

Fukushima
City

Urban Flooding Hazard Map

To avoid panic in the unlikely event of a disaster

The Urban Flooding Hazard Map...

In recent years, heavy rain in a localized area over a short period of time (concentrated torrential rain and guerrilla rainstorms), that exceeds the capacity of drainage systems including sewage systems, roadside gutters and waterways, has been occurring frequently. This water is unable to efficiently drain into rivers, and results in repeated inundation damage (by urban flooding).

This 'Urban Flooding Hazard Map' was created to provide all Fukushima City citizens with correct information and evacuation methods etc. for 'Inundation by Urban Flooding', and with the aim of countering inundation damage (by urban flooding).

We request that, you store each kind of hazard map including the flooding map, where they can be easily found.



Store in a place where it is easy to take out anytime, and make sure to read it through when you have time.

Firstly,

The Role of the Map

The role of this map is, through raising a balanced awareness of protecting your own life, regions ensuring their own safety, and disaster prevention countermeasures carried out by the administration, to strive for advanced prevention and the reduction of inundation damage.

Furthermore, as inundation damage due to urban flooding can occur in your immediate surroundings, protecting your own life from inundation damage caused by urban flooding is required.

'Urban Flooding' VS 'Exterior Water Flooding'

Urban Flooding

This is where, due to torrential or guerrilla rainfall, strong rain over a short time, drainage facilities such as sewage, gutters, and waterways are unable to efficiently drain into rivers, and overflowing rain water causes inundation.



This can occur in neighborhoods and other places far from rivers.

Urban Flooding Hazard Map

External Water Flooding (water from rivers etc.)

This is where inundation occurs as a result of heavy rainfall across a wide area, in which water levels in rivers rise and overflow from embankments or embankments give way, and the river water then inundates houses.

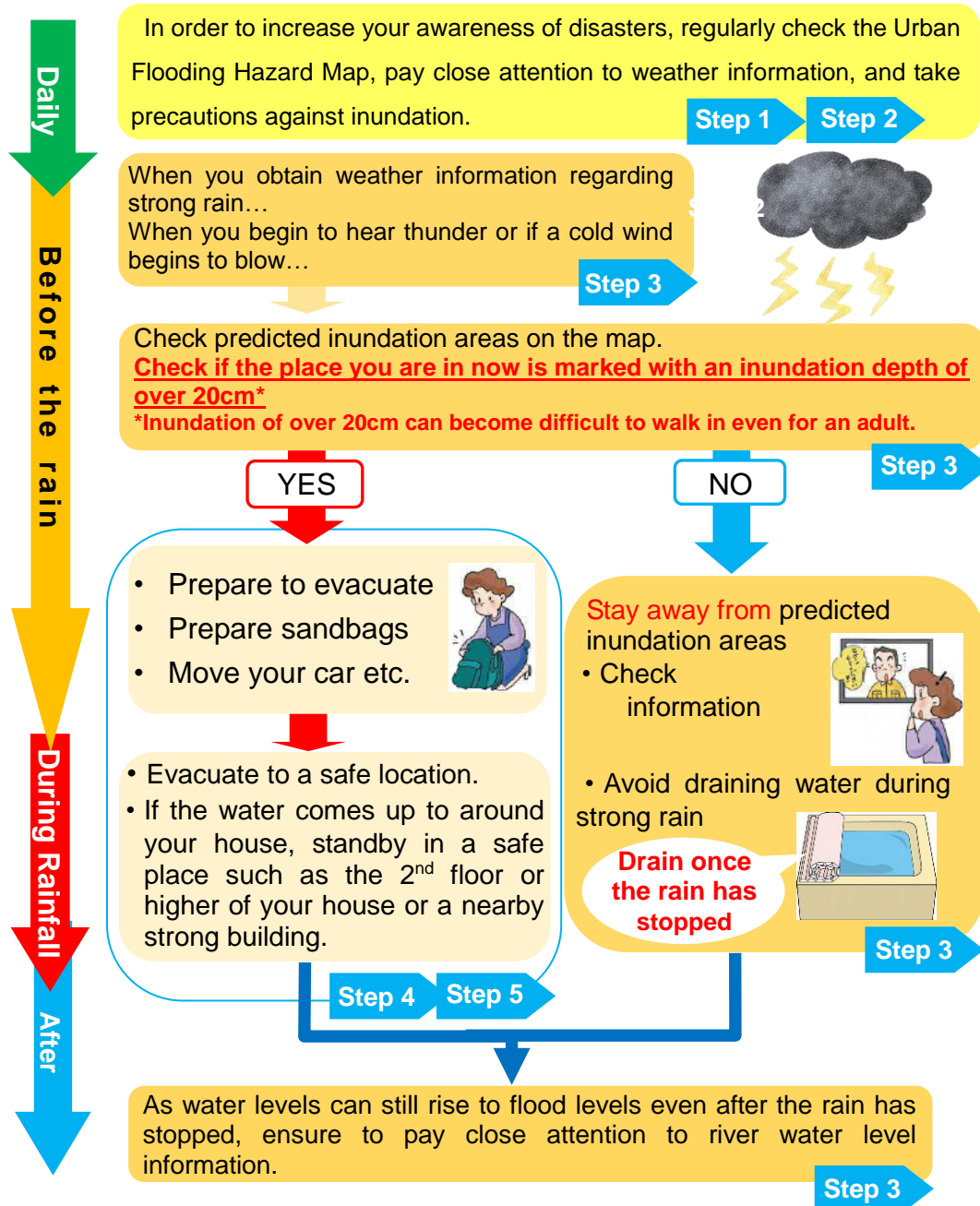


Flooding Hazard Map

Drawing up of the Map

The implementation of an inundation simulation (using Fukushima City's largest ever recorded rainfall of 71mm in an hour, on July 28th 2017) and interviews about real experiences regarding inundation from urban flooding, have been reflected in the drawing up of this map.

Check How to Use the Map



Step 1

Increase your Awareness of Disaster Prevention

Know the Relationship of Rain Strength and Rainfall

You can estimate the amount of rain by observing how the rain is falling. Ensure you understand this relationship so that you can make your own judgements, and evacuate before the situation becomes dangerous.

	Moderate Rain (10-20mm)	Strong Rain (20-30mm)	Intense Rain (30-50mm)	Extreme Rain (50-80mm) *	Violent Rain (over 80mm)
Predicted Rainfall (per hour)					
What you see	Falls heavily with a sound like white noise	A downpour	Falls as if a bucket has been tipped over	Falls like a waterfall (the rumbling of thunder continues)	A feeling of pressure that makes it hard to breathe. Feel a sense of fear
What you experience	Feet are wet by splash-back from the ground	You get wet even under an umbrella			Umbrellas are entirely pointless
Indoors (wood-frame house)	It becomes difficult to hear people speaking		Around half of those sleeping will notice the rain		
Conditions Outside	Puddles are formed all over the ground	Roads become like rivers		The ground becomes entirely white from water spray, and visibility becomes poor.	
While in a car		Difficult to see even with window-wipers at high speed	When on the highway, a film of water formed between the road and the car wheels prevents brakes from working properly	Driving is dangerous	

Our Disaster Notes *The subject rainfall for this map is 71 mm/hour.

- Characteristics of the area you live in regarding rain strength and how it falls.
- Temporary Evacuation Point

Example 1: In the torrential rain of (m) (d) water was pooled to around 20cm on the road in front of the house.

Example 2: The temporary evacuation point is [NAME] park parking lot.

Step 2

Increase your Awareness of Disaster Prevention

Preparation as Part of Day-to-Day Life

To protect yourself from flood damage, it is important to take an interest in flood damage in your daily routine, and to prepare in advance just in case.

1 Pay attention to weather forecasts and Weather information.

Pay close attention to weather forecasts and be aware of any changes in the weather.



2 Prepare in advance what to take with you in the event of an emergency.

If you begin preparations in a panic, you may completely forget things you require, and take longer than needed. Make preparations in advance, and confirm their location with your family.



3 Regularly clean out gutters and above storm-water inlets.

If trash and fallen leaves pile up, water will be unable to drain, and can cause inundation. Please cooperate in cleaning out gutters and above storm-water inlets.



4 Confirm the your evacuation center and evacuation route with your family.

Confirm the location of evacuation centers and evacuation points, as well as how to get there safely in advance, and record this on the map.



5 Be aware of those who require consideration regarding disaster prevention.

Turn your attention not only to your own family or household, but also to your area entire. Day-to-day awareness is required, especially for the elderly living alone, persons with a disability, or children etc., those who require consideration with regards to disaster prevention.



6 Make use of simple flooding prevention you can do in your own home.

When inundation water depth is low, you can use things around your house to reduce the inundation of water. Fill large rubbish-bags or plastic containers with water, and line them up where the water is getting in.



Step 3


Confirm Sources of Information


Gather Disaster Prevention Information

You can obtain weather information and disaster information via the following methods:

	Information from Fukushima City	Conditions at the time of announcement	Actions everyone should take
High	Evacuation Order (Emergency)	In cases where conditions worsen, a disaster occurs etc., and there is an extreme increase in the danger of human injury.	Evacuate to a safe place without delay.
Emergency Level	Evacuation Warning	In cases where damage by a disaster is predicted, and there is an increased possibility of the occurrence of human injury.	Cooperate in helping your family and neighborhood as you promptly evacuate to an evacuation point.
Low	Evacuation Preparation Commence evacuation of the elderly etc.	In cases where an announcement of an evacuation recommendation or evacuation order (emergency) is predicted.	Gather information and prepare to evacuate. Those who require extra time should begin evacuating.

Online Information:

Fukushima City Official Home Page 'Fukushima City Disaster Prevention Website'
<http://bousai.city-fukushima.jp/> 

MLIT River Disaster Prevention Information 
<https://www.river.go.jp/>



Fukushima Office of Rivers and National Highways LIVE Abukuma River
http://www.thr.mlit.go.jp/fukushima/abukuma_live/live07.html

Fukushima Prefecture River Catchment Integrated Information System
<http://kaseninf.pref.fukushima.jp/gis/>


Fukushima Area Meteorological Observatory
<https://www.jma-net.go.jp/fukushima/>


Disaster Prevention Information 'National Evacuation Center Guide'
Smart Phone Applications:




 Fukushima City Official Twitter
@fukushimacity 

 Fukushima City Official Facebook
<https://www.facebook.com/fukushimacity/> 

Fukushima City Official Home Page 'Fukushima City Urban Flooding Hazard Map'
<http://www.city.fukushima.fukushima.jp/gkensetsu-keikaku/kurashi/suido/jokaso/naisui/naisuihm.html> 

Fukushima City Official Home Page 'Fukushima City Flooding Hazard Map'
<http://www.city.fukushima.fukushima.jp/kasen-kanri/bosai/bosaikiki/hazard/kasen12032207.html> 

Fukushima City Official Home Page 'E map-Fukushima city'
<http://www.city.fukushima.fukushima.jp/jouhouka-seisaku/shise/fukushimaemap.html> 

Step 4

Confirm Your Evacuation Plan

Check Evacuation Method and Dangerous Places

In cases where there is a fear of inundation or if evacuation information etc. has been announced.

Water Level Evacuation

If you are able to get to a safe evacuation point...

Leave dangerous places and temporarily withdraw to a safe evacuation point

Vertical Evacuation

In cases where water inundation has already begun, and it is more dangerous to head towards an evacuation point...

Do not evacuate if it is not safe, and instead temporarily evacuate to the 2nd floor of your home or a nearby strong building

Unlike flood damage, urban flooding inundation is caused by localized strong rain, and as it is unlikely to cause widespread flooding damage, there are cases in which evacuation centers are not opened.

As a result of this, when taking evacuation action, not only is **water level evacuation** by relocating to an evacuation point effective, but so is **vertical evacuation** by relocating to the second floor above of your residence etc.

Dangerous Spots on Roads

■ Sloping Roads



Even when water depth is shallow, water can flow fast on sloped roads, making them dangerous.

■ Roads with gutters



Gutters etc. are difficult to see and there is a danger of falling in and being flushed away.

■ Underpasses *Indicated on the map

As underpasses run below railways and roads etc., these roads are lower than the surrounding area. Topographically, it is easy for water to pool there.



Step 5

Confirm Your Evacuation Plan

What to be Careful of When Evacuating

Ensure to check whether or not your evacuation route has any dangerous places as part of your day-to-day routine.

① Pay close attention to weather and disaster-conditions evacuation information, and if there is a possibility of inundation occurring, be duly cautious.



⑥ Evacuate in clothing that is easy to walk in, in groups of two people or more.



② Work towards obtaining as up-to-date information as is possible.



⑦ When evacuating in inundated areas, be careful of different elevations and manholes.



③ Turn off electricity and gas and put out any flames prior to evacuating.



⑧ Assist the elderly and those with a disability to evacuate.



④ Reduce what you will take with you during an emergency as much as possible.



⑨ Please avoid evacuating by car.



⑤ If water gets in, rubber boots can become difficult to walk in. Wear sports shoes instead.



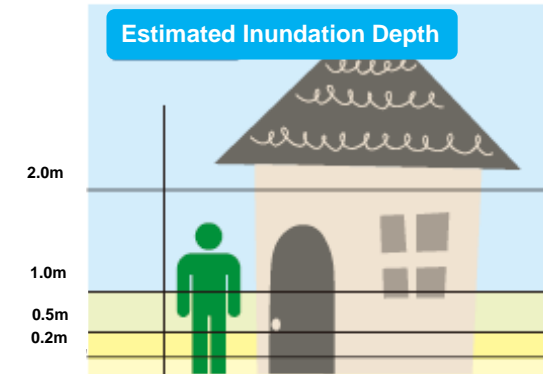
⑩ If you fail to get out in time, temporarily evacuate to the top floor of a nearby strong building.










Depth Estimates for Urban Flooding

The inundation depth is based on a simulation of the largest recorded rainfall amount per hour to have fallen in Fukushima City.

Depending on how the rain falls, even those areas not highlighted in yellow may not be safe. Please pay due attention to weather information.



Legend

 Inundation Simulation Target Areas	<p>The inundation simulation is a computer analysis based on information regarding sewage and drainage facilities, and ground surface information such as ground level etc. For areas in which size and drainage capacity of sewage pipes for draining rainwater are unknown, a suburban flooding inundation simulation was conducted.</p>
 Inundation Areas Determined by Interview Survey (Areas that were inundated in torrential rain during typhoons etc. in the past 10 years.)	<p>As drainage facilities are not consistently installed, there is an element of fluctuation, and calculation by analysis is difficult. As a result, interviews were conducted regarding places that experienced inundation (excluding 'exterior inundation' from rivers or the ocean etc.) of more than 20cm in the past 10 years, and are recorded as inundation areas.</p>
 Designated Evacuation Center	<p>Designated evacuation centers include schools and public facilities, and are facilities to which you can evacuate and where you can seek refuge for a period of time. Among these evacuation centers, are welfare evacuation centers, which are for the elderly and those with a disability etc., who would find it difficult to maintain their lifestyle at a regular evacuation center.</p>
 Designated Emergency Evacuation Area	<p>Designated emergency evacuation areas are a place to which you evacuate in an emergency in order to ensure your physical safety.</p>
 Evacuation Centers & Evacuation Areas that DO NOT Open in the Event of Flooding or a Landslide Disaster	<p>Evacuation centers and evacuation areas located areas predicted to experience inundation during floods or landslide disaster warning areas. They will not be open in the event of flooding or a landslide disaster. (Facilities which may become evacuation centers and evacuation areas in the event of an earthquake, volcanic disaster, or fire.)</p>
 Places that are Dangerous During Inundation in Torrential Rain (Underpasses and Underground Walkways)	<p>Indicates places such as passageways under rail or road bridges, underpasses, and underground walkways etc. In addition the possibility of vehicles becoming submerged, if water flows into underground walkways etc. stairs may become impossible to climb. Take detours during strong rain and please avoid any danger.</p>
 Landslide Disaster Warning Areas	<p>Even if the strong rain occurs in only one place and over a short period of time, there is still a possibility of landslide disasters occurring. Please confirm ahead of time if there are any landslide disaster warning areas along your evacuation route.</p>