STRATEGIC MANAGEMENT OF FLOOD PRONE AREAS THROUGH SPATIAL AND LAND POLICIES—POLAND

GUIDEBOOK FOR GMINAS

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SUMMARY

This guidebook is meant to assist Polish local governments in managing flood prone areas through the development of proactive flood planning policies. The need for strategic land management in these areas became evident as a result of widespread flooding that took place during the summer of 1997 in Poland. This publication is aimed at helping local political leaders, government officials, and members of councils in the formulation of flood policies and in the implementation of flood planning activities. The complete text is in Polish, although Chapter One of the Guidebook was translated into English and is included in this report in order to give the native English reader an overview of the publication.

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"Thinking globally, acting locally in management of land borrowed from the river"

1. INTRODUCTION

Changing Conditions of Flood Planning

The catastrophic Flood of 1997 made the Polish society aware that natural disasters are not only seen on TV reports from various parts of the world where 1990s turned out to be the decade of natural disasters with the alarming frequency. The flood proved that many local governments, central government bodies and agencies were not adequately prepared to confront the flood challenge neither in terms of structural protection nor in terms of emergency operations. The ongoing process of damage relief is also demonstrating various highly publicized failures. This leads to a sober reflection about the lack in our country of comprehensive and proactive flood planning incorporating in advance alternative strategies of flood mitigation, emergency operations, and damage relief. Typical "hastiness" of many activities cannot substitute for coordinated flood planning at local, regional and national levels. At the same time it needs to be emphasized, that the Polish society itself had demonstrated impressive solidarity in providing spontaneous help to the flood stricken, despite isolated incidences of plundering.

The Flood of 1997 prompted many to ask the fundamental question: what next? Does the simple tedious rebuilding to the pre-flood state suffice? Does mitigation of future floods mean further raising of dikes and increased spending for engineering-structural works? Does the present governments need to worry about it or should it be left to subsequent administrations? And maybe we should change or supplement the traditional approaches to flood mitigation, emergencies and relief? The answers to these questions require learning about natural, economic, social, organizational, legal and political conditions, which local governments, especially gminas, need to consider in their preparations for possible flooding.

The flood is a natural phenomenon occurring since the prehistoric times and has been essentially needed for regulation of certain natural processes. Man had known since ages, which lands were "reserved" by the river as a flooding buffer. Encroaching these lands Man needed to remember that these lands were "borrowed from the river". As long as Man kept that in mind there was a silent

agreement between Man and the river. Man had also known for ages that the river did not immediately receive all the water from rainfall or melting of snow. The water runoff was slow thanks to retention capacity of wetlands, marshes, peat fields, water reservoirs, ground waters, forests, greenery etc. Since Man was not modifying this natural retention capacity for ages, the flood damage risk was
commensurate with probability of prolonged and concentrated rainfall in a given river basin as well as with probability of very quick spring meltdown of snow cover. Historians noted in their chronicles great floods, which led to the perception of 100-year, 200-year, 300-year etc., and water.

The traditional reliance on the most popular notion of the 100-year water had blunted flood alertness of many societies, creating a comfortable perception that flood is recurs every 100 years. In reality though, this means a recurring annual flood risk of 2 percent probability, and in the case of 50-year water this means an annual risk of 1 percent probability. The expression X-year water should be closely associated with the level of annual risk and not with its frequency. The X-year water terminology confers also an illusory flood risk stability through ages and epochs, while in reality the risk factors have been worsening over time due to Man's activities (e.g., global warming) and urbanization (encroachment of flood plains) during the second half of the 20th century. The lack of dynamic approach to flood risk resulted in that the majority of maps with flood plains prepared on historical records of 100-year waters have lost their currency in the face of the already altered levels of flood risk.

Intervention of contemporary Man into the course of natural processes began, however, to change the dynamics and risk of flood occurrence. The flood risk has continuously been increasing with progressing urbanization, drying up of wetlands and marshes, cutting down of forests. This increasing risk should express itself through shortening of flood recurrence periods.

The intervention by Man can be divided into several factors, each alteration of conditions influencing flood risk. The first of them is related to the intensity of rainfall, the second to the speed of runoff, and the third to the dynamics of flood waters through river basin. These factors are connected to the observed phenomena amplifying the flood risk: increasing concentration of rainfall in place and time, faster runoff of rain waters, faster flow of flood waters through regulated river basins.

The first factor of increased intensity and climatic variability of rainfall has lead to higher flood risk as well as to higher flood damage risk through growing concentration of extreme events. These events are accompanied by concentration of economic damages expressed financially through costs incurred directly by flood victims as well as by insurance and reinsurance companies. The damages stem from the worsening of climatic conditions as well as from the increasing density of urbanized areas and location of expensive industrial assets in areas, which today confer high flood risk. Ecologists have been warning for many years that the continuing global warming effect is warming world's oceans, which is leading to larger volume of water vapor in the atmosphere and consequently to more rainfall concentrated in selected areas during longer periods. The results of such climatic changes are larger and more frequent floods with propensity to serial accumulation in so called wet and warm years.

The second factor of diminishing retention capacity of river basins is working through irrigation of wetlands and marshes and peat lands, clearing of vegetation, brushes, woods and forests, encroaching urbanization, building of roads etc. Climatic changes, partially caused by Man, have drastically reduced the volume of mountain and arctic glaciers, which traditionally store significant volumes of water releasing it successively during the spring warming. Rain water runoff has increased, which makes it easier for rivers to swell and surge into flood waves. Occurrence of strong geographically concentrated and protracted rainfall causes presently higher risk than before. For these reasons one can no longer rely on historical records of 100- year, 200-year waters. The 100-year level water may only correspond today to a 50-year water, but this can be verified statistically once we have consequent floods during many years.

The third factor of river regulation is connected to enhancement of natural water retention and to protection from flood damages of highly valued areas by Man. Straightening and cementing of river channels, building of dams, reservoirs, bypass channels, and classical dikes constitutes the traditional structural approach to flood hazards. This approach does not deal directly with the speed of rainwater runoff to rivers, but focuses on regulating the flow of water masses already in the river in such a way as to avoid flooding specific valuable lands and flash-flooding. This structural approach, so deeply entrenched in our traditions, has proven insufficient and even harmful in countries of North America and Western Europe where catastrophic floods of such rivers as the Mississippi and the Rhine took place in the 1990s. It was learned then that regulation of river channels accelerates the flow of water, which increases the risk of swelling and surging of river waters and pressure of water masses on river dikes and other protective works.

The amplified concentration of rainfall in place and time, the higher speed of rainfall runoff, and the accelerated flow of river waters through regulated channels have all caused the increase of flood risk. The effect of this increased risk is the growth of flood hazard threatening individual and collective property accumulated on flood prone areas. This has become a direct threat of financial, social and political dimensions to governments at local, regional and national levels. This stems on the one hand from the more aggressive than before encroachment of expensive development on flood prone areas, which has increased the flood hazard, and on the hand from the growing perimeters of flood prone areas, which is caused by the increased flood risk.

1.2 Proactive Approach to Flood Planning

The question arises then how an individual gmina, with its modest possibilities of action should respond to the above mentioned conditions influencing flood risk and damage hazard. This Guidebook attempts to assist in thinking globally and acting locally in respect to flood issues. The first important starting point is to accept that flooding is inevitable, it may happen soon, and it may be bigger than the previous one. The second
important starting point is to accept that flooding is a global phenomenon in the sense that it affects the whole river basin through interrelated events so that each gmina is affected by actions of other gminas, and through its actions affects other gminas as well. The third important starting point is to accept that flood prone lands are borrowed from the river and thus should be treated separately through specific flood plan strategies based on local use and land management policies. The latter issue is the focus of this Guidebook.

The topic of flood planning has many layers related to functions, approaches, geography and administration. This is illustrated on Chart 1 with shaded areas indicating the topics raised in this Guidebook.

In the functional layer one may distinguish three basic activities related to the following functions:

— Flood Mitigation–in order to reduce risk and minimize damage hazard before the flood

— Flood Preparation–in order to know what to do during the flood

— Flood Relief–in order to know what to do after the flood

In the approach layer one may distinguish three basic approaches:

— Zero Approach–based on doing nothing in relation to flood

— Structural Approach–based on engineering activities (see below)

— Non-Structural Approach–based on activities related to spatial planning, land management, water monitoring, flood warning, and insurance (see below)

In the geographic layer one may distinguish four basic geographic areas:

— Flood Prone Areas–delimited by the 100-year water

— Locality–city, town, village

— River valley–dominated by specific river or stream

— River watershed–including tributaries, often divided into higher and upper zones

In the administrative layer one may distinguish basic administrative areas in respect to territorial organization of Poland:

— Gmina–basic local self-government

— Powiat–second tier local self-government (composed of several gmina areas)

— Województwo–regional self-government entity as well as regional level of national administration

— Pa stwo–national government and its agencies

As shown in Chart 1 the interest of this Guidebook is focused on the following layers:

— Flood Mitigation–in the functional layers

— Non-Structural Approach–in the approach layers

— Flood Prone Areas–in the geographic layer

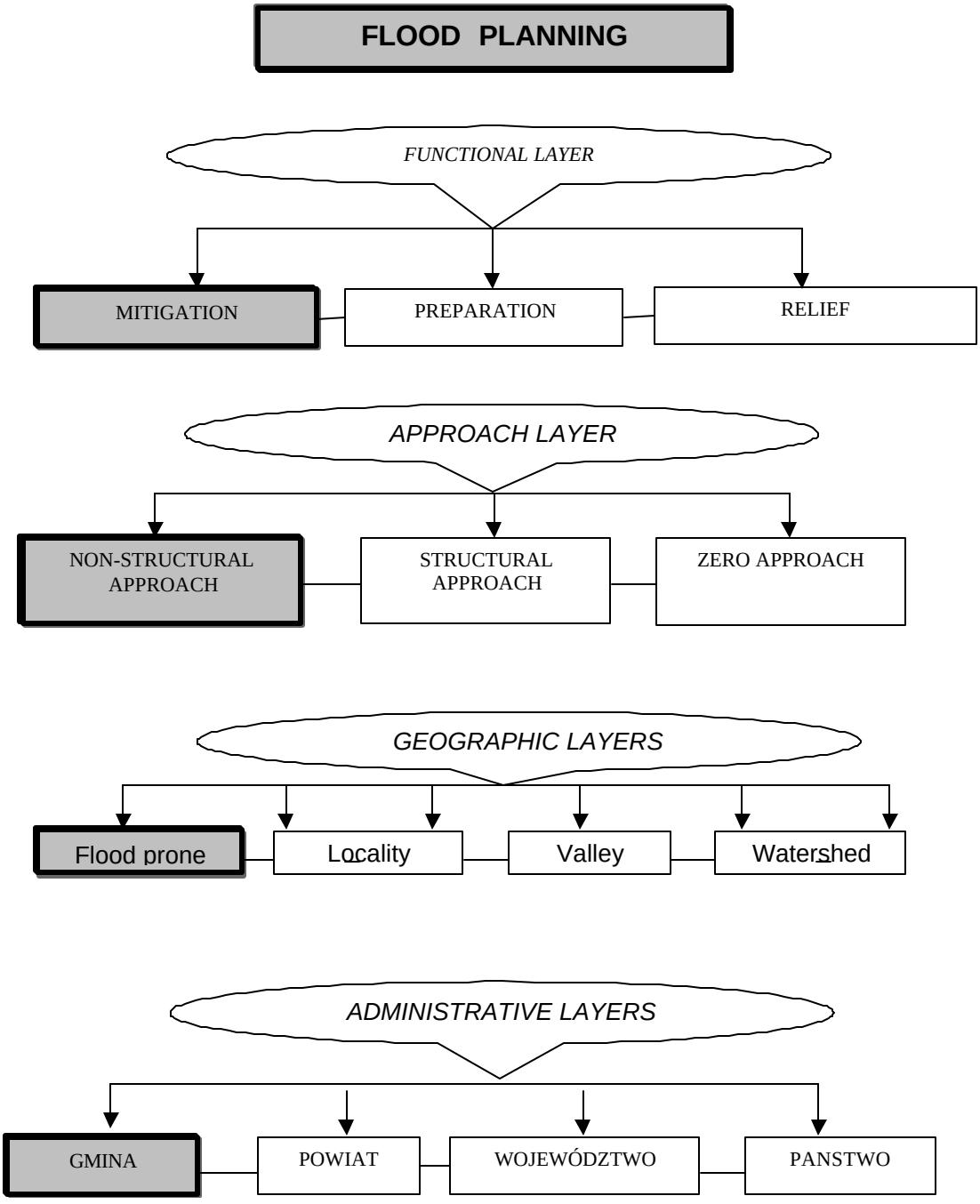
— Gmina–in the administrative layer

Structural approach has been traditional for flood planning and it consists of engineering activities related to regulating water courses through:

— Dikes and flood walls
— Water dams
— Water reservoirs
— Flood ponds
— Dry reservoirs
— Flood land reserves
— Flood by pass channels
— Flood proofing of buildings and structures

Chart 1

Layers of Flood Planning



Such activities, which are of passive nature, together with flood insurance policies, made people and governments feel secure and weakened the will of proactive flood planning through shaping human behavior, land use planning on flood prone lands or strategic management of watershed areas. It became evident in the 1990s that options of structural approach were insufficient and need supplementary molding of emergency behavior on the one hand and comprehensive planning and monitoring of human activities on the other hand, not only on flood prone lands, but also in whole watershed areas as they affect water management balance and flood risk.

Such a proactive approach-called a non-structural approach is an increasingly used supplement to the structural approach in the countries of Western Europe and North America. It is becoming articulated in:

— Local strategies for management of flood prone areas
— Regional land use planning in watershed areas
— Systems of water monitoring and flood warning
— Special flood insurance programs

Local management strategy for flood prone areas is the strongest option of the non-structural approach and its principal instrument is land use control exercised by gminas themselves. The non-structural approach is based also on the conviction that it is necessary to change popular perceptions of flood risk and hazard, the reduction of which is the flood mitigation method that is most economical and beneficial to the environment. This requires strengthened coordination among government levels (vertical integration) as well as forging partnerships among public, business and civic sectors (horizontal integration). The times are gone when the state was the only entity dealing with flood protection. Democratization of our country and European integration imply unequivocally that a subsidiarity principle be heeded as expressed by decentralization based on notion of fundamental responsibility vested in local community supported as required by higher levels of government.

The present Guidebook is focused on this behavior-related, non-structural approach, but limited to the range of gmina competency, which leads to the main emphasis being placed on planning (legal) and economic (financial) instruments available to gminas. An important element is the undertaking of activities aim at maintaining and increasing political and civic will in this area, since this will quickly fades away after a devastating flood as the memories and interests shift elsewhere in public awareness and in public finance.

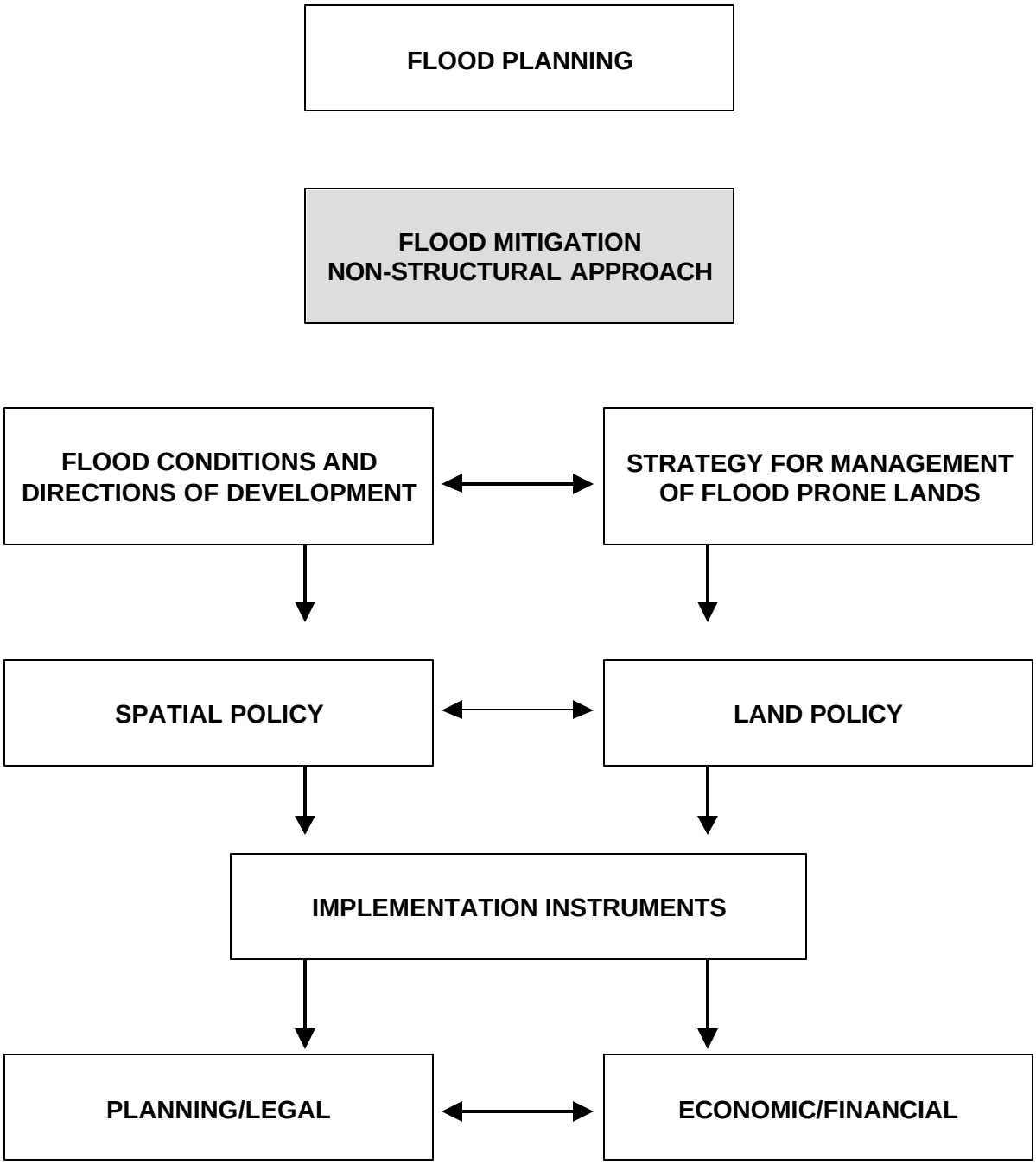
Placing this Guidebook in Polish reality requires strong linkage to the

overriding imperative of high economic growth, which will increasingly add to the pressure of accelerating urbanization and physical growth of cities and towns. This will continue exerting the pressure on development of flood prone areas, which are usually attractive from an economic point of view, even given the costs of necessary flood protection structural measures. At the same time this will continue increasing flood risk and hazards. This means that a strategy for management of flood prone areas in gminas, in terms of spatial and land management policies, is becoming increasingly important. This is shown on Chart 2 below.

Flood experience has made gminas aware of the necessity of a strategic approach, at least in order to manage flood prone areas, which is particularly important for those gminas which have not practiced strategic planning at all. It is obvious that it would be beneficial to place a specific land management strategy in the context of a more general or comprehensive local development strategy. But a specific land management policy focusing on flood prone areas should be effective, which implies using enforceable instruments (i.e., local land use planning regulations). This means that formulation of management strategy for the flood prone-areas must be closely linked to the legally sanctioned Studium of Background Conditions and Directions of Spatial Development. A pertinent Studium for a gmina should expressly address flood issues, especially in those gminas where flood hazard is a real threat, and should condition their decisions on directions of spatial development. Gmina land use policy expressed through the Studium can effectively become the most appropriate documentation of flood planning defining the non-structural approach to flood protection.

Chart 2

Non-Structural Flood Mitigation in Gmina



1.3 Who and How Can Use the Guidebook

This Guidebook is to assist local governments in developing and practicing proactive flood planning as related to a flood mitigation strategy for management of flood prone areas articulated through official spatial and land policies on these lands. The Guidebook is addressed to gminas, since they retain basic instruments for management of flood prone areas–spatial planning and land asset management. Our comments, suggestions and recommendations are directed to local governments interested in flood planning and using these instruments to develop strategies for management of flood prone areas. The Guidebook should be useful to local politicians (members of councils and executive boards) in formulation of flood policies, as well as to local government officials and consultants in implementation of spatial and land policies and their instruments.

The Guidebook can be used selectively with regard to needs and interests. It provides example deciding on specific cases, which should be taken into account in local flood planning. It is to assist gminas in their formulation of strategies for management of flood prone areas, but also in participation in groups, organizations and institutions at higher than local levels created to formulate strategies for whole watershed areas.

The Guidebook is also a compendium of instruments, which can be used for implementation of already formulated spatial and land policies. It is also a reference book with information about legal regulations, institutions, data sources, and literature, which can be accessed by everybody who is interested in the discussed non-structural elements of flood planning.

1.4 Structure and Contents of the Guidebook

Discussion of eight flood planning issues limited to the non-structural approach has been contained by the authors in four distinct chapters. The issues are:

— Legal regulations pertaining to flood issues in terms of selected most important (by authors' choice) acts or their parts. A complete listing of regulations is contained in Appendix D

— Evaluation of usefulness of selected legal regulations made by sampled flood gminas (flooded in 1997), supplemented by discussion of survey results contained in Appendix C

— Strategy for management of flood prone areas as an integral element of Studium of Background Conditions and Directions of Spatial Development

— Formulation of spatial policy, which should contain issues related to flood mitigation measures

— Example of a Gmina resolution regarding policy on flood prone areas

— Analysis of elements contained in the Studium of Background Conditions and Directions of Spatial Development

— Planning instruments in the light of administrative reforms of the country with emphasis on planning competency aspects

— Gmina land asset management regarding flood prone areas and the use of perpetual land leaseholds in this context

Chapter 5 is of particular importance. Although economic instruments are auxiliary to planning instruments, one should consider such issues crucial to flood planning as:

— Economic calculus in flood planning
— Investments and expenditures of public sector
— Budgetary reserves, insurance, flood bonds
— National budgetary assistance

The last chapter contains extensive bibliography both in Polish and in English, which shows how much has already been written on topics related to those raised in the Guidebook. There are also five appendices, of which the most extensive coverage is devoted to the case of Gmina Raciborz and its strategy for management of flood prone areas. A draft of a Gmina resolution on local land policy is included, as well as delimitation of flood prone zone subject of the Studium and of specific land policy.

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