the upstream of Horikawa River

Japanese mitten crab



◆ Improvement

- Variety and amount of fish have increased.
- Benthos have increased.
- Plants have grow up more.

Improvement of water quality

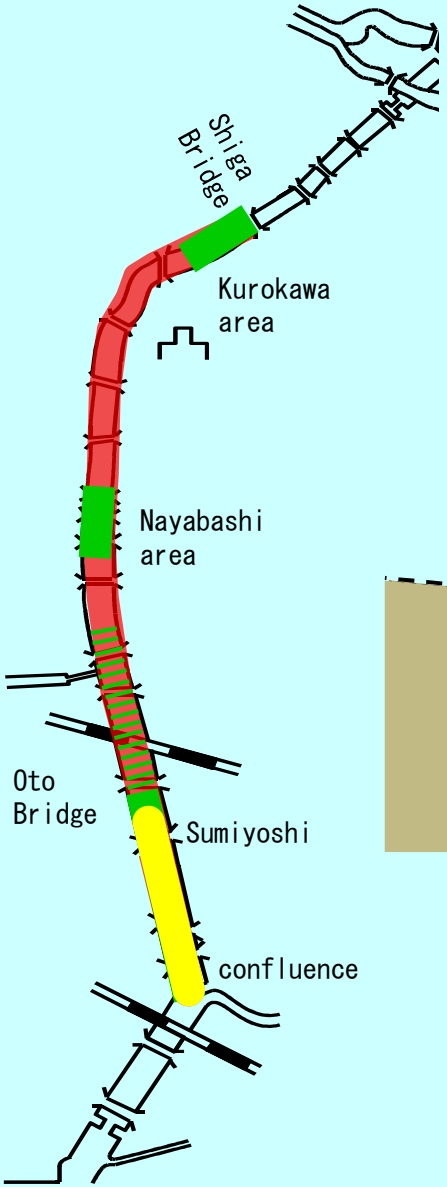
◆Construction of riffles and pools

At downstream of Meoto Bridge in Kita ward (2016.1 completion)

We can see a school of fish at the gentle flow

Improvement of water quality

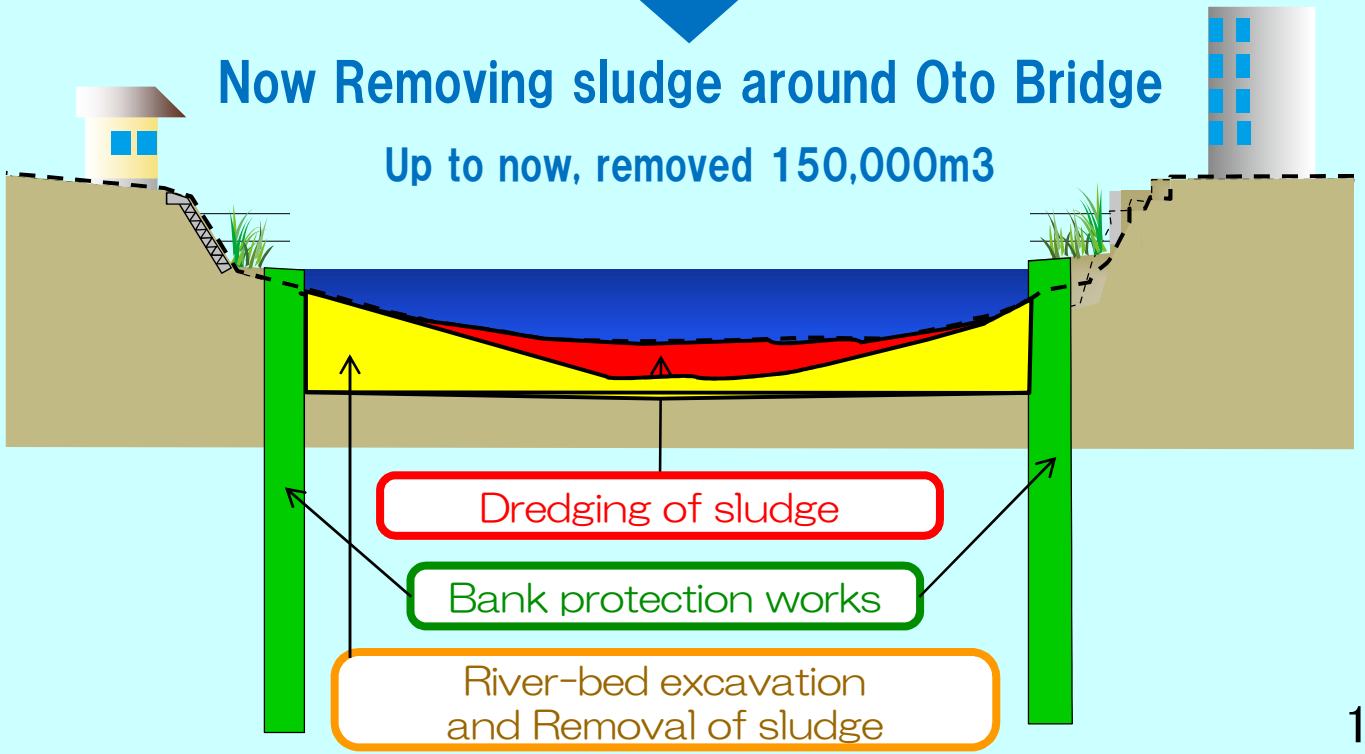
◆Removal of sludge



- Removal of sludge on water route from Shiga Bridge to Shin-Horikawa River confluence (1994～2007)
- Removal of sludge and river bed excavation at the same time implemented from downstream

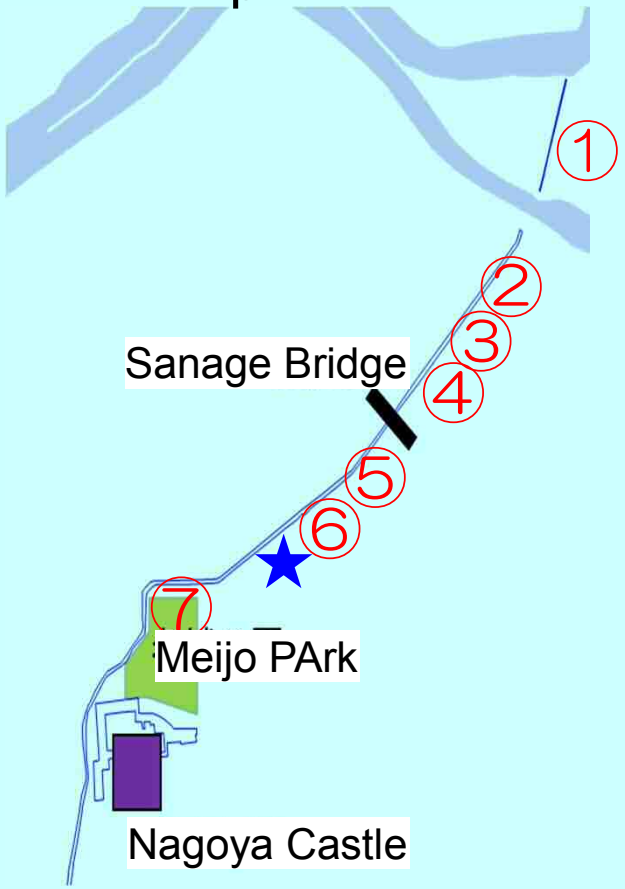
Now Removing sludge around Oto Bridge

Up to now, removed 150,000m3



Making Additional water sources

◆Use of shallow ground water in the upstream area



★：Survey point in 2016
（Downstream from Tabata Bridge）

Seko Bridge
0.01m³/s

Tsujie Bridge
0.01m³/s

Kizune Bridge
0.01m³/s

Sanage Bridge
0.01m³/s

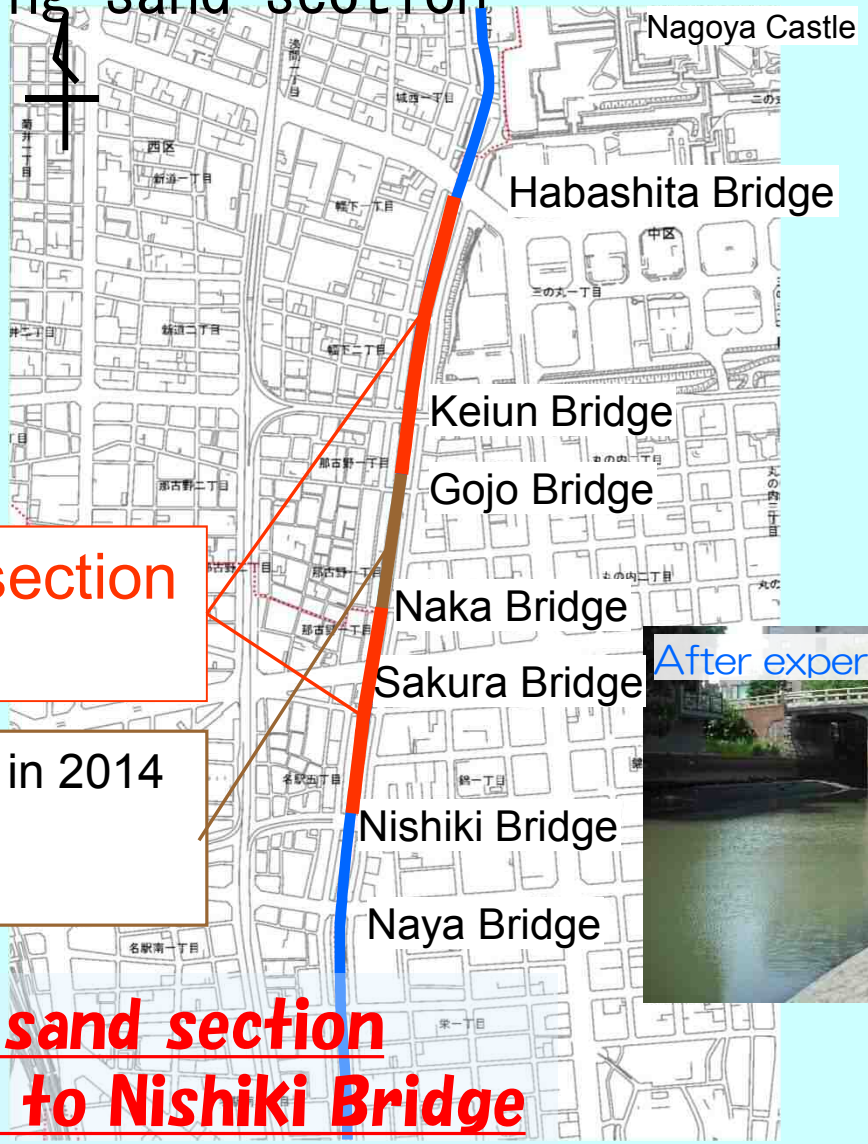
Shiga Bridge
0.01m³/s

Shimizu wakuwaku
0.0005m³/s

Nakatsuchi Bridge
0.01m³/s

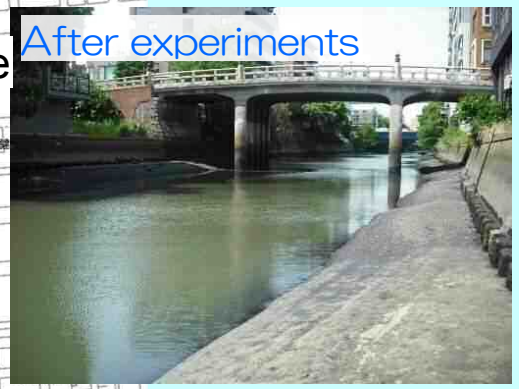
■Implementation to make Horikawa River Limpid in Gojo Bridge area(Scheduled in 2017)

◆Expansion of covering sand section



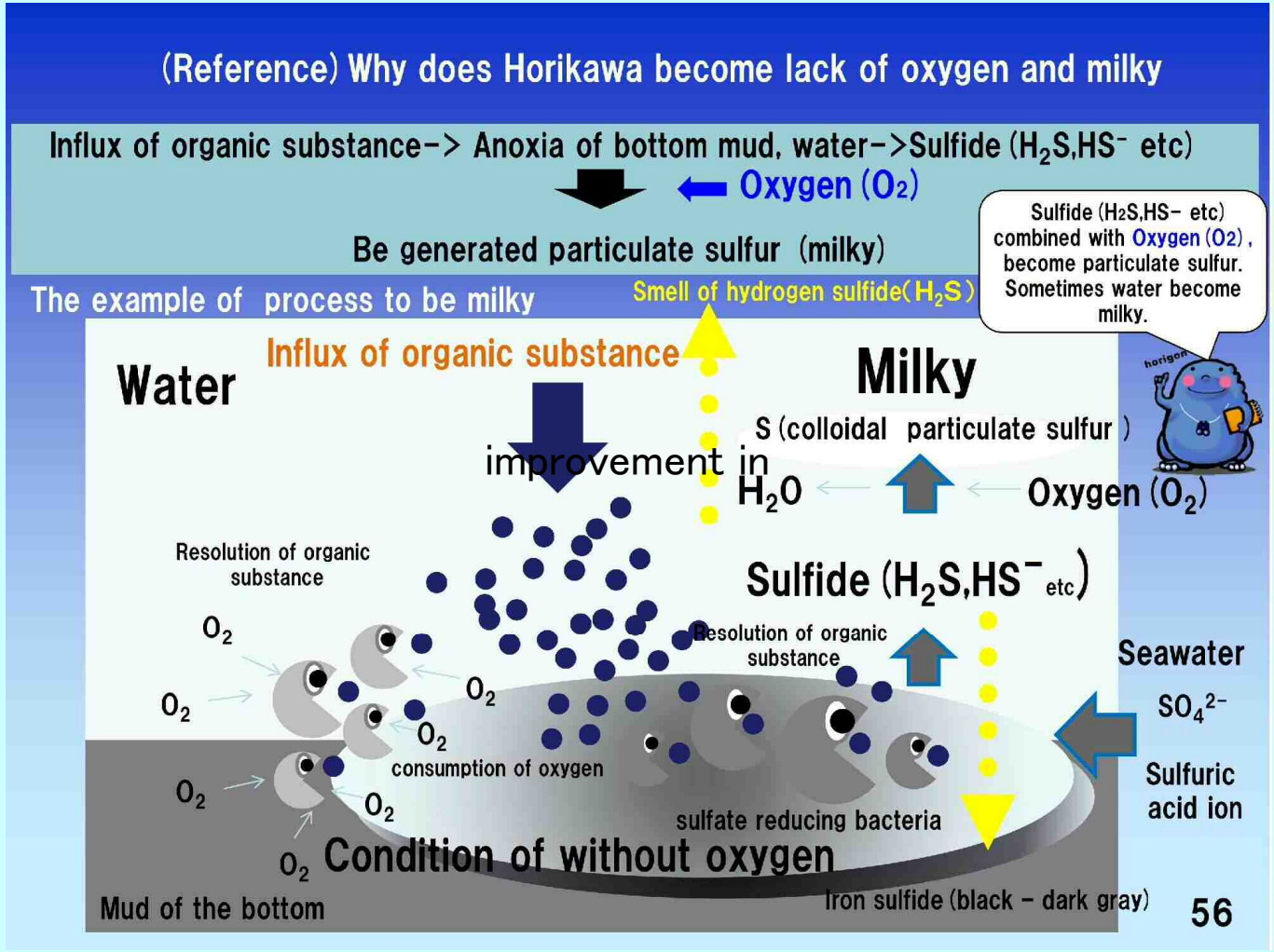
Scheduled construction section
Lentgh：1,100m

Clarification experiments section in 2014
（Gojo Bridge~Naka Bridge）
Length：300m



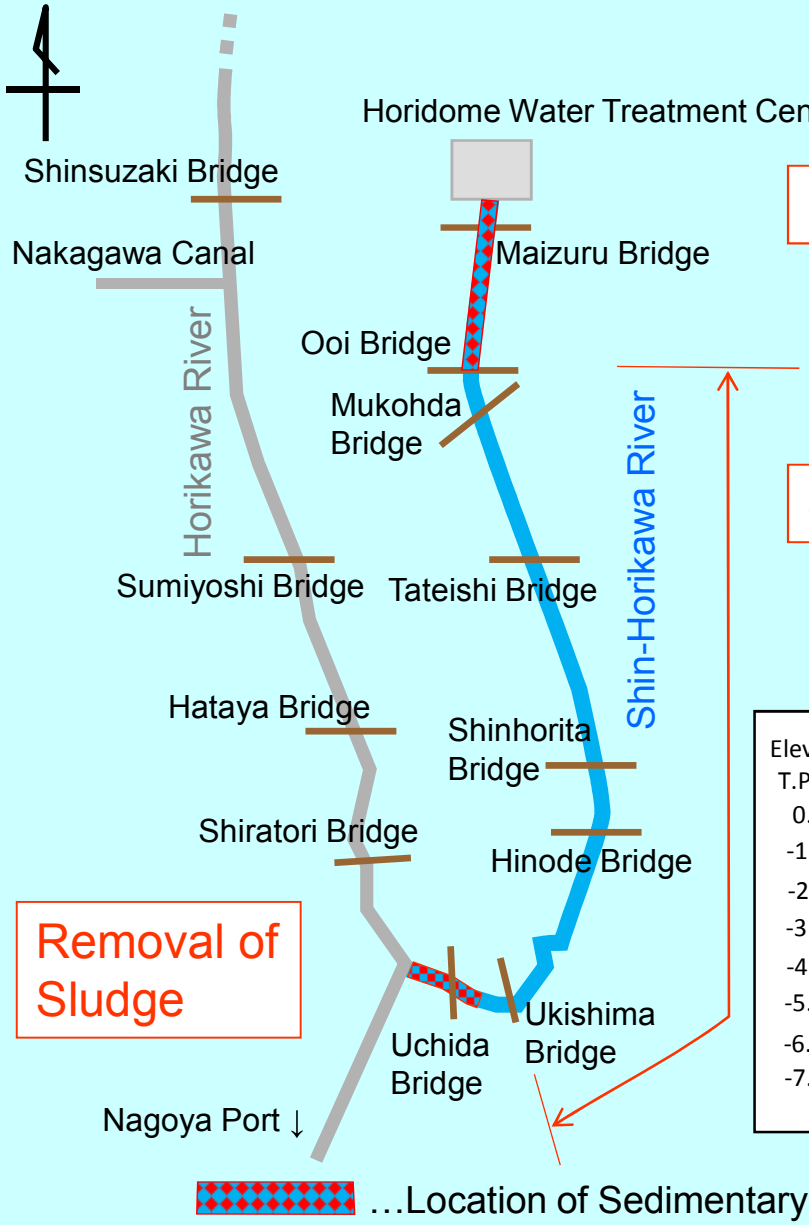
Expansion fo covering sand section from Habashita Bridge to Nishiki Bridge

Measures against Smell of Shin Horikawa River (scheduled in FY 2017)



An excerpt from report of Horikawa Sen-nin Chosatai

Measures against Smell of Shin-Horikawa River (scheduled in FY 2017)

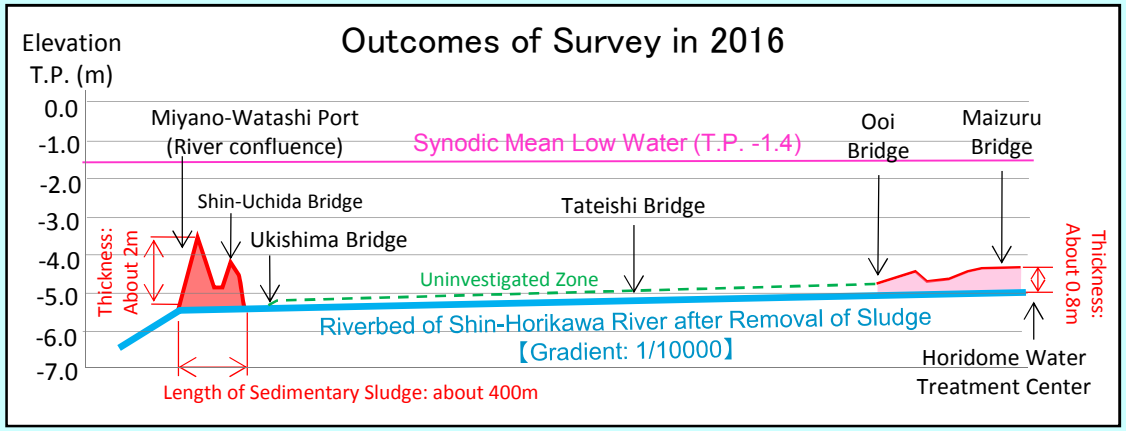


Considering of Measures

- Considering of effective countermeasures based on water quality survey and precise survey

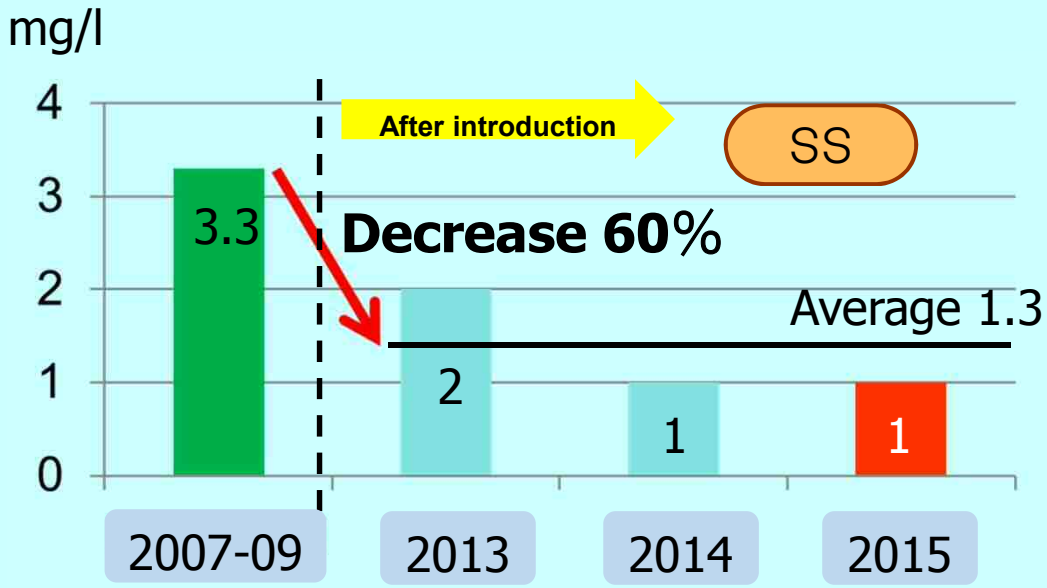
Survey Work

- Surveying to identify the shape of riverbed
  (Upstream and downstream zone was surveyed in 2016)



Removal and reduction of inflow of pollutants

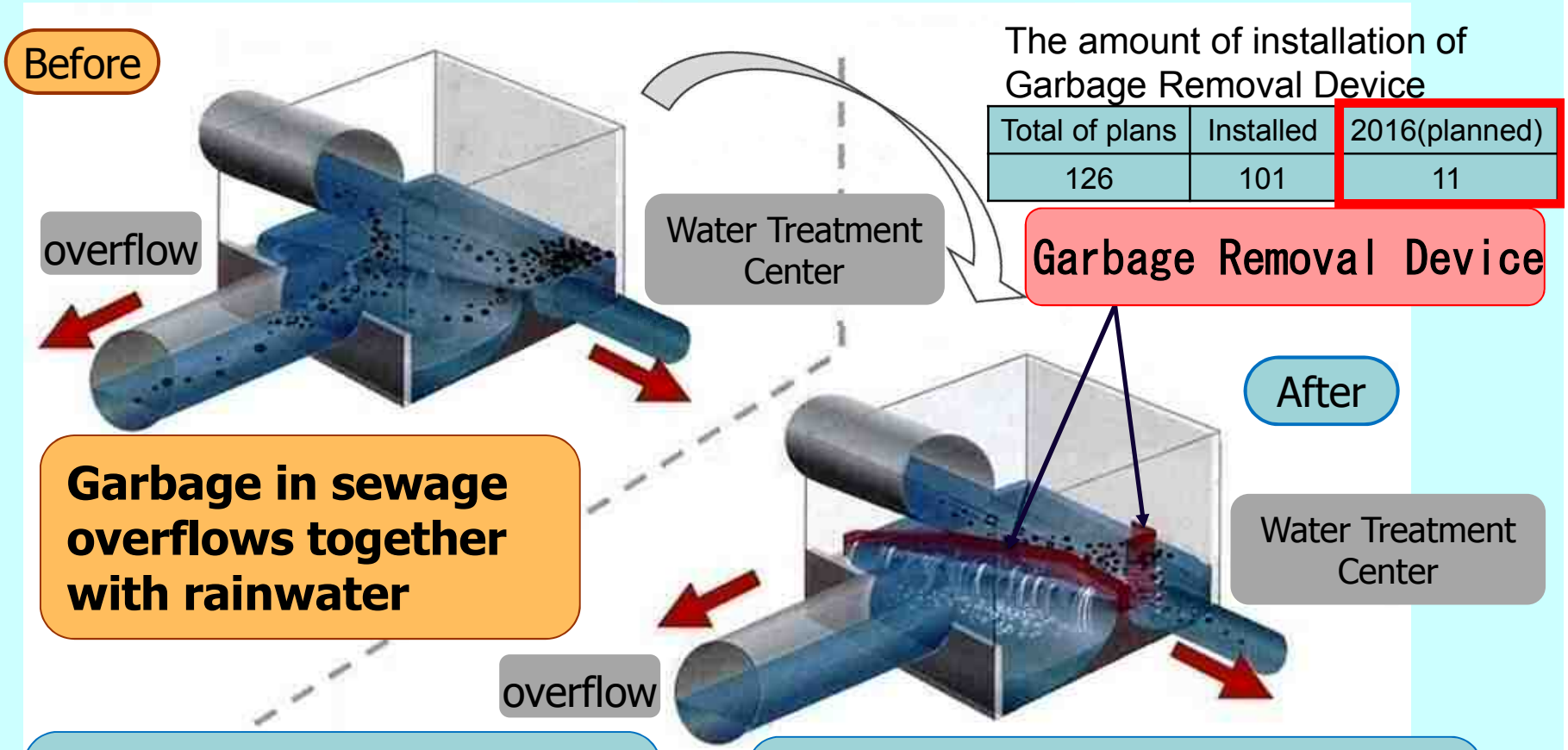
◆Advanced water treatment at the Meijo Water Treatment Center (From May 2010)



Filter out more minute Suspended Solids(SS) in treated water by filtration devices

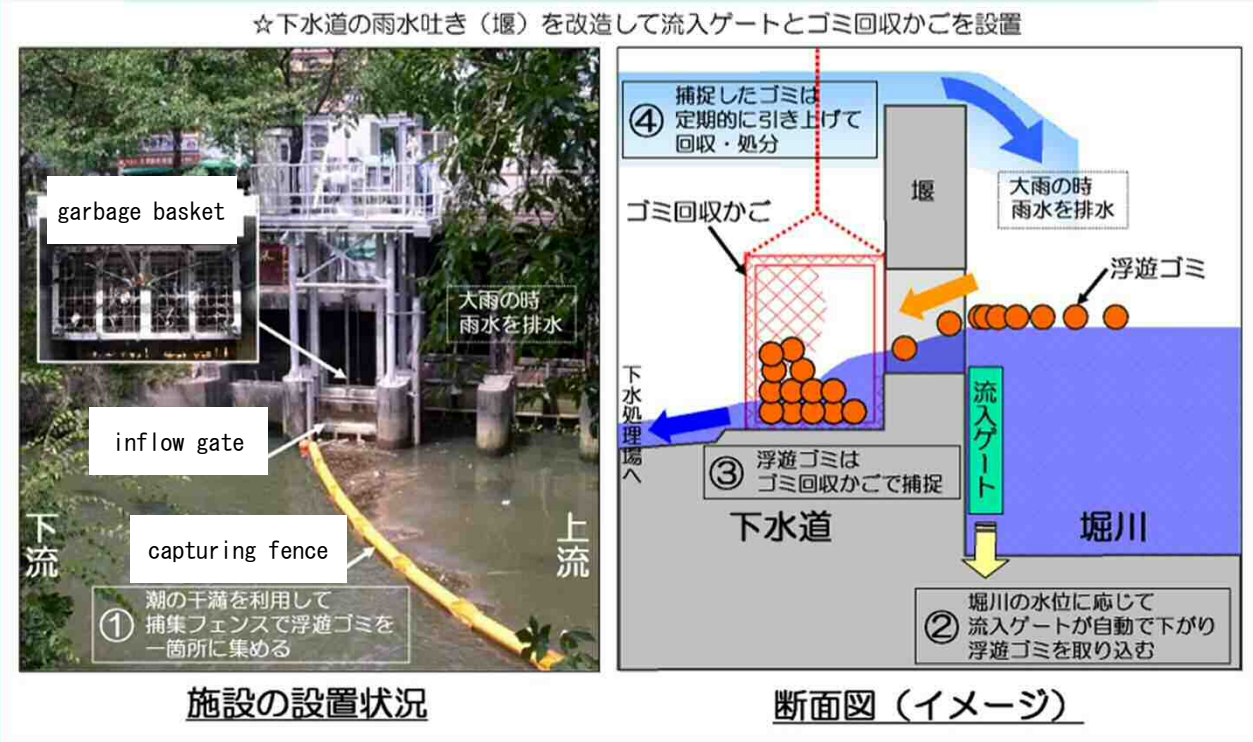
Removal and reduction of inflow of pollutants

◆Improvement of combined sewer system （Installation of Garbage Removal Device ）



■Removal and reduction of inflow of pollutants

◆Garbage catcher (Near Johoku Bridge) since 2006



施設の設置状況　　断面図（イメージ）

Result of collection in 2013	0．8 t
Result of collection in 2014	0．7 t
Result of collection in 2015	1．4 t
Result of collection in 2016	1．1 t

At the end of the December

Additional Water Resource

◆Utilization of Reclaimed Wastewater (Excluding Winter)

Conducting reclaimed wastewater treated by membrane filtration at the Moriyama Water Treatment Center

○ Water Supply： Up to 4,000㎥/day（0.046㎥/s）

Flat membrane unit aerobic tank

（400sheets × 12units）

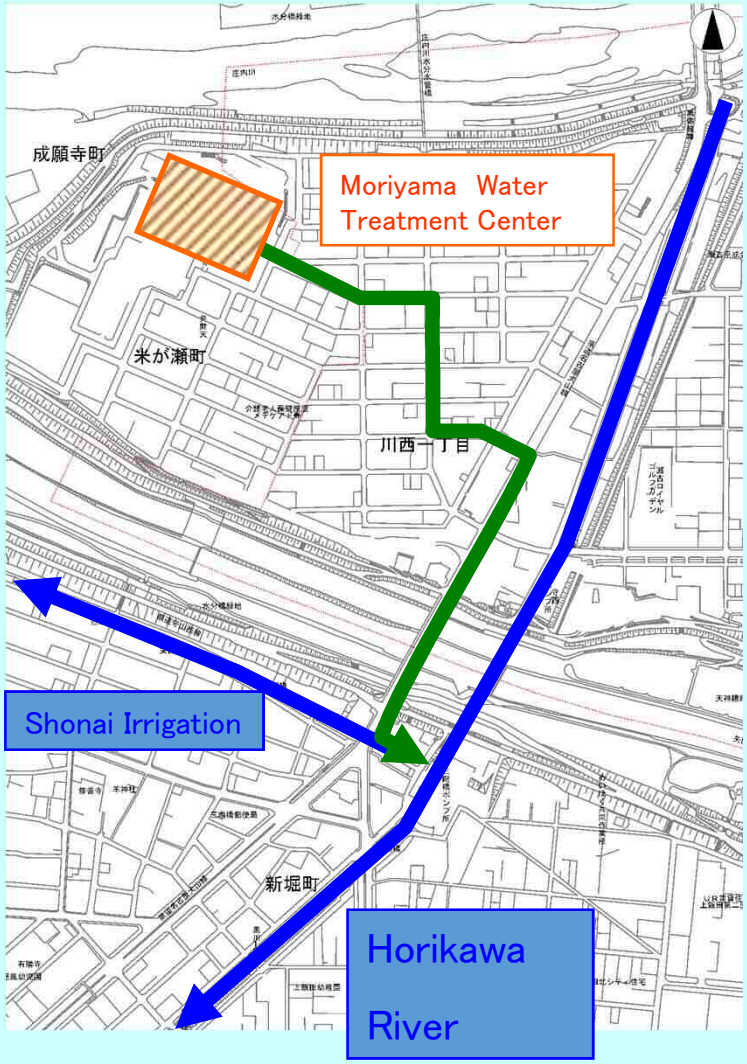
Upper stage membrane case

（200 cartridges inside）

Lower stage membrane case

（200 cartridges inside）

Flat membrane unit



※Watering period is almost irrigation period
（April～October）
（Except the period for Shonai irrigation channel
（Novemver～March））

Removal and reduction of inflow of pollutants

◆Control of combined sewer overflow (rainwater storage facility)

Construct rainwater storage facilities to reduce pollution load for Horikawa River in rainy weather by storing high polluted first flush rainwater temporarily.

Ozone Stormwater Reservoir for pollution control

Started operation in 2006 (12,000m^3)

Horikawa Ugan Rain-water Resevoir for pollution control

Started operation in 2010 (13,000m^3)

Horikawa Sagan Rain-water Resevoir for pollution control

Scheduled to start operation in 2018 (14,000m^3)

Removal and reduction of inflow of pollutants

◆Horikawa Ugan Rain-water Resevoir for pollution control

- Started operation in September 2010
- About 13,000㎥

Cumulative stored water volume in fy 2015
About 680,000㎥