

Spatial planning in floodplains in mountain catchments of different row, in the basin of the Upper Vistula and the Upper and Central Odra

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The genesis of the problem



Source: <http://www.gfoto.pl/>

WORP:

ok. 4 900 (flood)

10 (flash flood)



Source: <http://www.avinwestor.com/projekty.html>

Flash Flood

local, heavy rain

range of rain: **100 km² (50% - 25 km²)**

catchments areas up to **40 km²**

HYDRATE

flood > flash flood

local large material losses (**>100 tys./km²**)

~~flood protection~~

reduce the risk of flood



hazard

exposure

vulnerability

Exposure

spatial planning

Ustawa o planowaniu ... 2003

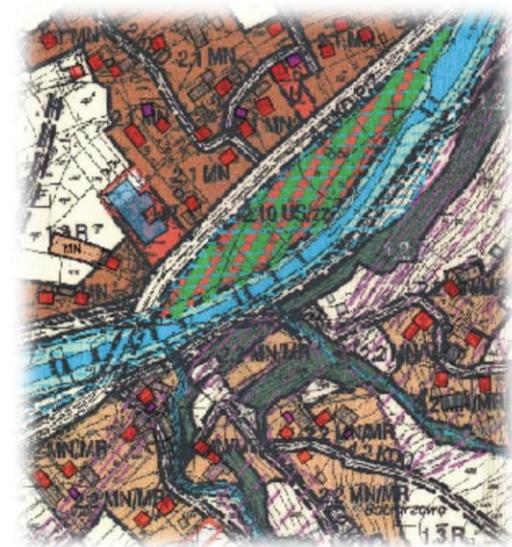
SUiKZP

MPZP

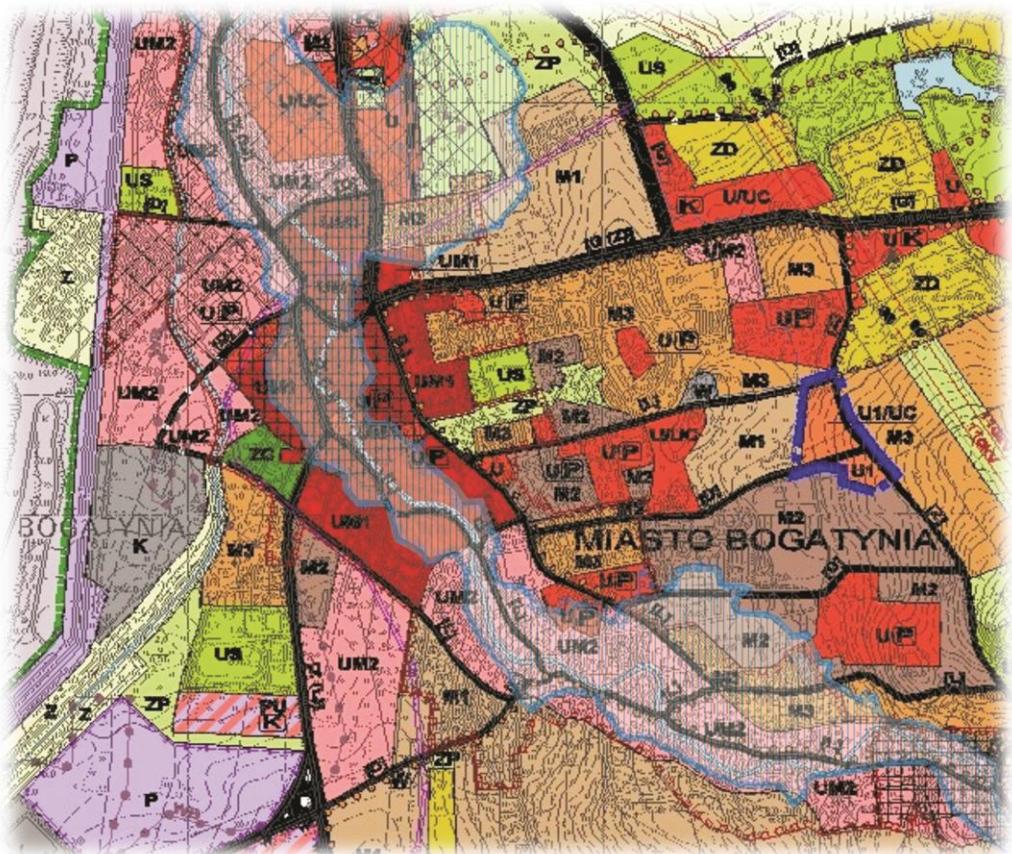
Ustawa Prawo Wodne 2001

MZP

MRP



Research Question



Field research

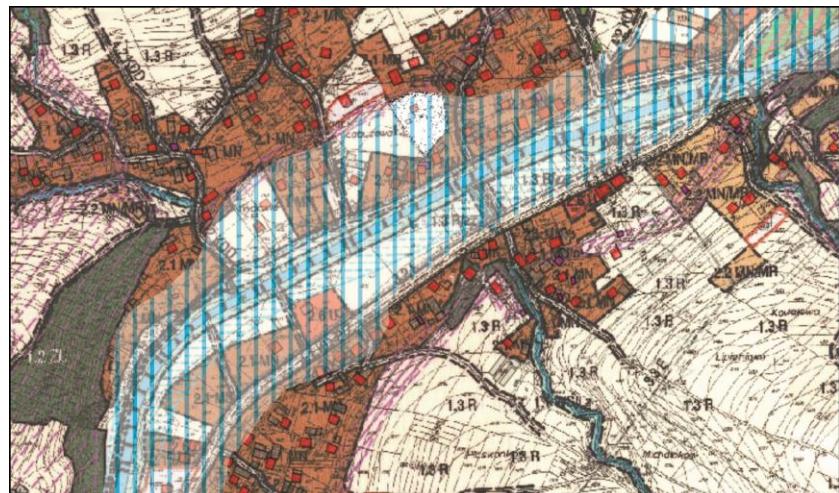
determination of flood areas

determination of WWQ

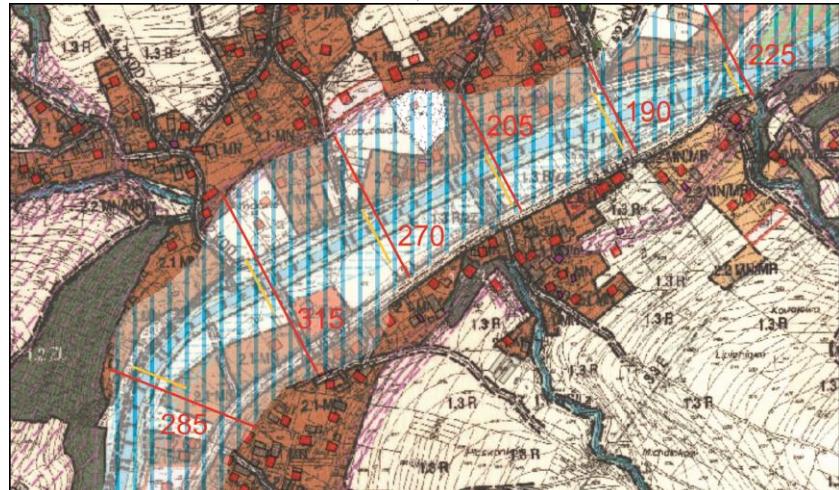
Chamber research

hydrological and meteorological situation

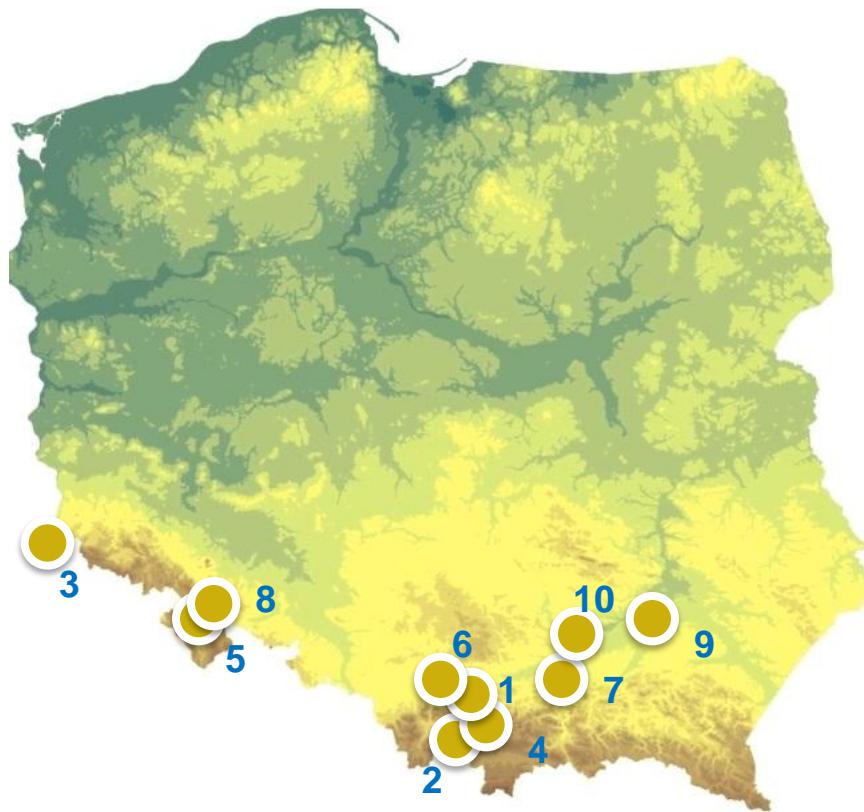
planning documents: MPZP; SUiKZP



min [m]	average [m]		max [m]	min	average q2014:q1%		max
190	215	240	315	1,56	1,98	2,12	3,55
120	140	160	210	1,42	1,78	1,93	3,43
135	155	170	190	1,15	1,80	2,00	2,90



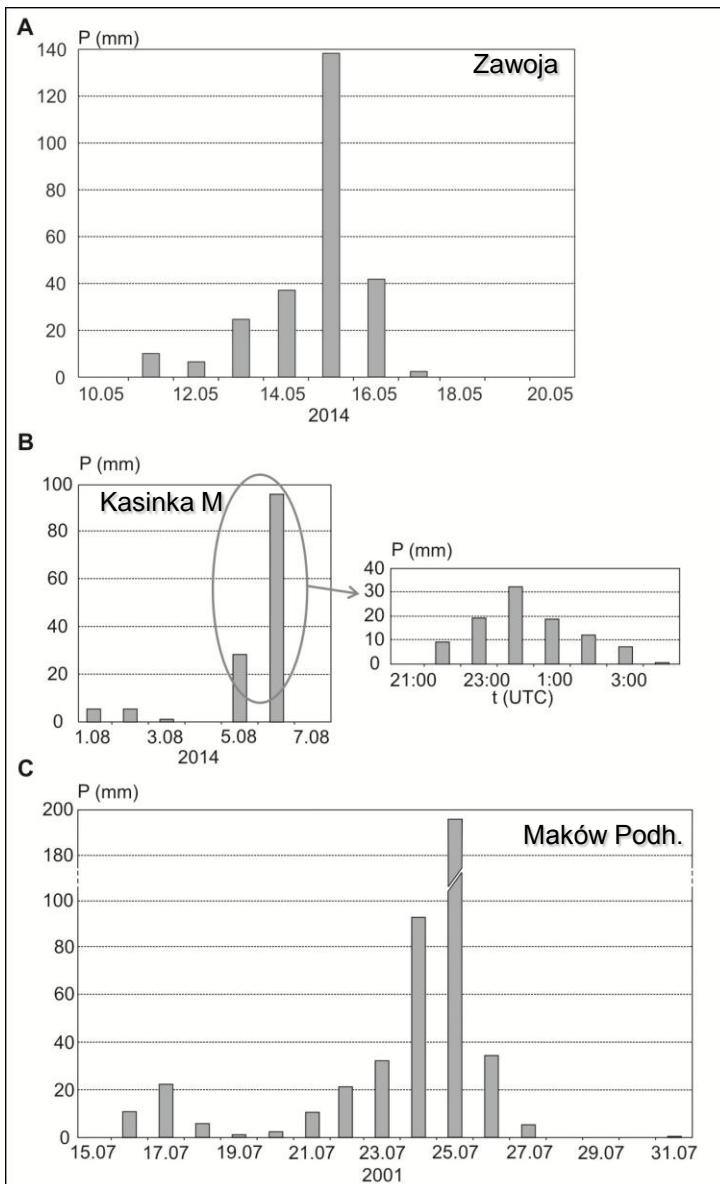
Area of study



	Area of study	Catchment
1	Maków Podhalański	Paleczka
2	Zawoja	Rybny Potok
3	Bogatynia	Miedzianka
4	Kasinka Mała	Kasinianka
5	Ołdrzychowice Kłodzkie	Biała Lądecka
6	Budzów	Paleczka
7	Tuchów	Biała Dunajcowa
8	Krosnowice	Nysa Kłodzka
9	Tarnobrzeg	Wisła
10	Zabrnje	Wisła

	Area of study	Catchment	Type of floods	Catchment [km²]	Historical region
1	Maków Podhalański	Paleczka	flash flood	2,1	Small town
2	Zawoja	Rybny Potok	flash flood	9,0	village
3	Bogatynia	Miedzianka	flash flood	82,9	Small town
4	Kasinka Mała	Kasinianka	flash flood	25,0	village
5	Ołdrzychowice Kłodzkie	Biała Lądecka	with rain pourable	270,0	village/small town
6	Budzów	Paleczka	with rain pourable /flash flood	85,0	village
7	Tuchów	Biała Dunajcowa	with rain pourable	650,0	Small town
8	Krosnowice	Nysa Kłodzka	with rain pourable	920,0	village
9	Tarnobrzeg	Wisła	with rain pourable	23 500,0	Small town
10	Zabrnje	Wisła/Breń	with rain pourable	18 010,0	village

Flash Flood



25.VII.2001

Maków Podh.

Budzów

7.VIII.2010

Bogatynia

13.V.2014

Zawoja

5.VIII.2014

Kasinka M



Bogatynia



Bogatynia



Kasinka Mała



Kasinka Mała

Krosnowice	1997, 2006, 2009
Ołdrzychowice	1997, 2006, 2009
Tarnobrzeg	2010
Zabrze	2010
Tuchów	2001, 2004, 2006, 2010 , 2011



2010:

3 floods: (May, June, September)

P: $24h_{max}$: 185 mm (Straconka);

May: about 500 mm

Q_{max}: 2480 m³/s (Kraków)



Spatial planning in floodplains

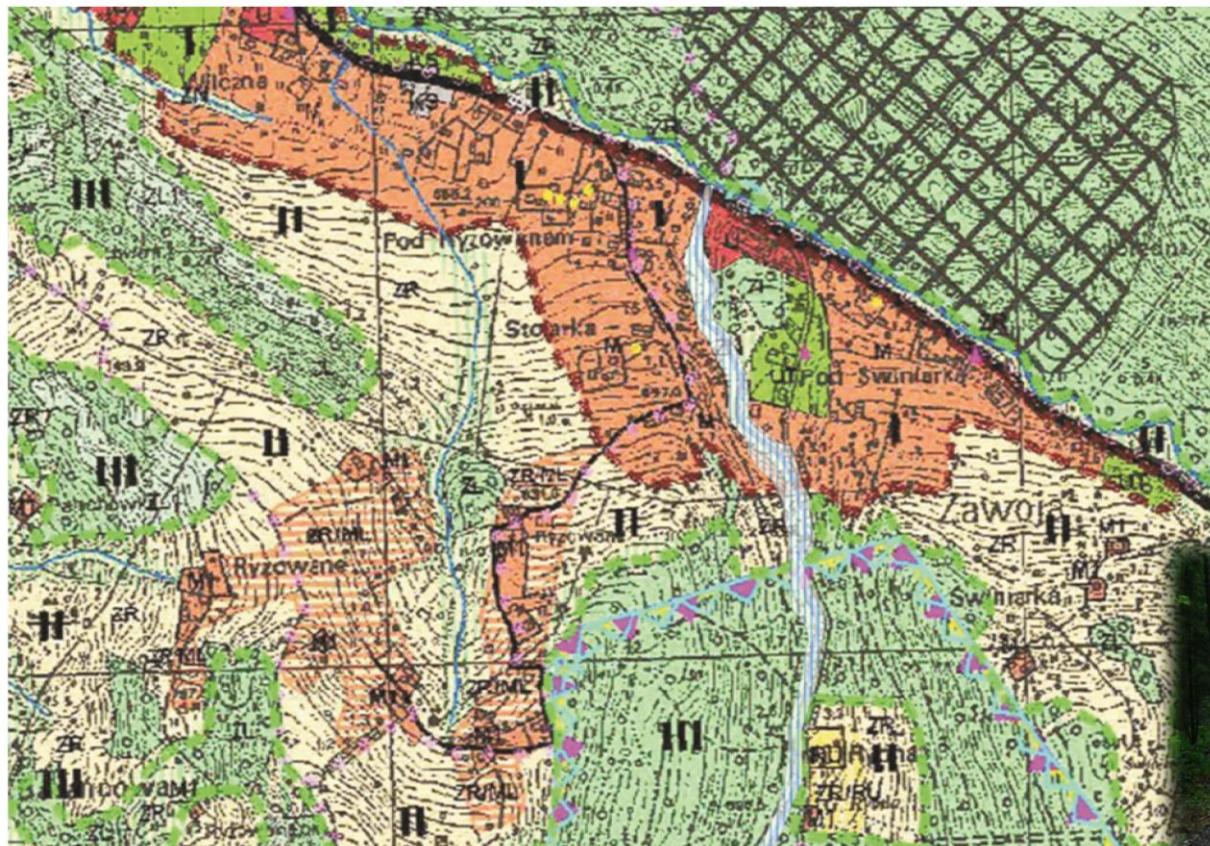
Zawoja (Rybny Potok)

The flood area:

No designated

Flash flood in 2014

min [m]	average [m]	max [m]
10	15	25



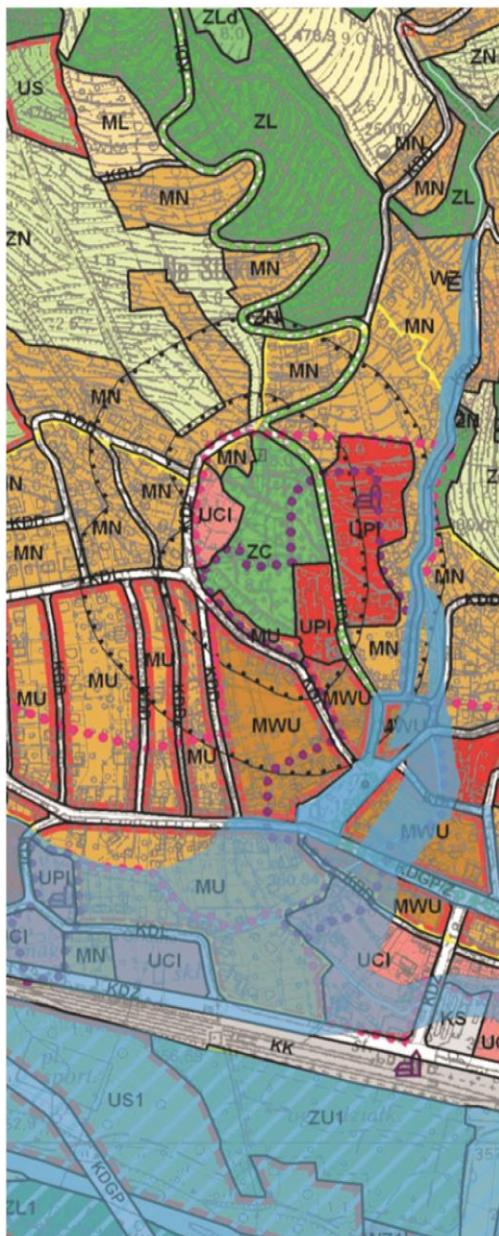
Zawoja

Rybny Potok

flash flood

9,0 km²

Maków Podhalański (Księży Potok)



The flood area:

No designated

Flash flood in 2001

min [m]	average [m]	max [m]
10	15	25



Maków Podhalański	Paleczka	flash flood	2,1 km ²
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Kasinka Mała (Kasinianka)



The flood area:

$$q=1\%$$

min [m]	average [m]	max [m]
15	70	90

Flash flood in 2014

min [m]	average [m]	max [m]
15	140	170

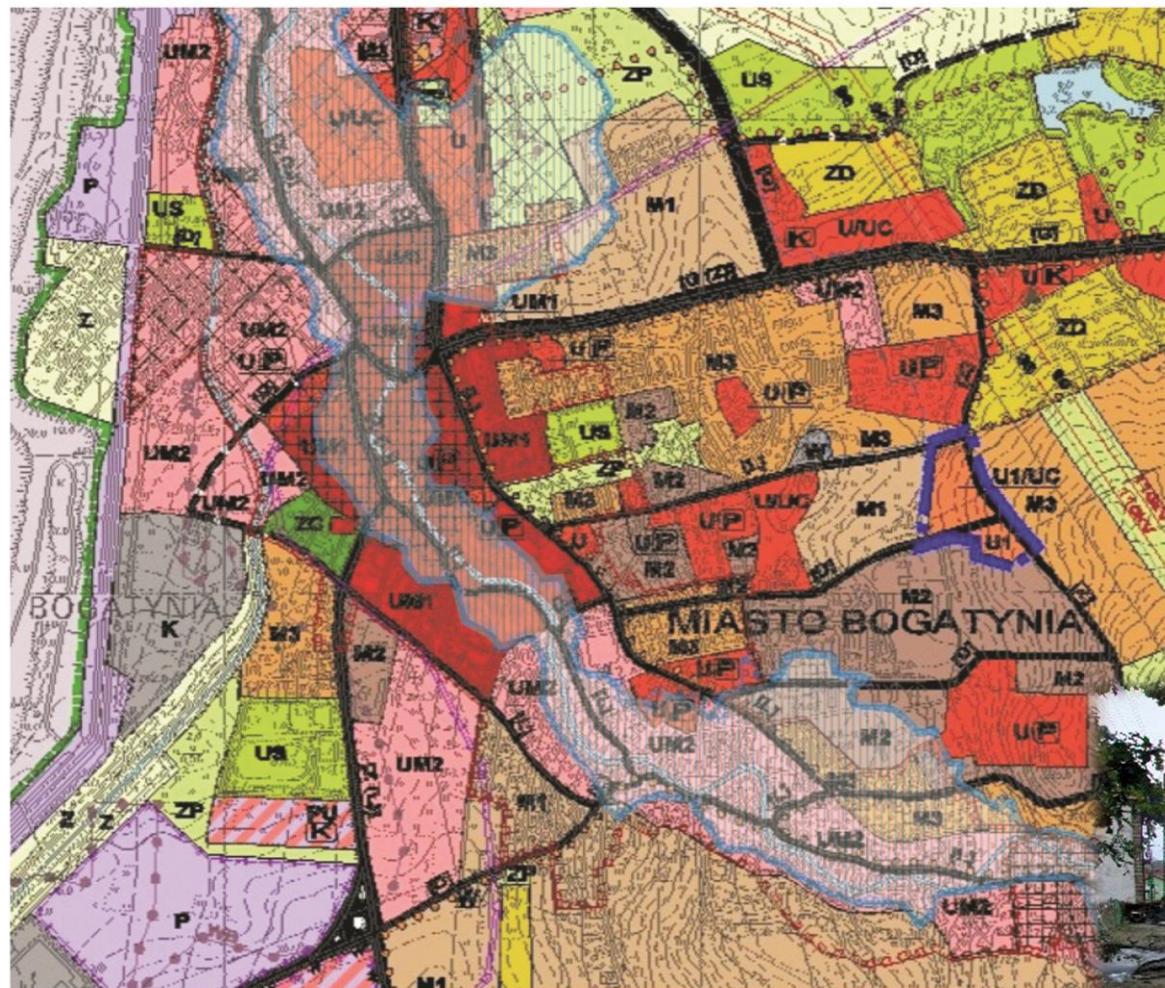
Kasinka Mała

Kasinianka

flash flood

25,0 km²

Bogatynia (Miedzianka)



The flood area:

$$q=q_{\max 2010}$$

min [m]	average [m]	max [m]
35	140	170

Bogatynia

Miedzianka

flash flood

82,9 km²



	min [m]	average [m]		max [m]	min	average $q_{flood} : q_{1\%}$		max
Maków Podhalański	10	15	20	50	-	-	-	-
Zawoja	10	15	25	40	-	-	-	-
Bogatynia	35	150	180	820	1	1	1	1
Kasinka Mała	15	140	170	315	1	1,98	2,05	3,55
Ołdrzychowice Kłodzkie	70	310	420	970	1,18	1,40	1,65	1,94
Budzów	40	130	160	360	1,33	1,60	1,65	3,68
Tuchów	280	380	450	620	1,06	1,25	1,35	1,65
Krosnowice	180	380	450	1120	1,14	1,35	1,48	1,75

floodplains management methods stored in the files of planning

- **Main river valleys : ZU, ZL, ZN, US, R**



- **Lateral river valleys: R, U, MN, MW, L**



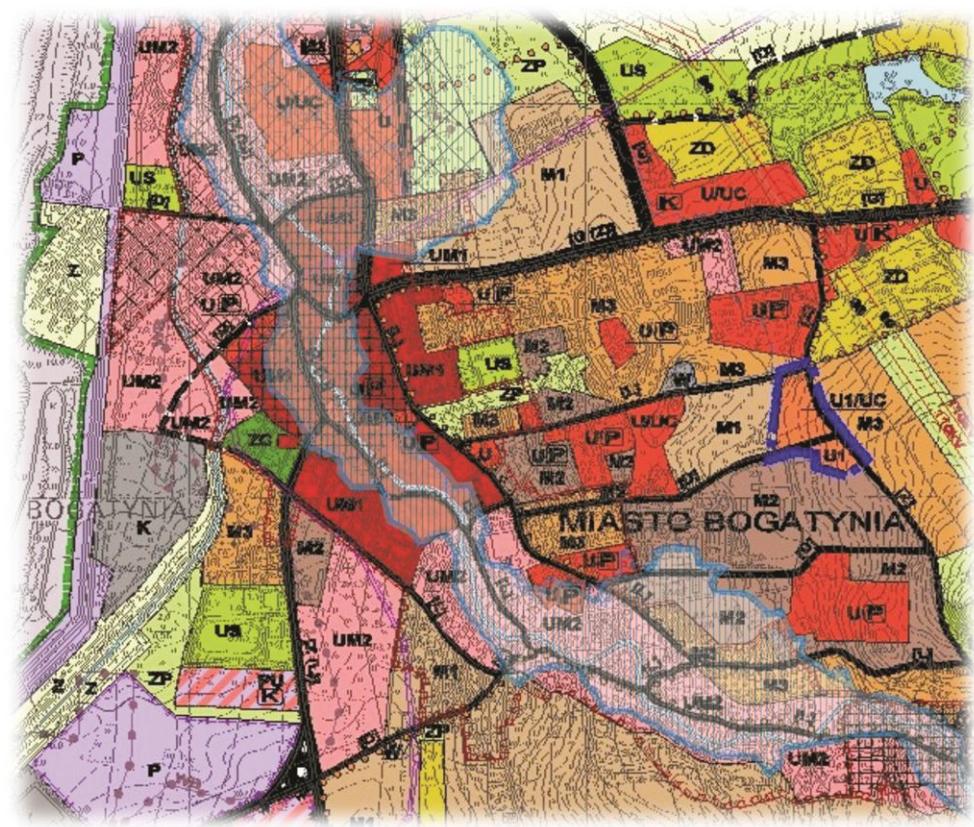
- Flood hazard areas have been designated for medium catchment (strahler number III).
- No flood hazard areas in small catchments ($< 50 \text{ km}^2$).
- Flood hazard areas are too narrow (in the catchment area of $100\text{-}150 \text{ km}^2$).
- Flood hazard areas designated for water with a probability 1% (with the exception of Bogatynia).

- The main valleys of flood hazard zones mainly include green areas.
- The small catchment flood hazard zones mainly include urban areas.

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Title grant: "Socio-economic determinants of social sensitivity to the flood, with a particular focus on the role of communication in shaping"





Tkank you for your attention !