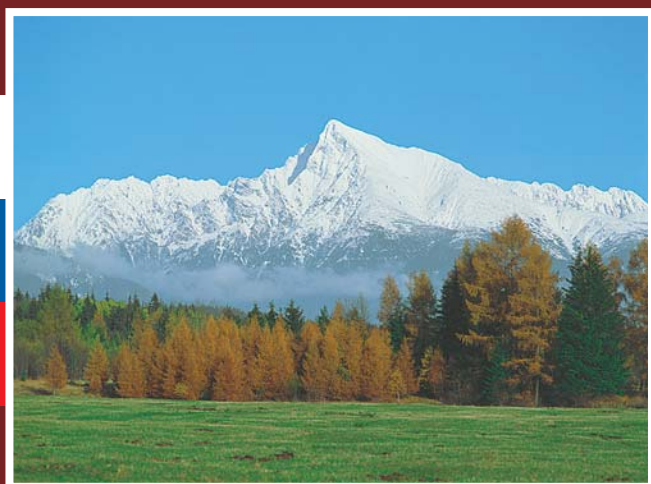


***Ministry of the Environment
of the Slovak Republic***



***STATE OF THE ENVIRONMENT
REPORT
SLOVAK REPUBLIC 2007***



***Slovak Environmental
Agency***





*The territory cannot be burdened by human activities over the bearable limit of load. The admissible **level of environment pollution** is given by threshold limits, specified by special regulations; these limits shall be specified in accord with the stage of knowledge, so that neither health of people, nor other living organisms and other elements of environment are threatened.*

§ 11 of the Act No. 17/1992 Coll. on Environment

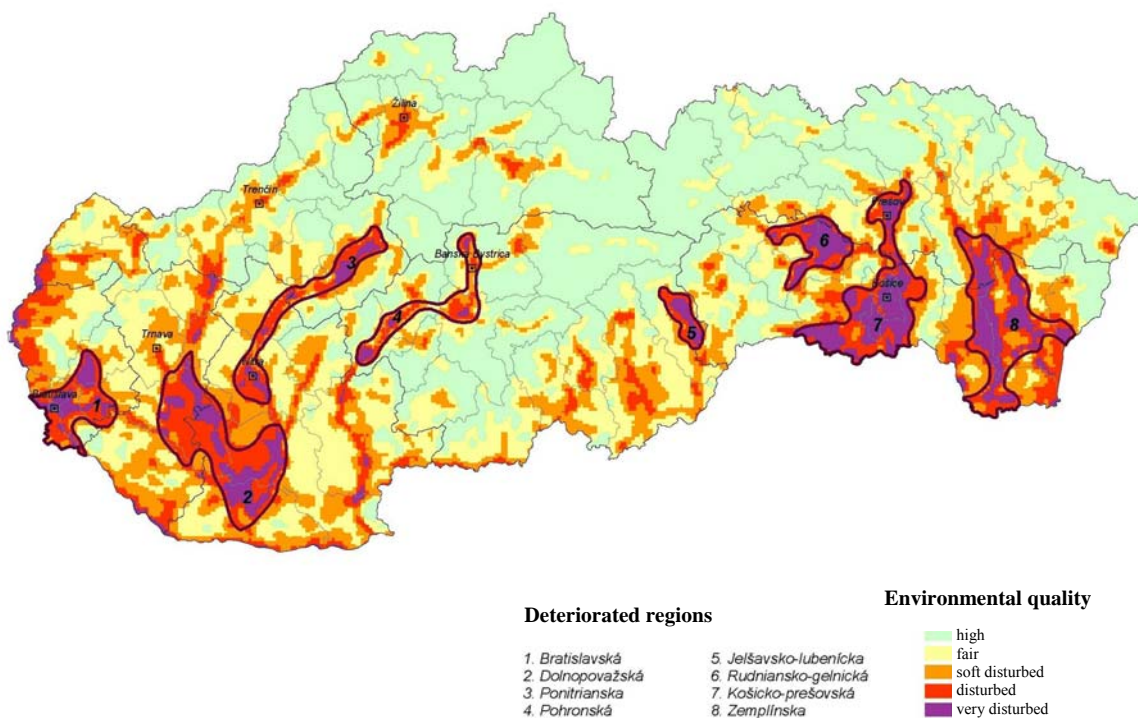
ENVIRONMENTAL REGIONALISATION

• ENVIRONMENTAL REGIONALISATION OF SLOVAKIA

Environmental regionalisation of Slovakia represents a cross-sectional source of information on the state of environment and reflects differentiated state of environment in different parts of the country. Regions show varying degree of individual environmental loads and also show different risk factors. These impacts, loads, or hazards show (along with a variety of natural conditions) mainly anthropogenic characteristics.

One of the final outputs is a map that evaluates the Slovak territory in 5 degrees of quality of environment, which is the basis for identification of areas with the greatest **environmental load**.

Quality of the environment and the loaded areas



Source: SEA

Differentiation of the SR territory by quality of environment

Quality of environment	Size (km)	% of SR size (49 034 km ²)
1 – high-quality environment	19 661	40.0
2 – suitable environment	12 580	25.7
3 – slightly damaged environment	9 055	18.5
4 – damaged environment	5 296	10.8
5 – heavily damaged environment	2 442	5.0

Source: SEA

Basic parameters of the loaded areas (LA)

LA	Area* (km ²)	Number of inhabitants	Location of ZO in the region – proportion in %
Bratislavská	488	432 000	Bratislavský 93 %, Trnavský 7 %
Dolnopovažská	1 261	247 000	Nitriansky 66 %, Trnavský 34 %
Ponitrianska	450	272 000	Nitriansky 51 %, Trenčiansky 49 %
Pohronská	203	186 000	Banskobystrický 100 %
Jelšavsko-lubenická	137	21 000	Banskobystrický 100 %
Rudniansko-gelnická	357	52 000	Košický 95 %, Prešovský 5 %
Košicko-prešovská	1 044	425 000	Košický 81 %, Prešovský 19 %
Zemplínska	1 040	173 000	Košický 83 %, Prešovský 17 %
Total	4 980	1 808 000	

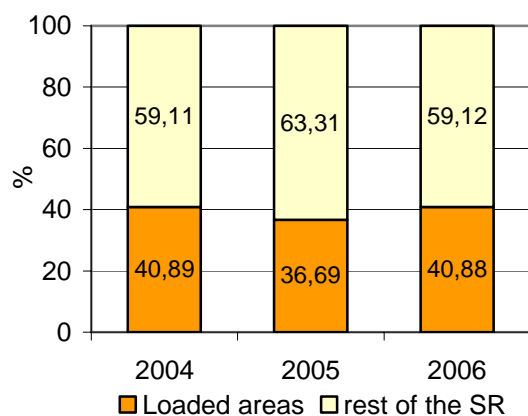
* The territory includes areas in the 5th and 4th degrees of environmental quality.

Source: SEA

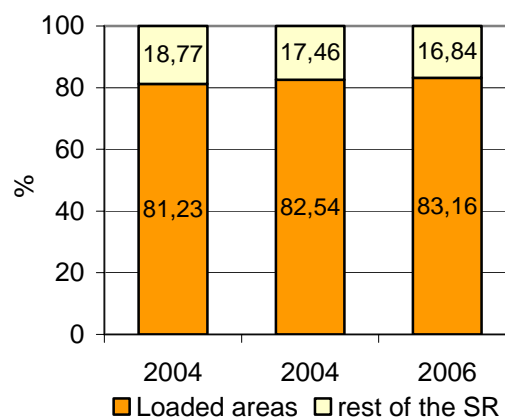
Loaded areas represent approximately 10 - 11 % of the SR territory. The charts show the fact that in the area of air pollution, water contamination, and waste generation that have significantly contributed to the state of environment in the territory; and most indicators show that the loaded areas bear 50 – 90 % of environmental load in Slovakia documented by individual indicators.

Air

PM emissions from stationary sources in LA

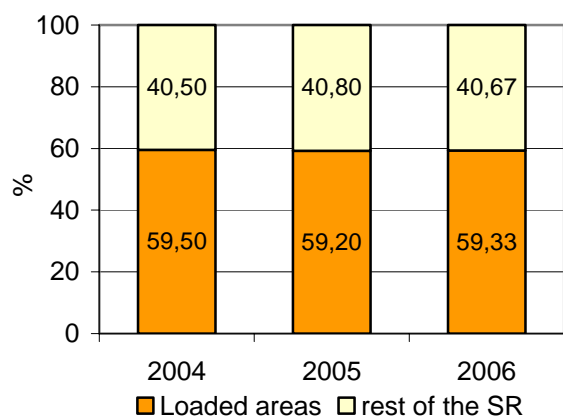


Source: SHMI

SO₂ emissions from stationary sources in LA

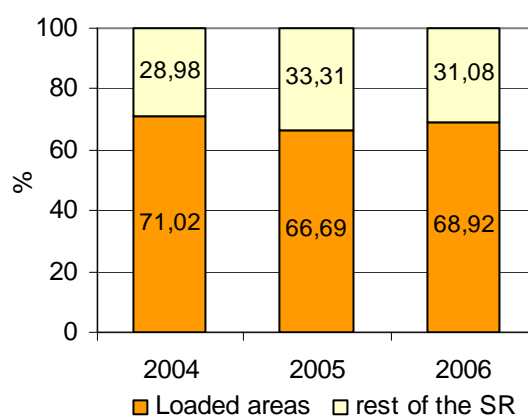
Source: SHMI

NO_x emissions from stationary sources in LA



Source: SHMI

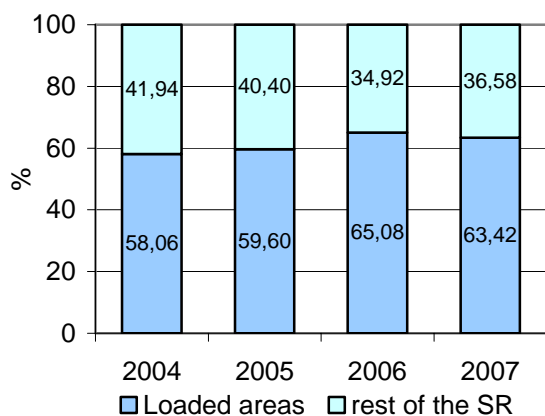
CO emissions from stationary sources in LA



Source: SHMI

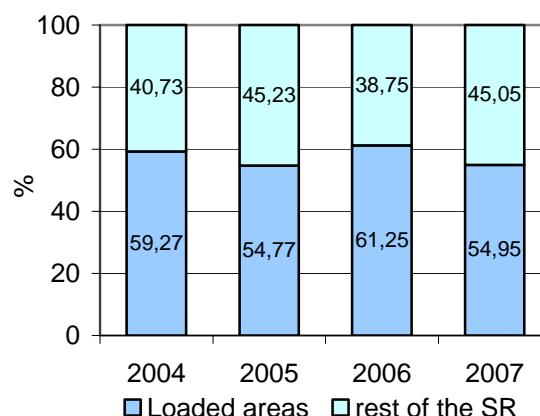
Water

Discharged BOD₅ contamination in LA



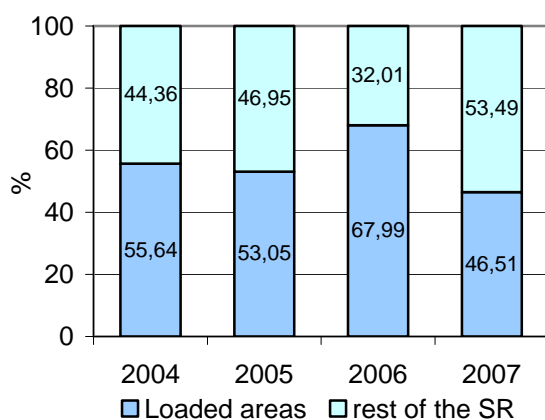
Source: SHMI

Discharged COD_{Cr} contamination in LA



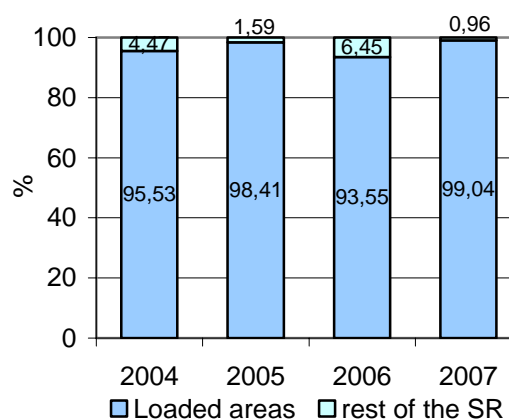
Source: SHMI

Discharged IS contamination in LA



Source: SHMI

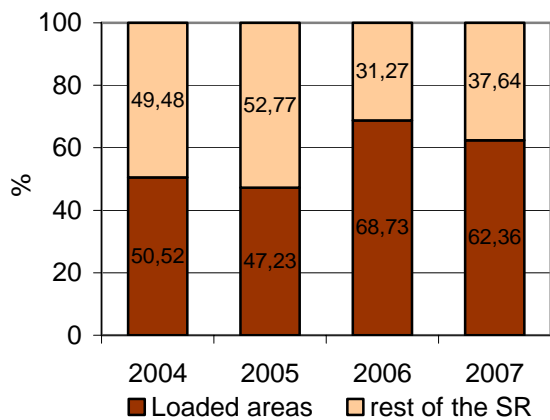
Discharged ENP_{UV} contamination in LA



Source: SHMI

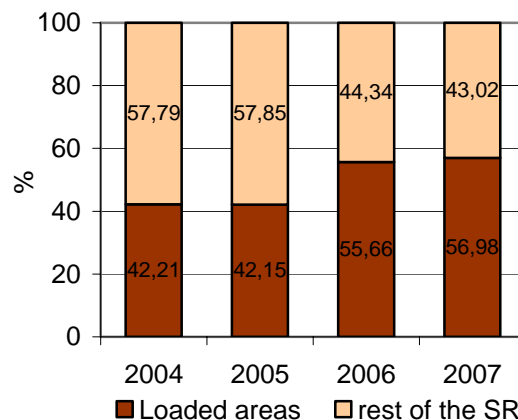
Waste

Other waste generated in LA



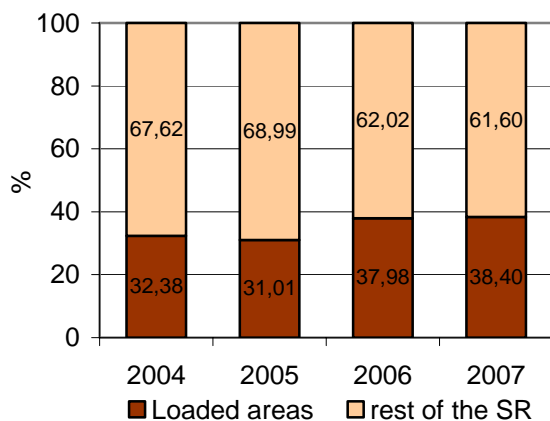
Source: SEA

Hazardous waste generated in LA

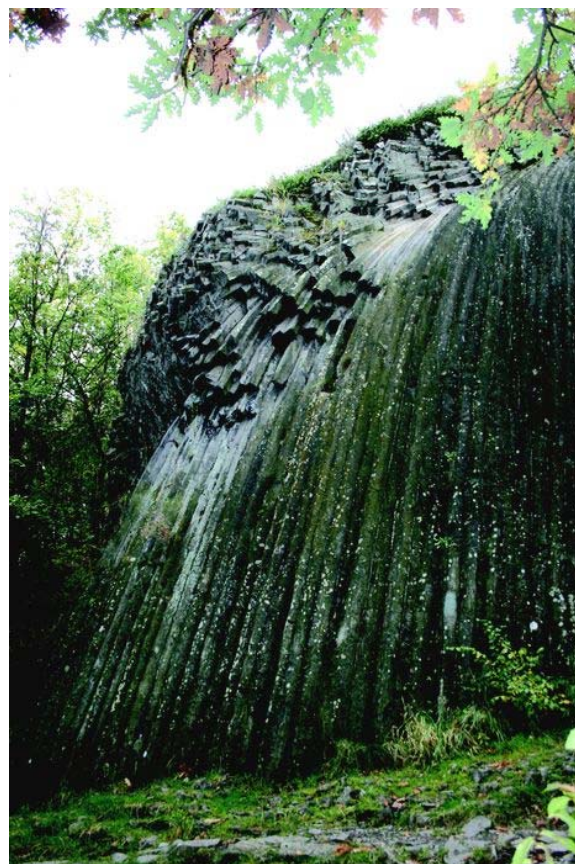


Source: SEA

Municipal waste generated in LA



Source: SEA





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§ 11 of the Act No. 17/1992 Coll. on Environment

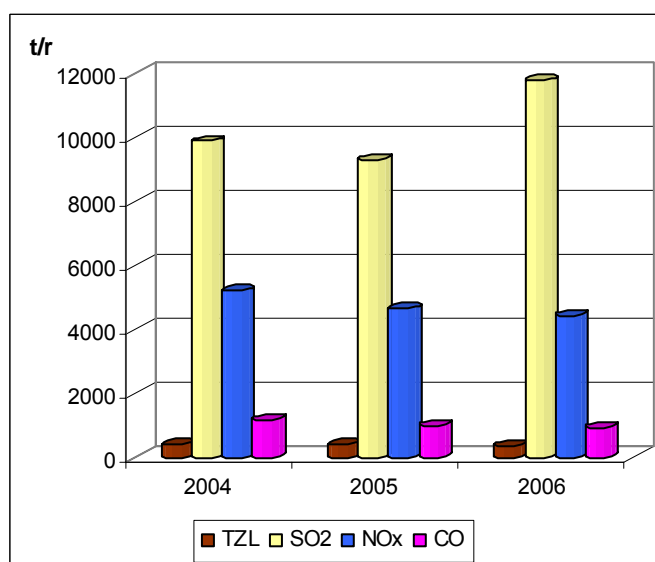
• LOADED AREAS

The Bratislava loaded area

◆ Air pollution

Large and middle-sized industrial sources of petrochemical, fuel-energy, and automobile industries are the main contributors to air pollution. Extensive construction activity and the related demolition, excavation and construction works represent another significant air-pollution source, along with an increasing concentration of road traffic.

Emission volumes in Bratislava loaded area



t/r – tons/year
TZL – PM

Source: SHMI

Assesment of air pollution by the limit values for human health protection, and limit values increased by the tolerance threshold (TT) for the year 2007 at the monitoring stations in Bratislava loaded area

Pollutant	Health protection											VHP ²⁾			
	SO ₂		NO ₂		NO ₂ +MT		PM ₁₀		*PM ₁₀		CO	Ben-zene	Ben.+MT	SO ₂	NO ₂
	1 hour	24 hour	1 hour	1 year	1 hour	1 year	24 hour	1 year	24 hour	1 year	8 hour ¹⁾	1 year	1 year	3 hour Floating average	3 hour Floating average
Limit value [$\mu\text{g}\cdot\text{m}^{-3}$]	350	125	200		230		50		50	40					
(number of exceeding measurements)	(24)	(3)	(18)	40	(18)	46	(35)	40	(35)		10000	5	8	500	400
Bratislava, Kamenné nám.							16	22.8	7	21.0					
Bratislava, Trnavské mýto			0	36.9	0	36.9	38	29.1	24	25.9	1910	1.7	1.7		0
Bratislava, Jeséniova			0	14.6	0	14.6	23	25.2	20	25.0					
Bratislava, Mamateyova	0	0	0	24.7	0	24.7	26	23.6	22	22.9				0	0

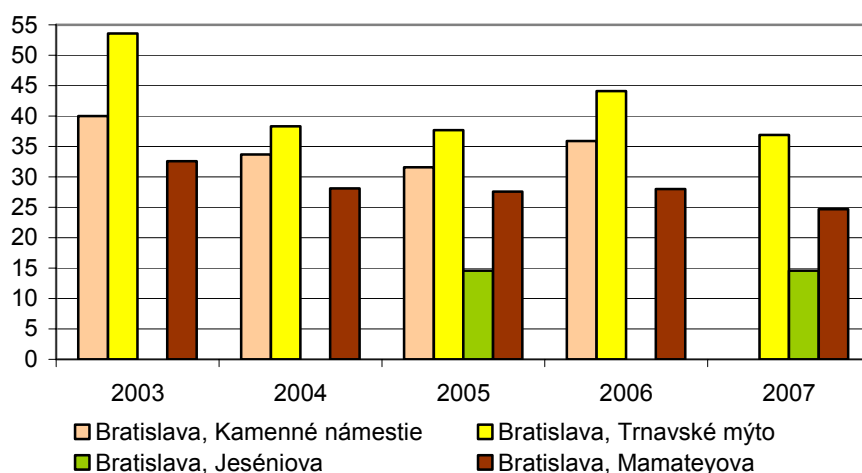
Source: SHMI

1) maximal eight-hour concentration

2) limit values for the alarm limit thresholds

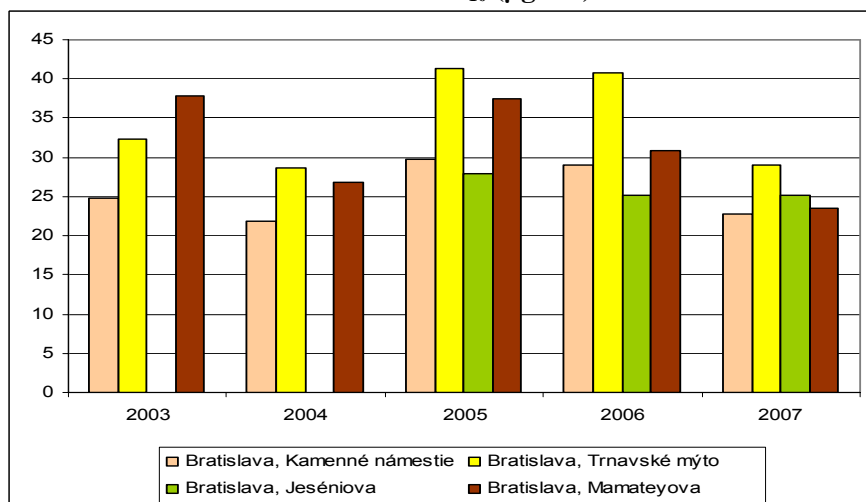
Pollutants exceeding the limit values are in bold

Trend in annual concentration of NO₂ ($\mu\text{g}\cdot\text{m}^{-3}$) in Bratislava loaded area



Source: SHMI

Trend in annual concentration of PM₁₀ ($\mu\text{g}\cdot\text{m}^{-3}$) in Bratislava loaded area



Source: SHMI

Permitted target number for detections of excessive contents of eight-hour ground ozone concentration ($120 \mu\text{g.m}^{-3}$) was exceeded at Bratislava-Jeséniova and Bratislava-Mamateyova monitoring stations.

Number of measured values exceeding the information threshold (IT) and the alarm threshold (AT) in ground ozone concentrations to inform or alarm the public in Bratislava loaded area

Station	IT _{1h} = 180 $\mu\text{g.m}^{-3}$					AT _{1h} = 240 $\mu\text{g.m}^{-3}$				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
Bratislava, Jeséniova	42	0	6	11	10	3	0	0	0	0
Bratislava, Mamateyova	32	0	8	19	17	3	0	0	0	1

Source: SHMI

Number of days showing the exceeded average eight-hour O₃ 120 $\mu\text{g.m}^{-3}$ ground ozone concentration (target value for protection of human health) in Bratislava loaded area

Station	2005	2006	2007	Average 2005-2007
Bratislava, Jeséniova	52	50	31	44
Bratislava, Mamateyova	42	34	37	38

Source: SHMI

An air-quality management area for the PM₁₀ pollutant is designated for the Bratislava metropolitan territory within the loaded area.

◆ **Surface water contamination**

Danube is the major water course in the area. Contributors of water contamination include industrial and municipal waste water, agricultural activities, and ship transport. Quality of Danube water in the area has been adversely affected by contamination flowing from its upper feeding stream, Morava. It is mainly the discharged cooling waste water from Slovnaft and the run-off water from towns, that influence the quality of the Malý Danube water.

Surface water quality in the Bratislava loaded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Danube	Karlova Ves	39	6	15
	Bratislava left bank	33	3	18
	Bratislava centre	50	5	10
	Bratislava right bank	32	3	9
	Rajka	29	6	21
Malý Danube	Bratislava	21	3	14
	Malinovo	16	1	6

Source: SHMI

◆ Ground water contamination

Groundwater quality for the affected area has been monitored in 2 groundwater formations - in quaternary sediments and in 2 formations of groundwater inside pre-quaternary rocks.

Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. in 2007 were exceeded in both groundwater formations inside quaternary sediments extending into the affected area. The most frequently exceeded indicators include total Fe, Mn, and nitrates. Limit values for heavy metals were exceeded for the categories of Al and As.

The area still shows an adverse situation in ground water contamination by sulphates, nitrates, chlorides, heavy metals, and specific organic compounds. This has been caused mainly by a heavy concentration of chemical and petrochemical industries, and a dense population.

◆ Sources of water contamination

Major sources of water contamination and contamination discharged to surface water within Bratislava loaded area

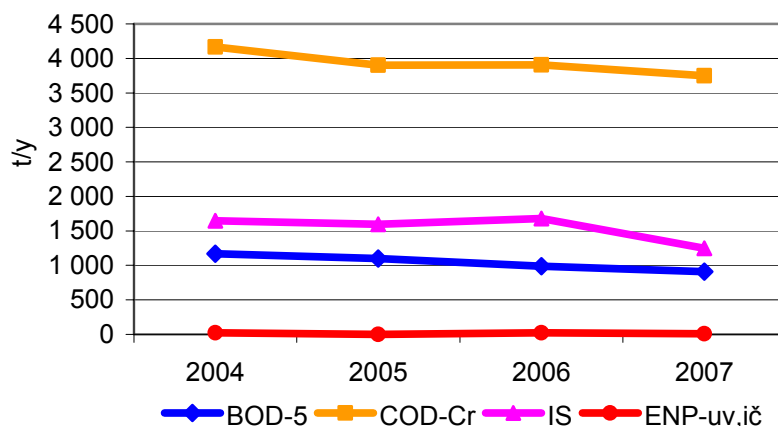
Source of contamination	BOD ₅ (t.y ⁻¹)				COD _{Cr} (t.y ⁻¹)			
	2004	2005	2006	2007	2004	2005	2006	2007
Slovnaft, Inc.,-WWTP	77.34	70.34	77.15	56.97	395.04	484.80	522.63	418.11
Istrochem, Inc.,-WWTP	729.29	696.49	532.51	512.96	1 905.23	1 594.24	1 404.52	1 436.10
Slovnaft bl. 17-18 WWTP	125.79	123.82	133.23	108.59	516.58	573.82	597.73	613.18
WWTP Vrakuňa	176.04	149.68	171.65	174.79	1 010.29	893.21	1 005.07	987.02
WWTP Petržalka	60.71	58.16	72.27	54.95	337.86	353.39	373.92	295.81

Source: SHMI

Source of contamination	IS (t.y ⁻¹)				ENP _{UV,IC} (t.y ⁻¹)			
	2004	2005	2006	2007	2004	2005	2006	2007
Slovnaft, Inc.,-WWTP	113.94	113.41	142.54	82.22	3.14	0	5.08	1.35
Istrochem, Inc.,-WWTP	57.71	47.89	59.25	102.51	1.29	0.66	0.75	0.99
Slovnaft bl. 17-18 WWTP	535.24	573.88	502.98	565.13	16.62	0	18.53	7.94
WWTP Vrakuňa	728.95	641.01	715.35	387.10	0	0	0	0
WWTP Petržalka	209.83	217.61	257.63	112.34	0	0	0	0

Source: SHMI

Trend in discharging of the pollution from significant resource into watercourses in Bratislava loaded area



Source: SHMI

◆ Waste management

Balance of waste generation

Waste production in Bratislava affected area

Sort of waste	Waste production (t.y ⁻¹)			
	2004	2005	2006	2007
Hazardous waste	74 195.38	51 555.00	80 223.48	99 538.62
Other waste	1 524 273.38	866 951.67	3 208 571.95	2 085 538.57
Municipal waste	184 937.70	200 998.52	194 973.39	208 315.43
Waste production in total	1 783 406.46	1 119 505.19	3 483 769.82	2 393 392.62

Source: SEA, SO SR

Waste handling

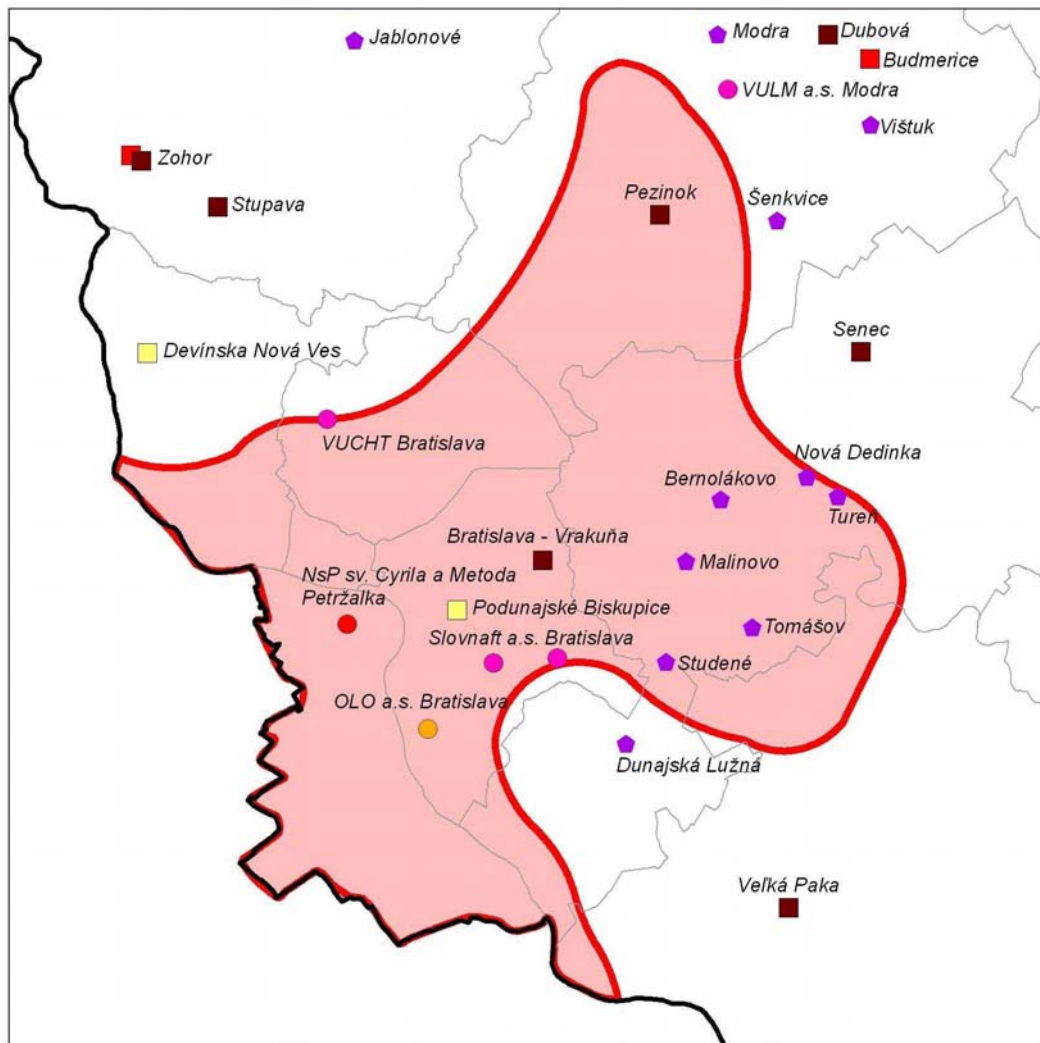
The most frequent waste handling activities within the monitored area include landfills and incineration. 44 – 84 % of annual production of the other waste and approximately 18 % of annual production of hazardous waste was disposed of at landfills, while 17 % of annual production of hazardous waste was disposed of through incineration. The year 2007 showed a more significant share of biologically eliminated hazardous waste. Annual production of hazardous waste reclamation rate was approximately 35 %, for other waste it was within the interval of 12 – 29 %.

Waste handling activities in the Bratislava loaded area

Waste handling	2004		2005		2006		2007	
	Waste amount (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	27 923.00	240 324.00	18 740.33	250 572.75	25 062.52	378 739.26	33 835.51	494 121.71
Disposal through landfills	17 766.00	1 241 388.00	9 603.99	383 985.22	11 982.73	2 686 387.65	14 490.21	1 494 525.23
Disposal through incineration	18 089.00	1 702.00	11 566.88	3 048.05	13 958.96	19 338.64	3 955.61	2 104.14
Biological disposal	5 222.00	8 024.00	5 311.24	4 409.61	5 476.08	2 186.18	23 763.74	1 929.36
Other disposal	5 195.00	32 835.00	6 329.87	224 934.06	23 743.26	121 920.33	23 493.54	92 858.14

Source: SEA

Waste disposal facilities in Bratislava affected area in 2007



Waste disposal facilities

- Municipal waste incinerator
- Medical waste incinerator
- Industrial waste incinerator
- Hazardous waste landfill
- Non-hazardous waste landfill
- Inert waste landfill
- ◆ Landfill operated under special conditions

Source: SEA

The Lower Považie loaded area

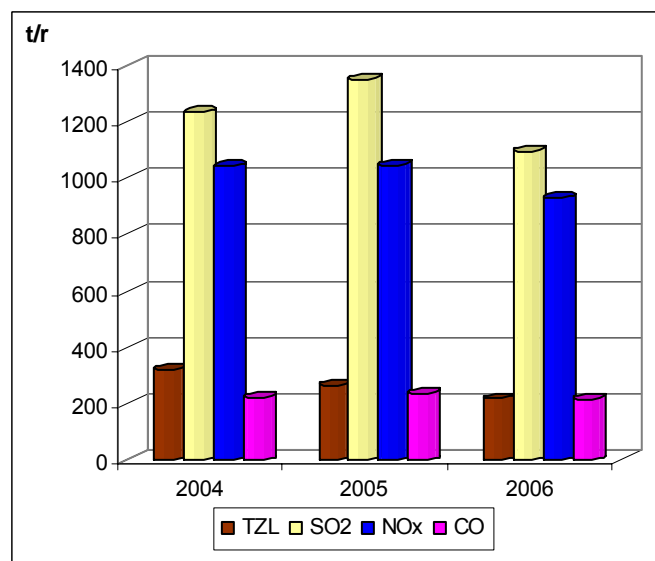
♦ Air pollution

Air quality has been affected mainly by industrial sources including chemical and food industries, production of glass fibre, agricultural production, and waste elimination. Other significant air pollution sources also include traffic, suspension and re-suspension of particles from insufficiently cleaned roads, construction sites, storing places of powdery material, and heating of houses with solid fuel. Emissions of all basic pollutants in 2006 showed a decreasing tendency.

Five major operators of air pollution sources in the Lower Považie loaded area

No.	Operator
1.	Duslo, Inc., Šaľa
2.	Slovak sugar, Inc., Premises Sereď
3.	Mach-Trade, Ltd., Sereď
4.	Zelex Slovakia, Ltd., Komárno
5.	QUEEN, Ltd., Neded

Emission volumes in the Lower Považie loaded area



t/r – tons/year
TZO – PM

Source: SHMI

There is no air pollution monitoring station within the area. Therefore, air quality of this loaded area cannot be assessed.

♦ Surface water contamination

The area includes the lower portion of the Váh River that receives run-off and industrial waste water. Váh in this area is periodically affected by contaminated streams of Trnávka and Dolný Dudváh, with 32-58 % of the indicators not complying with the SR GO 296/2005 Coll. Trnávka and Dolný

Dudváh belong to the most heavily contaminated streams in the SR. The ENP_{UV} indicator in the Váh river shows the most adverse situation.

The area also includes the lower Nitra River region. This part of the river together with its feeding streams has been impacted by the food industry and discharged run-off waste water from residential zones. The water course is heavily contaminated. Microbiological indicators show worse situation with the presence of the coliform bacteria, thermo-tolerant coliform bacteria and fecal streptococci that do not comply with SR GO 296/2005 Coll. Limit values also exceed the contents of Al and Hg. This situation in water quality is impacted also by contamination coming from the upper and middle parts of the stream.

Surface water quality in the Lower Považie laded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Váh	Nad Sereďou	29	3	11
	Vlčany	39	2	5
	Kolárovo	15	1	7
Trnávka	Modranka	22	7	32
Dolný Dudváh	Sládkovičovo	24	14	58
Nitra	Komoča	48	12	25

Source: SHMI

♦ Ground water contamination

Groundwater quality for the affected area has been monitored in 3 groundwater formations – in quaternary sediments and in 1 formation of groundwater inside pre-quaternary rocks.

Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. In 2007 were exceeded in all groundwater formations extending into the affected area. Most frequently exceeded indicators include total Fe, Mn, nitrates, sulphates, chlorides, ammonium ions, and chemical oxygen demand for Mn (COD_{Mn}). Limit values for heavy metals were exceeded for the categories of Al and As. Monitoring for organic substances shows exceeded values for total organic carbon, UI insoluble substances (IS_{UI}), benzene, chlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,1,2-tri-chloroethene, and poly-aromatic hydrocarbons. Exceeded were also the limit values for pesticides.

Groundwater is heavily attacked by agricultural and industrial activities.

♦ Sources of water contamination

Major water contamination sources for both the loaded area, as well as the whole SR territory, include WWTP Duslo, Inc. Šaľa, WWTP Trnava, WWTP Nové Zámky, and WWTP Galanta. Other than the mentioned sources, sewerages of the cities of Sereď, Šaľa, Sládkovičovo, and the sugar refinery in Sereď, significantly impact water contamination.

Major sources of water contamination and contamination discharged to surface water within the Lower Považie loaded area

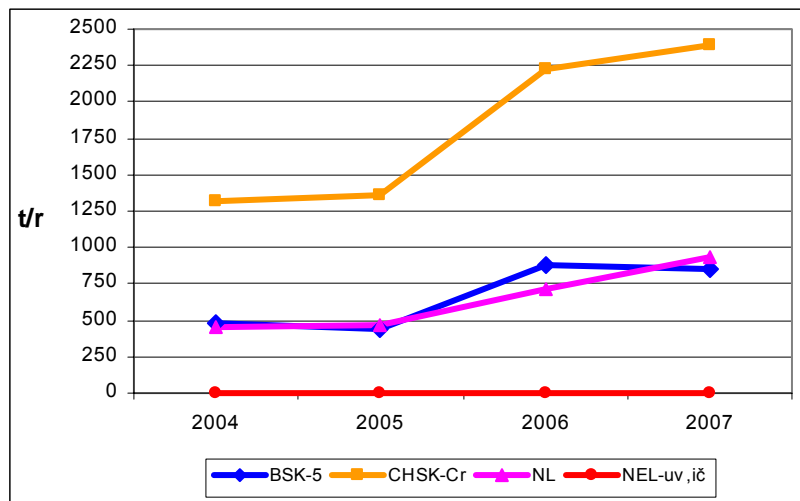
Source of contamination	BOD ₅ (t.y ⁻¹)				COD _{Cr} (t.y ⁻¹)			
	2004	2005	2006	2007	2004	2005	2006	2007
Duslo, Inc., Šaľa – WWTP	181.90	118.30	241.16	69.62	592.48	497.87	686.92	605.47
WWTP Trnava-Zeleneč	111.63	139.20	173.52	396.54	343.19	456.15	542.98	976.15
WWTP Nové Zámky	66.72	75.62	332.54	322.11	155.25	176.18	689.42	635.47
WWTP Galanta	108.31	96.03	124.84	56.64	225.22	219.91	301.53	166.02
Slovak sugar, Inc. Sereď	12.44	11.51	2.83	2.14	4.65	3.86	1.07	9.01

Source: SHMI

Source of contamination	IS (t.y ⁻¹)				ENP _{UV,IC} (t.y ⁻¹)			
	2004	2005	2006	2007	2004	2005	2006	2007
Duslo, Inc., Šaľa – WWTP	157.49	121.04	114.76	206.19	2.68	1.44	1.96	1.57
WWTP Trnava-Zeleneč	108.62	144.31	160.65	357.68	0	0	0	0
WWTP Nové Zámky	82.64	95.89	380.42	327.41	0	0	0	0
WWTP Galanta	53.61	50.01	60.65	42.72	0	0	0	0
Slovak sugar, Inc. Sereď	56.87	55.63	3.44	2.45	0	0	0	0

Source: SHMI

Trend in discharging of the pollution from significant resource into watercourses in Lower Považie loaded area



BSK – BOD, CHSK – COD, NL – IL, NEL - ENP

Source: SHMI

◆ Waste management

Balance of waste generation

Based on the RISO data, total production of waste in the area during 2004-2007 showed a rising trend, due to the production of other waste categories that have has a decisive effect on total production of waste within the area. Production of municipal waste did not show major changes.

Waste production in the Lower Považie loaded area

Sort of waste	Waste production (t.y ⁻¹)			
	2004	2005	2006	2007
Hazardous waste	15 543.23	14 844.98	43 791.96	7 501.49
Other waste	79 003.43	202 317.31	237 375.97	317 931.89
Municipal waste	84 220.43	75 462.03	80 448.77	86 401.29
Waste production in total	178 767.36	292 624.32	361 616.70	411 834.67

Source: SEA, SO SR

Waste handling

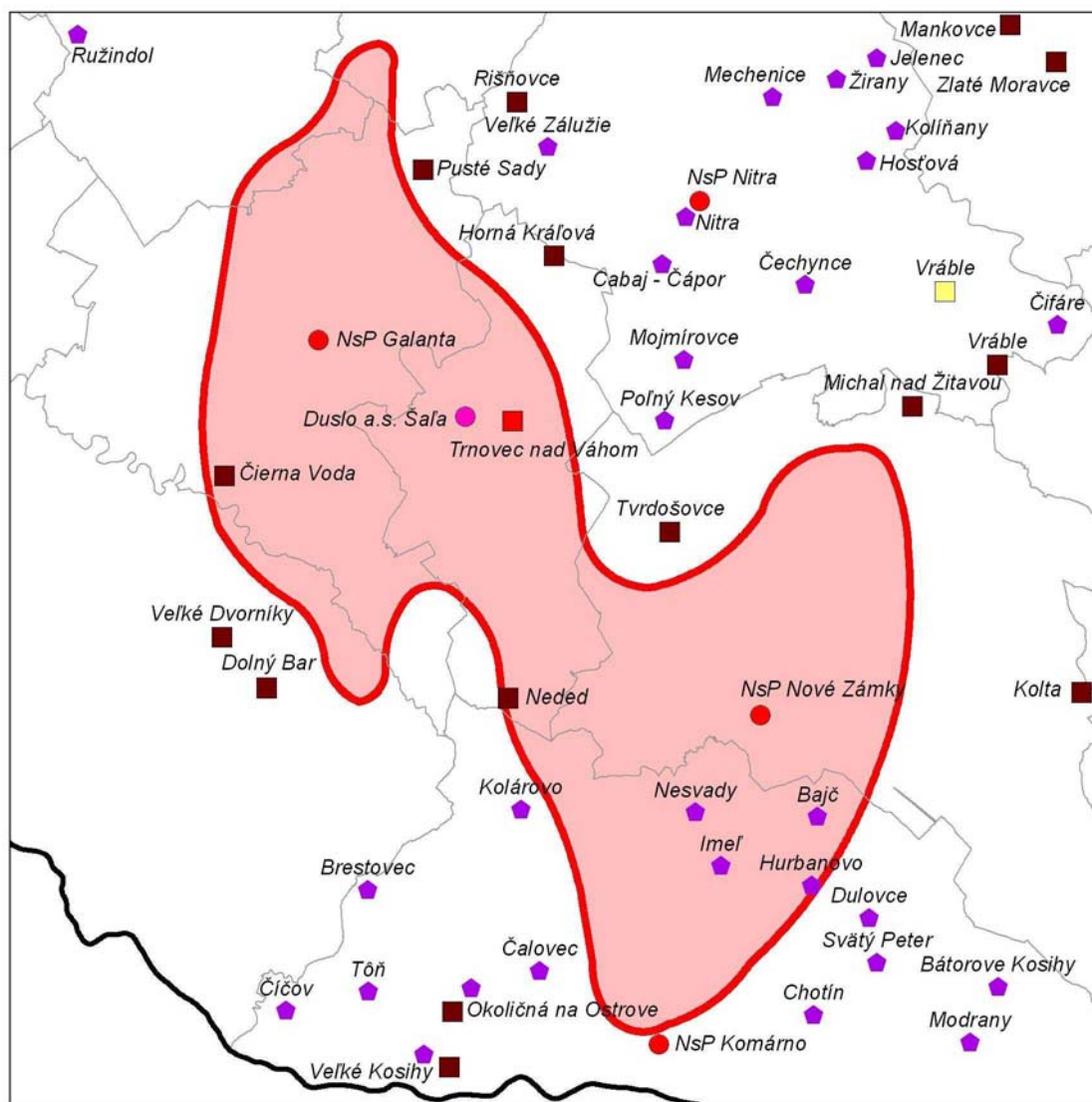
Waste disposal on landfills was the most frequent hazardous waste disposal approach in the area, showing the average of 43 %. Waste elimination through incineration was prevalent in 2004-2006, with the average of 47 %; however, in 2007 it dropped substantially to 7 %. Since 2006, another form of hazardous waste elimination grew to the average of 27 %. In 2006, hazardous waste reclamation grew from 5 % to 31 %, which persisted also in the following year at the level of 21 %. Total assessment of other waste handling activities shows the dominance of other waste handling activities within the interval of 56-75 %, with waste disposal through landfills showed significantly decreasing trend. The area shows an increase in other waste reclamation activities, staying at 26 % in 2006.

Waste handling activities in the Lower Považie loaded area

Waste handling	2004		2005		2006		2007	
	Waste handling (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	900.00	16 472.00	812.96	15 472.91	13 499.59	69 296.53	1 596.94	70 383.37
Disposal through landfills	5 853.00	15 575.00	3 881.08	38 554.12	11 748.50	33 587.25	3 306.88	8 042.41
Disposal through incineration	7 440.00	307.00	7 465.93	808.82	17 033.38	263.72	538.75	505.31
Biological disposal	223.00	23.00	45.89	173.35	275.45	384.68	165.23	147.14
Other disposal	1 127.00	46 626.00	2 638.46	147 307.75	1 235.14	133 843.79	1 893.70	238 853.64

Source: SEA

Waste disposal facilities in the Lower Považie loaded area 2007



Waste disposal facilities

- Municipal waste incinerator
- Medical waste incinerator
- Industrial waste incinerator
- Hazardous waste landfill
- Non-hazardous waste landfill
- Inert waste landfill
- ◆ Landfill operated under special conditions

Source: SEA

The Ponitrie loaded area

♦ Air pollution

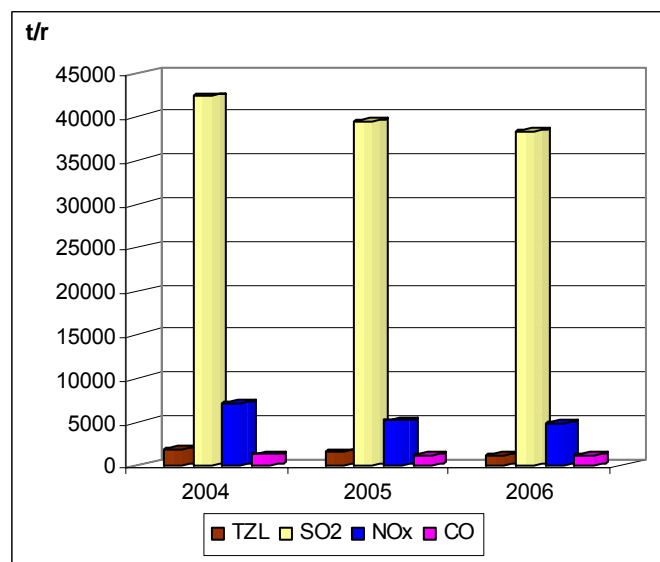
The affected area shows large industrial sources that are major representatives of fuel-energy, mining, and chemical industries. Other sources that contribute to air pollution include mostly traffic, suspension and re-suspension of particles from insufficiently cleaned roads, construction sites and other municipal areas, household heating places for solid fuel, coal stores in the district of Prievidza, and energy sector tailing dumps.

Five major operators of air pollution sources in the Ponitrie loaded area

No.	Operator
1.	Novácke chemické závody, Inc. , Nováky
2.	SE, Inc., Bratislava, - ENO Zemianske Kostofany
3.	KVARTET, Inc., Partizánske
4.	TSM, Ltd., Partizánske
5.	IDEA NOVA, Ltd., Nitra

In 2007, 24-hour limit value for public health protection for PM₁₀ was exceeded at all monitoring stations except the station of Nitra – J. Kráľa Annual limit value was exceeded only at Prievidza-Malonepalská monitoring station. NO₂ concentration in 2007 was measured only at one monitoring station.

Emission volumes in the Ponitrie loaded area



t/r – tons/year
TZO – PM

Source: SHMI

Annual lead concentration in the area shows a decreasing tendency every year. In 2007, this was measured only at one monitoring station. Limit value for benzene was not exceeded.

In 2007, there was only a single detected case of exceeded information threshold (IT) in ground ozone concentration with the duration of one hour (for the "caution" signal). Alarm threshold (AT) in ground ozone concentration lasting one hour (for the „warning" signal) at monitoring station was not exceeded.

There was defined an air quality management zone in the area for the territories of Nitra and the district of Prievidza, to monitor the PM₁₀, and SO₂ pollutants.

♦ Surface water contamination

The area includes the upper and central regions of the Nitra River. Surface water shows relatively heavy contamination, due to anthropogenic activities. The upper region of the river shows water quality that has for a long time been impacted by water from the mining industry. Also, industrial activities negatively impact water quality – production of plastic and heavy chemistry, electric power plants, heating stations, leather-processing industry, and food-processing industry in the river's central region. Microbiological indicators show the worse situation with the presence of the coliform bacteria, thermo-tolerant coliform bacteria and fecal streptococci that do not comply with SR GO 296/2005 Coll. Limit values significantly exceed the contents of Hg, IS_{UV}, and organic hydrocarbons.

Surface water quality in the Ponitrie loaded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Nitra	Nedožery	26	6	23
	Chalmová	48	18	38
	Nitrianska Streda	44	14	32
Nitrica	Partizánske	32	4	13

Source: SHMI

♦ Ground water contamination

Ground water quality for the loaded area has been monitored in 1 groundwater formation - in quaternary sediments and in 5 formations of groundwater inside pre-quaternary rocks.

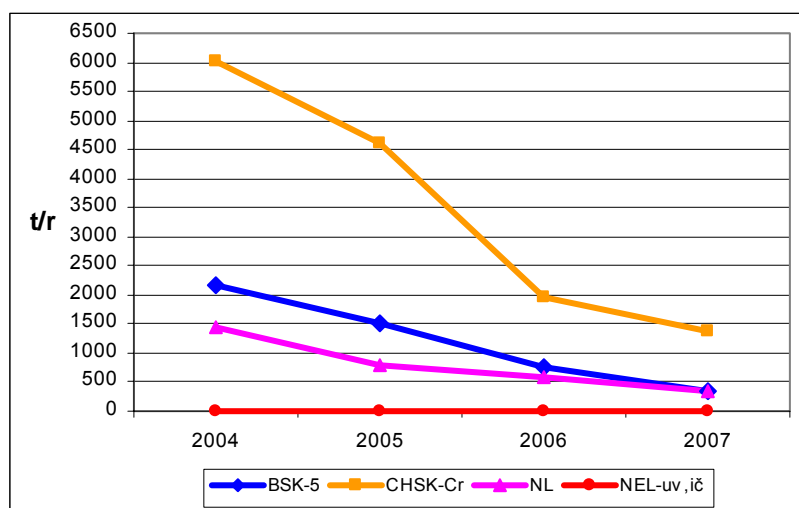
Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. in 2007 were exceeded in all groundwater formations extending into the affected area. The most frequently exceeded indicators include total Fe, Mn, and nitrates. Limit values for heavy metals were exceeded for the categories of Al and As. Organic substances that showed exceeded values include organic carbon, and poly-aromatic hydrocarbons. Also the limit values for pesticides were exceeded in the formation of groundwater inside quaternary sediments.

Ground water is negatively affected by high concentration of industrial and agricultural activities, which is reflected in its chemical composition.

◆ Sources of water contamination

Major water contamination sources for both the loaded area, as well as the whole SR territory, include WWTP NCHZ Nováky, WWTP Topoľčany, and WWTP Nitra. Besides these sources, public sewerage of the cities of Prievidza and Partizánske, as well as other sources above the loaded area, contribute to water contamination.

Trend in discharging of the pollution from significant resource into watercourses in Ponitrie loaded area



BSK – BOD, CHSK – COD, NL – IL, NEL - ENP

Source: SHMI

◆ Waste management

Balance of waste generation

Based on the RISO data, total production of waste in the area during 2004-2007 showed a rising trend. There was a gradual increase in the production of municipal waste and other waste, having a major impact on total waste production within the area. Production of hazardous waste showed a significant decline.

Waste production in the Ponitrie loaded area

Sort of waste	Waste production (t.y ⁻¹)			
	2004	2005	2006	2007
Hazardous waste	22 776.19	35 124.34	11 005.85	9 140.79
Other waste	1 041 523.89	1 064 061.20	1 160 447.21	1 136 060.29
Municipal waste	82 889.60	88 731.29	100 132.50	98 676.91
Waste production in total	1 147 189.66	1 187 916.83	1 271 585.59	1 243 877.99

Source: SEA, SO SR

Waste handling

Landfills represent the most frequent way of waste disposal with approximately 67 %, while 29 % is disposed of through reclamation. Hazardous waste handling for the monitored period varied. While in 2004 hazardous waste reclamation accounted for 59 %, in the following time period it dropped to the average 19 %. In 2005, hazardous waste disposal through incineration was dominant; accounting for 49 %, while in 2006

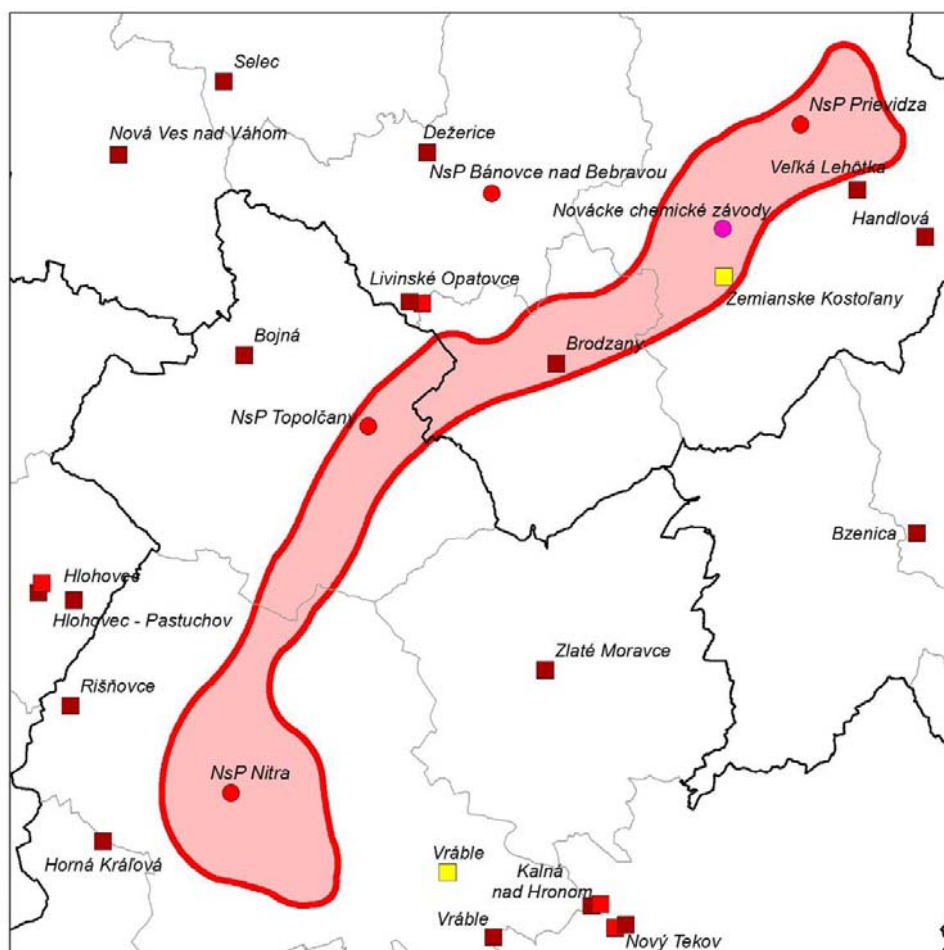
and 2007 other form of disposal was prevalent, accounting for the average 53 % of the annual production. On average, 8 % of annual hazardous waste production was disposed of through landfills.

Waste handling activities in the Ponitrie loaded area

Waste handling	2004		2005		2006		2007	
	Waste amount (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	13 372.00	291 586.00	6 168.83	276 965.53	2 095.41	351 236.05	1 809.82	379 533.73
Disposal through landfills	1 178.00	707 923.00	2 994.53	742 516.80	1 083.81	777 287.54	839.12	736 332.58
Disposal through incineration	2 295.00	39.00	17 575.94	77.87	1 374.99	9 857.72	948.72	47.67
Biological disposal	2 509.00	1 998.00	642.37	2 987.03	784.02	8 319.36	582.42	9 964.60
Other disposal	3 422.00	39 978.00	7 741.40	41 513.27	5 667.74	13 746.68	4 960.70	10 181.73

Source: SEA

Waste disposal facilities in the Ponitrie loaded area in 2007



Waste disposal facilities

- Municipal waste incinerator
- Medical waste incinerator
- Industrial waste incinerator
- Hazardous waste landfill
- Non-hazardous waste landfill
- Inert waste landfill
- Landfill operated under special conditions

Source: SHMI

The Pohronie loaded area

♦ Air pollution

Industrial sources including wood processing industry, heating houses, and aluminium processing industry that are concentrated in industrial municipal zones have a significant share on air pollution. Other local pollution sources include mainly transportation, suspension and re-suspension of particles from insufficiently clean roads, construction sites, and landfills of powder material, heating of houses with solid fuels, and agriculture that directly impact pollution level.

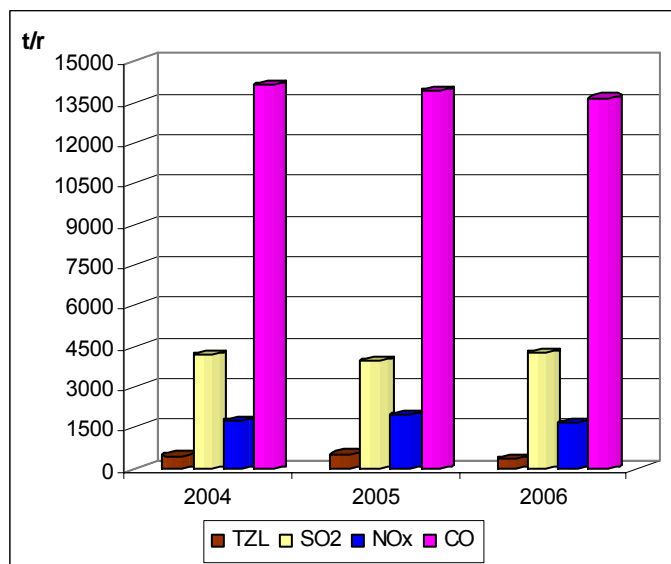
Five major operators of air pollution sources in the Pohronie loaded area

No.	Operator
1.	SLOVALCO, Inc., Žiar nad Hronom
2.	Zvolenská teplárenská, Inc., Zvolen
3.	ZSNP, Inc., Žiar nad Hronom
4.	Bučina, Inc., Zvolen
5.	BUČINA DDD, Ltd., Zvolen

Volumes of basic pollutant emissions in 2006 showed a decreasing tendency, with the exception of SO₂ that slightly increased.

Unlike 2006, number of exceeded measurements for 24-hour public health limit value decreased at the monitoring station of Banská Bystrica – Nám. slobody. Other pollutants did not exceed limit or target values. In 2007, NO₂ concentrations were measured only at one monitoring station.

Emission volumes in the Pohronie loaded area



t/r – tons/year
TZL – PM

Source: SHMI

In 2007, there was no single detected case of exceeded information threshold in ground ozone concentration with the duration of one hour (for the "caution" signal). Alarm threshold in ground ozone concentration lasting one hour (for the „warning" signal) at monitoring station was not detected.

♦ Surface water contamination

Hron is the major water course in the area. Water quality within the area is also influenced by received contamination from the upper region of the Hron river, which is the recipient of waste water from machinery, wood-processing, and food-processing plants, as well as from oil refineries and the production of heating oils.

Discharged waste water directly affects the Hron river in the Sliáč area, but part of the waste water enters Hron through its tributaries of Slatina and Zolná. Contamination by waste water from wood-processing and metal – processing industries is present in the surroundings of Žiar nad Hronom and Žarnovica. Microbiological indicators show the worse situation with the presence of the coliform bacteria, thermo-tolerant coliform bacteria and fecal streptococci that do not comply with SR GO 296/2005 Coll. Limit values significantly exceed also the contents of IS_{UV}. Limit-exceeding values were detected also for persistent organic pollutants - fluoranthene, Water quality has been adversely affected also by discharged municipal waste water within and outside municipal zones.

Surface water quality in the Pohronie loaded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Hron	Banská Bystrica	15	3	20
	Budča	31	7	23
	Žiar nad Hronom	20	5	25
	Žarnovica	20	3	15
Zolná	Ústie	23	5	22
Slatina	Ústie	21	3	14

Source: SHMI

♦ Ground water contamination

Groundwater quality for the loaded area has been monitored in 1 groundwater formation - in quaternary sediments and in 4 formations of groundwater inside pre-quaternary rocks.

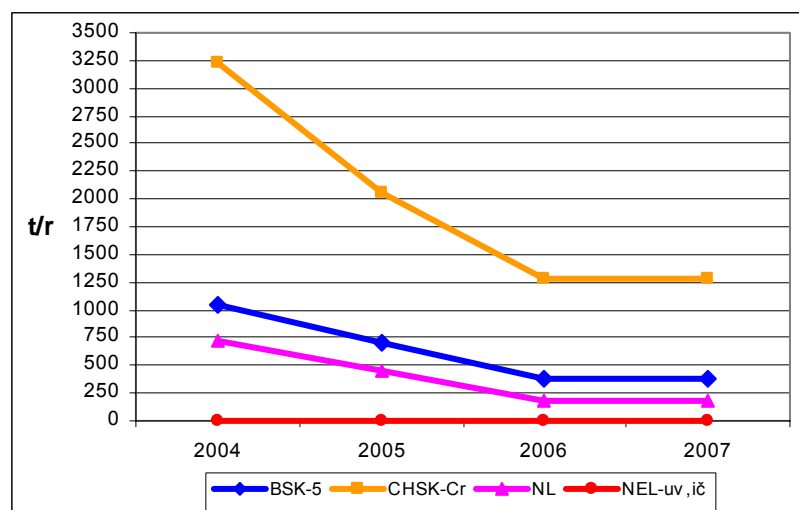
Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. in 2007 were exceeded in both, 1 groundwater formation inside quaternary sediments and in 3 groundwater formations inside pre-quaternary rocks reaching into the affected area. Most frequently exceeded indicators include total Fe, Mn, sulphates, nitrates, and ammonium ions. Limit values for heavy metals were exceeded for Al, As, Hg, Ni, and Sb. Organic substances that showed exceeded values include organic carbon, and poly-aromatic hydrocarbons. Also the limit values for pesticides were exceeded in the formation of groundwater inside quaternary sediments. especially in terms of trace elements.

♦ Sources of water contamination

Major sources of pollution for the local as well as the whole Slovak territory include WWTP SHP Harmanec, and WWTP Banská Bystrica. Other sources of water contamination include public sewerages and industrial facilities in Zvolen, Slovenská Ľupča, Žiar nad Hronom, and Žarnovica. Over the recent years, discharged contamination in the area was reduced, due to reduced discharged contamination from

the company Biotika Inc., Slovenská Ľupča. In this plant were carried out WWTP repairs. Reconstruction and extension of WWTP Zvolen and WWTP Banská Bystrica carried out last year were positively reflected in decreased volumes of discharged contamination from these sources.

Trend in discharging of the pollution from significant resource into watercourses in the Pohronie loaded area



BSK – BOD, CHSK – COD, NL – IL, NEL - ENP

Source: SHMI

◆ Waste management

Balance of waste generation

Total waste generation in the area, according to RISO data, was in 2004-2007 relatively stabilised, with the exception of 2005 when it showed significant increase due to increased production of other waste that, except for the mentioned year, show permanently dominant share on total waste generation in the area. In 2005, generation of hazardous and municipal waste also increased.

Waste production in the Pohronie loaded area

Sort of waste	Waste Production (t.y ⁻¹)			
	2004	2005	2006	2007
Hazardous waste	13 996.46	21 758.15	23 138.28	15 745.80
Other waste	236 245.91	695 661.34	278 010.90	230 041.45
Municipal waste	50 331.90	55 030.91	61 178.36	61 187.22
Waste production in total	300 574.30	772 450.40	362 327.56	306 974.47

Source: SEA, SO SR

Balance of waste generation

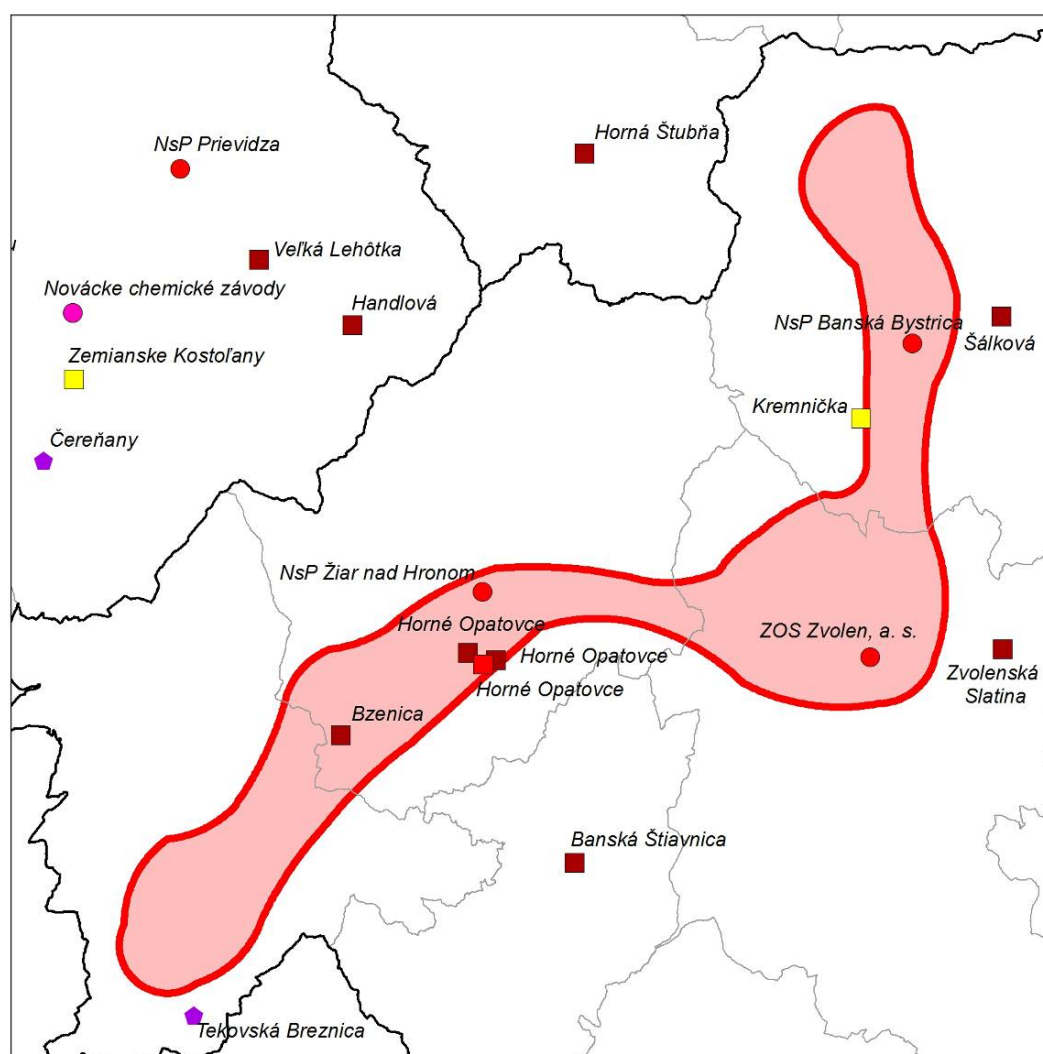
Most frequent hazardous waste handling approach in the area includes elimination by form, with the average 38 % of annual production. Waste elimination on landfills in 2004-2006 was 21 % on average, showing an increase to 48 % in 2007. On average, 24 % of hazardous waste was reclaimed. Other waste handling for the monitored period varied. Average 54 % of annual production was reclaimed (as much as 87 % in 2005), 27 % was disposed of on landfills, and 19 % of annual other waste production was eliminated through other forms.

Waste handling activities in the Pohronie loaded area

Waste handling	2004		2005		2006		2007	
	Waste amount (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	4 124.00	79 440.00	4 827.80	606 614.67	5 945.46	114 057.88	2 863.19	123 218.90
Disposal through landfills	2 362.00	40 809.00	4 631.36	56 626.94	6 582.60	114 175.71	7 481.10	91 573.59
Disposal through incineration	189.00	5 900.00	262.40	462.73	350.36	1 900.12	207.23	1 511.25
Biological disposal	1 943.00	125.00	1 624.95	38.77	3 003.68	261.15	428.56	455.81
Other disposal	5 378.00	109 972.00	10 410.24	31 917.35	7 256.24	47 616.09	4 765.71	13 281.91

Source: SEA

Waste disposal facilities in the Pohronie loaded area in 2007



Waste disposal facilities

- Municipal waste incinerator
- Medical waste incinerator
- Industrial waste incinerator
- Hazardous waste landfill
- Non-hazardous waste landfill
- Inert waste landfill
- Landfill operated under special conditions

Source: SEA

The Jelšava-Lubeník loaded area

♦ Air pollution

Magnesite plant that extracts and processes magnesite significantly contributes to air pollution. Other local pollution sources originate mainly from traffic, insufficiently cleaned roads, construction sites, stores of powdery materials, and heating of houses with solid fuels.

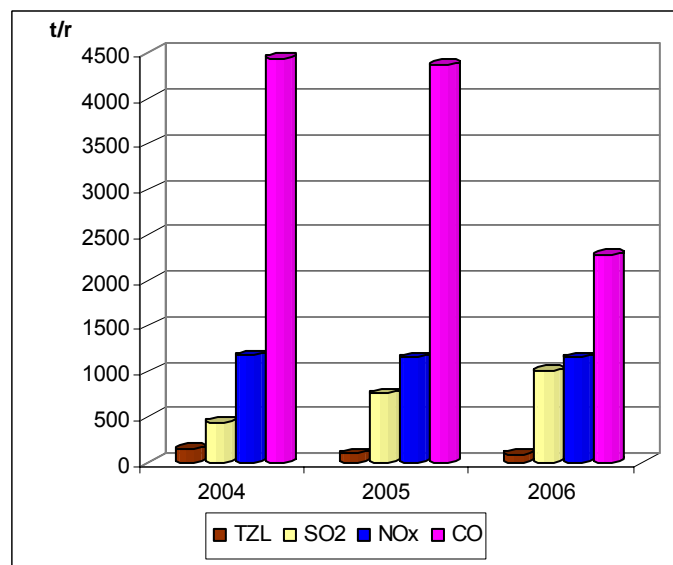
Five major operators of air pollution sources in the Jelšava-Lubeník loaded area

No.	Operator
1.	Slovak Magnesite Plant, Inc., Jelšava
2.	Slovmag Lubeník, Inc., Revúca
3.	Slovak bus traffic, Inc., Revúca
4.	DREVOEXPORT, Ltd., Revúca
5.	RETES, Ltd., Revúca

Emission volumes in this area decrease every year. CO pollutant showed greatest reduction by almost 2000 t/y.

In 2007, there were no NO₂ pollution values detected at the monitoring station. In case of PM₁₀, the 24-hour public health limit value was exceeded 78 times, with no exceeded annual limit value.

Emission volumes in the Jelšava-Lubeník loaded area



t/r – tons/year
TzL – PM

Source: SHMI

In 2007, lead concentrations were not monitored at the monitoring station. Most recent data comes from 2006.

Number of exceeded limits for one-hour ground ozone information threshold (IT) (for the “caution” signal) in 2007, shows rising tendency, compared to 2006. Alarm threshold (AT) in ground ozone concentration lasting one hour (for the „warning" signal) at monitoring station was not exceeded.

Target value of 120 µg.m⁻³ for allowed number of exceeded values for eight-hour ground ozone concentration was exceeded.

There was defined an air quality management zone for the territories of Jelšava, Lubeník, Chyžné, Magnezitovce, Mokrá Lúka, and Revúcka Lehota to monitor the PM₁₀ pollutant.

♦ Surface water contamination

Upper part of the Muráň water course crosses the area. Out of 18 assessed or measured indicators, only nitrite nitrogen does not comply with the provisions of SR GO 296/2005 Coll.

Surface water quality in the Jelšava-Lubeník loaded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Muráň	Jelšavská Teplica	18	1	6

Source: SHMI

♦ Ground water contamination

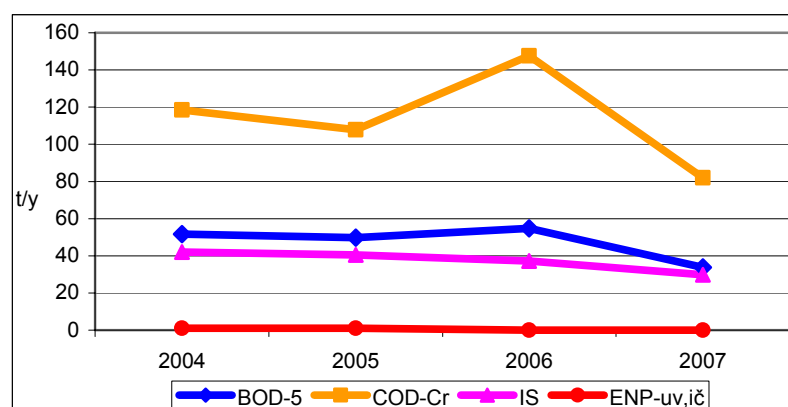
Ground water quality in the affected area is monitored in 2 ground water formations inside pre-quaternary rocks.

Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. in 2007 were exceeded in both groundwater formations inside pre-quaternary rocks reaching into the affected area. The most frequently exceeded indicators include total Fe, and Mn. Limit values for heavy metals were exceeded for the categories of Al, As, and Sb. Organic substances that showed exceeded values include poly-aromatic hydrocarbons.

♦ Sources of water contamination

In terms of volumes of discharged contamination in the SR, there is one major water contamination source – a WWTP in Revúca. Discharged contamination from industrial premises and WWTP in Lubeník and Jelšava is the biggest contributor affecting water contamination.

Trend in discharging of the pollution from significant resource into watercourses in the Jelšava-Lubeník loaded area



Source: SHMI

◆ Waste management

Balance of waste generation

Total waste generation in the area, by the RISO data, was on the rise in 2004-2007. This was caused by an increased generation of other waste types. Trend in the production of hazardous waste showed fluctuating characteristics. Municipal and other waste had a decisive impact on total production of waste in the area.

Waste production in the Jelšava-Lubeník loaded area

Sort of waste	Waste Production (t.y ⁻¹)			
	2004	2005	2006	2007
Hazardous waste	68.43	818.82	80.55	166.96
Other waste	2 309.71	4 043.09	3 310.60	6 469.89
Municipal waste	4 385.20	5 035.07	5 804.90	5 009.86
Waste production total	6 763.34	9 896.98	9 196.05	11 646.71

Source: SEA, SO SR

Waste handling

Individual hazardous waste handling approaches in the area show varying characteristics. Hazardous waste generation in 2004 and 2006 was disposed of through reclamation (the average of 61 %), in 2005 through biological elimination (91 %), and in 2007 through landfills (69 %). On average, 55 % of other waste types for the monitored period were reclaimed, with the greatest degree of reclamation of 74 % in 2005. Elimination of other waste types included other elimination approaches, biological elimination and landfills. Waste disposal on landfills represented 64 % in 2006.

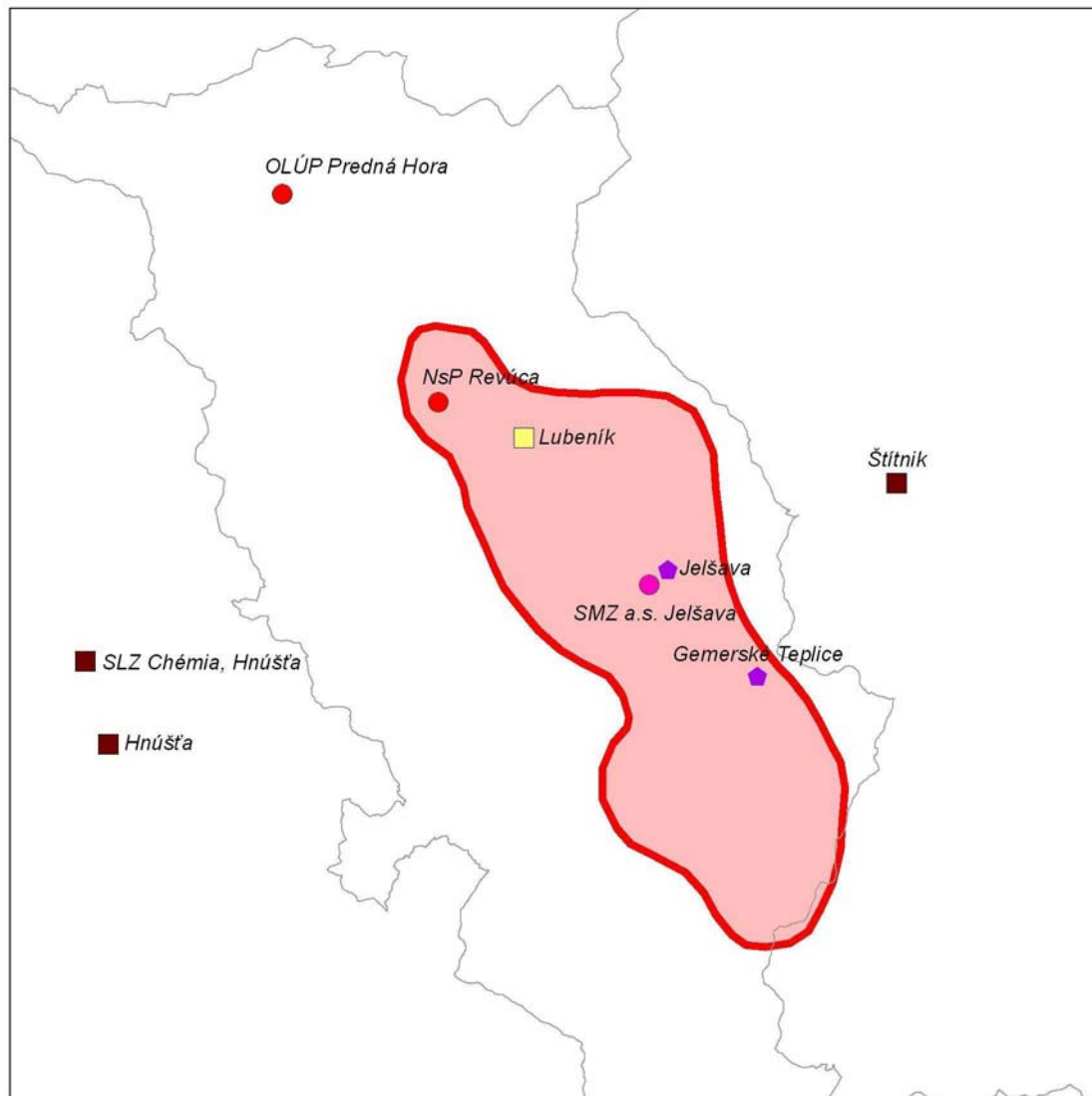
Waste handling activities in the Jelšava-Lubeník loaded area

Waste handling	2004		2005		2006		2007	
	Waste amount (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	48.00	1 114.00	51.07	2 966.66	41.87	1 123.97	26.36	4 092.54
Disposal through landfills	4.00	88.00	0.20	932.71	11.66	2 123.78	115.94	802.67
Disposal through incineration	7.00	12.00	22.93	9.96	15.88	6.98	10.70	33.93
Biological disposal	0.00	485.00	743.49	0.00	7.88	0.00	4.20	1 387.00
Other disposal	0.00	485.00	743.49	0.00	7.88	0.00	4.20	1 387.00

Source: SEA



Waste disposal facilities in the Jelšava-Lubeník loaded area in 2007

***Waste disposal facilities***

- | | |
|--------------------------------|--|
| ● Municipal waste incinerator | ■ Hazardous waste landfill |
| ● Medical waste incinerator | ■ Non-hazardous waste landfill |
| ● Industrial waste incinerator | ■ Inert waste landfill |
| | ◆ Landfill operated under special conditions |

Source: SEA

The Rudniansko-gelnická loaded area

♦ Air pollution

Industrial sources, especially smelting industries and mineral exploitation substantially contribute to air pollution. Other sources include dumps of debris from smelting industry, steel production, ore deposits with no cover, coal deposits, re-suspension of particles from roads, and local heating systems using solid fuels.

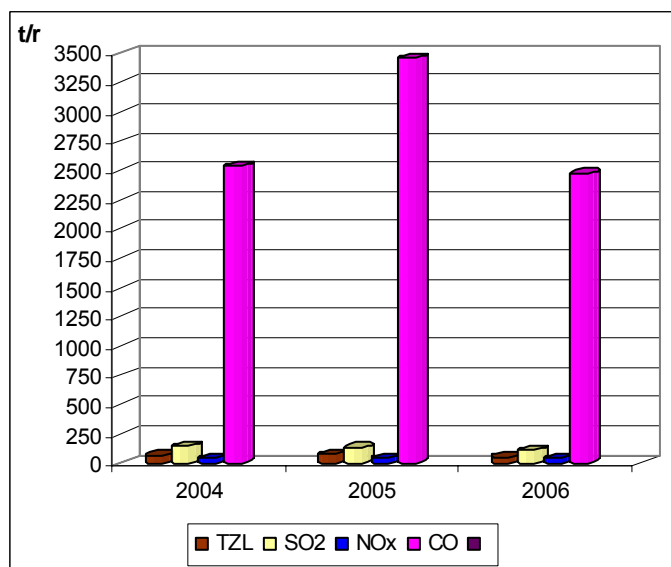
Five major operators of air pollution sources in the Rudniansko-gelnická loaded area

No	Operator
1.	Calmit, Ltd., Bratislava, operation Margecany
2.	KOVOHUTY, Inc., Krompachy
3.	Prakovská steel corp., Ltd., Prakovce
4.	Zlieváreň SEZ, Inc., Krompachy
5.	POLYTOP SNV, Ltd., Spišská Nová Ves

We can see that in 2007 the volumes of emissions, especially CO emissions, decreased. CO emissions showed a 1 000 t/y decrease.

Compared to 2006, annual NO₂ concentration in 2007 increased. However, the annual limit value tolerance was not exceeded, neither the one-hour public health limit value. The station did not show exceeded 24-hour limit, nor the annual public health limit for the PM₁₀ pollutant.

Emission volumes in the Rudniansko–gelnická loaded area



t/r – tons/year
TZL – PM

Source: SHMI

Lead volumes in 2007 decreased significantly, compared to 2006. Benzene limit value was not exceeded.

Number of exceeded limits for one-hour ground ozone information threshold (IT) (for the “caution” signal) in 2007, shows slightly rising tendency, compared to 2006. Alarm threshold (AT) in ground ozone concentration lasting one hour (for the „warning” signal) at monitoring station was not exceeded.

Target value of 120 $\mu\text{g}\cdot\text{m}^{-3}$ for allowed number of exceeded values for eight-hour ground ozone concentration was exceeded.

There was defined an air quality management zone for the territory of Krompachy to monitor the PM_{10} pollutant.

♦ Water contamination

Surface water contamination

Hornád river and its tributaries are contaminated due to years of mining and treatment activities in the watershed. Most adverse situation exists for COD_{Cr} and organic nitrogen. Also, volumes of the coliform bacteria and thermo-tolerant coliform bacteria show significant non-compliance with the SR GO 296/2005 Coll.

Surface water quality in the Rudniansko-gelnická loaded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Hornád	Pod Spišskou Novou Vsou	17	2	12
	Pod Kluknavou	18	4	22
Rudniansky stream	Ústie	13	3	23
Hnilec	Stratená	17	1	6

Source: SHMI

Ground water contamination

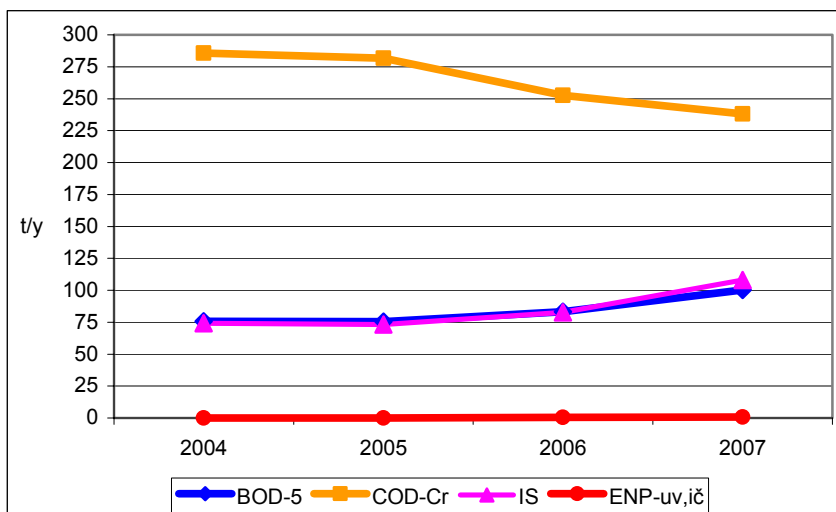
Ground water quality in the affected area is monitored in 4 ground water formations inside pre-quaternary rocks.

Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. in 2007 were exceeded in all groundwater formations inside pre-quaternary rocks reaching into the affected area. The most frequently exceeded indicators include total Fe and Mn. Limit values for heavy metals were exceeded for Al. Organic substances that showed exceeded values include poly-aromatic hydrocarbons.

Sources of water contamination

There is no major water contamination source in terms of volumes of discharged contamination in the SR. Discharged contamination from the WWTPs in Spišská Nová Ves, Gelnica, Margecany, and Krompachy is the biggest contributor affecting water contamination.

Trend in discharging of the pollution from significant resource into watercourses in the Rudniansko-gelnická loaded area



Source: SHMI

◆ Waste management

Balance of waste generation

Total production of waste in the area during 2004-2007 showed a fluctuating trend, due to the production of other waste categories that have has a decisive effect on total production of waste within the area. Hazardous waste generation with relatively balanced characteristics showed a significant rise for the monitored year. Production of municipal waste in the area did not show major changes.

Waste production in the Rudniansko-gelnická loaded area

Sort of waste	Waste Production (t.y ⁻¹)			
	2004	2005	2006	2007
Hazardous waste	1 452.81	1 385.00	2 019.74	8 136.91
Other waste	34 699.48	22 128.52	44 696.36	20 233.03
Municipal waste	7 689.90	7 381.38	7 631.65	8 377.05
Waste production in total	43 842.19	30 894.90	54 347.75	36 746.99

Source: SEA, SO SR

Waste handling

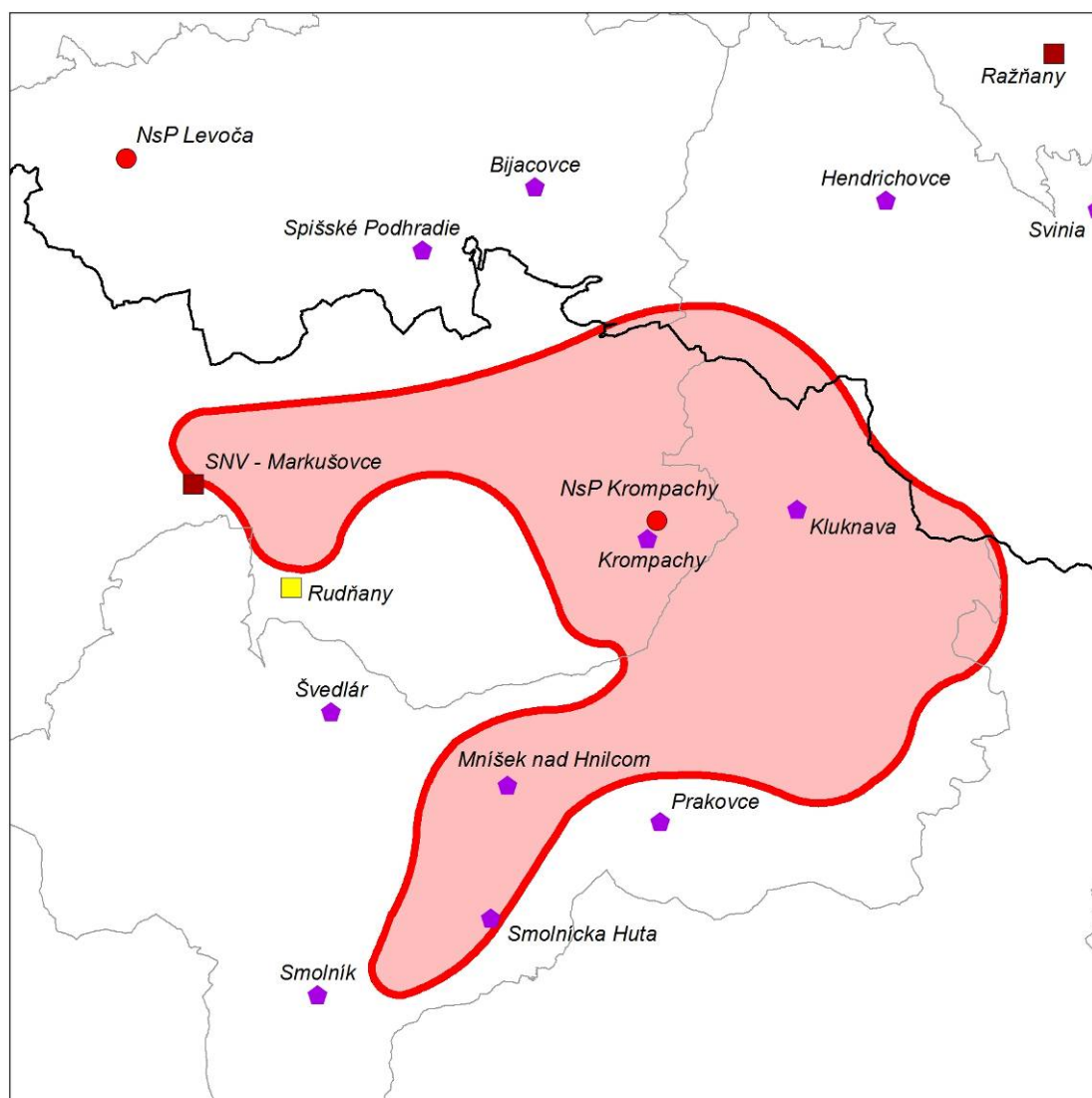
Waste reclamation was the most frequent waste disposal approach in the area. The average 60 % of hazardous waste annual production and 55 % (with the maximum of 88 % in 2004) was reclaimed. Share of individual waste disposal approaches varied. Approaches to waste disposal included mostly other methods to waste disposal together with biological elimination, with minimum degree of landfills and incineration. The average of 3 % of annual production of hazardous waste was disposed of at landfills, together with the average of 4 % of annual production of other waste categories. The average of 7 % of hazardous waste was disposed of through incineration.

Waste handling activities in the Rudniansko-gelnická loaded area

Waste handling	2004		2005		2006		2007	
	Waste amount (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	821.00	30 349.00	808.60	6 974.51	1 402.71	28 360.22	4 465.46	7 561.74
Disposal through landfills	30.00	2 236.00	63.56	401.31	88.84	1 911.49	36.55	591.44
Disposal through incineration	65.00	170.00	237.45	99.77	116.52	78.44	76.32	155.48
Biological disposal	6.00	612.00	232.15	1 105.50	87.22	0.00	3 193.33	9.90
Other disposal	531.00	1 332.00	43.03	13 547.24	324.49	14 346.22	365.24	11 914.47

Source: SEA

Waste disposal facilities in the Rudniansko-gelnická loaded area in 2007


Waste disposal facilities

- Municipal waste incinerator
- Medical waste incinerator
- Industrial waste incinerator
- Hazardous waste landfill
- Non-hazardous waste landfill
- Inert waste landfill
- ◆ Landfill operated under special conditions

Source: SEA

The Košice-Prešov loaded area

◆ Air pollution

Large and middle-sized industrial sources including smelting, mechanical, fuel, and energy industries heavily contribute to air pollution, together with mineral exploitation and incineration. Other local sources include especially automobile exhausts, mineral dust from construction, local heating systems using solid fuel, and re-suspension of solid particles from road surfaces (insufficient cleaning of streets, dirty cars, and anti-skid powdery material on roads).

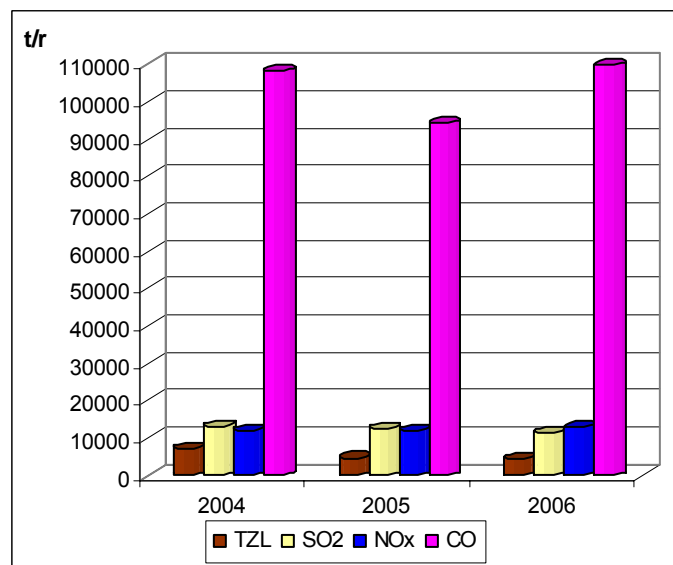
Five major operators of air pollution sources in the Košice-Prešov loaded area

No.	Operator
1.	U.S.Steel Košice, Ltd., Košice
2.	Carmeuse Slovakia, Ltd., plant Košice
3.	Kronospan Slovakia, Ltd., Prešov
4.	Carmeuse Slovakia, Ltd., plant Lomy - lom Včeláre Dvorníky - Včeláre
5.	TEKO, Inc., Košice

In 2006, volumes of pollutants in Košice-Prešov affected area dropped slightly. Only the CO pollutant showed increase by almost 15 000 t/y. NO₂ increased at the Košice-Štúrova due to increased traffic related to construction activities in this area.

24-hour public health limit for PM₁₀ was exceeded at the following stations: Košice-Štúrova, Košice-Strojárska, and Veľká Ida-Letná. The last station showed also exceeded annual PM₁₀ limit value.

Emission volumes in the Košice-Prešov loaded area



t/r – tons/year
TZL – PM

Source: SHMI

Lead concentration was measured only at the monitoring station of Veľká Ida-Letná where it increased slightly; however, compared to 2006, the limit value of 500 ng.m⁻³ was not exceeded.

In 2007, there was no single detected case of exceeded information threshold in ground ozone concentration with the duration of one hour (for the "caution" signal). Alarm threshold in ground ozone concentration lasting one hour (for the „warning" signal) at monitoring station was not exceeded.

Average eight-hour ground ozone concentration was exceeded in the affected area.

Air quality management zone was designated for the territories of Košice, Bočiar, Sokolany, Haniska, urban territory of Prešov, and Lobotice to monitor the PM₁₀ pollutant.

◆ Surface water contamination

Hornád and Torysa, together with their tributaries, are the major water courses in the area. Hornád is locally loaded with run-off and industrial waste water produced by the city of Košice. Adverse situation persists especially in the Sokoliansky brook, which is a recipient of industrial waste water from the U.S. Steel Ltd. Košice plant. Sokoliansky brook belongs to the most heavily polluted streams in SR.

Microbiological indicators show the worse situation with the presence of the coliform bacteria, thermo-tolerant coliform bacteria and fecal streptococci that do not comply with SR GO 296/2005 Coll. Limit values significantly exceed the contents of heavy metals, IS_{UV}, organic hydrocarbons, and COD_{Cr}.

Western part of the loaded area is drained into the Bodva water course and its tributaries. Quality of water in these streams shows contamination with microbiological indicators with volumes significantly exceeding the requirements of SR GO 296/2005 Coll. Limit values are significantly exceeded also in the case of Al and absorbable organically-bound halogens.

Surface water quality in the Košice-Prešov loaded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Hornád	Krásna nad Hornádom	29	5	17
	Žďaňa	30	7	23
	Hidasnémeti	58	10	17
Torysa	Kendice	10	1	10
	Košické Olšany	26	4	15
Sokoliansky stream	Tornyosnémeti	56	17	30
Turňa	Ústie	26	3	12
Bodva	Host'ovce	55	9	16

Source: SHMI

◆ Ground water contamination

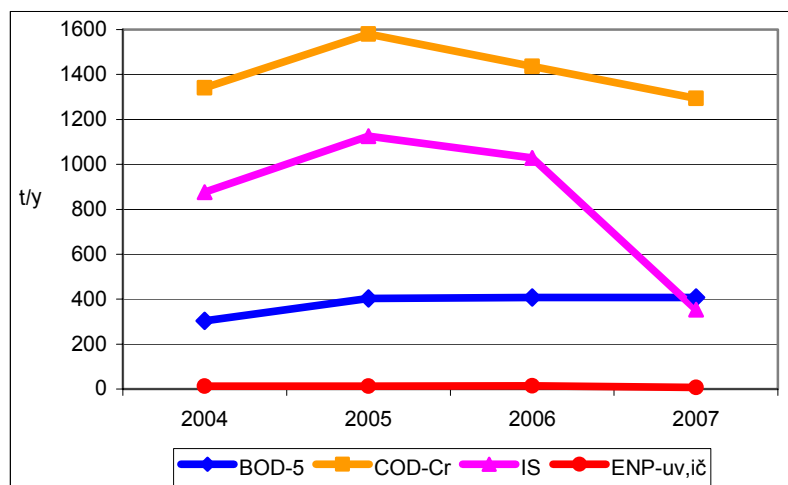
Groundwater quality for the loaded area has been monitored in 1 groundwater formation - in quaternary sediments and in 4 formations of groundwater inside pre-quaternary rocks.

Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. in 2007 were exceeded in all groundwater formations extending into the affected area. The most frequently exceeded indicators include total Fe, and Mn. Limit values for heavy metals were exceeded for Al. Organic substances that showed exceeded values include chlorinated solvents, and poly-aromatic hydrocarbons. Also the limit values for pesticides were exceeded in the formation of groundwater inside quaternary sediments.

◆ Sources of water contamination

Major water contamination sources of local and national significance include WWTP Košice, and WWTP U.S. Steel, Ltd. Košice. Discharged contamination from public sewerage and industrial premises in Prešov, Moldava nad Bodvou, and WWTP Šaca, is the major contributor to water contamination and the reduced water quality.

Trend in discharging of the pollution from significant resource into watercourses in the Košice-Prešov loaded area



Source: SHMI

◆ Waste management

Balance of waste generation

According to RISO data, total production of waste in the area during 2004-2007 showed a fluctuating trend, due to the production of other waste categories that have has a decisive effect on total production of waste within the area. Hazardous waste generation with relatively balanced characteristics increased in the monitored year. Generation of municipal waste in the area showed a mild increase.

Waste production in the Košice-Prešov loaded area

Sort of waste	Waste production (t.y ⁻¹)			
	2004	2005	2006	2007
Hazardous waste	68 811.16	62 475.89	63 983.21	84 903.97
Other waste	2 115 996.82	1 969 592.96	3 059 699.17	1 284 544.36
Municipal waste	106 351.80	100 071.29	122 442.51	130 514.82
Waste production in total	2 291 159.78	2 132 140.14	3 246 124.89	1 499 963.15

Source: SEA, SO SR

Waste handling

The most frequent approach to handling hazardous waste in the area was waste disposal at landfills, with about 68 % of the annual production, while in 2006, 77 % of waste was disposed of through this approach. On average, 4 % of hazardous waste was incinerated, while 13 % was disposed of through other methods. Other waste categories were eliminated mainly through landfills in about 40 % of cases per year, while 18 % was disposed of through other methods. Degree of reclamation of annual

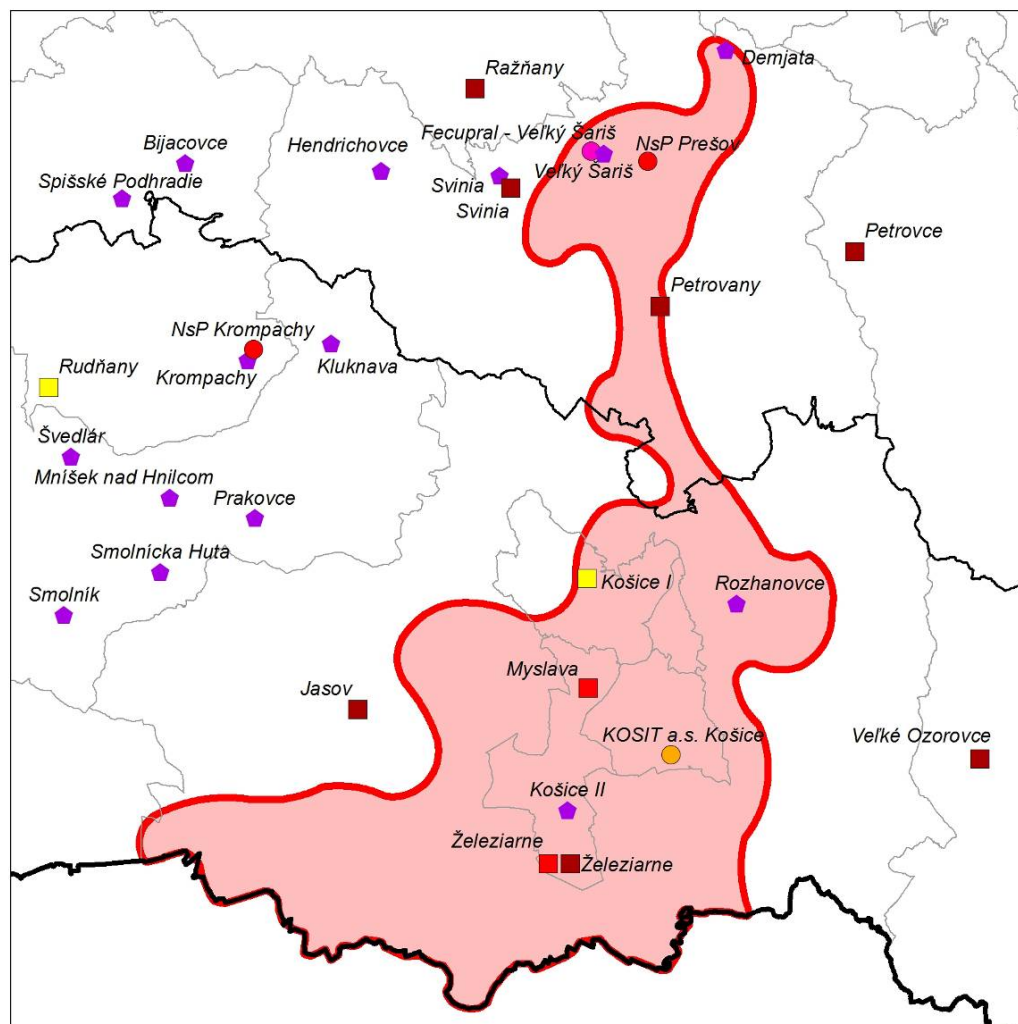
production of hazardous waste was 12 %, while for other waste categories it increased from 13 % in 2004 to about 50 % in the following monitoring period.

Waste handling activities in the Košice-Prešov loaded area

Waste handling	2004		2005		2006		2007	
	Waste amount (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	4 842.00	277 548.00	8 750.54	1 214 506.50	10 599.23	2 072 274.41	8 177.70	268 798.42
Disposal through landfills	44 407.00	925 820.00	39 349.14	527 416.32	49 260.07	800 293.08	56 511.35	820 804.50
Disposal through incineration	950.00	4 758.00	5 599.96	6 431.17	928.60	4 713.61	5 474.13	11 508.39
Biological disposal	1 157.00	45 642.00	1 736.99	1 665.51	2 037.14	734.77	3 675.58	70.00
Other disposal	17 455.00	862 229.00	7 037.35	219 571.79	1 158.31	181 682.81	11 065.13	183 363.05

Source: SEA

Waste disposal facilities in the Košice-Prešov loaded area in 2007



Waste disposal facilities

- Municipal waste incinerator
- Medical waste incinerator
- Industrial waste incinerator
- Hazardous waste landfill
- Non-hazardous waste landfill
- Inert waste landfill
- ◆ Landfill operated under special conditions

Source: SEA

The Zemplín loaded area

◆ Air pollution

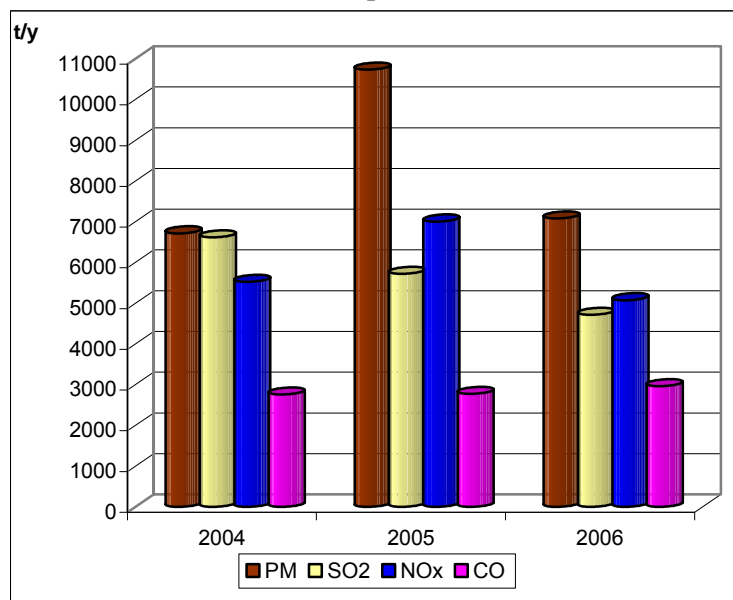
Chemical, wood-processing, fuel, and energy industries play major part in air pollution. Other local pollution sources include mainly transportation, suspension and re-suspension of particles from insufficiently clean roads, construction sites, landfills of powder material, heating of houses with solid fuels, and agriculture.

Five major operators of air pollution sources in the Zemplín loaded area

No.	Operator
1.	SE, Inc., Bratislava, Powerplant Vojany I a II
2.	BUKOCEL, Inc., Hencovce
3.	KERKO, Inc., Michalovce
4.	Vranovská brickyard, Ltd., Vranov nad Topľou
5.	Bukoza Preglejka, Inc., Hencovce

Pollutants in 2007 showed a decreasing trend, with only CO showing a slight increase, following the trend of the recent years. In 2007, 24-hour annual public health limit value for PM₁₀ was not exceeded at any monitoring station. Most number of exceeded-value measurements was detected at the Vranov nad Topľou - M.R. Štefánika monitoring station. In 2007, NO₂ annual concentrations in the affected area were not measured at any monitoring station.

Emission volumes in the Zemplín loaded area



Source: SHMI

The monitoring station of Vranov nad Topľou – M. R. Štefánika did not measure lead concentration in 2007.

There was defined an air quality management zone for the territory of Strážske and Vranov nad Topľou and the village of Hencovce to monitor the PM₁₀ pollutant. Generally binding decree of the

Regional Environment Office No. 1/2005 of January 11, 2005 promoted the publication of action plan to safeguard air quality related to the PM10 pollutant, for the cadastre areas of Vranov and Topľou, Čemerné, and Hencovce.

◆ Surface water contamination

Major water streams in the area include Ondava, with its tributaries of Laborec and Bodrog. Water quality in Laborec is significantly affected by discharged cooling waste water from the Vojňany electric power plant. This has resulted mainly in the increase of water temperature. Water quality deterioration is caused also by contamination coming from the upper part of the Topľa and Ondava water courses.

Microbiological indicators show the worse situation with the presence of the coliform bacteria, thermo-tolerant coliform bacteria and fecal streptococci that do not comply with SR GO 296/2005 Coll. Limit values also significantly exceed the contents of heavy metals, Al and Zn, organic hydrocarbons, and COD_{Cr}.

Surface water quality in the Zemplín loaded area

Water course	Sampling site	Number of assessed or detected indicators	Indicators not complying with SR GO No. 296/2005 Coll. of total number of assessed indicators	
			Number	%
Laborec	Petrovce	25	4	16
	Ižkovce	34	3	9
Uh	Pinkovce	49	4	8
	Ústie	17	1	6
Ondava	Brehov	36	5	14
Topľa	Pod Vranovom	18	3	17
Bodrog	Streda nad Bodrogom	56	6	11

Source: SHMI

◆ Ground water contamination

Groundwater quality for the loaded area has been monitored in 1 groundwater formation - in quaternary sediments and in 3 formations of groundwater inside pre-quaternary rocks.

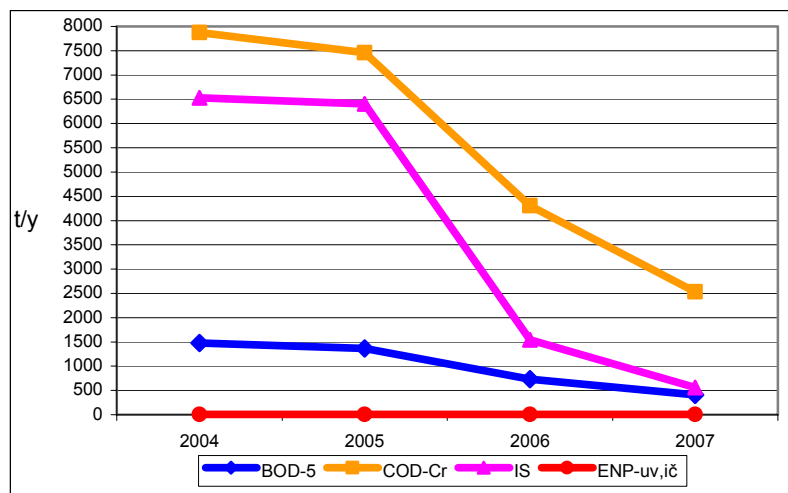
Limit values in comparison with requirements of the SR Government Ordinance 354/2006 Coll. in 2007 were exceeded in one water formation inside quaternary sediments and in 2 groundwater formations inside pre-quaternary rocks reaching into the affected area. Most frequently exceeded indicators include total Fe, Mn, nitrates, chlorides, and ammonium ions. Exceeded limit values for heavy metals include Al, As, and Pb in ground water formation inside quaternary sediments. Organic substances showing exceeded values include 1,2-dichlorobenzene, 1,3-dichlorobenzene in the ground water formation, inside quaternary sediments.

◆ Sources of water contamination

Major sources of water contamination of the local and national importance include Bukocel, Inc., Hencovce, SE, Inc., Vojňany electric power plant, and a WWTP in Humenné. Besides other factors of contamination, the major contributor to water quality situation is discharged contamination from public

sewerages and industrial facilities of Trebišov and Čierna nad Tisou. Discharged contamination from the upper regions of Topľa and Ondava also contributes to a deteriorated water quality.

Trend in discharging of the pollution from significant resource into watercourses in the Zemplín loaded area



Source: SHMI

◆ Waste management

Balance of waste generation

Total production of waste in the area during 2004-2007 showed a fluctuating trend, due to the production of other waste categories that have had a decisive effect on total production of waste within the area. In 2005, there was a significant rise in hazardous waste generation followed by a relatively balanced trend ever since. Production of municipal waste did not show major changes.

Waste production in the Zemplín loaded area

Druh odpadu	Waste production (t.y ⁻¹)			
	2004	2005	2006	2007
Sort of waste	8 404.03	83 725.44	73 549.00	74 085.30
Other waste	541 201.46	398 994.33	495 574.25	368 981.85
Municipal waste	39 697.40	39 188.96	43 954.01	42 348.52
Waste production in total	589 302.89	521 908.75	613 077.26	485 415.67

Source: SEA, SO SR

Waste handling

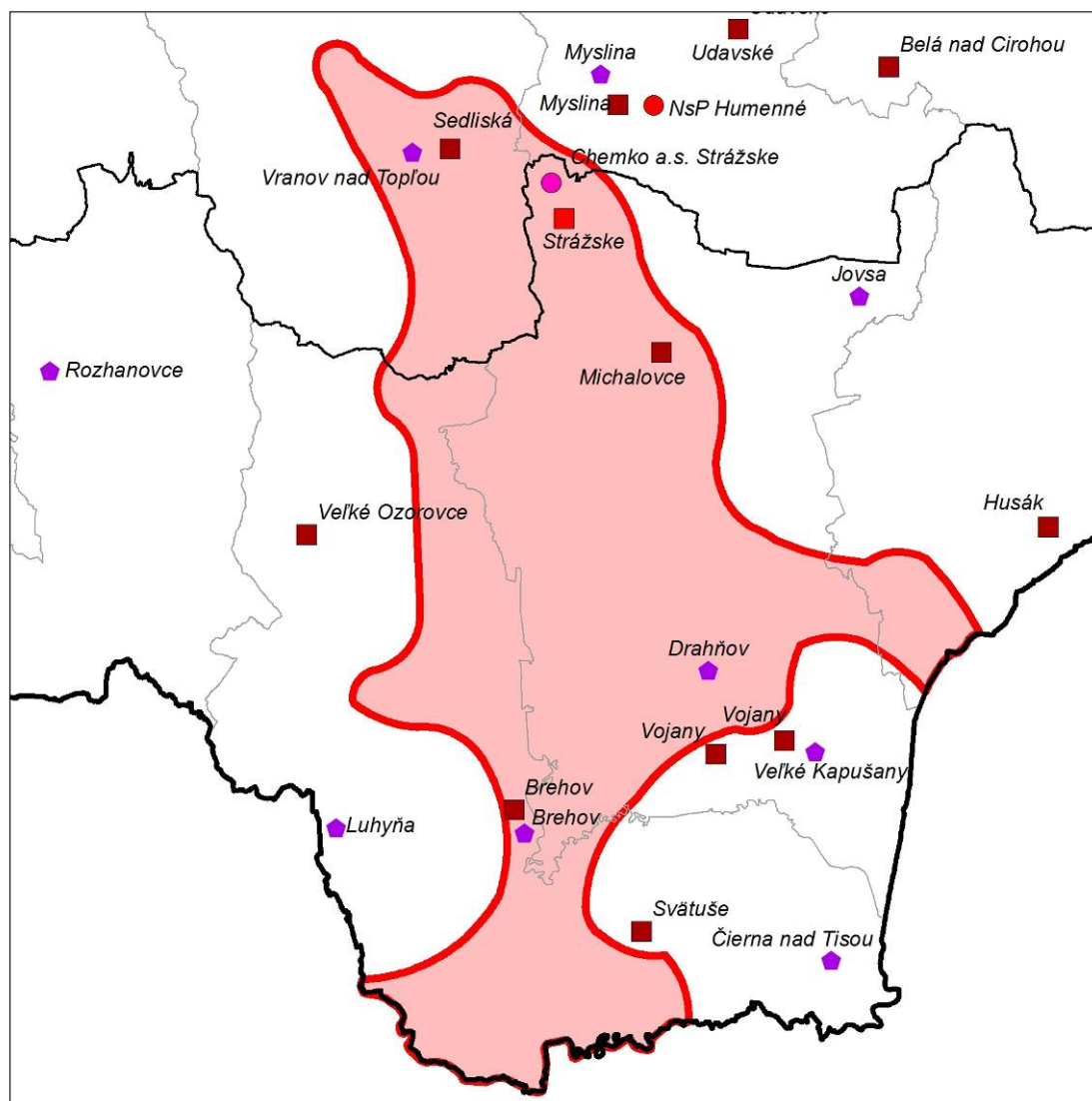
Individual hazardous waste handling approaches in the area show varying characteristics. In 2004, hazardous waste was disposed of through roughly equally distributed disposal approaches, including about 25 % by reclamation, 25 % by landfills, 25 % through biological disposal, and 25 % through other approaches. In 2005, 91 % of hazardous waste was reclaimed and in 2006, 2007 89 % of annual production of hazardous waste was biologically disposed of. The most frequent waste handling activity for other waste was its disposal through landfills (about 76 %), and reclamation (about 19 %) of the annual production.

Waste handling activities in the Zemplín loaded area

Waste handling	2004		2005		2006		2007	
	Waste amount (t.y ⁻¹)							
	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste	Hazardous waste	Other waste
Reclamation	2 328.00	104 732.00	75 436.24	58 888.63	3 005.37	126 371.77	1 773.66	62 356.91
Disposal through landfills	2 558.00	425 417.00	4 327.79	324 057.80	4 125.80	356 247.02	1 701.65	273 570.99
Disposal through incineration	240.00	11.00	204.86	9.82	211.55	10.26	151.17	90.79
Biological disposal	2 796.00	1.00	2 799.02	6 678.78	64 340.21	29.10	67 514.03	9 887.00
Other disposal	2 810.00	11 040.00	956.86	9 358.98	1 866.08	12 916.11	2 944.79	23 076.16

Source: SEA

Waste disposal facilities in the Zemplín loaded area in 2007


Waste disposal facilities

- Municipal waste incinerator
- Medical waste incinerator
- Industrial waste incinerator
- Hazardous waste landfill
- Non-hazardous waste landfill
- Inert waste landfill
- ◆ Landfill operated under special conditions

Source: SEA