



AGH UNIVERSITY OF SCIENCE  
AND TECHNOLOGY

## **The Problems of Establishing Cadastral Boundaries in River Erosion and Accumulation Areas, According to the Polish Law**

**Agnieszka Bieda, Paweł Hanus and Piotr Parzych**  
Faculty of Mining Surveying and Environmental Engineering  
Department of Geomatics

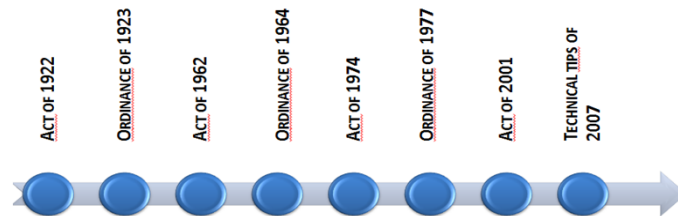
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### **1. Introduction**

- **Lands under flowing waters are property of state in Poland.**
- **Change of river bed, causes change of lands ownership including change of boundaries describing range of this ownership.**
- **In such case it is necessary to determine line of bank river as real estate boundary.**

## 2. LINE BANK RIVER



**Fig. 1:** The Law of Water development and dates of its creation in Poland

At present, an obligatory law in Poland – Water Act from 2001, defines line river bank, for natural streams, lakes or other natural water reservoirs – as:

- edge of bank river or line of permanent overgrowth of grass, or
- line determined by medium level of water fixed by hydrology – meteorology country service, on the basis of period of 10 years, at least

## 3. Line bank river determination

Line bank river is determined in Poland according to following order:

1. If edge of river bank is sharp, line river bank runs along this edge.
2. If edge of river bank is not sharp, line river bank runs along a line of permanent overgrowth of grass.
3. If line of permanent overgrowth of grass is located over medium level of water, fixed by hydrology – meteorology country service on the basis of period of 10 years, at least, line of bank boundary river runs along a line being result of crossing water-level (by this state of water) and land.

Additionally, if river banks are regulated, line river bank runs along a line joining outer edges of water constructions.



### 3. Line bank river determination (cont.)

- Line bank river fixes relevant public administrative body – through decision. It takes place as a result of application a person, having legal interest.
- The basis for line bank river determination is a project of delimitation of lands, covered by waters from adjoining lands.
- Project itself consists of two parts:
  - graphic,
  - descriptive.
- Project is one of essential documents prepared during measurements, dealing with line bank river determination.
- Owner of water pays for working out the project.
- In case of flowing water it is the Treasury

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### 3. Line bank river determination (cont.)

- Graphic part of project of delimitation waters from lands – is a map, made usually in scale 1:5000 or 1:2000. It contains:
  - fixed points of horizontal network tied to country network,
  - line of permanent grass overgrowth,
  - edges of lines of banks, alluviums, alluvial deposits and islands,
  - suggested line of river bank.
- Descriptive part contains:
  - data of a person who submits application for delimitation,
  - accepted manner of determination of projected line bank river,
  - determination of legal status of real estate and their owners included by project,
  - status of water conditions on lands adjoining to projected line river bank.

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### 3. Line bank river determination (cont.)

Stages of determination of line river bank	Detailed range of activities		
	Surveying part	Hydrologic part	Administrative part
Preparing materials for project of water delimitation	-	Determination of incormation range necessary to map updating	-
	Map for project updating	-	-
Preparing project of water delimitation	-	Project of line river bank course	-
	Work out of line bank river course	-	-
	Making a map of project of delimitations lands covered by waters from adjoining lands	Preparing descriptive part of project of delimitation lands covered by waters from adjoining lands	-
Giving administrative decision, fixing line bank river	-	-	Giving administrative decision, fixing line river bank

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### 4. Analysis of line bank of Vistula river in front of Cracow

Examined piece of Vistula river is located West of Cracow. Windings of Vistula river are in this place clearly limited by natural barriers which are: threshold of Carpatian Plateau (on south) and edge of Malopolskie Plateau (on north)



Fig.1. Location of researched object

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#### 4. Analysis of line bank of Vistula river in front of Cracow (cont.)



**Fig. 2.** Object of researches

#### 4. Analysis of line bank of Vistula river in front of Cracow (cont.)

Features of analysed section of river are :

- length of section about 13.5 [km] ,
- medium width of section about 50 [m],
- regulated river bed,
- visible patchwork of fields suggesting former location of river bed and numerous changes of river bank lines,
- boundaries, recorded in cadastre as boundaries of river were determined in 70-ties of last century.

#### 4. Analysis of line bank of Vistula river in front of Cracow (cont.)

Made researches

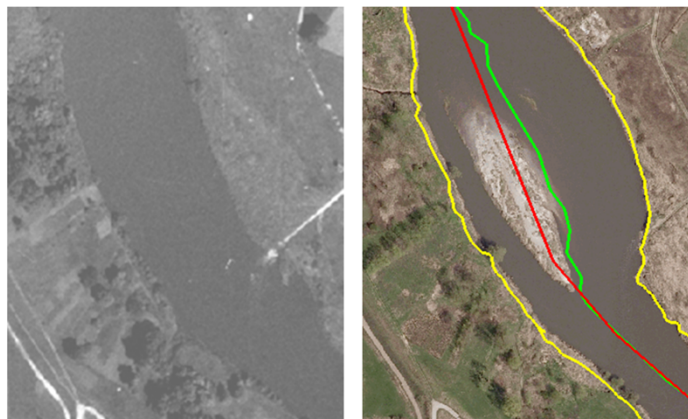
- Cadastral boundaries have been compared with line bank, measured by photogrammetric method.
- Measurement has been made by stereoscopic method on aerial photos taken in half of April 2009.
- Size of pixel was 0,20 [m]
- On the whole length of examined section, line bank was an upper edge of slope, making river bed.
- Because photos have been made in spring, vegetation overgrowing river bank was not so developed in order not to disturb during measurements. Nevertheless, there were places where river bank was veiled by vegetation or by casted shadows of its.

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#### 4. Analysis of line bank of Vistula river in front of Cracow (cont.)

1977

2009



**FIG. 4** Changes of river course – comparison aerial photo from 1977 and orthophoto map from 2009; boundary between Wolowice cadastral unit and Pozowice cadastral unit

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#### 4. Analysis of line bank of Vistula river in front of Cracow (cont.)



**Fig. 5** The biggest observed movement of „centre” of river bed; boundary between Wołowice cadastral unit and Ochodza cadastral unit

#### 4. Analysis of line bank of Vistula river in front of Cracow (cont.)

Table no 2. Changes of areas of parcels, which boundaries create administrative border determined by river

CADASTRAL UNIT	NO OF PARCEL	LENGHT OF BOUNDARY [m]	AREA OF PARCEL [m <sup>2</sup> ]	CHANGE OF AREA OF PARCEL [m <sup>2</sup> ]	CHANGE OF AREA OF PARCEL [%]
Czernichów	616	4 924	462400	7 501	1.6
Wołowice	1000	5 371	402300	5 117	1.3
Jeziorzany	251	3 135	254900	- 1 330	-0.5
Borek Szlachecki	123	367	44600	2 272	5.1
Facimiech	1	1 687	105800	- 850	-0.8
Jaśkowice	140	952	47400	- 824	-1.7
Kopanka	1	2 641	287700	- 1 475	-0.5
Ochodza	1	2 003	145500	- 6 595	-4.5
Pozowice	1	5 783	329900	- 3 816	-1.2

Change of area of parcel is expressed by fomula (1)

$$D_p = A_{pa} - A_{pb} \quad (1)$$

where:

$A_{pa}$  – area of parcel before change,

$A_{pb}$  – area of parcel after change



## 5. Conclusions

- Polish law defines procedures which should be performed if determining lines of river banks is necessary,
- Determination of line of river bank needs cooperation between specialists of such fields as: administration, surveying and hydrography,
- Surveyor, performing determination of lines of river banks, besides knowledge of law, must also have experience within this problem and skill of being as a mediator in the field, between parties when litigation takes place,
- Flowing waters act with such big force that they can influence mainly on cadastral boundaries being in close neighbourhood. Nevertheless they can also cause changes in shapes of cadastral parcels located in some distance from river.
- Changes caused by flowing waters can be of two types:
  - Water can cross existing cadastral boundaries towards adjoining parcels as result of side erosion,
  - Water can cross existing cadastral boundaries towards adjoining parcel as a result of drifting rock material; bank line moves to centre line („axis”) of river
- Discussed in the paper case is an example of big river examined on wide section where water flows slow. Bigger changes in cadastral boundaries would probably be observed in case of mountain streams.

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Thank you for attention

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