

Horikawa Sen-nin Chosatai 2010 (HSC) Summary meeting for the 26th stage

Place:
Nagoya Urban Institute
Conference room (11th floor)



The secretariat of Horikawa Sen-nin Chosatai 2010
Feb.29th.2020

1. Horikawa Sen-nin Chosatai 2010

~Transmission of Raw Water from Kiso River (TRWKR)~

The formation of HSC (April.22nd.2007)

With a viewpoint and a sense of citizens, the survey of the clarification effect of TRWKR started

1.Purpose

To verify the clarification effects of TRWKR with citizens

- (1) Develop to new clarifying measures
- (2) Asses the influence on an ecosystem
- (3) Sustain and enhance citizens' activities
- (4) Develop citizens' awareness in the entire Horikawa River basin



■ The survey from a viewpoint and a sense of citizens'
 *Clearness *Transparency *Color *Bubble *Smell
 *Garbage *Living things, etc

2.Water source and Volume of transmission of raw water

- (1) Water Source : Kiso River
- (2) Volume of transmission of raw water : Maximum 0.4 m3/s

3.Pilot project period

- (1) Evaluation and Survey term : About 5 years
 (from Apr.2007 to Mar.2012)
 (Including the term of follow-up survey and evaluation after the stop of TRWKR)
- (2) TRWKR period : about 3 years
 (from Apr.22nd.2007 to Mar.22nd.2010)



The first Nagoya City Environmental Practice Prize, Feb.2012
 Branch of contribution for Regional Environment Development Award for Excellence

■ Increase of Transmisson Volume from the Shonai River (additional pilot project)

1.Water source and Volume of transmission of raw water

- (1) Water Source : Shonai River
- (2) Transmission Usual 0.4m3/sec (maxium 0.7m3/sec)

2.Period of Increase

- (1) Experiment Period : Oct.1st - Dec.31st.2010
- (2) Period of Increased Transmisson Volume : Oct.5th - Nov.2nd.2010



Water Resource Contributor Awards
 Minister of Land, infrastructure and Transportation) Aug.2016

Transmission of Raw Water from Kiso River (TRWKR)

3 years from April.22nd.2007(Stopped on March.22nd.2010)



Surveys during TRWKR period :
April.2007 ~ March.2010
Surveys after the stop of TRWKR period :
April.2010 ~ March.2012



Horikawa Sen-nin Chosatai
April.2007 ~ March.2012

- Fixed Point Observation Groups
Surveying effects of TRWKR
- Free Survey Groups Researching
Horikawa River by free themes
- Horikawa Support Groups Supporting
clarification of Horikawa

The survey from
a viewpoint and a
sence of citizens

Results of pilot project (Clarification effects of TRWKR)

- It was confirmed that the water quality tended to improve during TRWKR between Sanage Bridge and Matsushige Bridge.
- Network of citizens who wish for clarification and restoration of Horikawa River expanded.
- Citizens' awareness of cleaning of the river was developed.

■ Role of Horikawa Sen-nin Chosatai
(Conclusions of Summary Meeting for the 10th Stage)

① More surveys should be implemented.

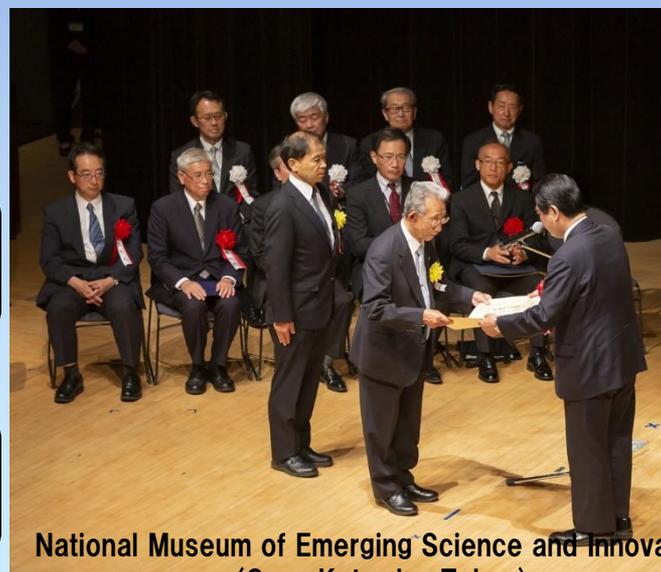
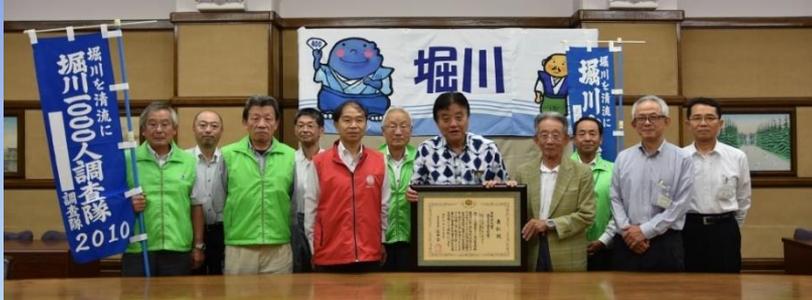
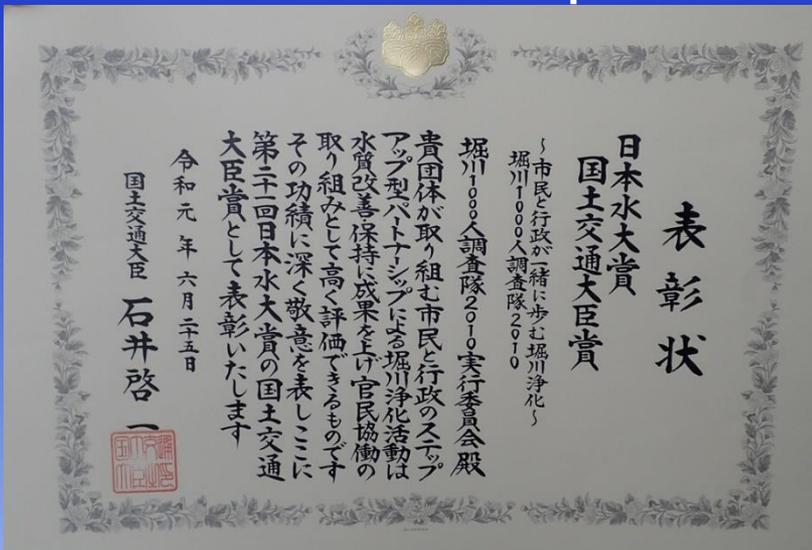
- Continuity of investigation, clarification of the situation of the river, identification of cause of pollution in the river, are needed.
- We improve our plan and take action against the pollution.
- After that, citizens and public administration do what is possible to clean the river.

②There are many things that citizens can do.

- We expand our partners who love Horikawa River and hope TRWKR again.
- We deepen exchanges with people living in the basin of Kiso, Nagara, and Ibi River.
- We check the effects of pollution removal from domestic wastewater and implement it in each house.

Won the 21st Japan Water Award Minister of Land, Infrastructure and Transport Award June 2019

Public-private academic collaboration step-up partnership



National Museum of Emerging Science and Innovation (Ome, Koto-ku, Tokyo)



Horikawa Sen-nin Chosatai Executive Committee visited Mayor Kawamura to report on the Japan Water Award and Minister of Land, Infrastructure, Transport and Tourism award.

On June 25, 2019, the award ceremony for the 21st Japan Water Awards was held in the presence of Crown Prince Akishino. Horikawa Sen-nin Chosatai Executive Committee received the Minister of Land, Infrastructure, Transport and Tourism Award.

Water Environment of Horikawa River

Area of basin: 51.9km²
Length: 16.2km

Change in temperature, precipitation and hours of sunshine

Kiso River is our water source.

Cause of breeding of phytoplankton, nitrogen and Phosphorus are included in wastewater from houses, factories and stores.

The primary cause of water pollution is wastewater from houses, factories, and stores.

Wastewater is discharged after treatment in wastewater treatment plant.

After heavy rain, wastewater is discharged without treatment.

Shonai River

Privisional raw water transmission: 0.3m³/s

Wastewater Treatment Plant

Sanage Bridge

Motoiri Sluiceway

Tide Gate

▼High Tide Horikawa River

▼Ebb Tide Difference of water level is more than 2m between high tide and ebb tide.

Water level, direction of current and velocity are changed, by tide.

It has looked like red tide or blue tide. In Nagoya Port and downstream of Horikawa, it is said that phytoplankton does over breeding and extinction, so water basin is polluted

Nagoya Port

Rising

Groundwater, etc

Ise Bay

Sludge rises and floats.



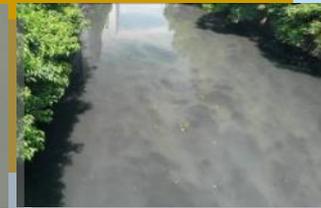
Shimizu wakuwaku-sui

Red Tide

Blue Tide



Floating Sludge



Raised Sludge

2. Number of Participants of Horikawa Sen-nin Chosatai

(Horikawa Sen-nin Chosatai started accepting participation on 26th Mar.2007)

Network of citizens who wish for clarification and restoration of Horikawa River is growing.



More than 50 thousand citizens' network

Horikawa, the Mother River of Nagoya, was polluted in rapid economic growth.. The citizens have risen to get the past back.



	Start 22nd Apr.2007	Now 29th Feb.2020
Fixed Point Observation Groups	55 groups 497 persons	107 groups 1,043persons
Free Survey Groups	22 groups 234 persons	40 groups 650 persons
Horikawa Support Groups	88 groups 1,531 persons	2,605 groups 52,021persons
Total	165 groups 2,262 persons	2,752 groups 53,714persons

Number of Participants

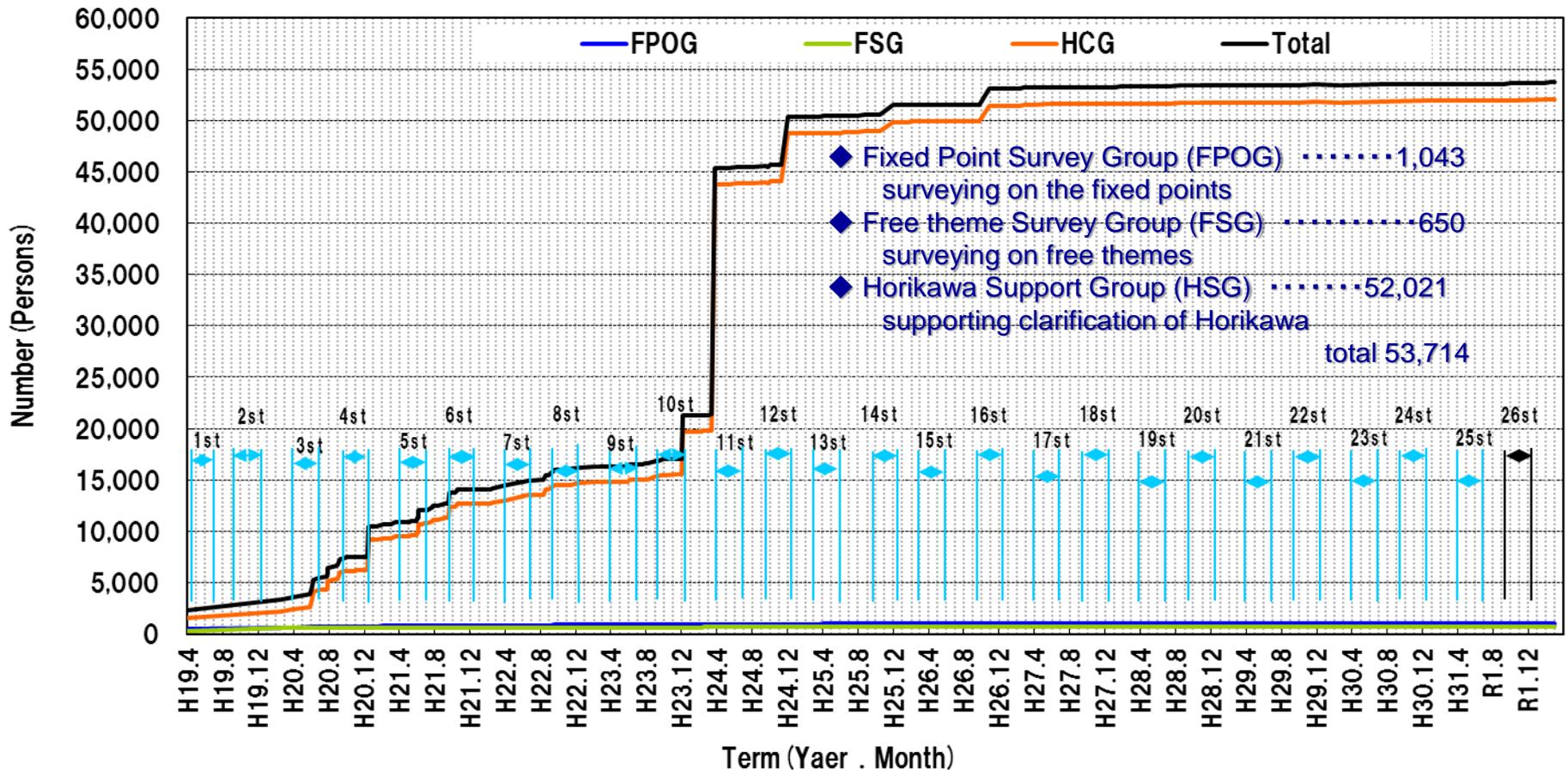


Horikawa Sen-nin Chosatai was established to do the project to clean *Horikawa River* and to check the effective of experiment for it by city citizen's viewpoint.

This activities are not only to surveys, but also spread to the clarification, cleanup, enlightenment activities and exchanges between regions.



Number of participants in 3 classes



3. Survey Periods and Number of Reports

Content	Fiscal year	Survey Period			Reports			
					Horikawa River	Shin-Horikawa River		
Horikawa River Purification Social Experiment	With TRWKR	2007	1st stage	Spring~Early summer	Apr.22nd~Jun.30th	258	258	-
			Interval		Jul.1st~Sep.7th	134	134	-
		2nd stage	Autumn~Early Winter	Sep.8th~Dec.16th	383	383	-	
			Interval		Dec.17th~Mar.31st	103	103	-
		2008	3rd stage	Spring~Early summer	Apr.1st~Jun.30th	245	245	-
			Interval		Jul.1st~Sep.27th	64	64	-
	4th stage		Autumn~Early Winter	Sep.28th~Dec.16th	152	152	-	
	Interval			Dec.17th~Mar.31st	100	100	-	
	2009	5th stage	Spring~Early summer	Apr.1st~Jun.30th	145	145	-	
		Interval		Jul.1st~Sep.26th	54	54	-	
		6th stage	Autumn~Early Winter	Sep.27th~Dec.16th	120	120	-	
		Interval		Dec.17th~Mar.31st	81	81	-	
	2010	7th stage	Spring~Early summer	Apr.1st~Jun.30th	111	111	-	
		Interval		Jul.1st~Sep.11th	44	44	-	
		8th stage	Autumn~Early Winter	Sep.12th~Dec.17th	104	104	-	
		Interval		Dec.18th~Mar.31st	72	72	-	
		2011	9th stage	Spring~Early summer	Apr.1st~Jun.30th	112	112	-
			Interval		Jul.1st~Sep.10th	42	42	-
	10th stage		Autumn~Early Winter	Sep.11th~Dec.16th	133	133	-	
	Interval			Dec.17th~Mar.31st	77	77	-	
Public-private academic collaboration step-up partnership	2012	11th stage	Spring~Early summer	Apr.1st~Jun.30th	148	148	-	
		Interval		Jul.1st~Sep.21th	60	59	1	
		12th stage	Autumn~Early Winter	Sep.22th~Dec.16th	139	135	4	
		Interval		Dec.17th~Mar.31st	92	78	14	
	2013	13th stage	Spring~Early summer	Apr.1st~Jun.30th	145	129	16	
		Interval		Jul.1st~Sep.28th	70	55	15	
		14th stage	Autumn~Early Winter	Sep.29th~Dec.17th	113	99	14	
		Interval		Dec.18th~Mar.31st	79	68	11	
	2014	15th stage	Spring~Early summer	Apr.1st~Jun.30th	133	117	16	
		Interval		Jul.1st~Sep.28th	91	78	13	
		16th stage	Autumn~Early Winter	Sep.29th~Dec.16th	99	90	9	
		Interval		Dec.17th~Mar.31st	107	89	18	
	2015	17th stage	Spring~Early summer	Apr.1st~Jun.30th	113	100	13	
		Interval		Jul.1st~Sep.19th	81	69	12	
18th stage		Autumn~Early Winter	Sep.20th~Dec.16th	126	109	17		
Interval			Dec.17th~Mar.31st	91	79	12		
2016	19th stage	Spring~Early summer	Apr.1st~Jun.30th	127	116	11		
	Interval		Jul.1st~Sep.19th	62	54	8		
	20th stage	Autumn~Early Winter	Sep.20th~Dec.16th	130	107	23		
	Interval		Dec.17th~Mar.31st	104	84	20		

Content	Fiscal year	Survey Period			Reports			
					Horikawa River	Shin-Horikawa River		
Public-private academic collaboration step-up partnership	2017	21st stage	Spring~Early summer	Apr.1st~Jun.30th	129	100	29	
		Interval		Jul.1st~Sep.18th	58	48	10	
		22nd stage	Autumn~Early Winter	Sep.19th~Dec.20th	121	93	28	
		Interval		Dec.21st~Mar.31st	80	67	13	
		2018	23rd stage	Spring~Early summer	Apr.1st~Jun.30th	180	107	73
			Interval		Jul.1st~Sep.19th	76	44	32
	24th stage		Autumn~Early Winter	Sep.20th~Dec.16th	184	106	78	
	Interval			Dec.21st~Mar.31st	108	67	41	
	2019	25th stage	Spring~Early summer	Apr.1st~Jun.30th	193	127	66	
		Interval		Jul.1st~Sep.19th	101	43	58	
		26th stage	Autumn~Early Winter	Sep.20th~Dec.16th	214	105	109	
		Interval						
	Total					6,088	5,304	784

To date, 6,088 reports have been reported. Of these, the number of reports for Shin-Horikawa River was 784.

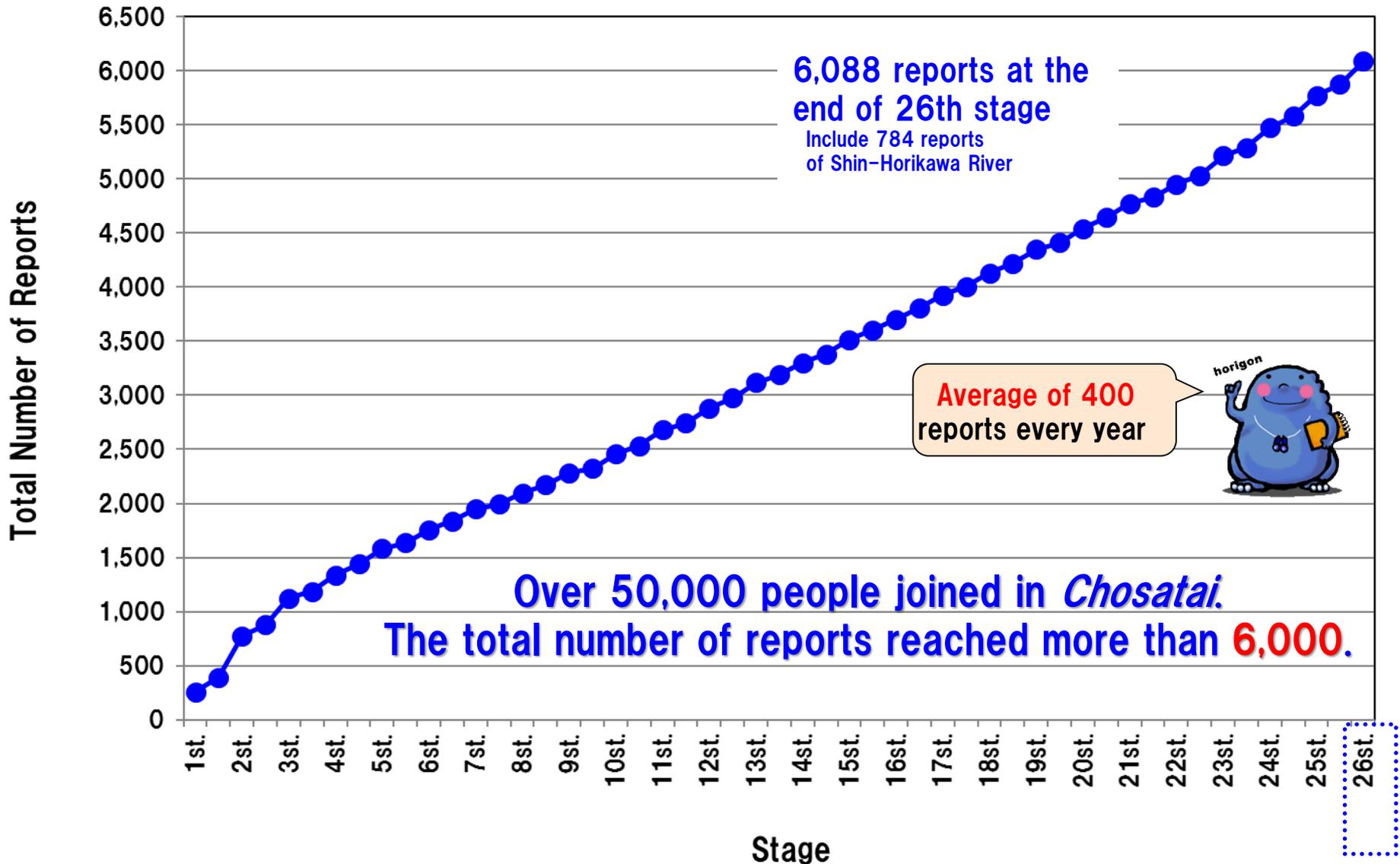
In the 26th stage, there were 214 reports. Of these, 105 were reported for Horikawa River and 109 were reported for Shin-Horikawa River.

On average, more than 400 surveys are conducted every year in Horikawa River and Shin-Horikawa River.

Many citizens are continuously examining the actual water environment of Horikawa River and Shin-Horikawa River on a daily basis from the perspective and sense of the citizens.



Total Number of Reports



4. State of the weather

(Overview)

The average temperature in Nagoya city in 2019 was the highest 17°C (the average value 15.8°C) since start of Meteorological Statistics.

Also the average temperature in 26th Stage was the highest since the HSC survey started in 2007.

Precipitation and Sunshine Hours was on average. Autumn rain front and Typhoon No. 24 brought a lot of rainfall and little sunshine.

in the 26th Stage (September–December)



■ Temperature

There was a lot of high warm day and recorded highest average temperature(17.3°C) since survey start. (temperature anomalies +1.9°C)

Especially the average temperature in Sep. and Oct. was higher than yearly by 2°C.

■ Precipitation

The precipitation for term of survey was yearly , expect less than in Sep. and Nov. although it increased about threefold (357mm/month) due to the impact of typhoon (NO19. NO20) , and the influence of the autumn rain front.

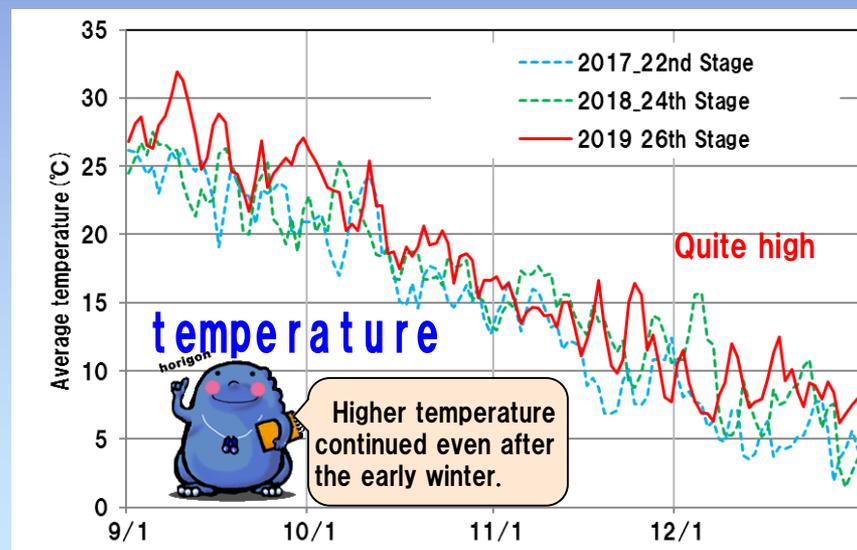
■ Sunshine Hours

It became almost normal(168hr/month) ,expect for in Sep. and Nov. when there was a lot of rain. In Oct. and Dec there were less sunny days, shorter than normal.

Nagoya Local Meteorological Observatory

category	Rainfall (mm) Gross	Temperature (°C)			Daylight (hour) Gross
		Average	Highest	Lowest	
Statistical Period	1981 ~2010	1981 ~2010	1981 ~2010	1981 ~2010	1981 ~2010
years	30	30	30	30	30
Apr.	124.8	14.4	19.9	9.6	196.6
May	156.5	18.9	24.1	14.5	197.5
Jun.	201.0	22.7	27.2	19.0	149.9
Average	160.8	18.7	23.7	14.4	181.3
Sep.	234.4	24.1	28.6	20.7	151.0
Oct.	128.3	18.1	22.8	14.1	169.0
Nov.	79.7	12.2	17.0	8.1	162.7
Dec.	45.0	7.0	11.6	3.1	172.2
Average	121.9	15.4	20.0	11.5	163.7

Source: Meteorological Agency _ Meteorological Statistics
<http://www.jma.go.jp/jma/menu/report.html>



5. 26th stage survey report

~Column~ For the clarification and regeneration of Horikawa River

Horikawa Sen-nin Chosatai (HSC) was established on April 22nd, 2007 for clarification and regeneration of Horikawa River, as a place for citizens' activities (Fixed Point Observation Group, Free Survey Group and Support group).

Fixed Point Observation Group examines Horikawa River to confirm the clarification effect by the water quality improvement measure and to make clear the condition of water quality and cause of pollution, from a viewpoint and a sense of citizen.

Free Survey Group studies Horikawa River from various view points.

Support Group supports clarification and regeneration of Horikawa River in various-free ways. These three groups wish for clarification and regeneration of Horikawa River, and work together in a large network.

Currently (as of 26th), there are 2,752 groups and 53,714 people in HSC.

(107 groups in Fixed Point Observation Groups, 40 groups in Free Survey Group and 2,605 groups in Support Group) At the time of launch of HSC, there were 165 groups and 2,262 people.

We can see that it was spread by the citizens' activities for clarification and regeneration of *Horikawa* River.

(Reference. Number of participant p.7~8)

We will explain the status of activities of Fixed Point Observation Groups. The Fixed Point Observation Groups carried out 6,088 observations. It has become clear from the surveys so far that the state of the water area changes from moment to moment due to the ebb and flow of the tide at the downstream section (tidal section) from the Sanage Bridge in Horikawa. Since Fixed Point Observation Groups made many observations from the perspective and sense of the citizens, We are able to grasp the average condition of the water quality of the Horikawa, and trends in that change become clear.

-Pilot project of Horikawa River clarification "from Apr. 2007 to Mar. 2012 confirmed the effect of TRWKR"-

In 5 years pilot project of Horikawa River clarification, it was confirmed that the range of improved water quality due to TRWKR "0.4m³/sec" was about between Sanage Bridge and Matsushige Bridge. And in this period, it was confirmed that the amount of waste "artificial waste : plastic waste" was reduced. This is probably because the public awareness has changed due to increased cleaning activities.

【Summary of 5 years pilot project】

- Confirmed the effect of clarification between Sanage Bridge and Matsushige Bridge due to TRWKR
- The network of citizens who wish to clean and revives the Horikawa River has been expanded
- Citizens' awareness of clarification improved as cleaning activities became active



(1) State of the weather

The weather of the 26th Stage (2019: in September (Sep.) ~ December (Dec.)) was warm and the average temperature was 17.3°C, which is the highest since the HSC survey start (temperature anomalies +1.9°C). Especially an average of Sep. and Oct. was higher more than 2°C compared with the average.

The precipitation for term of survey was on average, but in Sep. and Nov. was less than yearly and it increased about threefold (357mm/month) due to the impact of typhoon (NO19. NO20), autumn rain front in Oct.

(The point of the 26th Stage) Higher temperature and average precipitation

(2) Implementation of new water quality improvement measures.

After the TRWKR was stopped "Mar. 2010", new measures were implemented to improve the water quality.

Specifically, in 2010, the formation of shallows and abyss "improvement of natural clarification function" began in the upstream of Sanage Bridge, and advanced water treatment was introduced at Meijo Water Treatment Center, the Horikawa Right-bank Stormwater Reservoir was put into service.

In 2011, the reclaimed wastewater from the Moriyama Water Treatment Center was passed to the Horikawa River. "Max 4,000m³ /day from April to October" Currently, Horikawa Ugan Rain-water Reservoir for pollution control is under construction, and expectations are high for improving the water quality after the start of operation.

The use of shallow groundwater has been promoted as a new water resource for the Horikawa River from 2004. In 2016, the 8th well was dug upstream of Kinjo Bridge, and this year, the 9th well has been dug upstream of the Kurokawa-daiichi Bridge (0.01m³ /sec). In 2017, based on the results of clarification experiment with sand cover in which citizens also participated, sand cover was carried out to improve the waterfront environment between Habashita Bridge to Gojo Bridge and Naka Bridge to Sakura Bridge.

In the Shin-Horikawa River, dredging of the river channel were implemented near the confluence as a measure against foul odors in 2017, and dredging and sand cover of the river channel were implemented at the upstream of the river in 2018. At the Horidome Water Treatment Center, the simplified processing advanced facility was put into service in Mar. 2019.

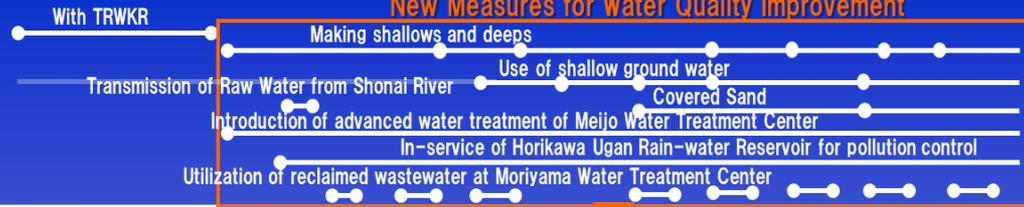
(3) Change in water quality of Horikawa River

The water quality of the **Horikawa deteriorated after the suspension of TRWKR**. However, there is a **general gradual improvement trend from the upstream**, except temporal deterioration due to weather conditions, etc.

At 26 stages, there was a **marked improvement tendency especially in "impression of water stains", "transparency", and "smell"**. For examples, "transparency" averages 76 cm between the Sanage Bridge and Oseko Bridge (the citizen's allowable value is 70 cm), and especially between Matsushige Bridge and Oseko Bridge exceeds 90 cm.

We believe this is due to changes in public awareness aimed at purifying and rehabilitating the Horikawa River and the implementation of new water quality improvement measures including the removal of sludge from the river along with the construction of revetments.

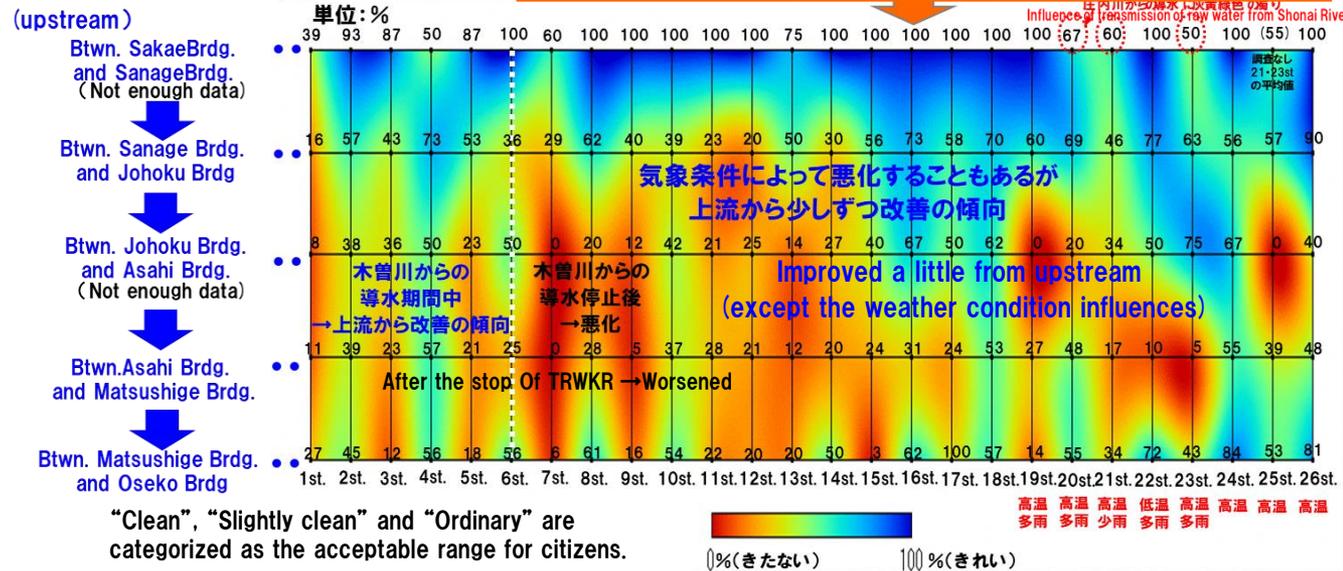
New Measures for Water Quality Improvement



(Note)

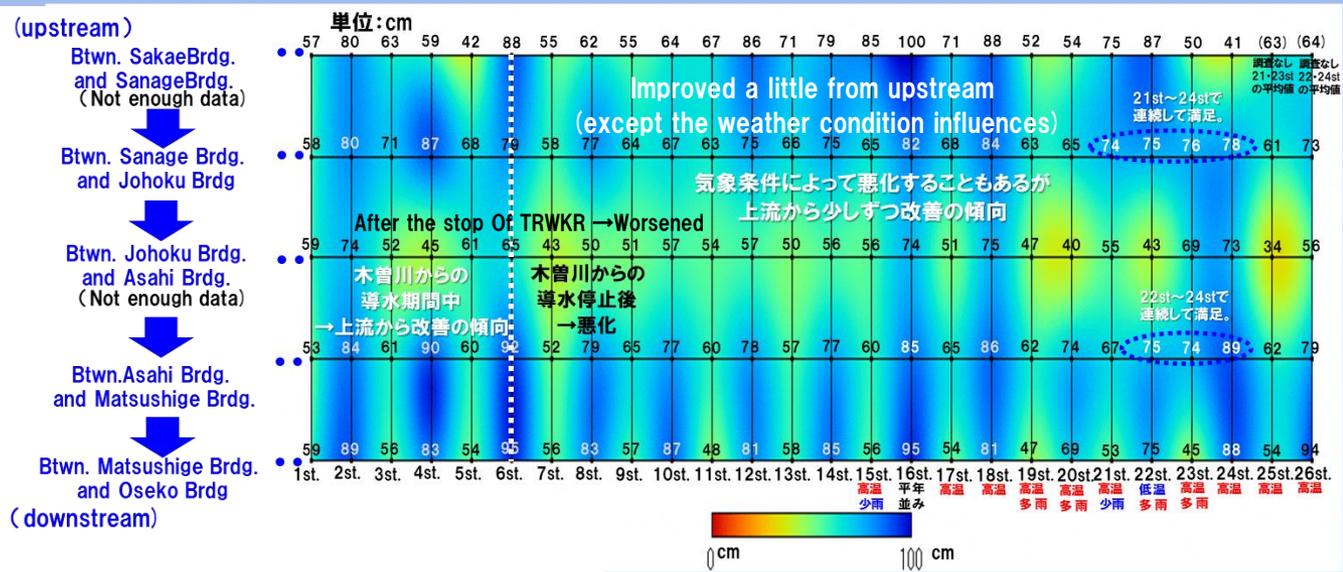
Impression of Water Cleanness

The ratio of "Clean", "Slightly clean" and "Ordinary"



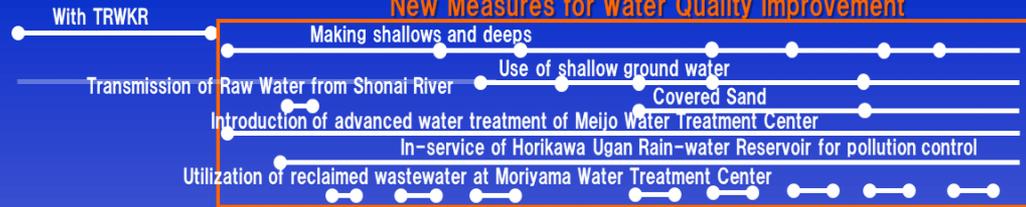
"Clean", "Slightly clean" and "Ordinary" are categorized as the acceptable range for citizens.

Change of Transparency

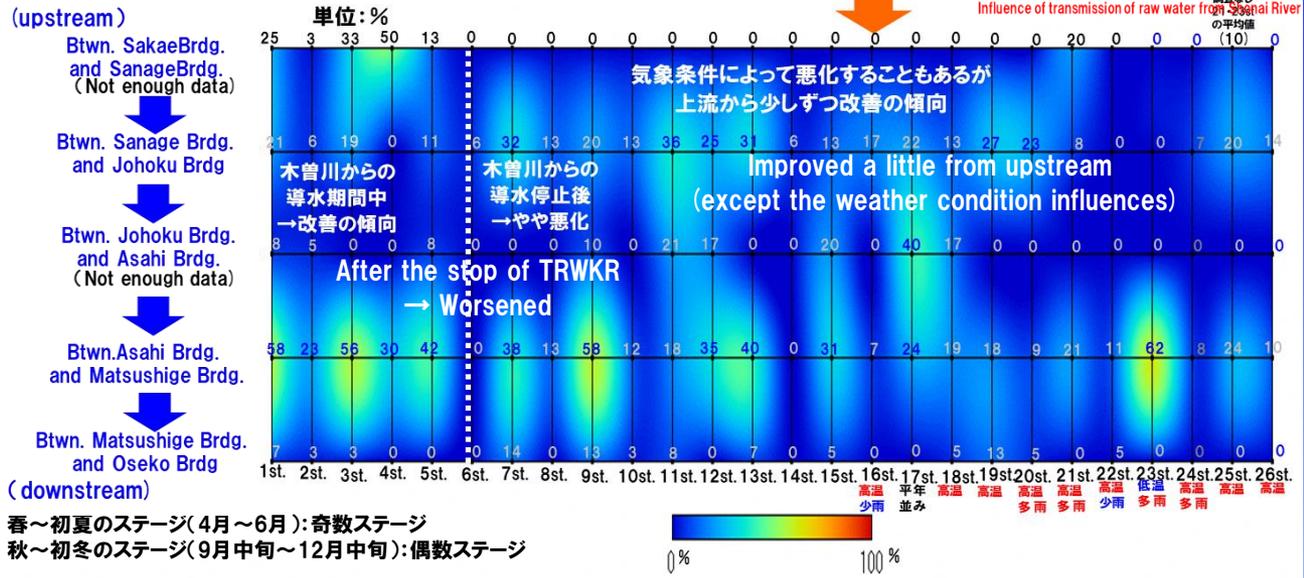


New Measures for Water Quality Improvement

(Note)

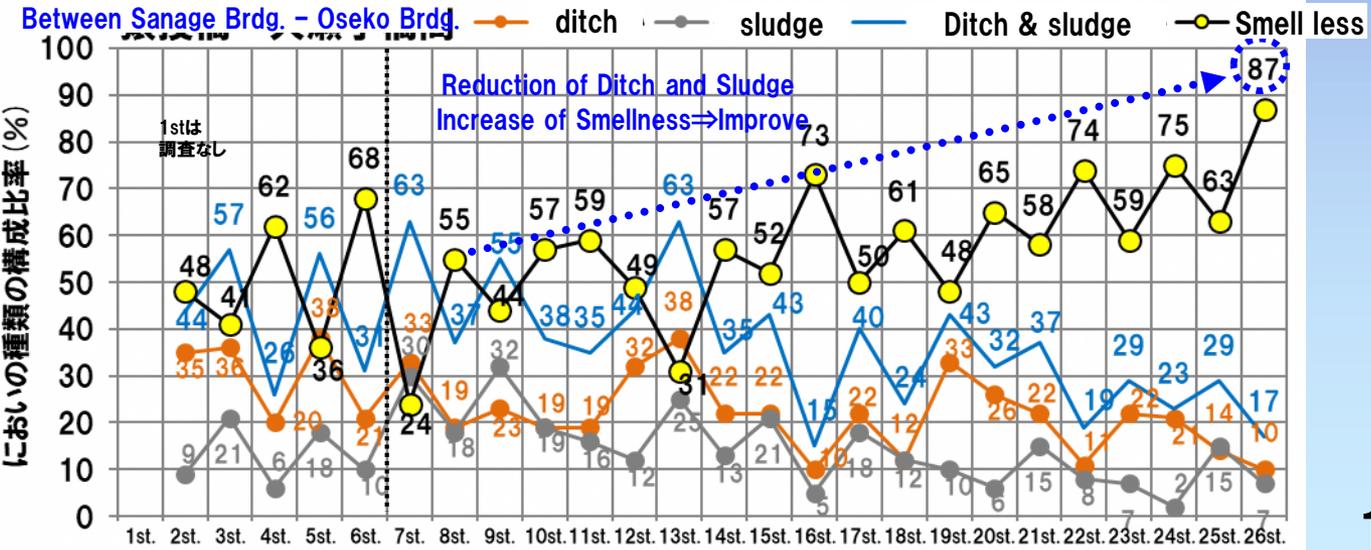


Occurrence of bubbles from river bottom



春～初夏のステージ(4月～6月): 奇数ステージ
 秋～初冬のステージ(9月中旬～12月中旬): 偶数ステージ

Occurrence of smell
 Ratio of Ditch, Sludge, Ditch & Sludge, Smell less

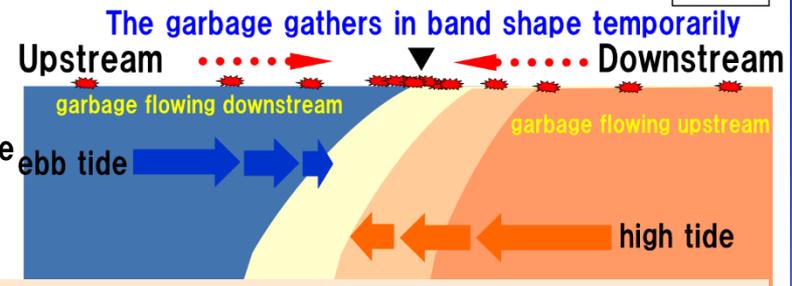


(4) Why does garbage gather in band shape around Shiratori Bridge ~ Oseko Bridge?

We organized the pictures Chikyu club survey group sent to us regularly (about 700 pictures) in order to find out the mechanism, "Why does garbage gather in band shape?", the question from Chikyu club survey group.

As a result, we find out **the garbage gather in band shape, mainly when high tide and ebb tide exchange each other.**

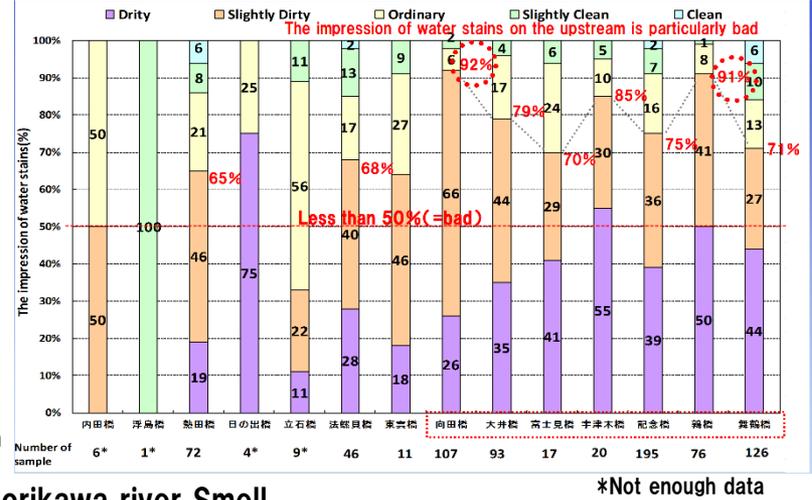
We are thinking that the elucidation of the mechanism of "gather in band shape" is beneficial information for the timing of garbage collection, for example.



When high tide and ebb tide exchange, the garbage flowing downstream on the surface of the river and the garbage flowing upstream on the surface of the river bump into each other, then the garbage gathers temporarily, we think.



Shin-Horikawa river The impression of water stains

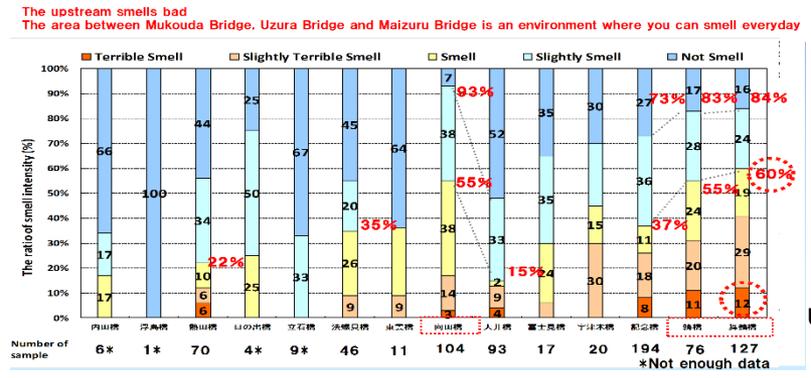


(Ref.: p.81)

(5) Change of the water quality of Shin-Horikawa river

At the end of the 26th stage, there were 784 surveys in the Shin-Horikawa river. From the results of previous surveys, we found that Shin-Horikawa river has a **bad impression of water stains in the upstream area**, and in specially, **the area between Mukouda Bridge, Uzura Bridge and Maizuru Bridge**, where the ratio of "Terrible smell" to "slightly smell" accounts for more than 80%, **is in an environment where it smells everyday.**

Shin-Horikawa river Smell



(Ref.: p.83)

(6) Mechanism of dirtying from the worst rating of clearness in Shin-Horikawa River

We drew up worst rating of clearness (factor below) by spot, month and tide.

■ Bubble from bottom ■ Sludge ■ Rotten egg ■ Cloudiness

One of mechanism of dirtying in Shin-Horikawa River

We found out that it is involved by organic pollution around Uzura Bridge, stagnant seawater in bottom, water temperature, tide level.

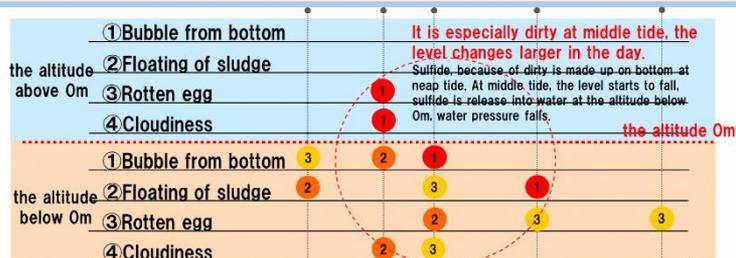
① By observation point... Organic substance easily accumulates on the riverbed in the upstream section centering on Uzura Bridge, and water pollution is remarkable.

② By month... From early spring (March) when the water temperature rises, cloudiness and sludge (scum) become apparent, and foam and rotten egg odor peak in July.

③ By tide... It is especially dirty at the time of young tide, long tide and middle tide, the level changes larger.

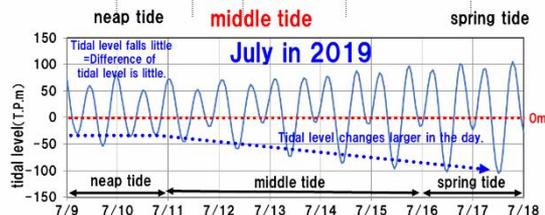
We found clue of provision from now on.

e.g. Decreasing suspended substance (organic substance) to flow in Shin-Horikawa River, Sinking water temperature, Flushing seawater in bottom.



③ By tide

Effects at the altitude above or below 0m rerates to mixing water and changing water pressure by tide.

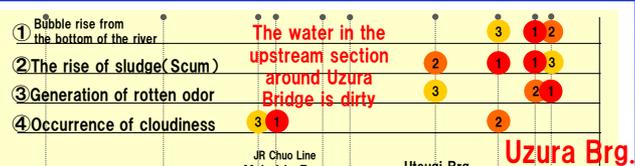


Horidone WTC, water from combined sewer system
SS coheres and sinks.

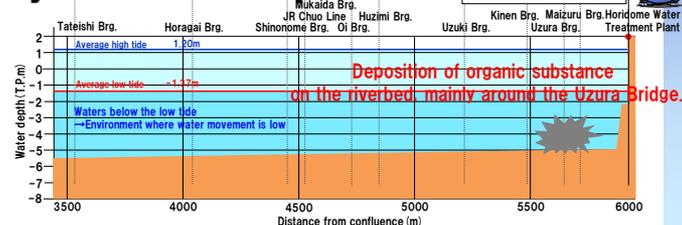
Seawater stagnates
Organic substance gathers in water and bottom. = Oxygen is used.
Water temperature rises
Water pressure falls
Non-oxygen
Sulfide is made up.
bubble, rotten egg, cloudiness

Water pollution worst ranking (by observation point)

With / without rainfall
Including out-of-period data
All Shin-Horikawa River data:784
(by 26th stage)

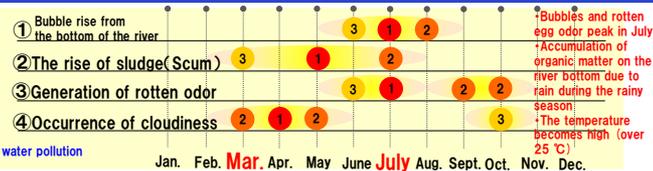


① By observation point

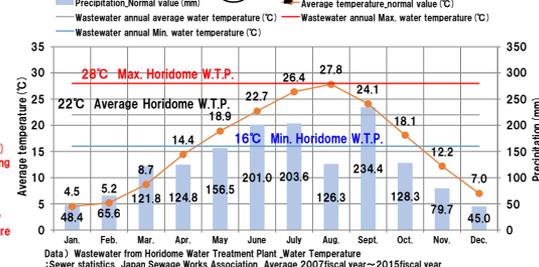


Water pollution worst ranking (by month)

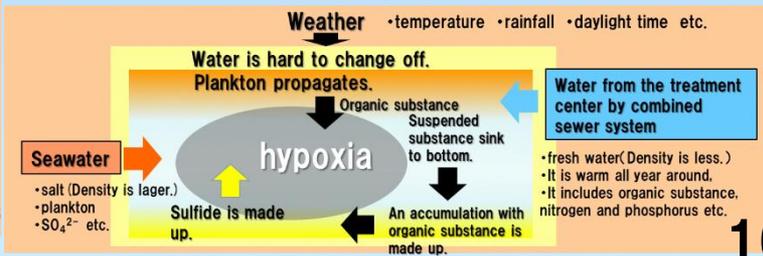
With / without rainfall
Including out-of-period data
All Shin-Horikawa River data:784
(by 26th stage)



② By month

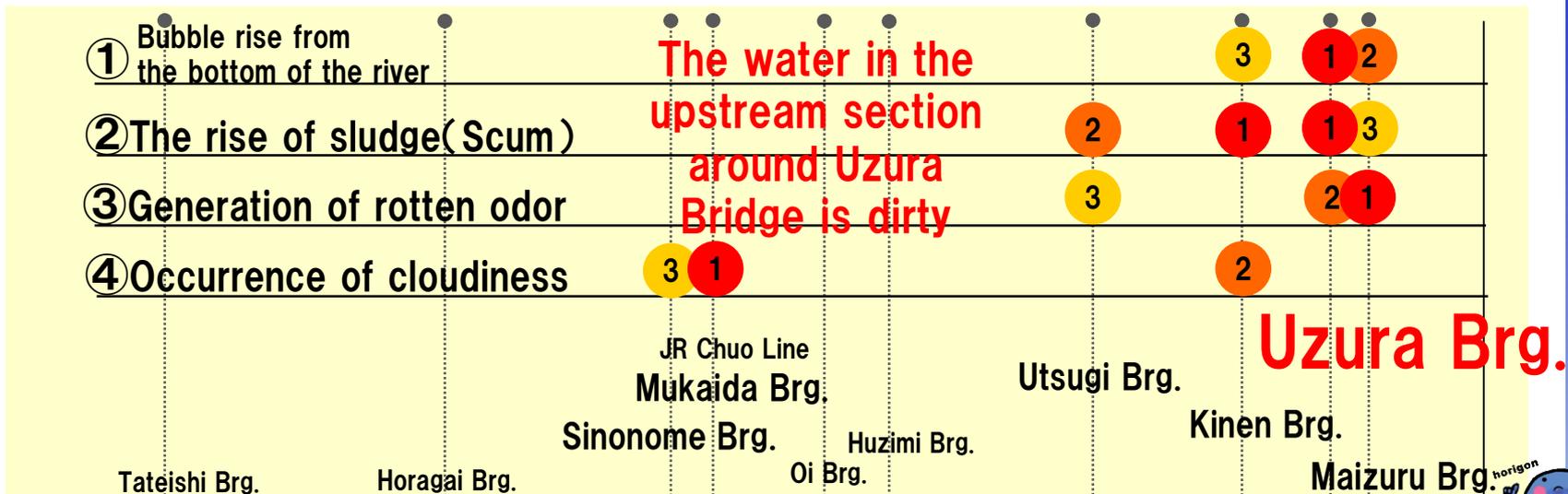


Point of mechanism of dirtying in Shin-Horikawa River



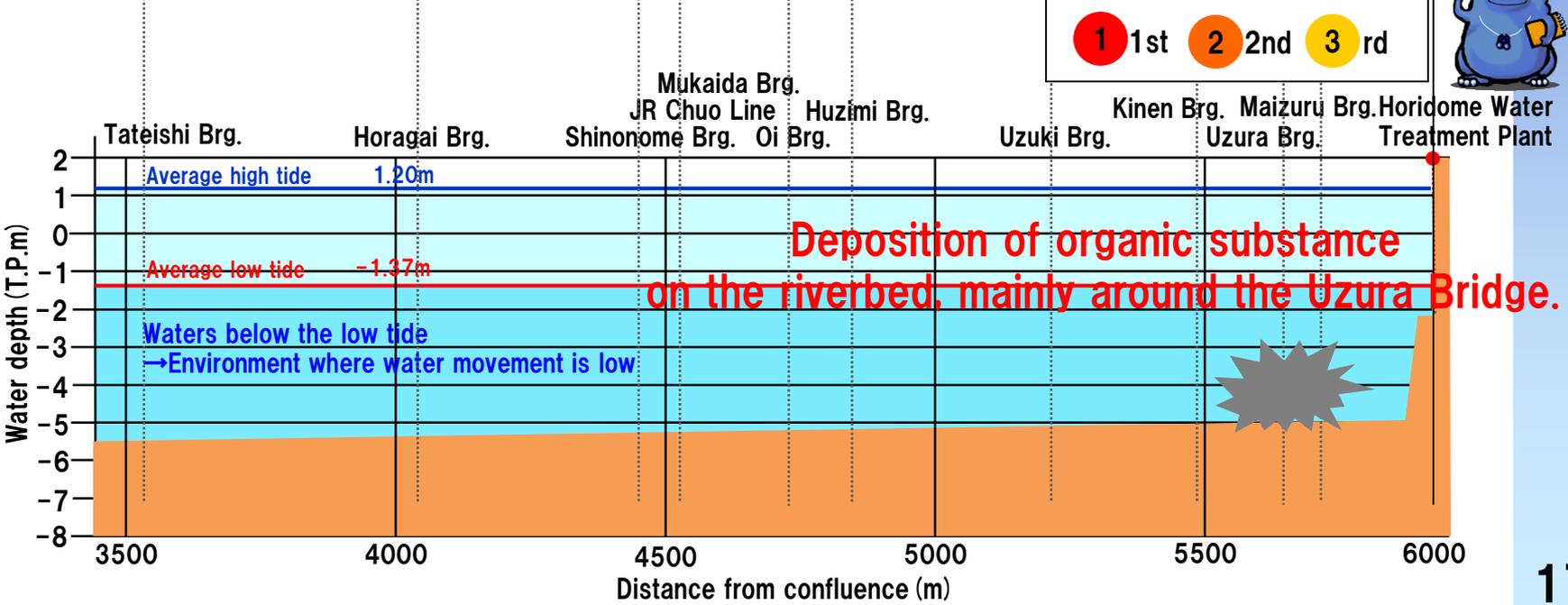
Water pollution worst ranking (by observation point)

With / without rainfall
Including out-of-period data
All Shin-Horikawa River data:784
(by 26th stage)



The water in the upstream section around Uzura Bridge is dirty

Uzura Brg.



Water pollution worst ranking (by month)

With / without rainfall
Including out-of-period data
All Shin-Horikawa River data:784
(by 26th stage)

① Bubble rise from the bottom of the river

② The rise of sludge (Scum)

③ Generation of rotten odor

④ Occurrence of cloudiness

• Bubbles and rotten egg odor peak in July
• Accumulation of organic matter on the river bottom due to rain during the rainy season
• The temperature becomes high (over 25 °C)

Jan. Feb. **Mar.** Apr. May June **July** Aug. Sept. Oct. Nov. Dec.

Reduces water pollution in winter

• There is little rain and little organic matter accumulates on the riverbed.

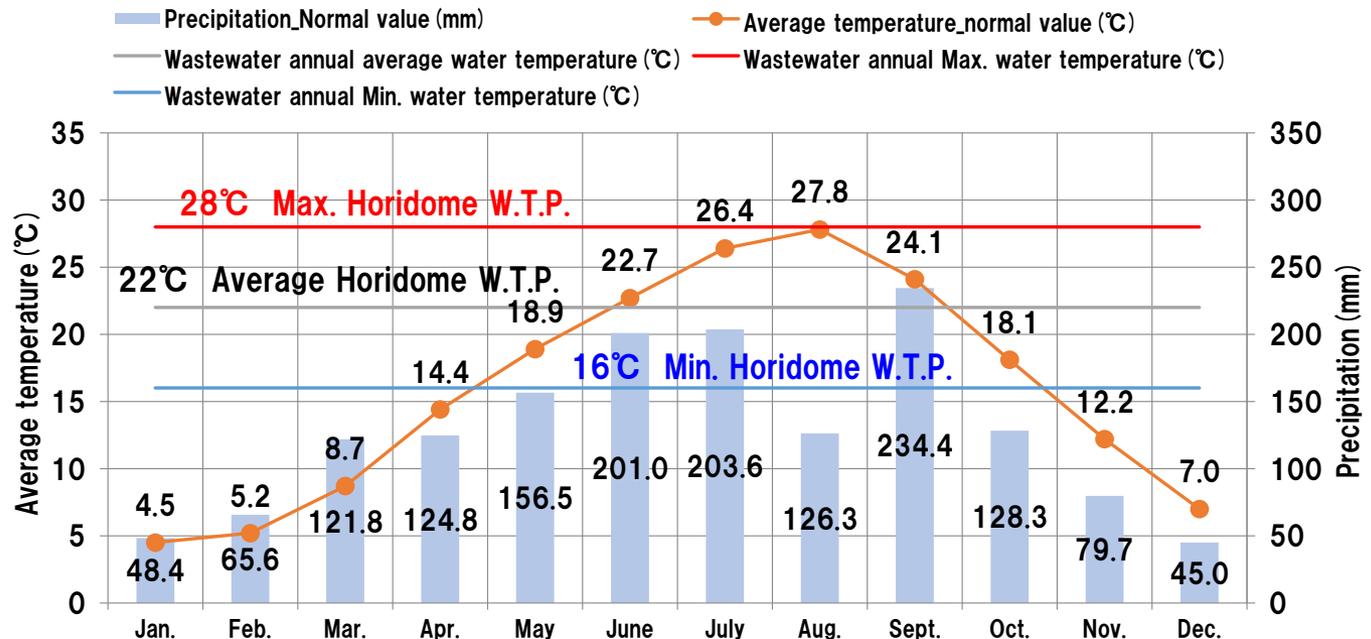
• The water temperature is low, the decomposition of organic substances on the riverbed is difficult, and the oxygen in the water is hard to decrease.

→ Accumulation of organic matter.



White turbidity and sludge (scum) became apparent from early spring (March)

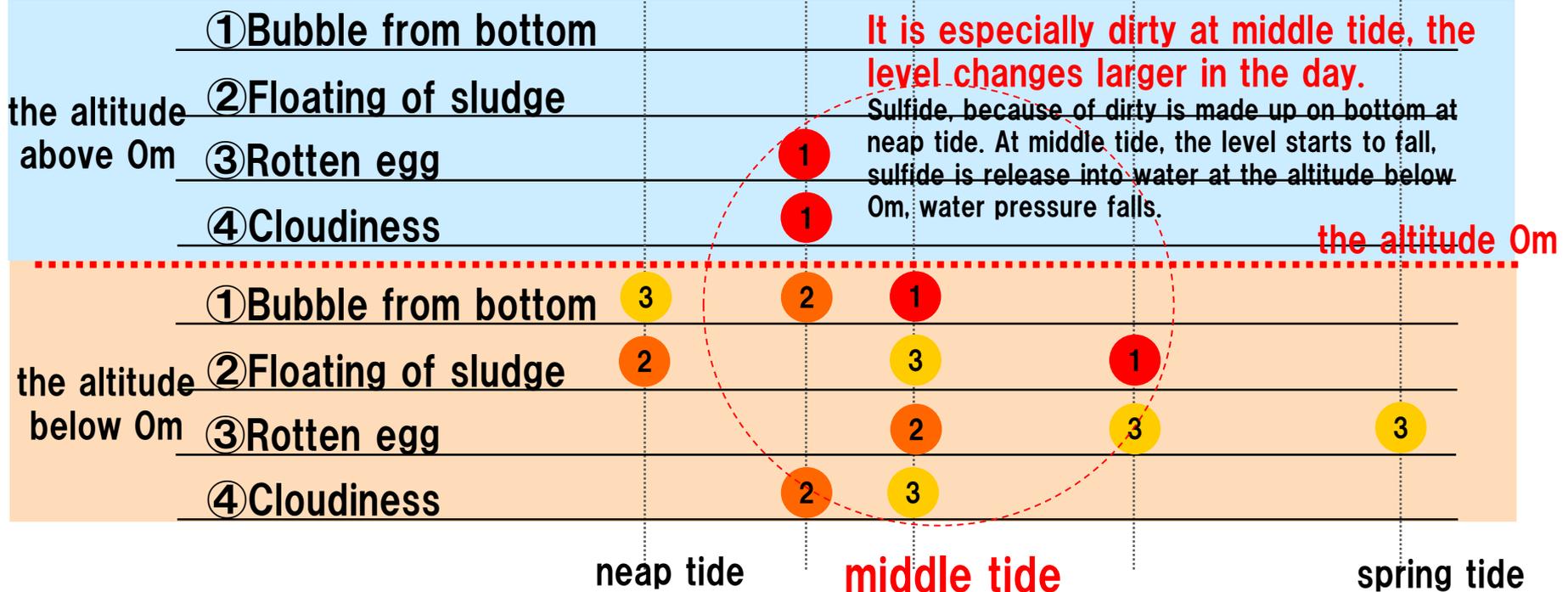
• Many organic substances accumulated on the river bottom gradually decomposed from early spring when the water temperature rises → Hypoxia



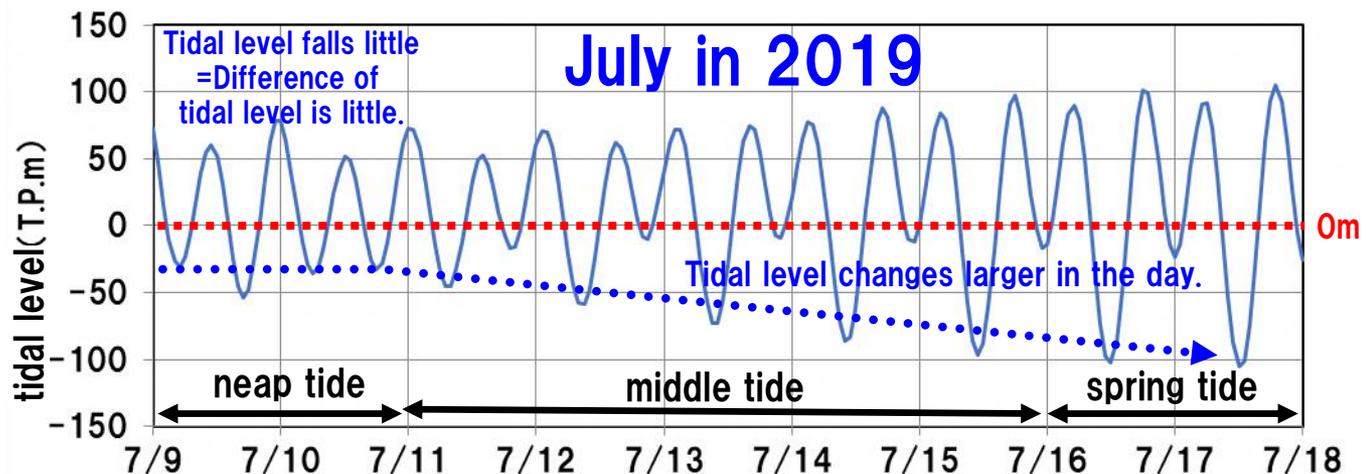
Data) Wastewater from Horidome Water Treatment Plant _Water Temperature
: Sewer statistics Japan Sewage Works Association Average 2007fiscal year~2015fiscal year

Worst rating of clearness(by tide)

including rainfall and off period data
All data (Shin-Horikawa) :784
(until 26th stage)



Effects at the altitude above or below 0m rerates to mixing water and changing water pressure by tide.



(6) Shin-Horikawa River got better after dredging sludge

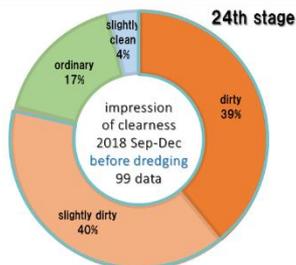
We found 'color', 'smell' and 'environment for lives' were improved after dredging sludge through the upstream of Shin-Horikawa River.

- ① 'clean'-'ordinary' got up 20% more.
- ② 'milky' and 'gray' got down 20% less.
- ③ 'not smell' and 'slightly smell' got up 20% more.
- ④ The group of fish were witnessed in the upstream of Shin-Horikawa River.

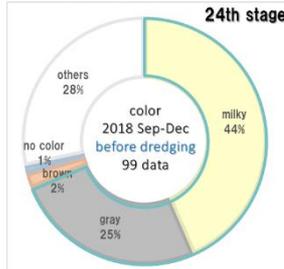
The group of Flathead mullets



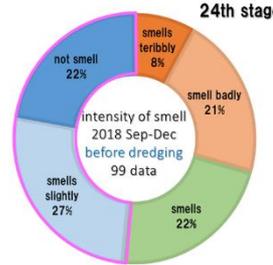
Impression of clearness improved.



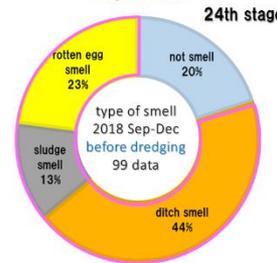
'milky' & 'gray' decreased.



Shin-horikawa's smell improved.



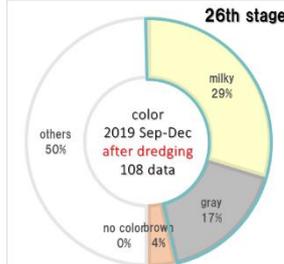
Shin-horikawa's smell improved.



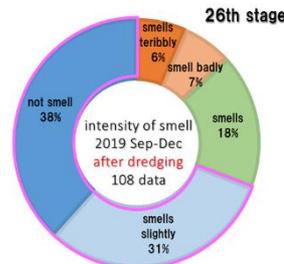
Impression of clearness improved.



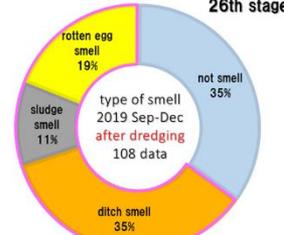
'milky' & 'gray' decreased.



Shin-horikawa's smell improved.

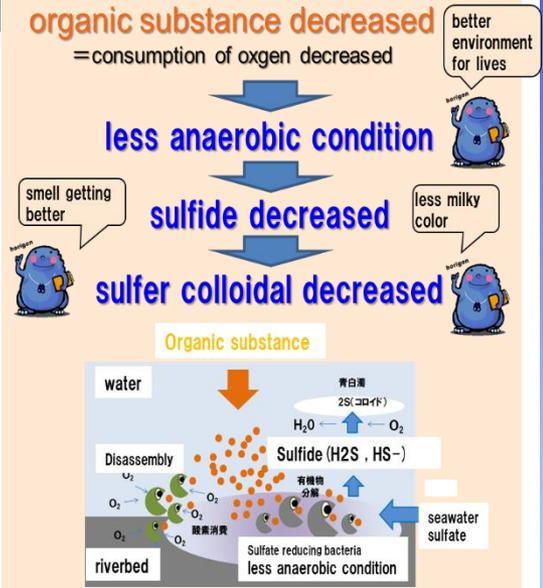


Shin-horikawa's smell improved.



What improved water quality of Shin-Horikawa River?

- Sludge on the riverbed was dredged.
- Advanced primary treatment facility (one of countermeasures against CSR) of Horidome water treatment center started its operation.

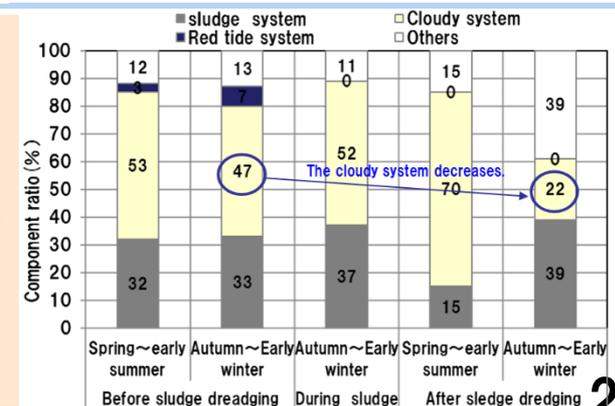


(7) The color of the water and its feature of Shin-Horikawa River are checked.

■ Comparison before and after sludge dredging
Based on a picture of the fixed-point observation of ECO DO-CO Cheering Groups (Shin-Horikawa River: Mukkaida Bridge), it was compared before and After sludge dredging conducted in an upper-class area on Shin-Horikawa river.

As the result, it was confirmed that the color of the cloudy system decreases by dredging of sludge.

We are thinking decrease with the color of cloudy system means that a sulfide in the water decreased. Organic matter decreases by sludge removal in a riverbed and using in simplicity treatment advance facilities in Horidome water treatment center (control of combined sewer overflow) and the oxygen conditionlessness in a water area may be improved.



(8) Is it true that the water gets dirty when it rains ?

We used Horikawa river • Between Asahi Brdg. and Matsushige Brdg. (7stage~26stage:number of surveys 1171), Shin-Horikawa River(All data for all sections: number of surveys 784) to organize and compare “without rain” and “with rain” As a result, it was found that when it rained, “the impression of water clearness” and transparency worsened in both Horikawa river and Shin-Horikawa river, and the smell and cloudiness worsened in Shinhorikawa river.

when it rains the water gets dirty

■ Impression of Water Clearness and Transparency

... Both Horikawa river and Shin-Horikawa river worsened

■ Smell • white cloudy ... Shin-Horikawa river worsened



Dirtying of water are more noticeable Shin-Horikawa river than Horikawa river

Related to the mechanism of dirtying on the Shin-Horikawa river Since it is difficult for water to be replaced, it is easy to become an environment where sulfides are generated and dirtying are likely to last for a long time

without rain: no rain on the day and the previous day

With rain : rain on the day and the previous day

Division		Impression of Water Clearness ratio of "dirty to slightly dirty"	Transparency acceptable value for citizens over 70cm	COD	Smell ratio of "bad smell~smell"	Color	
						ratio of "white cloudy"	ratio of "sludge"
Horikawa river	Without rain	73%	68cm	11mg/L	21%	25%	21%
	With rain	80% worsened	50cm worsened	11mg/L No difference	23% No noticeable difference	25% No difference	25% No noticeable difference
Shin-Horikawa river	Without rain	74%	72cm	16mg/L	37%	34%	16%
	With rain	90% worsened	43cm worsened	16mg/L No difference	54% worsened	52% worsened	7% -

(9) The 11th Horikawa-River simultaneous survey 4-Why?

(Changes in Horikawa-River according to periodical operation of vessel service)
If frequency of operation increases, water and sludge in Horikawa-River are periodically agitated, and oxygen is continuously supplied to the river bottom. So, we think that river bottom environment improve, reduce “bubbles, odors and cloudiness” and impression of water quality is improved.

In the previous simultaneous survey, temporary sludge hoisting and bubbles were confirmed at the start of vessel operation, but in this survey, sludge hoisting and bubbles from the river bottom were not confirmed after passing the vessel.

As a result of our study for "4-why" which was obtained in this simultaneous survey, we thought that the river bottom environment was in transitional situation when it was improving.

1. Between Miyano Watashi and Asahi Bridge (Operation segment)
Rolling up sludge and bubble from the bottom of the river. • Why?
2. Between Koshio Bridge and Nishiki Bridge, Near Atsuta Memorial Bridge.
Light color (Ⓜlight gray yellow green) and turbidity were seen. • Why?
3. Habashita-Bridge (downstream)
• We confirmed soil and sand disturbance at the waterside after passing the vessel.
• It did not turn black at the edge of water-side (visual inspection: no sludge at the edge of water-side) • Why?
4. Between Miyano Watari and Asahi Bridge (operation section)
Same as 9th and 10th Horikawa-River simultaneous surveys
• Bubble occurred on the wake
• We confirmed that the it takes long times to disappear the bubbles • Why?

Expected effective for cleaning and maintaining around water area

If vessel operate periodically, sediments of water area and riverbed are regularly agitated.

Periodically,

- Oxygen is supplied to the water area
- Sediment (mud etc.) on the river bottom is reduced
- Hydrogen sulfide, etc... in the deposit is released regularly

Direct improvement measures

- Removal of sludge (at the time of revetment maintenance)
- Improvement of combined sewer system (storage pipe), etc.

+

If vessel operate periodically,

- Re-deposition of bottom mud and suppression of sludge formation
- Improve natural purification capacity of Horikawa-River is expected

Impression of water pollution is improved

(Summary of the survey)

1. Rolling up sludge and bubble from the bottom of the river.

1. Between Miyano Watashi and Asahi Bridge (Operation segment)
Rolling up sludge and bubble from the bottom of the river.



Part.3

Rain is less than May and the temperature (water temperature) is lower.

There is little organic substance that flows into the river with rain, and decomposition is slow.

For this reason, the water area accumulated on the riverbed without sludge formation.

(floating mud is accumulated)

• The tide level at daytime doesn't drop below in spring.

The tide level is lower at night than at daytime, and the water depth doesn't easily become shallow during tyrants.

For this reason, it's difficult to watch rolling up sludge and large amount of bubbles by stirring.

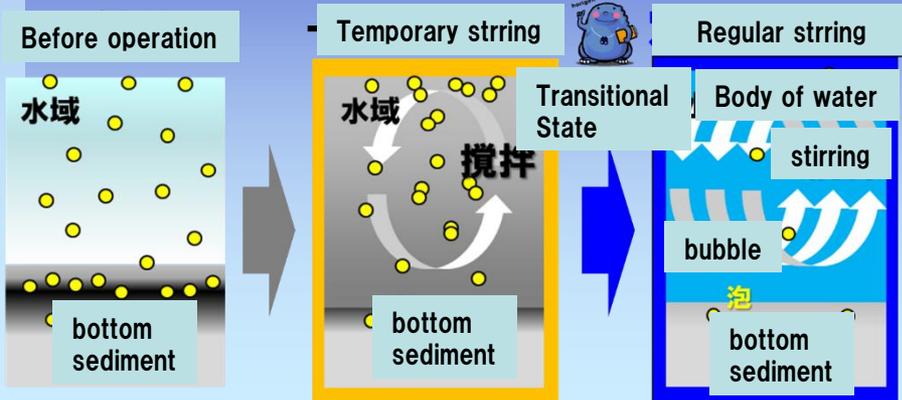
Why?



Part.1

Effect of ship operation

By stirring in water area and supplying oxygen,
Reduced sludge formation and redeposition.



Part.2

Effect of improvement of combined sewer system.

Started operation in 2010.

• Horikawa Ugan Rain-water Reservoir for pollution control.
(storage pipe)

• Advanced treatment at Meijo water treatment center.

Due to the decrease of organic substance. Flowing into the river,
Reduced sludge formation and redeposition.

The condition of riverbed gradually improved.

2. About water color and turbidity

About the situation of color and turbidity immediately after passing ships.

Between Koshio Bridge and Nishiki Bridge, Near Atsuta Memorial Bridge. Light color (Ⓢlight gray yellow green) and turbidity were seen.



Part.4 Why?

The bottom water of Horikawa river and the environment of the riverbed transitional state of improvement.

Hoisting of sludge by ship operation wasn't confirmed, but bottom water and riverbed sulphides and sludge that existed in it is thought that it was done.

■ Between Koshio Bridge and Nishiki Bridge With the stirring of water and sludge and the supply of oxygen by the operation of ships, I think that the following factors caused light colored water and turbidity.

I think that this is a transitional situation in which the environment of the bottom water and river bottom is improving.

(Cause)

- ① Sulfide in water changes sulfur colloid (blue turbidity)
- ② Black sludge reduced, but there was gray dusty mud and it rolled up.

■ Atsuta Memorial Bridge

By the supply of oxygen by stirring by the operation of ships. The sulfide in the bottom water changed to a sulfur colloid. (blue turbidity)

It's considered that it because a factor of light color water and turbidity.

地点名	11 th Horikawa simultaneous survey					
	November 2019					
	色			濁り		
	4日 小潮	8日 若潮	9日 中潮	4日 小潮	8日 若潮	9日 中潮
潮位 (T.P.cm)	38~48	-48~-8	-57	38~48	-48~-8	-57
巾下橋	Ⓢ灰黄緑色	Ⓢ灰黄緑色	-	○	○	-
小塩橋	-	Ⓢ灰黄緑色	⑨淡灰黄緑色	-	○	●濁りあり
五条橋	Ⓢ灰黄緑色	Ⓢ灰黄緑色	-	○	○	-
中橋	⑨淡灰黄緑色	-	⑨淡灰黄緑色	●濁りあり	-	●濁りあり
錦橋	Ⓢ灰黄緑色	⑨淡灰黄緑色	-	○	●濁りあり	-
天王崎橋	Ⓢ灰黄緑色	Ⓢ灰黄緑色	-	○	○	-
新洲崎橋	Ⓢ灰黄緑色	Ⓢ灰黄緑色	-	-	-	-
日置橋	-	-	-	-	-	-
松重橋	-	-	-	-	-	-
古渡橋	Ⓢ灰黄緑色	Ⓢ灰黄緑色	-	○	○	-
熱田記念橋	Ⓢ灰黄緑色	⑨淡灰黄緑色	-	○	●濁りあり	-
大瀬子橋	Ⓢ灰黄緑色	⑨淡灰黄緑色	-	○	●濁りあり	-

注) ●:濁りあり ○:濁りなし -:調査なし

Tide level: the tide level of the port of Nagoya at the latest hour of the survey time.

November 9 2019
7:50

Earth Club Research Team
It was reported sulfur colloid or bottom layer water containing sulfides mixed with surface water by stirring water generated at the abutment of Goryo Bridge.



Photo:
Earth Club Research Team

御陵橋

3. Disturbance of soil and sand at the water edge

■ Habashita Bridge (Downstream)

- We confirmed soil and sand disturbance at water edge after passing of vessel
- It did not turn black at edge

(Visual Inspection: No-sludge at water edge)

4. About bubbles on the wake

■ Between Miyano Watashi and Asahi-Bridge (vessel operation section)

Same as the 9th and 10th Horikawa-River simultaneous survey (24th and 25th stage)

- Bubble on the wake is confirmed
- It takes long times to disappear the bubbles



Part5

Why?

Environment of sand cover section (implemented in 2017) is kept.

We think that continuous disturbance at water edge due to vessel operation has the effect of maintaining good environment at water edge. And also it create and maintain a diverse ecosystem and improve natural purification function of Horikawa-River.



Part6

Why?

(Assumed factors) Quote: The 24th Survey team meeting p.116

① About surfactant

- Surfactant from detergent contained in the water source of Horikawa-River causes bubbles.

② About mucus of plankton etc..

If plankton or seaweed grows, these mucus causes bubbles.



Koshio-Bridge (upstream)
Dec.21 2017



Habashita-Bridge (downstream)
Apr.19 2018

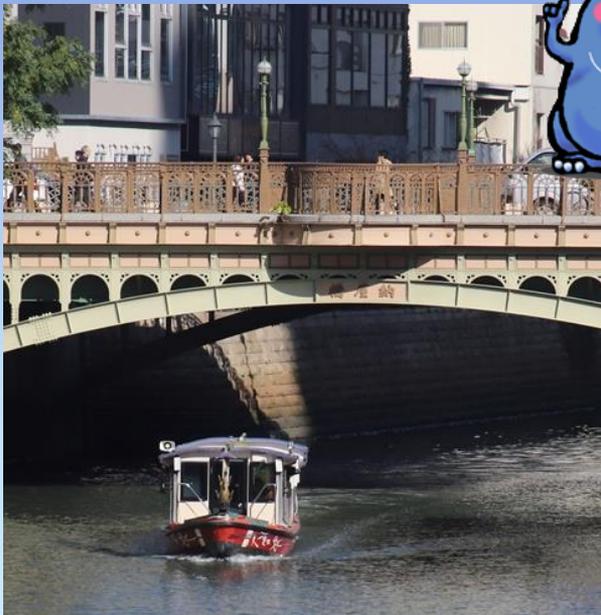


Continuous disturbance at water edge due to vessel operation
(Visual Inspection: No-sludge at water edge)
Habashita-Bridge (downstream)
Nov.8 2019

Expected effective for cleaning and maintaining around water area

Temporary vessel operation

In this simultaneous survey, transitional situation of improvement of bottom water and river bottom were confirmed through vessel operation.



If vessel operate periodically, sediments of water area and riverbed are regularly agitated.

Periodically,

- Oxygen is supplied to the water area
- Sediment (mud etc.) on the river bottom is reduced
- Hydrogen sulfide, etc... in the deposit is released regularly

Direct improvement measures

- Removal of sludge (at the time of revetment maintenance)
- Improvement of combined sewer system (storage pipe), etc.

+

If vessel operate periodically,

- Re-deposition of bottom mud and suppression of sludge formation
- Improve natural purification capacity of Horikawa-River is expected

Impression of water pollution is improved

from secretariat

■ Every data you offer to us is valuable

Information about subtle change you find when you survey Horikawa river can be valuable data to understand the present situation of the river. We're looking forward to your data from now on.

■ Let us introduce your activity

Your activity, such as survey, think and cheer up Horikawa, is the motivation to increase the number of those who love Horikawa, Nagoya City and the Earth.

■ Let's hand down the past appearance of Horikawa as record

To know about the past Horikawa is very important to design the future Horikawa. We refer Horikawa's pictures taken in Taisho and Showa era to know forgotten past Horikawa. Do you keep photos which Horikawa was photographed in in your album? For example, photo of your family with Horikawa in the background of the picture is Okay.

(contact) secretariat

e-mail:2010@horikawa1000nin.jp

Please send comments and pictures (with date and place) from mobile phone or PC.

*We think image quality of picture taken by mobile phone camera is enough.