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## A NEW APPROACH TO THE ASSESSMENT AND DELIMITATION OF ENVIRONMENTALLY DAMAGED AREAS IN THE CZECH REPUBLIC

V. Poštolka: *A New Approach to the Assessment and Delimitation of Environmentally Damaged Areas in the Czech Republic*. – Geografie-Sborník ČGS, 101, 2, pp. 143 – 157 (1996). – The paper deals with the proposal of new criteria and methodology for geographical delimitation and differentiation of “environmentally damaged areas” in the Czech Republic. This new approach is based on “ecological, social and health load assessment” on the municipality area level by means of 27 proposed indicators. By means of this methodology more than 1200 selected municipalities out of the more than 6000 ones existing in the Czech Republic, all the municipalities from the North-West Bohemia area included, were assessed.

KEY WORDS : Ecological, social and health load indicators – environmentally damaged areas – environmental zones delimitation and differentiation – North-West Bohemia.

### Preface

The so-called “damaged” or “affected” areas in the Czech Republic were defined and approved by the Czech government in 1974. The “damaged areas” (DA) have been defined as *“territories where the civilization factors impact has significantly unfavourable effects upon the natural environment, health of the population and its well-being, and all these negative effects have to be, at least partly, compensated for by special measures taken by the state administration and authorities”* (Kaulich, K., 1982, Usnesení vlády ČSR a ČR, 1973, 1974, 1980, 1990).

The latest amendments and changes regarding the delimitation and the range of these areas were taken by the Czech government in August 22, 1990 (Usnesení vlády ČR, 1990).

At present, according to this “last approved delimitation” of nine regions and eight cities, there are on the territory of the Czech Republic in total 17 damaged areas representing about 10 % of the total area with 39 % of the total population of the Czech Republic.

The used method of delimitation, together with to the wrong political practice before 1989, has been abandoned consequently to new requirements and demands in order to distinguish the extent, structure and intensity of environmental risks and problems within those damaged areas.

This was the reason why the new Czech government aspired after the political changes in 1989 to take new measures and regulations to improve the environmental situation preferably in the most damaged areas, including those aiming to compensate the impact of worsened living conditions in these areas.

Therefore, in November 1991, the Ministry of Economy and the Ministry of Environment were charged to ensure *“a delimitation of areas with environ-*

*mental deterioration and to set regional policy priorities in these areas including measures for their support"* (Usnesení vlády ČR, 1990).

In July 1993 the Ministry of Environment and the Ministry of Health presented to the Czech government *"a revised delimitation of ecologically damaged areas in the Czech Republic and a proposal of systematic measures in view to improve the environment in these areas"*.

Therefore, the Ministry of Environment proceeded to draw up the *"Criteria and methodology for delimitation and internal differentiation of ecologically damaged areas in the Czech Republic"* and to test them in the area of North and North-West Bohemia (the Czech side of the so-called Black Triangle).

The Czech Ministry of Environment decided in April 1992 to entrust the Research Institute for Building and Architecture (Výzkumný ústav výstavby a architektury, VÚVA) and its Centre for Environmental Studies in Ústí nad Labem (in the North Bohemian brown coal basin) to prepare the first draft of the revised delimitation of the so-called affected areas in the North and North-West Bohemia (Poštolka, V. et al., 1992).

### **Criteria and Methodology of the Total Environmental Load Assessment**

From the beginning, two basic principles have been stressed:

1) *A comprehensive methodology should be created comprising not only the data on the physical or natural environment quality, but also indicators related to its social and health consequences, and particularly on their negative impacts upon the exposed population.*

2) *By means of this methodology, the extent, structure, intensity and impact of the so-called "ecological load" on the municipality administrative area should be evaluated.*

The previous system of delimitation of the "affected areas" did not differ the extent, structure and intensity of the "ecological load" neither among "distinguished regions" nor within them. On the territory of the North Bohemia the "affected areas" included on the one hand whole districts with all there existing municipalities and on the other hand some of municipalities from some other districts. In both cases, however, comparable and compatible data referring to such decision were missing. Naturally, almost all the municipalities tried hard to be included into the delimited "affected areas" to get special state subsidies compensating the local ecological problems (Kaulich, K., 1982).

The proposed system of criteria and methodology for delimitation and internal differentiation of the "ecologically damaged areas" is based on the idea to define, to indicate and to measure by means of some basic selected indicators the extent, the structure and the intensity of the so called "total ecological load" or the "total environmental load".

Even though we have stressed in our methodology the main and prevailing part of the indicators and coefficients related to "negative impacts of physical and chemical factors on the environment" showing the intensity of negative effects due to the air, water, soil, landscape and biodiversity, noise and radiation loads, we prefer to emphasize the "total environmental load of the area". It includes also additional negative effects and consequences of social and health problems, risks and threats affecting inhabitants living in monitored territories (partly as a result of feedback).

It is just the combination of all the three different types of risk factors – the ecological (in a strict sense), the social and the health load (though the last one can be also a part of the social load) – showing more expressively the existing differences among municipalities. If evaluated separately, without respect to social and health risks and problems, they can often show a quite similar or a nearly similar intensity of the “ecological load”.

Certain problems are connected with evaluation of health consequences and risks and with their territorial differences. For the time being all the accessible and available data make possible to assess and to differ among whole districts only, but do not allow the same within individual districts for the all municipalities areas.

The principle problem of this methodology is to define and to choose a set of reliable criteria and indicators, to determine as well as possible their mutual weight-proportions and to find an appropriate internal evaluation scale for each of these selected indicators. Therefore, we tested six different evaluation scale systems on two “model districts” – Liberec and Teplice in the North-West Bohemia – and the following conclusion has been drawn: none of the six different evaluation scales had fundamental effects on the change of municipality sequence according to different ways of the “ecological load” evaluation. The sequence of municipalities remained almost the same, meanwhile the total sum of “points” expressing the “ecological load” was changing.

Hence we suppose that this proposed methodology makes possible to compare the extent of ecological problems and to distinguish the municipalities in compliance with this measured extent.

### Indicators for Ecological, Social and Health Load Assessment

We proposed to use a system containing 27 indicators of the total environmental load and consisting of three separated, but interlinking parts (groups).

Among the three proposed parts, we accept and validate the essential significance of the assessment and evaluation of the “physical environment” and of its deterioration (75 from the 100 points possible from the entire “total environmental load”).

Within the remaining quantity of 25 points we want to acknowledge and to stress mutual linkages and relations between the quality of the “physical” and the “social environment”, with a special respect to “health conditions, health risks and threats”.

Table 1 – Multicriterial System of the Total Environmental Load Assessment – Proposal

Group of factors	Number of indicators	Number of points-max.	Span of points
Ecological load	14	75	2 – 15
Social load	7	10	1 – 2
Health load	6	15	1 – 4
<i>Total environmental l.</i>	27	100	1 – 15

N.B.: A more detailed information on the proposed structure and contents of the multicriterial system of this evaluation is given in Table 5.

Out of a set of the 27 chosen and used indicators of negative effects and impacts, we assign the main significance to the following indicators (including their proposed order; see Table 2).

For the remaining 13 used indicators – two last for “physical risks”, four for “health load” and seven for “social load” – we use the range from 0 to 2 points.

Table 2 – Indicators Sequence According to their Significance for Assessment

Order	Indicator (type of load)		Max. points
1.	The share and extent of devastated landscape and land	E	15
2.-3.	Air pollution by flying dust (particular matters)	E	8
	Air pollution by sulphur dioxide	E	8
4.	Destruction of ecological biodiversity (instability or stability)	E	6
5.-8.	Flowing (river) water pollution	E	5
	The share of people supplied with unsuitable drinking water	E	5
	The share of damaged and dying forests	E	5
	The share of people affected by excessive noise	E	5
9.-12.	Air pollution by other harmful pollutants	E	4
	The extent of hazardous and toxic waste sites	E	4
	Life expectancy	H	4
	Appearance of malignant neoplasms	H	4
13.-14.	Soil contamination	E	3
	Others physical risks (as radioactivity, radon)	E	3

Since we want to assess only negative effects and to differ areas only according to the extent and intensity of these risks and threats, we propose to appoint the used points merely there, where the acceptable or reasonable limits of these negative effects will be exceeded.

If not, then we use mark 0, which means an area without excessive loads or threats.

For instance, as the lowest limit related to air pollution both by sulphur dioxide and by flying dust we decided to accept the limit of 44 µg per cubic metre as an average immission concentration per year.

Areas with a lower air pollution concentration have 0 points and are evaluated as “unloaded areas” (only from this point of view) without further or deeper differentiation. On the contrary an area with air pollution exceeding the given limit of 100 µg per cubic metre have 8 points (in maximum) and is qualified as a “critically overloaded area”, also without any further and more detailed differentiation. The areas (in our case “administrative area of municipality”) affected by air pollution in the range between 44 – 100 µg per cubic metre and year have 1 to 7 points (black points) according to a special evaluating table and can be characterized as a less or more “loaded territory”.

Similarly it is possible to assess the extent and intensity of two or more selected problems by means of relevant indicators or of their associated groups.

We can also divide our proposed methodology into eight logical groups of topics, which generally cover all the essential problems of the “environmental deterioration and crises”.

In compliance with this division it is possible to clarify the order of these issues and problems within our methodology (according to the highest possible number of relevant black-points).

**Table 3 – Topics and Problems Related to the Total Environmental Load Assessment**

Group of topics and problems	N.of indicators	Number of max.points
1. Air pollution	4	22 (8,8,4,2)
2. Water pollution	2	10 (5,5)
3. Landscape and soil degradation	4	24 (15,4,3,2)
4. Biodiversity instability	2	11 (6,5)
5. Other physical impacts	2	8 (5,3)
<b>ECOLOGICAL LOAD</b>	<b>14</b>	<b>75 (15....2)</b>
6. Social structure	5	6 (2,1,1,1,1)
7. Migration of population	2	4 (2,2)
8. Health consequences	6	15 (4,4,2,2,2,1)
<b>SOCIAL AND HEALTH LOAD</b>	<b>13</b>	<b>25 (4.....1)</b>
<b>TOTAL ENVIRONMENTAL LOAD</b>	<b>27</b>	<b>100 (15....1)</b>

**Table 4 – Sequence and Significance of the Assessed Topics and Problems**

Order	Group of topics and problems and number of possible black-points		
1. Landscape and soil degradation	24	5. Water pollution	10
2. Air pollution	22	6. Others physical impacts	8
3. Health consequences	15	7. Social structure	6
4. Biodiversity instability	11	8. Migration of population	4

Above all, we consider this comprehensive methodology as an “open system”, in which it will be possible to make any further changes in favour to improve its practical implementation. We also know that our is only one of many possibilities and ways how to identify, assess and measure the extent, structure, intensity and essential consequences of environmental problems.

Within the group of these “ecological indicators” we can distinguish two different types. On the one hand there are the so-called “basic” (meaning above all “with the possibility to be distributed almost everywhere” or “with a large scale distribution and impact”), on the second hand there are still the so-called “specific” indicators (with appearance or impact only within some areas or places).

While the basic indicators can be mostly acquired or derived from “large scale information and data sources” (e.g. from thematic yearbooks, maps and databasis concerning the whole area of the Czech Republic), the specific indicators are to be gained from “local or regional information sources” (in our case, mainly from the District Council authorities).

Among the 14 selected “ecological indicators” we differ ten basic and four specific ones.

**A. Basic ecological indicators**

1. Flying dust
2. Sulphur dioxide
3. Flowing water contamination
4. Population supplied by an unappropriate drinking water
5. Landscape and landsurface devastation
6. Soil contamination

7. Wind and water erosion
  8. Biodiversity destruction (instability)
  9. Damaged and dying forest
  10. Noise pollution
- (In total 10 indicators with 62 black-points in maximum).

- B. Specific ecological indicators**
11. Other harmful air pollutants
  12. Offensive odour in the air
  13. Hazardous and toxic waste sites
  14. Other physical risky factors (e.g. radioactivity, soil radon, etc.)
- (In total 4 indicators with 13 black-points in maximum).

N.B. A more detailed information on all the selected “ecological indicators” – including information on their availability (sources), reliability (quality) and ways of their elaboration and interpretation – is comprised in some VUVA’s research papers (see Appendix).

Beside the “ecological indicators”, the “total environmental load criteria and methodology” include the proposed indicators of “social and health environmental consequences” (see also Table 1).

Table 5 – The suggested Criteria Enabling the Total Environmental Load Assessment Containing Indicators of the Ecological, Social and Health Load Assessment

NUMBER	POINTS	INDICATOR - measure unit
1	max. 8	Flying dust, mikrogram per cubic metre per year for period...
2	8	Sulphur dioxide, mikrogram per cubic metre per year for period...
3	4	Other harmful pollutants in the air, acc. to expert estimation
4	2	Offensive odour in the air, acc. to expert estimation
5	5	Flowing water contamination, acc. to water quality indicators
6	5	Drinking water, % inhab.supplied by the unappropriate drinking water
7	15	Surface and landscape devastation, % of the total area
8	3	Soil contamination, acc. to expert estimation
9	2	Erosion by wind and water, acc. to expert estimation
10	4	Hazardous waste sites, acc. to expert estimation
11	6	Biodiversity instability, calculated acc. to land-use structure
12	5	Damaged and dying forest, % of the total forest area
13	5	Noise pollution, % inhab.affected by the excessive noise
14	3	Others physical risks (radioactivity, geopath.zones...), acc. to expert est.
15	1	Uncomplete families, % of all families
16	1	One-person households, % of all households
17	1	University educated people, % of all population
18	2	Native people (living in their birthplaces), % of all population
19	1	Unemployment, % of people in activ age
20	2	Migration balance, per 1000 inh. per year for period ...
21	2	Migration volume, per 1000 inh. per year for period ...
22	4	Life expectancy, separately for males and females
23	4	Appearance (morbidity) of malignant neoplasms
24	2	Mortality caused by malignant neoplasms
25	2	Mortality from diseases of the respiratory system
26	2	Mortality from diseases of vascular and circulatory system
27	1	Infant mortality

1 to 14	max. 75	Ecological load - air, water, landscape, biodiversity and physical factors
15 to 21	max. 10	Social load - social structure, unemployment and migration
22 to 27	max. 15	Health load - life expectancy, morbidity and mortality
1 to 27	max.100	TOTAL ENVIRONMENTAL LOAD - ecological, social and health risks

N.B.: The starting point of each of the indicators is equal to 0, which means an area without any excessive negative impact and inclusive risk. Each of the indicators has its own "pointing scale" from this starting point 0 to the maximal possible number of points (black points).

This proposed evaluation scale is a result of discussions, various tests and final debates within a group of experts and authorities from the whole Czech Republic going on in 1993. Later, a modified and simplified new version of this criterial system (without evaluation of social and health problems and risks) was completed by the North Project Foundation in Ústí nad Labem.

For more details, see also Fig. 1.

The evaluation of the so-called "health load" is done by separated indicators for men and women, with exception of the mortality rate of sucklings. We have put more emphasis on the "average life expectancy" indicator and on the sickness rate (morbidity rate) caused by cancer. We have evaluated these two indicators by a double number of points in comparison with the other health indicators, that is 4 (2 for men + 2 for women) possible points.

The evaluation of the so-called "social load" was done by 1 to 2 points only. We suggest to use as perhaps the most important indicators of "deteriorated social environment" the low share of inhabitants living at present in their

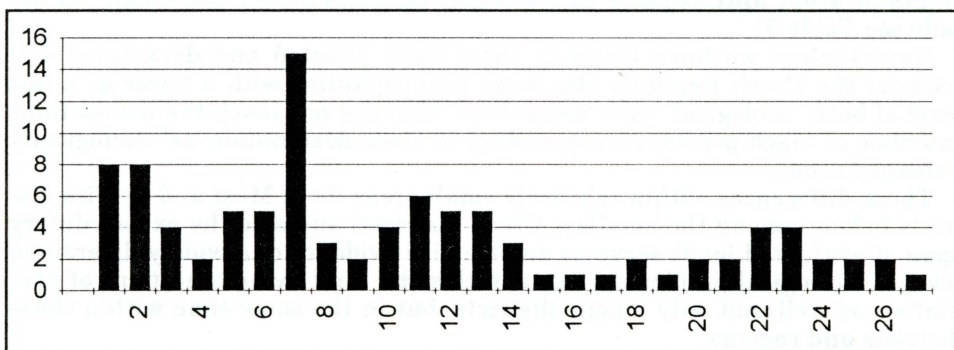


Fig. 1. – Indicators of the total environmental load assessment and maximal possible number of points at the proposed and used pointing scale. Axis x – indicators number, axis y – number of points. The list and structure of indicators: 1 – 4: Air pollution (1 = Flying dust, 2 = Sulphur dioxide, 3 = Other harmful pollutants, 4 = Offensive odour); 5 – 6 Water pollution (5 = Flowing water, 6 = Drinking water); 7 – 10 Landscape and surface (7 = Devastations, 8 = Soil contamination, 9 = Erosion, 10 = Waste sites); 11 – 12 Biodiversity (11 = Land use, 12 = Forest); 13 – 14 Physical factors (13 = Noise pollution, 14 = Radioactivity); 15 – 19 Social structure (15 = Uncomplete families, 16 = One-person households, 17 = Educated p., 18 = Native people, 19 = Unemployment); 20 – 21 Migration (20 = Migration balance, 21 = Migration volume); 22 – 27 Health problems and risks (22 = Life expectancy, 23 = Morbidity caused by cancer, 24 = Mortality due to cancer diseases, 25 = Mortality due to by respiratory diseases, 26 = Mortality by circulatory diseases, 27 = Infant mortality).

birth places, the migration balance and the migration volume rate. This type of indicators is particularly significant for the borderland of the North-West Bohemia.

According to the official migration volume data there is a theoretical exchange of population within some municipalities in a relatively short time period. Such instability of population and settlement has also its negative effect upon the “environmental situation” of these areas.

### **The Main Results of Environmental Load Assessment**

For evaluation and classification of the so-called “total ecological load”, a system with a scale of 100 points in maximum (100 %), **75 points (75 %) and 14 indicators are used for “ecological load”, 15 points (15 %) and 6 indicators for “health load”, 10 points (10 %) and 7 indicators for “social load”.** (For further details see Table 5).

According to this evaluation system, the maximal possible level of separately assessed loads was reached only once, in one type of load and in one municipality only. Ten black-points were achieved for “social load” in municipality of **Rovná** (District of Sokolov) in the West Bohemia.

The highest number of black-points for “health load” (only whole districts, but for the whole area of the Czech Republic, were evaluated) was somewhat surprisingly found for district of **Cheb** (14 points) in the West Bohemia as well.

The highest levels of the “ecological (physical) load”, but of the total sum of “ecological and social loads” and the highest level of “total environmental load” including “health load” were found in the area of two neighbouring **districts of Most and Teplice** in the North Bohemia brown coal basin (for details see Table 7).

Nevertheless we have found in these most affected and devastated districts of the Czech Republic also some municipalities with a lower or a low level of both “ecological” and “social load” that did not reach the lowest limit (number of black-points) corresponding to their designation as “ecologically damaged area”.

These differences within relatively small areas (both Most and Teplice districts belong among the smallest Czech districts) and also the extraordinary span of evaluated loads serve as an objective evidence of a widely diversified level of “ecological problems, risks and threats” (and living conditions of population as well) not only among districts, but in the same time within these districts and regions.

Therefore it is a vital political task to establish the necessary and convincing **limits** both for classification and structuring of “ecologically damaged areas” according to municipality areas into **different levels (zones or degrees)** according to the degree of ecological, health and social loads affecting their territories, landscape, nature and human population.

We have proposed **20 points** for “ecological (physical) load” – it means 25 % of the possible maximal load or 40 % of the really identified maximal load (51 black-points were achieved in Komořany, part of Most) – as the **lowest limit** to classify any area as an “ecologically damaged area” (further on, the abbreviation **EcoDA** is used).

According to the “ecological load” level, we propose to divide EcoDA into three basic groups:



1. degree (20 – 29 points): areas with a “high ecological load”
2. degree (30 – 39 points): areas with a “very high ecological load”
3. degree (40 and more points): areas with a “critical ecological load”.

This system of evaluation has allowed to classify and categorize more accurately the level of ecological problems, risks and threats and also to express the differences among municipalities (respectively their parts), districts and regions.

We consider this system of EcoDA delimitation and classification – if needed completed by the “health and social load” – as a vital basis and a turning point of the regional state policy in favour of areas and inhabitants affected by a deteriorated environment and in compliance with the extent, structure and intensity of this deterioration.

Out of the 6098 municipalities existing in 1992 in the Czech Republic, selected 1242 ones have been evaluated, which means about 20 % of all the municipalities, but also more than 25 % of the total area with more than 57 % of the whole population of the Czech Republic (in 1991).

We can say that this number includes nearly all the known existing and potentially assumed areas (municipalities) affected by environmental problems and risks. Therefore, we suppose that our results could be considered as an objective picture of ecological and environmental problems in the Czech Republic and on the Czech side of the so-called Black Triangle area (or European Black Boomerang).

Out of the 1242 evaluated municipalities ( according to the proposed methodology) there were 525 municipalities with 20 and more black-points of “ecological load” which could be included into EcoDA. This means almost 9 % of all the municipalities and about 12 % of the total area with more than 49 % of the whole population of the Czech Republic are included into affected, threatened and damaged zones. (See attached

Table 6 – Number and Share of the Municipalities in the Czech Republic (in 1992) and their Distribution into Three Zones of the “Ecologically Damaged Areas”

The area	CR totally	NW Bohemia	Rest of CR
Total	6098	657	5441
Evaluated	1242	657	585
%	20.4	100	10.8
EcoDA total	525	336	189
%	42.3	51.1	32.3
1. degree	392	236	156
%	74.7	70.2	82.5
2. degree	108	85	23
%	20.6	25.3	12.2
3. degree	25	15	10
%	4.7	4.5	5.3

N.B.: The NW Bohemia includes the whole area of 13 districts along the borders with Saxony and Poland and on the Czech side the prevailing part of the crossborder area of the Black Triangle with an enormous concentration of environmental problems.

From the remaining 63 districts in the rest of the Czech Republic municipalities from other 38 districts were selected, but in only in seven of them all the municipalities were evaluated.

maps of geographical distribution of ecological, social and health load in the Czech Republic).

### **The Problems of the North-West Bohemia on the Municipality Level**

All the municipalities of the whole territory of the North-West Bohemia, in general assessed as the most affected and damaged part of the Czech Republic, have been evaluated.

This area includes 13 districts along the border with Saxony (in the former DDR and now one of the so-called new lands of Germany) and Poland (in the area of the so-called Lower Silesia) from Cheb (on the West) to Jablonec nad Nisou (on the East). This area constitutes the main part of the Czech side of the so-called Black Triangle, which is one of the most polluted and the most environmentally affected areas in Europe.

**In accordance with our evaluation more than 51 % of municipalities within this area, which means about 51 % of the whole territory and 83 % of all population, can be classified as “ecologically damaged areas”.**

An evidence of the significant differences in the level of ecological problems is e.g. a huge span of the “ecological load” between *Most* (51 black-points) with the absolutely highest load and *Brandov* (only 14 points) in the same district of Most (one of the smallest districts in the Czech Republic), and *Cetenov* (the district of Liberec) with the lowest level in this territory (only 5 black-points). The span between the municipalities of Most and Cetenov represents a ten times higher or lower “ecological load”, burdening both nature and people of these areas.

**More than 1,2 million inhabitants live on the territory of EcoDA in the North-West Bohemia, which means about 83 % of the all there living inhabitants (from the total number of 1,48 million in 1991).**

**Almost 60 % of the total area qualified as EcoDA in the Czech Republic belongs to the territory of the North-West Bohemia with more than 31 % of the whole population living in the Czech Republic in the areas with a “very high and critical ecological load”.**

The situation of the North-West Bohemia will get considerably worse, if we take into consideration the “health and social consequences” (in comparison for instance with Prague and Ostrava regions, where the “ecological load” seems to be roughly the same).

There are 214 municipalities in the Czech Republic with a moderate and high social load, 197 (92 %) of them being located in the North-West Bohemia (see Table 7 and attached map).

**In addition, 10 out of 13 districts in the NW Bohemia have been classified with a high and a very high “health load” (see also Table 7 and attached map).**

All this gives an evidence of an extraordinary concentration not only of ecological problems, but also of serious social and health problems cumulated in this area.

The attached table gives the basic data on the distribution of municipalities in the districts of the North-West Bohemia in compliance with their “ecological, social and health load” assessment.

We suggest to divide these “loads” into four levels according to the achieved number of the so-called black points (from the total sum of 100 black points):

**Ecological load (EL)** with the maximal possible number of 75 black points. 1. low – less than 20, 2. high – 20-29, 3. very high 30-39, 4. critical 40 and more.

**Social load (SL)** with the maximal possible number of 10 black points. 1. very low 0-2, 2. low 3-4, 3. moderate 5-6, 4. high 7 and more.

**Health load (HL)** with the maximal possible number of 15 black points. 1. very low 0-3, 2. moderate (low) 4-7, 3. high 8-11, 4. critical 12 and more.

(N.B. it was possible to assess only whole districts.)

Municipalities in the area of the North-West Bohemia (in 1992) according to the districts and the ecological, social and health load in compliance with the proposal of criteria and methodology for monitoring and evaluation of environmental problems, risks and threats (for a more detailed information, see VÚVA's research papers).

Table 7 – Number of Municipalities in the Area of the North-West Bohemia (in 1992) According to the Zones of Ecological, Social and Health Load

District	CH	SO	KV	CV	MO	TP	UL	LN	LT	DC	CL	LB	JN	Sum
Type of load														
Totally	39	39	53	49	33	41	27	65	105	52	59	60	35	657
low	31	14	33	19	6	6	0	40	29	23	45	46	29	321
high	7	13	18	20	11	15	18	23	56	23	14	13	5	236
very high	1	10	2	8	11	14	9	2	20	6	0	1	1	85
critical EL	0	2	0	2	5	6	0	0	0	0	0	0	0	15
very low	8	3	9	5	5	19	12	28	49	19	22	41	27	247
low	18	12	20	15	3	9	12	21	42	16	24	13	8	213
moderate	7	12	19	11	14	11	3	8	11	13	10	5	0	124
high SL	6	12	5	18	11	2	0	8	3	4	3	1	0	73
very low														0
moderate									105			60	35	200
high			53			41	27	65		52	59			297
critical HL	39	39		49	33									160

Districts on the territory of the North-West Bohemia (and their abbreviations) : Cheb – CH, Sokolov – SO, Karlovy Vary – KV, Chomutov – CV, Most – MO, Teplice – TP, Ústí nad Labem – UL, Louny – LN, Litoměřice – LT, Děčín – DC, Česká Lípa – CL, Liberec – LB, Jablonec nad Nisou – JN.

A further information is given in the attached maps (Fig. 2 – 5).

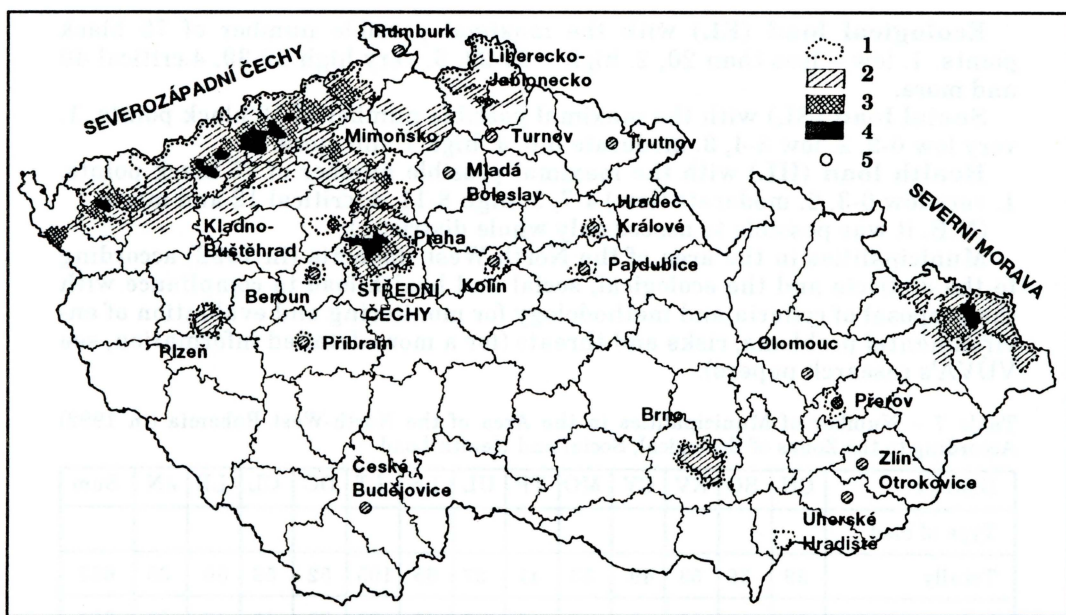


Fig. 2 – The Czech Republic: Ecologically Damaged Areas. Comparison with the “affected regions” according to the Czech Government’s Regulation. 1 – Affected areas according to the Regulation of Czech Government from August 22, 1990. Ecological load (EL): 2 – high, 3 – very high, 4 – critical. 5 – towns with ecological load.

N.B. Municipalities and district areas on the attached maps correspond to the state in 1992.

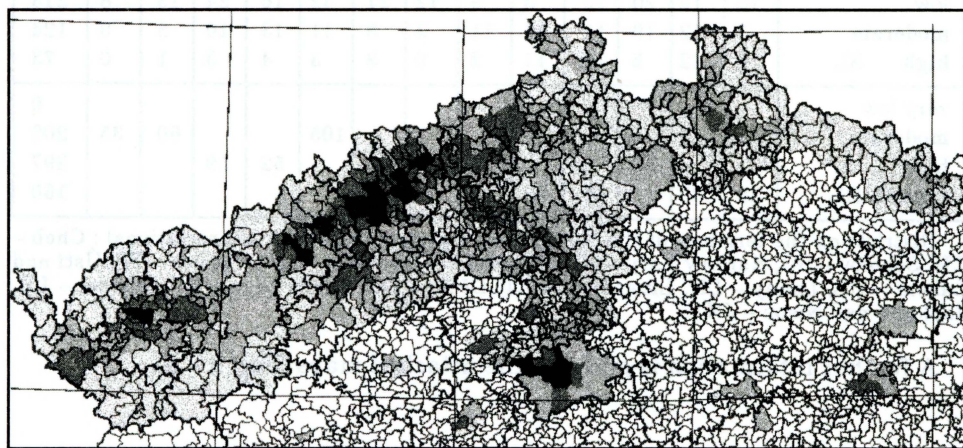


Fig. 3 – Ecological Load in the North-West Bohemia. Selected 1242 out of the total of 6098 municipalities were assessed. Degree of ecological load: white – not assessed, light grey – low, grey – high, dark grey – very high, black – critical.

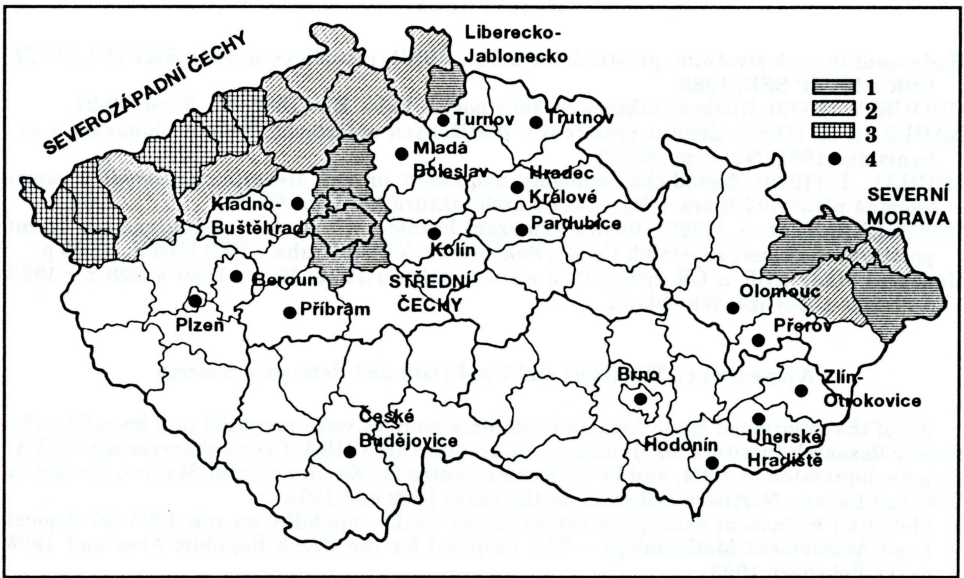


Fig. 4 – The Czech Republic: Health Load. On the district level (for all the 76 districts). Health load (HL): 1 – medium, 2 – high, 3 – very high. 4 – towns with ecological load.

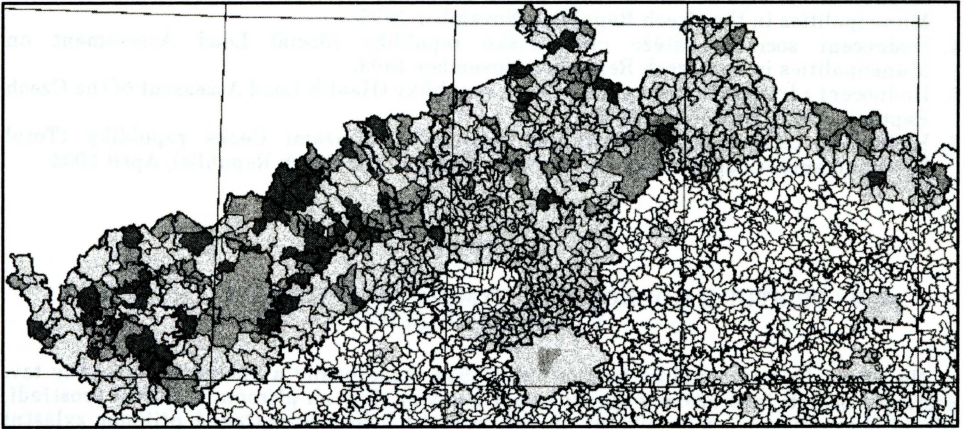


Fig. 5 – Social Load in the North-West Bohemia. Selected 1242 out of the total of 6098 municipalities were assessed. Degree of social load: white – not assessed, light grey – low, grey – medium, dark grey – high.

## References:

- Hodnocení úrovně životního prostředí na území ČSSR (metodický návod). SKVTIR, MVŽP ČR a MVŽP SSR, 1988.
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- POŠTOLKA, V. et al. (1992): Revize vymezení hranic a návrh vnitřní diferenciacie území postižených oblastí severních Čech a Sokolovska. VÚVA Praha – PŽP Ústí n. L., 30 p.
- Usnesení vlády ČR a ČR číslo 213 z r.1973, 315 z r.1974, 76 z r.1980 a 228 z r.1990 o vymezení postižených oblastí.

### Appendix: The Basic and Used Data and Reference Sources

All of the mentioned basic data and reference sources were prepared and issued by the former Research Institute for Building and Architecture (RIBA, Czech abbreviation VÚVA) Prague, liquidated in 1994, and by its former Centre for Environmental Studies, located in Ústí nad Labem, Northern Bohemia, in the years 1992 and 1994.

1. Metodika hodnocení ekologické zátěže území České republiky na rok 1993 (Ecological Load Assessment Methodology – The Proposal for the Czech Republic Area and 1993 year), February 1993.
2. Metodika hodnocení ekologické zátěže na příkladu území okresů Liberec a Teplice (Ecological Load Assessment Methodology – Case Study based on the example of Liberec and Teplice District Areas), June 1993.
3. Hodnocení ekologické zátěže obcí České republiky (Ecological Load Assessment on Municipalities in the Czech Republic), November 1993.
4. Hodnocení sociální zátěže obcí České republiky (Social Load Assessment on Municipalities in the Czech Republic), November 1993.
5. Hodnocení zdravotní zátěže území České republiky (Health Load Assessment of the Czech Republic Area), November 1993.
6. Hodnocení celkové zátěže životního prostředí na území České republiky (Total Environmental Load Assessment on the territory of the Czech Republic), April 1994

## Shrnutí

### NOVÝ PŘÍSTUP K HODNOCENÍ A VYMEZOVÁNÍ POSTIŽENÝCH OBLASTÍ V ČESKÉ REPUBLICCE

Na území České republiky jsou od roku 1974 vymežovány a vládou vyhlášovány tzv. postižené oblasti jako území s výrazně nepříznivými vlivy na přírodní a životní prostředí, zdraví obyvatelstva a jeho životní úroveň, v nichž bylo a je potřebné přijímat zvláštní ochranná a kompenzační opatření. Podle poslední úpravy v roce 1990 je v ČR vymezeno celkem 17 takových postižených oblastí – devět regionů a osm měst – na 10 % rozlohy a s 39 % obyvatelstva ČR.

Nový přístup k řešení problémů životního prostředí v ČR vyvolal na počátku 90. let mj. i požadavek na revizi jejich vymezení. Ministerstvo životního prostředí ČR zadalo vypracování "Kritérií a metodiky pro vymežování a vnitřní diferenciaci ekologicky poškozených území ČR" a jejich ověření na území severozápadních Čech. Úkolem byl pověřen Výzkumný ústav výstavby a architektury (VÚVA) a jeho bývalé Pracoviště pro životní prostředí v Ústí n. L.

Předkládaný příspěvek čerpá z výsledků prací dosažených za vedení jeho autora v průběhu let 1992 – 1994. Během relativně velmi krátké doby bylo nutné shromáždit, připravit a zpracovat velkou řadu údajů o stavu a vývoji životního prostředí v ČR a navrhnout nový způsob hodnocení a vymežování "postižených oblastí" včetně jejich vnější i vnitřní diferenciacie.

Navrhovaný nový přístup k hodnocení úrovně životního prostředí spočívá v rozlišování, oddělování, ale i spojování tzv. ekologické, sociální a zdravotní zátěže území, a to pomocí

bodovací stupnice vybraných ukazatelů vypovídajících o rozsahu nebo stupni poškozování či ohrožování životního prostředí. Základní územní jednotkou pro hodnocení jsou zásadně celé obce (správní obvody), v některých případech a u větších měst to jsou však menší účelově vymezené části obcí.

Na základě četných diskusí a na základě ověřovacích testů na dvou modelových okresech byl navržen soubor 27 ukazatelů pro hodnocení tzv. celkové zátěže životního prostředí s bodovací stupnicí do maximálně 100 bodů. Z toho je určeno 14 ukazatelů a 75 bodů pro hodnocení tzv. ekologické, šest kritérií a 10 bodů pro sociální a sedm kritérií a 15 bodů pro zdravotní zátěž území. Pro každý z používaných ukazatelů byla vypracována vlastní hodnotící bodovací stupnice. Hlavní váhu v hodnocení získaly především faktory devastace povrchu a krajiny, znečištění ovzduší a vodních zdrojů.

Předložený příspěvek popisuje a hodnotí navrhovanou metodiku a vybrané ukazatele pro hodnocení uváděných typů zátěže území. Podle takto přijaté metodiky byla stanovena tzv. ekologická a sociální zátěž pro 1242 vybraných obcí ČR (z celkem 6100 obcí v r. 1992) včetně všech obcí SZ Čech a tzv. zdravotní zátěž pro všech 76 okresů ČR.

V další části příspěvku jsou uváděny hlavní výsledky tohoto hodnocení na území SZ Čech. Ty ukazují na mimořádně vysokou vnitřní diferenciaci mezi okresy a mezi obcemi. Na jedné straně tu nacházíme území s nejvyššími hodnotami zátěže – jako Most u ekologické, obec Rovná (okres Sokolov) u sociální a okres Cheb u zdravotní zátěže – ale i území s výrazně nízkými hodnotami zátěží. Z tohoto hlediska lze výsledky navrhovaného hodnocení považovat za velmi významné a důležité pro rozhodovací a plánovací činnost.

Podle výsledků použitého hodnocení lze více než 51 % celkového počtu obcí a plošné výměry a asi 83 % všech bydlících obyvatel na území SZ Čech označit za "ekologicky postižená území", která jsou dále navržena členit na tři stupně (na území s vysokou, velmi vysokou nebo kritickou zátěží). V kombinaci s výsledky hodnocení sociální a zdravotní zátěže lze vymezovat zóny různého typu a velikosti zátěže území.

Jedním z cílů uvedené metodiky a nového přístupu k hodnocení, vymezování a diferencování "postižených oblastí", jakkoliv je můžeme považovat za problematické a diskutabilní, je právě snaha přispět k objektivizovanému hodnocení a řešení problémů životního prostředí v nutně širším zájmovém prostoru naší republiky a tohoto regionu.

Obr. 1 – Indikátory pro hodnocení celkové zátěže životního prostředí a maximální možný počet bodů podle navrhované bodovací stupnice. Osa x – číslo indikátoru, osa y – počet bodů.

Obr. 2 – Ekologicky postižená území České republiky. Porovnání s "postiženými oblastmi" podle usnesení vlády ČR. 1 – postižené oblasti stanovené usnesením vlády ČSR č. 76/80. Ekologická zátěž: 2 – vysoká, 3 – velmi vysoká, 4 – kritická. 5 – města s ekologickou zátěží.

Obr. 3 – Ekologická zátěž území Severozápadních Čech. Hodnoceno vybraných 1242 z celkového počtu 6098 obcí. Stupeň ekologické zátěže: bílá – nehodnoceno, světle šedá – nízká, šedá – vysoká, tmavě šedá – velmi vysoká, černá – kritická.

Obr. 4 – Zdravotní zátěž území České republiky. Zdravotní zátěž na úrovni okresů (pro všech 76 okresů). Zdravotní zátěž: 1 – střední, 2 – vysoká, 3 – velmi vysoká. 4 – města s ekologickou zátěží.

Obr. 5 – Sociální zátěž území severozápadních Čech. Hodnoceno vybraných 1242 z celkového počtu 6098 obcí. Stupeň sociální zátěže: bílá – nehodnoceno, světle šedá – nízká, šedá – střední, tmavě šedá – vysoká.

Poznámka: Hranice obcí a okresů na přiložených mapách odpovídají roku 1992.

The proposed contribution is a part of the author's individual project, which has been done in the framework of the Global Security Fellows Initiative concerning the Black Triangle Focus Area, at the Faculty of Social and Political Sciences at the University of Cambridge (UK) in 1994 – 1995.

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