



MINISTRY OF THE ENVIRONMENT OF THE SLOVAK REPUBLIC



**STATE OF THE ENVIRONMENT REPORT
SLOVAK REPUBLIC 2006**





*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.*

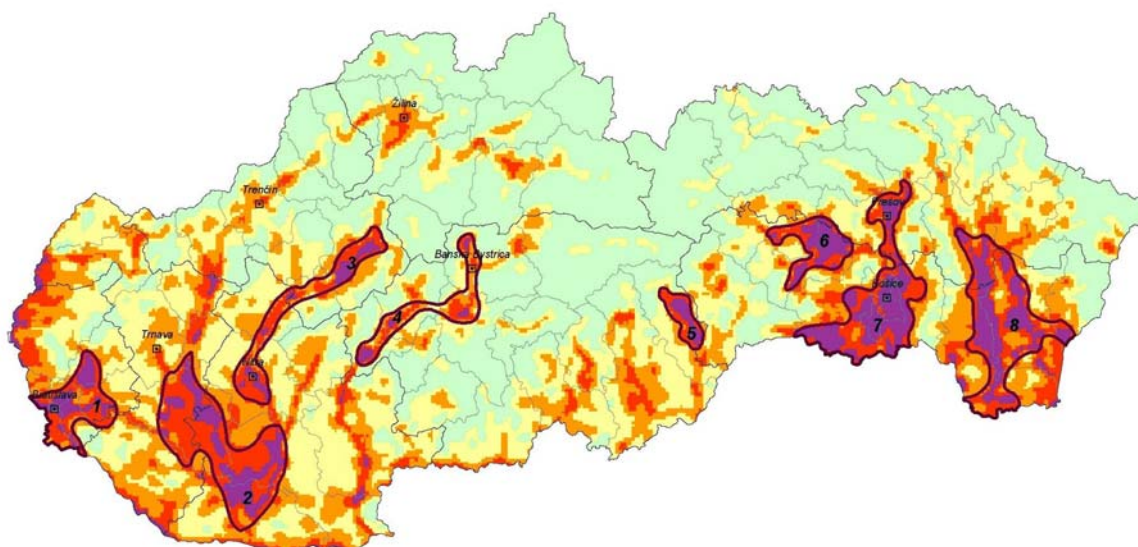
§ 11 of the Act No. 17/1992 Coll. on Environment

ENVIRONMENTAL REGIONALISATION

• ENVIRONMENTAL REGIONALISATION OF SLOVAKIA

State of environment in the Slovak territory is differentiated. Regions show varying degree of individual environmental loads due to anthropogenic activity. Individual components of environment also show different risk factors that in turn limit the quality of life.

Quality of the environment and the loaded areas



Deteriorated regions

1. Bratislavská
2. Dolnopovažská
3. Pontrianska
4. Pohronská

5. Jelšavsko-lubenícka
6. Rudniansko-gelnická
7. Košicko-prešovská
8. Zemplínska

Environmental quality

- high
- fair
- soft disturbed
- disturbed
- very disturbed

Source: SEA

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**. The assessment map shows that regions with the greatest environmental load have the tendency to be reduced especially to the areas of the upper Váh region and east Gemer. On the other hand, the loaded area has grown in size in the lower Zemplín. In other cases, the trend in changes to the size of the loaded territories has not been very significant.

Basic parameters of the loaded areas (LA)

LA	Area* (km ²)	Number of inhabitants
Bratislavská	488	432 000
Dolnopovažská	1 261	247 000
Ponitrianska	450	272 000
Pohronská	203	186 000
Jelšavsko-lubenická	137	21 000
Rudniansko-gelnická	357	52 000
Košicko-prešovská	1 044	425 000
Zemplínska	1 040	173 000
Total	4 980	1 808 000

Source: SEA

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

Proportion of loaded areas (LA) on the regions' territories

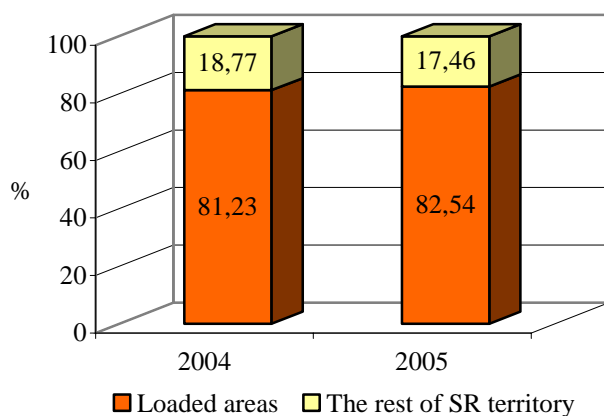
Region	LA of the regions' territory (km ²)	LA of the regions' territory – proportion in %
Banskobystrický	599.7	6.3
Bratislavský	515.7	25.1
Košický	2 304.1	34.1
Nitriansky	1 196.4	18.9
Prešovský	416.8	4.6
Trenčiansky	281.9	6.2
Trnavský	499.5	12.0
Žilinský	0.0	0.0

Source: SEA

Loaded areas represent approximately 10 % 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.

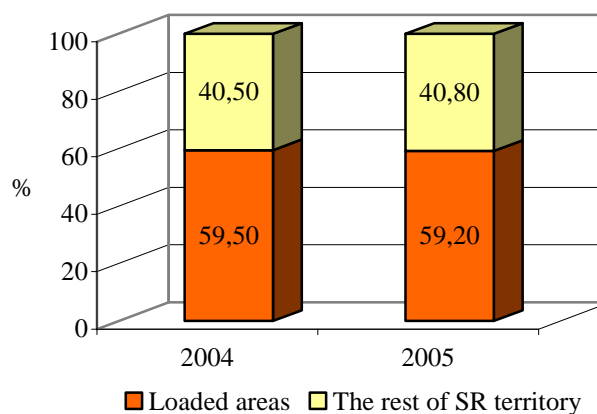
Air

SO₂ emissions from stationary sources in LA



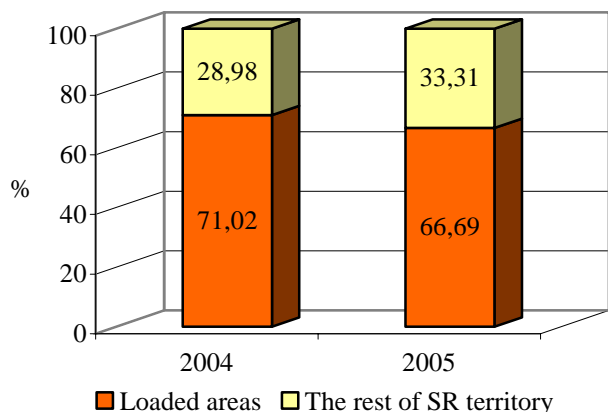
Source: SHMI

Discharged NO_x contamination in LA



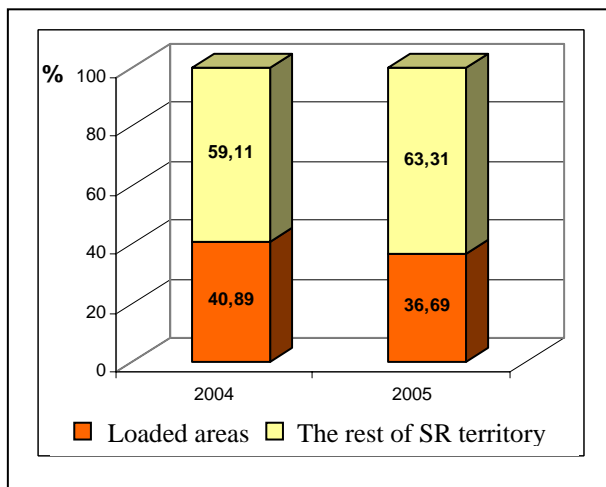
Source: SHMI

CO emissions from stationary sources in LA



Source: SHMI

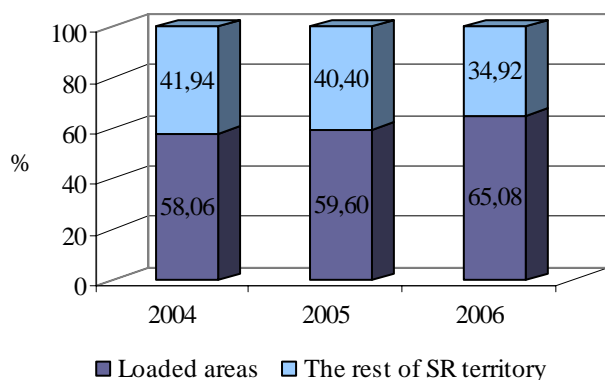
PM emissions from stationary sources in LA



Source: SHMI

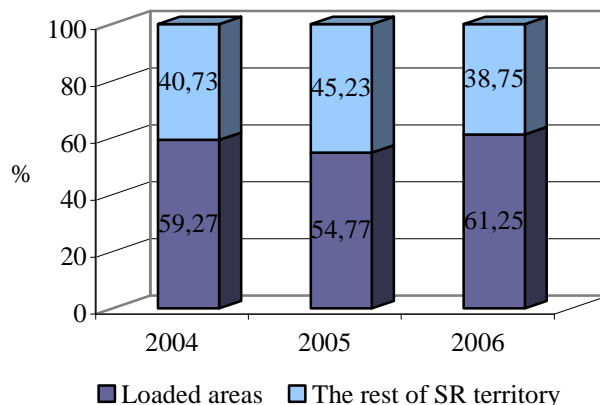
Water

Discharged BOD₅ contamination in LA



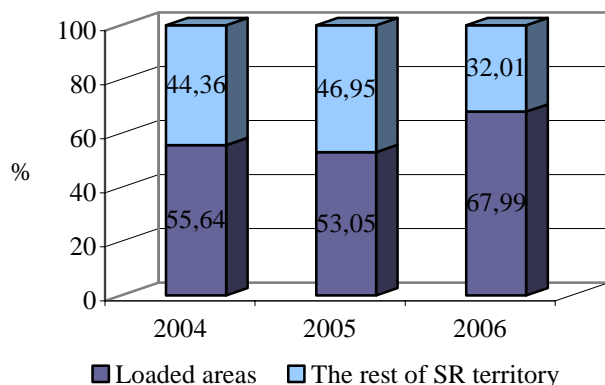
Source: SHMI

Discharged COD₅ contamination in LA



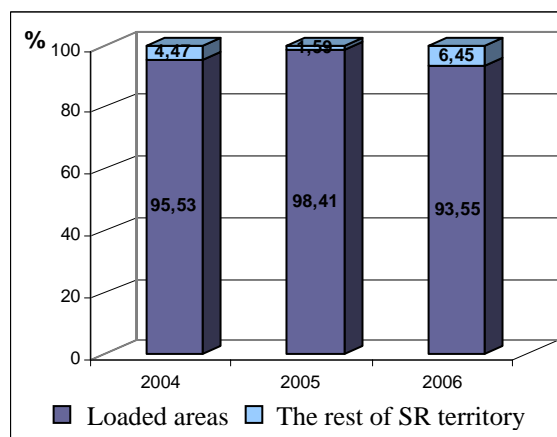
Source: SHMI

Discharged IS contamination in LA



Source: SHMI

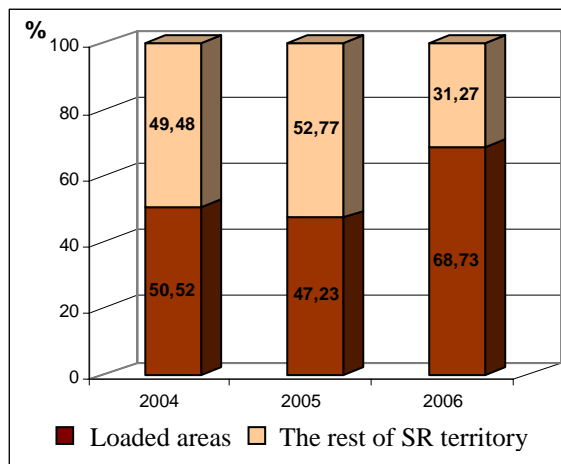
Discharged ENP_{UV} contamination in LA



Source: SHMI

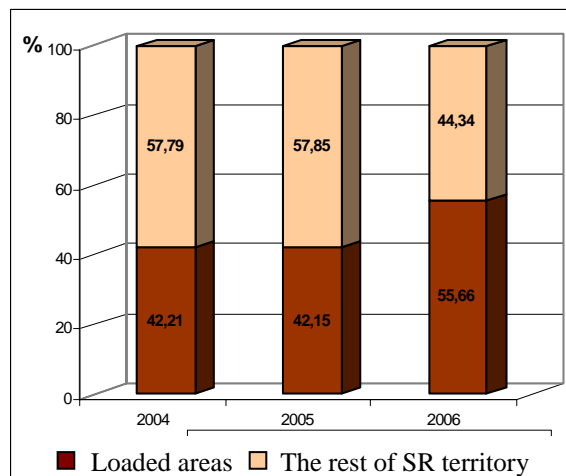
Waste

Other waste generated in LA



Source: SEA

Hazardous waste generated in LA



Source: SEA



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

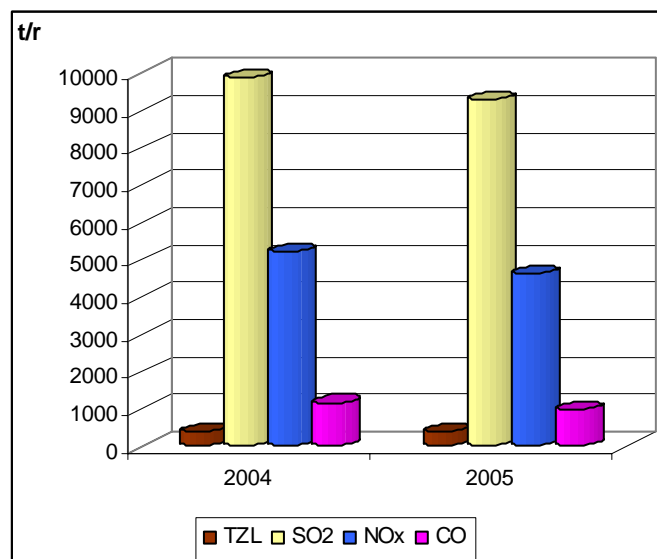
• LOADED AREAS

Bratislava loaded area

◆ Air pollution

Main polluter in the area is the petrochemical industry, power industry, and transportation that increases from year to year. Extensive building activities especially of multi-purpose objects and related demolition, excavation, and construction works are another significant source of air pollution. Compared to 2004, the volumes of emissions in the area show a decreasing trend.

Emission volumes in Bratislava loaded area in the years 2004, 2005



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 2006 at the monitoring stations in Bratislava loaded area

Pollutant	Health protection											VHP ²⁾	
	SO ₂		NO ₂		NO ₂ +TT		PM ₁₀		CO	Benzene	Benzene +TT	SO ₂	NO ₂
	1 hour	24 hour	1 hour	1 year	1 hour	1 year	24 hour	1 year	8 hour ¹⁾	1 year	1 year	3 hour Floating average	3 hour Floating average
Limit value [$\mu\text{g}\cdot\text{m}^{-3}$] <i>(number of exceeding measurements)</i>	350 (24)	125 (3)	200 (18)	40	240 (18)	48	50 (35)	40	10000	5	9	500	400
Bratislava, Kamenné nám.	^b 0	^b 0	^c 0	^c 32.9	^c 0	^c 32.9	39	29.1				0	0
Bratislava, Trnavské mýto	0	0	0	44.1	0	44.1	100	40.7	3019	2.4	2.4	0	0
Bratislava, Jeséniova *							^a 10	^a 25.2					
Bratislava, Mamateyova	6	0	0	28.0	0	28.0	48	30.9				0	0

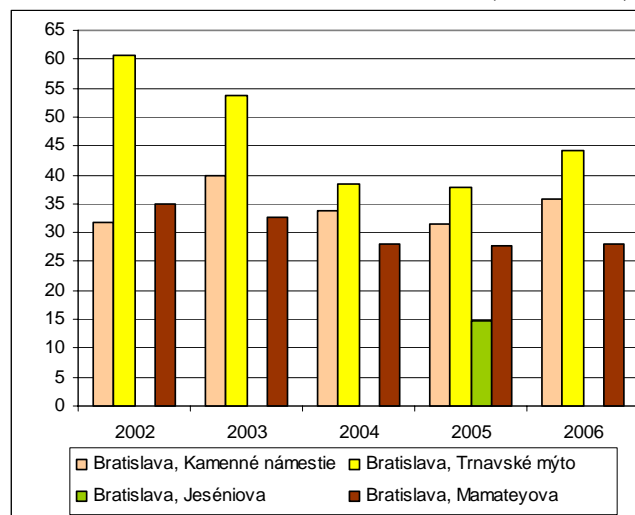
1) maximal eight-hour concentration

2) limit values for the alarm limit thresholds

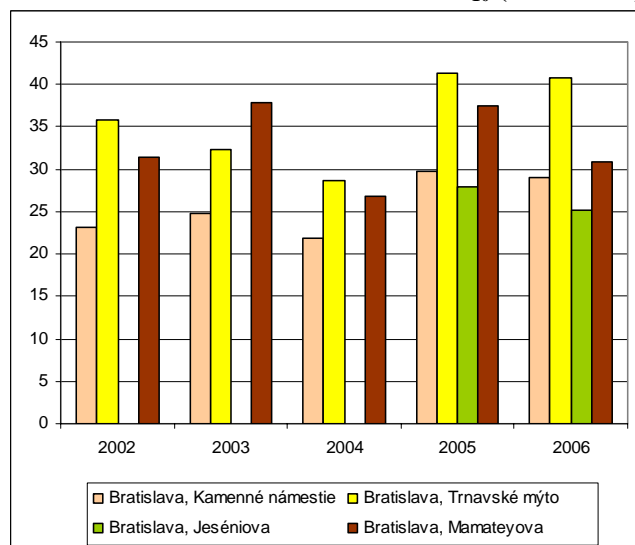
Pollutants exceeding the limit values are in bold

 Marked yields: > 90%, ^a 75–90 %, ^b 50–75 %, ^c < 50 % of valid measurements

Source: SHMI

Trend in annual concentration of NO₂ (2002-2006) in Bratislava loaded area ($\mu\text{g}\cdot\text{m}^{-3}$)


Source: SHMI

Trend in annual concentration of PM₁₀ (2002-2006) in Bratislava loaded area ($\mu\text{g}\cdot\text{m}^{-3}$)


Source: SHMI

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

Station	VHP = 240 $\mu\text{g}\cdot\text{m}^{-3}$					IHP = 180 $\mu\text{g}\cdot\text{m}^{-3}$				
	2002	2003	2004	2005	2006	2002	2003	2004	2005	2006
Bratislava, Jeséniova	0	3	0	0	0	0	42	0	6	11
Bratislava, Mamateyova	0	3	0	0	0	0	32	0	8	19

Source: SHMI

Average eight-hour ground ozone concentration was exceeded at all stations. Permitted limit is 25 days for 3 years in average.

Number of days showing the exceeded average eight-hour O_3 120 $\mu\text{g}\cdot\text{m}^{-3}$ ground ozone concentration (target value for protection of human health) at the SHMI monitoring stations in Bratislava loaded area in the years 2004-2006

Station	2004	2005	2006	Average 2004-2006
Bratislava, Jeséniova	28	52	50	43
Bratislava, Mamateyova	15	42	34	30

Source: SHMI

An air-quality management area for the PM_{10} a NO_x pollutants was 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 (III.-IV. categories) Surface water in the Morava watershed belongs to heavily polluted waters. 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. Classification of the Danube water flow into the V. quality category in 2006 was the consequence of recorded great AI volumes in the category of micro-pollutants (F).

Quality of water in the water courses within the loaded area has not changed significantly over the monitored years. The poorest water quality (IV.-V. category) has long been shown for the groups of microbiological indicators (E) and micropollutants, notwithstanding a recent improvement in the Malý Danube water course by one quality category.

Surface water quality in Bratislava loaded area

Watercourse	Sampling site	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Danube	Karlova Ves	II	II	II	II	III.	III.	II	III.	III.	III	III	III	IV	IV	IV	V	V	V
	Bratislava left bank	II	II	II	II	III	III	III	III	III	III	III	III	IV	IV	IV	V	V	V
	Bratislava centre	II	II	II	III	III	IV	II	II	II	III	III	II	IV	IV	IV	V	V	V
	Bratislava right bank	II	II	II	II	II	III	II	II	II	III	III	II	V	IV	IV	V	V	V
	Rajka	II	I	II	II	II	III	II	II	II	III	III	II	IV	IV	IV	V	I	I
Malý Danube	Bratislava	II	I	I	II	II	II	III	II	II	IV	III	III	IV	III	III	III	IV	IV
	Malinovo	II	I	I	II	II	II	IV	IV	IV	IV	III	III	IV	III	III	IV	IV	IV

Source: SHMI

◆ Ground water contamination

Ground water quality within the loaded area has been monitored for the important water management regions of Bratislava and Small Carpathians. Monitoring was implemented at 18 facilities of the monitoring network (16 wells within the basic SHMI network, 1 actively used well, and 1 unused well). Ground water has been significantly influenced by anthropogenic contamination. The most frequently exceeded indicators include total Fe and Mn. Sulphates also belong among the frequently exceeded indicators. Limit values for heavy metals were exceeded for the categories of Al and Hg.

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

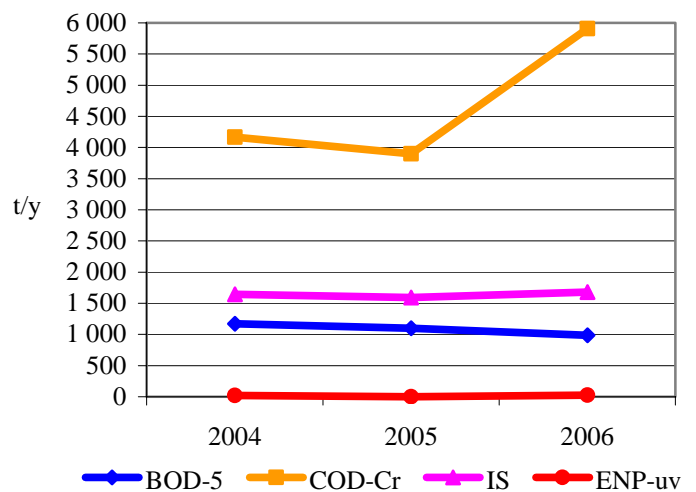
Major sources of water contamination and contamination discharged to surface water within Bratislava loaded area

Source of contamination	BOD ₅ (t.r ⁻¹)			COD _{Cr} (t.r ⁻¹)			IS (t.r ⁻¹)			ENP _{UV} (t.y ⁻¹)		
	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Slovnaft, Inc., - WWTP	77.34	70.34	77.15	395.04	484.80	522.63	113.94	113.4	142.54	3.14	0	5.08
Istrochem, Inc., - WWTP	729.29	696.5	532.51	1 905.23	1 594.24	1 404.52	57.71	47.89	59.25	1.29	0.66	0.75
Slovnaft bl. 17-18- WWTP	125.79	123.8	133.23	516.58	573.82	597.73	535.24	573.9	502.98	16.6	0	18.53
BVS, Inc., - WWTP Vranka	176.04	149.7	171.65	1 010.29	893.21	1 005.07	728.95	641	715.35	0	0	0
BVS, Inc., - WWTP Petržalka	60.71	58.16	72.27	337.86	353.39	373.92	209.83	217.6	257.63	0	0	0

Source: SHMI

The year 2006 shows a slight increase in the volumes of discharged contamination at these sources for the majority of the indicators.

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 loaded area

Sort of waste	Waste production (t)		
	2004	2005	2006
Hazardous waste	74 195.38	51 555.00	80 223.48
Other waste	1 524 273.38	866 951.67	3 208 571.95
Municipal waste	184 937.70	200 998.52	194 973.39
Waste production in total	1 783 406.46	1 119 505.19	3 483 769.82

Source: SEA, SO SR

Waste handling

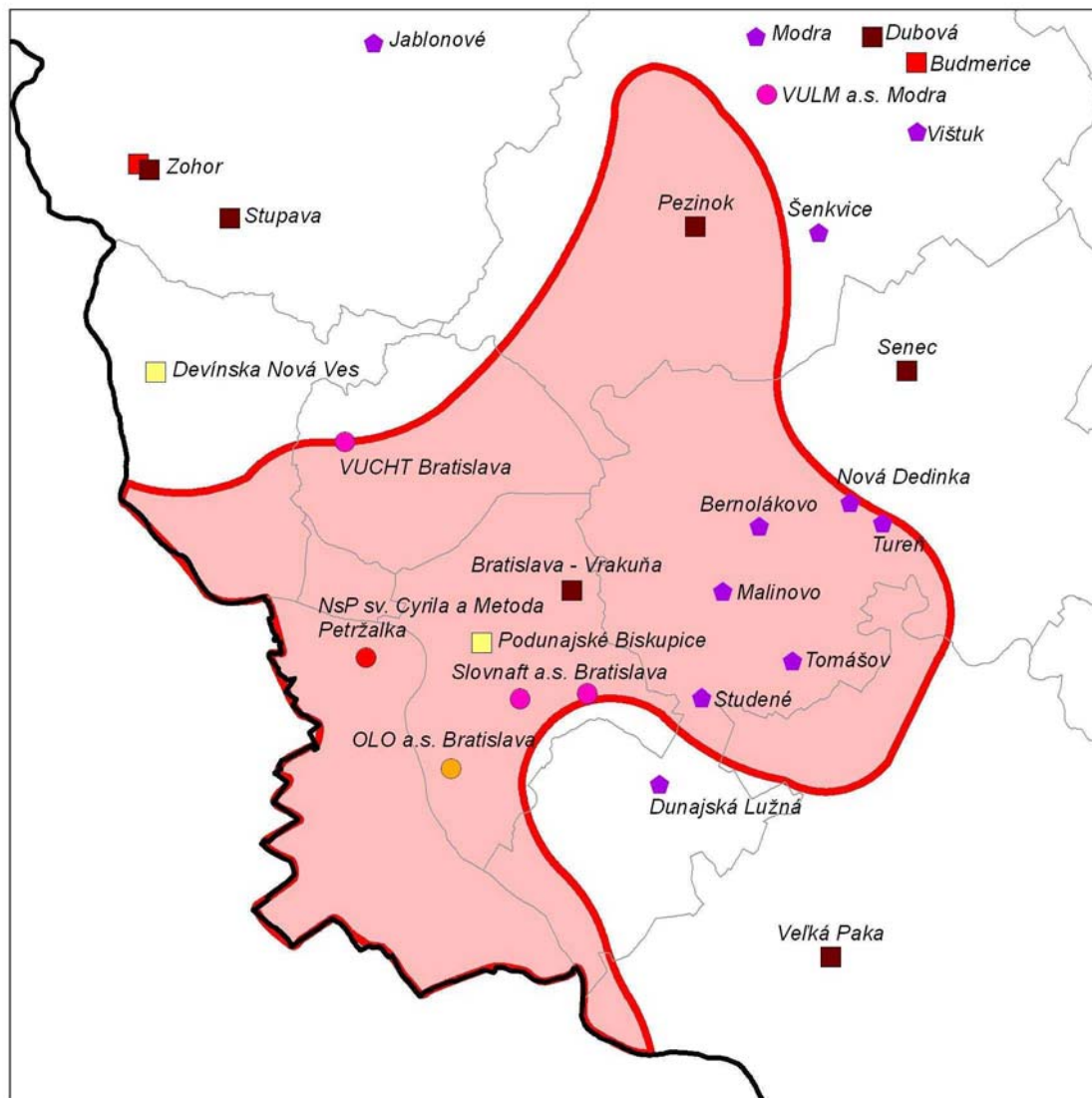
The most frequent waste handling activities within the monitored area include landfills and incineration. 44 – 84% of annual production of the other waste and approximately 20 % of annual production of hazardous waste was disposed of at landfills, while 21 % of annual production of hazardous waste was disposed of through incineration. 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 Ponitrie loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)				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
Disposal through landfills	17 766.00	1 241 388.00	9 603.99	383 985.22	11 982.73	2 686 387.65
Disposal through incineration	18 089.00	1 702.00	11 566.88	3 048.05	13 958.96	19 338.64
Biological disposal	5 222.00	8 024.00	5 311.24	4 409.61	5 476.08	2 186.18
Other disposal	5 195.00	32 835.00	6 329.87	224 934.06	23 743.26	121 920.33

Source: SEA

Waste disposal facilities in Bratislava loaded area in 2006



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

Lower Váh loaded area

◆ **Air pollution**

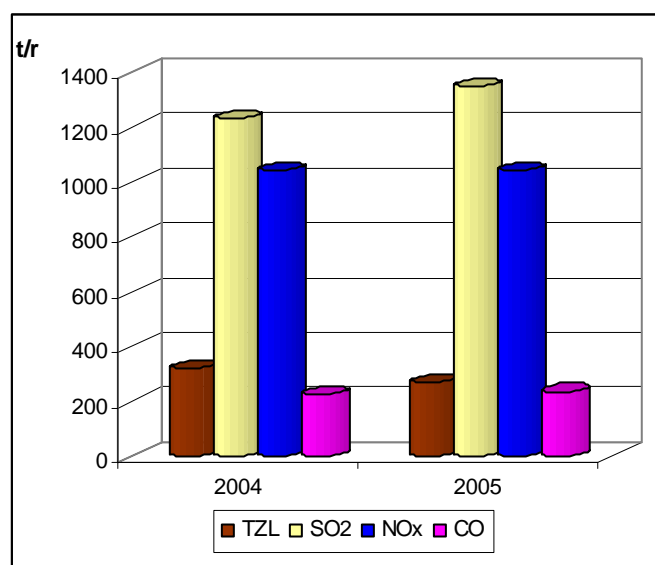
Air quality within the area has been affected especially by the operation of large industrial sources that belong to the major chemical industrial agents. Significant contributors to total pollution include transportation, especially within the main transportation corridors.

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

No.	Operator
1.	Duslo, Inc., Šaľa
2.	Slovenské cukrovary, Inc., prevádzkareň Sereď
3.	Mach-Trade, Ltd., Sereď
4.	Zelex Slovakia, Ltd., Komárno
5.	QUEEN, Ltd., Neded

Emission volumes within the area in 2005 increased for all pollutants, with the exception of PM, which showed a falling trend.

Emission volumes in the Lower Váh loaded area in the years 2004, 2005



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. In this region, the Váh River has been regularly contaminated from the streams of Trnávka and the Lower Dudváh that show the persisting water quality of the IV. category. Classification of the Váh water course into the V. quality category in 2006 was the consequence of recorded big Hg volumes in the category of micro-pollutants (F).

The area also includes the lower Nitra River region with the water quality within the IV.-V. categories. 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.

Quality of water in the water courses within the area has not changed significantly over the monitored years. The poorest water quality (IV.-V. category) for most indicator groups has long been shown at Nitra and Malá Nitra water courses.

Surface water quality in the Lower Váh loaded area

Watercourse	Sampling site	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Váh	Nad Sereďou	III	II	II	IV	II	II	II	V	II	III	II	III	IV	III	III		I	III
	Selice	III	II	II	IV	III	II	III	III	II	V	III	III	IV	III	III	III	V	V
	Kolárovo	II	I	I	III	II	III	III	III	III	IV	II	II	IV	III	III		III	
Trnávka	Modranka	V	V	IV	IV	III	III	V	V	IV	V	III	IV	V	IV	V	V	V	IV
D. Dudváh	Sládkovičovo	IV	III	IV	V	IV	IV	V	V	V	IV	IV	IV	IV	V	V	IV	V	V
Malá Nitra	Pod Šuranmi	III	III	IV	IV	IV	IV	V	V	V	III	IV	IV	IV	IV	V	IV	V	IV
Nitra	Komoča	III	IV	IV	IV	IV	IV	V	V	V	IV	IV	IV	V	V	V	IV	IV	IV

Source: SHMI

♦ Ground water contamination

Ground water quality within the loaded area has been monitored for the major water management areas at 16 facilities of the monitoring network (16 wells of the basic SHMI network). The most frequently exceeded indicators include total Fe, Mn, and the ammonium ions. The exceeded anions included chlorides and sulphates.

Compared to the previous years, ground water quality in the area of the Lower Váh has not changed significantly. The area of alluvial sediments of the Nitra River 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 Váh loaded area

Source of contamination	BOD ₅ (t.y ⁻¹)			COD _{Cr} (t.y ⁻¹)			IS (t.y ⁻¹)			ENP _{UV,ič} (t.y ⁻¹)		
	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Duslo, Inc., Šaľa - WWTP	181.90	118.30	241.16	592.48	497.87	686.92	157.49	121.04	114.76	2.68	1.44	1.96
TAVOS, Inc., - WWTP Trnava-Zeleneč	111.63	139.20	173.52	343.19	456.15	542.98	108.62	144.31	160.65	0	0	0
ZVS, Inc., OZ Nové Zámky WWTP	x	x	332.54	x	x	689.42	x	x	380.42	x	x	0
ZVS, Inc., OZ Galanta WWTP	x	x	124.84	x	x	301.53	x	x	60.65	x	x	0

x – source was not listed among the major sources within the SR, and was not considered for the assessment of the 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 2004-2006. This was caused by an increased generation of hazardous waste, as well as a significant growth in the production of other waste types. Trend in the generation of municipal waste shows a slight reduction.

Waste production in the Lower Váh loaded area

Sort of waste	Waste production (t)		
	2004	2005	2006
Hazardous waste	15 543.23	14 844.98	43 791.96
Other waste	79 003.43	202 317.31	237 375.97
Municipal waste	84 220.70	75 462.03	80 448.77
Waste production in total	178 767.36	292 624.32	361 616.70

Source: SEA, SO SR

Waste handling

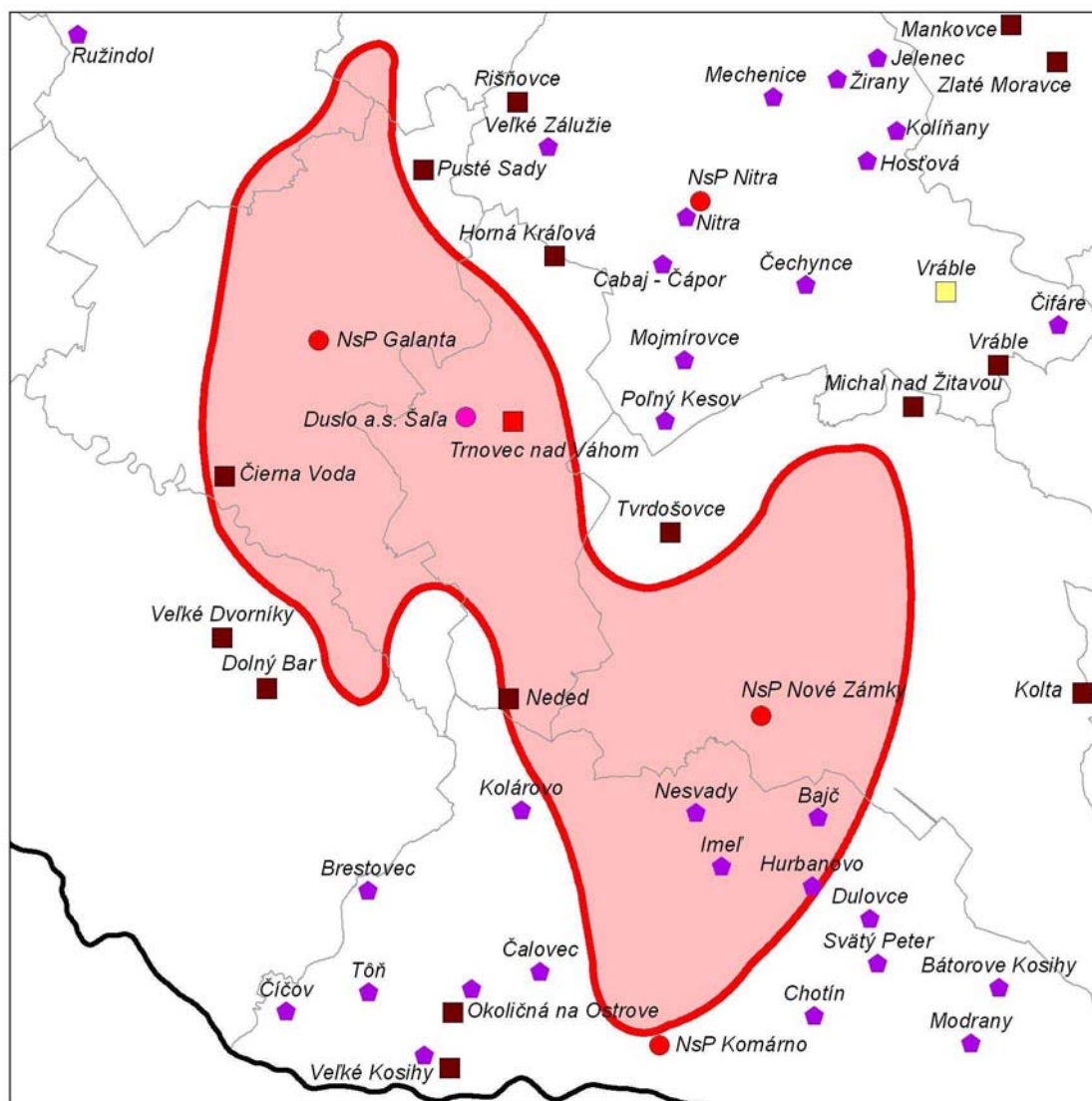
The most frequent handling types of hazardous waste within the area were incineration, approximately 47 %, and landfills, approximately 30 % of the annual waste production. Increase in hazardous waste reclamation rate was from 5-6 % to 31 % in 2006. Total assessment of other waste handling activities shows the dominance of other waste handling activities within the interval of 56-73 %, while 18 % of the annual production was disposed of through landfills. The area shows an increase in other waste reclamation activities to 29 % in 2006.

Waste handling activities in the Lower Váh loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)					
	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
Disposal through landfills	5 853.00	15 575.00	3 881.08	38 554.12	11 748.50	33 587.25
Disposal through incineration	7 440.00	307.00	7 465.93	808.82	17 033.38	263.72
Biological disposal	223.00	23.00	45.89	173.35	275.45	384.68
Other disposal	1 127.00	46 626.00	2 638.46	147 307.75	1 235.14	133 843.79

Source: SEA

Waste disposal facilities in the Lower Váh loaded area 2006



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

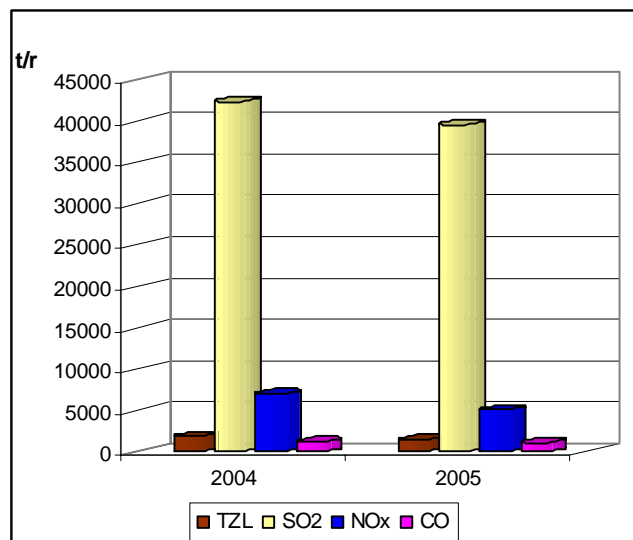
Ponitrie loaded area

♦ Air pollution

Structure of industry that includes power, chemical, and mining industries is typical for its used high energy demand technologies with a significant escape of emissions, which significantly impacts the quality of air in the area. Significant contributors to total pollution include also transportation, especially within the main transportation corridors.

Five major operators of air pollution sources in 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

Emission volumes in the Ponitrie loaded area in the years 2004, 2005

t/r – tons/year
TZL – PM

Source: SHMI

In terms of local air pollution in 2006, the pollution limit for sulphur dioxide was not exceeded for hour, nor for daily values with greater number than the limit value for protection of human health. PM₁₀ particles exceeded the permitted number of exceeding times at all monitoring stations in the area. Air pollution by lead in 2006 showed a decreasing trend and does not exceed the limit value. Limit value in case of benzene was not exceeded either. Exceeding of the information threshold for ground ozone was not recorded. Alarm threshold was not exceeded in the area.

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 heavy to extremely 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. Classification of water courses into the V. quality category in 2006 was the consequence of different P and N forms in the nutrient group (C), saprobic bioestone index in the biological indicators group (D), volumes of the coliform and thermo-tolerant coliform bacteria, fecal streptococci in the microbiological indicators group (E), and the content of ENP_{UV} and Hg in the micropollutants group (F).

There has been a persisting adverse condition in surface water quality.

Surface water quality in the Ponitrie loaded area

Water-course	Sampling site	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Nitra	Opatovce n/N.	III	III	III	II	II	II	III	IV	IV	III	III	III	V	V	V			
	Chalmová	III	IV	V	V	V	V	IV	V	IV	V	IV	V	V	V	V	V	V	V
	Nitrianska Streda	III	V	III	IV	IV	IV	IV	V	IV	IV	IV	IV	V	V	V	V	V	V
	Lužianky	III	III	III	IV	IV	IV	IV	IV	IV	IV	IV	IV	V	V	V	IV	V	V
	Čechynce	V	IV	IV	IV	IV	IV	V	V	IV	IV	IV	V	V	V	V	IV	V	IV
Handlovka	Koš	IV	V	IV	III	III	III	V	V	V	IV	IV	V	V	V	V	IV	V	V
Nitrica	Partizánske	II	II	II	II	II	II	III	IV	III	III	III	III	IV	III	IV	III	IV	V
Bebrava	Krušovce	III	III	III	III	III	III	IV	V	IV	IV	IV	IV	V	V	V	IV	IV	IV

Source: SHMI

◆ Ground water contamination

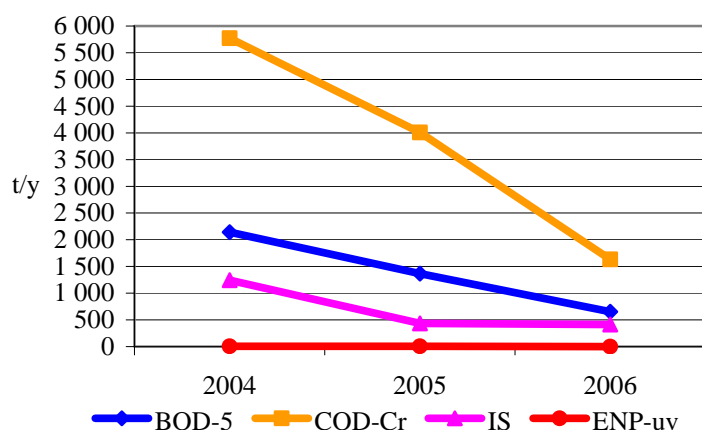
Ground water quality within the loaded area has been monitored for significant water management areas of the Mesozoic formation of Strážovské hills, and alluvial sediments of the Nitra river from Prievidza to Hurbanovo at 17 facilities of the monitoring network (16 wells of the basic SHMI network, 1 actively used well). The most frequently exceeded indicators include total Fe, Mn, and the ammonium ions. Exceeded are also values for chlorides, sulphates, and nitrates.

There has been a continuing deterioration in the ground water situation in the area of alluvial sediments of Nitra. The area shows a high rate of industrial and agricultural activities, which negatively impacts the ground water chemistry.

◆ 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. In 2006, there was a significant reduction in discharged contamination from the production plant of NCHZ, Inc. Nováky.

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



Source: SHMI

◆ Waste management

Balance of waste generation

Total production of waste within the area during the years 2004-2006 showed relatively balanced characteristics. 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. Trend in the production of hazardous waste showed fluctuating characteristics.

Waste production in the Ponitrie loaded area

Sort of waste	Waste production (t)		
	2004	2005	2006
Hazardous waste	22 776.19	35 124.34	11 005.85
Other waste	1 041 523.87	1 064 061.20	1 160 447.21
Municipal waste	82 889.60	88 731.29	100 132.53
Waste production in total	1 147 189.66	1 187 916.83	1 271 585.59

Source: SEA, SO SR

Waste handling

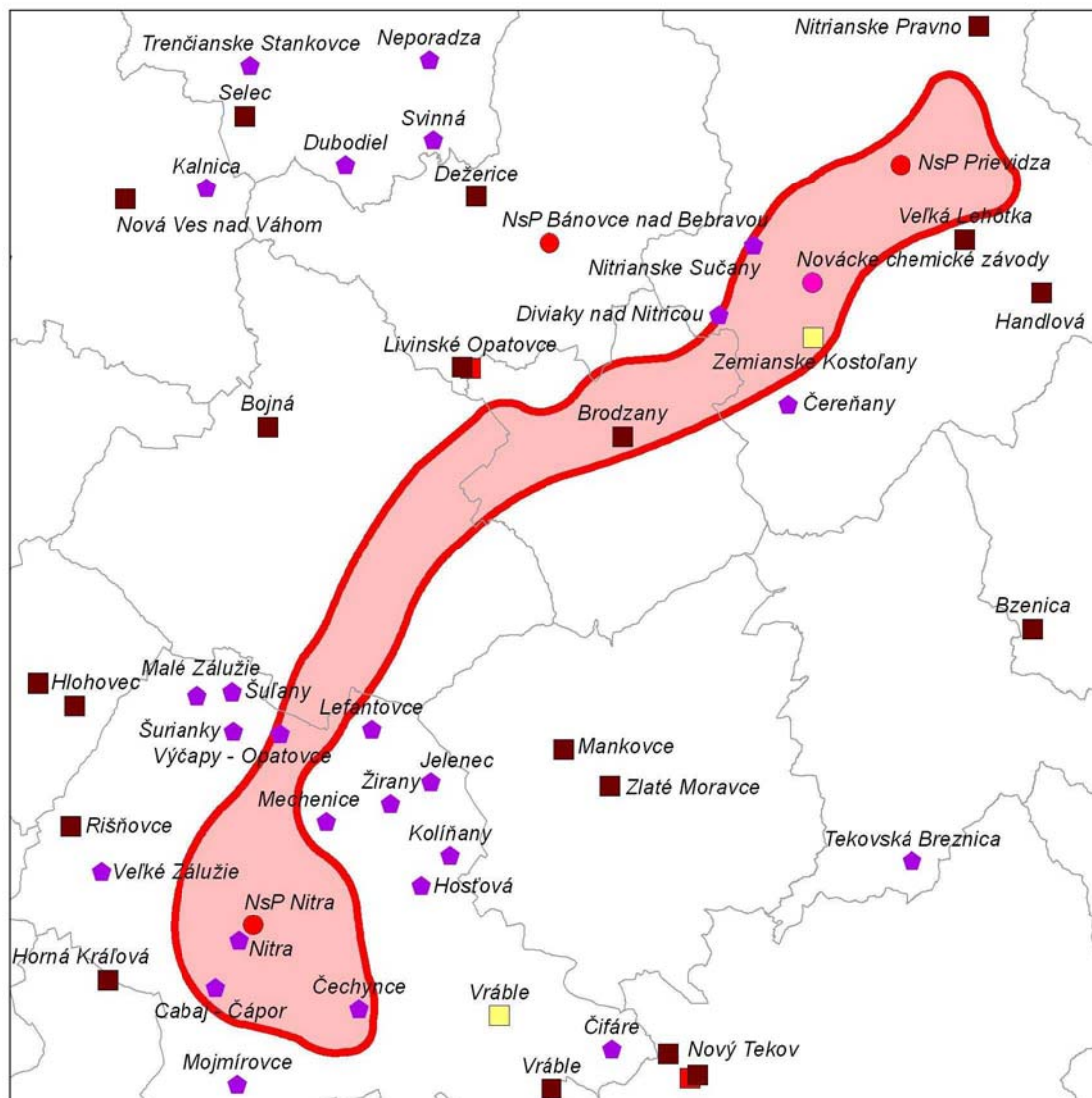
Landfills represent the most frequent way of waste disposal with approximately 68 %, while 28 % is disposed of through reclamation. Hazardous waste handling for the monitored period varied. While in 2004 hazardous waste was disposed of through waste reclamation in 59 %, in 2005, 49 % of waste was incinerated, and in 2006, 51 % of waste was disposed of through other approaches. About 8 % of annual hazardous waste production was disposed of through landfills.

Waste handling activities in the Ponitrie loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)					
	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
Disposal through landfills	1 178.00	707 923.00	2 994.53	742 516.80	1 083.81	777 287.54
Disposal through incineration	2 295.00	39.00	17 575.94	77.87	1 374.99	9 857.72
Biological disposal	2 509.00	1 998.00	642.37	2 987.03	784.02	8 319.36
Other disposal	3 422.00	39 978.00	7 741.40	41 513.27	5 667.74	13 746.68

Source: SEA

Waste disposal facilities in the Pontrie loaded area in 2006

**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

Pohronie loaded area◆ **Air pollution**

Wood-processing industry, aluminium production, as well as a great number of local heat sources, all contributes to air contamination in the area.

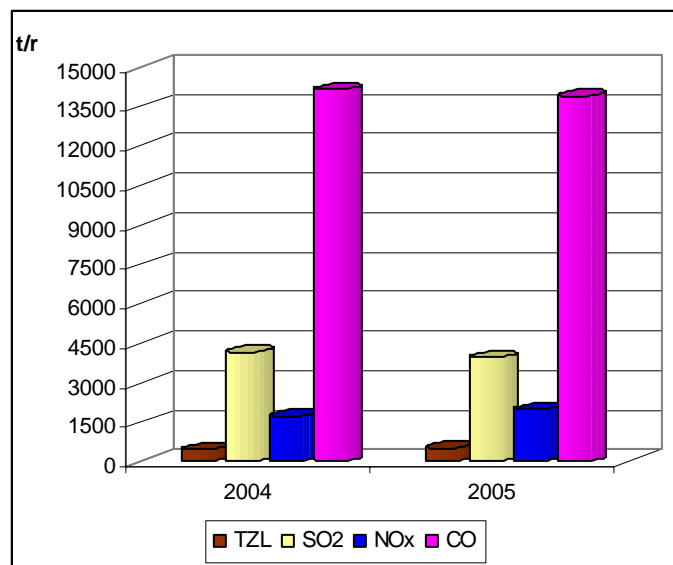
Major local pollution sources include mainly transportation, suspension and re-suspension of particles from insufficiently clean roads, construction sites, landfills of powder material, heating of houses with solid fuels, and agriculture.

Five major operators of air pollution sources in 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 emissions in 2005 show a slightly decreasing trend.

Emission volumes in Pohronie loaded area in the years 2004, 2005



t/r – tons/year
TZL – PM

Source: SHMI

In terms of local air pollution in 2006, the pollution limit for sulphur dioxide was not exceeded for hour, nor for daily values with greater number than the limit value for protection of human health. The annual limit value for protection of human health for nitrogen dioxide was not exceeded either. PM₁₀ particles exceeded the permitted number of exceeding times at both monitoring stations in the area. Air pollution by lead in the area showed a slightly decreasing trend and did not exceed the limit values. Exceeding of the information threshold for ground ozone was not recorded. Alarm threshold was not exceeded in the Hron loaded area.

There was defined an air quality management zone for the territory of Banská Bystrica to monitor the PM₁₀ pollutant. Similar zone was proposed on the basis of air quality assessment for the PM₁₀ pollutant in Žiar nad Hronom, and Ladomerská Vieska.

♦ 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. Contamination by waste water from wood-processing and metal –processing industries is present in the surroundings of Žiar nad Hronom and Žarnovica.

Classification of water courses into the V. quality category in 2006 was the consequence of volumes of the coliform and thermo-tolerant coliform bacteria in the microbiological indicators group (E), and the content of ENP_{UV} and Al in the micropollutants group (F).

Water quality in the loaded area over the recent years has not changed significantly. 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	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Hron	B. Bystrica	III	II	II	III	II	III	III	II	III	III	III	III	IV	V	V	IV	III	II
	Sliach	III	IV	IV	II	II	II	III	III	III	IV	III	III	V	V	V	IV	III	III
	Budča	III	III	III	II	I	I	III	III	III	IV	III	III	V	V	V	IV	IV	V
	Žiar n/Hron.	III	II	II	II	II	III	III	III	III	IV	III	III	V	V	V	IV	IV	V
	Žarnovica	III	II	II	II	II	II	III	III	III	IV	III	III	IV	V	V	II	IV	IV
Bystrica	B. Bystrica	III	IV	IV	II	II	II	II	III	III	III	IV	IV	IV	IV	IV	III	IV	III
Zolná	mouth	IV	III	IV	II	II	II	IV	III	III	V	IV	IV	V	V	V	V	V	V
Neresnica	mouth	II	II	II	III	II	II	III	IV	III	III	II	II	IV	IV	IV	III	III	I
Slatina	mouth	III	III	III	V	II	II	IV	IV	IV	III	III	III	IV	IV	IV	IV	V	V

Source: SHMI

♦ Ground water contamination

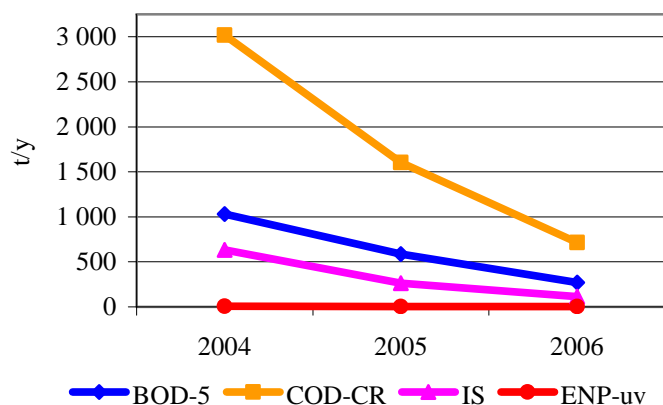
Ground water quality within the loaded area has been monitored for the major water management zones of alluvial sediments of the Hron river, Mesozoic of the Low Tatras and Veľká Fatra, and in the zone of alluvial sediments of the Hron river from Žiar nad Hronom to Želiezovce, at 6 facilities of the monitoring network (6 wells of the basic SHMI network). The most frequently exceeded indicators include total Fe, Mn, and the ammonium ions. Most heavily contaminated zone of alluvial sediments of the Hron river is Lehôtka pod Brehmi, with total exceeded limit values for 13 indicators.

Compared to the previous period, ground water quality has not changed significantly, especially in terms of trace elements. Contamination in the category of specific organic compounds increased.

♦ 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 2006, a reconstruction and expansion of the WWTP Zvolen and WWTP of Banská Bystrica was completed. This has a positive impact on reduced volumes of discharged contamination from these sources.

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



Source: SHMI

◆ Waste management

Balance of waste generation

Total production of waste in the area during 2004-2005 showed a rising trend, due to an increased production of hazardous, municipal, and other waste categories. Other waste had a decisive impact on total production of waste in the area, especially in 2005.

Waste production in the Pohronie loaded area

Sort of waste	Waste Production (t)		
	2004	2005	2006
Hazardous waste	13 996.49	21 758.15	23 138.28
Other waste	236 245.91	695 661.34	278 010.90
Municipal waste	50 331.90	55 030.91	61 178.36
Waste production in total	300 574.30	772 450.40	362 327.56

Source: SEA, SO SR

Balance of waste generation

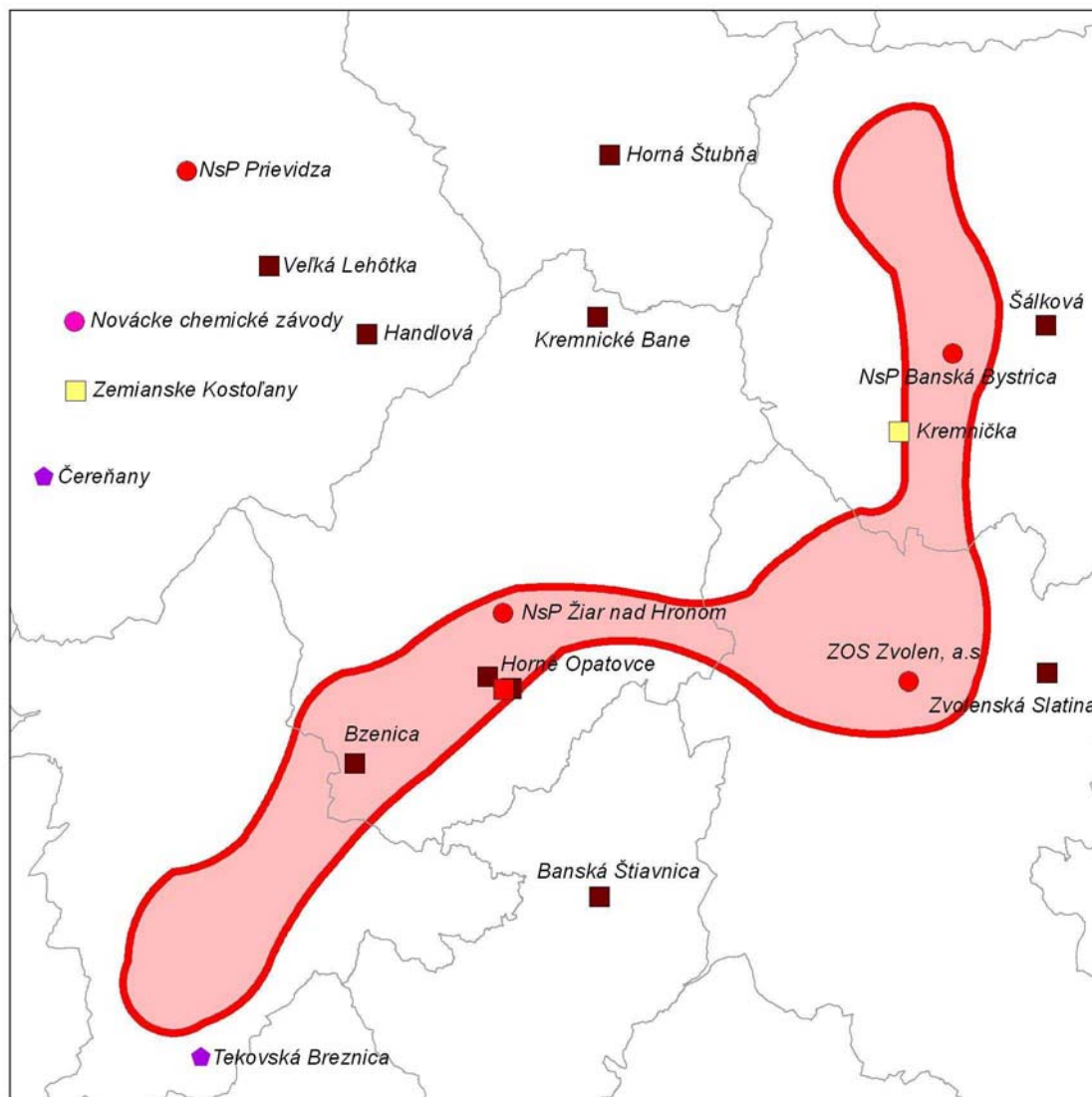
The most frequent form of waste disposal was through other ways – about 40 % of annual production, while 21 % of annual production was disposed of at landfills, and 27 % of annual production was reclaimed. Other waste handling for the monitored period varied. While in 2004, landfills were the dominant waste disposal form – as much as 47 %, in 2005, waste reclamation was dominant with 87 %. In 2006, waste was equally reclaimed (41 %) and disposed of at landfills (41 %).

Waste handling activities in the Pohronie loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)					
	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
Disposal through landfills	2 362.00	40 809.00	4 631.36	56 626.94	6582.60	114 175.71
Disposal through incineration	189.00	5 900.00			262.40	462.73
Biological disposal	1 943.00	125.00	1 624.95	38.77	3 003.68	261.15
Other disposal	5 378.00	109 972.00	10 410.24	31 917.35	7 256.24	47 616.09

Source: SEA

Waste disposal facilities in the Pohronie loaded area in 2006

**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

Jelšava-Lubeník loaded area◆ **Air pollution**

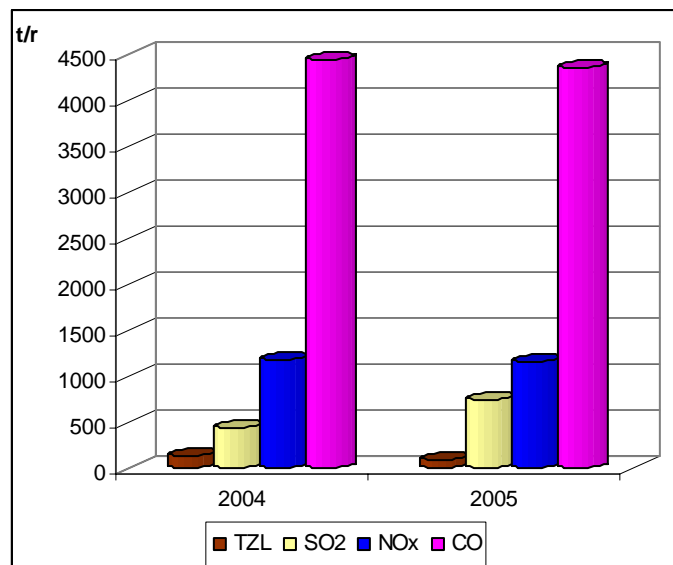
Major contributors to air contamination include the magnesite works, medium and small sources, and small local heating systems. Transportation plays a significant part in pollution (mineral dust, dust from streets taken up and whirled by traffic). Dust from towns and regions contributes to pollution as well.

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

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

Compared to 2004, the volumes of emissions in the area show a slightly decreasing trend.

Emission volumes in Jelšava-Lubenik loaded area in the years 2004, 2005



t/r – tons/year
TZL – PM

Source: SHMI

In terms of local air pollution in 2006, the pollution limit for sulphur dioxide was not exceeded for hour, nor for daily values for protection of human health. Neither in case of nitrogen dioxide was this value exceeded. PM₁₀ particles exceeded the permitted number of exceeding times, with 85 exceeding episodes for the 24-hour limit value. Annual lead concentration shows a diminishing trend and does not exceed the limit values. Alarm threshold of ground ozone in the area did not register a single exceeding episode. Information threshold in 2006 was exceeded three times.

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

♦ Surface water contamination

The Muráň water course flows through the area. Water quality falls into the I.-IV. categories for individual indicator groups and has not changed, compared to the previous year. Water quality has been negatively affected by industrial run-off water from residential areas, mainly outside the loaded area. These include especially WWTPs in towns and villages and agricultural activities. The most adverse situation is in the microbiological indicators group (E) and has been caused by great volumes of the coliform bacteria.

Surface water quality in the Bratislava loaded area

Watercourse	Sampling site	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Muráň	Bretka	II	II	II	II	II	II	III	III	III	III	II	II	IV	IV	IV		IV	I

Source: SHMI

♦ Ground water contamination

Ground water quality within the loaded area has been monitored for the major water management area of alluvial sediments in Slaná, and Muránska plane, at 1 object of the monitoring network (1 well of the basic SHMI network). The most frequently exceeded indicators include total Fe and Mn; however, recently the number of the indicators with recorded excessive limit values decreased.

♦ Sources of water contamination

There is no major water contamination source in terms of volumes of discharged contamination in the SR. Discharged contamination from industrial premises in Lubeník and Jelšava is the biggest contributor affecting water contamination.

♦ Waste management

Balance of waste generation

Total production of waste in the area during 2004-2006 showed a rising trend, due to an increased production of hazardous, municipal, and other waste categories. Municipal and other waste had a decisive impact on total production of waste in the area.

Waste production in Jelšava-Lubeník loaded area

Sort of waste	Waste Production (t)		
	2004	2005	2006
Hazardous waste	68.43	818.82	80.55
Other waste	2 309.71	4 043.09	3 310.60
Municipal waste	4 385.20	5 035.07	5 804.90
Waste production total	6 763.34	9 896.98	9 196.05

Source: SEA, SO SR

Waste handling

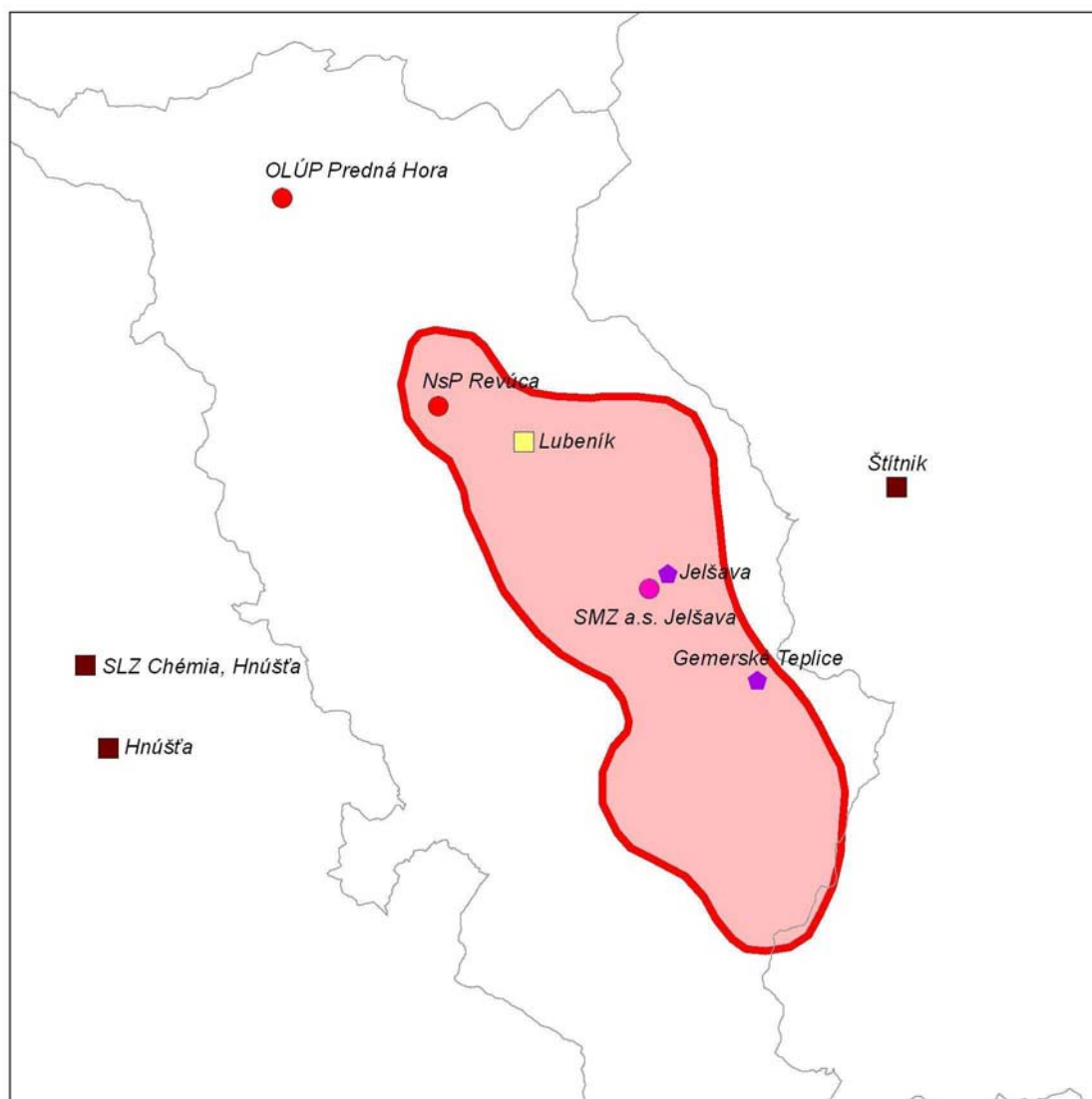
Individual waste-handling approaches in the area show varying characteristics. Reclamation of hazardous waste and other waste showed a fluctuating trend. While in 2004, there was reclaimed 71 % of annual production of hazardous waste, in 2005 it was only 6 %, and in 2006, it grew to 52 %. Reclamation of other waste category shows a similar trend. In 2004, there was reclaimed 48 % of annual production of other waste, in 2005 it grew to 74 %, and in 2006, it fell to 34 %. Approaches to disposal of hazardous waste and other waste included alternatively also other disposal approaches, biological elimination, growing trend in landfills of other waste, and growing trend in incineration of hazardous waste.

Waste handling activities in Jelšava-Lubeník loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)					
	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
Disposal through landfills	4.0	88.00	0.20	932.71	11.66	2 123.78
Disposal through incineration	7.0	12.00	22.93	9.96	15.88	6.98
Biological disposal	0.0	485.00	743.49	0.0	7.88	0.00
Other disposal	9.0	611.00	1.07	133.73	3.26	55.89

Source: SEI

Waste disposal facilities in Jelšava - Lubeník loaded area in 2006

**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

Rudniansko-gelnická loaded area

♦ Air pollution

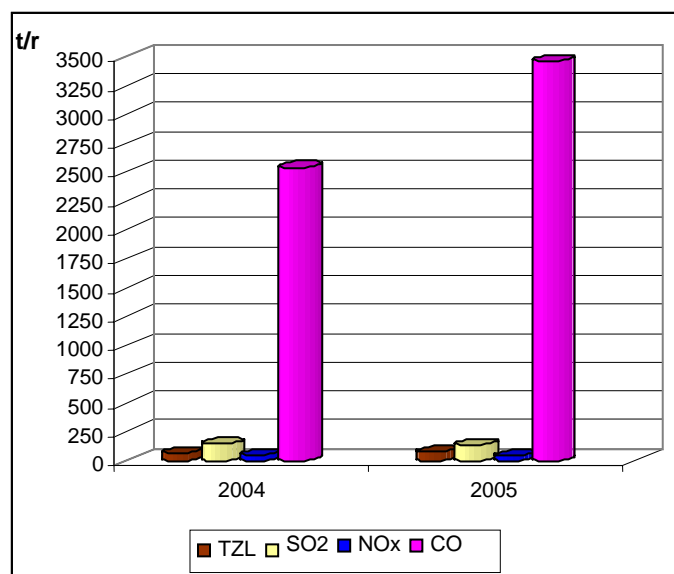
Concentration level of air pollution has been affected by small and middle-sized sources, transportation (diesel engines, busses, trucks) and mineral dust from the urban environment (construction works – insufficient cleaning), and from the regional environment.

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

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

In 2005, CO emissions in the area increased by almost 1 000 t in 2005, compared to 2004.

Emission volumes in Rudniansko-gelnická loaded area in the years 2004, 2005



t/r – tons/year
TZL – PM

Source: SHMI

In terms of local air pollution in 2006, the pollution limit for sulphur dioxide was not exceeded for hour, nor for daily values with greater number than the limit value for protection of human health. Neither in case of nitrogen dioxide was this value exceeded. PM₁₀ particles exceeded the permitted number of exceeding times, with 41 exceeding episodes for the 24-hour limit value for the particular pollutant. Relatively high lead concentrations were recorded in 2006 at the Kropachy, Lorenzova station. Number of episodes of exceeded information threshold and alarm threshold shows a falling trend, compared to 2005. Ground ozone concentrations grow with increasing altitude. Average eight-hour ozone concentration in the area at the Kojšovská hoľa station exceeded the 25-days/3 years limit.

There was defined an air quality management zone for the territory of Krompachy to monitor the PM₁₀ pollutant.

♦ Surface water contamination

Hornád and its tributaries (Hnilec, Rudniansky brook, Slovinský brook, and Smolník) in the area are contaminated by heavy metals as the consequence of a long-term mining and treatment activities in the watershed. Heavy metal concentrations still persist in the streams of the IV. and V. quality categories. Classification of water courses into the V. quality category in 2006 was the consequence of water reaction (pH) in the basic mechanical-chemical indicator group (B), volumes of the coliform bacteria in the microbiological indicators group (E), and the content of Hg and Cu in the micropollutants group.

Surface water quality in Rudniansko-gelnická loaded area

Water-course	Sampling site	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Hornád	Pod Sp. N. Vsou	III	IV	IV	III	II	II	IV	IV	IV	IV	II	II	IV	IV	IV	IV	III	III
	Kolinovce	III	III	IV	III	III	III	IV	IV	IV	V	II	II	IV	IV	IV	II	III	III
	Pod Kluknavou	II	V	V	III	IV	IV	IV	IV	IV	V	II	II	IV	IV	IV	IV	IV	IV
Rudniansky p.-2	mouth	II	I	II	III	III	III	III	III	III	IV	II	II	IV	IV	IV	III	V	V
Slovinský p.	mouth	III	I	I	III	III	III	III	III	III	III	II	II	V	V	V	III	III	III
Smolník - 1	mouth	I	I	III	V	V	V	II	II	II	III	II	II	II	II	II	V	V	V
Hnilec	Pod Mníškou	I	II	III	V	I	III	II	II	II	II	II	II	IV	IV	IV	III	III	III
	Prítok do VN Ružín	II	I	I	III	I	I	II	III	III	II	II	II	V	IV	IV	III	III	III

Source: SHMI

♦ Ground water contamination

Ground water quality within the loaded area has been monitored for the major water management area of alluvial sediments in Horná from Spišské Vlchy to Družstevná pri Hornáde, at 1 object of the monitoring network (1 well of the basic SHMI network). Recently, episodes of exceeded limit values for the indicators of total Fe, and Al were recorded only at the Kolinovce facility. All other indicators did not exceed the set limits.

♦ 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 WWTP Spišská Nová Ves is the biggest contributor affecting water contamination.

♦ Waste management

Balance of waste generation

Total production of waste in the area during 2004-2006 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. Production of municipal waste in the area did not show major changes.

Waste production in Rudniansko-gelnická loaded area

Sort of waste	Waste Production (t)		
	2004	2005	2006
Hazardous waste	1 452.81	1 385.00	2 019.74
Other waste	34 699.48	22 128.52	44 696.36
Municipal waste	7 689.90	7 381.38	7 631.65
Waste production in total	43 842.19	30 894.90	54 347.75

Source: SEA, SO SR

Waste handling

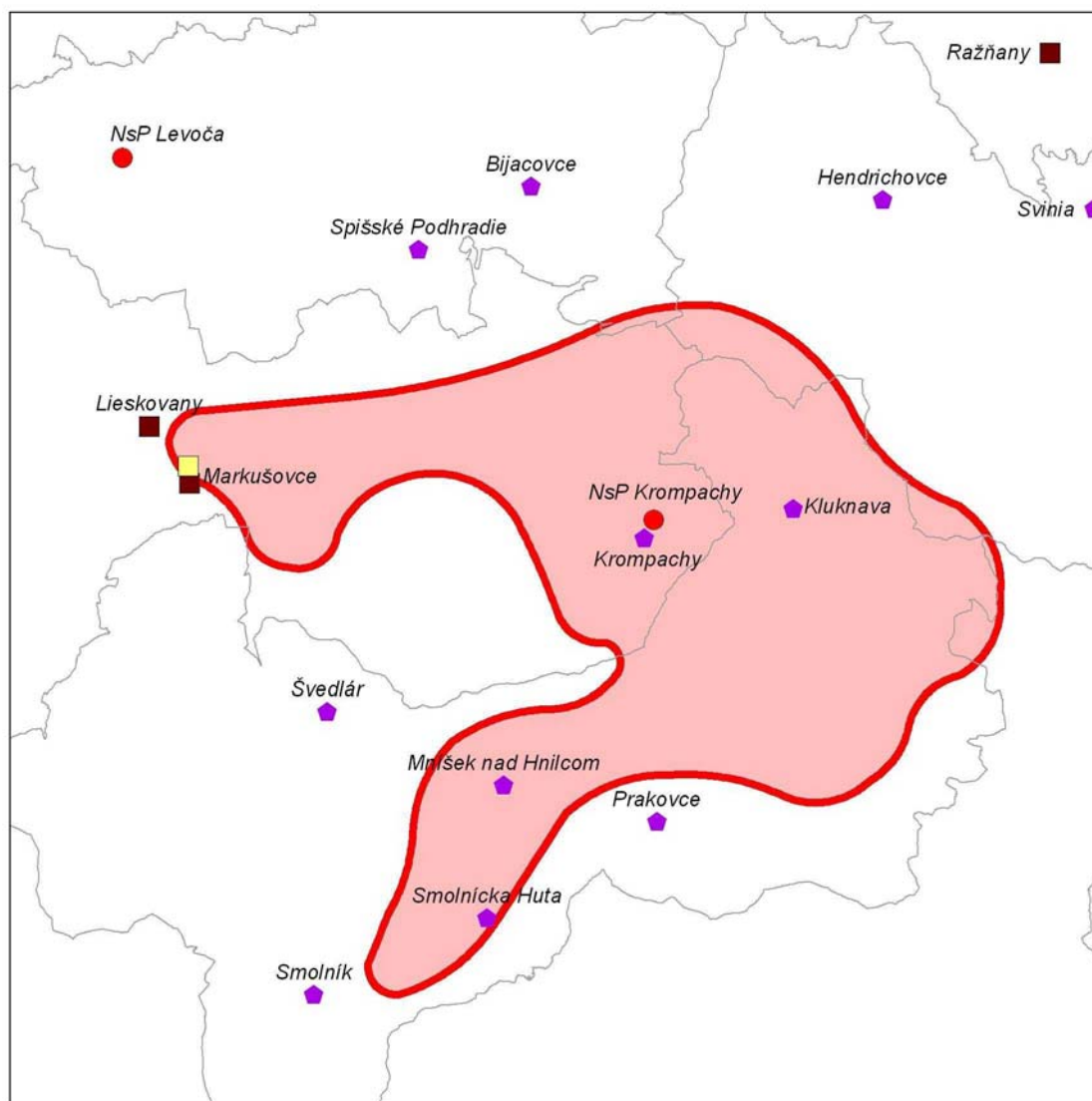
Waste reclamation was the most frequent waste disposal approach in the area. About 61 % of annual production of hazardous waste was disposed of through reclamation, while for other waste it was within the interval of 32-88 %. Approaches to waste disposal included mostly other approaches to waste disposal, with less degree of landfills and incineration. About 3.5 % of annual production of hazardous waste was disposed of at landfills, together with approximately 4 % of annual production of other waste category. Approximately 10 % of hazardous waste was disposed of through incineration.

Waste handling activities in Rudniansko-gelnická loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)					
	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
Disposal through landfills	30.0	2236.00	63.56	401.31	88.84	1 911.49
Disposal through incineration	65.0	170.00	237.45	99.77	116.52	78.44
Biological disposal	6.0	612.00	232.15	1 105.50	87.22	0.00
Other disposal	531.00	1 332.00	43.03	13 547.24	324.49	14 346.22

Source: SEA

Waste disposal facilities in Rudniansko-gelnická loaded area in 2006

**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

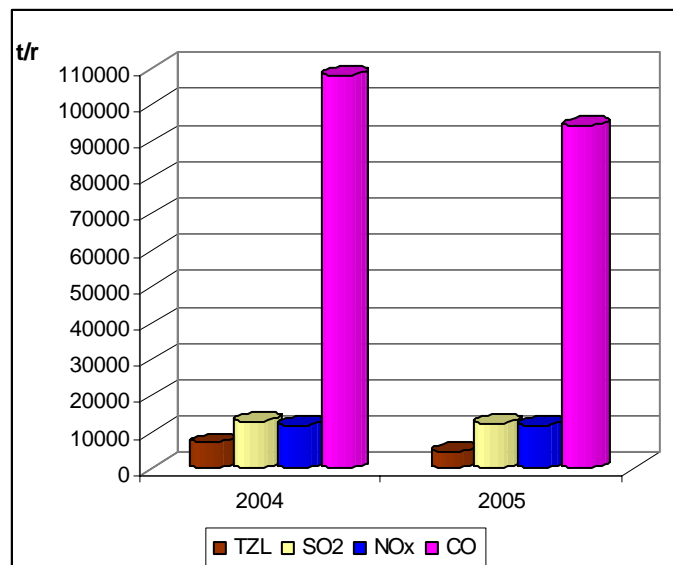
Košice-Prešov loaded area◆ **Air pollution**

Air pollutants originate mainly from large sources, especially metallurgic, mechanical, chemical, electrotechnical, food-processing, and fuel industries, as well as from mineral exploitation activities. 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 Košice-Prešov loaded area

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

In 2005, there was a slight reduction in all basic pollutants.

Emission volumes in Košice-Prešov loaded area in the years 2004, 2005

t/r – tons/year
TZL – PM

Source: SHMI

In terms of local air pollution in 2006, the pollution limit for sulphur dioxide was not exceeded for hour, nor for daily values with greater number than the limit value for protection of human health. Neither in case of nitrogen dioxide was this value exceeded.

Episodes of exceeded 24-hour limit value for the PM₁₀ pollutant were recorded at all four stations. Emitted lead volumes from year to year show a falling tendency, and lead does not pose a major problem nowadays. No ground ozone alarm thresholds were exceeded within the area. Exceeding of the information threshold has not been recorded since 2004. Target values for protection of human health are currently exceeded only at the Košice monitoring station. Other stations show no exceeded average value of 25 days per three years.

There was defined an air quality management zone for the territories of Košice, Bočiar, Haniská, Sokoľany, Veľká Ida, urban territory of Prešov, Solivar, and territories of Šalgovník, Nižná Šebestová, and Ľubotice 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. Water quality is of

the IV.-V. category for most indicators. Torysa sends into the Hornád river water of the II.-IV. quality categories. Water quality in Torysa has been adversely influenced by its tributary Sekčov with a high content of NEL_{UV} in the micropollutants group (F). Water quality situation at the sampling site of Torysa-Kednice has not changed, compared to the previous year. This suggests that contamination in the given area of the river is not increasing. Classification of Hornád into the V. quality category in 2006 was the consequence of COD_{Cr} in the oxygen indicators group (A) varying volumes of the P forms in the nutrients group (C), volumes of the fecal streptococci in the microbiological indicators group (E), and the content of NEL_{UV} and Al in the micropollutants group.

Western part of the loaded area is drained into the Bodva water course and its tributaries (Ida and Turňa). Water quality in these water courses belong to the II.-V. categories. The whole Bodva watershed is typical for its low water potential. Classification of Bodva and Ida into the V. quality category in 2006 was the consequence of COD_{Cr} in the oxygen indicators group, volumes of the fecal streptococci in the microbiological indicators group, and the content of Al in the micropollutants group.

Surface water quality in Košice-Prešov loaded area

Watercourse	Sampling site	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Hornád	Krásna n/H.	II	III	III	III	II	II	II	III	V	IV	II	II	IV	IV	IV			
	Žďaňa	III	IV	III	II	IV	II	IV	IV	IV	III	I	II	IV	IV	IV	IV	V	IV
	Hidasnémeti	III	V	V	V	V	IV	IV	IV	IV	IV	II	III	IV	V	V	IV	IV	V
Torysa	Kendice	III	IV	IV	III	III	III	V	IV	IV	IV	II	II	V	IV	IV	V	IV	IV
	Koš. Olšany	III	IV	IV	III	III	III	IV	IV	IV	III	II	II	V	IV	IV			I
Svinka	Obišovce	II	III	III	III	III	III	II	III	III	II	II	II	IV	IV	IV		V	
Sekčov	Ústie	II	III	III	IV	III	III	III	III	III	V	II	II	IV	IV	IV	IV	IV	V
Sokoliansky p.	Tornyosnémeti	II	II	III	IV	IV	IV	III	V	V	V	II	II	V	V	IV	IV	IV	IV
Ida	Ústie	IV	V	V	II	II	II	III	III	III		II	II	V	IV	IV		III	III
Turňa	Ústie	IV	III	IV	II	II	II	III	III	III		III	III	IV	IV	IV		III	III
Bodva	Hosťovce	IV	V	V	III	IV	IV	III	IV	III		II	II		V	V		IV	V

Source: SHMI

◆ Ground water contamination

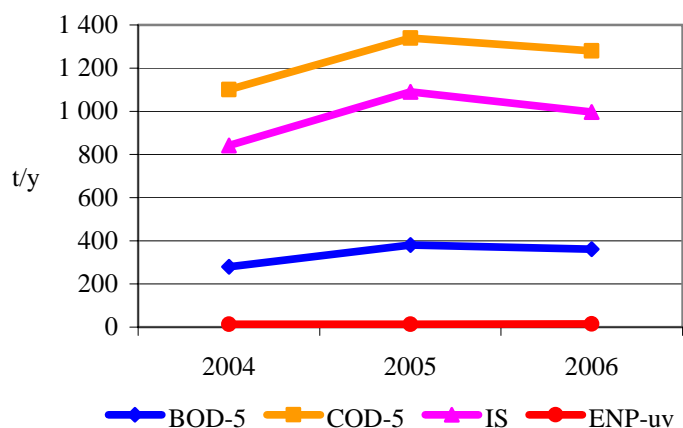
Ground water quality within the loaded area has been monitored for the major water management zones of alluvial sediments of the Hornád river from Družstevná pri Hornáde to the national border, and in the zone of alluvial sediments of the Bodva river and Slovenský Carst, at 14 facilities of the monitoring network (13 wells of the basic SHMI network, 1 actively used well). Just as in the previous years, the most frequently exceeded indicators include total Fe, Mn, due to an adverse oxygen situation. For anions, recorded exceeded limits included nitrates, sulphates, and chlorides.

Water quality in alluvial sediments of Hornád has not changed significantly over the recent period. Limit-exceeding concentration of trace elements was recorded at Drieňovec – Hlavný station, which suggests a need for increased protection of ground water in the area of Bodva alluvial 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 Košice-Prešov loaded area



Source: SHMI

◆ Waste management

Balance of waste generation

Total production of waste in the area during 2004-2006 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 hazardous and municipal waste has not shown major changes.

Waste production in Košice-Prešov loaded area

Sort of waste	Waste production (t)		
	2004	2005	2006
Hazardous waste	68 811.16	62 475.89	63 983.21
Other waste	2 115 996.82	1 969 592.96	3 059 699.17
Municipal waste	106 351.80	100 071.29	122 442.51
Waste production in total	2 291 159.78	2 132 140.14	3 246 124.89

Source: SEA, SO SR

Waste handling

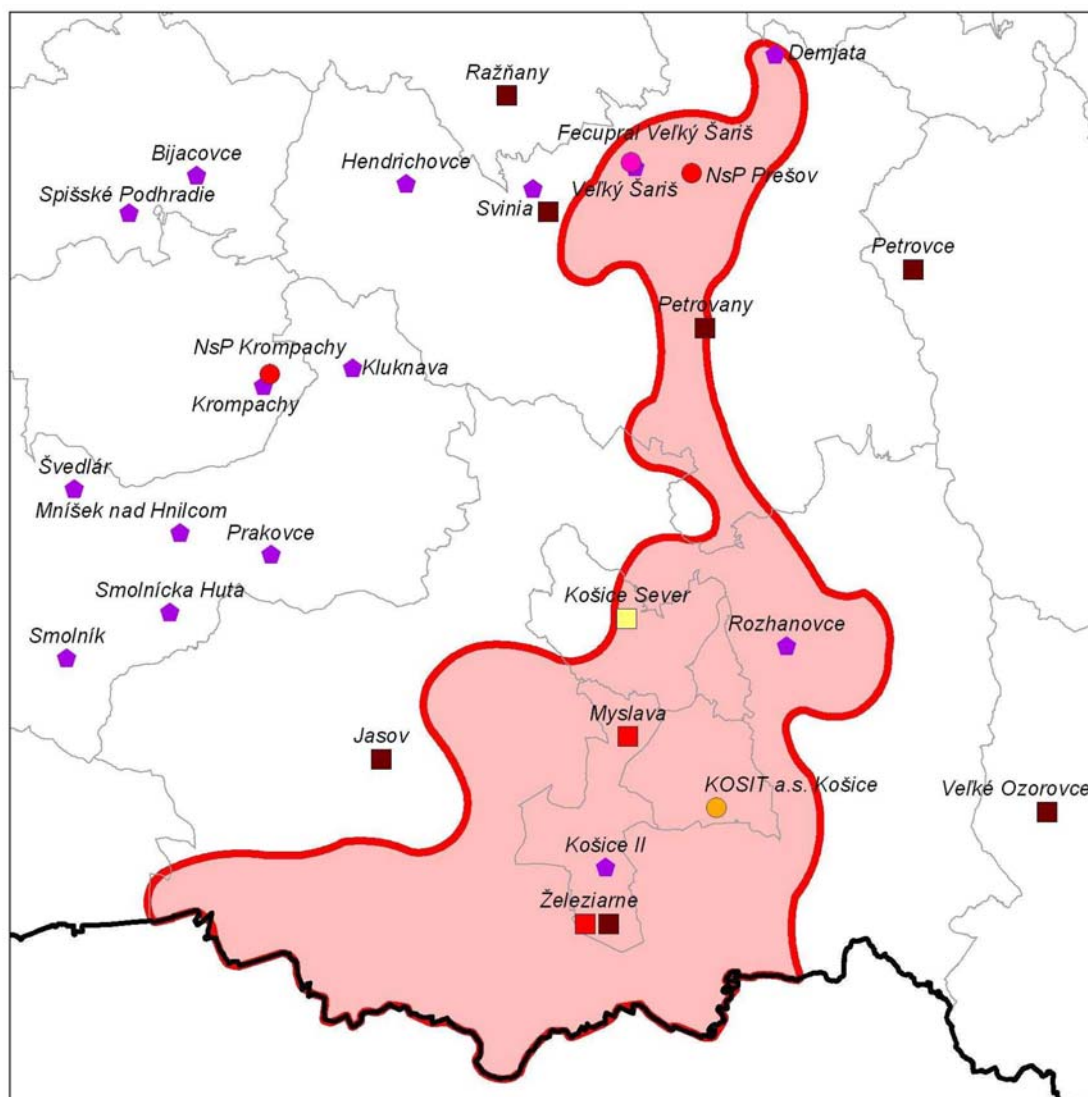
The most frequent approach to handling hazardous waste in the area was waste disposal at landfills, with about 64 % of the annual production, while in 2006, 77 % of waste was disposed of through this approach. About 3.5 % of annual waste production was incinerated. 25 % was disposed of through other approaches, dropping to 1.8 in 2006. Other waste category was disposed of mainly through landfills (about 33 % of annual production) and other approaches to waste disposal gradually dropping from 41 % to 6 % in 2006. The area recorded a gradual increase in hazardous waste reclamation from 7 % to 16 % in 2006, and from 13 % to 68 % for other waste category in 2006.

Waste handling activities in Košice-Prešov loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)					
	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
Disposal through landfills	44 407.00	925 820.00	39 349.14	527 416.32	49 260.07	800 293.08
Disposal through incineration	950.00	4 758.00	5 599.96	6 431.17	928.60	4 713.61
Biological disposal	1 157.00	45 642.00	1 736.99	1 665.51	2 037.14	734.77
Other disposal	17 455.00	862 229.00	7 037.35	219 571.79	1 158.31	181 682.81

Source: SEA

Waste disposal facilities in Košice-Prešov loaded area in 2006


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

Zemplín loaded area

◆ Air pollution

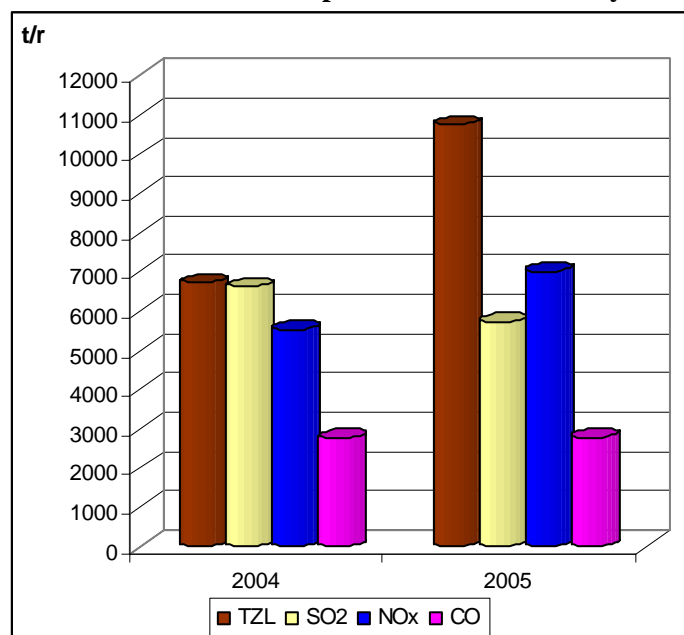
Air pollution is mainly caused by activities of large sources within the power, wood-processing, chemical, and food-processing industries. Air quality has been influenced also by small sources and public heat supply. Contamination by dust includes mineral dust from urban (construction works – cleaning) and regional contamination.

Five major operators of air pollution sources in 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

In 2005, there was a big increase in emissions of all basic pollutants, with the exception of SO₂, which showed a falling trend.

Emission volumes in Zemplín loaded area in the years 2004, 2005



t/r – tons/year
TZL – PM

Source: SHMI

In terms of local air pollution in 2006, the pollution limit for sulphur dioxide was not exceeded for hour, nor for daily values with greater number than the limit value for protection of human health. Neither in case of nitrogen dioxide was this value exceeded. PM₁₀ particles exceeded the permitted number of above-limit recordings at 1 station. Increased lead concentration trend was recorded in Vranov nad Topľou, in 2006.

There was defined an air quality management zone for the territory of Vranocv nad Topľou and the villages of Čemerné and Hencovce to monitor the PM₁₀ pollutant.

◆ Surface water contamination

Major water streams in the area include Ondava, with its tributaries of Laborec and Bodrog. Water quality is within the interval of the II. - V. categories for individual indicator groups. 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 temperature and classification of the stream into the III. category for the basic mechanical-chemical indicators group (B). Over years, Trnávka stream has been the most contaminated water courses within the Ondava watershed, as well as the whole of Slovakia. The stream is contaminated by waste water from the city of Trebišov. Classification of water courses into the V. quality category in 2006 was the consequence of COD_{Cr} and O₂ in the oxygen indicators group (A) varying volumes of different P forms in the nutrients group (C), and volumes of coliform and thermotolerant bacteria in the microbiological indicators group (E).

Surface water quality in Zemplín loaded area

Water-course	Sampling site	Indicator groups and quality categories																	
		A			B			C			D			E			F		
		2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Laborec	Petrovce	II	III	III	II	II	III	III	III	III	III	II	II	IV	IV	IV	III	II	II
	Lastomír	II	III	III	III	II	II	III	II	III	V	II	II	IV	III	III	I	I	I
	Ižkovce	II	IV	IV	IV	III	III	II	II	II	II	II	II	IV	IV	IV	III	III	II
Šíravský k.	mouth	III	III	III	II	II	II	III	II	II	V	II	II	IV	IV	IV		II	
Zálužický k.	Pod Šíravou	II	III	III	IV	II	II	II	II	III	V	III	III	III	III	III			I
Uh	Pinkovce	IV	III	III	IV	III	III	IV	III	III	V	II	III	V	V	V	IV	III	IV
	mouth	III	IV	IV	III	II	III	II	II	II	III	II	II	IV	III	III	IV	III	II
Čierna voda-4	Stretava	III	IV	IV	IV	II	II	III	III	III	V	III	III	III	III	III		III	
Ondava	Nižný Hrušov	II	III	III	II	II	II	II	III	III	III	II	II	IV	IV	IV	IV	III	III
	Brehov	II	III	III	III	II	II	III	IV	IV	III	II	II	IV	IV	IV	IV	IV	IV
Ofka	mouth	III	V		III	III		II	II		IV	II		IV	III				
Topľa	Pod Vranovom	III	II	IV	II	II	II	III	III	III	IV	II	II	IV	IV	IV	IV	III	III
Trnávka – 1	Zemplínske Hradište	IV	V	V	IV	III	III	V	V	V	V	IV	III	IV	V	V	II	IV	
Somotorský kanál	Somotor	V	V	V	IV	III	III	IV	V	V	III	III	III	III	III	III			
Bodrog	Streda nad Bodrogom	III	III	III	IV	IV	III	III	III	II	III	II	III	IV	IV	IV	IV	V	IV

Source: SHMI

◆ Ground water contamination

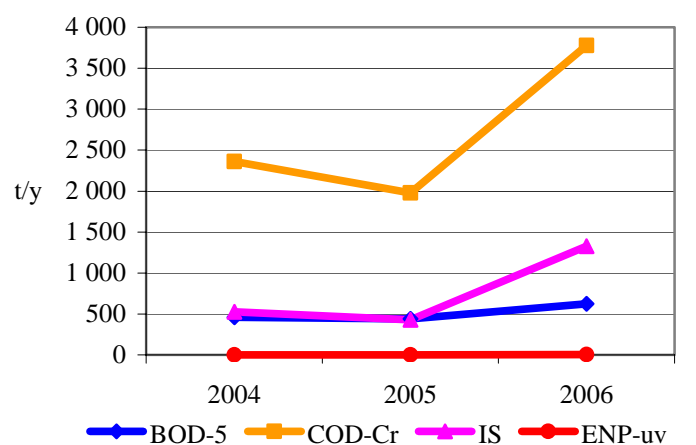
Ground water quality within the loaded area has been monitored for the major water management area of alluvial sediments of Ondava from Domašas to Trebišov and SLánske hills, alluvial sediments of Cirochy from Snina to Humenné and of Laborec from Humenné to Budkovce, and in the area of Medzibodrožie the alluvial sediments of Rožňava at 14 facilities of the monitoring network (12 well of the basic SHMI network, 2 actively used wells). Just as in other areas of the Easter-Slovakia basin, the most frequently exceeded indicators include total Fe, Mn, due to an adverse oxygen situation. Limit

values were exceeded also in case of ammonia ions, nitrates, and COD_{Mn} . Compared to previous time periods, content of trace elements was exceeded at the facility of Vranov nad Topľou in case of As, and at Trebišov – Olšina and Malčice, in case of Al. Reduction conditions in ground water cause increased contents of a number of indicators (ammonium ions, Fe, Mn).

◆ 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 Zemplín loaded area



Source: SHMI

◆ Waste management

Balance of waste generation

Total production of waste in the area during 2004-2006 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. Production of hazardous waste grew significantly in the area. Production of municipal waste did not show major changes.

Waste production in Zemplín loaded area

Sort of waste	Waste production (t)		
	2004	2005	2006
Hazardous waste	8 404.03	83 725.44	73 549.00
Other waste	541 201.46	398 994.33	495 574.25
Municipal waste	39 697.40	39 188.96	43 954.01
Waste production in total	589 302.89	521 908.75	613 077.26

Source: SEA, SO SR

Waste handling

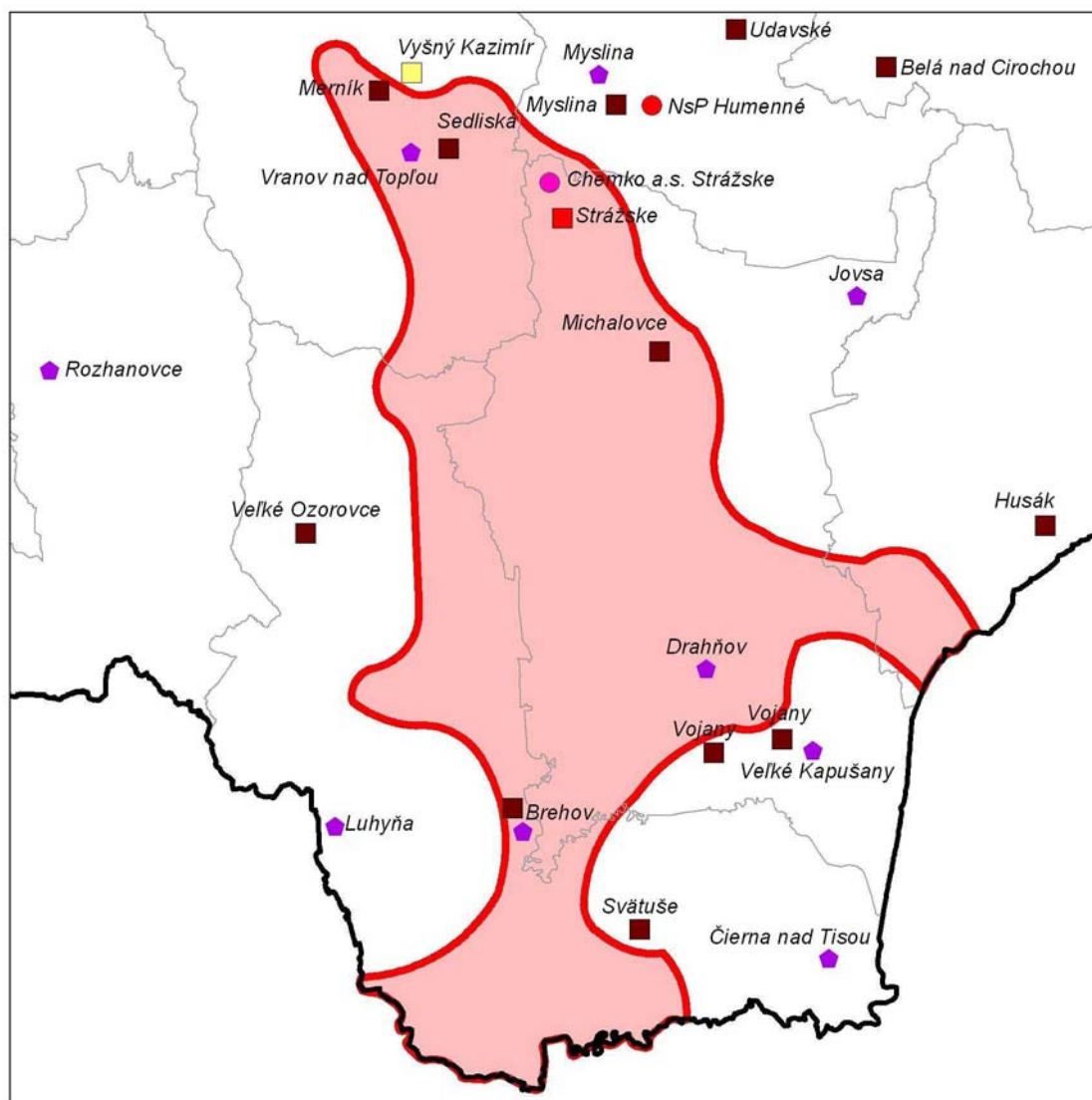
Individual hazardous waste handling approaches in the area show varying characteristics. In 2004, hazardous waste was disposed of through roughly equally distributed disposal approaches, including about 25 % by reclamation, 25 % by landfills, 25 % through biological disposal. and 25 % through other approaches. In 2005, 91 % of hazardous waste was reclaimed. and in 2005, 87 % 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 77 %), and reclamation (about 20 %) of the annual production.

Waste handling activities in Zemplín loaded area

Waste handling	2004		2005		2006	
	Waste amount (t)					
	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
Disposal through landfills	2 558.00	425 417.00	4 327.79	324 057.80	4 125.80	356 247.02
Disposal through incineration	240.00	11.00	204.86	9.82	211.55	10.26
Biological disposal	2 796.00	1.00	2 799.02	6 678.78	64 340.21	29.10
Other disposal	2 810.00	11 040.00	956.86	9 358.98	1 866.08	12 916.11

Source: SEA

Waste disposal facilities in Zemplín loaded area in 2006



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