Annex 2

List of reference sites

Group 1.1 Fast-flowing stream (< 100 km²)

River	**Station**
Piģele	0,4 km no grīvas
Šepka	pie "Dišleru" mājām
Ģibzdes valks	50 m lejpus Dundagas-Puzes ceļa
Cimziņa*	0.3km augšpus grīvas
Egļupe*	1km augšpus grīvas

* Potential ref sites

Group 2.2 Slow-running stream (< 100 km²)

River	**Station**
Baņģeva	lejtece, ceļš Usma – Amjūdze
Raķupe	augšpus Vecieres ietekas
Pilsupe	Rigas Licis baseins

Group 1.3 Fast-flowing river (100 - 1000 km²)

River	**Station**
Lielā Jugla	augšpus Zaķiem
Amula	Ventas basin

Group 1.4. Slow-running river (100 - 1000 km²)

River	**Station**
Rinda	lejtece
Rēzekne	augšpus Rēzeknes
Viesīte	vidustece, ceļš Aizkraukle – Ēberģi

Group 1.5 Big fast-running river (> 1000 km²)

River	**Station**
Salaca *	upstream Salacgrīvas.

*the station does not fully correspond to reference status

Group 1.6. Big slow-running river (> 1000 km²)

River	**Station**
Gauja	upstreams Valmiera
Irbe	Vičaki
Daugava*	upstream Jēkabpils

*The station has indications of anthropogenic influence

Lakes, with corresponding group number,

Group 2.1
Aklais
Baltiņu (Teikuru)
Būšnieku
Silabebru
Group 2.2
Dūņieris
Group 2.3
Kosas
Bricu
Lēpītis
Group 2.4
Asaru (rīgas)
Lisiņš

Garezers (Ance)
Dienvidu Garezers
Group 2.5
Juveris
Sventes
Group 2.6
Lieluikas
Group 2.7
Čertoks
Laukezers
Baltezers (Timsmales)
Group 2.8
Tolkāja
Dauguļu Mazezers
Ungurs
Group 2.9
Drīdzis
Riču
Group 2.10
Ojatu

Annex 3

Map of reference sites

Annex 4

Tables of physico-chemical parameters rivers and lakes (for reference conditions=high status)

Proposal for reference values for Latvian river types

Type of river	River type, catchment and slope	O2 min mg/l	BOD5 mg/l	N/NH4 mg/l	P tot (mg/l)	N tot (mg/l)
1	Small, <100km2, high slope	> 8	<2,0	0,09	< 0,04	<1,5
2	Small, <100km2, low slope	> 7	< 2,0	< 0,1	< 0,045	< 1,5
3	Medium 100 -1000km2, high slope	>8	< 2,0	< 0,09	<0,050	< 1,8
4	Medium 100 – 1000 km2, low slope	> 7	< 2,0	< 0,16	< 0,06	< 2
5	Large >1000km2, high slope	>8	<2,0	0,09	0,04	1,8
6	Large >1000km2, low slope	> 7	< 2,0	<0,1	< 0,045	< 1,8

Proposal for reference values for Latvian Lake types

Type of lake	Lake type	P tot (mg/l)	N tot (mg/l)	Chl a (µg/l)	Secci desk M
.1	very shallow hw oligohumic	<0,025	< 1	< 7	To buttom at mean depth
2	very shallow hw polyhumic	< 0,030	< 1	< 4	-
.3	very shallow sw oligohumic	< 0,025	< 1	< 5	To buttom at mean depth
4	very shallow sw polyhumic	< 0,030	< 1	< 5 (pH<5) <7 (pH>5)	-
5	shallow hw oligohumic	< 0,020	< 0,5	< 7	> 4
6	shallow hw polyhumic	< 0,030	< 0,8	<10	-
7	shallow sw oligohumic	<0,015	< 0,5	< 5	> 4,5
8	shallow sw polyhumic	< 0,030	< 1	< 5 (pH<5) <10 (pH>5)	-
9	deep hw oligohumic	< 0,020	< 0,5	< 5	>4,5
10	deep sw oligohumic	< 0,020	< 0,6	< 4	>4,5

Annex 5

Table of biological parameters
rivers and lakes (for reference conditions=high status)

Proposal for reference values for Latvian river types

1- Biological elements

Indicative parameter of quality element	Type - 1	Type - 2	Type – 3	Type - 4	Type - 5	Type - 6
	Fast-floating stream with medium size catchment area	**Slow-running stream with medium size catchment are**	**Fast-floating river with large size catchment area**	**Slow-running river with large size catchment area**	**Big fast-floating river with very large size catchment area**	**Big slow-running river very large size catchment area**
1.1 - Aquatic flora						
1.1.1- Macrophytes						
Overall surface coverage in percents:	never exceeds 30%	5 – 30%	5 – 30%	5 – 30%	5 – 30%	5 – 30%
Species composition:	*Hildebrandia rivularis, Fontinalis antipyretica, Amblystegium riparium Potamogeton alpinus*	*Potamogeton praelongus*	*Hildebrandia rivularis, Fontinalis antipyretica, Amblystegium riparium Butomus umbellatus f.submersus, Schoenoplectus lacustris f.submersus, Potamogeton praelongus*	*Potamogeton praelongus, P.lucens, Sium erectum,*	*Hildebrandia rivularis, Fontinalis antipyretica, Amblystegium riparium Butomus umbellatus f.submersus, Schoenoplectus lacustris f.submersus, Potamogeton praelongus*	*Potamogeton praelongus, P.lucens Overall surface*
Presence of *Potomogeton alpinu:*	Presence	Presence	Presence	Absence	Absence	Absence
1.2 - Benthic invertebrate fauna						
Saprobity index	1,0-1,5	1,3 – 1,8	1,1-1,6	1,3 – 1,8	1,3- 1,8	1,5-2,0

Proposal for reference values for Latvian lake types – Types: 1-5

Indicative parameter of quality element	**Type - 1** Very shallow hard water oligohumic lake	**Type - 2** Very shallow hard water polyhumic lake	**Type - 3** Very shallow soft water oligohumic lake	**Type - 4** Very shallow soft water polyhumic lake	**Type - 5** Shallow hard water oligohumic lake
1.1 - Aquatic flora					
1.1.1. - Macrochytes					
Indicator species	*Chara sp., Nitella sp.,* *dominating* *Najas marina,* *Stratiotes aloides*	*Myriophyllum alterniflorum* *Cladium mariscus* *Chara sp., Nitella sp.,* *Najas marina*	*Isoetes lacustris, I.echinospora, Lobelia dortmanna, Litorella uniflora, Subularia aquatica, Sparganium affine*	*Sphagnum riparium fluitans Utricularia minor,* *Nuphar lutea*	*Chara sp., Nitella sp., Myriophyllum alterniflorum, Stratiotes aloides, Potamogeton lucens*
Presence of indicator species	dominating	dominating	frequently	frequently	frequently
Indicator species coverage	>50%	>50%	>5%	>5%	>5%
Total coverage with macrophytes	>80%	>50%	<30%	<30%	>30%
1.1.2- phytoplankton					
Biomass	<0,15	<0,27	0,95-1,0	0,05-0,3	0,2-1,2
Dominating taxa	**Chrysophyta**: *Dinobryon sp.*, **Chlorophyta:** *Desmidiales sp.*, **Dynophyta:** *Ceratium sp., Peridinium sp.*	**Bacillariophyta**, **Chlorophyta**: *Desmidiales sp.*, **Chrysophyta**: *Dinobryon sp.,* **Dynophyta**: *Ceratium sp., Peridinium sp.*	**Bacillariophyta:** *Asterionella sp., Fragilaria sp.,* **Chlorophyta:** *Desmidiales sp.,* **Chrysophyta:** *Dinobryon sp.*, **Cyanophyta:** *Anabaena sp.*, **Dynophyta:** *Ceratium sp., Peridinium sp.*, **Euglenophyta:** *Trachelomonas sp.*	**Bacillariophyta:** *Asterionella sp., Aulacoseira sp.,* **Chlorophyta:** *Desmidiales sp.,* **Euglenophyta:** *Trachelomonas sp.,* **Chrysophyta:** *Mallomonas sp., Dinobryon sp.*	**Chlorophyta:** *Chlorococcales sp.*, **Bacillariophyta:** *Fragilaria sp., Tabellaria sp.,* **Chrysophyta:** *Dinobryon sp.,* **Dynophyta:** *Ceratium sp.*

Indicative parameter of quality element	**Type - 1** Very shallow hard water oligohumic lake	**Type - 2** Very shallow hard water polyhumic lake	**Type - 3** Very shallow soft water oligohumic lake	**Type - 4** Very shallow soft water polyhumic lake	**Type - 5** Shallow hard water oligohumic lake
Presence of red algae (Rhydophyta)	-	+ (*Batrachospermum sp.*)	+	+ (*Batrachospermum sp.*)	-
Presence of blue green algae	-	-	never exceeds 0,1-0,2% (plankton communities)	never exceeds 0,1-0,2% - (periphyton communities	never exceeds 0,1-0,2% (plankton communities)
1.2 - Benthic invertebrate fauna (1)					
Number of species	17	8-25	36	54-81	80
Number of organisms	1960	1380-2380	2360	1220-5610 (3)	740-3600
Biomass	1,18 (2)	2,16-46,04	16,10	1,40-7,3 (3)	12,24 – 30,5
Dominating taxa	**Chironomidae, Culicoides, Oligochaeta**: *Limnodrillus hofmeisteri*	**Trichoptera, Ephemeroptera, Oligochaeta:** *Limnodrillus hofmeisteri, Stylaria lacustris ;* **Mollusca**	**Chironomidae**; **Oligochaeta** : *Limnodrillus hofmeisteri, Stylaria lacustris*	**Chironomidae** ; **Oligochaeta :**	**Mollusca; Insecta**

Note: (1) – communities typical for zone of shallow water – littoral; (2) – without Mollusca; (3) in case of Chironomidae dominating

Proposal for reference values for Latvian lake types – Types: 6 -10

Indicative parameter of quality element	**Type - 6** Shallow hard water polyhumic lake	**Type - 7** Shallow soft water oligohumic lake	**Type - 8** Shallow soft water polyhumic lake	**Type - 9** Deep hard water oligohumic lake	**Type - 10** Deep soft water oligohumic lake
1.1 - Aquatic flora					
1.1.1. - Macrochytes					
Indicator species	*Chara sp., Nitella sp., Myriophyllum alterniflorum, Stratiotes aloides, Potamogeton lucens*	*Isoetes lacustris, I.echinospora, Lobelia dortmanna, Litorella uniflora, Myriophyllum alterniflorum*	*Nuphar lutea Isoetes lacustris, Sphagnum riparium fluitans*	*Chara sp., Nitella sp.,*	*Isoetes lacustris, I.echinospora, Lobelia dortmanna, Litorella uniflora, Subularia aquatica, Myriophyllum alterniflorum*
Presence of indicator species	frequently	frequently	present	present	present
Indicator species coverage	>5%	>5%	>1%	>1%	>1%
Total coverage with macrophytes	>30%	>10%	>5%	<10%	<10%
1.1.2- phytoplankton					
Biomass	0,5-1,5	0,25-0,5	0,2-1,2	0,1-1,5	0,5-1,5
Dominating taxa	**Bacillariophyta**: *Asterionella sp., Cyclotella sp., Diatoma sp., Fragilaria sp., Synedra sp.,* **Chlorophyta:** *Desmidiales sp. Chlorococcales sp.,* **Dynophyta:** *Ceratium spp., Peridinium sp.,* **Euglenophyta:** *Trachelomonas sp.*	**Bacillariophyta:** *Asterionella sp., Navicula sp., Nitzschia sp.,* **Chlorophyta:** *Desmidiales sp. Chlorococcales sp.,* **Cyanophyta:** *Gomphosphaeria lacustris*		**Bacillariophyta**: Fragilaria sp., **Chrysophyta:** *Dinobryon sp.,* **Cyanophyta**: Aphanizomenon sp., Chroococcus sp., Coelosphaerium sp., Microcystis sp., ., **Dynophyta:** *Ceratium sp.*	**Chlorophyta:** *Chlorococcales sp.,* **Chrysophyta:** *Dinobryon sp.,* **Cryptophyta**; *Cryptomonas sp.,* **Cyanophyta**: *Anabaena sp., Chroococcus sp., Coelosphaerium sp., Snowella sp., Synechococcus sp.*

Indicative parameter of quality element	**Type - 6** Shallow hard water polyhumic lake	**Type - 7** Shallow soft water oligohumic lake	**Type - 8** Shallow soft water polyhumic lake	**Type - 9** Deep hard water oligohumic lake	**Type - 10** Deep soft water oligohumic lake
Presence of red algae (Rhydophyta)	+	-	+	-	-
Presence of blue algae	never exceeds 0,1-0,3% (plankton communities)	never exceeds 0,1-0,2% (plankton communities)	never exceeds 0,1-0,2% (plankton communities)	never exceeds 0,1-0,2% (plankton communities)	never exceeds 0,1-0,2% (plankton communities)
1.2 - Benthic invertebrate fauna (1)					
Number of species	No data available	14-30	12	29	13-21
Number of organisms		1400 - 5900	1960-2300	2000	640-3380
Biomass		3,9 – 21,9	13,7 - 16,4	149,0	1,7 – 12,6
Dominating taxa		**Chironomidae;** ***Assellus aquaticus,*** **Oligochaeta** : *Limnodrillus hofmeisteri,* ***Psammoryctides barbatus***	**Trichoptera:** *Polycentropus sp., Triaenodes bicolor, Phryganea bipunctata ;* **Chironamidae; Sialis sp.; Hydracarina sp.; Aranei sp.**	**Chironomidae; Mollusca:** *Unia pictorum;* **Ephemeroptera**	**Chironomidae; Ephemeroptera –** ***Baetis sp.;*** **Asellus aquaticus; Oligochaeta:** *Stylaria lacustris,*

Annex 6

Methodology for modelling of nutrient loads In Rivers

Application of simple decision making tool - nutrient load mass balance calculation model in river basin management – experience of Latvian-Swedish "Daugava river basin project".

Introduction

The model was applied within the Latvian – Swedish "Daugava River Basin Project" (Daugava project) in order to assess the amount of nitrogen and phosphorus (nutrients) in surface waters of Daugava river basin, and, correspondingly, possibilities as well as possibilities to reduce the load depending on:

- preliminary determined water quality objectives for sub-catchments;
- traditionally large amount of analysis collected during longer time period of monitoring, observations and investigations on amount of nitrogen and phosphorus and its changes in the natural waters and wastewater discharges;
- significant role of nitrogen and phosphorus in processes of eutrophication of surface waters;
- nitrogen and phosphorus are listed as priority substances in WFD.

Data and information used for water quality assessment and determination of nutrient load were obtained from a number of institutions – state and municipal institutions and agencies, scientific institutes, enterprises etc, including digital (different formats and programs) and paper copies.
For evaluation of nutrient load from different kind of land use *CORINE Landcover* digital map prepared by Latvian Environmental Agency was used, and for more detail investigation – the main map of Latvia prepared by State Land Service.
Load of nutrients was analyzed in scale of sub-catchments (or Surface Water Bodies –according to WFD definitions) on order to link characteristic concentrations of nitrogen and phosphorus in the main stream with possible sources of nutrients in the catchment area. The main problem and most challenging task were to aggregate available information and data collected and codified at the level of administrative territories to the level of sub-catchments.

The most downstream point in the main stream of sub-catchment was identified as the most characteristic point for evaluation of quality of the whole main stream. This approach also allows a calculation of actual nutrient load originating in this sub-catchment.

Actual nutrient load in the sub-catchment is calculated by multiplying of the amount of discharge with mean concentrations of nutrients (mg/l) in the most characteristic – the most downstream point of the main stream. It reflects actual amount of nutrients in tons that origin from different sources and reach this point during the year.

Maximum allowable load of nutrients according to the quality objectives for some definite sub-catchment is calculated by multiplying of the corresponding concentrations of nutrients set in the quality objectives for this sub-catchment with average multi-year amount of discharge or standard discharge. Thus, amount of nutrient load is determined so that it can be drained from different sources to the most characteristic point of the sub-basin in such way that quality of surface waters in this point will correspond theoretically with certain objectives.

Necessary nutrient load reduction means difference between actual nutrient load and maximum allowable load of nutrients according to the quality objectives for some definite sub-catchment. It

makes basis for planning and realization of measures necessary fro load reduction from separate sources and consecutive reduction of nutrient load downstream the main stream of sub-catchment.
Sources of nutrient load differ greatly – pollution point sources are wastewater treatment plant discharges, diffuse sources of pollution are agriculture (including farms), forests and forestry, transport infrastructure objects – roads and bridges, waste dumps, summer house districts and others. Knowledge of nutrient load from point sources is comprehensive in general, and it is possible to calculate it accurately. At the other hand, nutrient load from diffuse sources depends on land use within sub-catchment area.

One of possibilities how to calculate theoretically nutrient load at sub-catchment that origins from different sources is described below.

Methodology of nutrient load mass balance calculation in river basin management

Load of total nitrogen and total phosphorus on sub-catchment was calculated by a Swedish computer model prepared by Tord Wennerblom, Chairman of Administrative Council of Communes Alvsborg and Hans Kvarnas, Swedish Agriculture University. This model is accepted by Swedish Environmental Protection Agency and is widely used by municipalities in Sweden. Sten Carlsson and "Daugava project" work group has modified this model for use at river basin level in Latvia.

Description of the model

The model consists of 10 calculation sheets in MS EXCEL 3.0

Forests

Nutrient load from forests was calculated based on monitoring results from drained forests ecosystem at site Vesetnieki conducted by Latvian Forestry Research Institute (LFRI) "Silava" and data from State Hydrometheorological Agency:
$N - NH_4$ – 1,4 kg/ha year;
$N - NO_3$ – 0,7 kg/ha year;
$N_{tot.}$ – 2,1 kg/ha year;
$P_{tot.}$ – 0,1 kg/ha year.

If figures more precisely describing the catchment are available, those should be used.

It is assumed that nutrient load from fertile forest soils (class I and II) may be respectively 10 and 5 times more than from ordinary forests.

Nutrient load from area covered with forests is considered as natural or „background" load.

All impact from forestry activities is considered as anthropogenic. It is considered that clear-cuts are responsible for larger runoff of nitrogen during shorter time in more fertile soils. It means that runoff of nitrogen will be 4 times larger than normal for next 8 years and phosphorus – 3 times larger for next 3 years.

Similarly also drainage of clear-cut areas is expected to increase nutrient runoff for approximately 3 times, and this effect is observed for next 5 years regarding nitrogen runoff and 1 year regarding phosphorus runoff.

Fertilization of forests increases runoff of nitrogen that is considered for use in the model as 3 times more than from ordinary forests for next 3 years.

Wetlands

Wetlands are considered to leak as forests, except for organic nitrogen and phosphorus, which are supposed to leak twice as much. Load of nutrients from wetlands was calculated using the following nutrient runoff rates that derive from investigations in Sweden:

$N_{tot.}$ – 0,15 kg/ha year;
$P_{tot.}$ – 0,2 kg/ha year.

When necessary these figures can be replaced with another, which will describe the catchment area more precisely and according to new data sets and research results.
Nutrient load from wetland area is considered as natural or „background" load.

Land area used in agriculture

For calculation of nutrient load from land used in agricultural land following runoff were used, the data originates from agriculture monitoring site ran by University of Agriculture of Latvia:

$N_{tot.}$ – 8,55 kg/ha year;
$P_{tot.}$ – 0,18 kg/ha year.

When necessary these figures can be replaced with others, which will describe the catchment area more precisely and according to new data sets and research results.

Probably, the phosphorus runoff is underestimated due to the fact that losses of phosphorus in the process of soil erosion are not considered in current model. Therefore, the possibility of increasing the area loss by any factor, due to erosion, has been incorporated in the model.

Nitrogen runoff from wintergreen area (pastures, meadows, winter cereals) is calculated to be for 25% less than annual runoff from plough fields (arable land) and fallow. Phosphorus runoff reduction from the wintergreen area is not considered here. All types of meadows and temporary pastures are classified as „wintergreen area" in this model.

Load of nutrients from arable land is considered as anthropogenic, and it is possible to decrease the load by realization of respective measures.

Other surfaces

This group includes all areas not covered with forests, waters, wetlands or arable land. It contains, e.g. mountains, rocky terrain, impediments, roads and towns. For approximate calculation of nutrient load from other surface area could be used the same nutrient runoff rate as from natural forests (i.e. natural or „background" load). Influence of storm water from urban area is calculated in connection with wastewater treatment plants

Precipitation on water surface area

Dry deposition of nitrogen on lakes is assumed to be quite small, about 10 % of the total, it follows that total deposition can be approximated with wet deposition. The nitrogen deposition is well known due to measurements of rainwater. Load of nutrients that origins from precipitation on water surface area is calculated using following rates derived from hydro-meteorological monitoring:

$N_{tot.}$ – 1060 kg/km^2 year;
$P_{tot.}$ – 8 kg/km^2 year.

When necessary these figures can be replaced with another which will describe the catchment area more precisely and according to new data sets and research results. Load of nutrients that origins from precipitation on water surface area is considered as natural or „background" load.

Wastewater treatment plants, overflows and storm water

In the model measured effluents and/or standard values are used when calculating direct discharges. The standard values for contributions from people using WC are 13,5 g nitrogen/person and day and 2,1 g phosphorus/person and day. Treatment effect can be varied as wished, e.g. corresponding to the following table.

Removal effects of sewage treatment facilities of private houses:

	Reduction of nitrogen %	Reduction of phosphorus %
Only sedimentation	15	15
Sedimentation with infiltration field	80	90
Sedimentation with sand filter	25	50
Wastewater treatment using chemical substances for additional phosphorus removal	40	90

Corresponding values for households using dry toilet are as follows:

$N_{tot.}$ – 1,0 g/person/day;
$P_{tot.}$ – 0,6 g/person/day.

If phosphate free detergents are used then amount of phosphorus is decreased by 40 %.
Load of nutrients is considered as anthropogenic.

Impact from milk storage
Production of the nutrients per dairy cow is assumed to be following if regular dishwashing detergents are used:
$N_{tot.}$ – 0,1 g/day;
$P_{tot.}$ – 1,11 g/day.

Purification effect sees as for private sewers above. For milk rooms there are also the possibilities of urine or dung pools, with 100 % removal or direct discharge, with 0 % removal.

Load of nutrients is considered as anthropogenic.

Manure pits

Production of nutrients in manure is assumed to be 100 kg nitrogen and 12 kg phosphorus par animal unit (AU) per year. A leakage from the manure facilities at 10 % leakage of total nutrient content is generally assumed.

Load of nutrients from the manure pits is considered as anthropogenic.

Aquaculture

In case if measured discharge data are not available then nutrient load standard estimation can be used as 5,5 kg of phosphorus and 65 kg of nitrogen per metric ton fish produced.
Load of nutrients is considered as anthropogenic.

Industry

It is obvious to use data from measured effluent discharges. However, these data are often incomplete concerning nutrients and if not available, data from investigations of similar enterprises can be used.

Load of nutrients is considered as anthropogenic.

Impact of other kind

Data on additional load from upstream located water bodies, as well as data on nutrient load from other anthropogenic activities depending on present knowledge and observations or monitoring may be entered into the model, e.g. data on nutrient load from waste dumps, roads, summer house districts etc.

Load of nutrients is considered as anthropogenic.

Calculated summary load of nutrients in Daugava river basin
This model was used for screening of nutrient load sources within Daugava river basin. Total nutrient load into the basin was calculated using presently available information and it makes **35 850 t N_{tot} /year** and **1500 t P_{tot} year** (this is "gross load" that is not considering nutrient retention.)

Approximately 14 290 t N_{tot} and 654 t P_{tot} of total nutrient load originates within Latvian part of Daugava river basin. Load of phosphorus and nitrogen was analyzed at sub-catchment level and different sources of load origin are comparatively described in the graphs below (tons per year; relative share of source in % of total load):

Figure. Detailed distribution of phosphorus load that originates in Latvia („raw load" without consideration of nutrient retention or self-purification), tons per year; % of total load

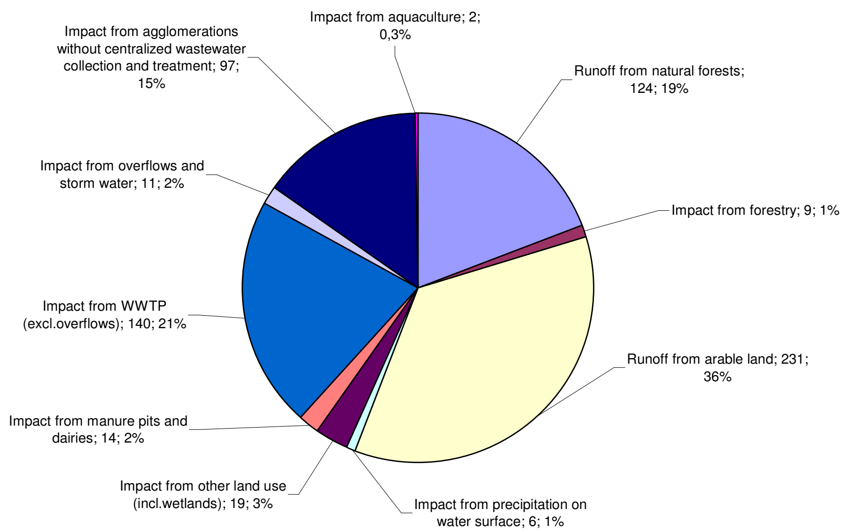
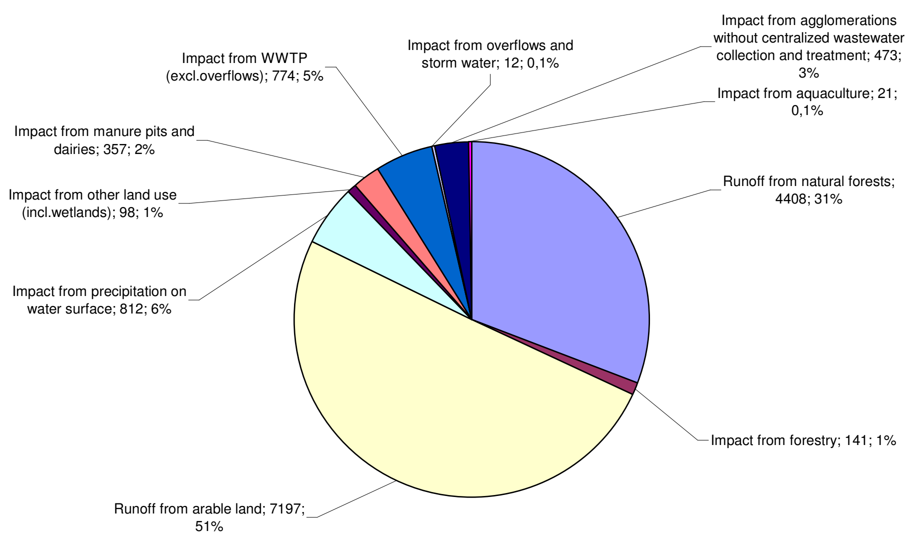


Figure. Detailed distribution of nitrogen load that originates in Latvia („raw load" without consideration of nutrient retention or self-purification), tons per year;%



Summary

Plant nutrients are the ultimate causes of eutrophication of surface waters. Simple calculation tool – model can be used for estimation of nutrient (phosphorus and nitrogen) load and determination of the main pollution sources. It can be used at different stages of preparation of River basin district management plans according to EU Water Framework Directive 2000/60/EC:

- at initial "screening" phase of pollution sources,
- for selection of appropriate measures and/or groups of measures to be included in the programs of measures to achieve water quality objectives;
- as well as illustrative material for discussions with stakeholders and general public.

The model that has been described in this paper do not need for extra knowledge of its use except of general calculation tool – MS Excel that is normally included in MS Office. This model seems to be one of the simplest mass balance calculation tools. Although originally it has been prepared in Sweden for use in the municipalities it has been modified for use in Latvia at river catchment scale, which means that it can be adopted also for use at other regions, too.

Reliability of results calculated by this model is directly dependent on reliability of data that are put into the model for calculations. Data and rates should reflect to the best of availabilities situation at the definite catchment area where nutrient load is to be calculated. When necessary these figures can be replaced with another which will describe the catchment area more precisely and according to new data sets and research results.

General problem of use of any calculation tool is following – generally much more data are collected and codified at level of administrative territories (boundaries of catchment area do not fit as a rule with borders of administrative territories). It is necessary to codify existing data at level of catchment areas, as well as establish several new water quality observation sites at places which will reflect precisely situation in the catchment area. Moreover, many additional investigations are necessary to precise background runoff value and diffuse pollution source influence, like for instance, natural runoff of nutrients from wetlands, impact from forests of different kind, impact of transport infrastructure elements, summer-house districts etc.