

**Damage to Drinking Water Systems  
and Restoration Measures  
after  
the Great East Japan Earthquake and Tsunami**

**July 2011**

**The Japan Water Research Center**

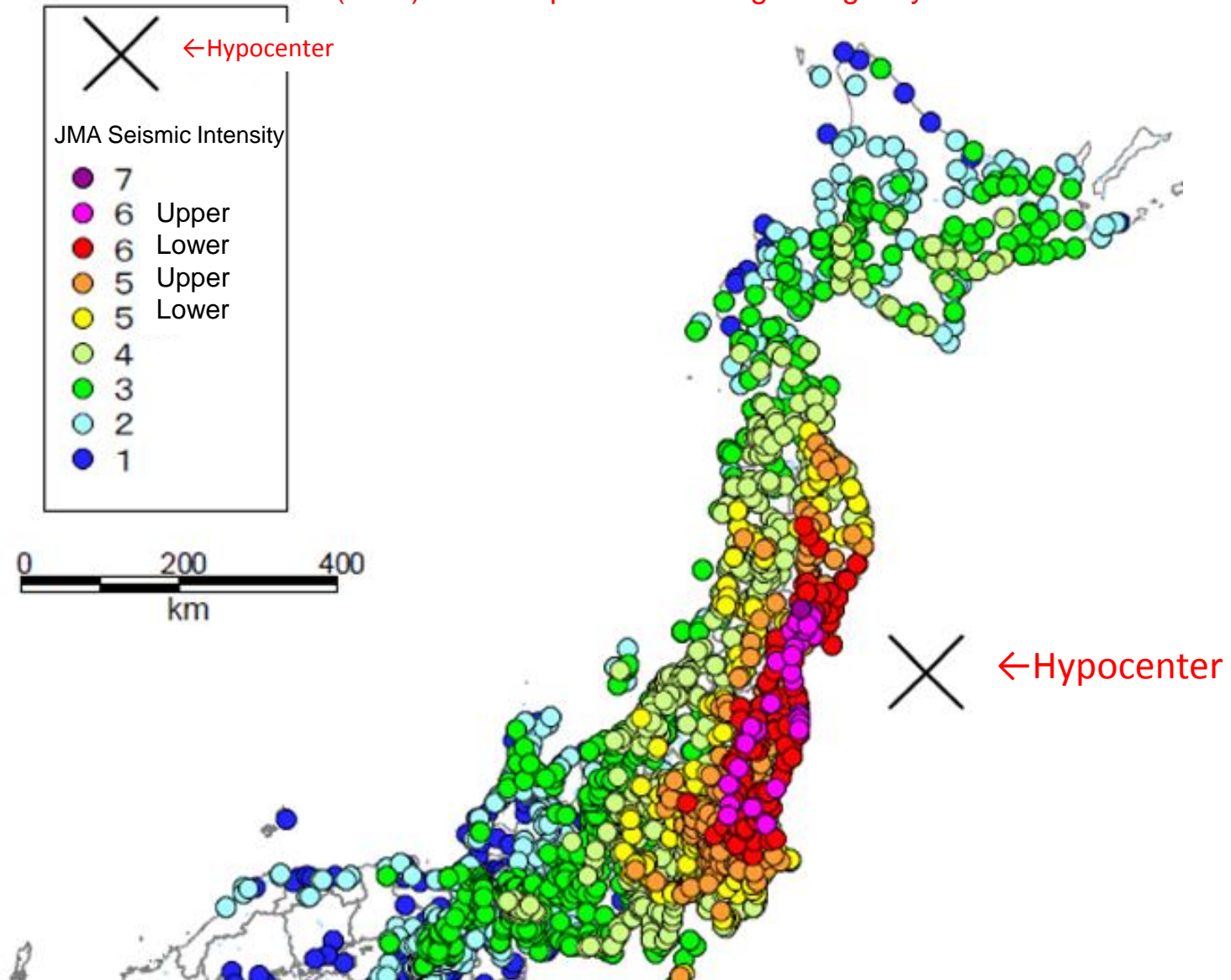
# Summary of the Great East Japan Earthquake

<b>Date and Time:</b>	<b>11 March 2011 14:46 JST (05:46 UTC)</b>	
<b>Magnitude:</b>	<b>9.0 (interim value; the largest earthquake recorded in Japan)</b>	
<b>Hypocenter:</b>	<b>N38.1, E142.9 (130km ESE off Oshika Peninsula) Depth 24km (interim value)</b>	
<b><u>Mechanism:</u></b>	<b>Reverse fault type with WNW–ESE compressional axis (by CMT analysis)</b>	
<b><u>Earthquake Early Warning:</u></b>	<b>Issued 8.6 seconds after the detection of the first P–wave at the nearest seismic station</b>	
<b><u>JMA Seismic Intensity:</u></b>	<b>7 (Max)</b>	<b>Kurihara City of Miyagi Prefecture</b>
	<b>6+</b>	<b>28 cities and towns (including Wakuya Town, Tome City, Osaki City, Natori City) in Miyagi, Fukushima, Ibaraki, and Tochigi Prefectures</b>
	<b>6– or weaker</b>	<b>Observed nationwide from Hokkaido to Kyushu</b>

(Source)[http://www.jma.go.jp/jma/en/2011\\_Earthquake.html](http://www.jma.go.jp/jma/en/2011_Earthquake.html)

# JMA Seismic Intensity of the Great East Japan Earthquake

(Note) JMA : Japan Meteorological Agency



(Source)<http://www.jishin.go.jp/main/oshirase/201103111446sanriku-oki.gif>

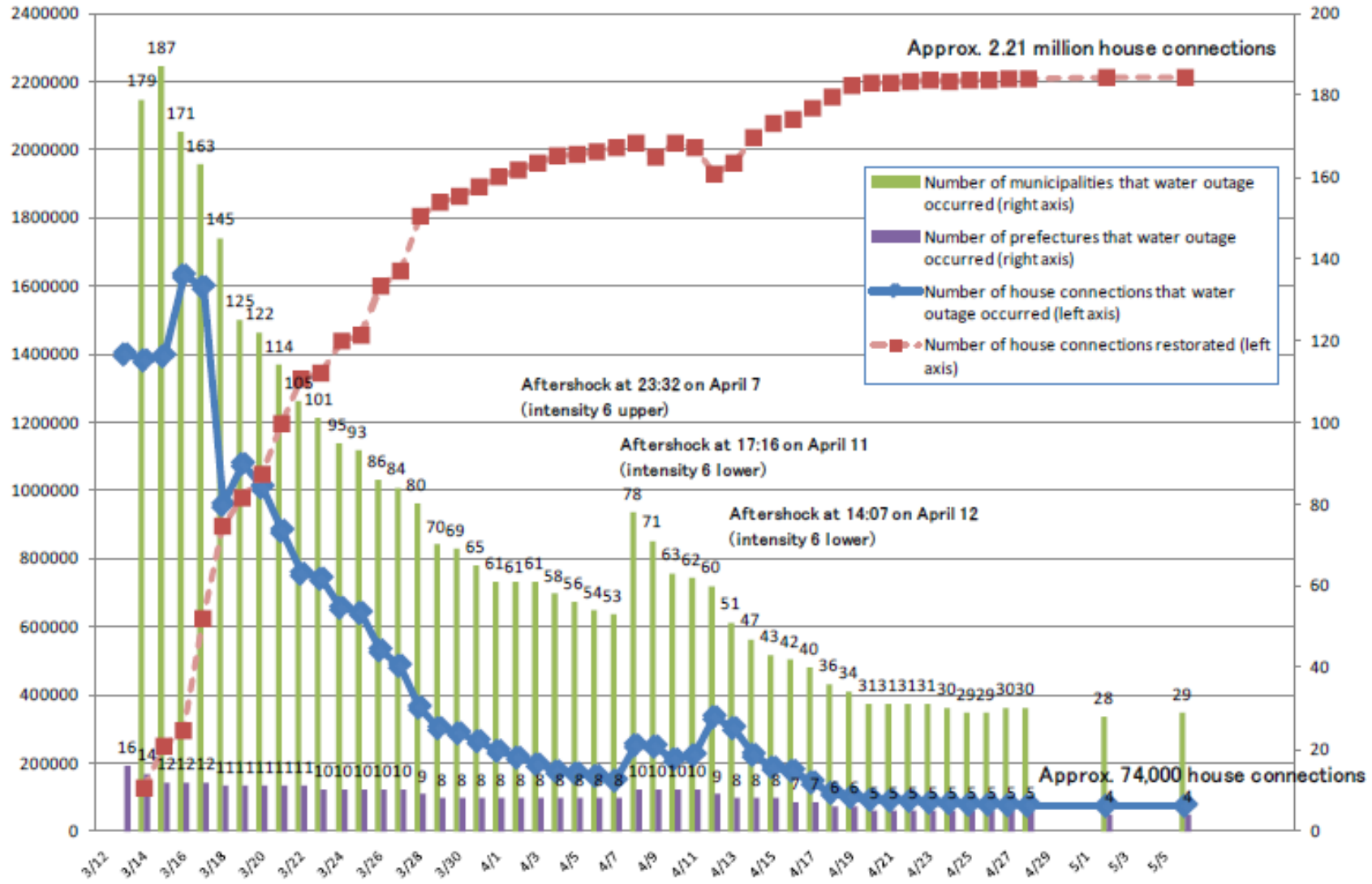
# Major Pattern of Damage to Drinking Water Systems by the Great East Japan Earthquake

- ☑ Earthquake damage only (Inland area)
- ☑ Damage due to both earthquake and tsunami (Northeastern coast area)
- ☑ Damage due to liquefaction (Reclaimed land)
- ☑ Adverse effect by the Fukushima No 1 nuclear power plant accident

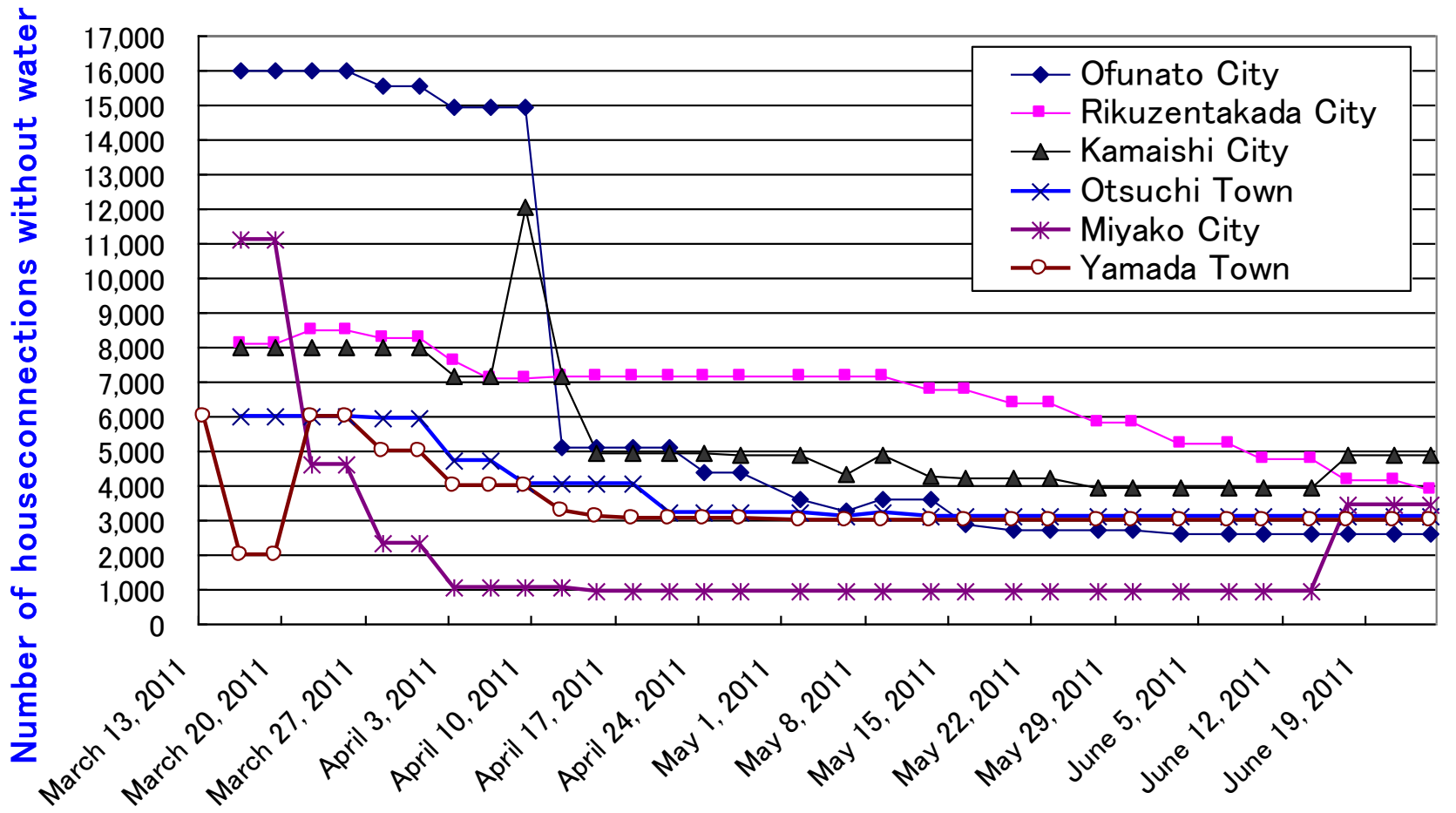
# Water Outage by the Earthquake & Tsunami and Restoration of Water Supply

# Water Outage by the Great East Japan Earthquake and Restoration of Water Supply

(Number of house connections)

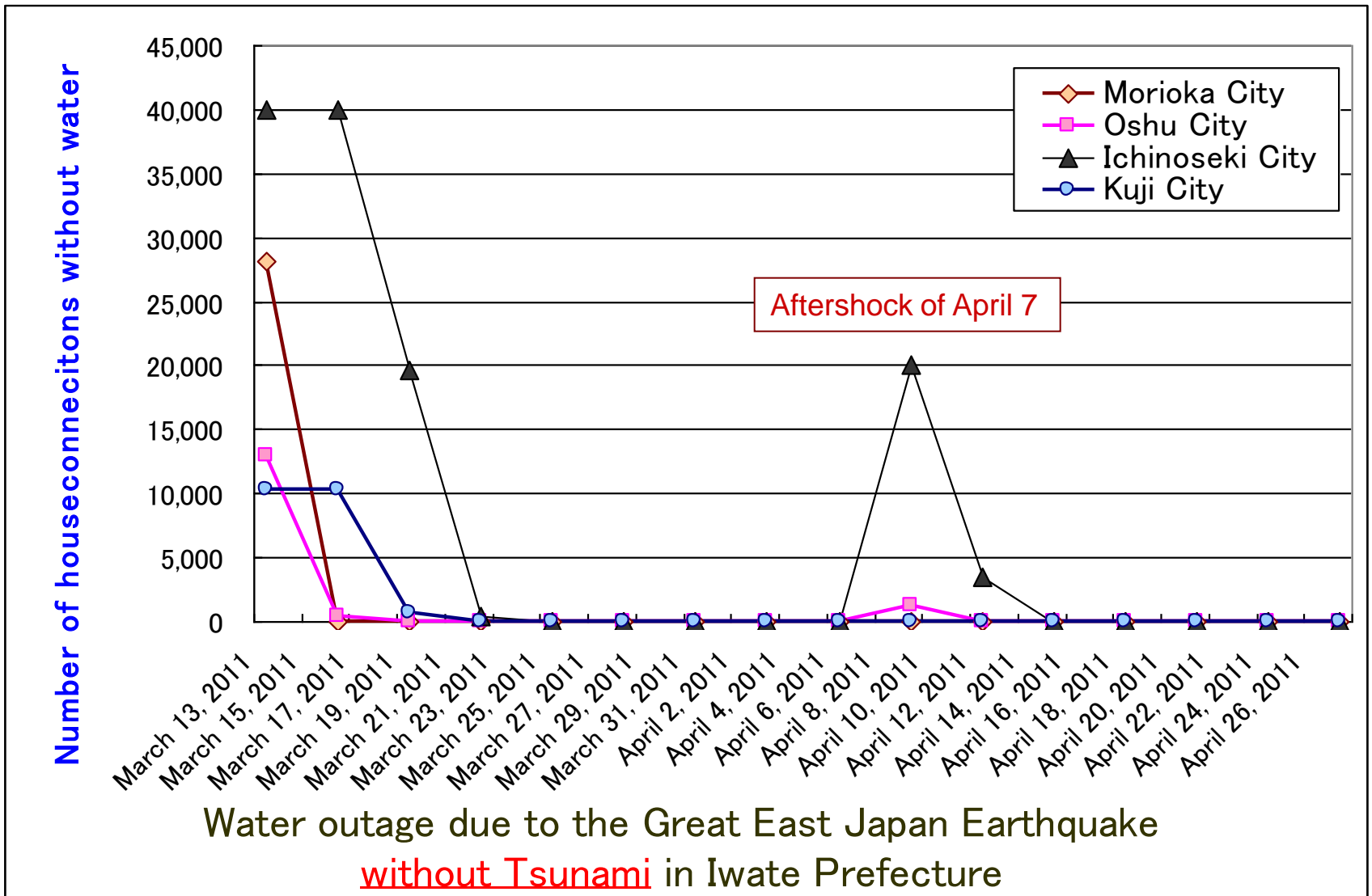


(Source) [http://www.mhlw.go.jp/english/topics/2011eq/dl/damage\\_situation\\_110511.pdf](http://www.mhlw.go.jp/english/topics/2011eq/dl/damage_situation_110511.pdf)



Water outage due to the Great East Japan Earthquake  
with Tsunami in Iwate Prefecture

Note : The water supply recovered early during a month after the Earthquake in the areas not affected by tsunami while it has still been suspended in the most tsunami-affected areas.



Note : Depending on the areas, the water supply was recovered about ten days after the Earthquake. An aftershock on April 7 left some areas without water supplies.



# Typical Cases of Damage to Drinking Water Systems



Damage due to Tsunami to Takekoma Treatment Plant of Rikuzentakada City

Note : The water source of Takekoma TP is shallow wells which were possibly salinized and contaminated by various substances.



Damage to No.2 Sokedukuri Intake Facility in Minamisanriku Town

Note : The water source of No.2 Sokedukuri Intake facility is shallow wells which were possibly salinized.

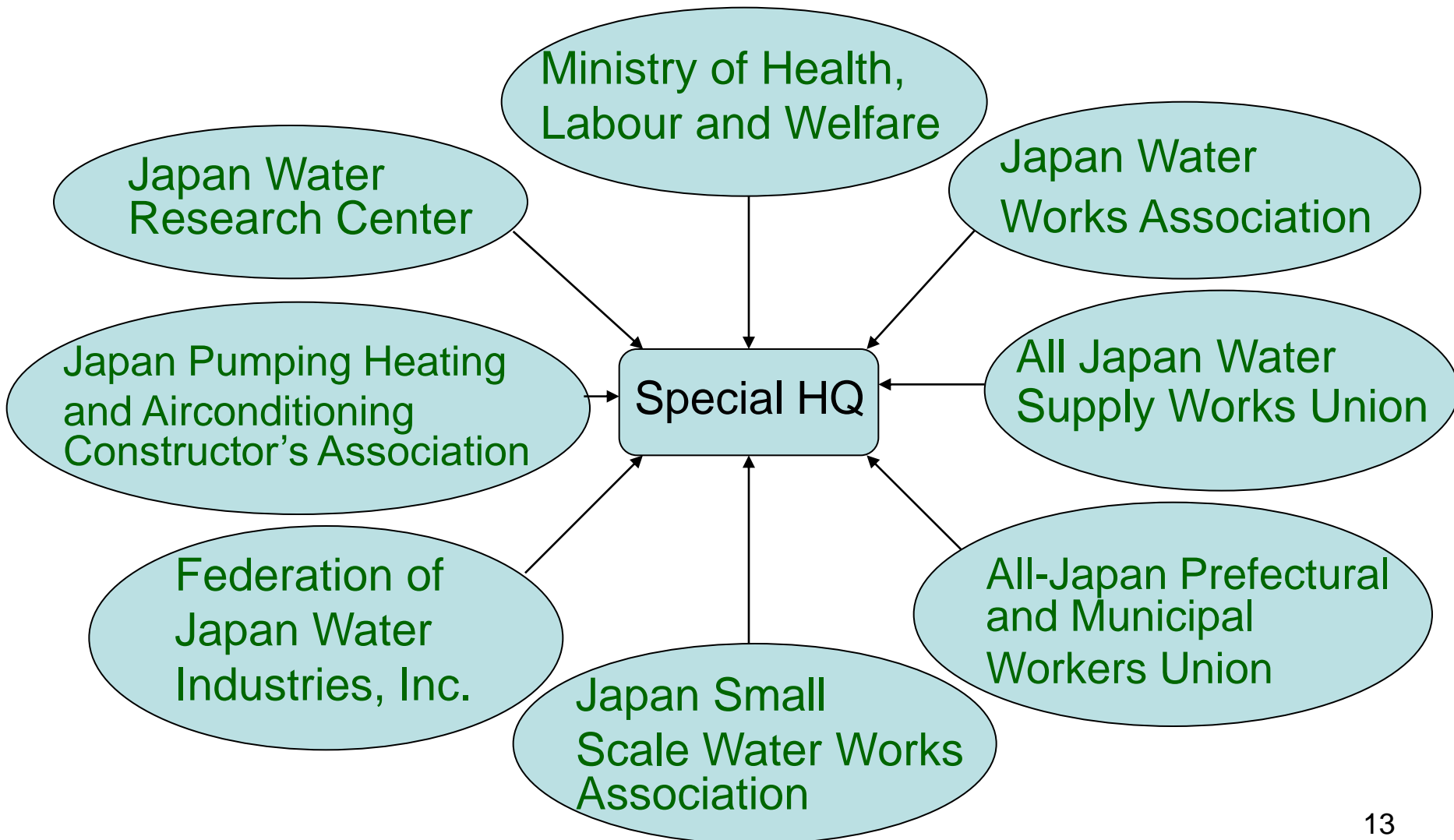


## Damage due to Liquefaction at the Wanigawa WPP in Ibaraki Prefecture

<http://www.pref.ibaraki.jp/bukyoku/kigyuu/wanigawa230416.pdf>

# Setup of the Special Headquarters on Emergency Supply and Restoration in the Affected areas in March 2011

## Member organizations



# JWRC's Activities for Restoration & Reconstruction of Drinking Water Systems

Fact Findings

Emergency  
Response

Proposal for  
Recovery and  
Reconstruction

Scientific  
Research  
for the Future

# Fact Findings & Response Activities by the JWRC

- \* Formation of JWRC's Supporting Team for Drinking Water Purification Technology
- \* Gathering & Providing Information on the Great East Japan Earthquake
- \* Site Survey by the Supporting Team Members to Damaged Areas
- \* Research Activities on Earthquake Vulnerability Assessment
- \* Proposal on Future Plan of Drinking Water Systems



This message means "let's deliver not only water but also heart to disaster area".

This message is our wish in each of us.

This Japanese calligraphy was written through the courtesy of the calligrapher Ms. Michiko Hamasaki.