

TABLE G.4.1 SELECTION OF PRIORITY TOWNS AND PRIORITY ORDER

Region	Catchment	Town	Population in 1992	Population in 2015	Town Load in 1992 (kgBOD/d)				Total Poll Load in Town	Domestic Pollution Load in 2015 (kgBOD/d)	Priority Order*1			
					Domestic Wastewater						1st	2nd	3rd	
					Sewered		Non-Sewered	Total						
Non-treated water	Treated water													
Prioritized Region	Maritza	Up stream	MU2-2 Pazardjik	90286	108343	3933		109	4042	6658	5851	X		
			MM1-9 Plovdiv	344336	378770	16734	15061	465	2138	5127	3887	X		
			CPE-1 Assenovgrad	52360	57596	2827			2827	3248	3110	X		
			MM1-12 Stambolyski Kaloyanovo - Village	13155	14471	426		71	497	2297	781		X	
		MM1-2 STA Peshtera	2812	3374	38			38	38	182			X	
		STA Batak	18900	20790	510	459	128	179	271	617			X	
		STA Bratzigovo	4468	4915	96		36	133	145	265			X	
		STA	5022	5524	54		54	108	115	298			X	
	Mid-stream	MM3-9 Dimitrovgrad	50977	61172	2753			2753	4581	3303	X			
		MM2-15 Sadovo*2	2647	2912	143			143	9759	157		X		
		MM2-13 Parvomay	16690	18359	542		90	632	1403	991		X		
		MM2-1 Chirpan	19694	23633	957		27	984	1312	1276		X		
	Down stream	MM3-1 Simeonovgrad	8265	9918	268		45	312	1434	536			X	
		HAR-2 Haskovo	80959	89055	4153		55	4208	4298	4809	X			
		HAR-1 Harmanli	21559	26949	931		58	990	1098	1455		X		
	Saziyka	SAZ-7 Stara Zagora	149666	164633	7435		162	7597	19322	8890	X			
SAZ-6 Radnevo		14203	17044	499		268	767	2643	920		X			
SAZ-4 Galabovo		8473	11368	450		15	465	4581	614		X			
SAZ-6 Nova Zagora		26658	29324	1324	1192	29	161	163	272			X		
Non-Prioritized Region	CPE-2 Lakki	3437	3781	149		9	158	158	204			X		
	CPE-3 Chopelare	6085	6694	66		66	131	131	361			X		
	LUD-3 Strelcha	5063	5569	96		44	140	140	301			X		
	MU1-3 Belovo	5016	5518	190		20	210	627	298			X		
	MU1-8 /MU1-10 Kostenetz /Dolna Banya	15667	19584	731		29	760	760	1058			X		
	STR-3 Sopot/Karlovo	39065	42972	2110			2110	2724	2320			X		
	TOP-2 Ihtiman	12860	14146	694	625		69	69	76			X		
	VAC-1 Perushtitza	5535	6089	90		52	142	142	329			X		
	VAC-1 Kritchin	8875	9763	216		66	282	285	527			X		
	VAC-3 Borino - Village	2884	3172	39		39	39	39	171			X		
	VAC-4 Devin	6141	6755	116		54	170	170	365			X		
	20 Packed Wastewater 4 Module wastewater treatment facilities											X		
Important Spot*3	CPI-3 /CPI-2 Velingrad /Rakitovo*4	58672	64539	2840		82	2922	3479	3485	X				
	STR-1 Hissarya	8959	9855	339	305	36	70	88	197		X			
	LUD-2 Panagurishte	20944	23038	894		59	953	1112	1244		X			
	TOP-3 Pirdop/Zlatitza	14008	15409	756			756	756	832		X			
Other Region			601993	635970	0	0	7712	10487	26278	10653	-	-	-	
Maritza River Basin			1747334	1921000	53360	17640	9880	48374	105451	52610	-	-	-	

*1: Priority Order 1st - Implementation or rehabilitation will be performed in the year of 2000 to 2005

Priority Order 2nd - Implementation or rehabilitation will be performed in the year of 2006 to 2010

Priority Order 3rd - Implementation or rehabilitation will be performed in the year of 2011 to 2015

*2: Pollution reduction is focused on industrial load.

*3: Towns represent important spot such as tourism area (Velingrad, Hissarya) and significant influence by mining industry (Panagurishte, Pirdop/Zlatitza)

*4: Pollution loads represent winter season. In summer, the load becomes a double of winter.

TABLE G.4.2 SELECTION OF PRIORITY ORDER

		Total Load Pollution Load in 1992 (kg/d)		
		0-1000	1000-3000	over 3000
Domestic Load in 2015 (kg/d)	0-600	Kaloyanovo Batak Bratzigovo Nova Zagora	Simionovgrad	Sadovo
	600-1200	Peshtera	Stamboliski Radnevo Parvomay	Galabovo
	over 1200		Chirpan Harmanli	

■ : 1st Priority

▨ : 2nd Priority

□ : 3rd Priority

TABLE G.4.3 BASIC ALTERNATIVES FOR POLLUTION REDUCTION

Alt	BOD									TN	
	Domestic				Other	Industry			Livestock		2 Fertilizer Industries
	Priority Order			Most Loaded Industry		Farm	Other				
	1st	2nd	3rd		1 - 10			11 - 20	other		
Alt 1	90	90	90	0	30	0	0	0	0	0	
Alt 2	90	90	30	0	30	30	0	30	0	90	
Alt 3	90	30	30	0	90	30	0	30	30	90	

TABLE G.1.2. SELECTION OF PRIORITY OBJECTS

Priority	Type of Project	Top Priority (relative priority) objects		
		1st Priority	2nd Priority	3rd Priority
1st	over 10000	Blagoevgrad	Chirpan	Pazardjik
	over 5000	Hadzhipovo	Harmanli	Plovdiv
	over 1000	Novi Pazar		Assenovgrad
2nd	over 10000	Plavani	Radnevo	Dimitrograd
	over 5000		Parvomay	Slaskovo
	over 1000			Star Zagora

 1st Priority
 2nd Priority
 3rd Priority

TABLE G.1.3. BASIC ALTERNATIVES FOR POLYMERIZATION

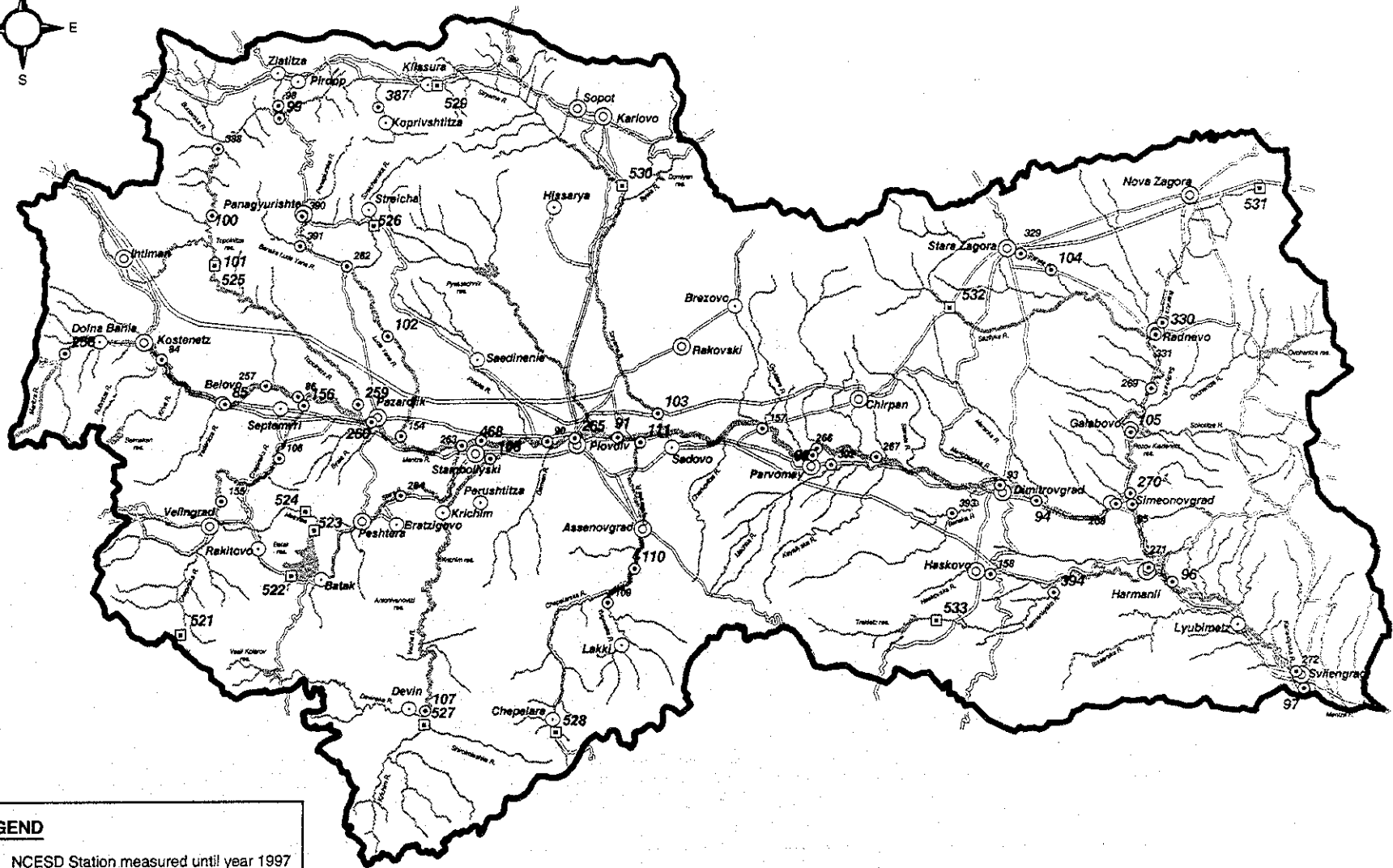
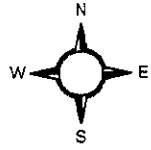
Alt.	Domestic				RDP			
	Priority Order			Cost	Priority Order			Cost
	1st	2nd	3rd		1st	2nd	3rd	
Alt. 1	90	90	90	0	30	30	30	0
Alt. 2	90	90	30	0	0	90	90	0
Alt. 3	90	30	30	0	90	90	30	0

TABLE G.4.4 SUMMARY OF CONSTRUCTION COST OF MUNICIPAL WASTEWATER TREATMENT PLANTS

	Town	Costs (US\$ 1000)			Total cost
		Main collectors	Primary treatment only	Primary and secondary treatment	
1.	1st Stage Towns	18,034	0	103,987	122,021
1-1	Pazardjik with Septemvri	5,854	-	19,924	25,778
1-2	Plovdiv	4,889	-	-	-
1-3	Assenovgrad	115	-	12,047	12,162
1-4	Dimitrovgrad	1,877	-	10,678	12,554
1-5	Haskovo	1,250	-	17,196	18,446
1-6	Stara Zagora	1,650	-	25,533	27,183
1-7	Velingrad/Rakitovo	2,400	-	18,610	21,010
2.	2nd Stage Towns	14,992	21,445	0	36,437
2-1	Stamboliyski	1,200	2,213	-	3,413
2-2	Parvomay	192	3,042	-	3,234
2-3	Chirpan	2,160	3,030	-	5,190
2-4	Harmanli	3,840	3,192	-	7,032
2-5	Radnevo	0	2,435	-	2,435
2-6	Galabovo	7,200	1,688	-	8,888
2-7	Hissarya	0	2,706	-	2,706
2-8	Panagyurishte	400	3,138	-	3,538
3.	3rd Stage Towns	34,270	16,922	4,080	55,272
3-1	Peshtera	960	-	-	960
3-2	Batak	120	848	-	968
3-3	Bratzigovo	960	940	-	1,900
3-4	Simeonovgrad	6,000	1,560	-	7,560
3-5	Nova Zagora	3,360	-	2,900	6,260
3-6	Lakki	1,200	739	-	1,939
3-7	Chepelare	1,690	1,123	-	2,813
3-8	Strelcha	1,400	951	-	2,351
3-9	Belovo	4,800	944	-	5,744
3-10	Kostenetz with Dolna Banya	2,160	1,955	-	4,115
3-11	Sopot with Karlovo	2,500	4,654	-	7,154
3-12	Ihitiman	1,440	-	1,180	2,620
3-13	Perushtitza	720	475	-	1,195
3-14	Krichim	2,400	1,632	-	4,032
3-15	Borino - village	960	-	-	960
3-16	Devin	3,600	1,101	-	4,701
	Total	67,296	38,366	108,068	213,730

TABLE G.4.5 PROPOSED STAGE PROGRAM OF WATER QUALITY MANAGEMENT

Item			Preparation Year 1999-2000	Short Term Year 2001-2005	Mid Term Year 2006-2010	Long Term Year 2011-2015	After Year 2015
Pollution Reduction	BOD	Domestic	1st priority town	-----	-----		
			2nd priority town			-----	
			3rd priority town				-----
		Other			-----	-----	
	Industry	Top 1-10	-----	-----			
		Top 11-20	-----	-----			
		Other			-----	-----	
		Livestock					
	TN	2 Fertilizer Industries			-----		
		Other				-----	
Strengthening of Monitoring System				-----	-----	-----	
Investigation	Sewer system and effluent						
	Industrial effluent		-----				
	Mining waste and wastewater						
	Solid waste						
	Implementation of improvement and management based on above investigation					-----	

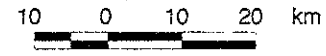


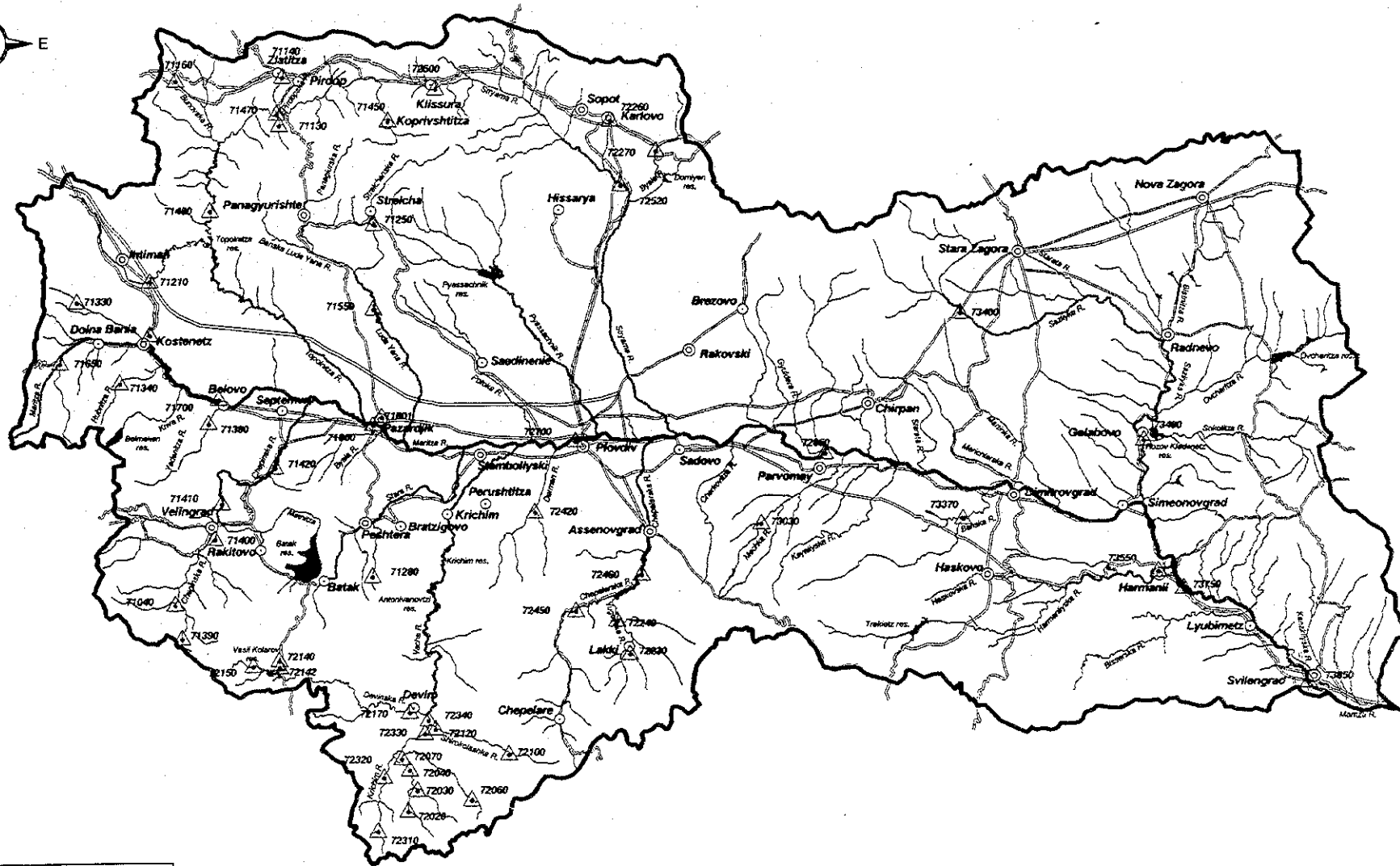
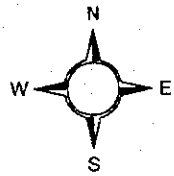
LEGEND

- [●] NCESD Station measured until year 1997
- [—] NCESD Station existed before 1997 and measured now
- ⁵²⁷ New Stations added in 1998

FIG.G.2.1 UPDATED MONITORING SYSTEM OF NCESD

Scale 1 : 1000000

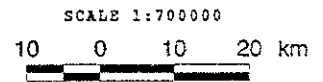


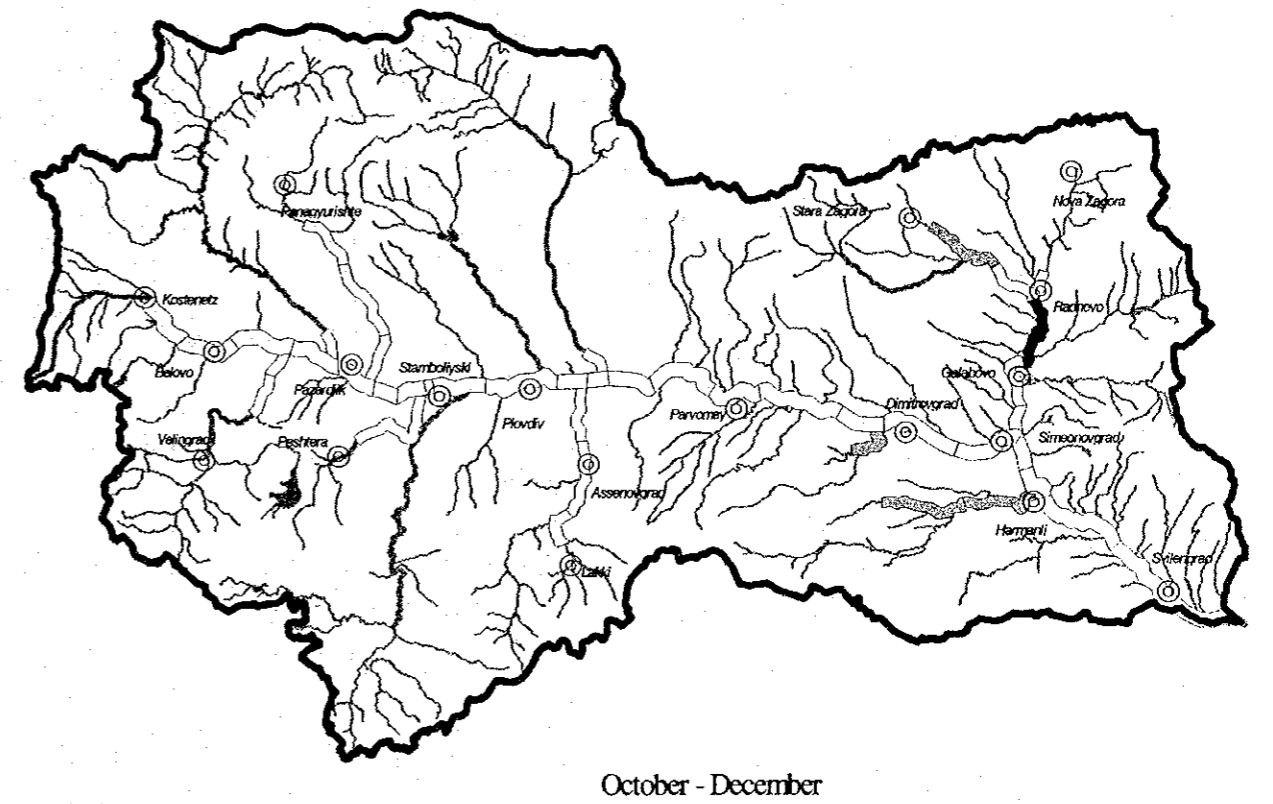
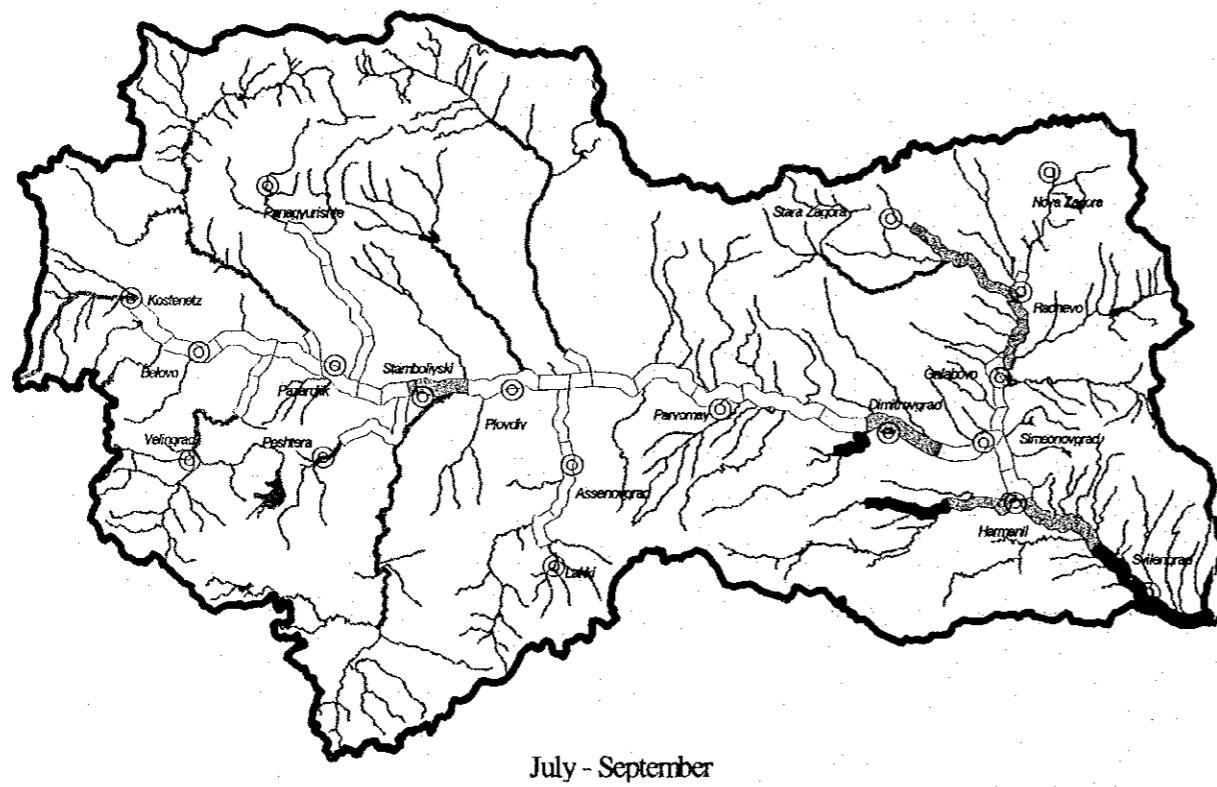
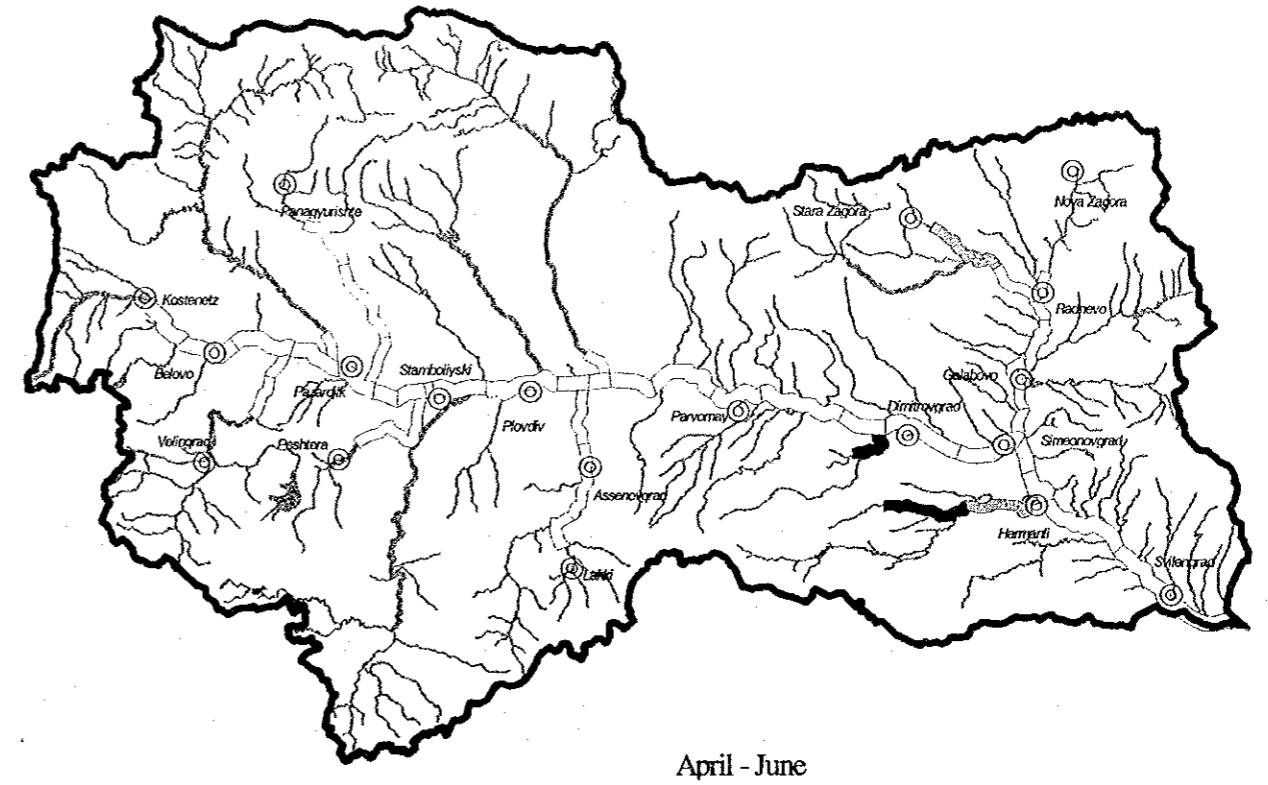
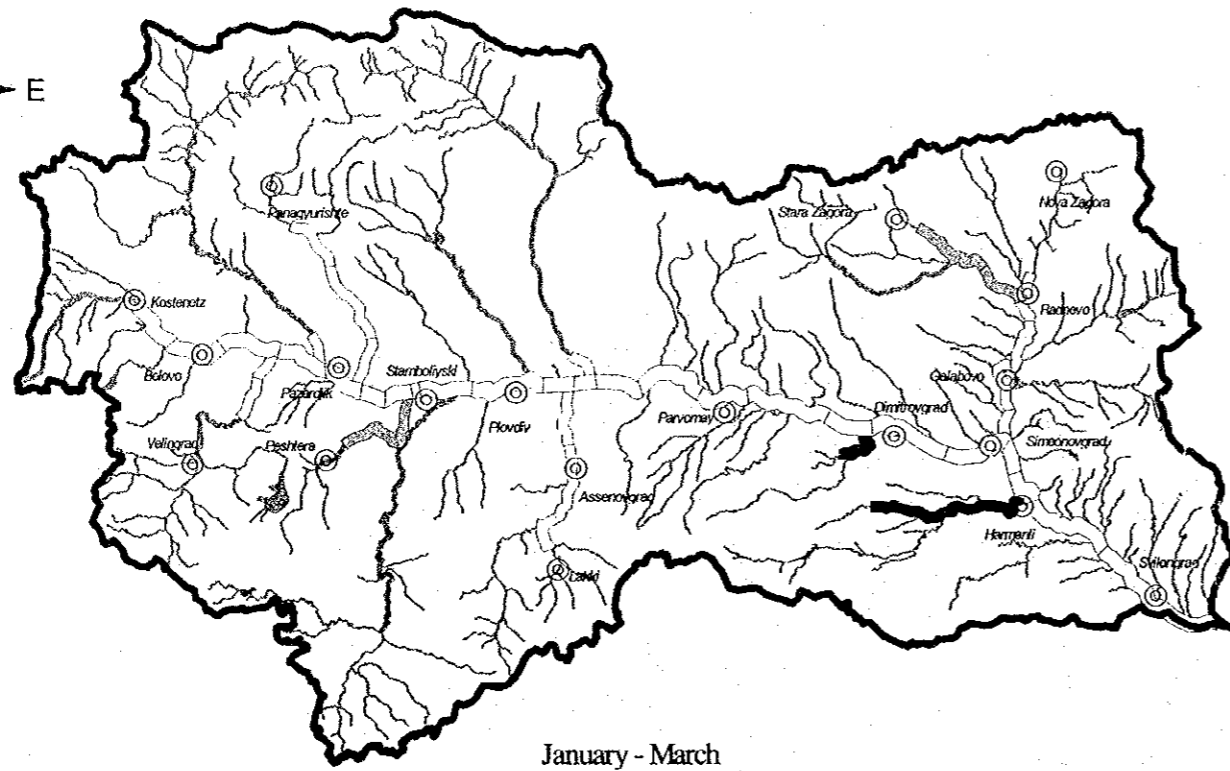
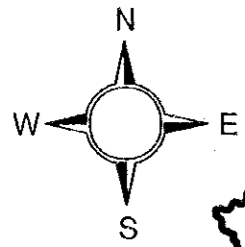


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LEGEND	
	Hydrometric Station
73850	New Code No.

TABLE G.2.2 MONITORING STATION BY NIMH



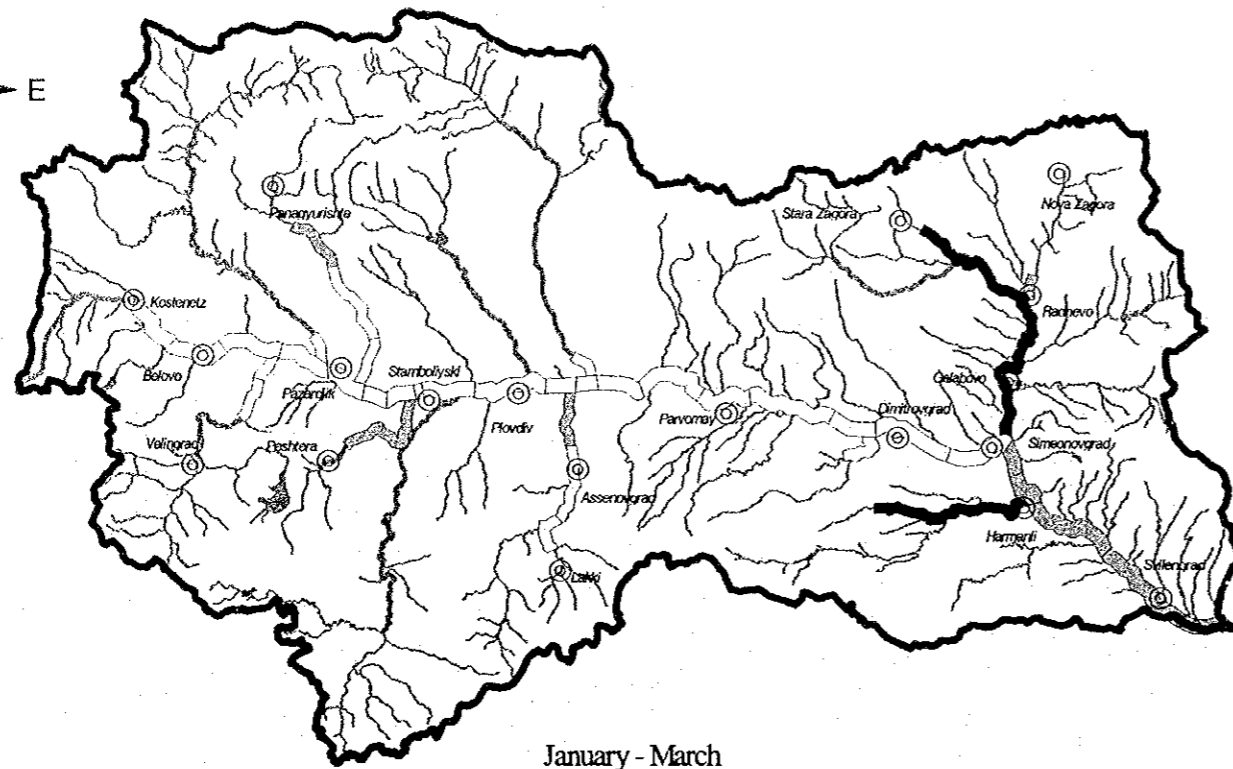
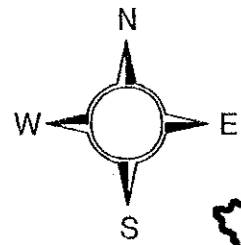


LEGEND

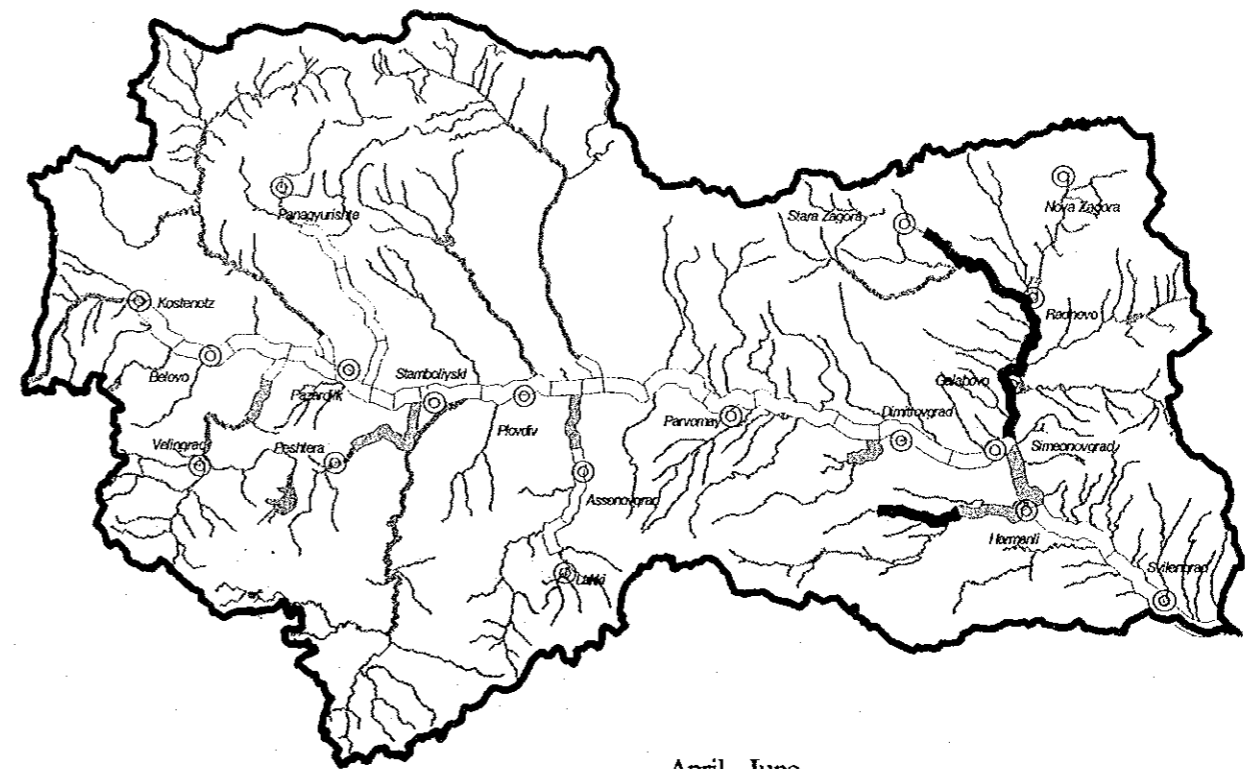
- category I
- category II
- category III
- worse than category III

FIG.G.2.3 SEASONAL WATER QUALITY OF BOD IN 1994 - 1996

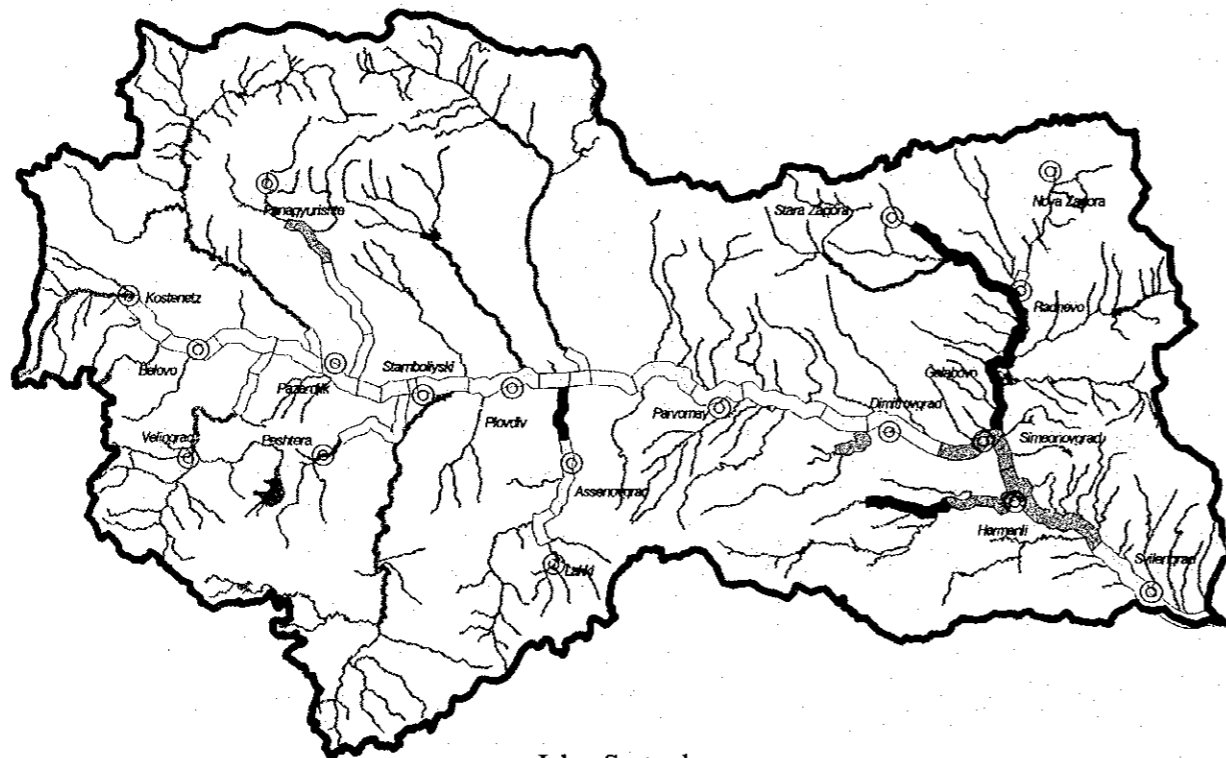
SOURCE : NCESD



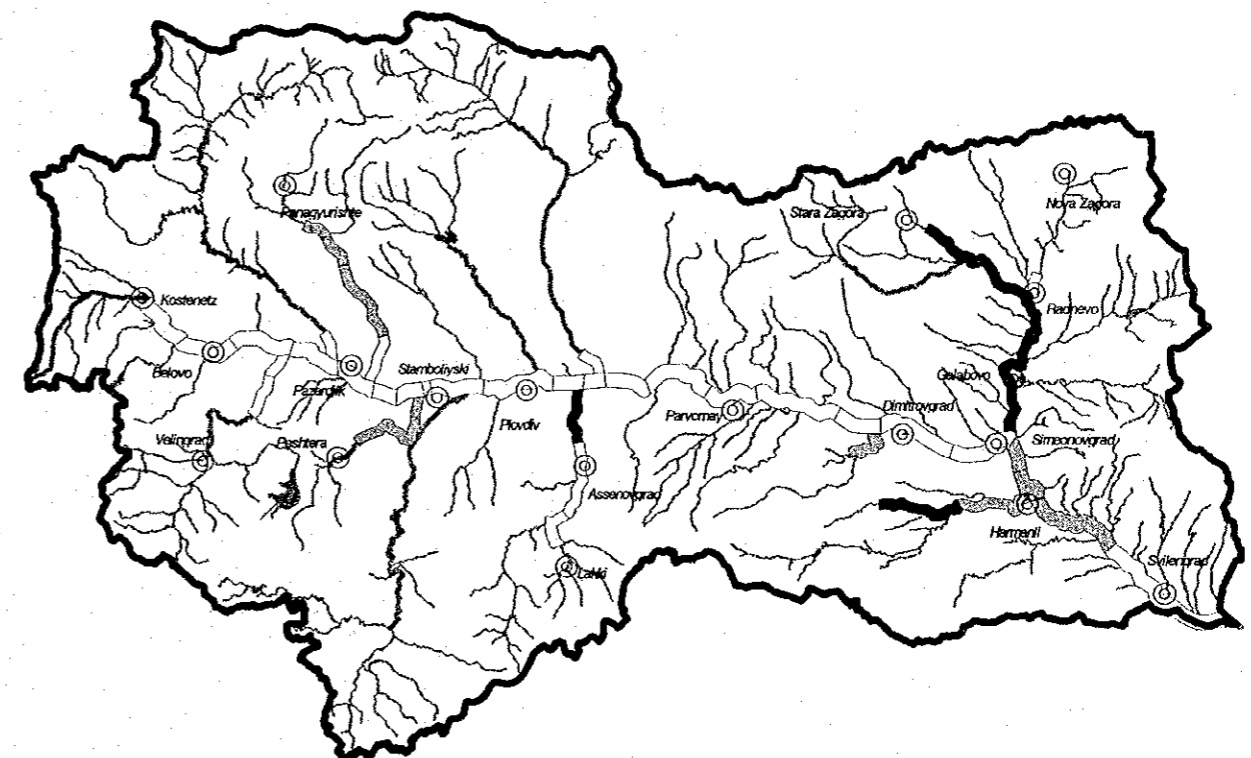
January - March



April - June



July - September



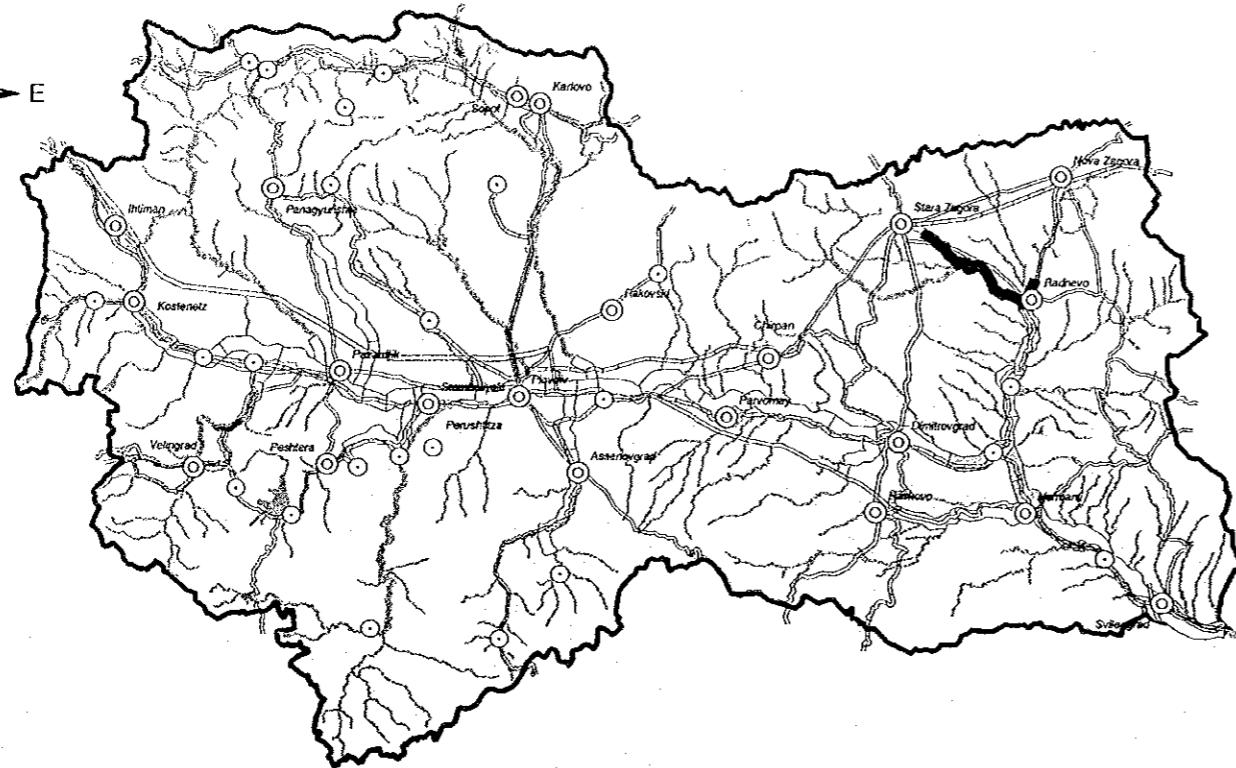
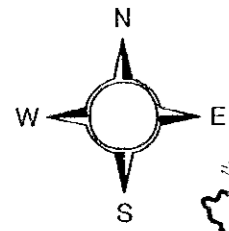
October - December

LEGEND

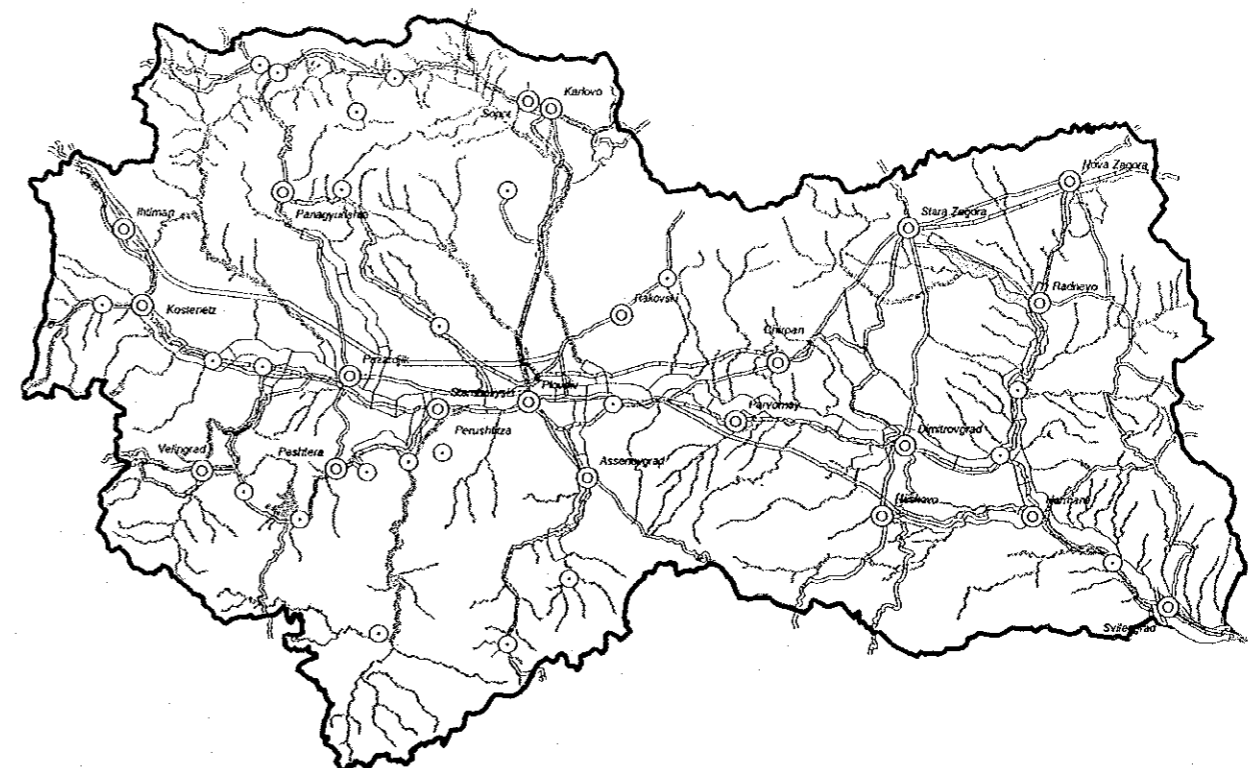
- category I
- category II
- category III
- worse than category III

FIG.G.2.4 SEASONAL WATER QUALITY OF NH4 IN 1994 - 1996

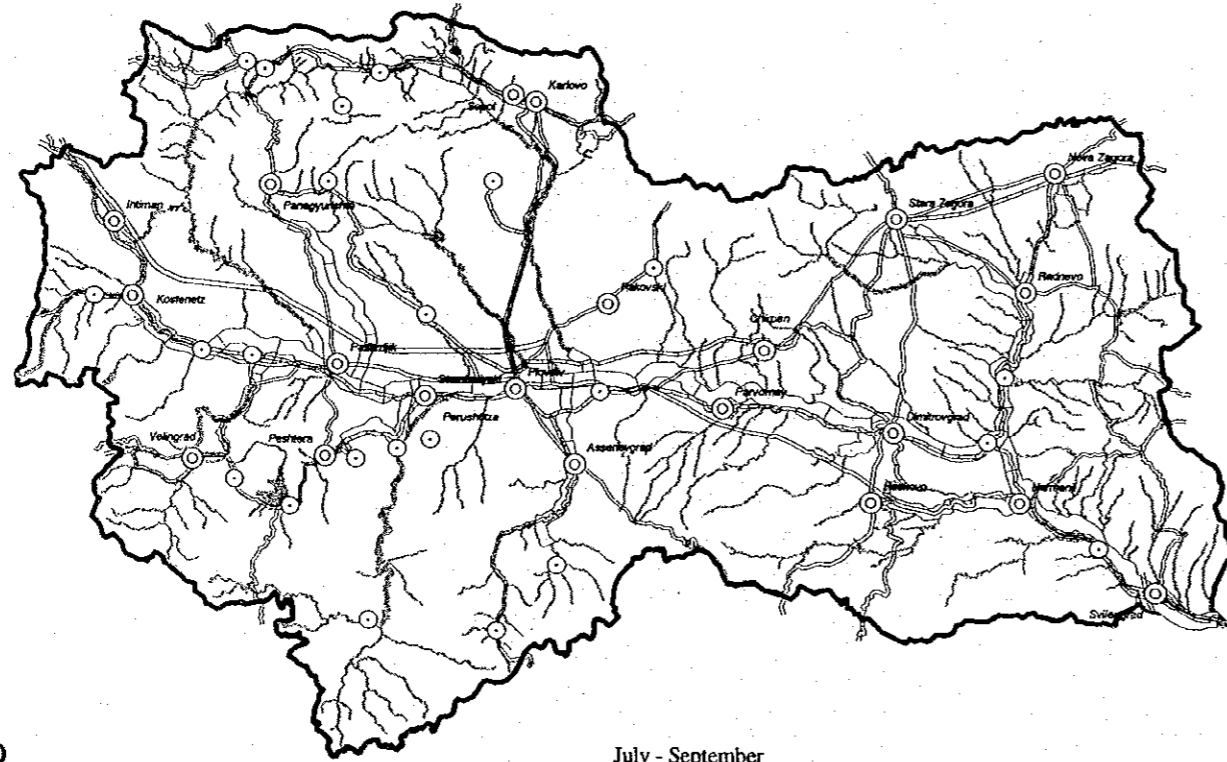
SOURCE : NCESD



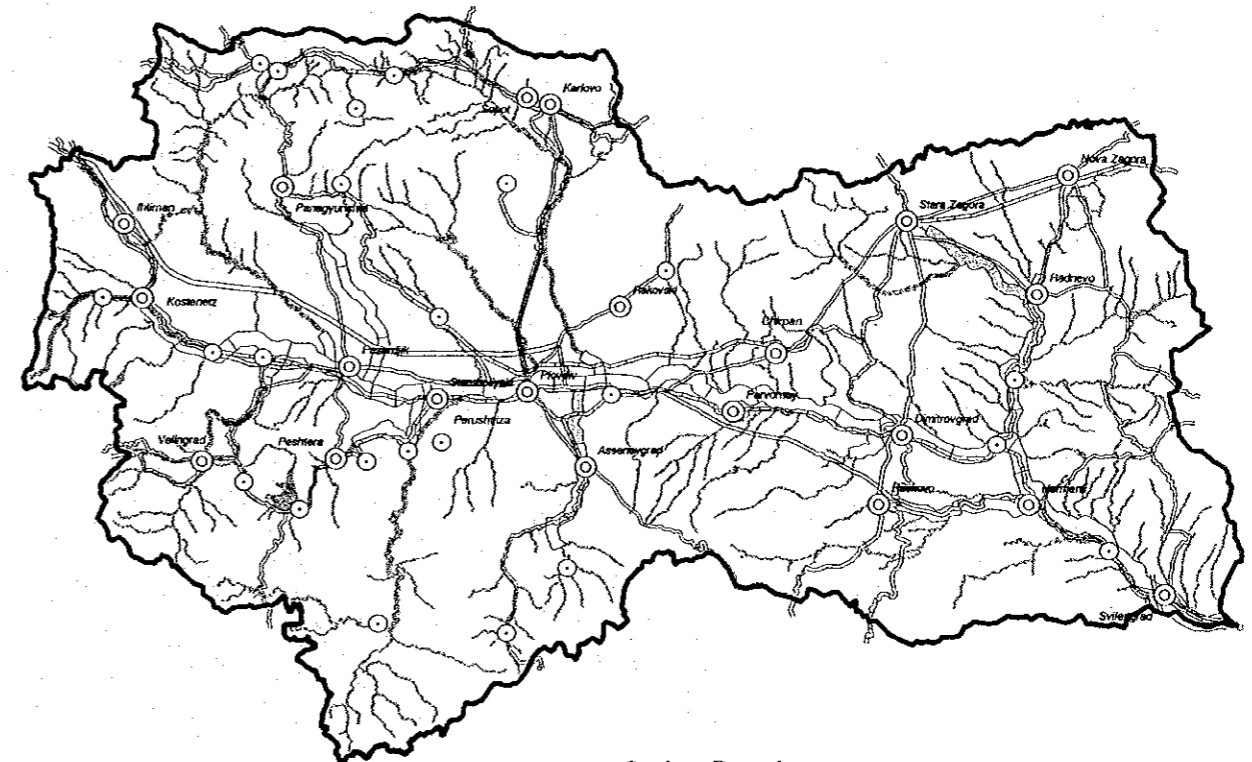
January - March



April - June



July - September



October - December

LEGEND





-  category I
-  category II
-  category III
-  worse than category III

FIG.G.2.5 SEASONAL WATER QUALITY OF NO3 IN 1994-1996

SOURCE : NCESD

FIG. G.2.6 SEASONAL BOD CONCENTRAITON AND LOAD IN MAJOR TOWNS

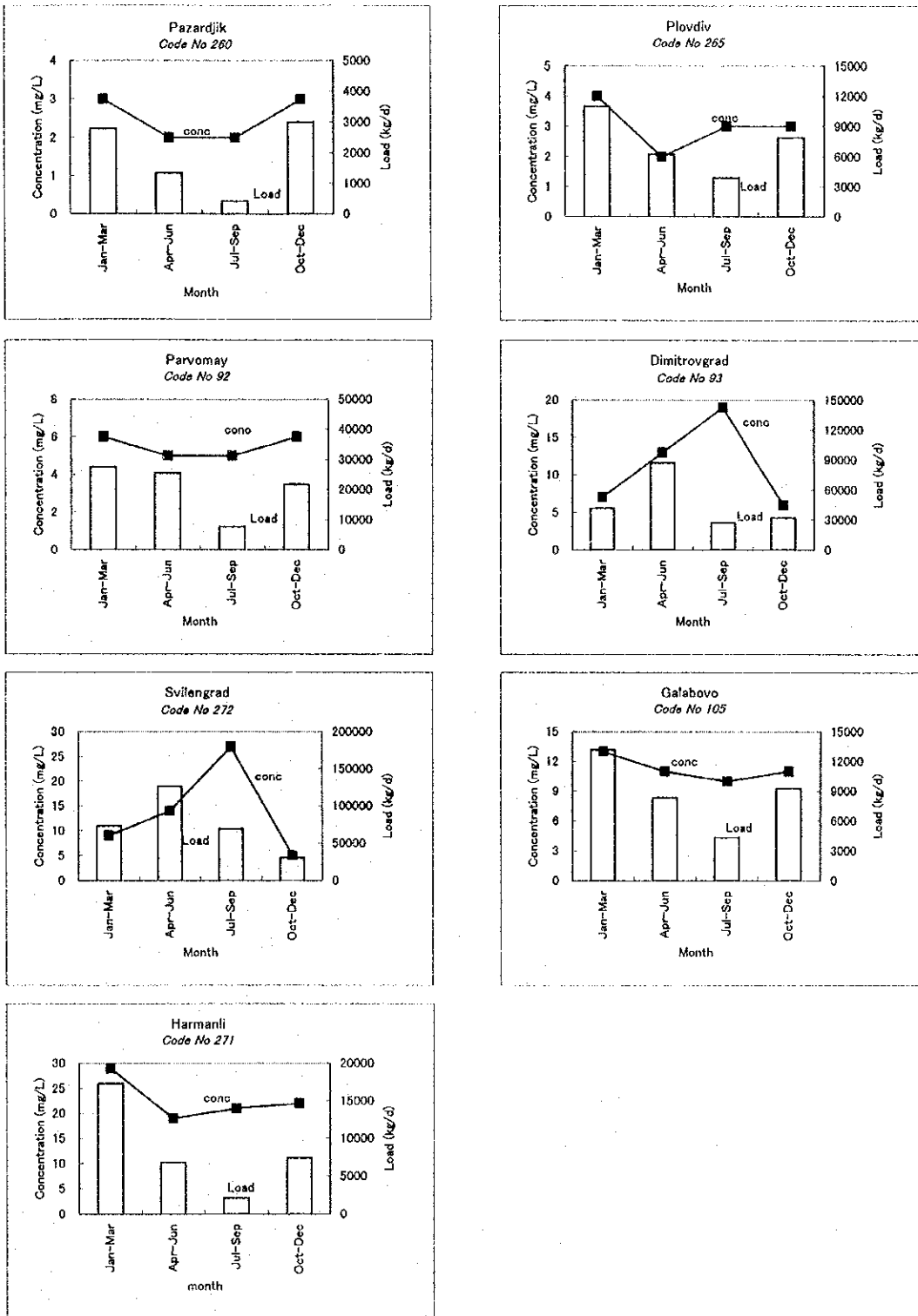


FIG. G.2.7 SEASONAL NH₄ CONCENTRATION AND LOAD IN MAJOR TOWNS

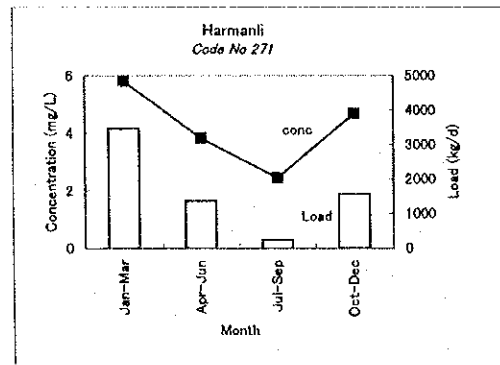
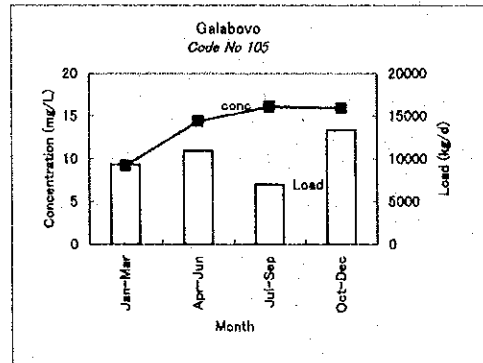
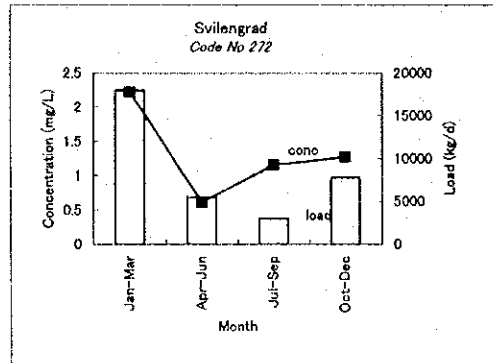
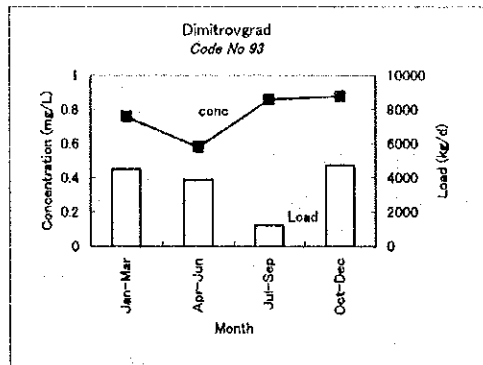
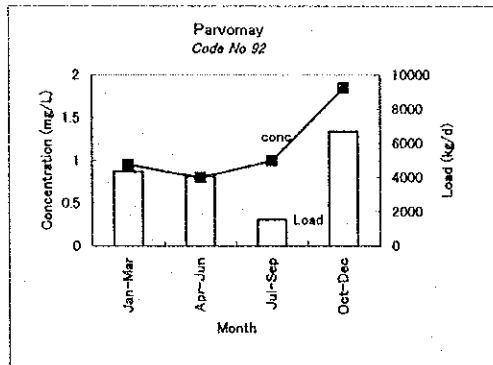
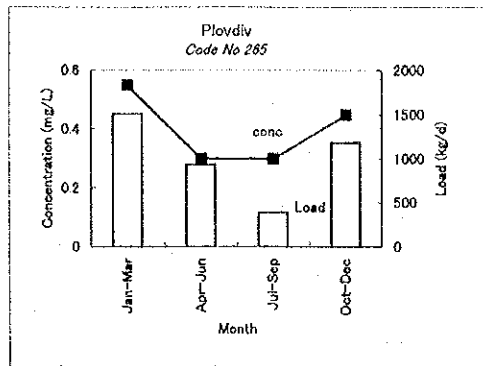
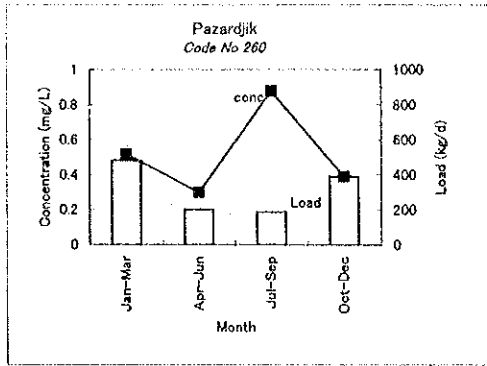
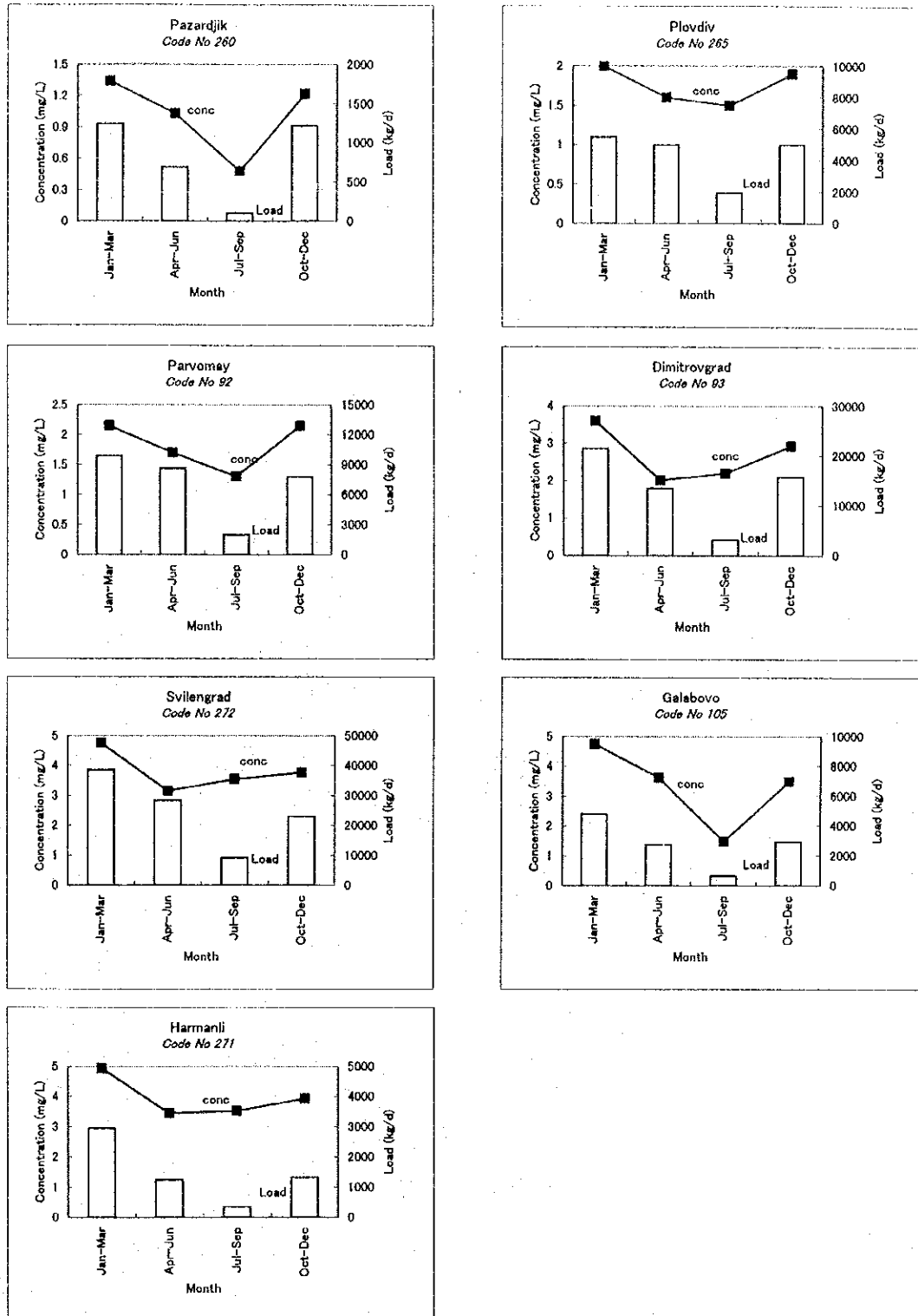
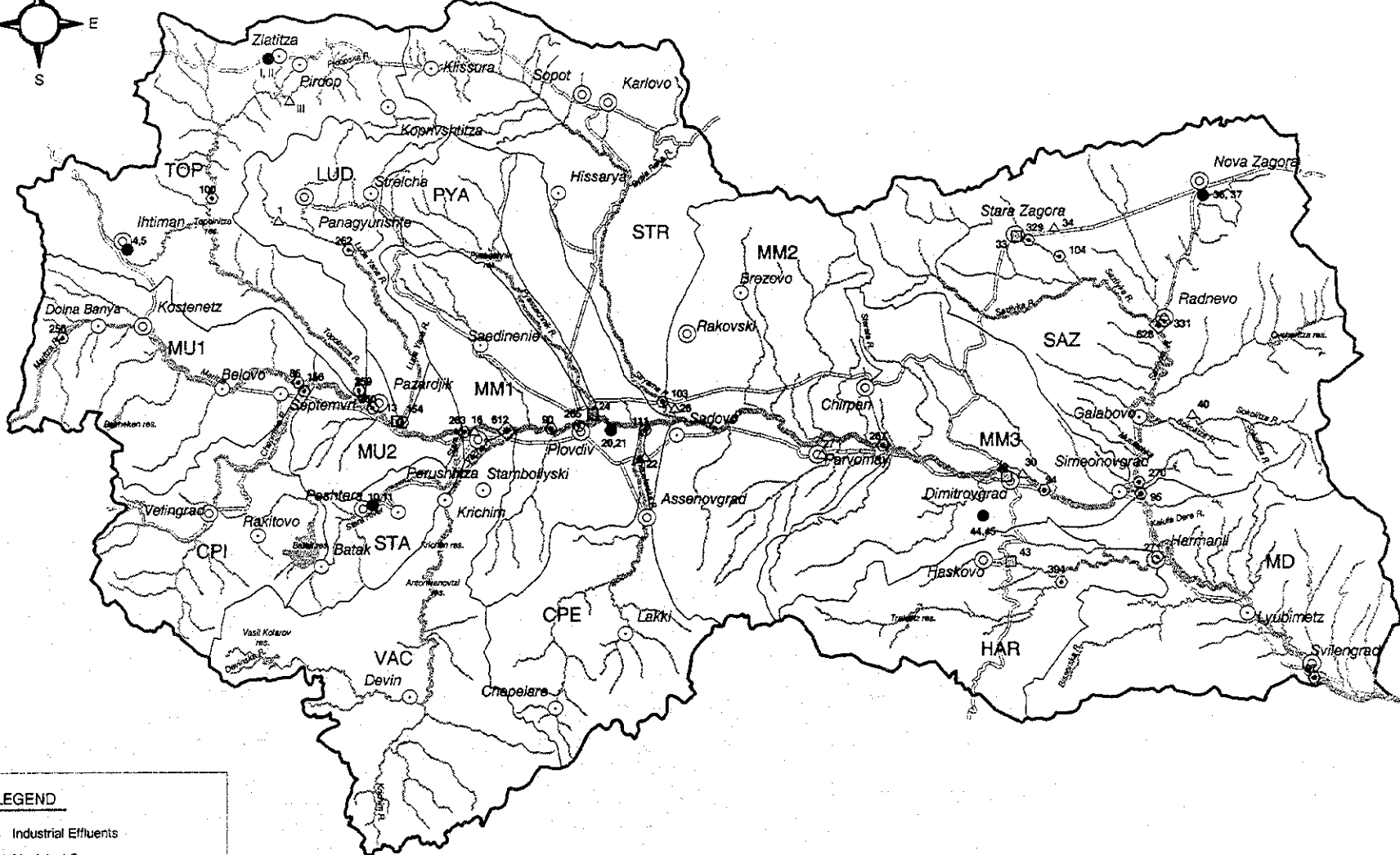
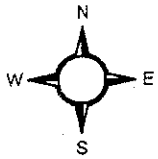


FIG. G.2.8 SEASONAL NO3 CONCENTRAITON AND LOAD IN MAJOR TOWN





LEGEND

- △ Industrial Effluents
- Municipal Sewage
- Waste Water Treatment Plant
- ◇ Monitoring Station of NCESD
- ◇ Monitoring Station of UNDP Project

Scale 1 : 1000000

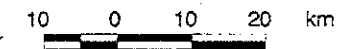
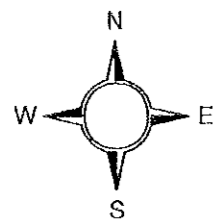


FIG.G.2.9 MONITORING STATIONS OF WATER QUALITY SURVEY BY JICA STUDY

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JICA-Maritza River Study



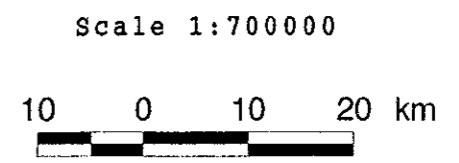
Source: NCESD

LEGEND

- Unpolluted sites (BI 4 to 5)
- Slightly polluted sites (BI 3.5)
- Moderately polluted (BI 2.5 to 3)
- Heavily polluted (BI 1 to 2)

BI - Biotic index

FIG. G.2.10 BIOLOGICAL ASSESSMENT OF WATER QUALITY



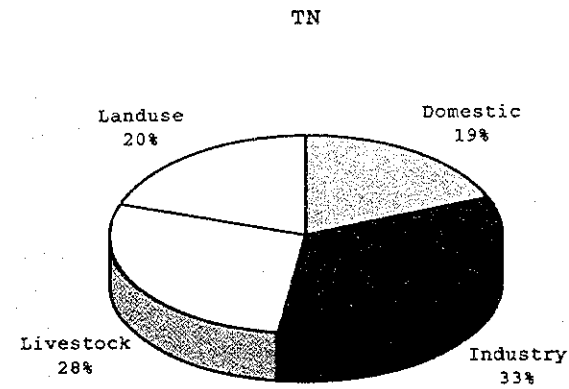
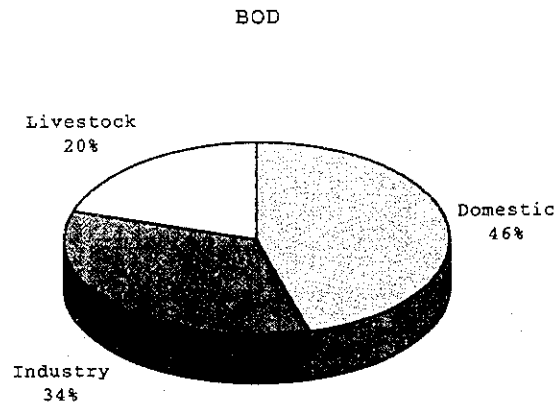


FIG. G.3.1 BOD AND TN BY POLLUTION SOURCE

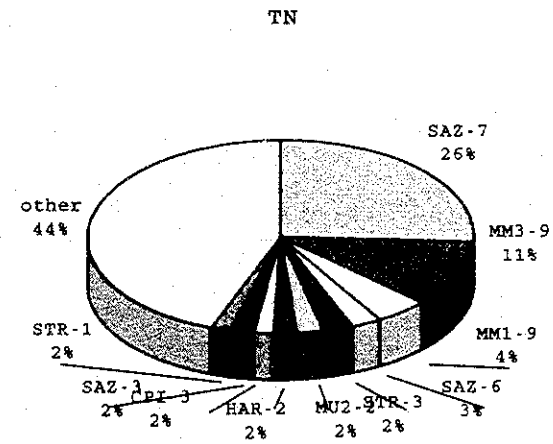
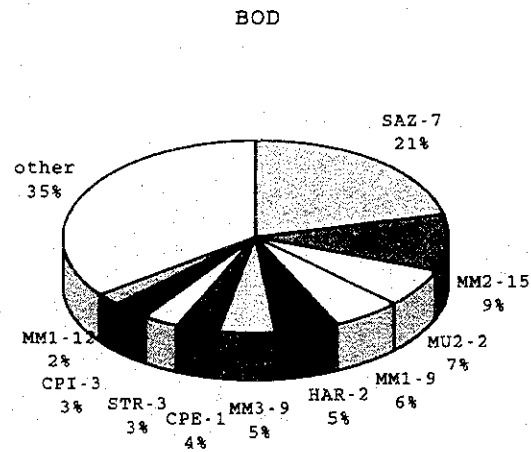


FIG. G.3.2 POLLUTION LOAD PER SUB-CATCHMENT

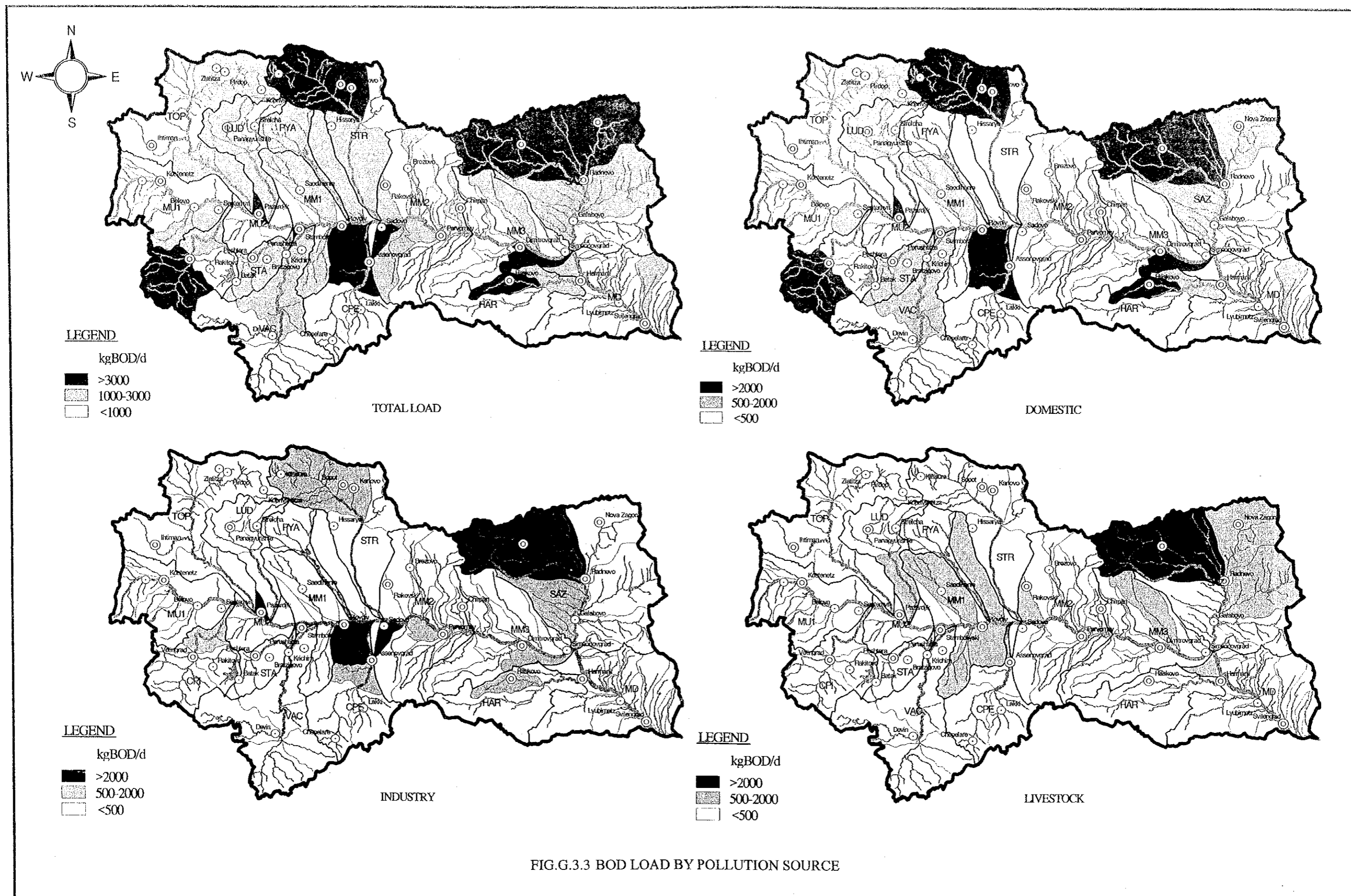


FIG.G.3.3 BOD LOAD BY POLLUTION SOURCE

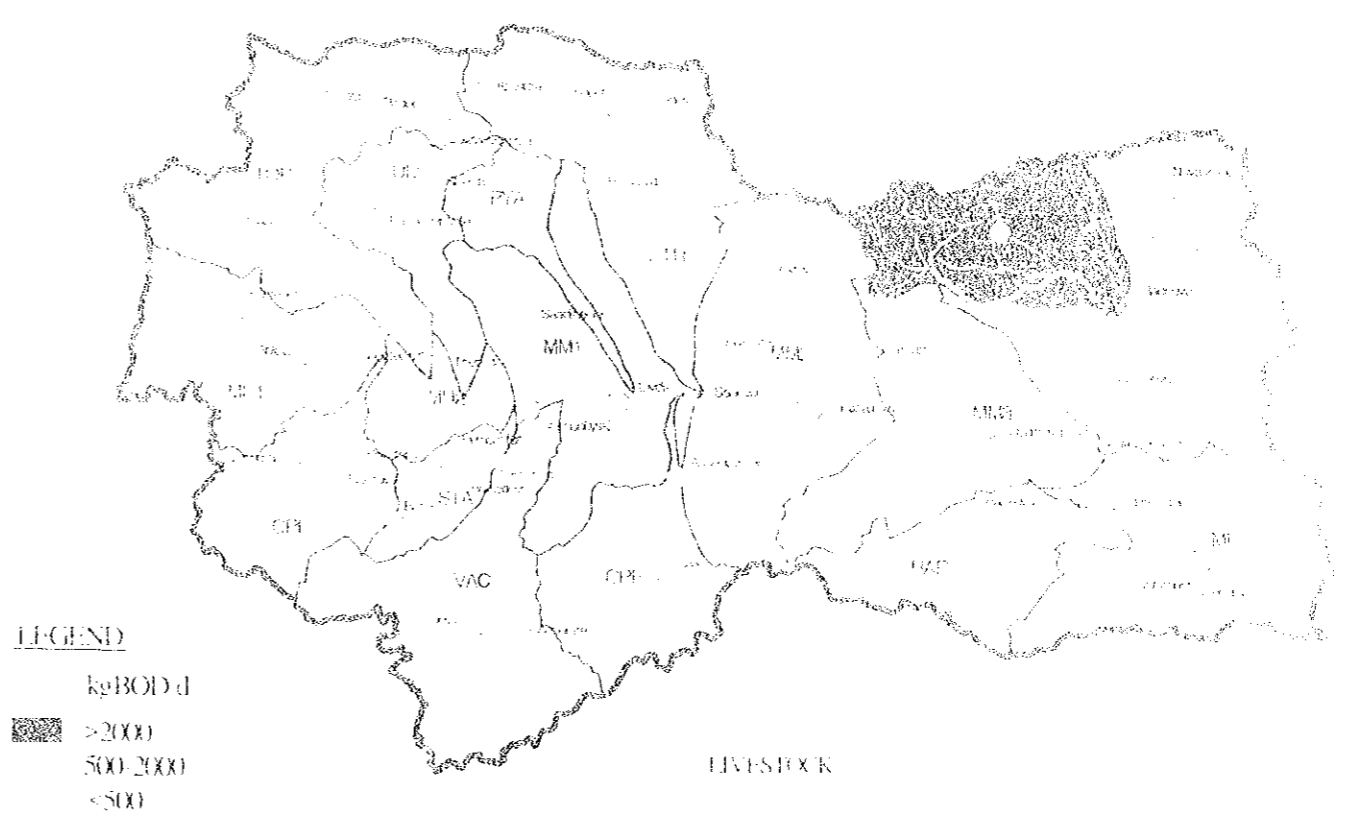
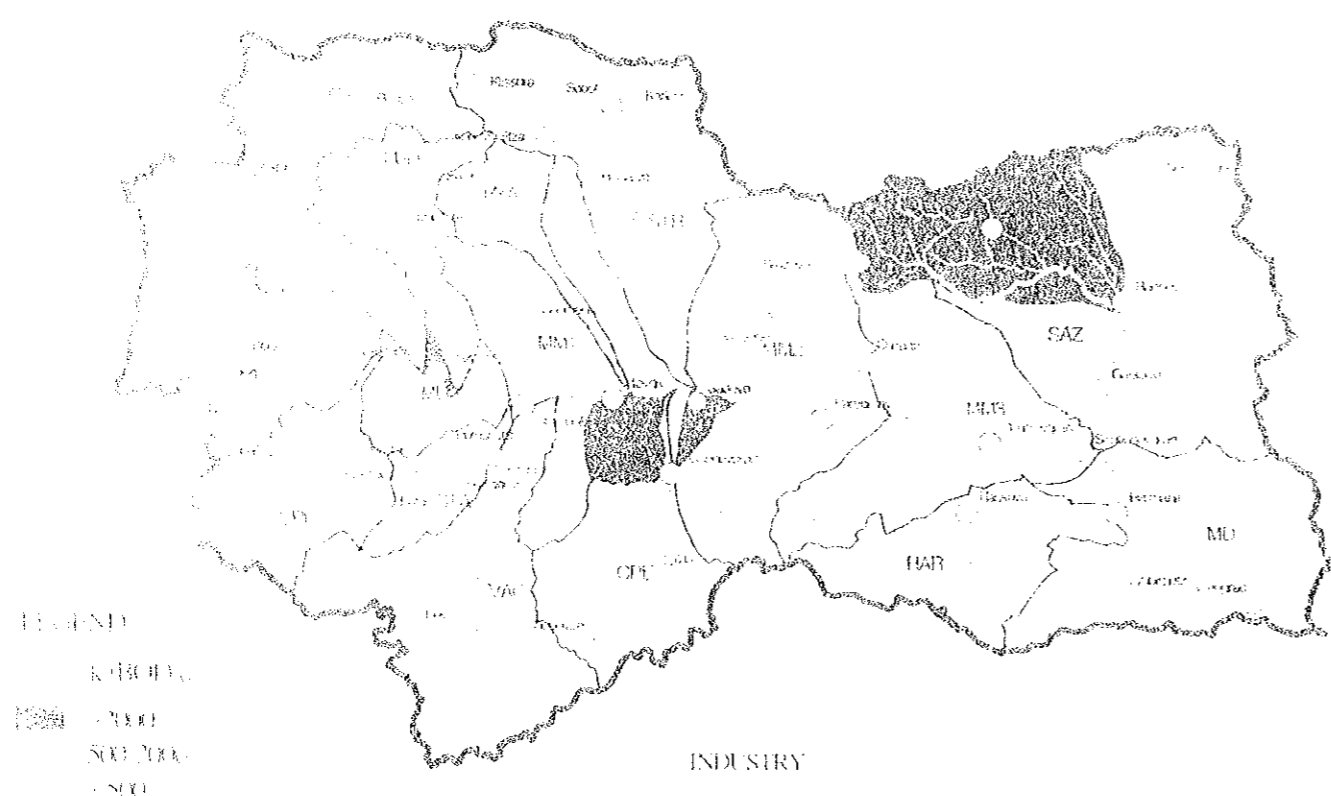
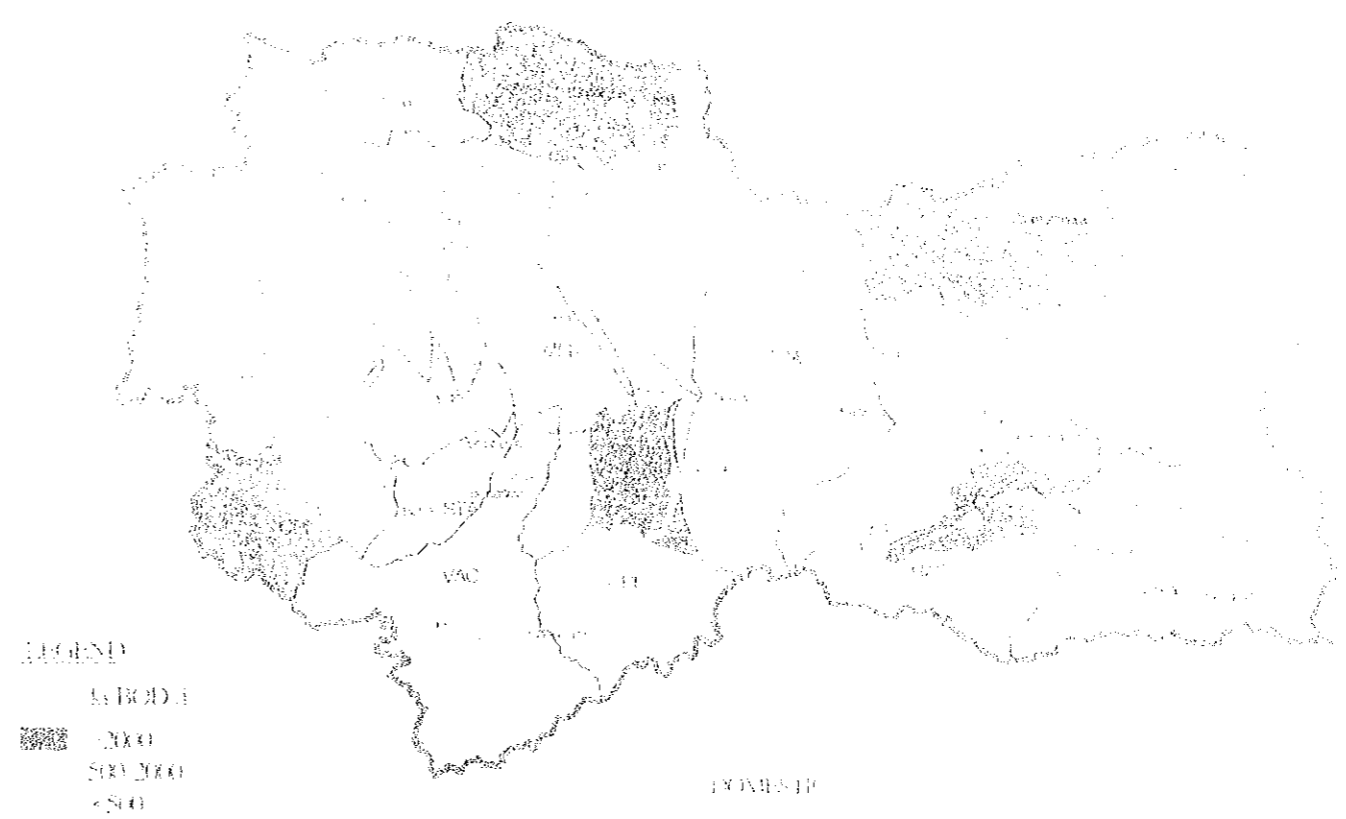
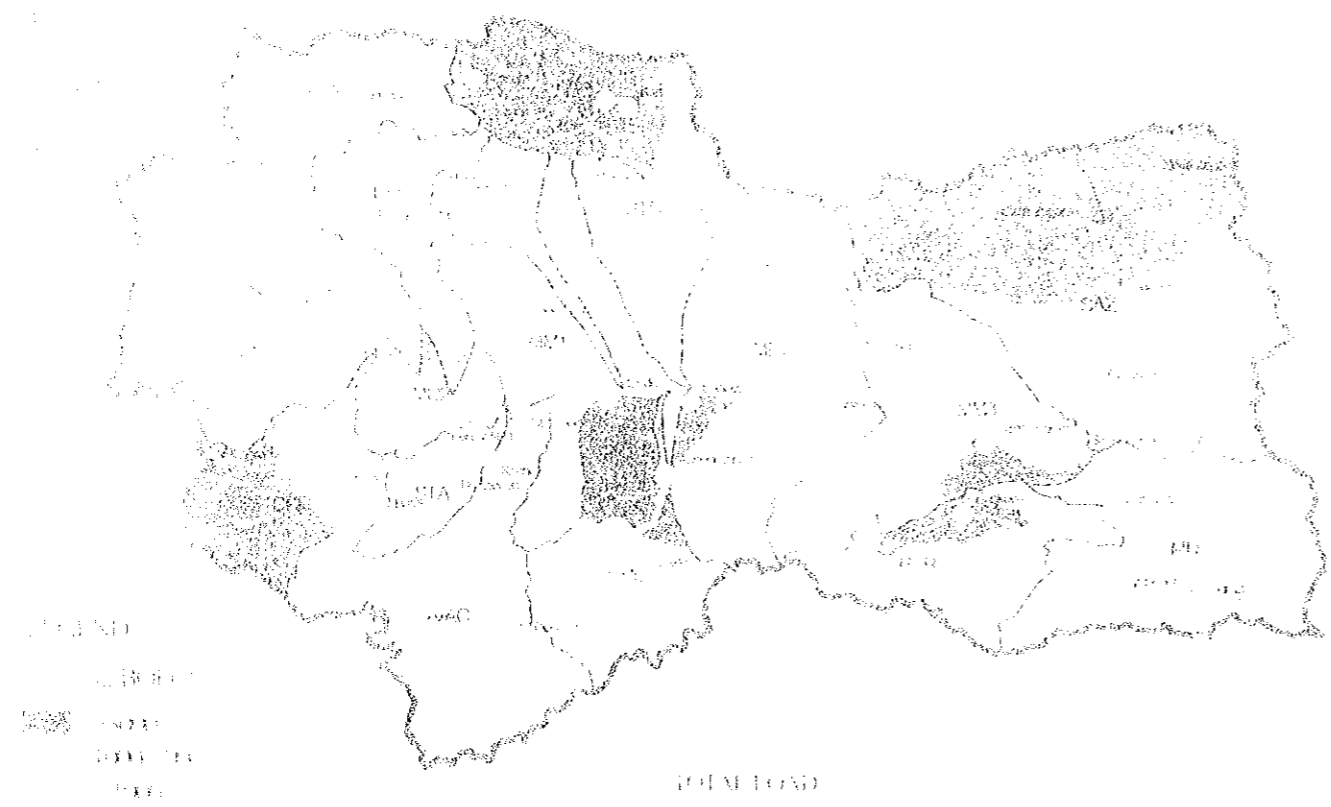


FIG.3.3 BOD LOAD BY POLLUTION SOURCE

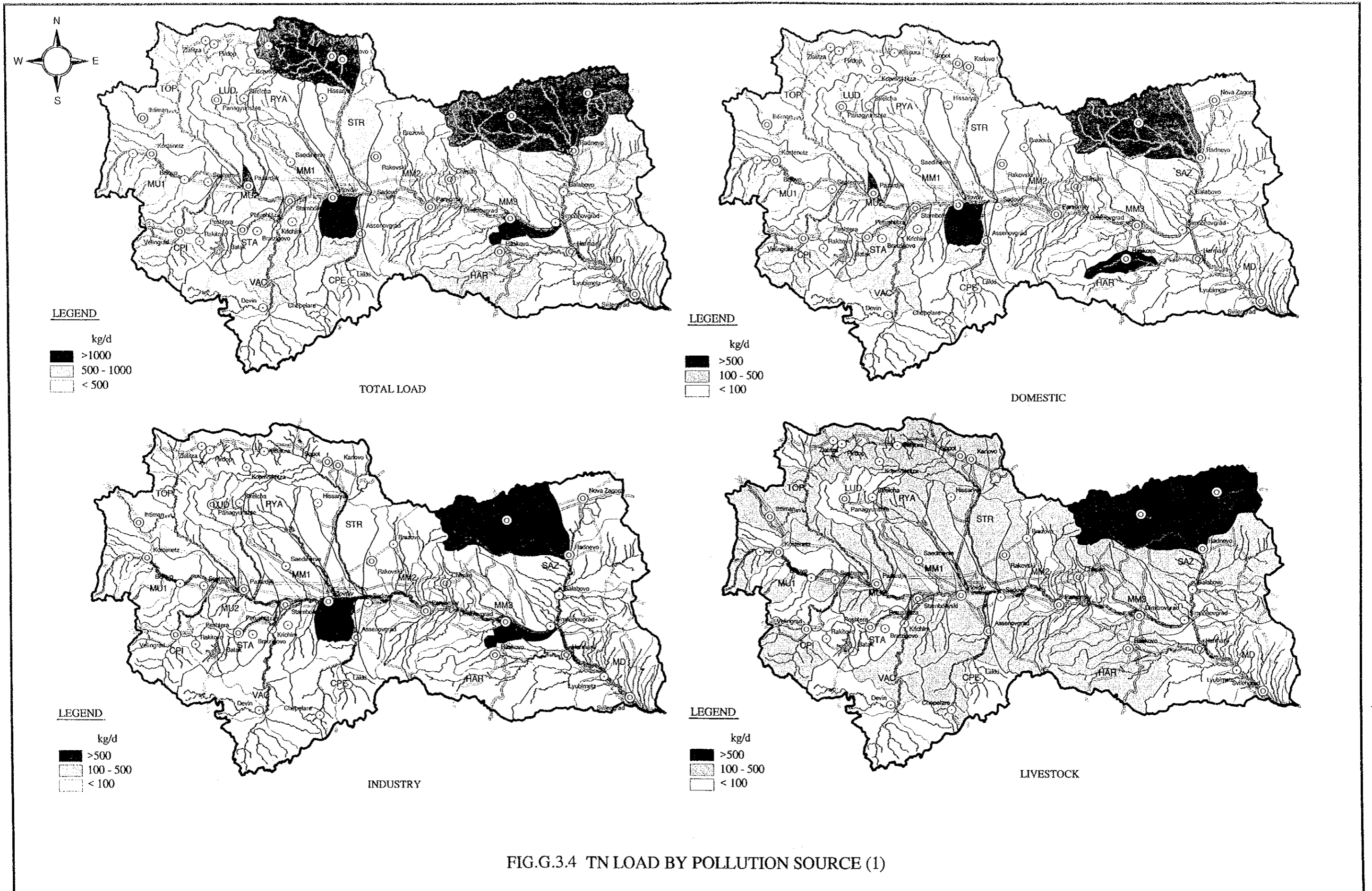


FIG.G.3.4 TN LOAD BY POLLUTION SOURCE (1)

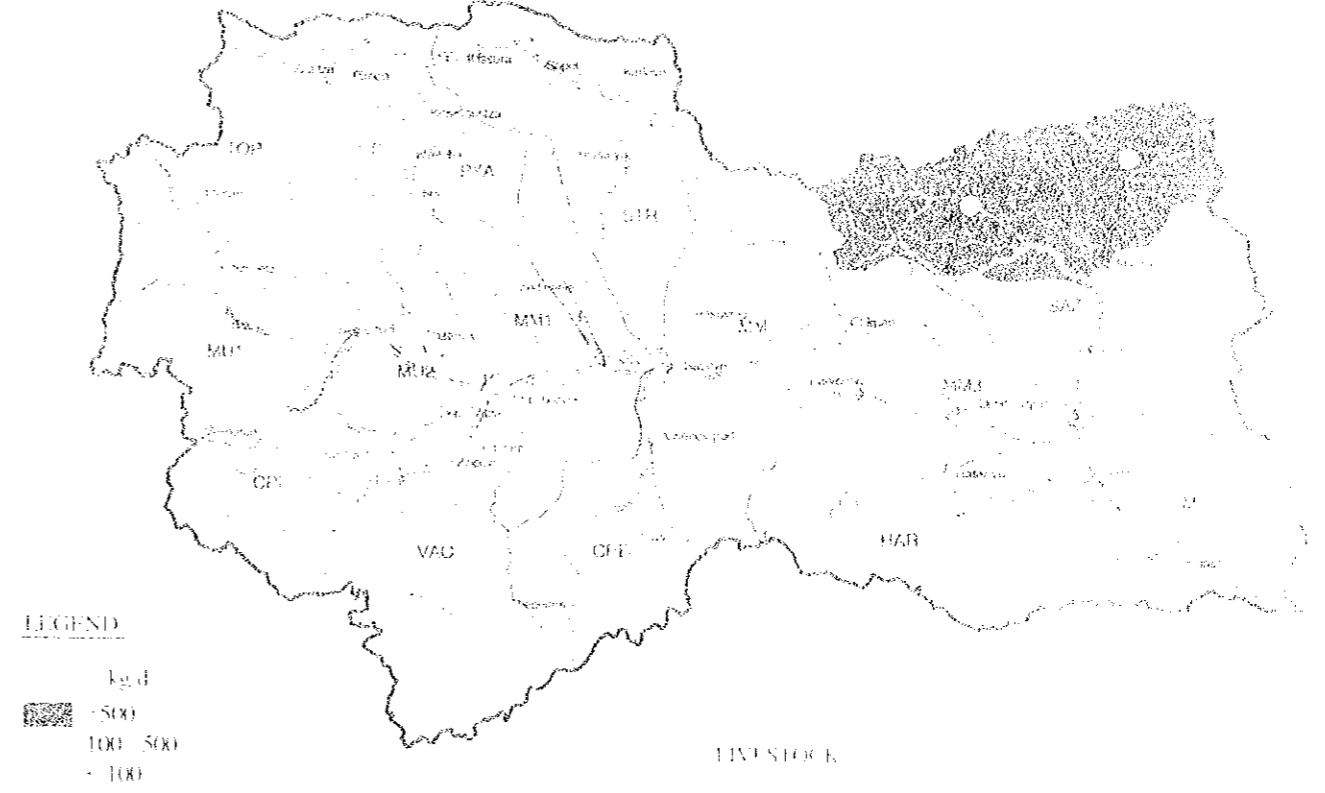
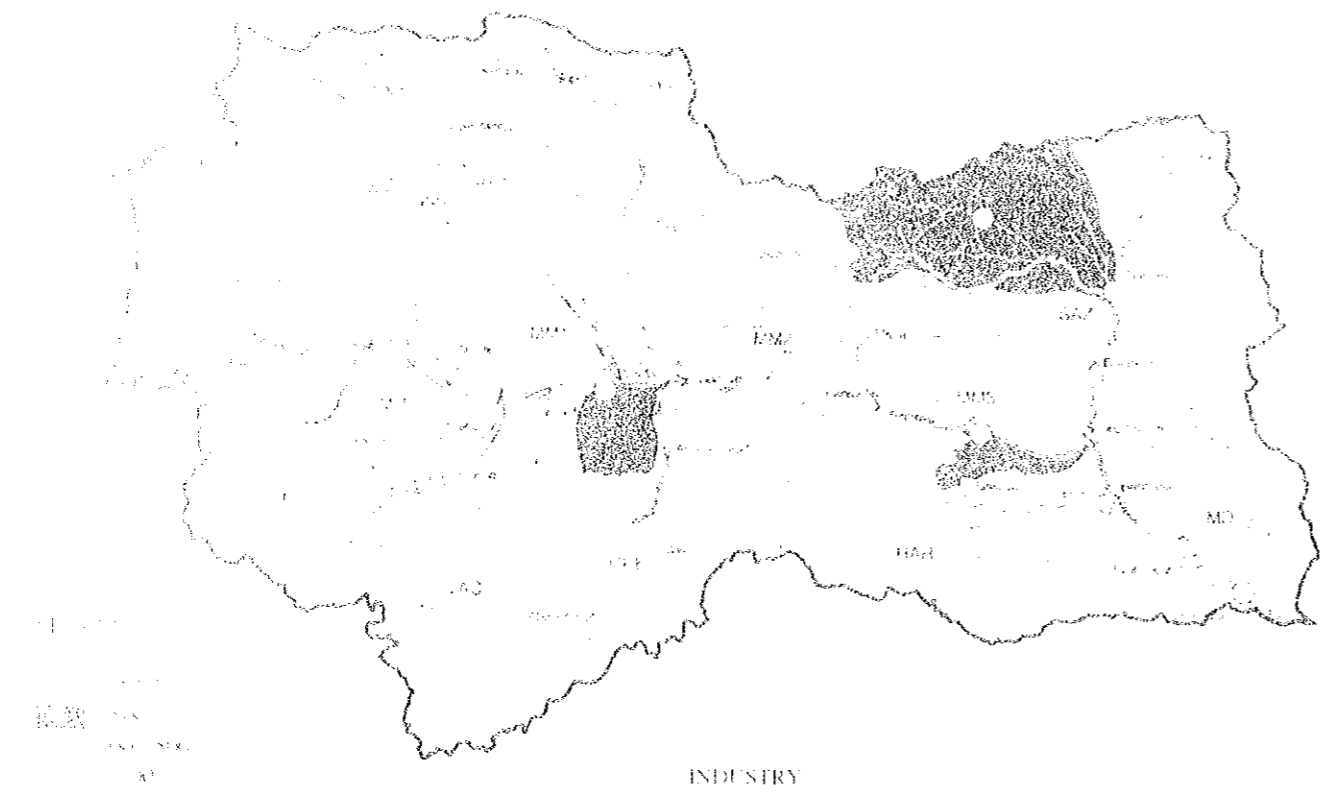
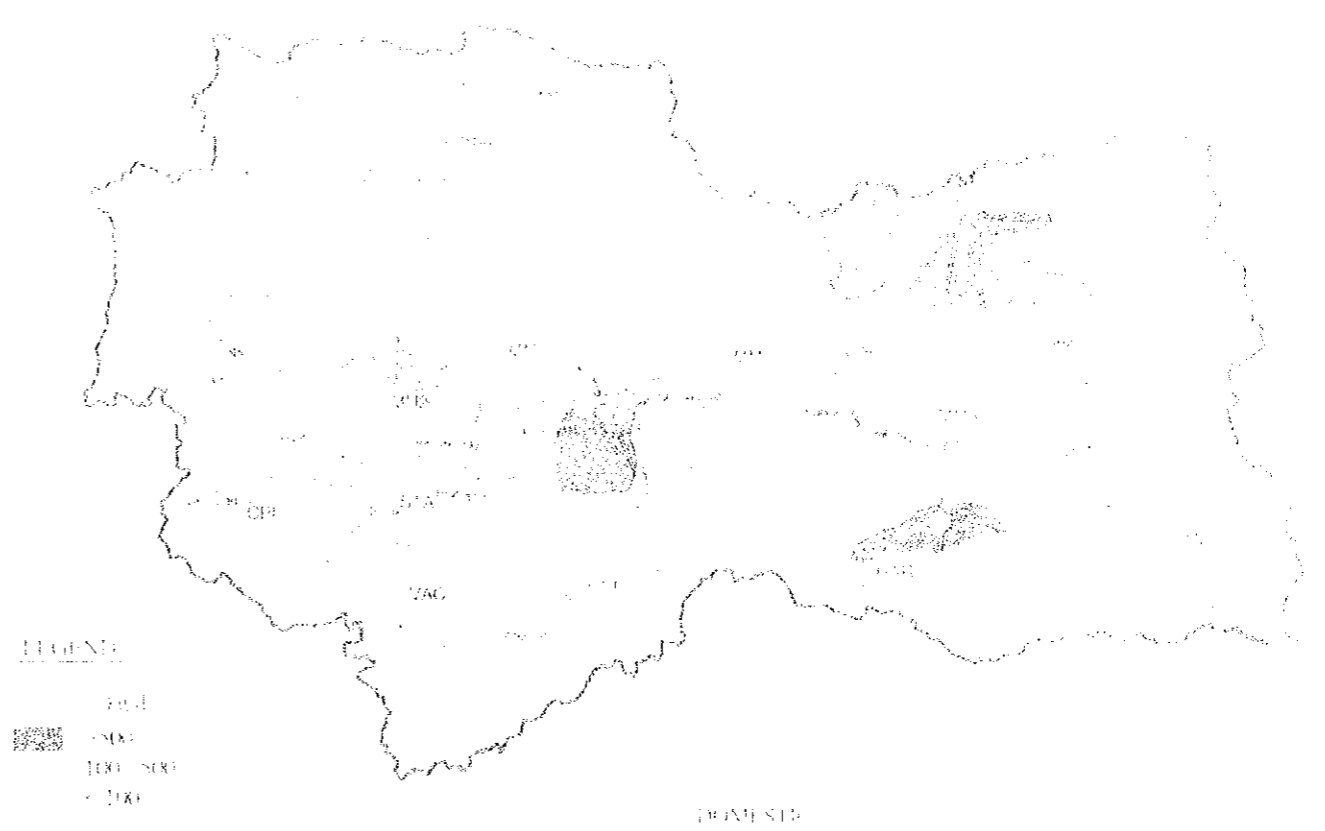
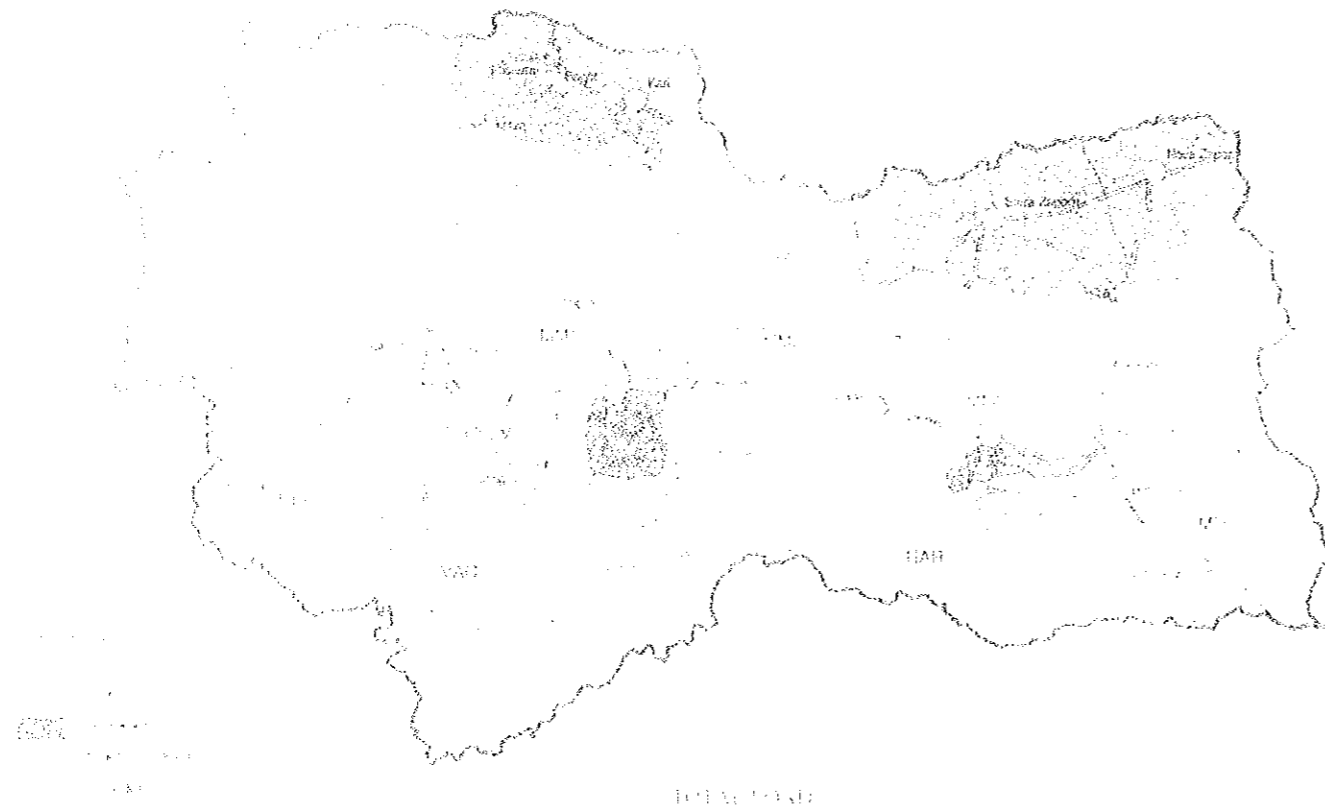
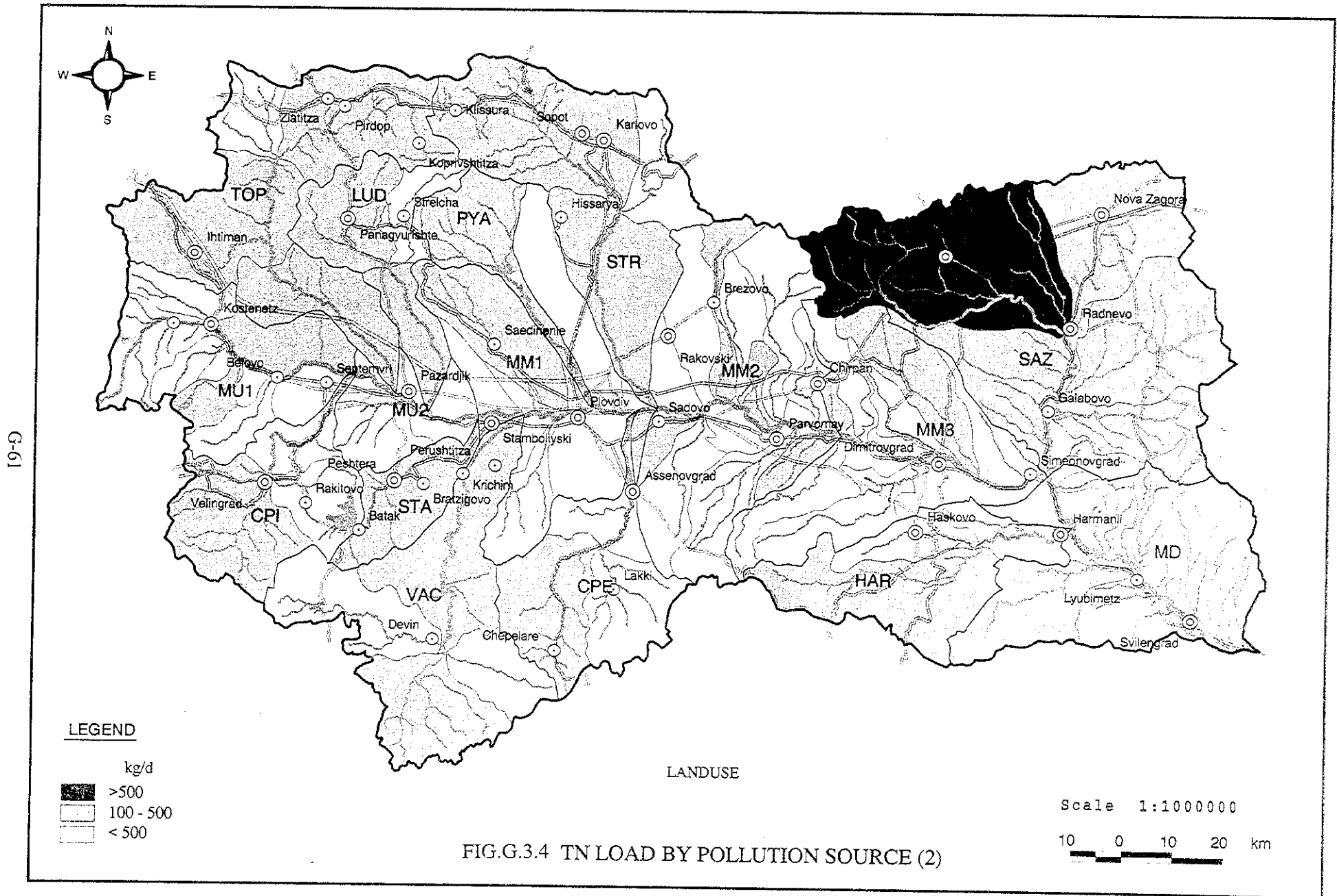


FIG.G.3.4 TN LOAD BY POLLUTION SOURCE (1)



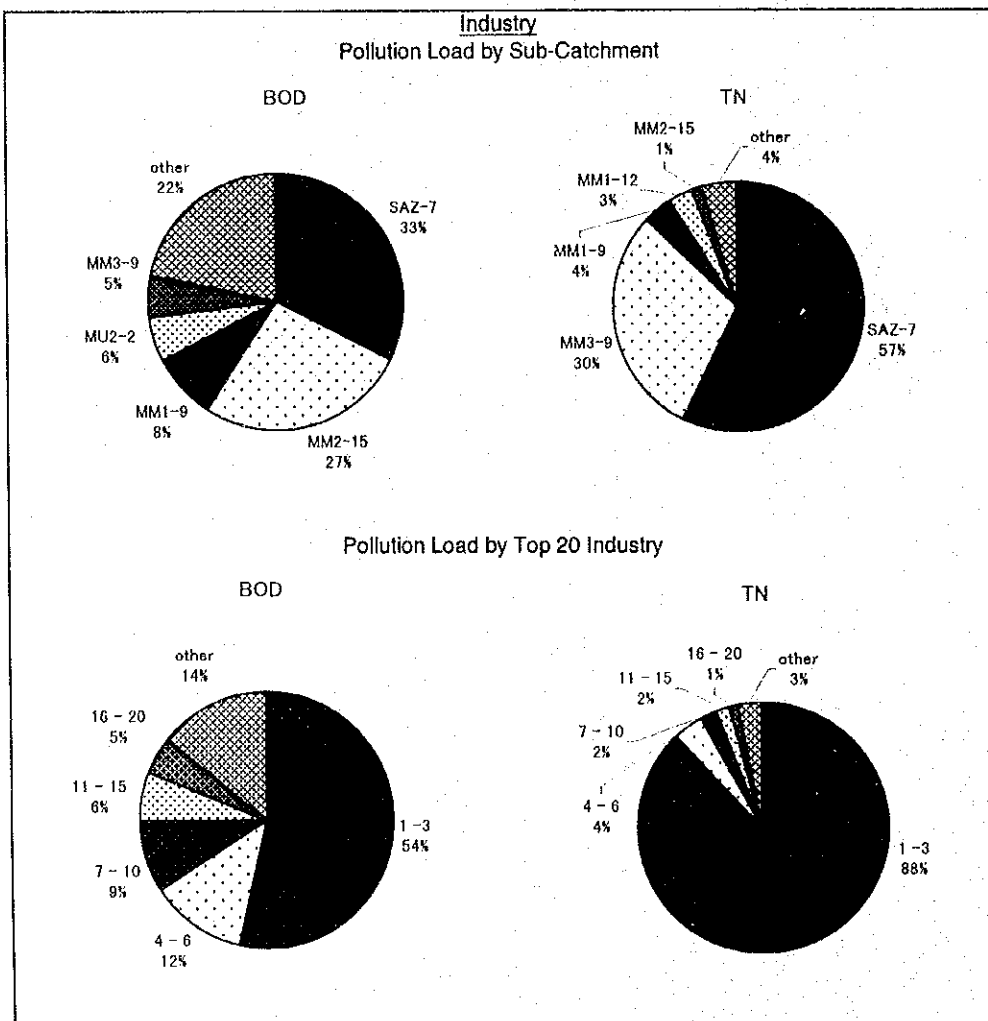
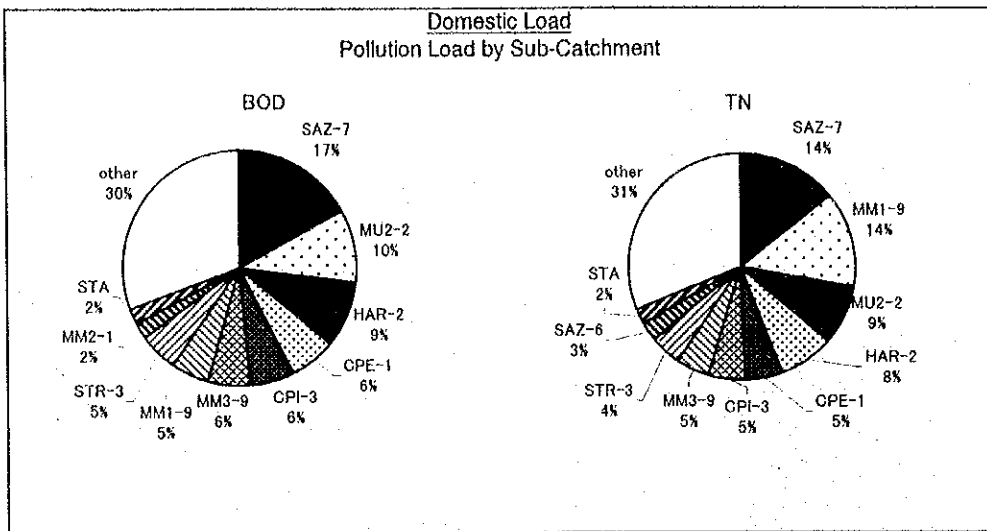
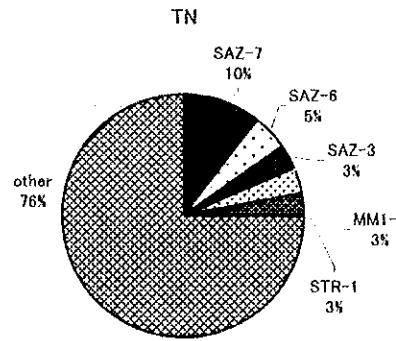
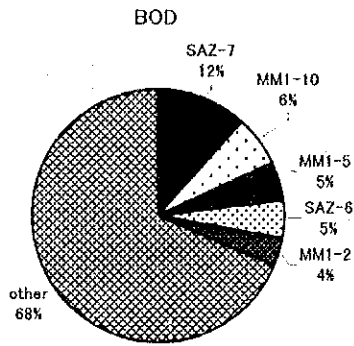
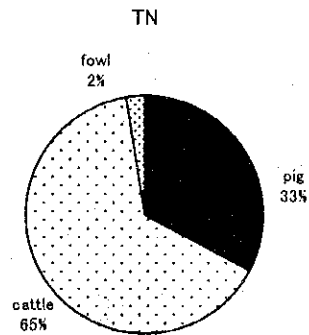
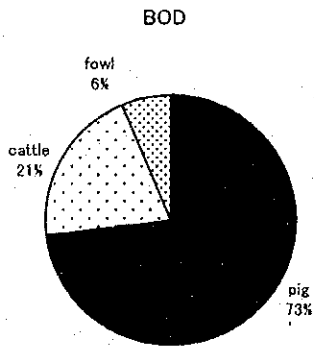


FIG G.3.5 COMPOSITION OF POLLUTION BY POLLUTION SOURCE

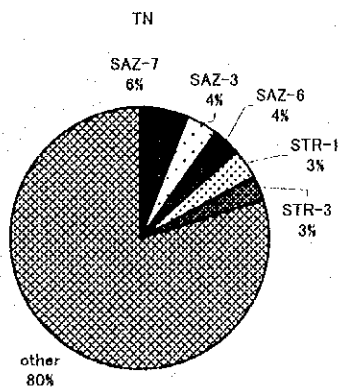
Livestock
Pollution Load by Sub-Catchment



Pollution Load by Animal



Landuse



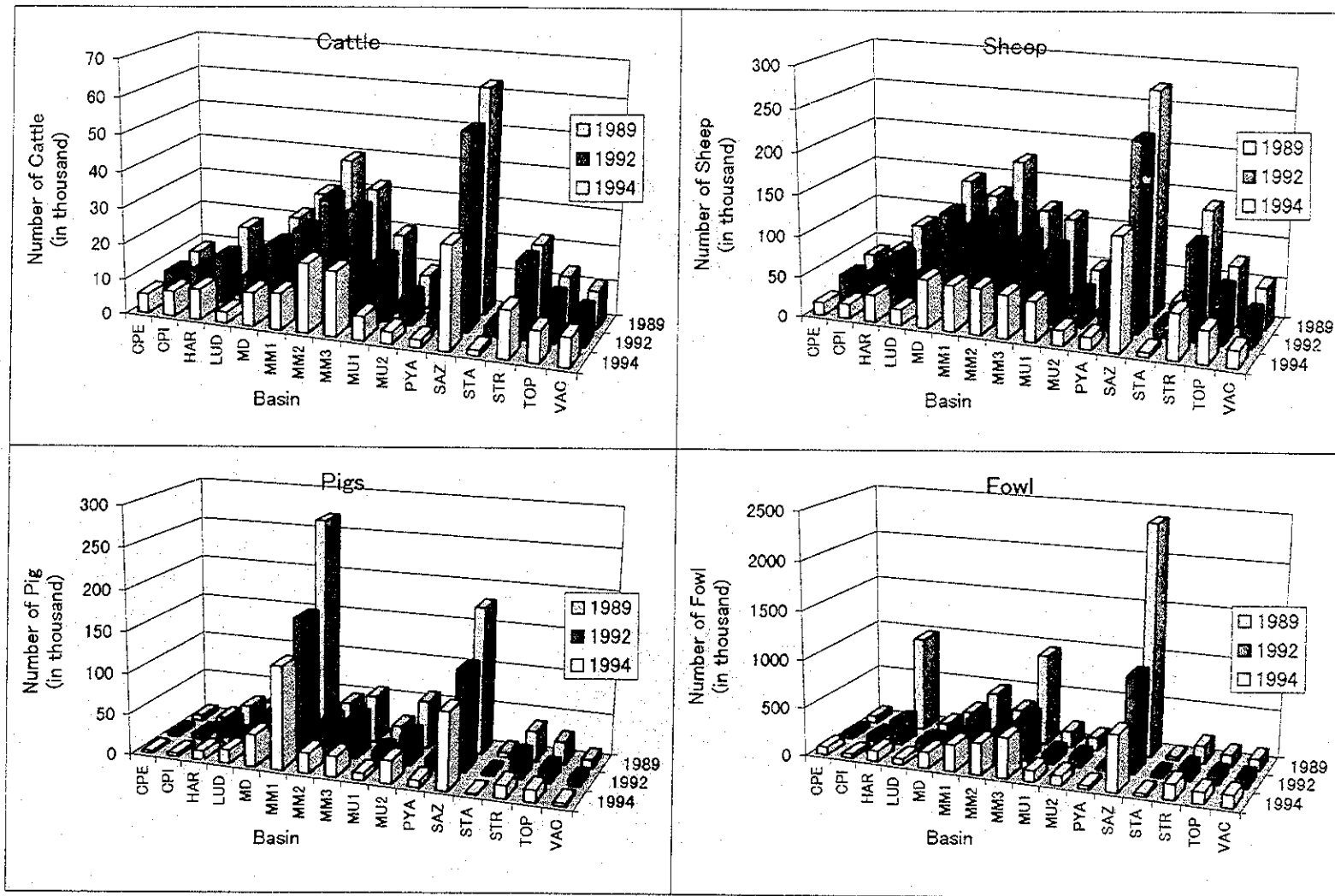


FIG.G.3.6 NUMBER OF LIVESTOCK IN MARITZA RIVER BASIN

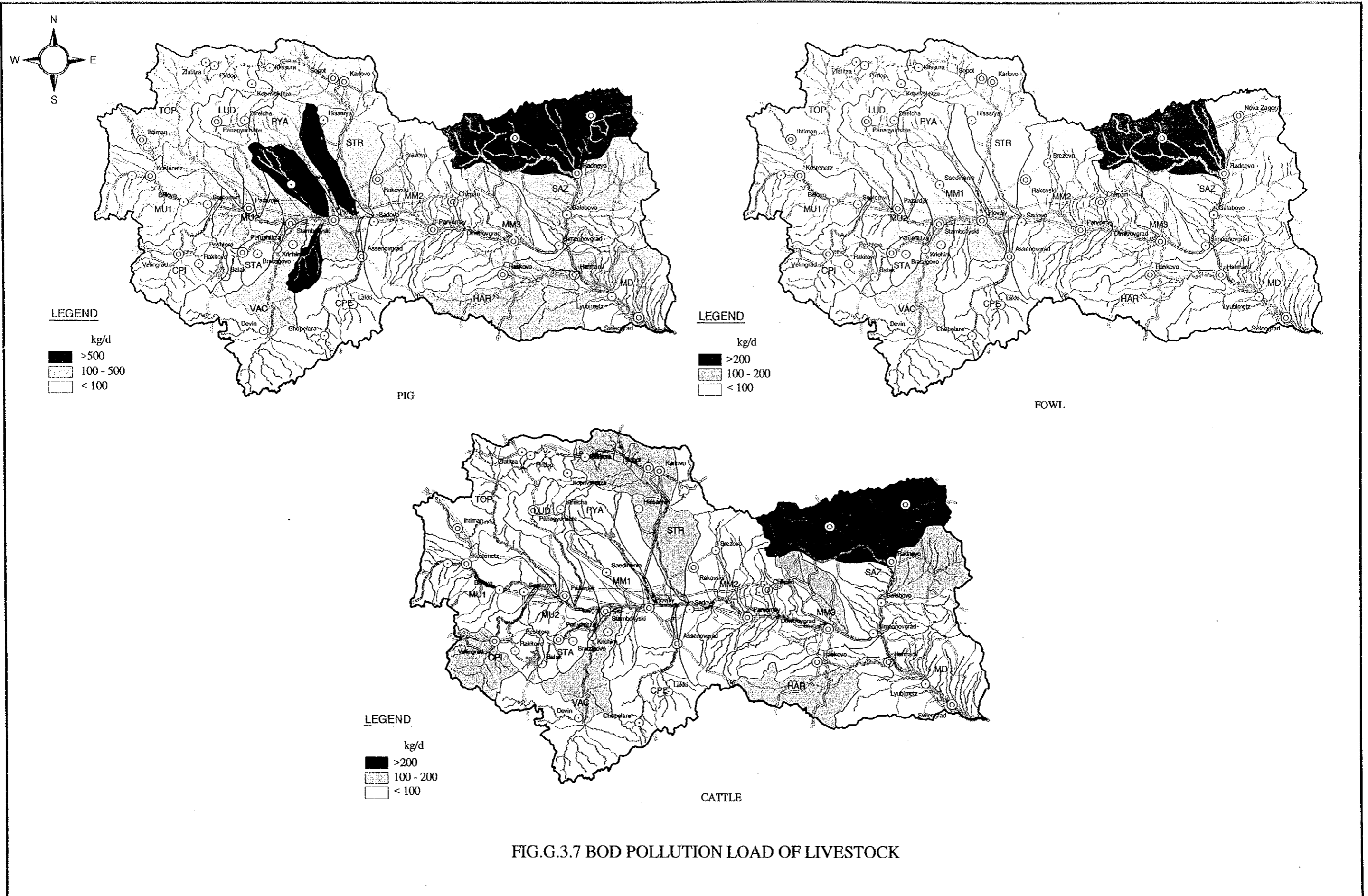


FIG.G.3.7 BOD POLLUTION LOAD OF LIVESTOCK

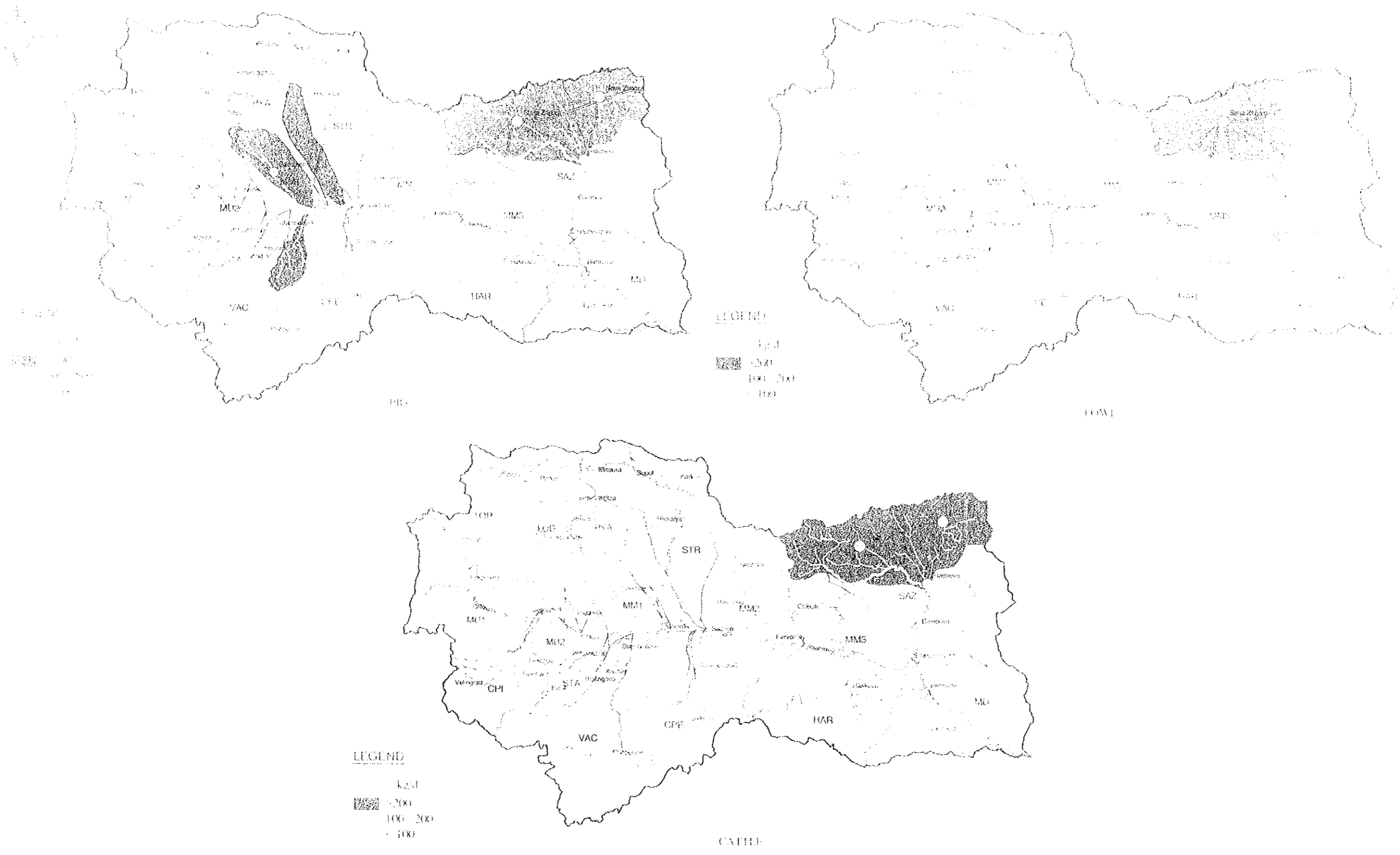


FIG.G.3.7 BOD POLLUTION LOAD OF LIVESTOCK

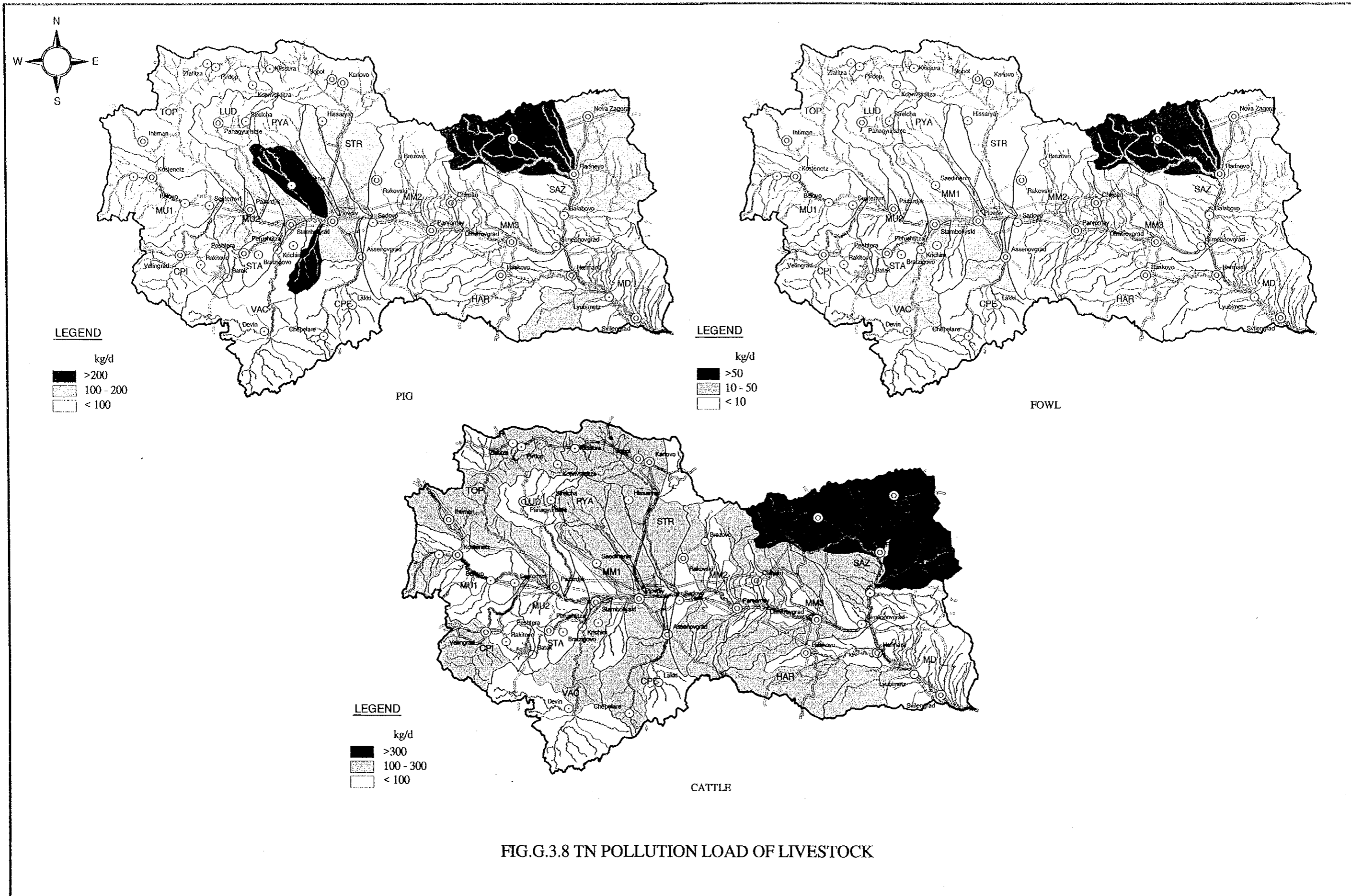


FIG.G.3.8 TN POLLUTION LOAD OF LIVESTOCK

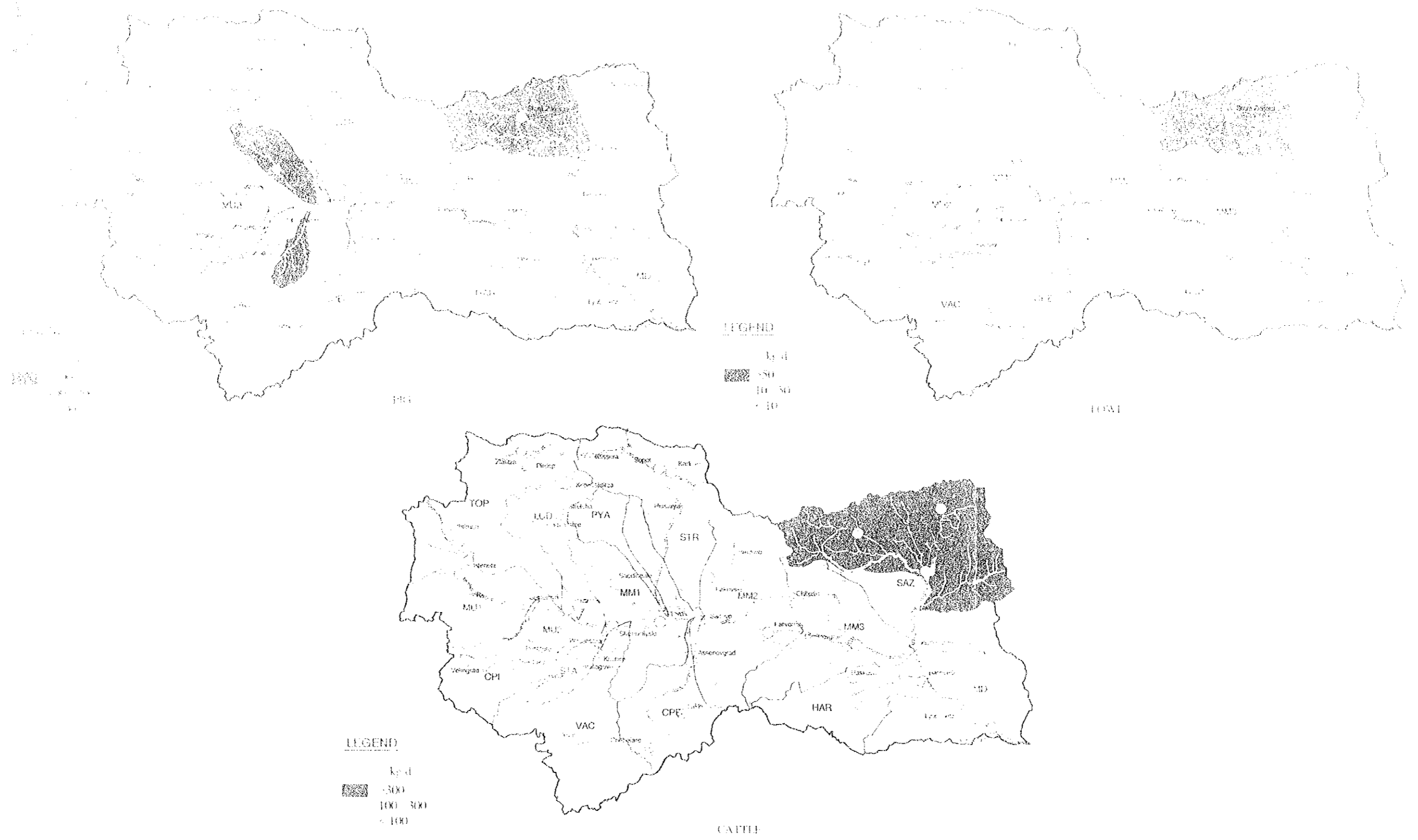
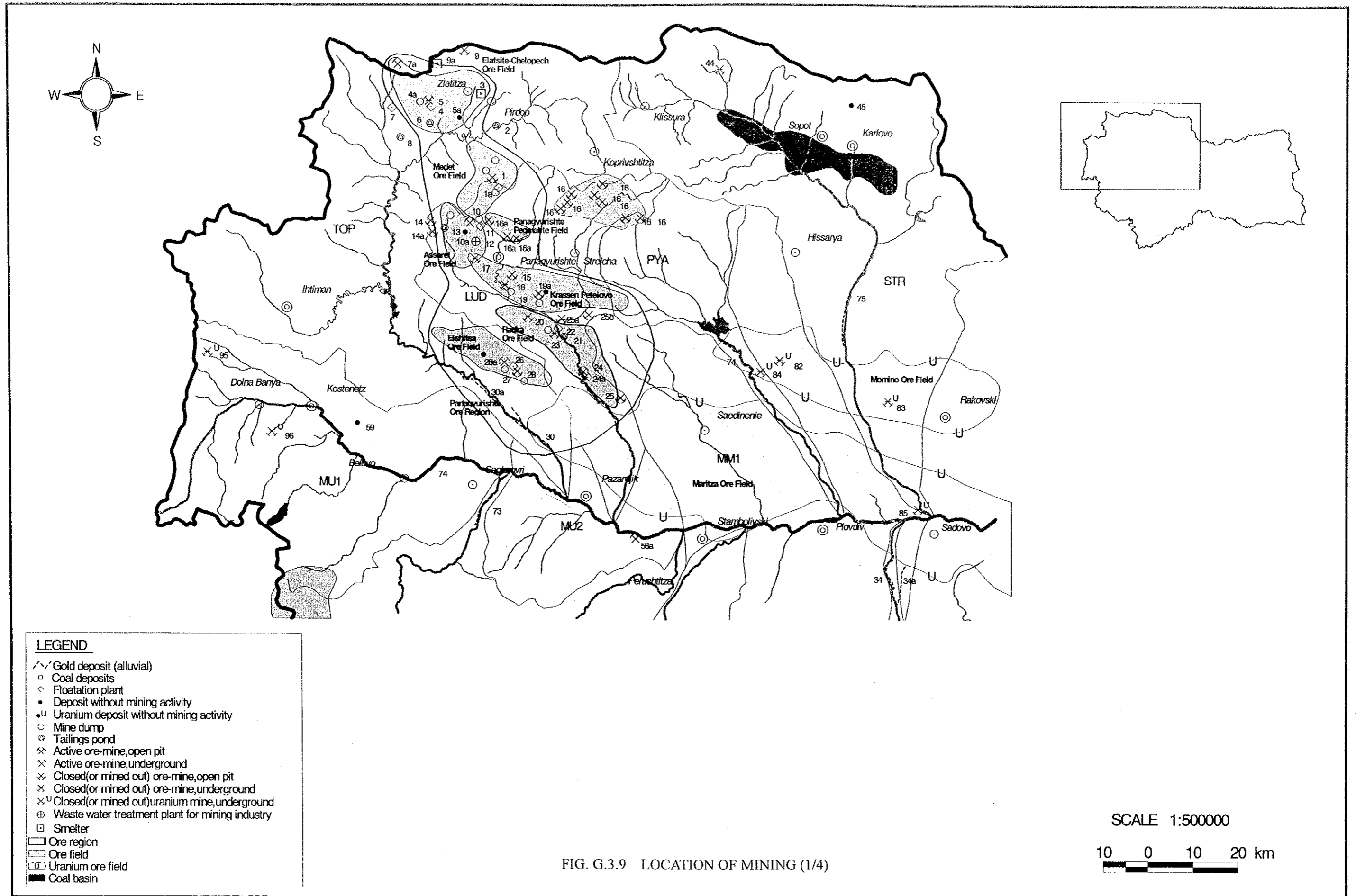


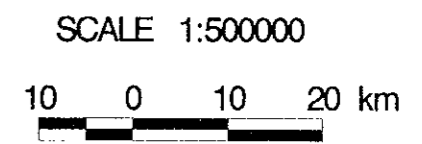
FIG.G.3.8 TN POLLUTION LOAD OF LIVESTOCK

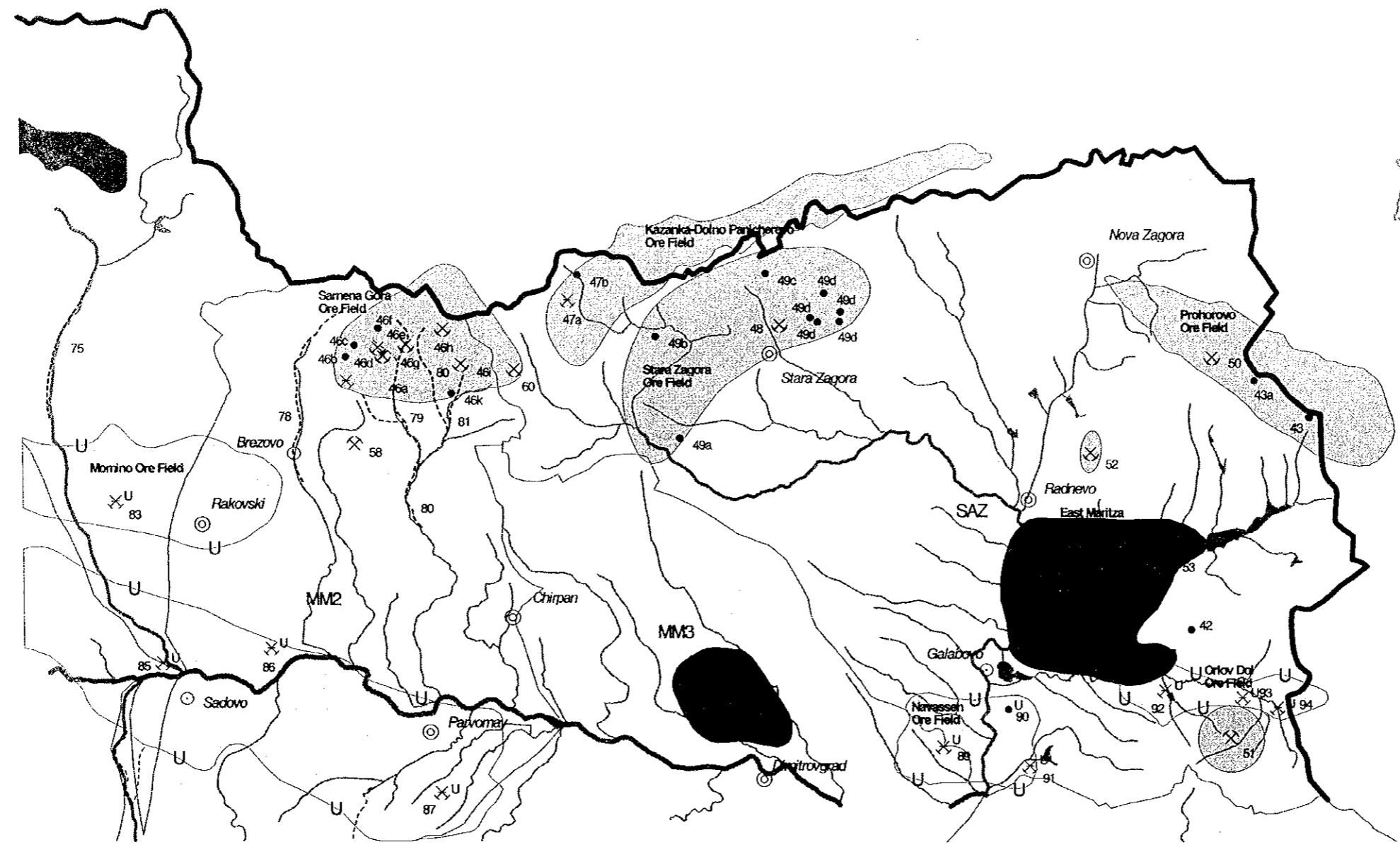
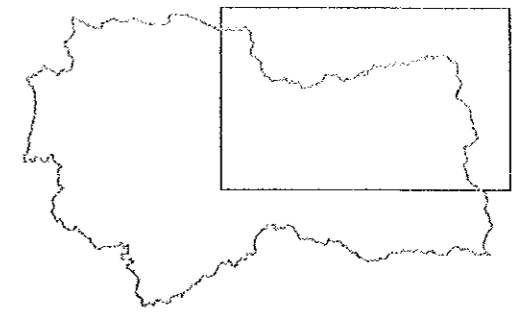
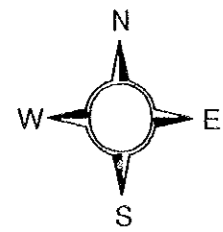


LEGEND

- ∨ Gold deposit (alluvial)
- Coal deposits
- ◇ Flotation plant
- Deposit without mining activity
- U Uranium deposit without mining activity
- Mine dump
- ⊗ Tailings pond
- ⊗ Active ore-mine, open pit
- ⊗ Active ore-mine, underground
- ⊗ Closed (or mined out) ore-mine, open pit
- ⊗ Closed (or mined out) ore-mine, underground
- ⊗^U Closed (or mined out) uranium mine, underground
- ⊕ Waste water treatment plant for mining industry
- ⊠ Smelter
- ▭ Ore region
- ▨ Ore field
- ▨^U Uranium ore field
- Coal basin

FIG. G.3.9 LOCATION OF MINING (1/4)

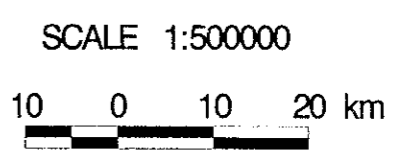


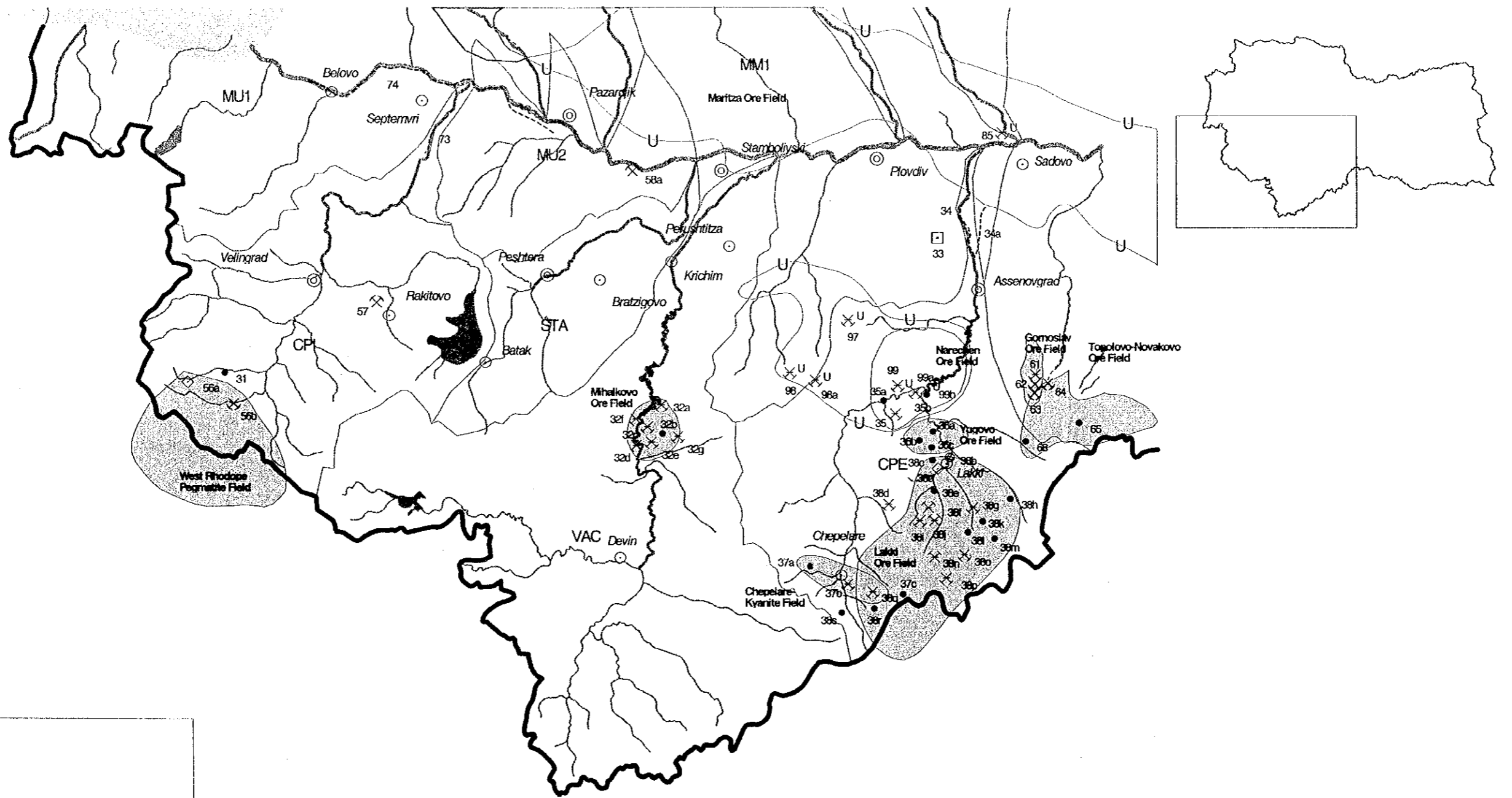
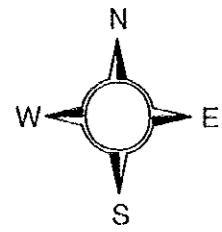


LEGEND

- ∨∨ Gold deposit (alluvial)
- Coal deposits
- ◇ Flotation plant
- Deposit without mining activity
- U Uranium deposit without mining activity
- Mine dump
- ⊙ Tailings pond
- ⊗ Active ore-mine, open pit
- ⊗ Active ore-mine, underground
- ⊗ Closed (or mined out) ore-mine, open pit
- ⊗ Closed (or mined out) ore-mine, underground
- ⊗^U Closed (or mined out) uranium mine, underground
- ⊕ Waste water treatment plant for mining industry
- ⊠ Smelter
- ▭ Ore region
- ▨ Ore field
- ▨^U Uranium ore field
- Coal basin

FIG. G.3.9 LOCATION OF MINING (2/4)



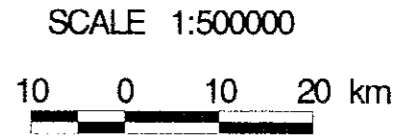


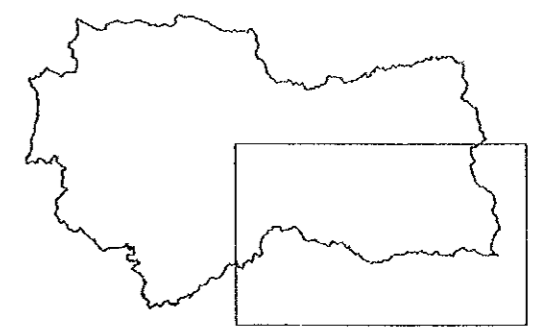
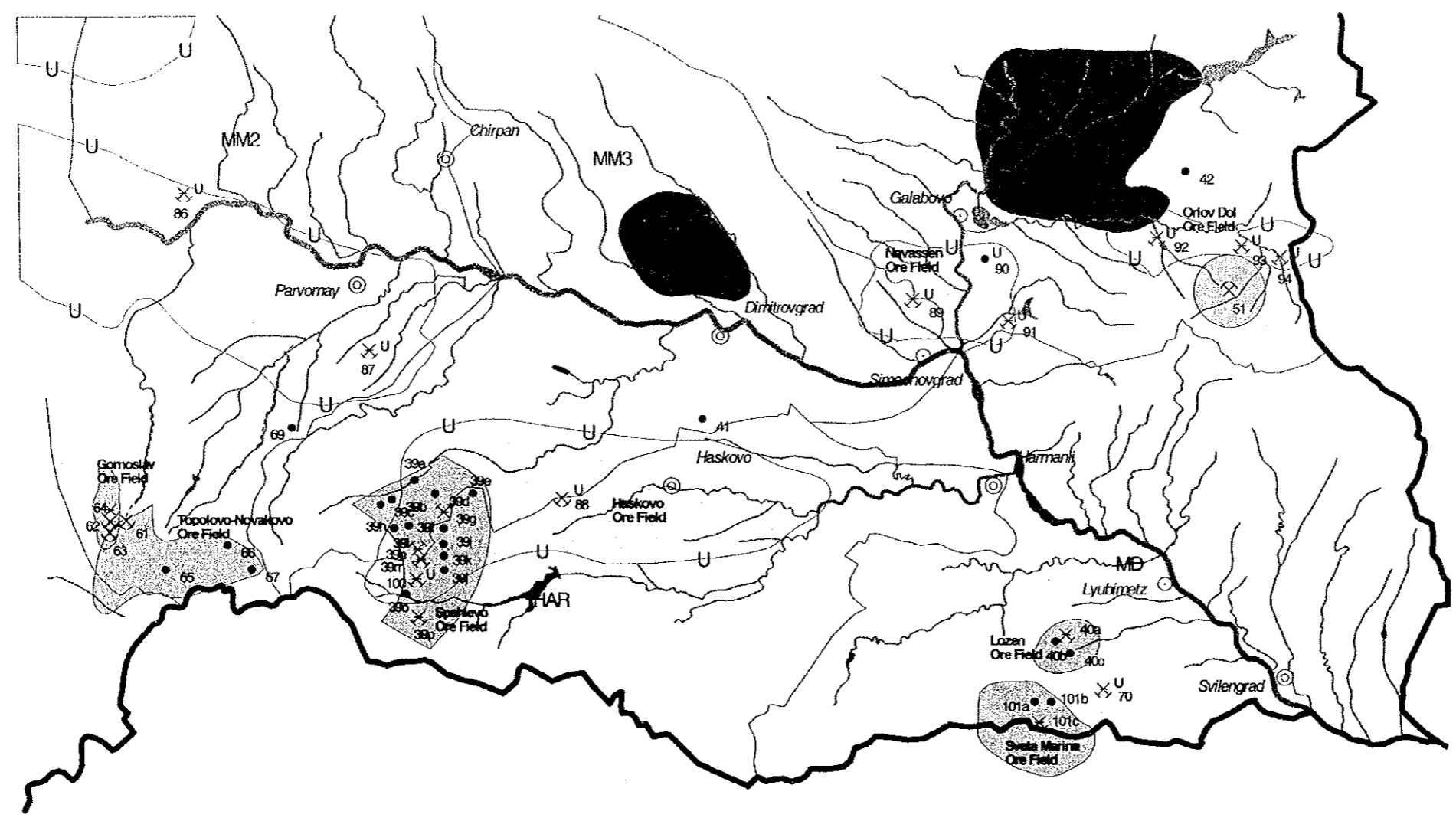
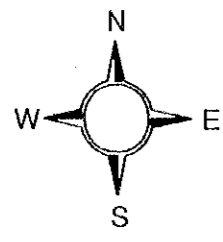
LEGEND

- ∧ Gold deposit (alluvial)
- Coal deposits
- ◇ Flotation plant
- Deposit without mining activity
- U Uranium deposit without mining activity
- Mine dump
- ⊙ Tailings pond
- ⊗ Active ore-mine, open pit
- ⊗ Active ore-mine, underground
- ⊗ Closed (or mined out) ore-mine, open pit
- ⊗ Closed (or mined out) ore-mine, underground
- ⊗ Closed (or mined out) uranium mine, underground
- ⊕ Waste water treatment plant for mining industry
- Smelter
- Ore region
- ▨ Ore field
- ▨ Uranium ore field
- Coal basin



FIG. G.3.9 LOCATION OF MINING (3/4)





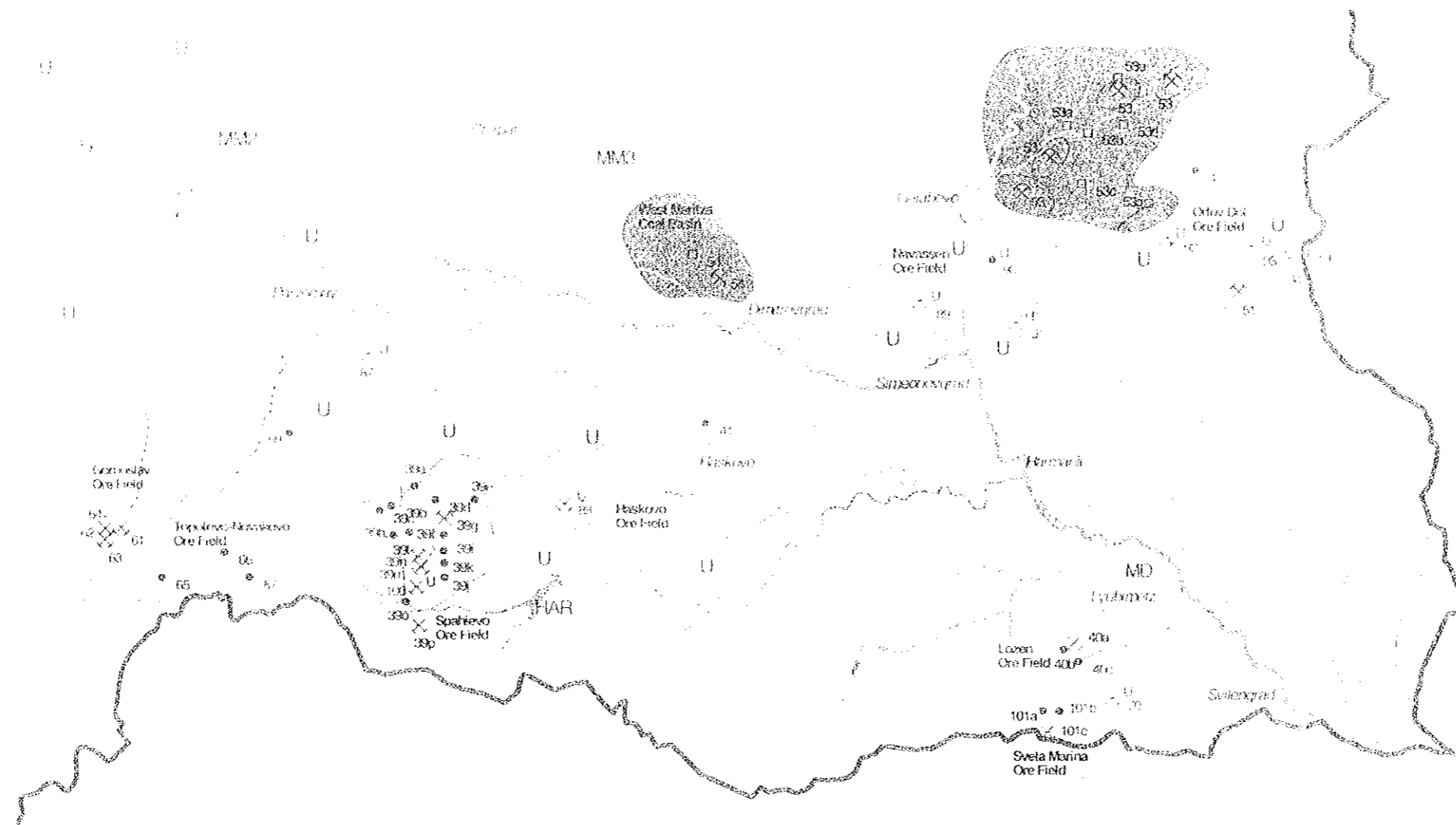
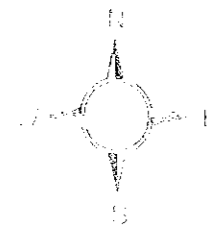
LEGEND

- ∧∧ Gold deposit (alluvial)
- Coal deposits
- ◇ Flotation plant
- Deposit without mining activity
- U Uranium deposit without mining activity
- Mine dump
- ⊙ Tailings pond
- ⊗ Active ore-mine, open pit
- ⊗ Active ore-mine, underground
- ⊗ Closed (or mined out) ore-mine, open pit
- ⊗ Closed (or mined out) ore-mine, underground
- ⊗^U Closed (or mined out) uranium mine, underground
- ⊕ Waste water treatment plant for mining industry
- ⊠ Smelter
- ▭ Ore region
- ▭ Ore field
- ▭ Uranium ore field
- ▭ Coal basin

SCALE 1:500000

10 0 10 20 km

FIG. G.3.9 LOCATION OF MINING (4/4)



LEGEND

- Ore deposit with active open-pit
- Ore deposit
- Evaporation plant
- Deposit with mining activity
- Uranium deposit with mining activity
- Mine dump
- Tailings pond
- Active ore mine open pit
- Active ore mine underground
- Closed or mined out ore mine open pit
- Closed or mined out ore mine underground
- Closed or mined out uranium mine underground
- Waste-water treatment plant for mining industry
- Smelter
- Ore region
- Ore field
- Uranium ore field
- Coal basin

SCALE 1:500000

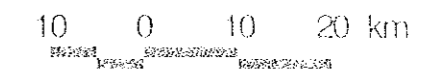
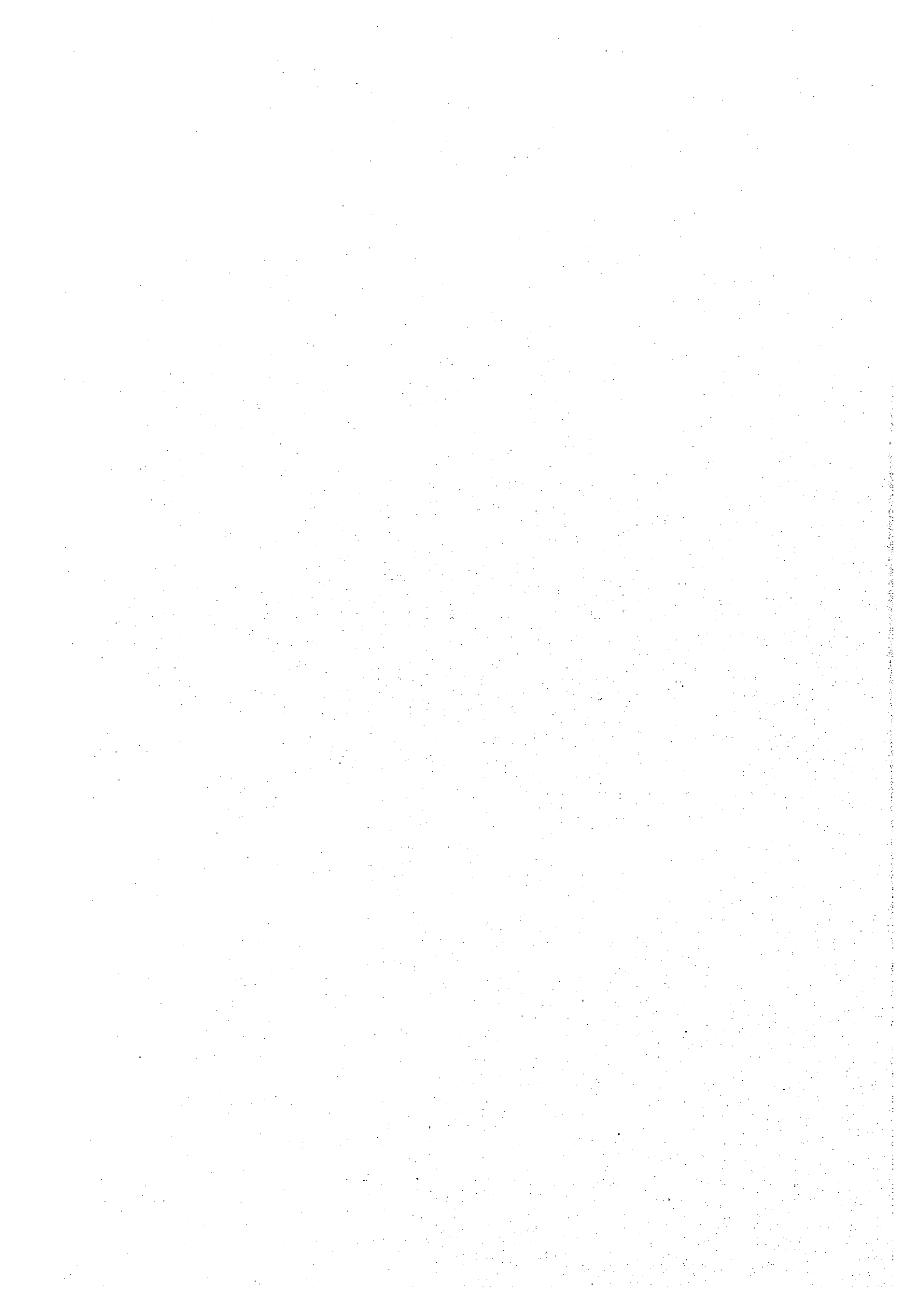


FIG. G.3.9. LOCATION OF MINING (1:4)



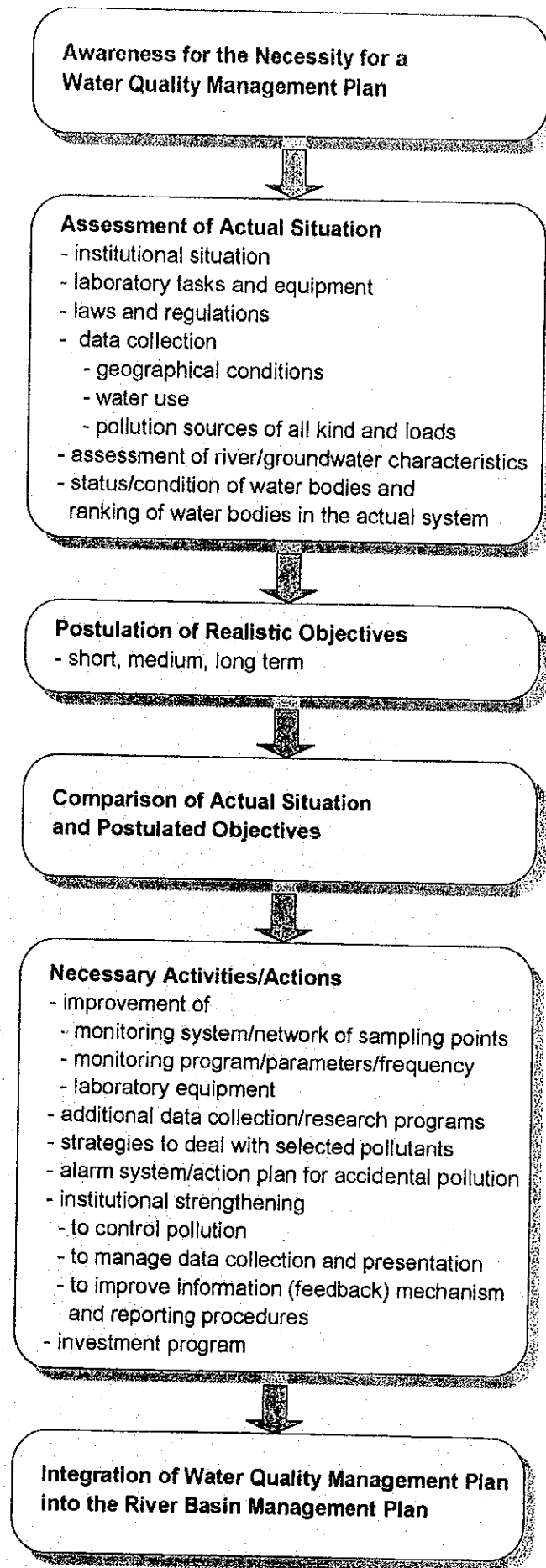
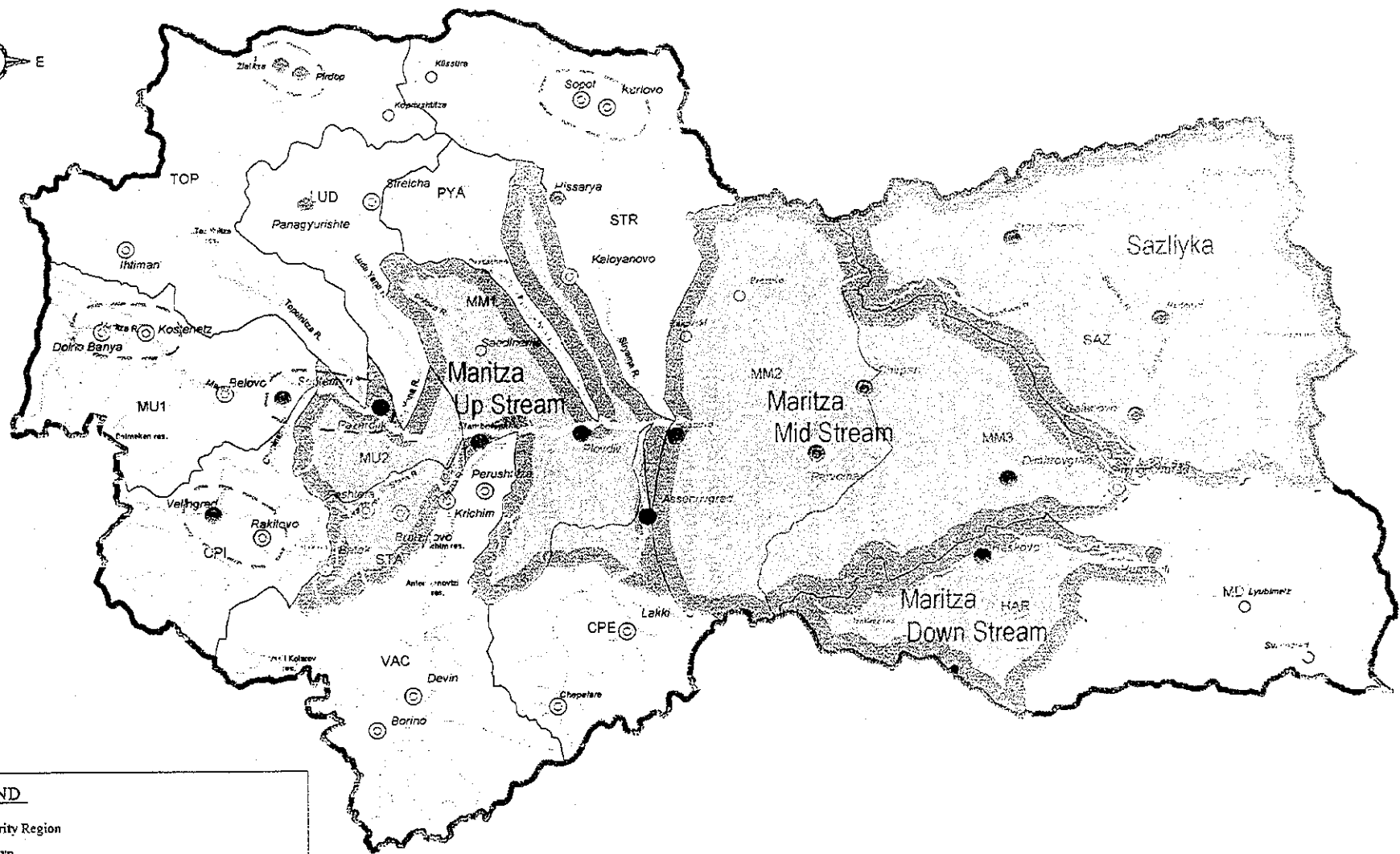
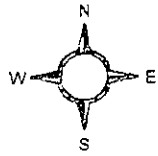


FIG.G.4.1

BASIC PROCEDURE OF WATER QUALITY MANAGEMENT PLAN



LEGEND

- Priority Region
- Priority Town**
 - 1st Priority (Completion of project by the year of 2005)
 - 2nd Priority (Completion of project by the year of 2010)
 - 3rd Priority (Completion of project by the year of 2015)
 - Grouped Town

SCALE 1: 1000000

FIG.G.4.2 ZONING AND PRIORITY TOWN

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JICA-Maritza River Study

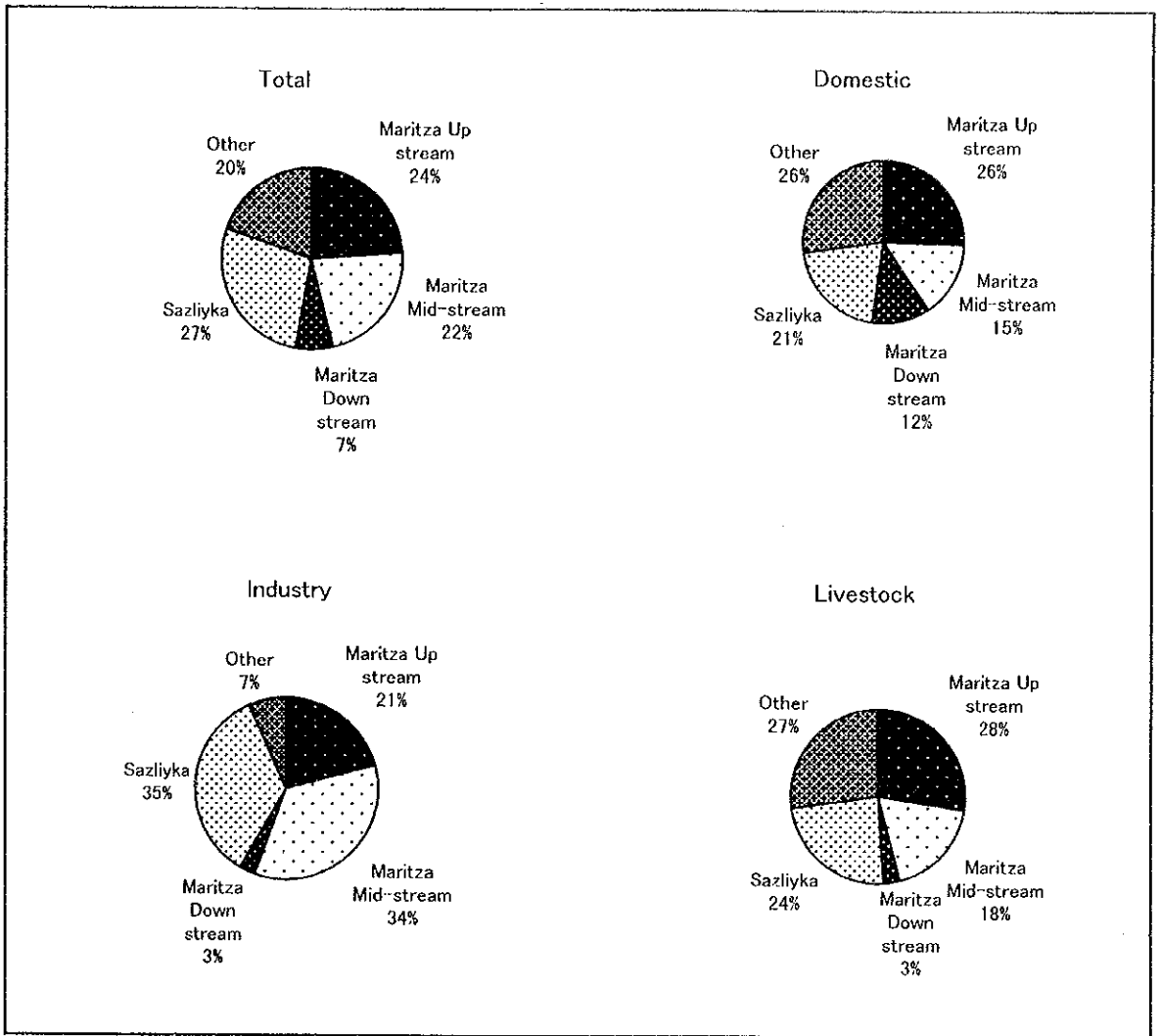


FIG.G.4.3 POLLUTION LOAD FROM PRIORITIZED REGIONS

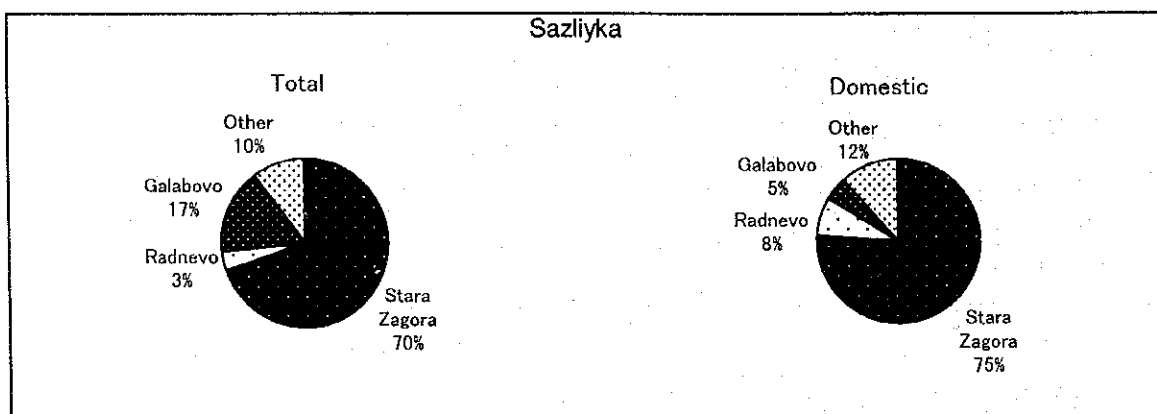
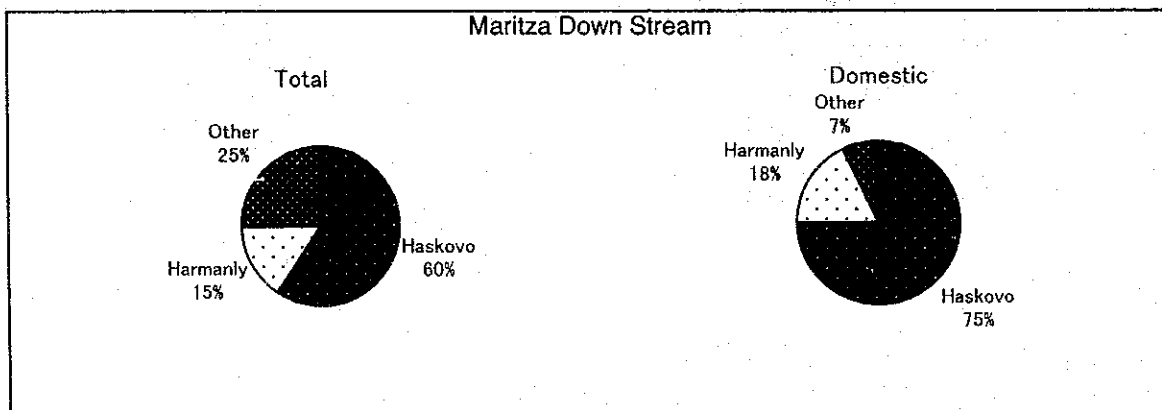
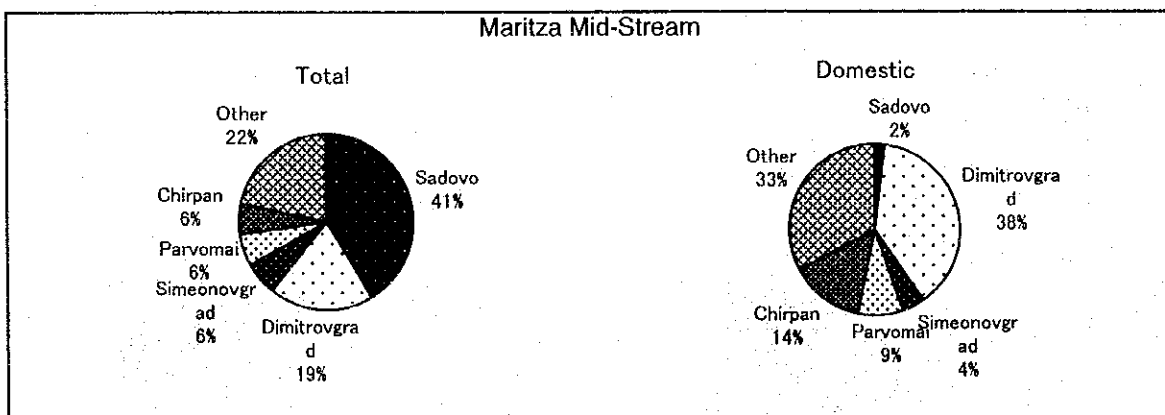
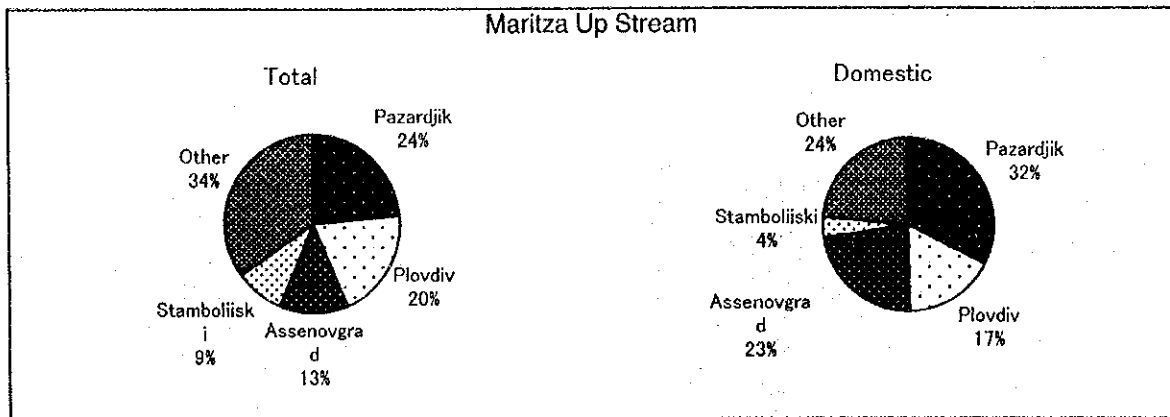
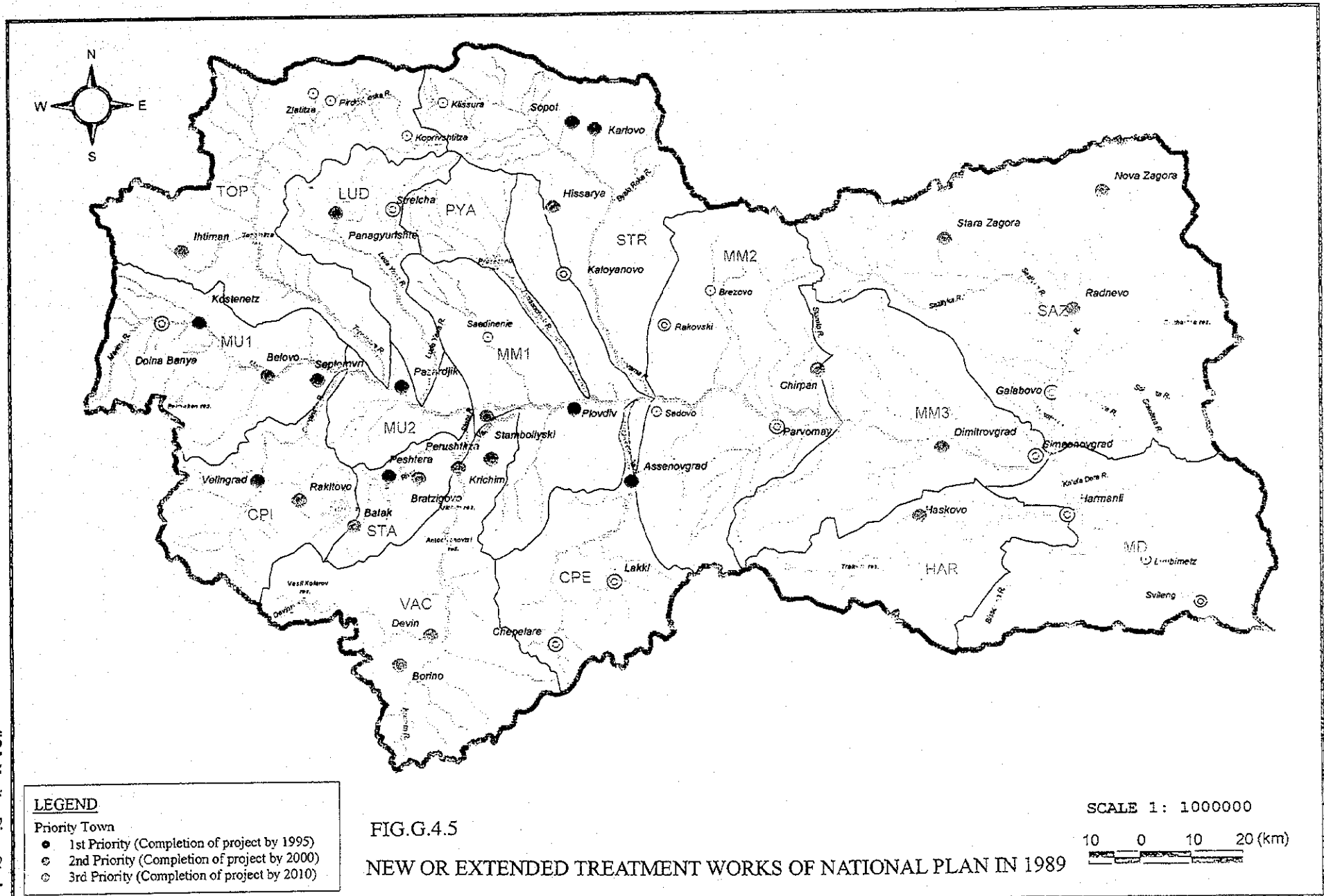
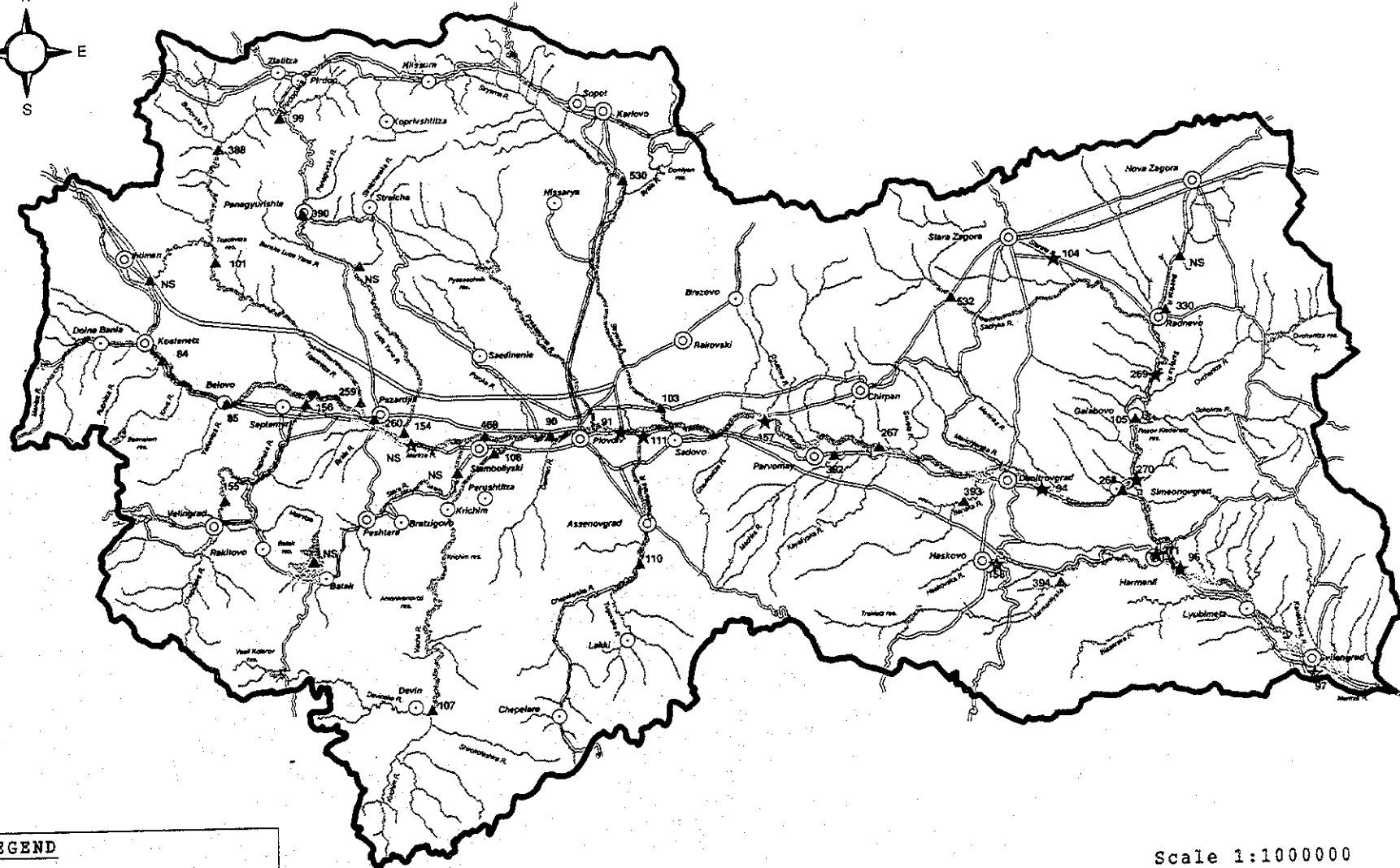
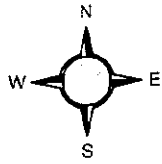


FIG.G.4.4 POLLUTION LOAD FROM MAJOR TOWNS IN PRIORITIZED REGIONS





LEGEND

- ★ Principal Station
- ▲ Auxiliary Station
- 84 Code No of existing NCESD Station
- NS Proposed New Station

Scale 1:1000000

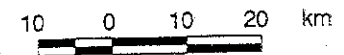


FIG.G.4.6 PROPOSED MONITORING SYSTEM

