

Step4ward – An E fate Toolbox



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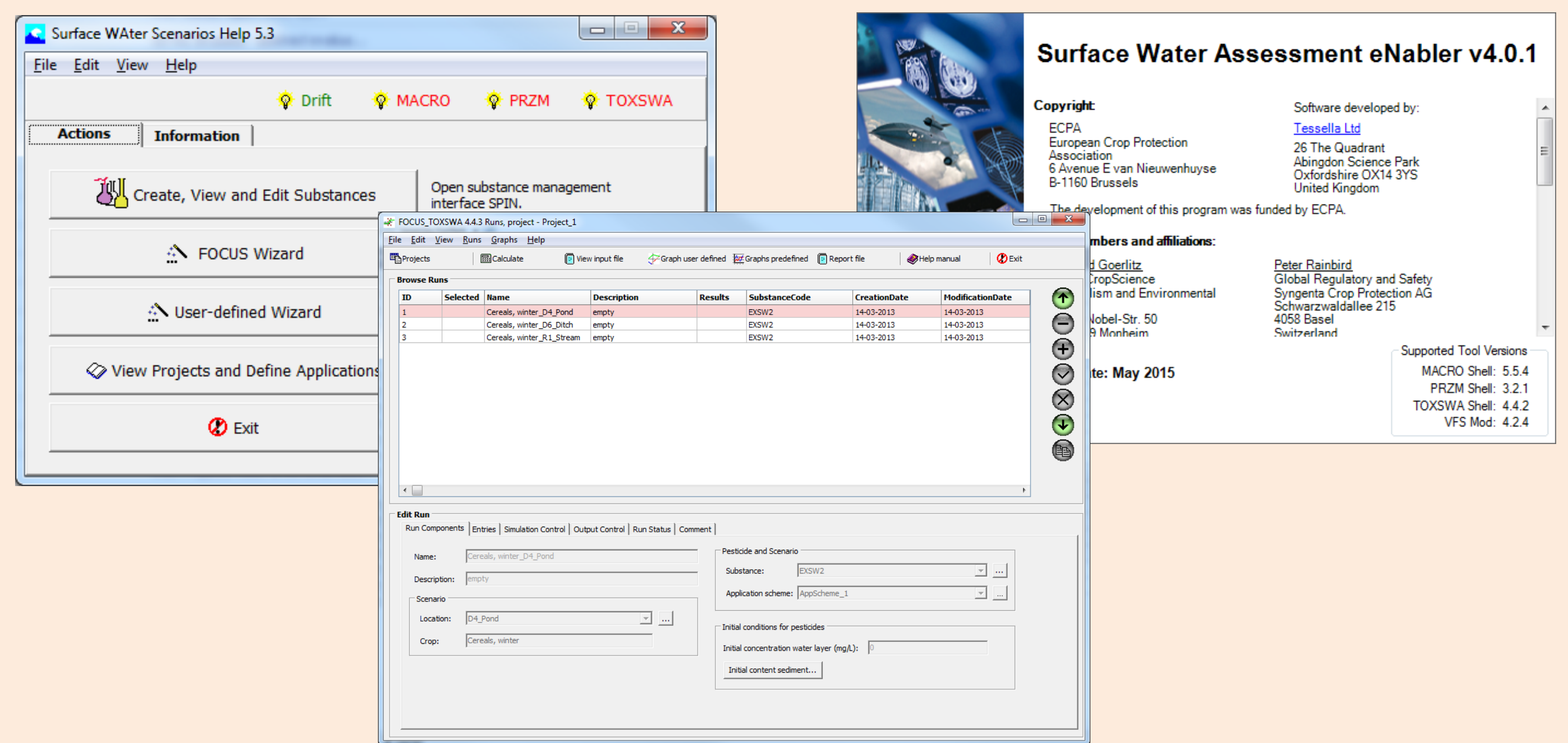
SUMMARY

‘Step4ward’ is a user-friendly Windows® toolbox to automate PEC_{sw} calculations, extract data from the current models FOCUS TOXSWA and SWAN and create MS Word® tables in the current dRR format. Software tools are very helpful and well-established for modelling environmental fate and exposure of plant protection products, and also for decision-making in a regulatory context. Although the models were developed for regulatory purposes, model outputs, mostly text files, are not ready for use in regulatory reports or dossiers and need further formatting. Remarkably, the EU provides dRR templates with ready-made tables for predicted environmental concentrations in soil and surface water, which are harmonised with the ecotoxicological section. Therefore, there is a high potential for reducing writing workload for all involved parties. At present, the main functionalities for writing reports and dossiers are already available within ‘Step4ward’ and a variety of additional output options can be added to the toolbox in the near future.

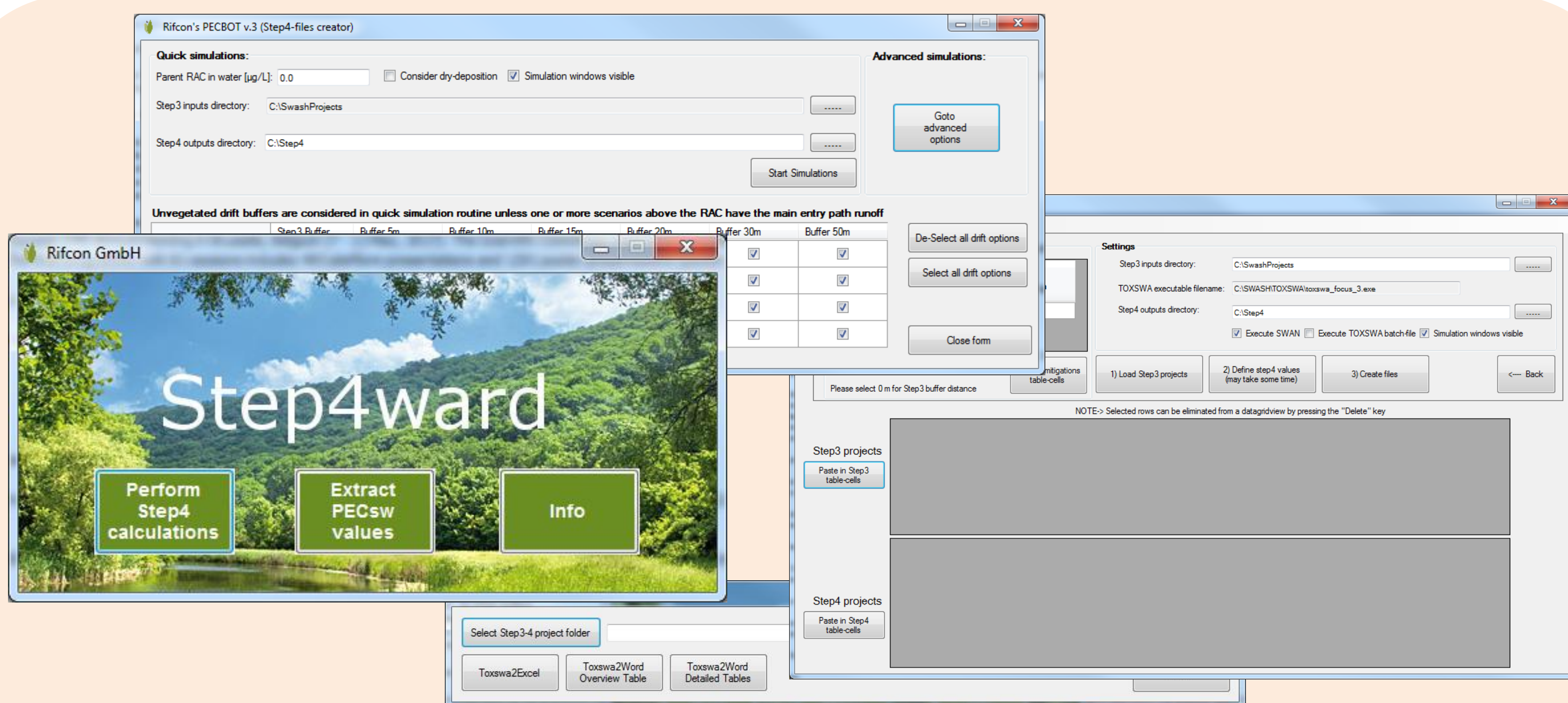
INPUT DATA

Step4ward requires three kinds of input data:

- SWASH project / TOXSWA data: input and output files containing substance and application pattern information
- SWAN command line version: STEP 4 runs considering mitigation measures like runoff or drift reduction
- EVA Excel sheet: Estimation of dry deposition values, if vapour pressure meets the triggers



FUNCTIONALITIES



Step4ward functionalities can be divided into two main groups:

- Automation of STEP 4 calculations: Execution of STEP 4 runs based on a RAC or user-defined settings
- Preparation of STEP 3 and STEP 4 output: Preparation of Excel sheets for a quick overview of calculations or Word documents for the use in dRR dossiers

OUTPUT DATA

Step4ward offers a variety of output options in Excel or Word format:

- STEP 4 output files stored in folders with consistent names (substance abbreviation, drift buffer width, runoff mitigation, drift reduction factor)
- Detailed overview of STEP 3/4 runs: application dates selected by user or by PAT, occurrence dates of maximum PECs, main entry paths, actual and time weighted PECs, chosen mitigation measures, folder names
- PEC_{sw} results in Word dRR 2015 format

Table 1: Global maximum FOCUS Step 3 PEC_{sw} and PEC_{soil} for EXSW1 following application of test product to winter cereals

Scenario	Water body	Max PEC _{sw} (µg/L)	Dominant entry route	21 d-PEC _{sw,ave} (µg/L)	Max PEC _{soil} (µg/kg)
D1	ditch	7.857	Drainage	2.796	1.465
D1	stream	6.042	Drainage	2.519	1.235
D2	ditch	81.690	Drainage	15.590	7.096
D2	stream	59.850	Drainage	10.400	4.178
D3	ditch	6.565	Spray drift	0.464	0.484
D4	pond	0.219	Spray drift	0.030	0.020
D4	stream	5.482	Spray drift	0.072	0.237
D5	pond	0.383	Drainage	0.229	0.102
D5	stream	5.914	Spray drift	0.415	0.294
D6	ditch	8.314	Drainage	2.386	0.926
R1	pond	0.337	Runoff	0.133	0.058
R1	stream	28.560	Runoff	0.611	1.781
R3	stream	4.193	Runoff	1.854	4.254
R4	stream	7.857	Spray drift	0.041	0.163

Step 3 PEC values of EXSW1 for D1, Ditch after application of 1 x 1000 g a.s./ha in winter cereals

Time after peak [d]	PEC _{sw} (µg/L)	TWA	PEC _{soil} (µg/kg)	TWA
0	7.857	-	1.465	-
1	7.426	7.776	1.448	1.453
2	6.885	7.591	1.439	1.451
4	4.968	6.938	1.156	1.414
7	2.099	5.694	0.888	1.314
10	0.936	3.115	0.591	1.082
14	0.703	2.796	0.439	0.917
21	0.743	2.284	0.376	0.799
28	0.599	1.721	0.269	0.639
35	0.770	1.535	0.300	0.580
42	0.239	1.242	0.193	0.478

EC values of EXSW1 for D1, Stream after application of 1 x 1000 g a.s./ha in winter cereals

Time after peak [d]	PEC _{sw} (µg/L)	TWA	PEC _{soil} (µg/kg)	TWA
0	6.042	-	1.235	-
1	2.272	5.825	1.171	1.224
2	0.103	5.559	1.138	1.204
4	4.349	5.196	0.906	1.096
7	4.961	4.780	0.686	0.844
10	1.550	3.411	0.444	0.644
14	0.611	2.519	0.317	0.517
21	0.441	2.027	0.266	0.466
28	0.295	1.486	0.191	0.391
35	0.463	1.307	0.228	0.328
42	0.546	1.041	0.120	0.220

EC values of EXSW1 for D2, Ditch after application of 1 x 1000 g a.s./ha in winter cereals

Time after peak [d]	PEC _{sw} (µg/L)	TWA	PEC _{soil} (µg/kg)	TWA
0	81.69	-	7.096	-
1	45.22	60.47	6.797	6.797
2	42.13	50.44	6.244	6.244
4	21.39	40.54	5.342	5.342
7	12.28	30.35	4.818	4.818
10	7.218	21.00	2.939	2.939
14	4.245	15.59	1.882	1.882
21	1.786	12.40	1.099	1.099
28	0.535	8.920	0.589	0.589
35	0.395	7.607	0.251	0.251
42	0.103	3.921	0.050	0.050

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