4.2.2.2. Classification "Dangerous for the Environment"

The EC scheme for classification "dangerous for the environment" is driven by toxicity, biodegradability and/or bioaccumulation potential. For certain types of substances (those which show low solubility in water) the water solubility may also be taken into account when determining the final classification.

The EC classification criteria and the resulting risk phrases (R-phrases) for the aquatic environment are as follows:

R 50: Very toxic to aquatic organisms

Acute toxicity: 96 hr LC 50 (for fish)   ≤1 mg/l
      or   48 hr EC 50 (for Daphnia)   ≤1 mg/l
      or   72 hr IC 50 (for algae)   ≤1 mg/l

R 50: Very toxic to aquatic organisms
and
R 53: May cause long-term adverse effects in the aquatic environment

Acute toxicity: 96 hr LC 50 (for fish)   ≤1 mg/l
      or   48 hr EC 50 (for Daphnia)   ≤1 mg/l
      or   72 hr IC 50 (for algae)   ≤1 mg/l
and the substance is not readily degradable
or the log P_{ow} ≥3.0.

R 51: Toxic to aquatic organisms
and
R 53: May cause long-term adverse effects in the aquatic environment

Acute toxicity: 96 hr LC 50 (for fish)   1 mg/l < LC 50 ≤10 mg/l
      or   48 hr EC 50 (for Daphnia)   1 mg/l < EC 50 ≤10 mg/l
      or   72 hr IC 50 (for algae)   1 mg/l < IC 50 ≤10 mg/l
and the substance is not readily degradable
or the log P_{ow} ≥3.0.

R 52: Harmful to aquatic organisms
and
R 53: May cause long-term adverse effects in the aquatic environment

Acute toxicity: 96 hr LC 50 (for fish)   10 mg/l < LC 50 ≤100 mg/l
      or   48 hr EC 50 (for Daphnia)   10 mg/l < EC 50 ≤100 mg/l
      or   72 hr IC 50 (for algae)   10 mg/l < IC 50 ≤100 mg/l
and the substance is not readily degradable.

R 53: May cause long-term adverse effects in the aquatic environment

Substances not falling under the criteria above, but which, on the basis of the available evidence concerning their persistence, potential to accumulate, and predicted or observed environmental fata

and behaviour may nevertheless present a long-term and/or delayed danger to the structure and/or functioning to the aquatic ecosystems.

E.g. poorly water soluble substances, i.e. substances with water solubility < 1 mg/l, will be covered by this criteria if: a) they are not readily degradable
                                      b) and the log P_{ow} ≥3.0.

Further details are to be found in the complete EC classification and labelling guide which is attached as Appendix 3.

In this comparative study the EPA's quantitative predictions are used to classify the chemicals according to the EC criteria. The results are compared to those classifications based on the measured data. All 144 chemicals in the project were classified for the comparison purpose on the data available, independent of whether the data sets - both measured and predicted - were complete or not. The comparison and the results are given in Tables 8 and 9.

TABLE 8:   Comparison of classification "dangerous for the environment" according to the EC scheme based on MPD vs SAR data

Classif. based on MPD data	Total	Classification based on SAR data					
		N.c.*	R53	R52/53	R51/53	R50/53	R50
Not class.	48	28	6	6	3	3	2
R53	23	2	17	-	-	4	-
R52/53	26	8	4	4	7	3	-
R51/53	34	5	3	3	14	9	-
R50/53	13	1	2	1	2	7	-
R 50	-	-	-	-	-	-	-
Total	144	44	32	14	26	26	2

* Not classified

TABLE 9:   Result of the comparison of classification "dangerous for the environment"

	N° of chemicals	%
Total	144	100
Agreement	70	48.6
Disagreement	74	51.4
- Overclassification	43	29.9
- Underclassification	31	21.5

Conclusions

The overclassifications can be considered acceptable as being conservative. The agreement of 78% when including the overclassifications is encouraging, even though the underclassifications give cause for concern since potentially dangerous substances may not be recognized.

The concordance in classification of chemicals "dangerous for the environment" is in general reasonably good. However, for the purpose of classification within a legislative scheme, the use of measured data is clearly preferable.