# UNDP/GEF – Danube Regional Project/ICPDR Stakeholder Seminar
# Phosphates in Detergents
# Bucharest, 25 January 2007

## Technical Overview

## Purpose of this Document

This document provides a summary of the key technical conclusions and recommendations that arose from the Detergent Seminar. The Seminar built on work following the ICPDR's Joint Action Plan and undertaken by the UNDP/GEF Danube Regional Project that recommended a ban on phosphates in laundry detergents. This document is intended to guide the Danube Countries through the key conclusions and presents the recommendations from the Seminar and the ICPDR's Task Group on Detergents. Additional material can be found on the DRP's web site containing the presentations used at thus Seminar.

## Conclusions

The overall conclusions of the seminar were:

- Further phosphorus input reduction is needed in the Danube River Basin and the Western Black Sea;
- Tertiary treatment as required by the UWWT Directive is not sufficient to address the problem of excess P emissions (<10,000 pe and long timescale);
- Significant and fast phosphorus reduction can be achieved by widespread adoption of P-free detergents;
- EU wide legislation banning P-detergents are unlikely in the short-term;
- Voluntary agreements are unlikely to be effective and there is a clear need for a ban through legislation;
- 66% of all laundry detergents sold in EU-25 are P-free;
- The detergent industry has not offered any cost information on the implication on the switch to P-free detergents.
- There is no evidence of additional costs to consumers from a switch to P-free detergents;

## Background

***Evidence of eutrophication in the Danube River Basin and Black Sea***

Mismanagement of nutrients (N and P) in the Danube River Basin (DRB) has led to severe ecological problems especially in the 1980s, among them the deterioration of groundwater and the eutrophication of rivers, lakes and of the Western Black Sea (WBS). The WBS has suffered chronic harmful algal blooms, permanent hypoxic situations as well as mass mortalities of benthic and pelagic organisms including fish.

The ecological situation in the Black Sea has improved considerably in the last decade (reduced eutrophication, disappearance of anoxic conditions, regeneration of zoo-benthos and phytoplankton). This improvement is due to: (i) nutrient removal at wastewater treatment plants (WWTPs), (ii) the replacement of phosphate-containing laundry detergents in some countries and (iii) the economic crises in several DRB during the middle 1990s with reduction of loads from industry and agri-industrial discharges..

Phosphorus loads discharged by the Danube River in 2000 are 30 - 50 % lower than in the 1980s (dissolved P even to a higher extent). The current emissions are similar to those in the 1960s (Figure 1).

In the Western Black Sea waters off the Danube Delta the N/P ratio increased during the early 1990s and reached its optimum value in 1997. Since then P has become the limiting nutrient for phytoplankton growth in the Romanian Shelf Area. The influence of the Danube discharge on the Bulgarian Shelf Area and on the Black Sea offshore waters is smaller. In these areas N is the limiting nutrient for primary production.

Two major developments endanger the improvements in the Western Black Sea observed, which will lead to an increase of nutrient emissions:

- The economic redevelopment of CEE countries in the coming years
- The (full) implementation of the Urban Waste Water Treatment Directive (UWWTD) – the problem of settle.

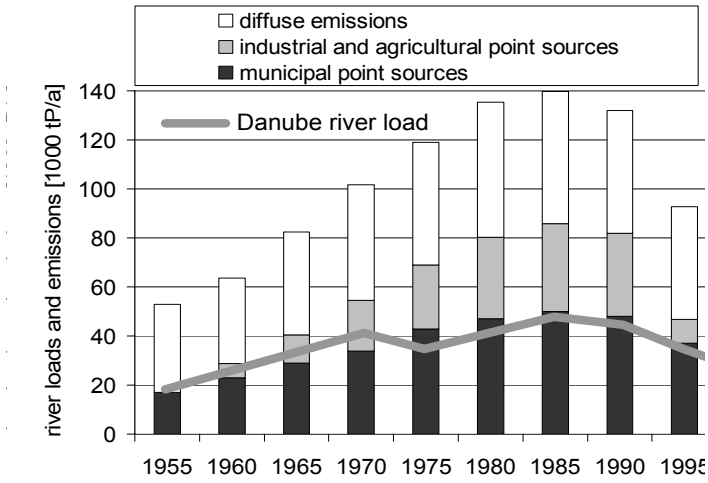


**Figure 1. Phosphorus loads discharge by the Danube into the Black Sea**

## Means of reducing P load

***Wastewater collection and treatment***

The current annual emissions via waste water treatment plants amount to about 24 kt P. The implementation of the UWWTD will increase the number of people connected to sewer systems and WWTPs. Scenario calculations were carried out to show the consequences in respect of P discharges, considering different amounts of P-containing detergents (0.3; 1.0; 1.75, 2.5 g P per inhabitant per day) consumed.

Settlements between 2 000 and 10 000 inhabitants will emit more than 50% of the total P emissions because only biological treatment is required. Only in the Scenario with 0.3 g P/inh.d in detergents the emissions will be lower than in 2000. The introduction of P-free laundry detergents in the Danube countries would reduce P input by 5 kt P/a compared to the 1gP/inh.d Scenario and by 10.5 kt P/a. compared to the 1.75 gP/inh.d Scenario (Figure 2). In addition, the non EU countries will not be under the same pressure to comply with the UWWTD and new sewerage and WWTWs without P removal will add to the problem.

***Agriculture***

Relevant P-emissions stem from the erosion of agricultural soils. P emissions via erosion are mainly in particulate form, which are only partly available for algal growth. These emissions provide a potential P source which can be mobilised in the case of anaerobic conditions in the waters as a result of eutrophication.

***P-free laundry detergents***

The pioneering example of Switzerland has demonstrated that improved wastewater treatment (P removal) alone during the 1970s was not adequate to control eutrophication, nor was an additional voluntary agreement to reduce P in detergents. Consequently a ban on phosphate in detergents was introduced in 1986, which resulted in clear improvements in water quality[1].

[1] EAWAG News, 42E, July 1997

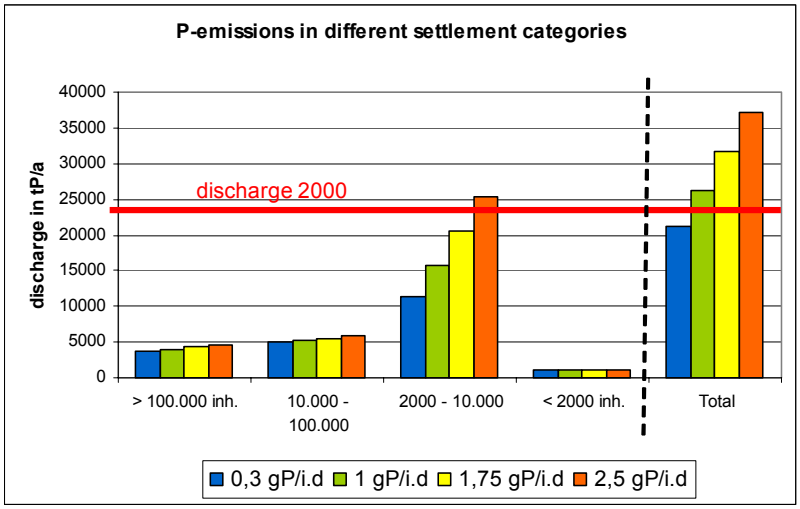


Figure 2: P-discharge in different scenarios in tP/a in distinct settlements

## Current usage of P / P free detergents in DRB

The current situation is summarised in Table 1. Only Germany and Austria are virtually P free. The Czech Republic has recently introduced legislation to replace a voluntary agreement, which had failed after an initial period of success. Slovenia has a high proportion of P free detergents, but there are signs of a decreasing trend which should be monitored. Together these four countries account for about a quarter (26%) of the DRB population. Of the remaining countries, only Hungary and Serbia use significant proportions (about 50% or more) of P free detergents and together account for another 24% of the DRB population. The other seven (see Table 1) countries use little or no phosphate-free detergents and make up about half the DRB population; of these Romania is the most significant in terms of DRB population (about 27% of total). Overall in the EU-25 it has been estimated that about 66% of laundry detergents sold are P free[2].

## Voluntary agreements / legislation

Current EU legislation (Detergents Regulation EC/648/2004, Article 16) could provide an opportunity to review the situation and to harmonise it across Europe by introducing a ban or restrictions on phosphate detergents across the Community. However, the EC DG Enterprise did not expect that there would be a quick conclusion to the current review. Therefore, since EU legislation cannot be expected in the near future, it is important for DRB countries to develop national legislation and to mobilise NGOs to inform the public.

It has been demonstrated that voluntary agreements without legislative back up are unlikely to succeed in DRB countries, as clearly demonstrated in the Czech Republic, where the initial success of a voluntary agreement between government and the industry association was eroded due to increasing sales of phosphate detergents by non-members of the association. Moreover, it is difficult to control imports of P detergents.
In Slovenia the sale of P free detergents was successfully encouraged through tax incentives (lower tax on P free detergents) but since abandoning this measure in 1990, the sale of P detergents has increased again 3.

Few DRB countries outside the EU have experience with voluntary agreements, but they are generally following EU legislation. Therefore EU legislation to ban or reduce phosphates in detergents would be the most effective option to deal with the problem. However, in the absence of any EU legislation the countries of the Danube River Basin should be encouraged to implement national bans on laundry detergents containing phosphates.

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[2] Sotirios Kiokias, DG ENV (seminar presentation)
[3] Jaroslav Slunecko, Slovenian Industry Association KPC (seminar presentation)

**Table 1 Detergent usage, populations & phosphate-free detergents by country**

| Percentage detergent that is phosphate-free | Country | Total laundry detergent usage | Total population [1] | Population in Danube River Basin (DRB) [2] | |
|---|---|---|---|---|---|
| | | tonnes/year | million | million | % of DRB |
| >98% | Austria | 55,197 | 8.1 | 7.7 | 9.4 |
| | Germany | 643,000 | 82.0 | 9.1 | 11.1 |
| >~50% | Czech Republic | | 9.9 | 2.7 | 3.3 |
| | Hungary | 126,300 | 10.3 | 10.3 | 12.6 |
| | Slovenia | | 2.0 | 1.7 | 2.1 |
| | Serbia-Montenegro [3] | 89,057 | 9.3 | 9.1 | 11.1 |
| <10% | Bosnia-Herzegovina | 7,485 | 4.4 | 2.5 | 3.1 |
| | Bulgaria | | 7.9 | 4.4 | 5.4 |
| | Croatia | 16,516 | 4.7 | 3.2 | 3.9 |
| | Moldova | | 4.3 | 1.1 | 1.3 |
| | Slovak Republic | | 5.4 | 5.2 | 6.4 |
| | Ukraine | 219,873 | 49.1 | 3.1 | 3.8 |
| Not known [4] | Romania | 154,584 | 22.4 | 21.8 | 26.6 |
| **Total** | | | **219.8** | **81.9** | **100** |

**Notes:**

1. Information from Whitaker's Almanack 2005
2. FromJoint Action Programme, 2000-2005
3. Data for 'phosphate-free' in Serbia-Montenegro may include low phosphate detergents (i.e. up to 5% phosphate)
4. Data for products indicates 'no phosphate-free detergents' on the market in 2005

## Concluding Comments

Although the available cost information is inadequate, there is no evidence of higher costs to the consumer for P free detergents, whereas cost savings can be achieved through lower wastewater treatment costs.

Whilst it is recognised that other actions, such as improved urban waste water collection and treatment, as well as 'good agricultural practices' are necessary complementary actions, there is scope for contributing to a successful resolution of the problem of eutrophication, by replacing P detergents with P free detergents, thereby reducing the total phosphate burden from detergents.

## The Next Steps:

The Detergents Task Group met on the 26 January 2007 and concluded that ban on P-containing laundry detergents was of significant benefit to the DRB and the North West Shelf of the Black Sea. The Task Group recommended that the following steps should be taken:

- There is a need for Danube Countries (except AT, DE and CZ) to take positive action in developing national legislation to ban P-detergents;
- Romania should be encouraged to act as a pilot for this ban due to the size of the population, the production facility available, the benefits to the Black Sea coast and tourism, the growth of wastewater treatment, etc.