Flood Protection and prevention in Cologne

StEB Köln – Stadtentwässerungsbetriebe Köln, AöR
(Municipal Drainage Operation Cologne, AöR)

Dr. Marlene Willkomm
Stadtentwässerungsbetriebe Köln, AöR
Hochwasserschutzzentrale
Ostmerheimer Straße 555, 51109 Köln
marlene.willkomm@steb-koeln.de
0049221/221-24242

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Summary

- Short overview StEB Köln
- What does flood protection on the river Rhine look like?
- Projectable flood protection on the river Rhine
- Public relations before and during a flood (river Rhine)

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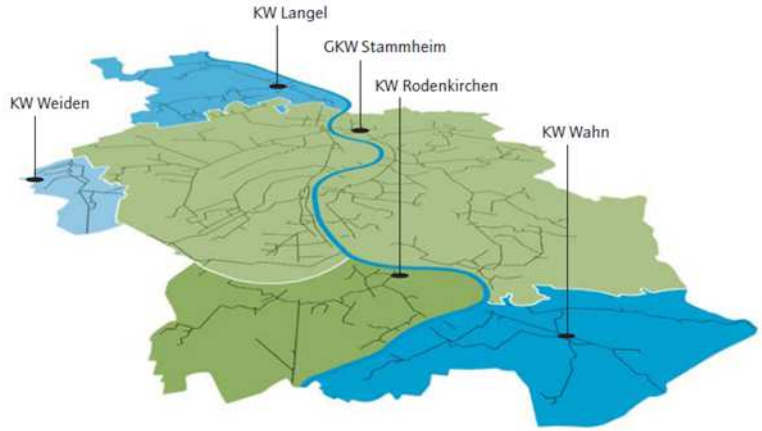
StEB Köln and it‘s duties today

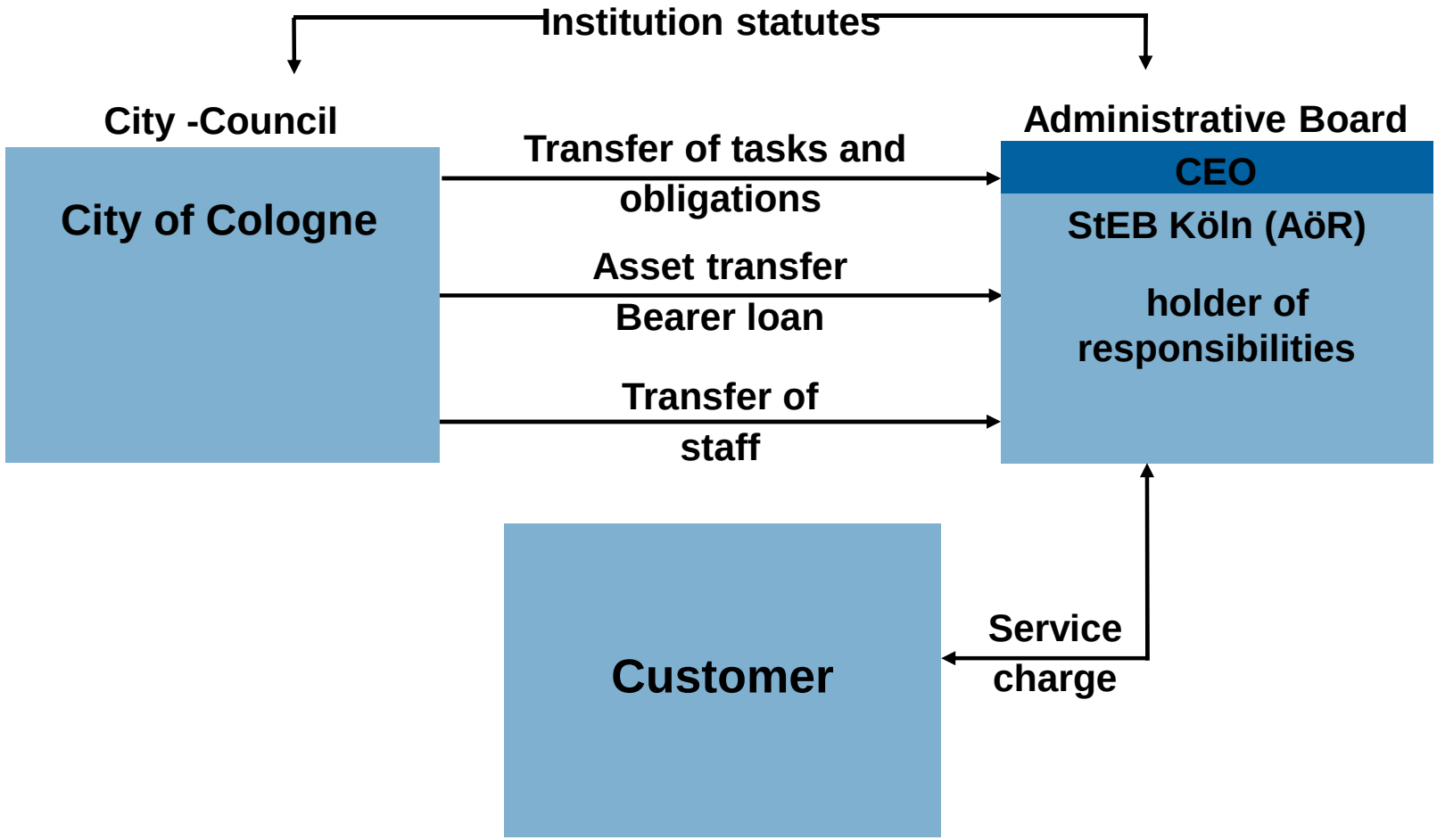
» Wastewater drainage and treatment

» Flood protection and prevention

» Management and development of the smaller streams and ponds



Foundation model of StEB Köln (Institution under public law)



It was established in May 2001 as a municipal company of the City of Cologne.

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Waste water disposal in Cologne

- 1 Mio. inhabitants
- 5 WWTP‘s
- 2.377 km sewers
- 148 pumping stations
- 94.643 road gullies

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Bodies of water in Cologne

- 15 smaller streams
- 59 km open surface bodies of water
- 15 km piped streams

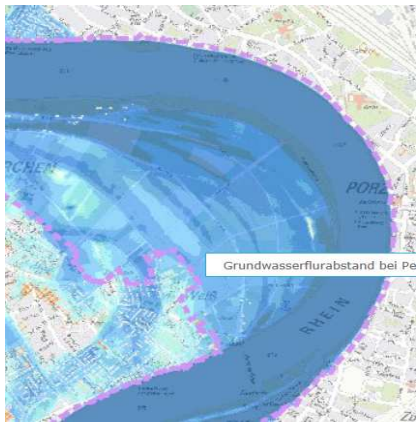
Ponds in the parks

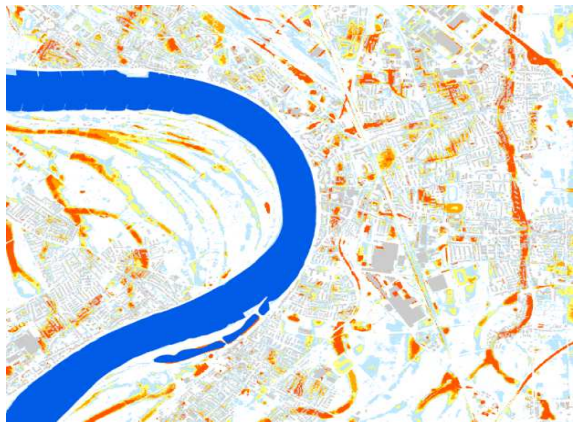
- 15 ponds in Cologne
- 61 ha surface on water
- 0.4 – 3.0 m water depth

Volksgartenweiher

Different between flood on large river and heavy rainfall

Flood on a large river	Urban storm water
Rain in a long period of time in the hole catchment area	Short and heave rainfalls
Long forecast time possible	Pretty Short forecast time
Main risks near the borderline or in correspondent deep areas	Risks for all areas, particularly in low grounds and hillsides
Structural protection (state initiative) mostly up to HQ_{100} or HQ_{200}	Every owner is self-responsible





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Flood on a large river

Rain in a long period of time in the hole catchment area

Long forecast time possible

Main risks near the borderline or in correspondent deep areas

Structural protection (state initiative) mostly up to HQ_{100} or HQ_{200}

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Flood protection on the river Rhine in Cologne

- Through our work and our flood protection we try to prevent the catastrophe.
- We are not a civil protection authority, but the experts in water management.
- A great advantage with flood on a large river, we have time to implement the technical flood protection measures.
- We have an action plan so that the protective measures can be implemented depending on the water level.

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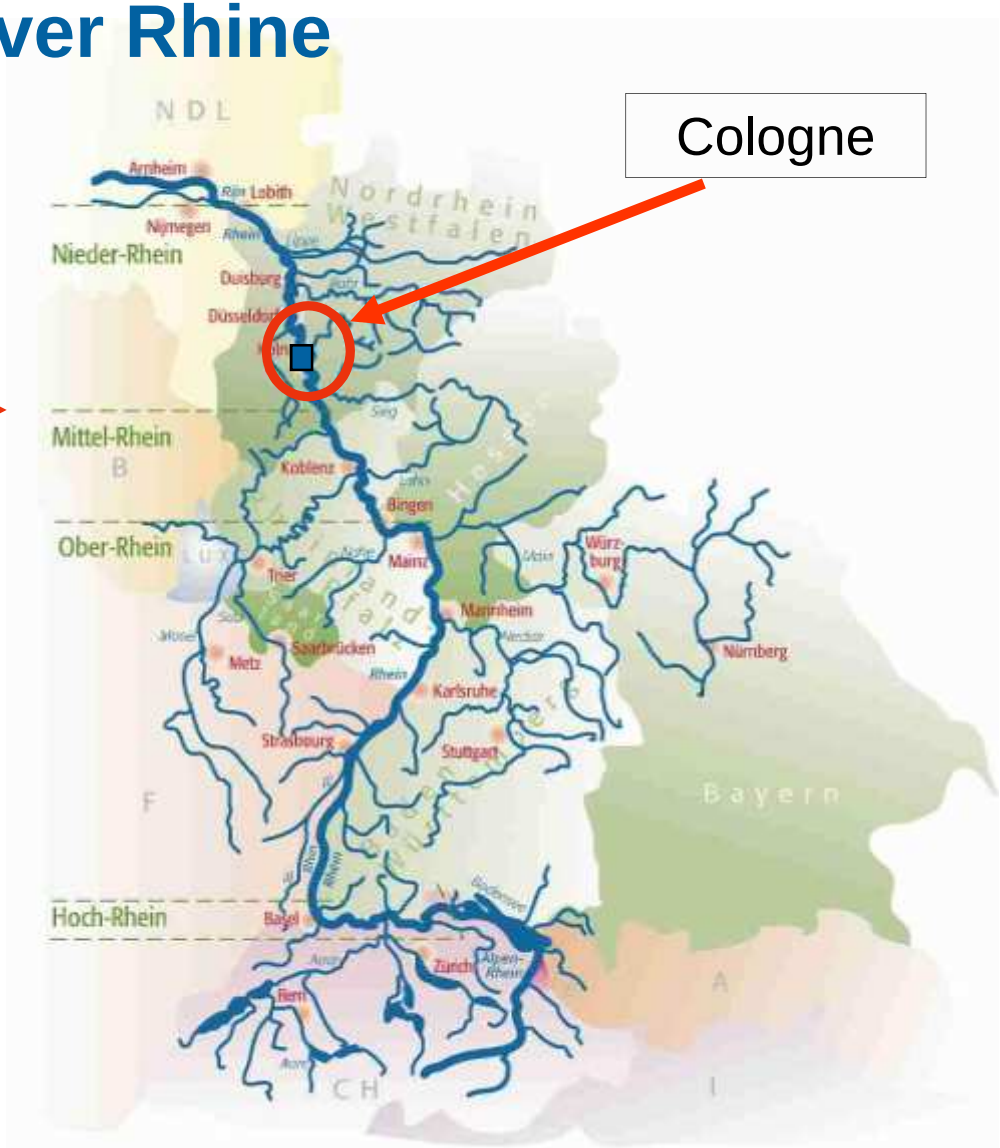
Catchment area of the river Rhine



June 2021

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„Disaster Flood“

1993

10.63 m Cologne Gauge

1995

10.69 m Cologne Gauge

The flood protection level was 10.00 m Cologne Gauge.

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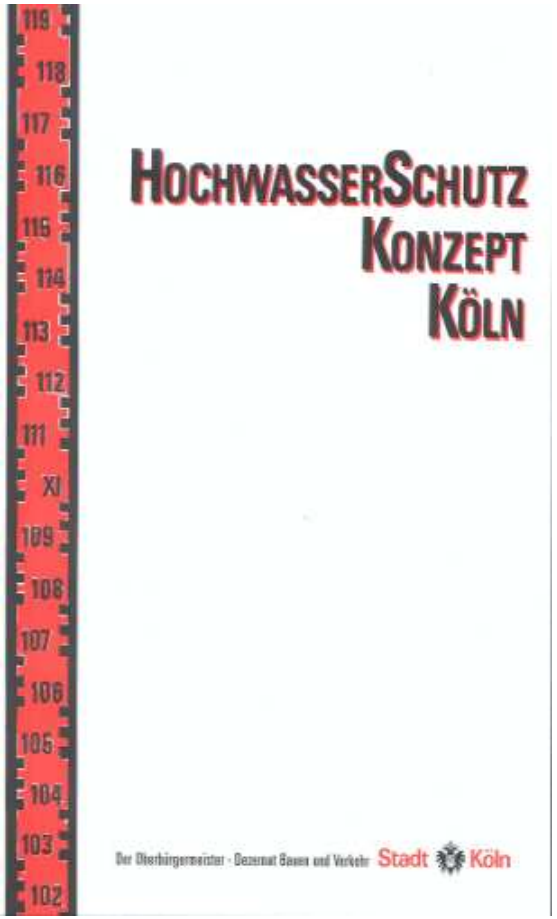
What can be done by flood?

The Flood Protection Concept (1996)

- Basics of flood problems
- Preventive flood protection
- Structural flood protection
- Flood management
- Danger prevention und disaster control
- Public relations



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What can the city protect?

Water Level	Affected Inhabitants (Status Quo 2017)	Damage potential without flood Protection [Billion €] (Status Quo 2001)	Damage potential with flood Protection [Billion €] (Status Quo 2001)
10,70 m KP	388	0,9	0,04
11,30 m KP	521	1,6	0,1
11,90 m KP	21.751	2,5	0,7
12,50 m KP	116.599	3,5	3,5

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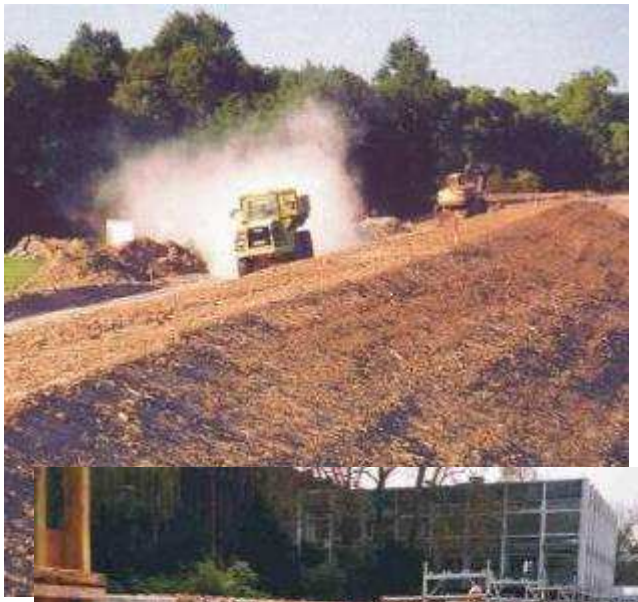
Technical flood protection on the river Rhine

- ca. 28 km – new flood protection walls
- ca. 27 km – renew of flood protection walls
- construction of 2 retention area in Cologne
- underground flood protection
  (pumping station and valves in the sewer system)
- improve flood management
- total cost: ca. 430 Mio. €
  (ca. 200 Mio € for the underground flood protection
  and ca. 230 Mio € for the surface flood protection
  and flood management)



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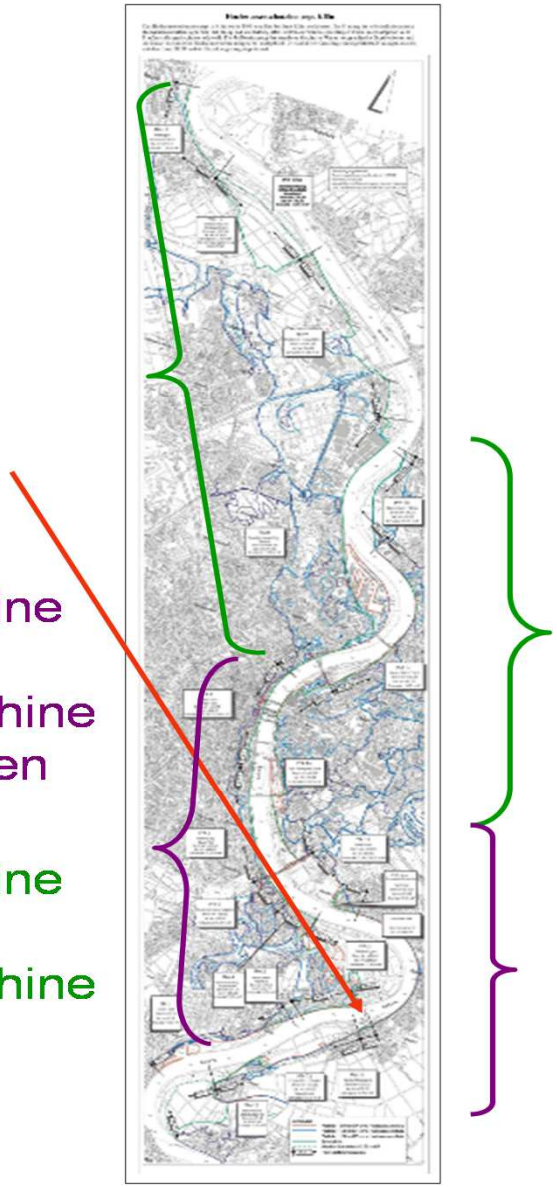
Protection levels

- 10,70 m — Porz-Zündorf, Marktplatz
- 11,30 m — on the left bank of the Rhine Godorf bis Altstadt Nord, on the right bank of the Rhine Porz-Langel bis Westhoven
- 11,90 m — on the left bank of the Rhine Riehl bis Worringen, on the right bank of the Rhine Poll bis Flittard



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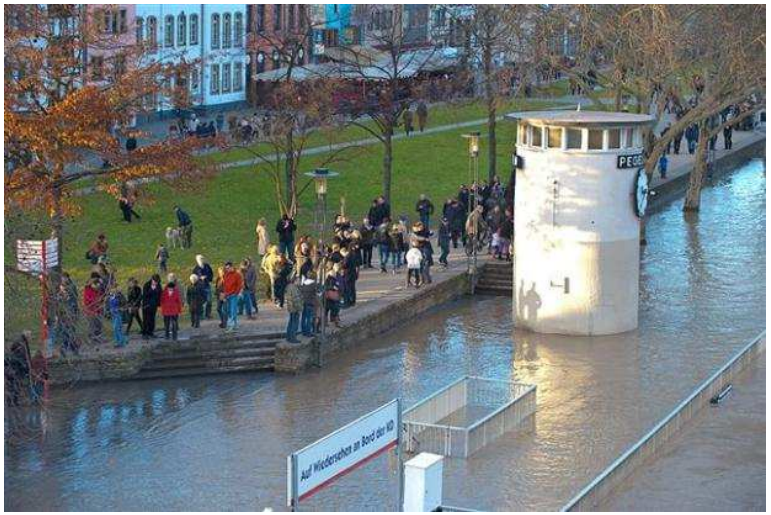
Flood protection at the river Rhine

- 70 km border line
- 10.3 km mobile walls
- 9 storage areas for the mobile walls
- 34.5 Mio m³ retention area



Pictures: StEB Köln, Peter Jost

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Flood protection at the river Rhine

- 75 outlet canals into the River Rhine
- 827 flood protection valves

- 24 flood – pumping station (capacity up to 10 m³/sec)

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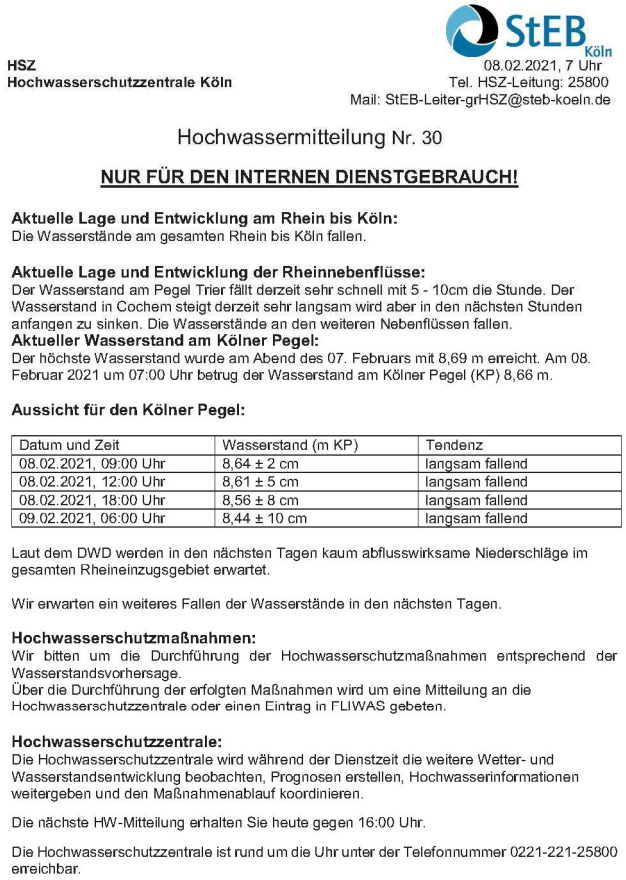
Who has what responsibilities during a flood?

- StEB Köln (technical flood protection, water level forecast and coordination and monitoring of the flood stakeholders)

- City of Cologne, department of streets and traffic (road barrier)
- City of Cologne, department of public order (public safety)
- City of Cologne, fire department (Fire and rescue service)

It is important that everyone knows his duties!

How do we inform those involved in flood?



HSZ
Hochwasserschutzzentrale Köln

StEB Köln
08.02.2021, 7 Uhr
Tel. HSZ-Leitung: 25800
Mail: StEB-Leiter-grHSZ@steb-koeln.de

Hochwassermitteilung Nr. 30

NUR FÜR DEN INTERNEN DIENSTGEBRAUCH!

Aktuelle Lage und Entwicklung am Rhein bis Köln:
Die Wasserstände am gesamten Rhein bis Köln fallen.

Aktuelle Lage und Entwicklung der Rheinnebenflüsse:
Der Wasserstand am Pegel Trier fällt derzeit sehr schnell mit 5 - 10cm die Stunde. Der Wasserstand in Cochem steigt derzeit sehr langsam wird aber in den nächsten Stunden anfangen zu sinken. Die Wasserstände an den weiteren Nebenflüssen fallen.
Aktueller Wasserstand am Kölner Pegel:
Der höchste Wasserstand wurde am Abend des 07. Februars mit 8,69 m erreicht. Am 08. Februar 2021 um 07:00 Uhr betrug der Wasserstand am Kölner Pegel (KP) 8,66 m.

Aussicht für den Kölner Pegel:

Datum und Zeit	Wasserstand (m KP)	Tendenz
08.02.2021, 09:00 Uhr	8,64 ± 2 cm	langsam fallend
08.02.2021, 12:00 Uhr	8,61 ± 5 cm	langsam fallend
08.02.2021, 18:00 Uhr	8,56 ± 8 cm	langsam fallend
09.02.2021, 06:00 Uhr	8,44 ± 10 cm	langsam fallend

Laut dem DWD werden in den nächsten Tagen kaum abflusswirksame Niederschläge im gesamten Rheineinzugsgebiet erwartet.

Wir erwarten ein weiteres Fallen der Wasserstände in den nächsten Tagen.

Hochwasserschutzmaßnahmen:
Wir bitten um die Durchführung der Hochwasserschutzmaßnahmen entsprechend der Wasserstandsvorhersage.
Über die Durchführung der erfolgten Maßnahmen wird um eine Mitteilung an die Hochwasserschutzzentrale oder einen Eintrag in FLIWAS gebeten.

Hochwasserschutzzentrale:
Die Hochwasserschutzzentrale wird während der Dienstzeit die weitere Wetter- und Wasserstandsentwicklung beobachten, Prognosen erstellen, Hochwasserinformationen weitergeben und den Maßnahmenablauf koordinieren.

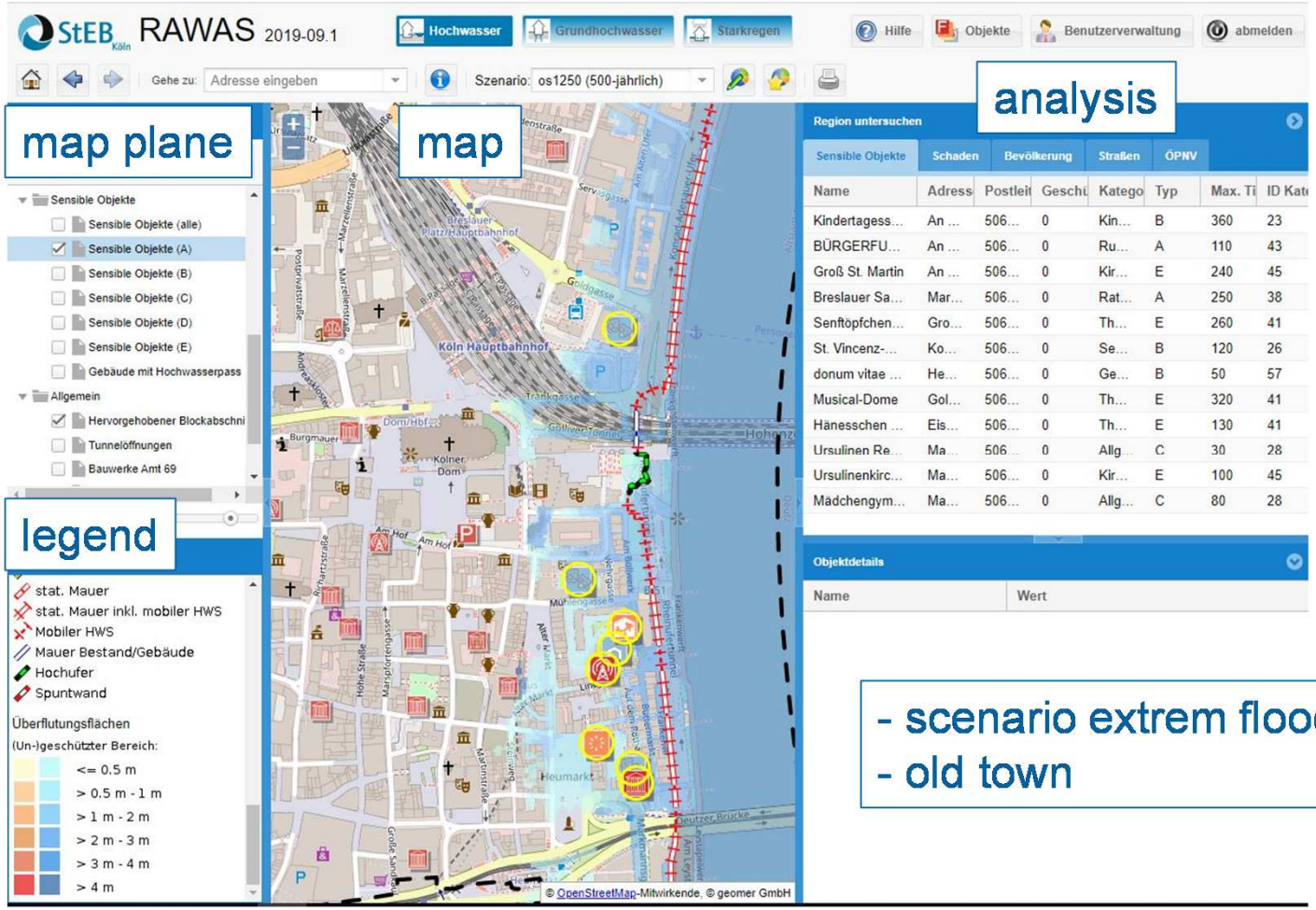
Die nächste HW-Mitteilung erhalten Sie heute gegen 16:00 Uhr.

Die Hochwasserschutzzentrale ist rund um die Uhr unter der Telefonnummer 0221-221-25800 erreichbar.

We are sending out a flood notice.

It contains the water level forecast and the current discharge and weather situation in the Rhine Catchment area.

Risk analysis tool for administration (RAWAS = Risk Analysis Tool Water)



- scenario extrem flood
- old town

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Public relations during a flood:

- Daily water level forecast for Cologne gauge
- Information for the public and media

Homepage: www.steb-koeln.de

Hotline: 0221-221-26161

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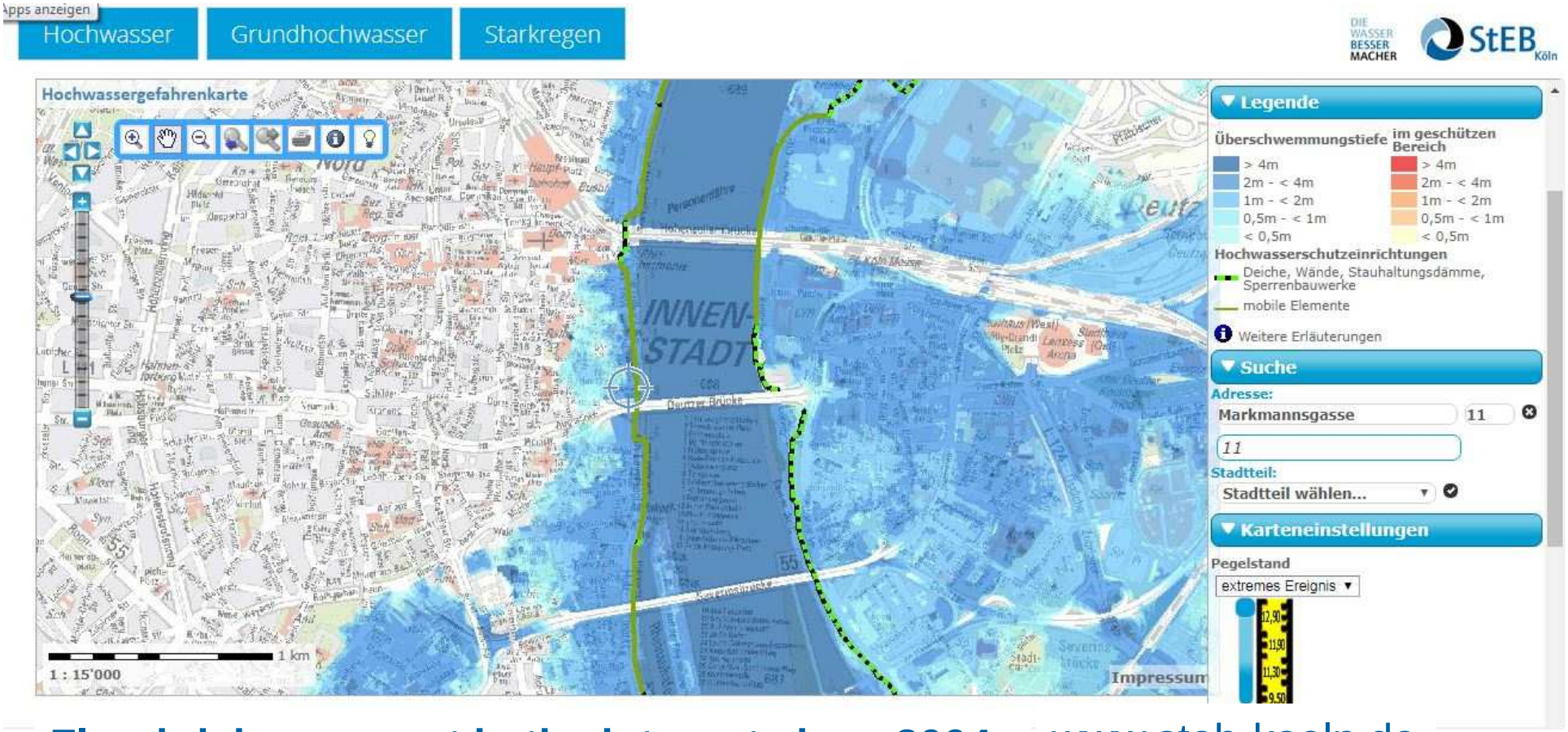
Which areas of the city are at risk?



Flood risk map post in the internet since 2004: www.steb-koeln.de

June 2021

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Which areas of the city are at risk?

Obligatory for the entire EU since 2013 due to the 2007 Flood Risk Management Directive.

Flood risk map post in the internet since 2004: www.steb-koeln.de

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Public relations before a flood:

Examples:

- flyers, brochure
- guided tour
- event in combination with other organisation
- consulting of the City of Cologne, industry and citizen
- warning app, loudspeaker and siren by the fire bridge

Thank you for your attention.

Dr. Marlene Willkomm
Stadtentwässerungsbetriebe Köln, AöR
Hochwasserschutzzentrale
Ostmerheimer Straße 555, 51109 Köln
marlene.willkomm@steb-koeln.de

Foto StEB Köln, Fotograf Peter Jost, Januar 2011