

# For Protecting Not Only Lives But Also Assets and Livelihoods When Flood Overwhelms Flood Control Structures

## River Department

Since the limitation of the conventional measures for flood damage prevention, which combine flood control structures development and advance evacuation, has become apparent in the face of frequent heavy rainfall and flooding under climate change, a shift to flood damage prevention / reduction measures that "protect not only lives, but also assets and livelihoods when flood overwhelms flood control structures" is urgently needed, and we are conducting the necessary research.

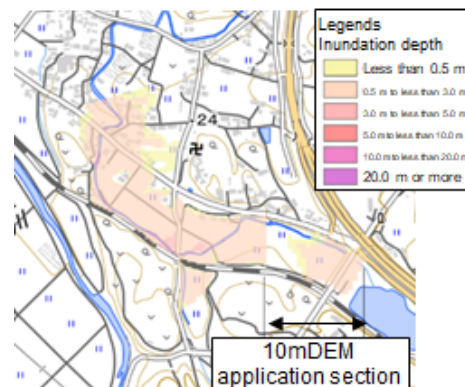
## Social background and challenges

- Severe flood damage occurred frequently (July 2021 Heavy Rain in Shizuoka, etc. July 2020 Torrential Rain in Kyushu, October 2019 Typhoon in East Japan).
- Along with the steady development of flood control structures, measures to prevent / reduce damage when flood overwhelms flood control structures are important (promotion of "River Basin Disaster Resilience and Sustainability by All" is essential).
- As heavy rains and floods frequently exceed the design scale of flood control structures, flood damage prevention measures to protect lives by evacuation from flooding are reaching their limit because of difficulties for the elderly in evacuation, rebuilding livelihood after the disaster, etc.

## Research contents

Support for eliminating blank areas of hazard information that are expected to be inundated in the event of flooding.

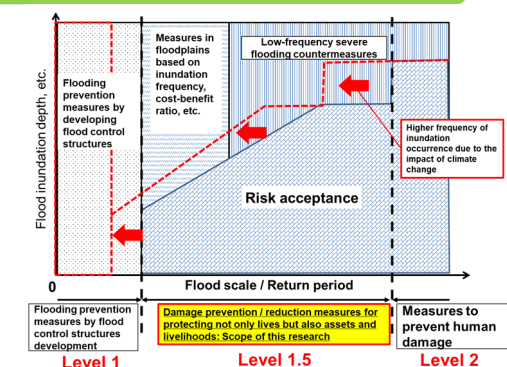
In order to study specific damage prevention / reduction measures in the event of a flood that exceeds the capacity of flood control structures, flood hazard maps (e.g., legal flood hazard area map) are necessary to show the extent and depths of inundation that is expected in the event of flooding. However, the number and length of rivers in Japan are enormous, and it is difficult to conduct field surveys, etc. on all rivers in order to create the flood hazard maps. Therefore, we have developed a flood hazard mapping method with using LP (aerial laser survey) data, which eliminates the need for field survey, etc., and in response to requests from the prefectural governments, we have performed the calculations necessary to create flood hazard maps for about 2,800 rivers, extending about 12,000 km, to support the prefectural governments and solve technical challenges.



Example of flood hazard mapping with using LP data

## Research on methods for studying measures to prevent /reduce damage from level 1.5 flooding

Conventionally, we mainly took flood control structures measures to prevent flooding up to the design scale of flood control structures (Level 1 measures) and to save only lives at the assumed maximum scale of flooding (Level 2 measures). However, as shown in the Figure on the right, a specific study method has not yet been developed for "damage prevention / reduction measures for not only lives but also assets and livelihoods when flood overwhelms flood control structures" (tentatively called "Level 1.5 measures"), which fills the gap between the two measures. Therefore, based on a set of flooding scenarios assumed for each area where the levee could break in the event of flooding, we are considering what are possible to avoid the "worst-case flooding scenario for the area" and are studying measures to gradually upgrade flood damage prevention / reduction measures in stages.



Damage prevention / reduction measures according to flood scale

Securing a society where not only lives but also assets and livelihoods are protected in case flood overwhelms flood control structures by implementing "River Basin Damage Resilience and Sustainability by All" in preparation for climate change.

☞ See the following for related articles.

- Eliminating flood hazard information blank areas - Trial flood hazard mapping in small rivers, p. 54
- For avoiding the worst-case flood scenario - Study on damage reduction measures in case floods overwhelm flood control structures, p. 56