FLOOD MANAGEMENT STUDIES

Directorate General for Water Management
Flood and Drought Management Department
Işıl SAKIN (Dep. Expert)
March 2014 - İstanbul

CONTENT

1. Directorate General for Water Management
2. Twinning Project :Capacitiy Building to Implement the Floods Directive
3. Other Studies related to Flood Directive

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Orman ve Su İşleri
Bakanlığı

MINISTRY OF FORESTRY AND WATER AFFAIRS
Directorate General for Water Management

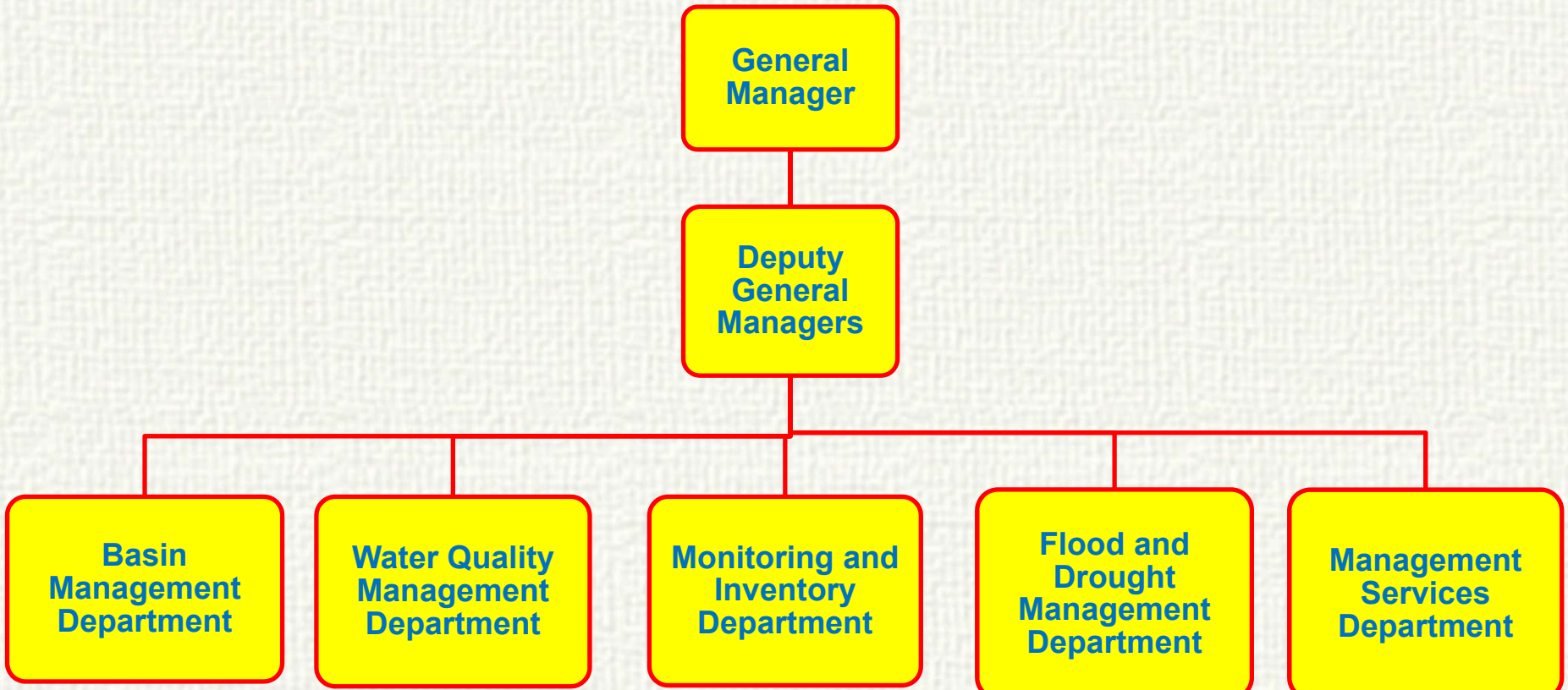
SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ

DIRECTORATE GENERAL FOR WATER MANAGEMENT

DIRECTORATE GENERAL FOR WATER MANAGEMENT

- Directorate General for Water Management has been founded within the Ministry of Forestry and Water Affairs in accordance with 29.06.2011 dated and 645 numbered decree law “Organization and duties of Ministry of Forestry and Water affairs”.

DIRECTORATE GENERAL FOR WATER MANAGEMENT



DUTIES OF DIRECTORATE GENERAL FOR WATER MANAGEMENT (1)

- To Determine policies related to protection, improvement and usage of water resources.
- To provide coordination of water management in national and international level.
- To prepare/make prepared river basin plans on the basis of river basins and carry out the relevant legislation studies about integrated river basin plans, with the aim of protection and improvement of ecological and chemical quality of aquatic environment by taking protection – use balance into accout.

DUTIES OF DIRECTORATE GENERAL FOR WATER MANAGEMENT (2)

- To determine, assess and update precautions, on the basis of basin, together with related institutions and associations and follow up their implementations.
- To determine, together with related institutions and associations, objectives, principles and receiving environment standards aimet at protection of surface waters and ground waters, to monitor water quality or make it monitored.
- To determine and monitor sentitive areas in terms of water quality and areas sensitive to nitrate,
- To make necessary coordination related to water allocations on the basis of sector, according to river basin management plans.

DUTIES OF DIRECTORATE GENERAL FOR WATER MANAGEMENT (3)

- To follow up processes, related to protection of water resources, arising from international agreements and other legislations, to carry out works related to transboundary and frontier waters in coordination with related institutions.
- Constituting national water data-based information system.
- **To determine strategies and policies related to floods and drought, to prepare related legislation and flood management plans.**
- **To perform studies on effects of climate change on water resources.**
- To perform relevant duties given by the Minister.

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EU TWINNING PROJECT
"CAPACITY BUILDING TO IMPLEMENT FLOOD DIRECTIVE"

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Floods Directive

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The Floods Directive,
(Directive on assessment and management of flood risks)

came into force on 26 November 2007 by decision of Council of Ministers of the European Parliament

DIRECTIVES

DIRECTIVE 2007/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 23 October 2007
on the assessment and management of flood risks
(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Economic and Social Committee [1],

Acting in accordance with the procedure laid down in Article 251 of the Treaty [2],

Whereas:

(1) Floods have the potential to cause fatalities, displacement of people and damage to the environment, to severely compromise economic development and to undermine the economic activities of the Community.

(2) Floods are natural phenomena which cannot be prevented. However, some human activities (such as increasing human settlements and economic assets in floodplains and the reduction of the natural water retention by land use) and climate change contribute to an increase in the likelihood and adverse impacts of flood events.

(3) It is feasible and desirable to reduce the risk of adverse consequences, especially for human health and life, the environment, cultural heritage, economic activity and infrastructure associated with floods. However, measures to reduce these risks should, as far as possible, be coordinated throughout a river basin if they are to be effective.

(4) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy [3] requires river basin management plans to be developed for each river basin district in order to achieve good ecological and chemical status, and it will contribute to mitigating the effects of floods. However, reducing the risk of floods is not one of the principal objectives of that Directive, nor does it take into account the future changes in the risk of flooding as a result of climate change.

(5) The Commission Communication of 12 July 2004 to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Flood risk management — Flood prevention, protection and mitigation' sets out its analysis and approach to managing flood risks at Community level, and states that concerted and coordinated action at Community level would bring considerable added value and improve the overall level of flood protection.

(6) Effective flood prevention and mitigation requires, in addition to coordination between Member States, cooperation with third countries. This is in line with Directive 2000/60/EC and international principles of flood risk management as developed notably under the United Nations Convention on the protection and use of transboundary water courses and international lakes, approved by Council Decision 95/308/EC [4], and any succeeding agreements on its application.

(7) Council Decision 2001/792/EC, Euratom of 23 October 2001 establishing a Community mechanism to facilitate reinforced cooperation in civil protection assistance interventions [5] mobilises support and assistance from Member States in the event of major emergencies, including floods. Civil protection can provide adequate response to affected populations and improve preparedness and resilience.

[1] OJ C 195, 18.8.2006, p. 37.
[2] Opinion of the European Parliament of 13 June 2006 (OJ C 300 E, 9.12.2006, p. 123), Council Common Position of 23 November 2006 (OJ C 311 E, 19.12.2006, p. 10) and Position of the European Parliament of 25 April 2007. Council Decision of 18 September 2007.
[3] OJ L 327, 22.12.2000, p. 1. Directive as amended by Decision No 2455/2001/EC (OJ L 331, 15.12.2001, p. 1).
[4] OJ L 186, 5.8.1995, p. 42.
[5] OJ L 297, 15.11.2001, p. 7.

Target Plan for Floods Directive

According to the Floods Directive, member states will manage flood risks by aplplying a 3-phased plan by the end of the year 2015.

Preliminary Flood Risk Assesment (end of 2011)

Flood Hazard and FloodRisk Mapping (end of 2013)

Flood Risk Management Plans (end of 2015)

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Target Plan for Floods Directive

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Preliminary Flood Risk Assesment (end of 2011)

The use of existing data

Mapping
(Delineation of River Basins)

Identification of the historical floods which has repetition possibility and significant losses experienced

- Flood coverage area
- Transport ways
- Assessment of adverse effects

Identification of floods expected to cause to significiant damage

- Flood coverage area
- Transport ways
- Assessment of adverse effects

Assessment of possible effects of expected future floods by taking the existing physical conditions into consideration.

- Topography
- Watercourses
- Hydrology and Morphology
- Floodplain, Storage
- Existing Flood Protecting Structures
- Economic zoning
- Other long-term planning

Target Plan for Flood Directive

Flood Hazard and FloodRisk Mapping (end of 2013)

Chosen flood types for preparing flood hazard maps

- Flood covarege,
- Water depth and water level
- Flow rate,
- Flow

Flood Risk Maps

- approximate population will be in possible impact area
- Economic actions will be in possible impact area
- The organizations will cause of unexpected accidents
- Determination of areas source of high sedimend and polutant

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Target Plan for Flood Directive

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Flood Risk Management Plans (end of 2015)

Measures to prevent possible adverse effects

- Human
- Environment
- Cultural Heritage
- Economic Activity

Important Points;
- Cost-benefit analysis
- Flood Coverage and Flood transpor routes
- Posible Flood Retention Areas
- Environmental factors
- Management of soil and water resource s
- Nature protection and land use

Target;
- Preventation,protection and preparation
- Flood forecasting and early warning
- Sustainable land use
- Improvement of water retention structures
- Controlled floods in certain areas

Capacity Building to Implement the Floods Directive”

- A project entitled “ *Capacity Building to Implement the Flood Directive”* has been submitted to the 2010 year’s program under “Instutitional Building” which is the 1st component of “Instrument for Pre-Accession Assistance (IPA)” and has been approved by EC.

- Following the drafting phase of the project contract and its endorsement, project activities have begun in August 2012.

- Implementation peridod of the Project was 24 Months and extended to 29 Months as of 04.03.2014

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Project Components

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Component 1: Enhancing juridical capacity and improving technical and institutional capacity

- 1.1 Legal and Institutional Gap analyses
- 1.2 Training Program
- 1.3 Preparation of communication strategy

Component 2: Implementation of the flood directive in a pilot basin

- 2.1 Data Needs Assessment for the Pilot Basin
- 2.2 Preliminary Flood Risk Assessment in the Pilot Basin
- 2.3 Flood Risk Maps and Flood Hazard Maps in the Pilot Basin
- 2.4 Flood Risk Management Plan in the Pilot Basin
- 2.5 Dissemination of the Experiences from the Pilot Basin

Component 3: Preparation of National Implementation Plan for the Flood Dir.

- 3.1 Identify the alternative options for implementation of the Flood Directive
- 3.2 Analyze the investment needs for future implementation of the Flood Directive
- 3.3 Estimate the cost of transposition and implementation
- 3.4 Identify the social and environmental impacts of each option
- 3.5 Compare the options which have been defined for the implementation of the Flood Directive
- 3.6 Prepare the detailed national implementation plan for the Flood Directive
- 3.7 Prepare a report on the coordination between the implementation of Directive 2000/60/EC and Directive 2007/60/EC

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Pilot Basin & Quick Scan Basins

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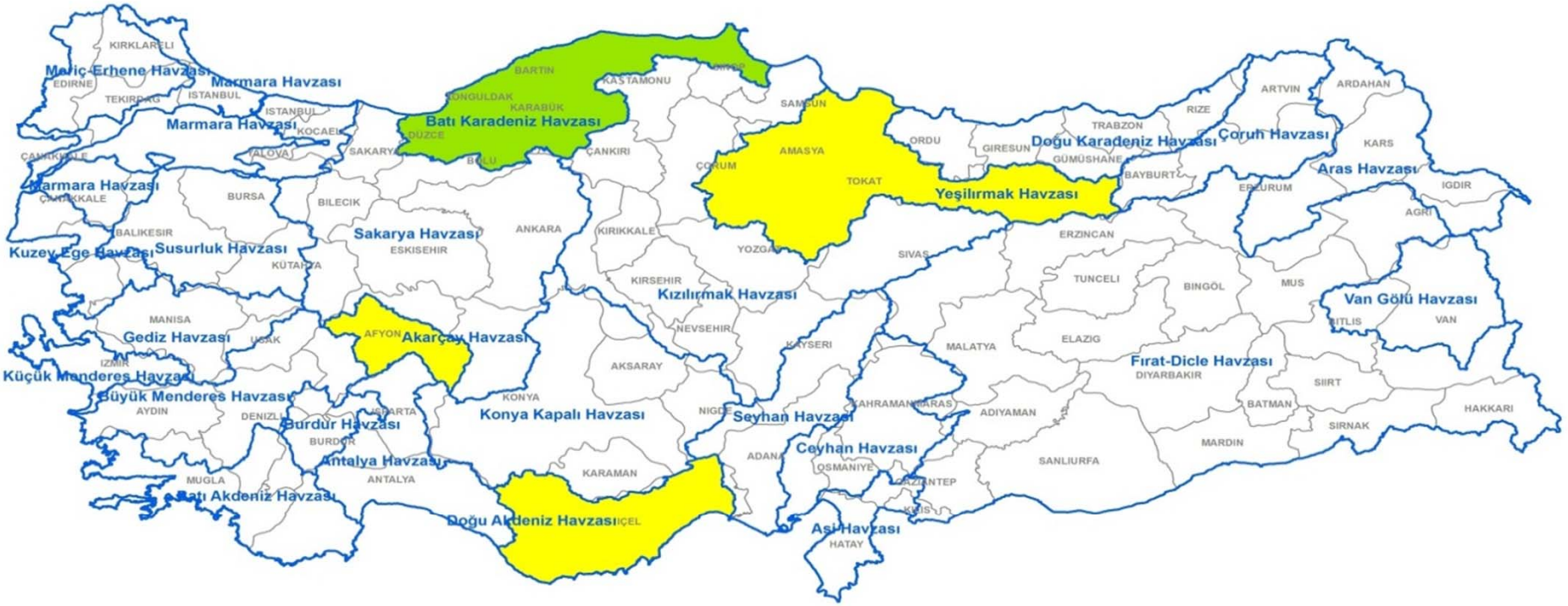


Studies within the Framework of Twinning Project

Within the scope of the project 38 activities heve been performed.

- 9 High Level Meetings (Kickoff Meeting, SCMs, Opening Meeting in the Basin and PFRA Stakeholder Meeting)
- 9 Missions in the pilot basin
- 2 Study Visits (France and Raomania)
- 18 Training activities

Studies within the Framework of Twinning Project

Under Component 1:

1. Legal and Institutional Gap Analysis
2. Trainining Needs Analysis
3. Preparation of Communication Strategy

Under Component 3:

1. Identification of the Alternative Options for Implementation of the Flood Directive and Preparation of the National Strategy
2. Estimation of the cost for transposition and implementation (including investment needs) of Flood Directive by adapting the results for 3 quick scan basins for each option

Studies within the Framework of Twinning Project

Under Component 2:

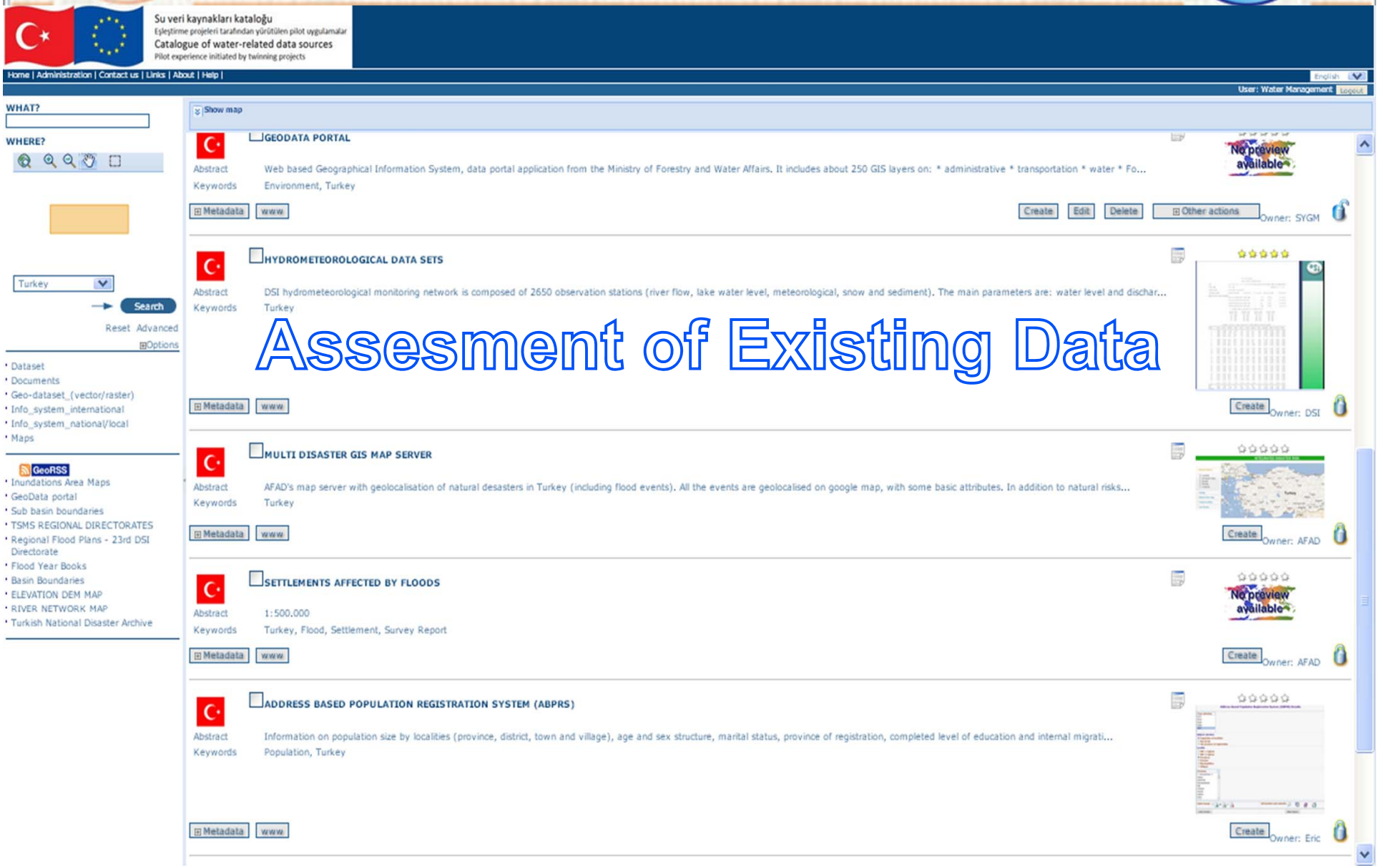
1. Data Needs Assessment for the Pilot Basin
2. Preliminary Flood Risk Assessment in the Pilot Basin (Batı Karadeniz Basin)
3. Flood Hazard and Flood Risk Maps
4. Flood Risk Management Plan

Component 2: Implementation of the Floods Directive in the Pilot Basin (Batıkaradeniz)

Preliminary Flood Risk Assesment

- The use of existing data
- Mapping (Delineation of River Basins)
- Identification of the historical floods which has repetition possibility and significant losses experienced
  - Flood coverage area
  - Assessment of adverse effects
- Identification of floods expected to cause to significiant damage
  - Flood coverage area
  - Assessment of adverse effects
- Assessment of possible effects of expected future floods by taking the existing physical conditions into consideration.
  - Topography
  - Watercourses
  - Hydrology and Morphology
  - Floodplain, Storage
  - Existing Flood Protecting Structures
  - Economic zoning
  - Other long-term planning

Component 2: Implementation of the Floods Directive in the Pilot Basin (Batıkaradeniz)



Assesment of Existing Data

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Map of River Basin

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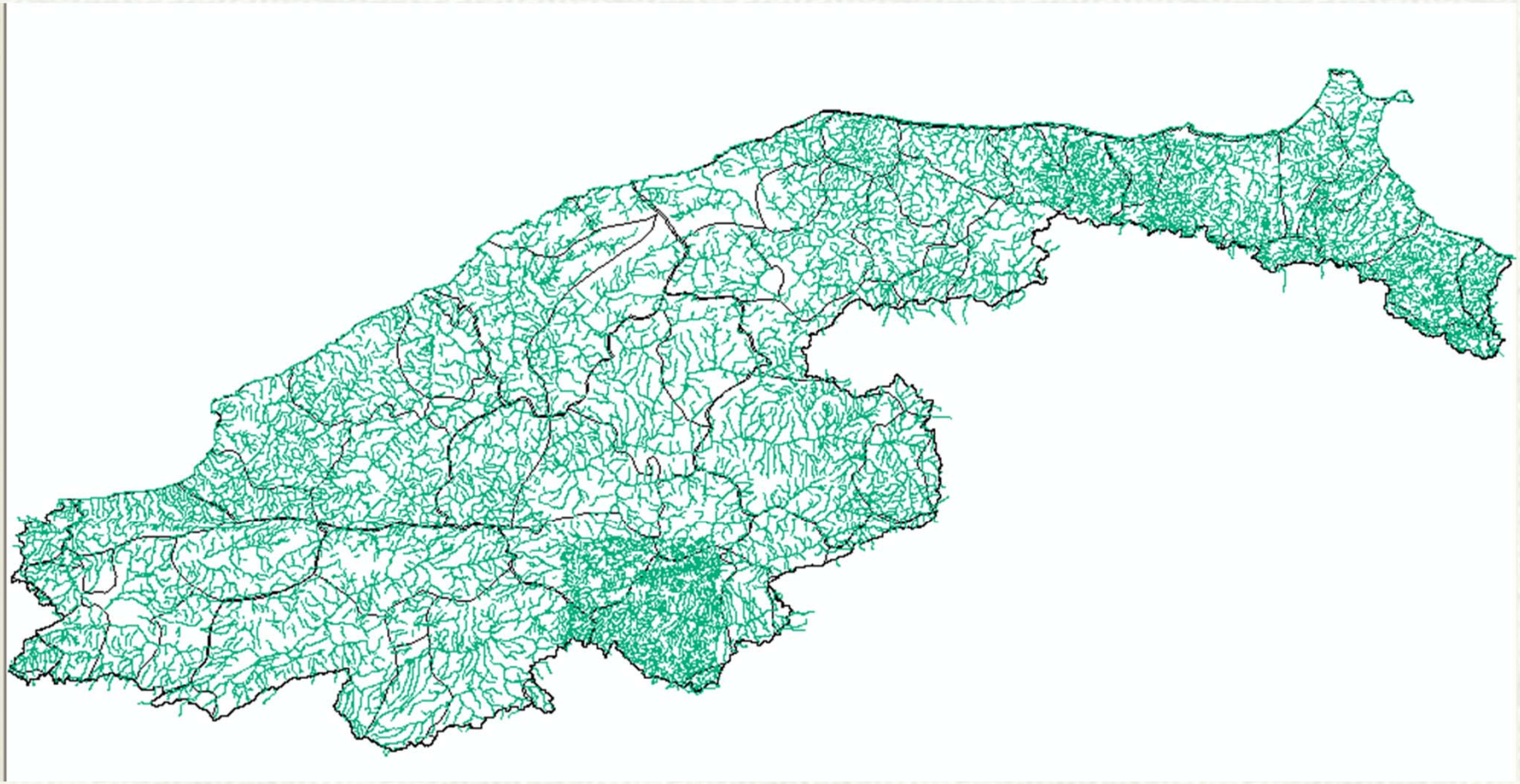
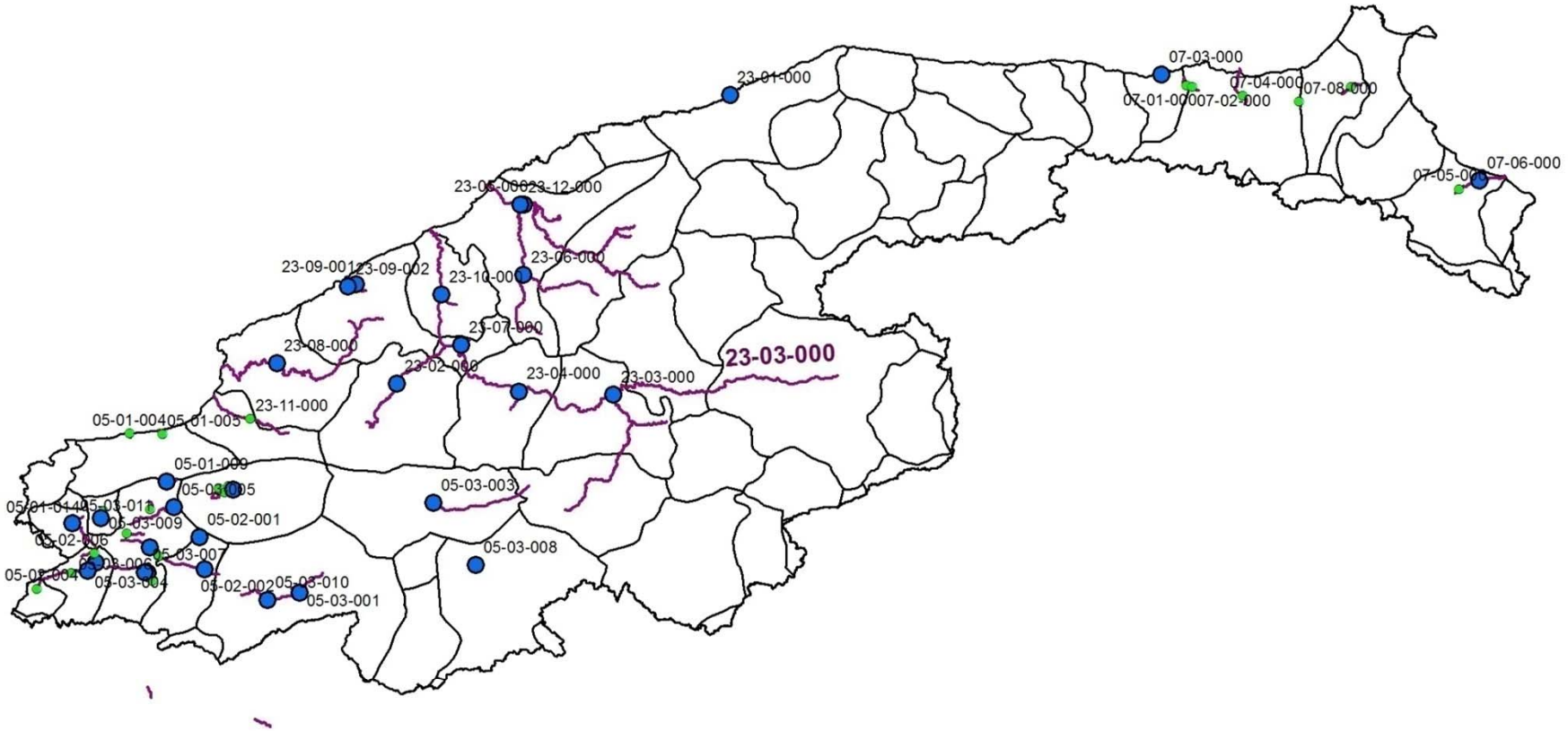


Significant Past Floods



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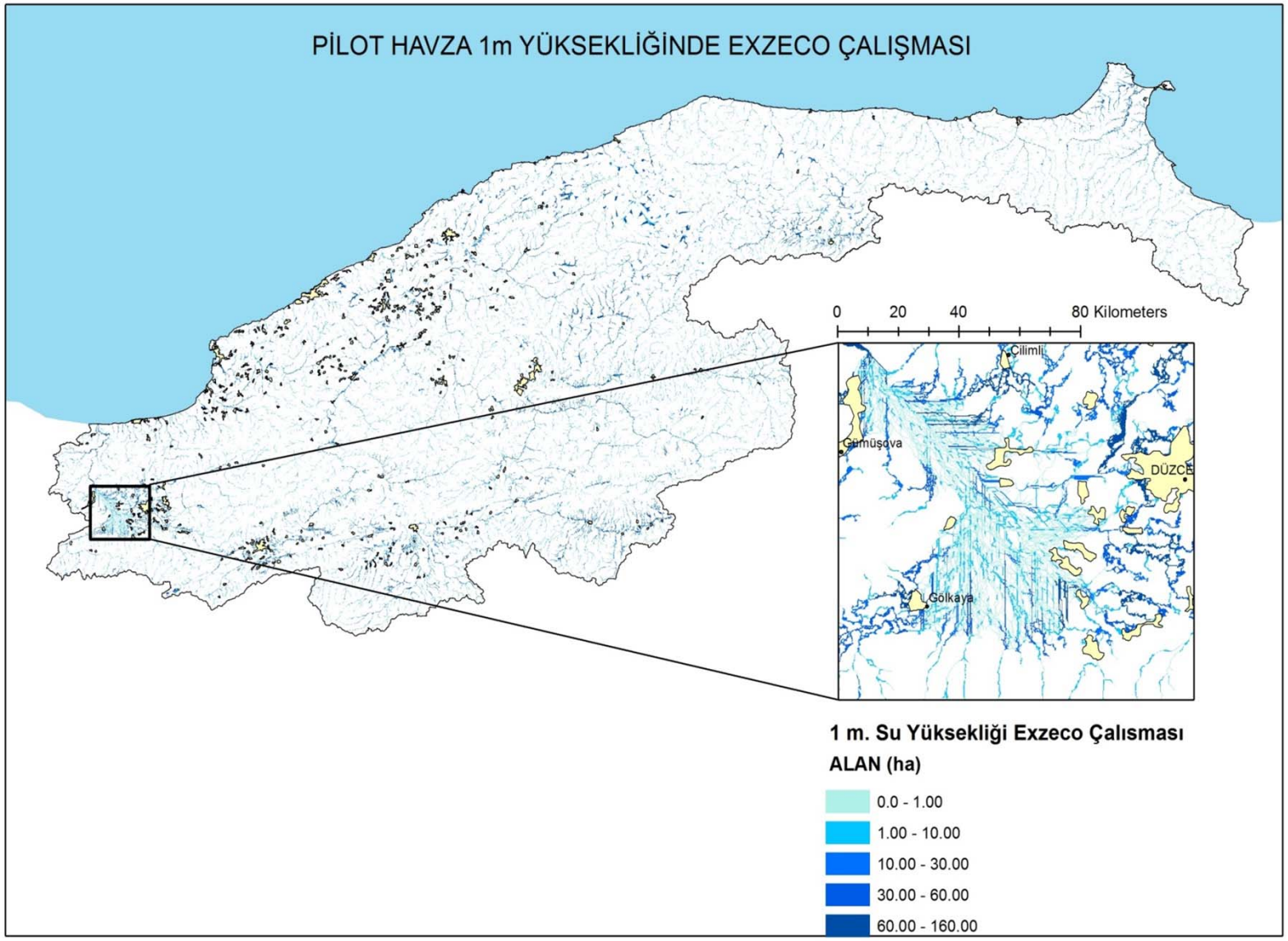
Possible Future Floods (Execo Method)



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Possible Future Floods
(Water Level Rise Method)

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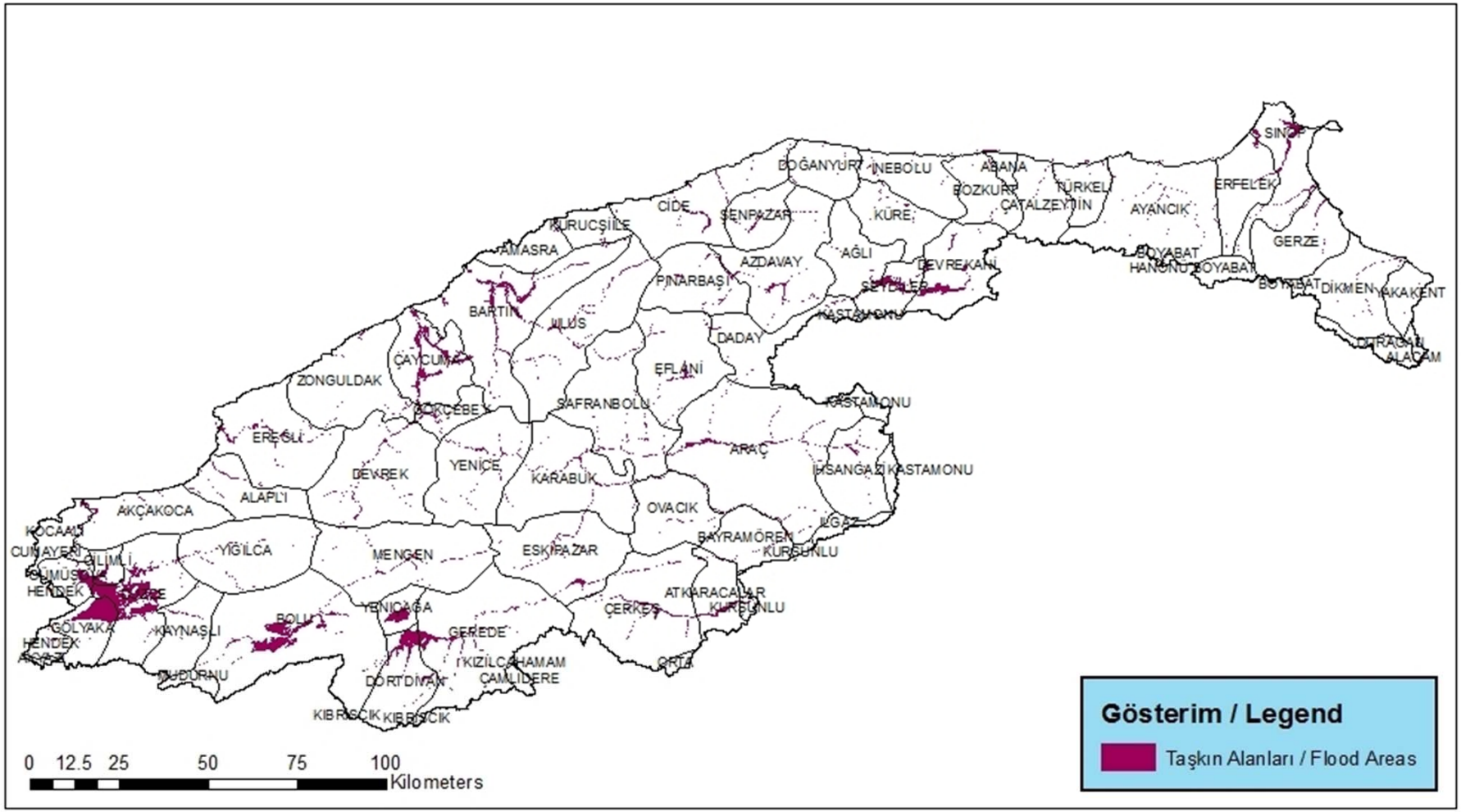

SU YÜKSELTME YÖNTEMİNE GÖRE TAŞKIN RİSKİ TAŞIYAN ALANLAR
FLOODED AREAS ACCORDING TO WATER LEVEL RISE METHOD

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ
GENERAL DIRECTORATE OF WATER MANAGEMENT
Çizen - Drawn By : F.GİRAYHAN
Tarih-Date: 08/2013

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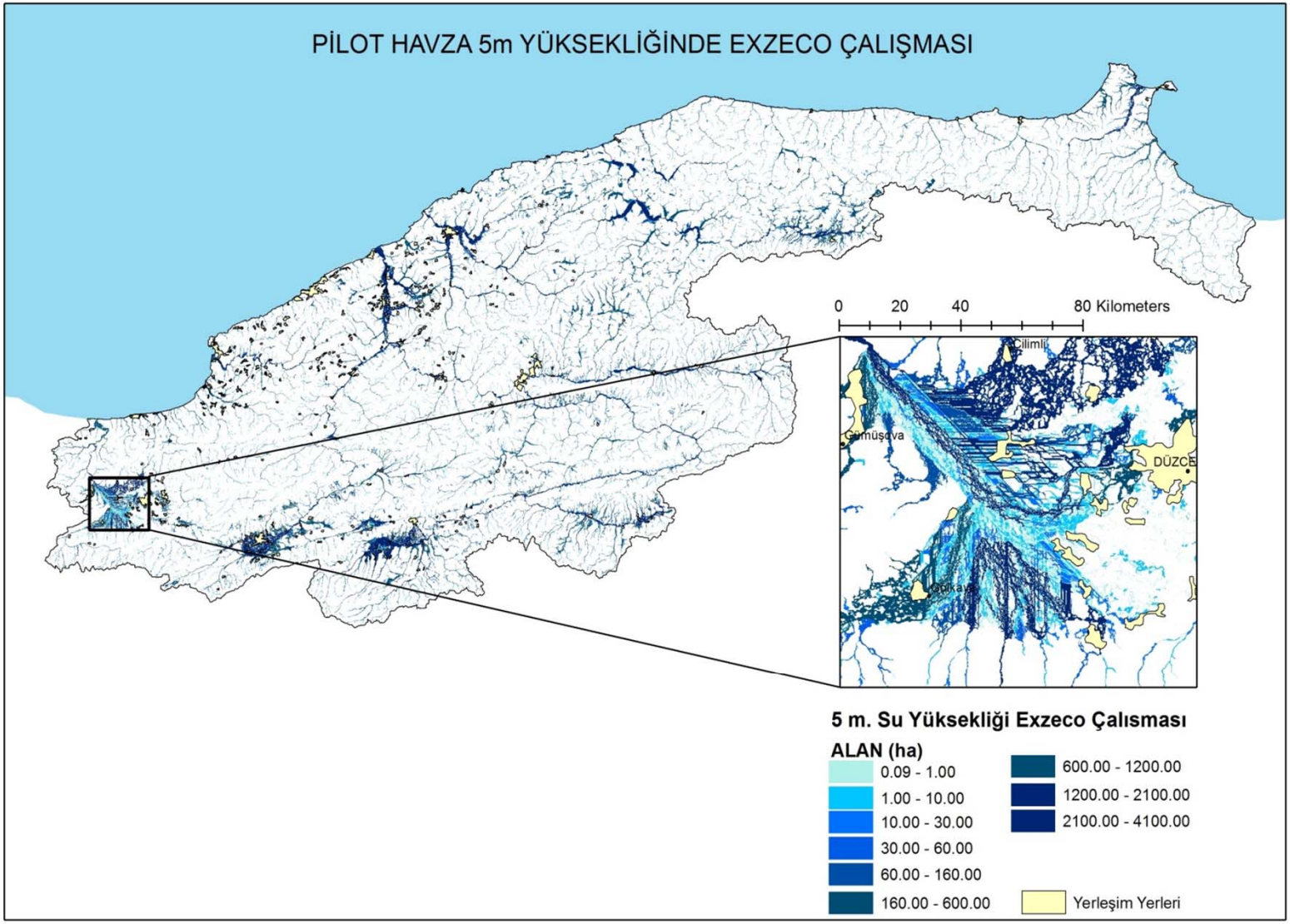
Possible Future Floods (Execo Method)

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ



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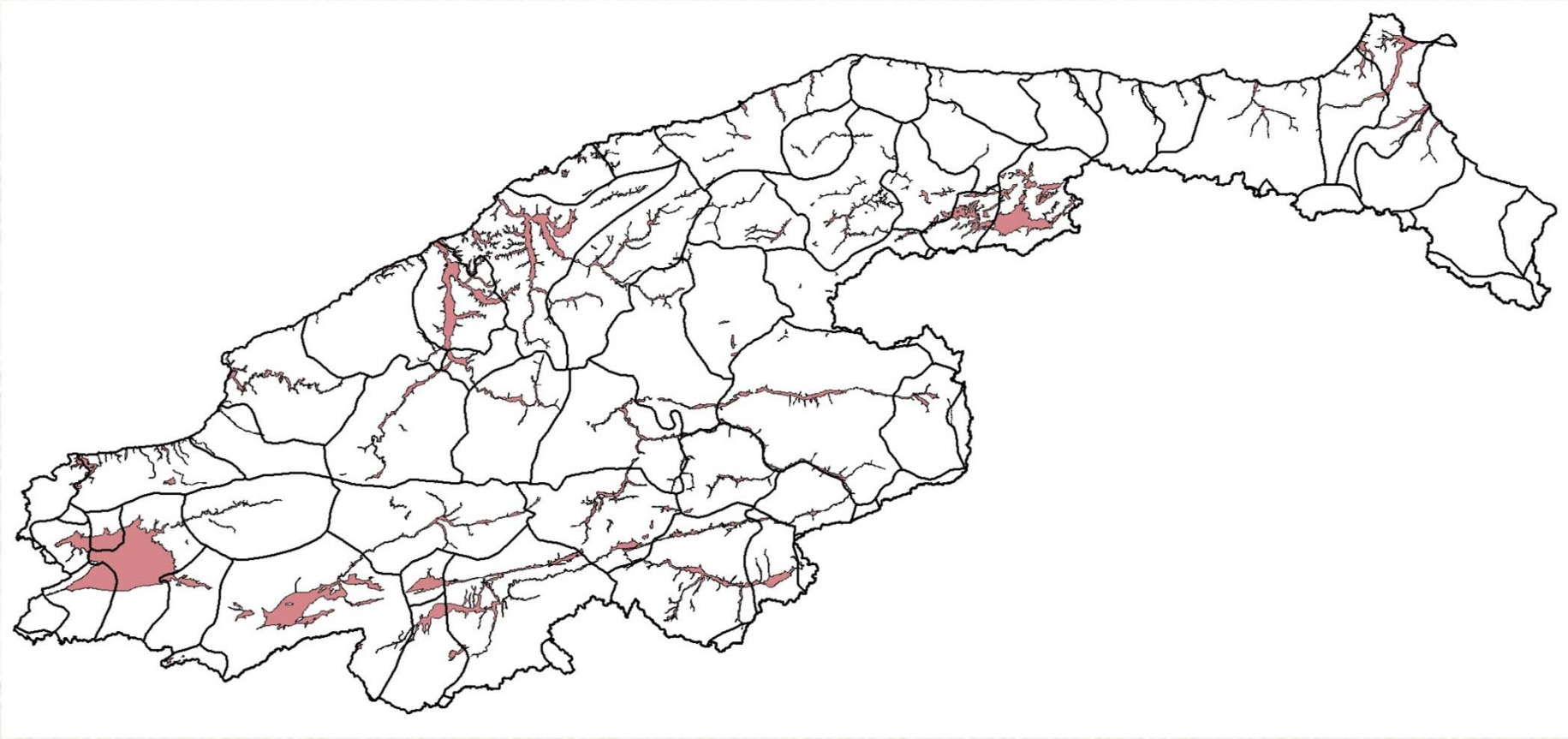
Possible Future Floods (Aluvion Method)

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ



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Comparision of Different Methods

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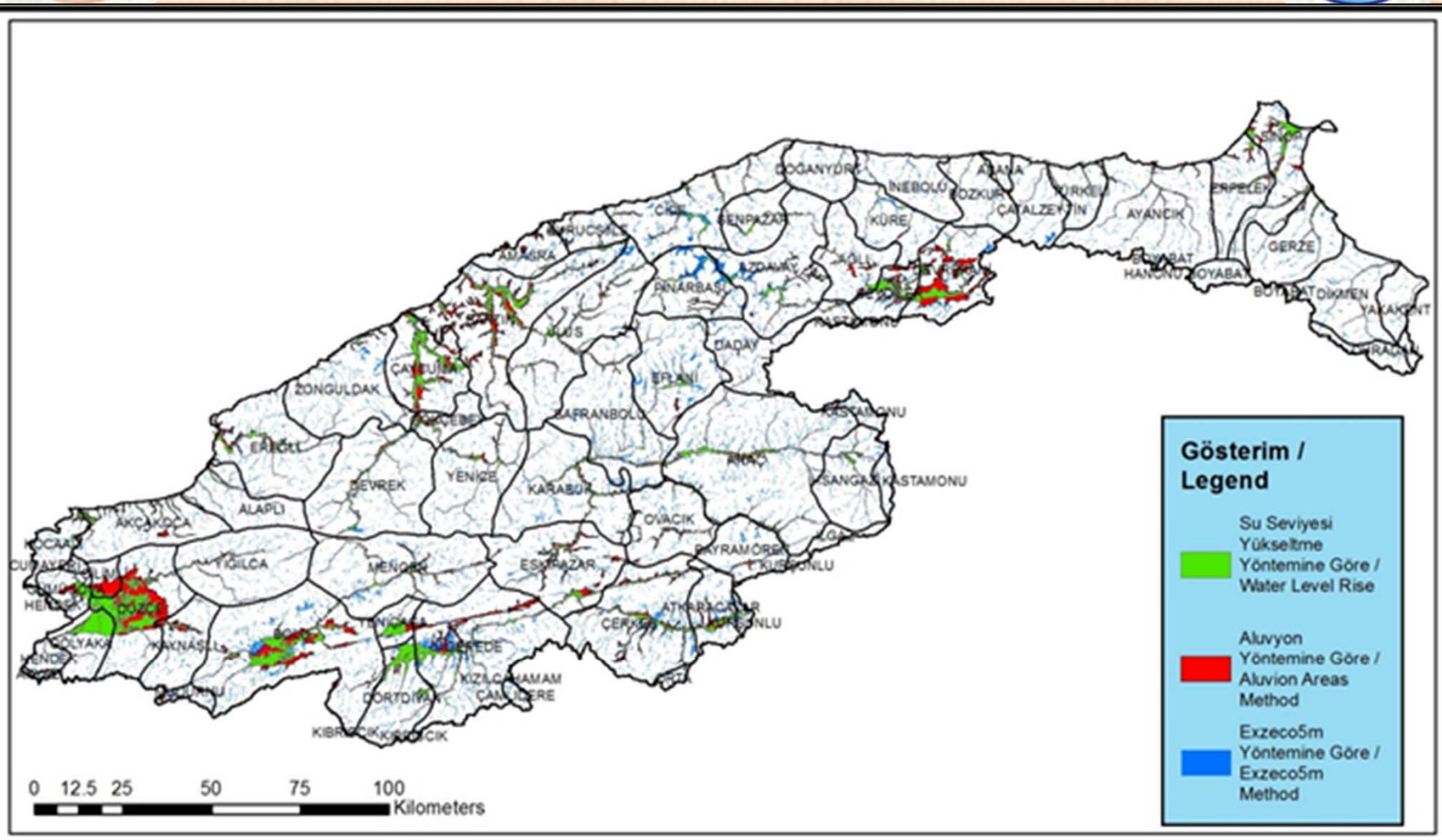

FARKLI YÖNTEMLERİN KARŞILAŞTIRILMASI

COMPARING OF DIFFERENT METHODS

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ
GENERAL DIRECTORATE OF WATER MANAGEMENT
Çizen - Drawn By: F.GİRAYHAN
Tarih-Date: 06/2013

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Negative Effects of Possible Future Floods (Settlement Area)

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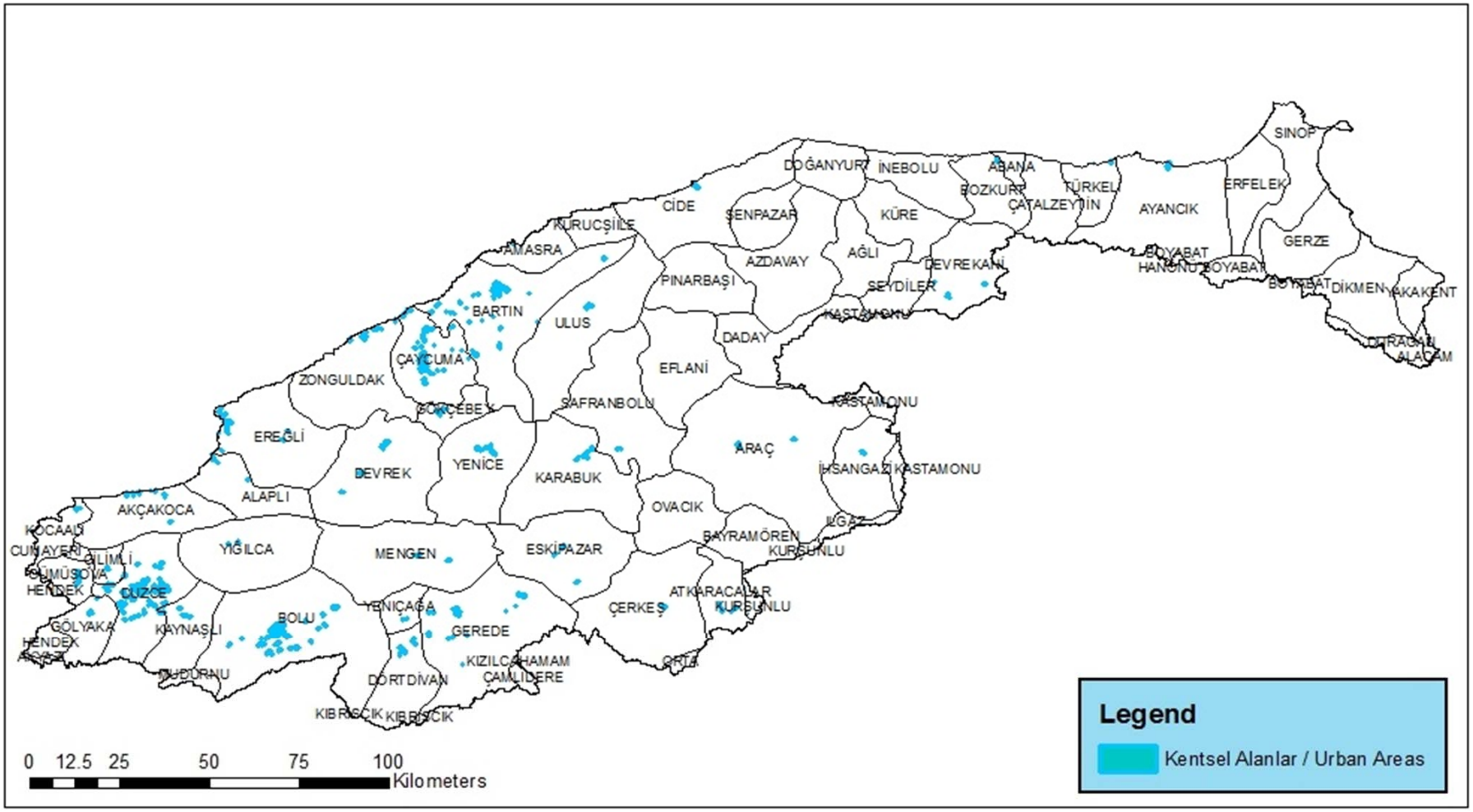

MUHTEMEL TAŞKIN ALANLARINDA KALMASI BEKLENEN KENTSEL NUFUS ALANLARI

POPULATION UNDER FUTURE FLOOD RISK

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ
GENERAL DIRECTORATE OF WATER MANAGEMENT

Çizen - Drawn By : F.GİRAYHAN

Tarih-Date: 08/2013

Negative Effects of Possible Future Floods (Settlement Area)

Table

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FID	Shape *	ILCELER_ID	PLATE_NO	CITY	NAME	TOTAL_POP	URBAN_POP	RURAL_POP	KZ_KOD	DSI_BOLGE	NO	YER_ADI	YUZOLCUM	YOG2000	Shape_Leng	Shape_Area	AREA1
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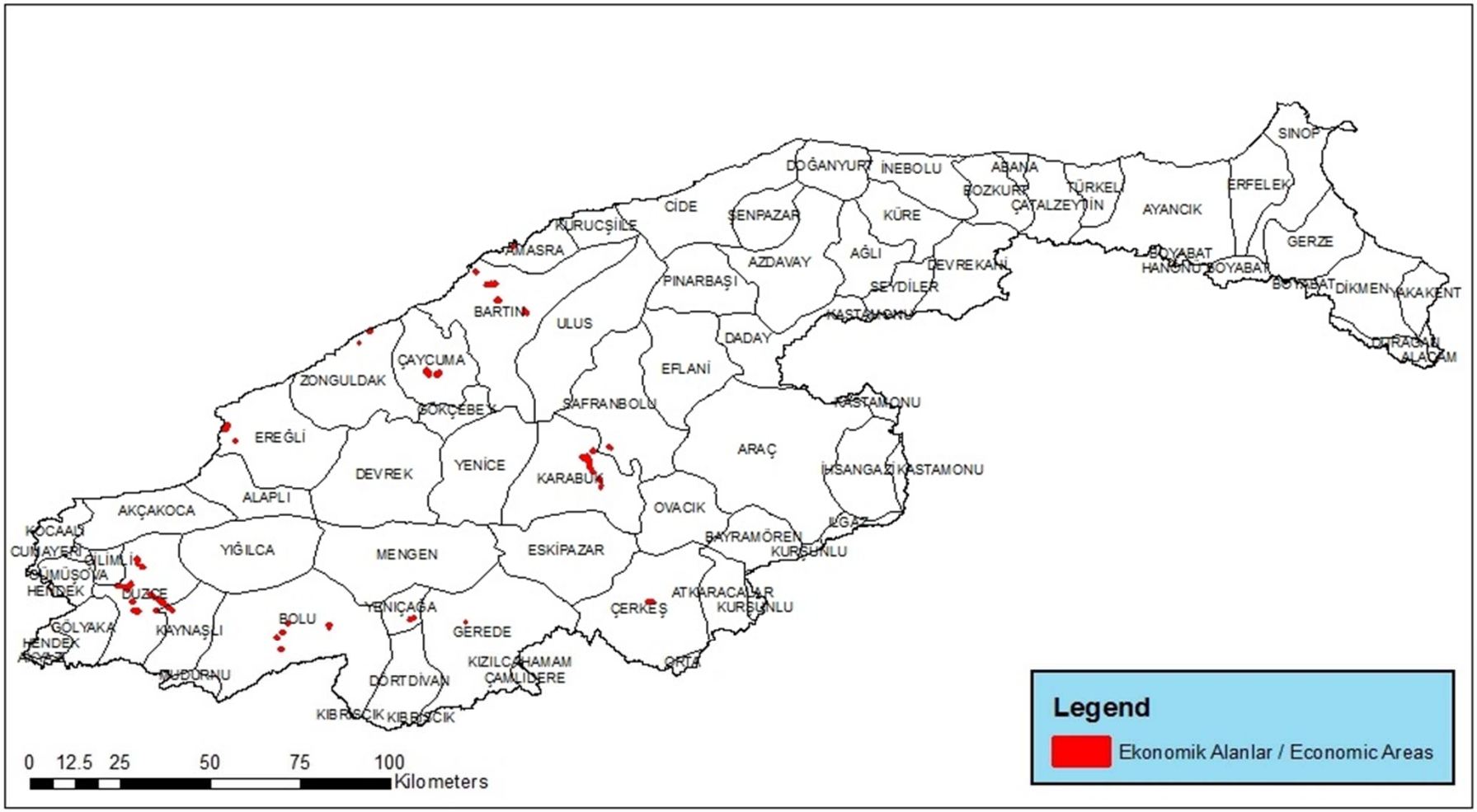
Negative Effects of Possible Future Floods (Economic Activity)



MUHTEMEL TAŞKIN ALANLARINDA KALMASI BEKLENEN EKONOMIK TESİSLER

ECONOMIC AREAS UNDER FLOOD RISK

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ
GENERAL DIRECTORATE OF WATER MANAGEMENT
Çizen - Drawn By : F.GİRAYHAN
Tarih-Date: 08/2013

Negative Effects of Possible Future Floods (Economic Activity)

Table

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FID	Shape *	ILCELER_ID	PLATE_NO	CITY	NAME	RURAL_POP	KZ_KOD	DSI_BOLGE	DSI_SUBE	OID	IL_KOD	KZ_KOD_1	YER_ADI	YUZOLCUM	Shape_Leng	Shape_Area	area
12	Polygon	816	81	DUZCE	MERKEZ	93719	8100	5	53	923	81	8100	Merkez	736	132221.884585	617595148.126	599.377777
9	Polygon	795	78	KARABUK	MERKEZ	14680	7800	23	232	906	78	7800	Merkez	760	143995.171185	802121737.603	374.292889
5	Polygon	737	67	ZONGULD	EREĞLİ	81045	6704	23	232	846	67	6704	Ereşli	972	127611.001394	718117421.724	216.40032
8	Polygon	779	74	BARTIN	MERKEZ	98313	7400	23	232	886	74	7400	Merkez	1027	213490.026949	1049749971.63	201.067691
4	Polygon	735	67	ZONGULD	ÇAYCUMA	85897	6702	23	232	844	67	6702	€aycuma	392	100867.821021	480270492.29	192.096571
1	Polygon	143	14	BOLU	MERKEZ	49975	1400	5	53	163	14	1400	Merkez	1524	170978.715678	1584776301.05	179.726637
11	Polygon	815	81	DUZCE	KAYNAŞLI	0	8106	5	53	929	81	8106	KaynaŸl	205	84256.476301	340739097.439	73.29889
3	Polygon	183	18	CANKIRI	ÇERKEŞ	14266	1803	5	52	216	18	1803	€erkeŸ	986	141435.007697	982795793.945	63.92129
6	Polygon	739	67	ZONGULD	MERKEZ	112532	6700	23	232	842	67	6700	Merkez	631	125857.005344	690949338.678	34.102345
7	Polygon	777	74	BARTIN	AMASRA	10353	7401	23	232	887	74	7401	Amasra	179	73833.699813	229463823.249	23.211155
2	Polygon	146	14	BOLU	YENIÇAĞA	4296	1408	5	53	171	14	1408	Yeni‡a§a	128	46517.797871	127521431.092	21.037614
10	Polygon	797	78	KARABUK	SAFRANBOL	13820	7804	23	232	910	78	7804	Safranbolu	1000	154257.983423	799472810.911	12.287146
0	Polygon	139	14	BOLU	GEREDE	16737	1402	5	53	165	14	1402	Gerede	1260	168638.610816	1325287256.02	0.517172

10 (6 out of 13 Selected)

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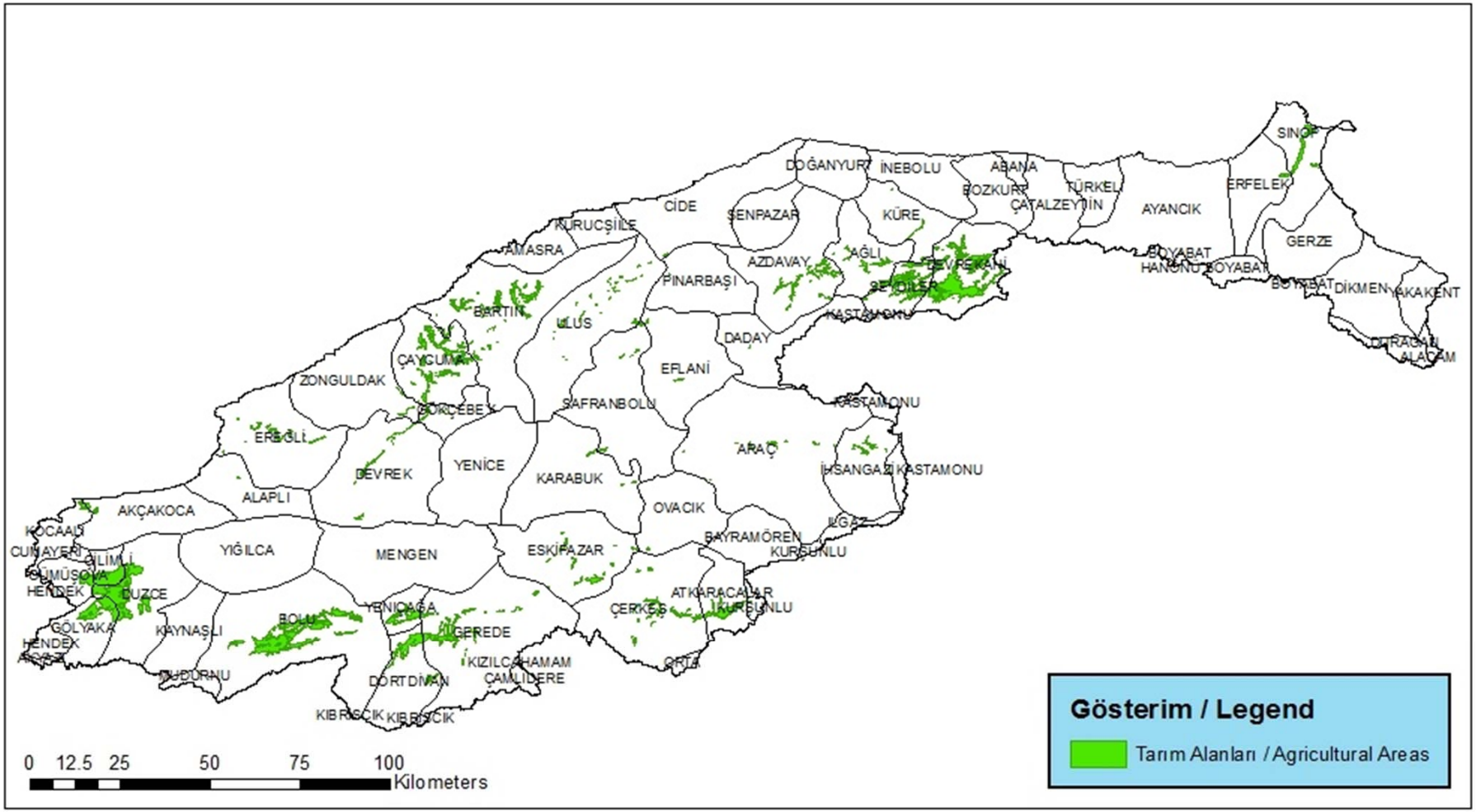
T.C.
Orman ve Su İşleri
Bakanlığı

Negative Effects of Possible Future Floods (Agriculture)

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ



MUHTEMEL TAŞKIN ALANLARINDA KALMASI BEKLENEN TARIM ALANLARI

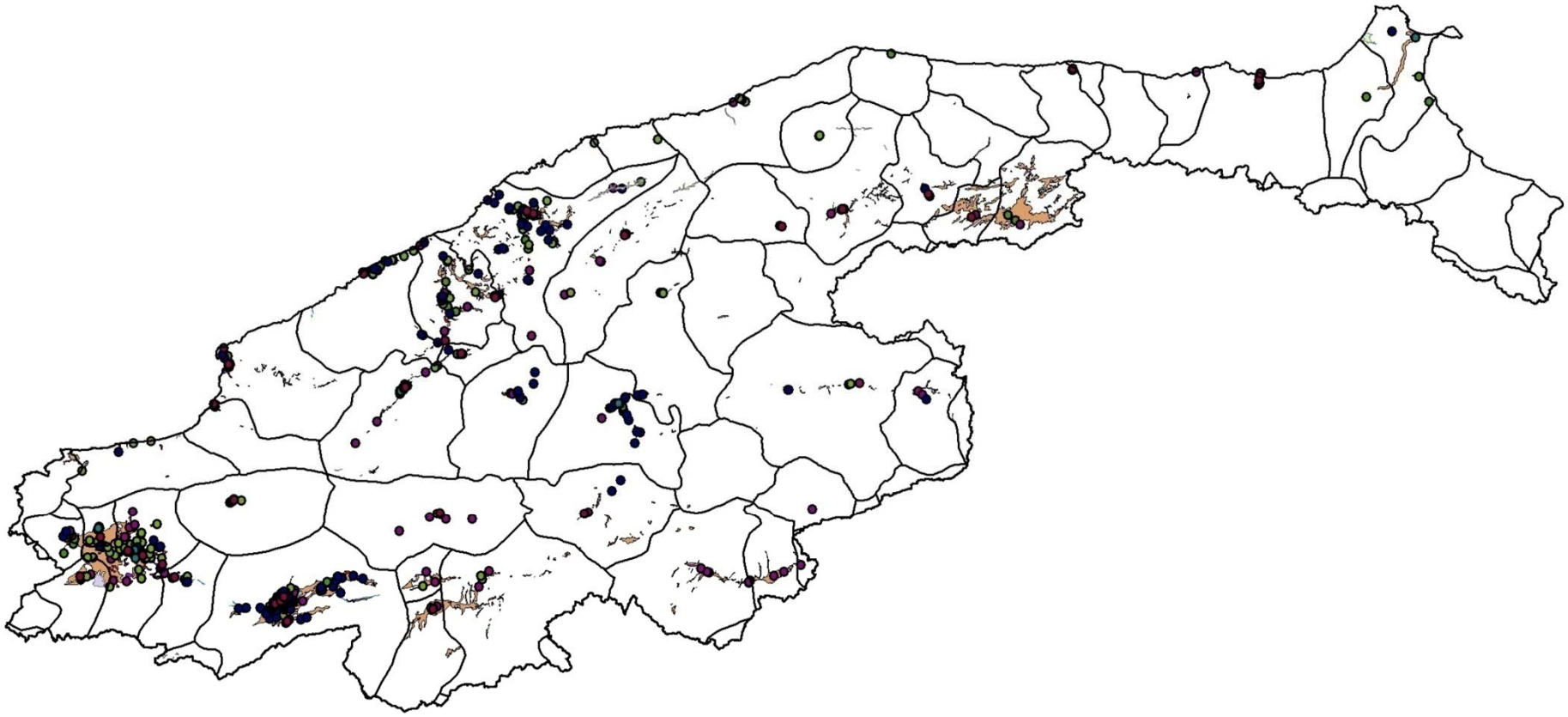
AGRICULTURAL AREAS UNDER FLOOD RISK

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ
GENERAL DIRECTORATE OF WATER MANAGEMENT
Çizen - Drawn By: F.GİRAYHAN
Tarih-Date: 08/2013

T.C.
Orman ve Su İşleri
Bakanlığı

Areas with Potential Significant Flood Risk (Art. 5)

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ



Negative Effects of Possible Future Floods (Agriculture)

Table

agr_aluv_clip

FID	Shape *	ILCELER_ID	PLATE_NO	CITY	NAME	TOTAL_POP	URBAN_POP	RURAL_POP	KZ_KOD	DSI_BOLGE	KZ_KOD_1	YER_ADI	YUZOLCUM	Shape_Leng	Shape_Area	Area
3	Polygon	143	14	BOLU	MERKEZ	125773	75798	49975	1400	5	1400	Merkez	1524	170978.715678	1584776301.05	8995.439218
13	Polygon	412	37	KASTAMO	DEVREKANİ	14338	4930	9408	3709	23	3709	Devrekani	599	105940.591972	665050267.877	8665.042736
40	Polygon	816	81	DUZCE	MERKEZ	170619	76900	93719	8100	5	8100	Merkez	736	132221.884585	617595148.126	6953.890858
18	Polygon	421	37	KASTAMO	SEYDİLER	5270	3230	2040	3716	23	3716	Seydiler	222	65168.883534	205576421.901	3621.818147
24	Polygon	735	67	ZONGULD	ÇAYCUMA	105037	19140	85897	6702	23	6702	€aycuma	392	100867.821021	480270492.29	3340.189196
38	Polygon	813	81	DUZCE	GÖLYAKA	18155	5267	12888	8104	5	8104	G°lyaka	222	69888.520768	253787176.787	3159.65347
37	Polygon	811	81	DUZCE	ÇİLİMLİ	14871	3961	10910	8103	5	8103	€ilimli	100	40140.058597	84834989.4521	3130.000557
29	Polygon	779	74	BARTIN	MERKEZ	133054	34741	98313	7400	23	7400	Merkez	1027	213490.026949	1049749971.63	2799.457085
1	Polygon	139	14	BOLU	GEREDE	45057	28320	16737	1402	5	1402	Gerede	1260	168638.610816	1325287256.02	2566.116616
0	Polygon	138	14	BOLU	DÖRTDİVAN	10169	3043	7126	1401	5	1401	D°rtdivan	384	87769.03575	394156761.05	2422.282506
21	Polygon	633	57	SINOP	MERKEZ	47688	28574	19114	5700	7	5700	Merkez	439	158551.251111	455301205.722	1457.018134
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4	Polygon	146	14	BOLU	YENİÇAĞA	10249	5953	4296	1408	5	1408	Yeni‡aşa	128	46517.797871	127521431.092	1325.081701
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32	Polygon	794	78	KARABUK	ESKİPAZAR	18873	9937	8936	7802	5	7802	Eskipazar	740	118049.671542	721684651.647	787.882509
26	Polygon	737	67	ZONGULD	EREĞLİ	155123	74078	81045	6704	23	6704	Ereğli	972	127611.001394	718117421.724	416.642056
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30	Polygon	780	74	BARTIN	ULUS	32246	3507	28739	7403	23	7403	Ulus	707	149988.555026	873266127.834	345.233927
19	Polygon	605	54	SAKARYA	KOCAALİ	28205	13464	14741	5409	3	5409	Kocaali	315	75300.020491	281390286.322	267.054748
35	Polygon	797	78	KARABUK	SAFRANBOLU	45970	32150	13820	7804	23	7804	Safranbolu	1000	154257.983423	799472810.911	207.809496
9	Polygon	406	37	KASTAMO	ARAÇ	25534	5146	20388	3703	23	3703	Ara‡	1642	178988.987453	1538247220.84	191.709855
20	Polygon	631	57	SINOP	ERFELEK	13816	4072	9744	5705	7	5705	Erfelek	340	88703.409511	359691981.935	190.141039
15	Polygon	417	37	KASTAMO	KÜRE	11015	4291	6724	3714	23	3714	Kre	541	93710.479582	353847712.593	178.853922
36	Polygon	810	81	DUZCE	AKÇAKOCA	36972	19604	17368	8101	5	8101	Ak‡akoca	440	112888.680304	496531833.478	173.787606
27	Polygon	738	67	ZONGULD	GÖKÇEBEY	27339	7414	19925	6705	23	6705	G°k‡ebey	189	65054.052699	162344434.498	171.743099
33	Polygon	795	78	KARABUK	MERKEZ	117408	102728	14680	7800	23	7800	Merkez	760	143995.171185	802121737.603	126.369656
31	Polygon	793	78	KARABUK	EFLANİ	13027	2929	10098	7801	23	7801	Eflani	587	112587.834999	624981059.885	99.434327
28	Polygon	739	67	ZONGULD	MERKEZ	219274	106742	112532	6700	23	6700	Merkez	631	125857.005344	690949338.678	75.213162
34	Polygon	796	78	KARABUK	OVACIK	5027	1198	3829	7803	5	7803	Ovack	402	87786.722328	449132335.013	32.522149
22	Polygon	635	57	SINOP	TÜRKELİ	17352	5200	12152	5708	7	5708	Trkeli	236	65064.319013	205387024.094	27.064832
16	Polygon	418	37	KASTAMO	MERKEZ	95715	57681	38034	3700	23	3700	Merkez	1829	206086.441031	1859088588.5	22.069555
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23	Polygon	734	67	ZONGULD	ALAPLI	44012	15988	28024	6701	23	6701	Alapl	185	96460.642424	358943777.506	10.331533
7	Polygon	188	18	CANKIRI	KURŞUNLU	16198	4191	12007	1808	5	1808	KurŸunlu	477	113581.187255	439731129.205	8.253109
17	Polygon	419	37	KASTAMO	PINARBAŞI	38575	12903	25672	3715	23	3715	PnarbaŸ	513	90384.639042	443499667.041	4.68679
2	Polygon	142	14	BOLU	MENGEN	16311	4920	11391	1405	5	1405	Mengen	828	140970.499156	919870253.667	0.904299

5 (0 out of 41 Selected)

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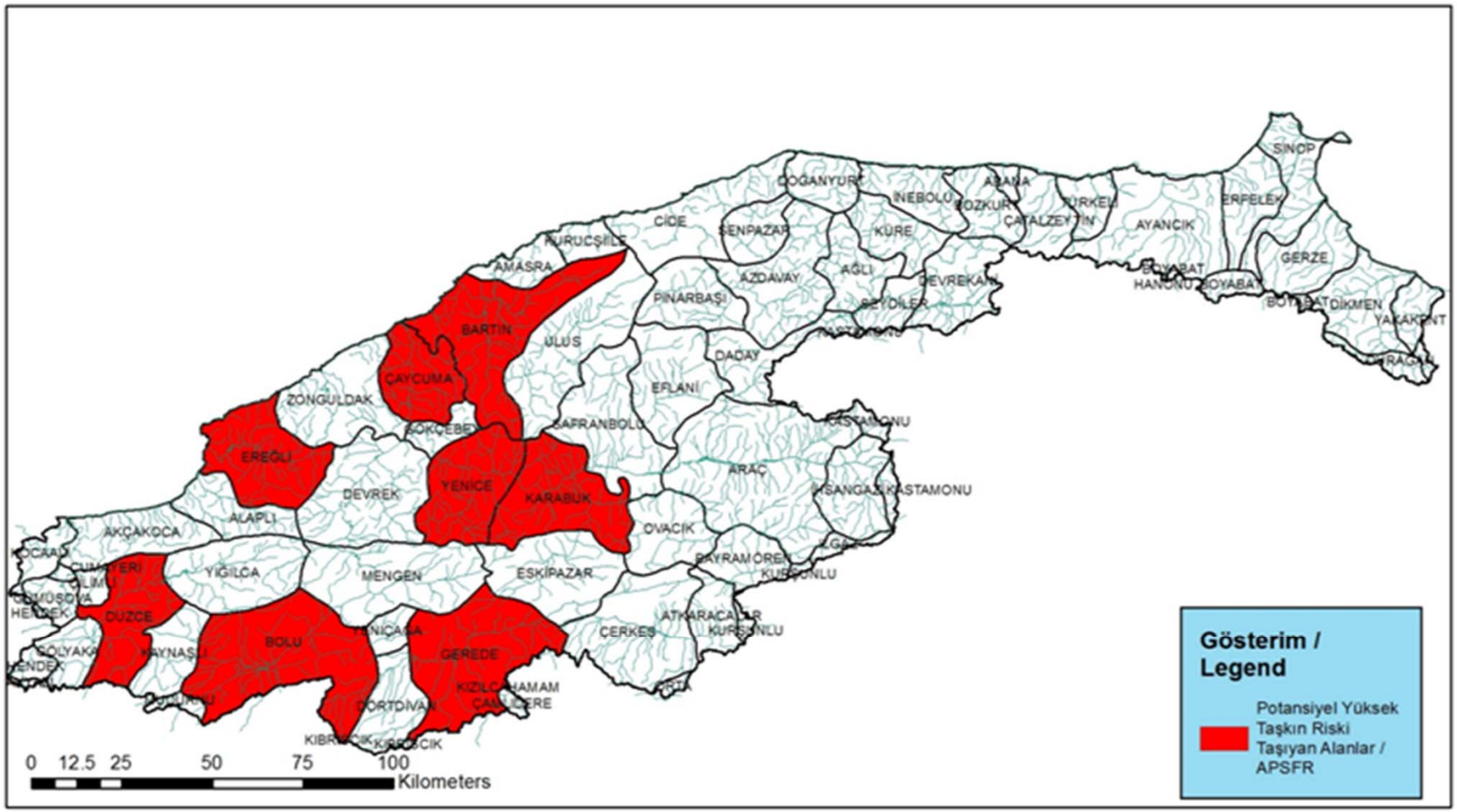
Areas With Potential Significant Flood risk (Agriculture)

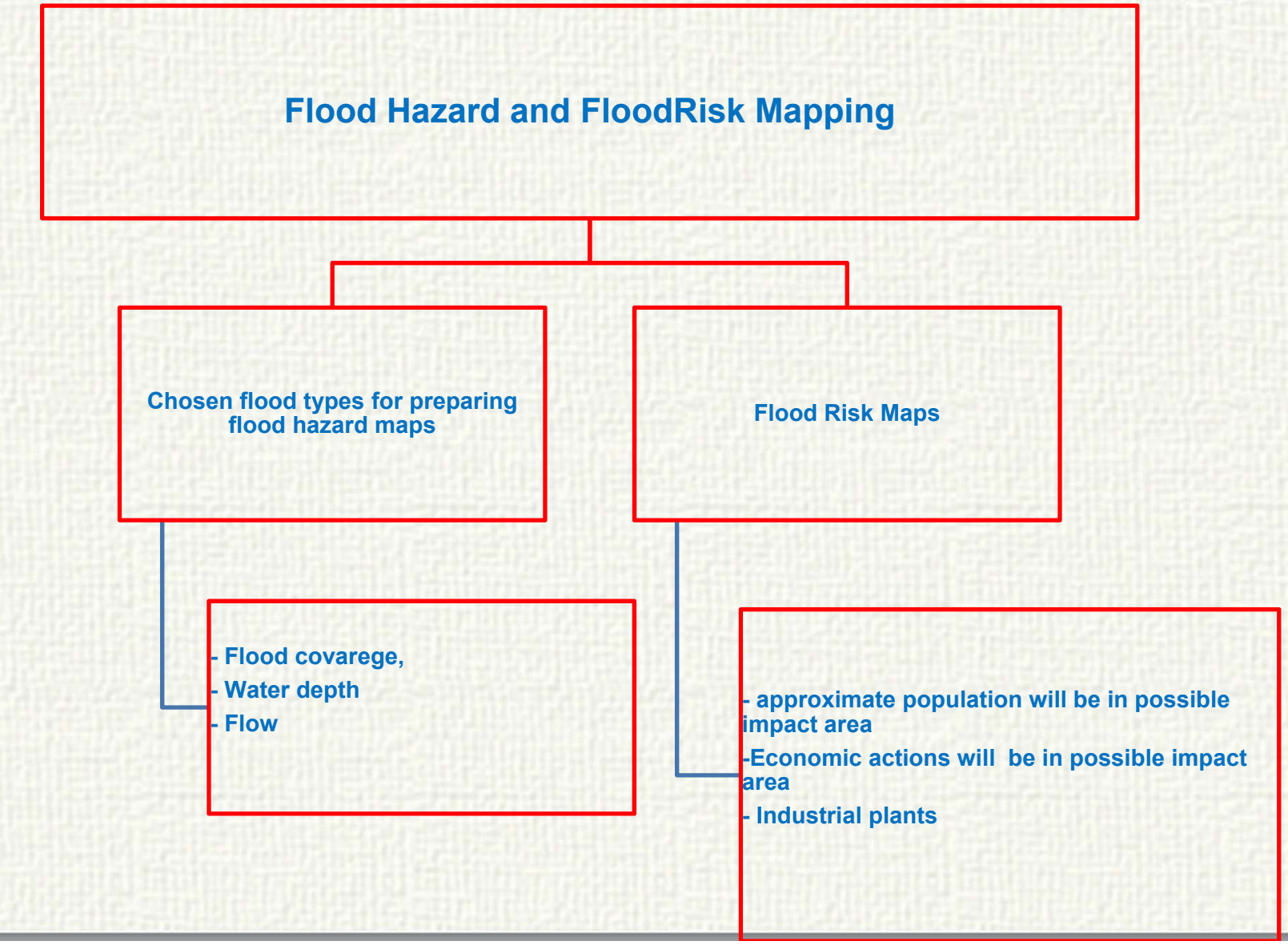


POTANSİYEL YÜKSEK TAŞKIN RİSKİ TAŞIYAN ALANLAR

AREAS OF POTENTIAL SIGNIFICANT FLOOD RISK

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ
GENERAL DIRECTORATE OF WATER MANAGEMENT
Çizen - Drawn By: F.GİRAYHAN
Tarih-Date: 06/2013

Component 2: Implementation of the Floods Directive in the Pilot Basin (Batıkaradeniz)



Flood Hazard Maps
-Methodology-

- Depending on the availability and quality of the data, central district of Bartın and Çaycuma district of Zonguldak have been chosen for mapping.

Hydrological Data :

Flood flows taken from related hydrology reports, which were provided by DSİ, have been used.

Flood Hazard Maps
-Methodology-

Topographic Data:

- ***for Bartın River*** :
- Detailed bathymery map (taken by sonar) in riverbed
- **1/1000** scale strip map at the left and right bank of river.
- **1/25000** scale elevation lines map out of the river

- ***for Çaycuma Creek*** : **1/1000** scale settlement plan taken from municipality.

Flood Hazard Maps
-Methodology-

Digital Elevation Model (DEM):

- TIN (Triangulated Irregular Network) created using the integrated topographic maps through GIS (ArcGIS)
- Riverbed and cross-sections defined with HEC-GeoRAS interface on DEM (created TIN) and transferred to HEC-RAS program.

Hydraulic Modelling

- Limit conditions determined for upstream and downstream
- Defined roughness coefficients for riverbed and banks are inserted in the program
- Hydraulic structures, which may effect the regime, such as bridges are inserted in the program

Flood Hazard Maps
-Methodology-

Calibration:

- Roughness coefficients are calibrated according to the flood marks.
- Sensitivity analysis has been performed by changing upstream and downstream conditions and analyzing the effect on water surface profile.

Evaluation of Flood Hazard Maps

- Flood Extensions and water depths in these areas (for selected return periods) have been defined by HEC-RAS, transferred to GIS through HEC-GeoRAS interface and shown on 1:25.000 scale map

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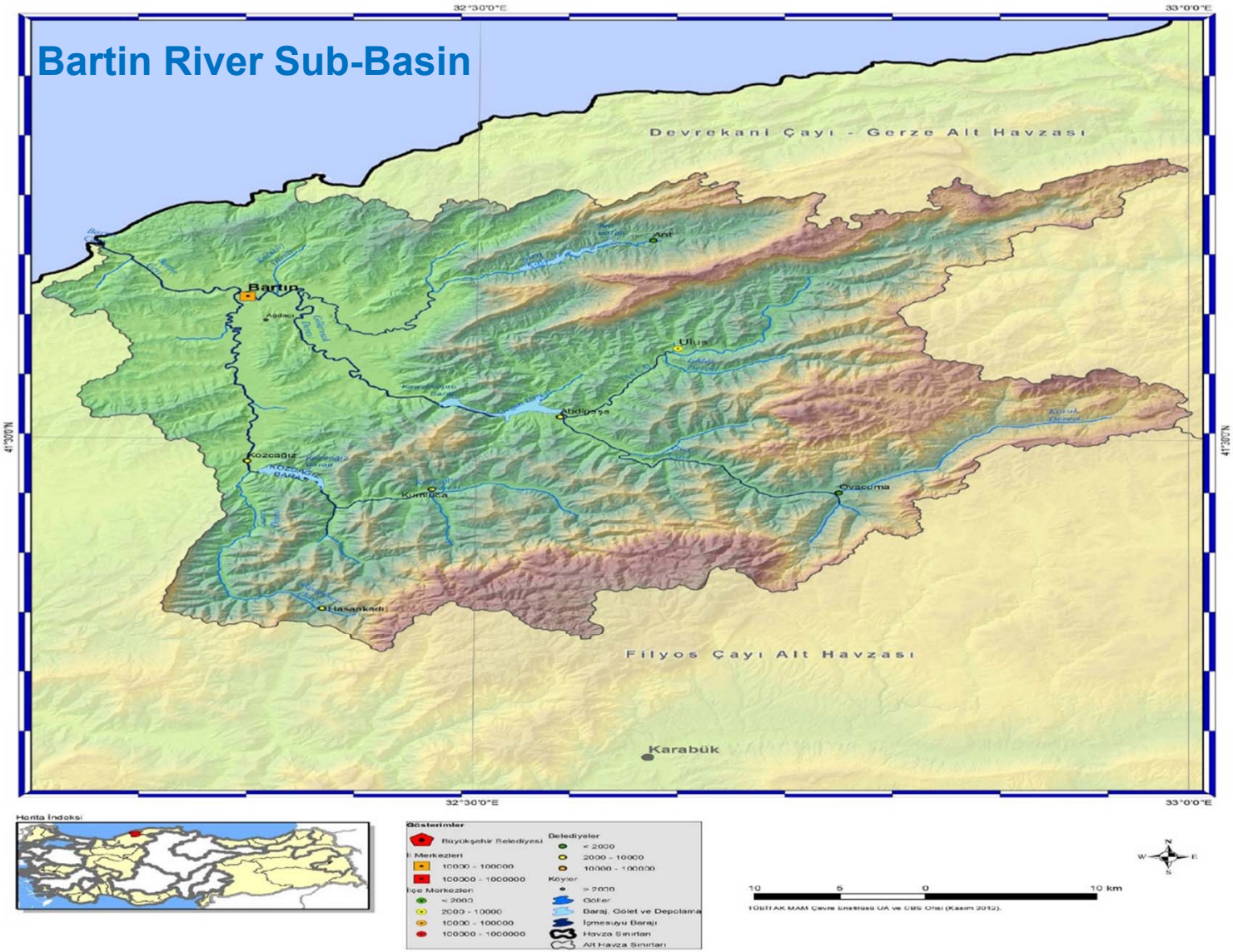
Flood Hazard Maps

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ

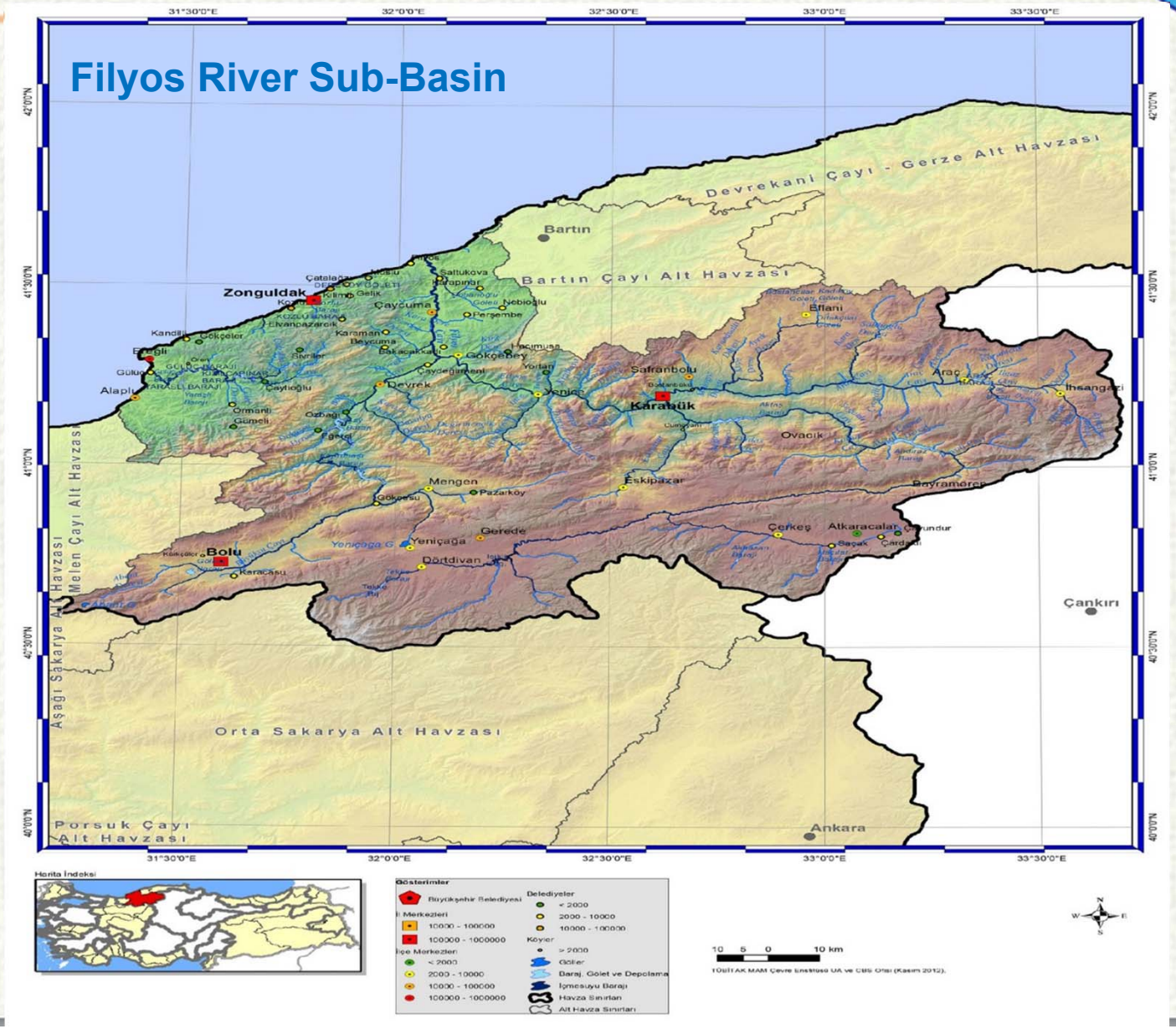


Türkiye

T.C.
Orman ve Su İşleri
Bakanlığı

Flood Hazard Maps

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ



Türkiye

Flood Risk Maps
-Methodology-

Corine landcover layer including attributes intersected with flood hazard maps for return periods Q_{10},Q_{100} ve Q_{1000}

Corine landcover has been reclassified.

Together with reclassified Corine Lancover and Flood Hazard Maps , risk classes have been defined and a new layer created.

Flood Risk Maps
-Methodology-

(0.5 m), (0.5 m -2.0 m) and (>2.0 m) water depths have been taken into consideration in classification and 3 groups created.

Same procedure have been applied to 3 return periods (Q_{10},Q_{100},Q_{1000}).

Results have been intersected with different indicators/stakes in GIS and indicators under risk have been calculated.

Component 2: Implementation of the Floods Directive in the Pilot Basin (Batıkaradeniz)

Flood Risk Management Plans

Measures to prevent possible adverse effects

- Population
- Economic Activity

Important Points;
- Cost-benefit analysis
- Flood Coverage and Flood transport routes
- Posible Flood Retention Areas
- Environmental factors
- Management of soil and water resource s
- Nature protection and land use

Target;
- Preventation,protection and preparation
- Flood forecasting and early warning
- Sustainable land use
- Improvement of water retention structures
- Controlled floods in certain areas

OTHER STUDIES RELATED TO FLOOD DIRECTIVE

Within the scope of those projects;

- Preliminary Flood risk assesment will be performed at Basin Scale
- Hydrological Assesmet Report will be prepared
- Flood Hazard and Flood risk Maps will be prepared
- Flood Risk Management Plan (which includes the planning and steering of the studies and works which will be performed before, during and after floods) will be prepared.
- Flood database will be created.

"Flood Management Plan Preparation" Projects for Yeşilırmak and Antalya Basins

T.C.
Orman ve Su İşleri
Bakanlığı

MINISTRY OF FORESTRY AND WATER AFFAIRS
Directorate General for Water Management

SU YÖNETİMİ GENEL MÜDÜRLÜĞÜ

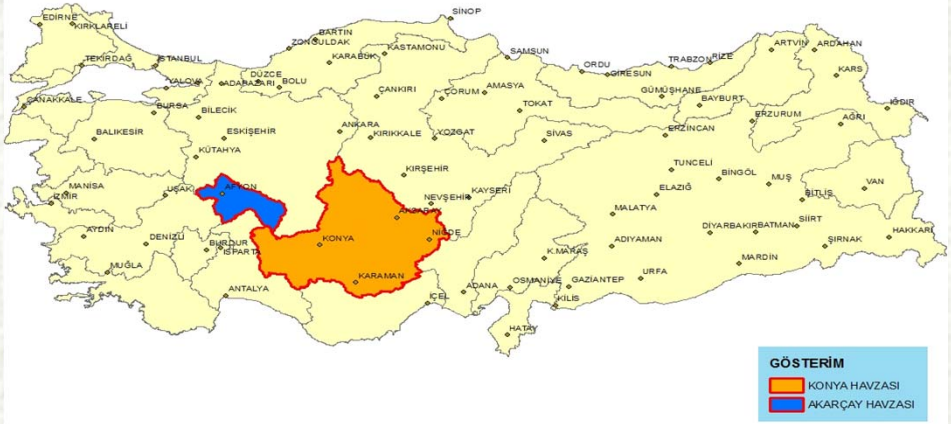
Short Information Related to Other Projects of Flood and Drought Management Department

Konya ve Akarçay Havzası Kuraklık Yönetim Planlarının Hazırlanması Projesi

Within the scope of the project;

- Determination of drought indices, indicators and threshold values.
- Havzadaki Su Potansiyeli ve Su Potansiyelindeki Değişim Tespit Edilecektir.
- Conducting sectoral impact analysis.
- Preparation of drought maps.
- Determination of the measures to be taken in order to reduce the effects of drought and water scarcity.
- Establishing the Drought Database of the basin.

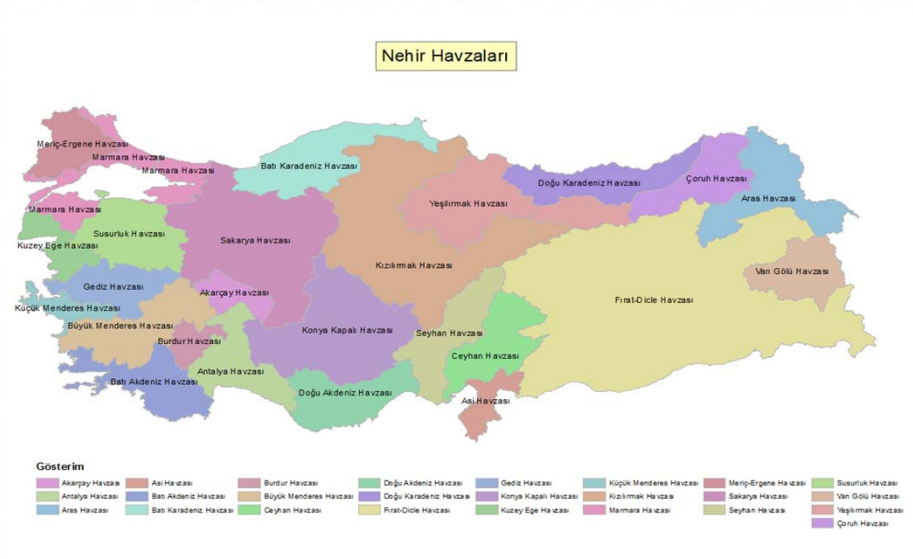
Konya and Akarçay Basins



Project on Impacts of Climate Change on Water Resources

Scope of the project: 25 Basins in Turkey

- Preparation of climate change projections
- Determination of the changes in surface and ground water levels
- Modelling of water potential/budget
- For three basins, conducting sectoral impact analysis (for municipal water, agriculture, industry and ecosystem) in terms of the effects of climate change on water resources and studies for adaptation activities
- Creation of Climate Database and web applicaiton



THANK YOU

Directorate General for Water Management
Flood and Drought Management Department

Işıl SAKIN (Dep. Expert)
isakin@ormansu.gov.tr