

European Commission



**Renewal Assessment Report prepared according to the Commission
Regulation (EU) N° 1107/2009**

Mecoprop-P

Volume 3 – B.8 (PPP) – Mecoprop-P K 600 g/L

Rapporteur Member State : United Kingdom
Co-Rapporteur Member State : Ireland

Version History

When	What
31/03/2016	Initial Renewal Assessment Report (RAR)

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B.8. ENVIRONMENTAL FATE AND BEHAVIOUR

This evaluation includes new information evaluated or added for the purpose of Annex I Renewal together with existing data or original assessments reproduced from the original DAR (1998). A summary box outlining the source of the study (eg. existing data or original assessments or new information evaluated or added for the purpose of renewal), the level of UK RMS evaluation and a brief note on how the data have been used has been included at the beginning of every study.

In the original submission for Annex I inclusion the representative formulations were Duplosan KV, Optica, Astix and Combitox Plus. For the purposes of renewal, the formulation is now Mecoprop-P K 600, code CA3015.

Mecoprop-P K 600 is a liquid soluble concentrate containing 600 g mecoprop-P acid/L, formulated as the potassium salt, for use as a herbicide in winter and spring cereals. Nufarm initially also listed use on amenity grassland, however, this use has now been withdrawn.

Table B. 8.1. Representative use pattern of Mecoprop-P K 600

Crop	Application rate (kg a.s./ha)	Application method	Number of applications	Minimum application interval (days)	Growth Stage	Remarks
Spring Cereals Wheat (including durum and spelt), Barley, Rye, Oats, Triticale	1.2	Tractor Mounted Boom	1	-	In the spring at BBCH 13-32	Applied from 1 st March
Winter Cereals Wheat (including durum and spelt), Barley, Rye, Oats and Triticale	1.2	Tractor Mounted Boom	1	-	In the spring at BBCH 20-32	Applied from 1 st March

Table B. 8.2. Substances considered in the risk assessment

Name	Compartment(s)
mecoprop-P	Soil, surface water and sediment, groundwater, air
<i>o</i> -cresol	Surface water

B.8.1. FATE AND BEHAVIOUR IN SOIL

B.8.1.1. Route and rate of degradation in soil

No studies with Mecoprop-P K 600 have been carried out.

Mecoprop-P degrades rapidly in aerobic soil via minor metabolites to CO₂.

Table B. 8.3. Proposed modelling end-points for mecoprop-P

Soil	Soil Type	Fit	20°C / 75% FMC (1/3bar)		20°C / pF2	
			DT ₅₀ (days)	DT ₉₀ (days)	DT ₅₀ (days)	DT ₉₀ (days)
Timmerman	Sandy Loam	SFO	7.67	25.5	4.7	15.6
Speyer 2.1	Sand	SFO	7.0	23.1	4.0	13.2
Speyer 2.2	Loamy Sand	FOMC	10.12*	33.6	8.2*	27.2
Speyer 2.3	Sandy Loam	SFO	6.0	19.9	4.9	16.3
Geometric mean					5.24	

*calculated from FOMC DT₉₀/3.32

B.8.1.2. Mobility in soil

No studies with Mecoprop-P K 600 have been carried out.

For the active substance, mecoprop-P, variation in both K_{foc} and 1/n with pH is evident. K_{foc} and 1/n values are clustered above and below approximately pH 5.5, with sorption increased at lower pH (Table B. 8.4).

Table B. 8.4. Proposed modelling endpoints for mecoprop-P

Soil	pH (KCl)	pH (CaCl ₂)	pH (H ₂ O)	OC %	K _f (ml/g)	K _{foc} (ml/g)	1/n	R ²	Reference
Zeist	4.3	-	5.2*	3.2	4.5	139	0.66	0.99	Matla & Vonk, 1993
De Krakeling	4.4	-	5.3*	2.1	3.5	167	0.69	0.99	Matla & Vonk, 1993
Maarn	4.3	-	5.2*	2.4	3.3	135	0.75	0.99	Matla & Vonk, 1993
Plainfield	-	-	5.6**	0.5	0.199	42.9	1.093	0.950	Obrist, 1986
Fox	-	-	7.6**	1.3	0.298	22.3	0.942	0.996	Obrist, 1986
Hagerstown	-	-	6.6**	1.5	0.428	29.5	1.012	0.997	Obrist, 1986
Plano	-	-	6.8**	3.4	0.687	20.1	0.961	0.999	Obrist, 1986
Calke	5.4	5.6	5.8	3.1	0.56	18	0.852	0.99	Simmonds, 2010
South Witham	6.9	7.2	7.3	3.7	0.46	12	0.892	1.00	Simmonds, 2010
Lockington	5.1	5.6	5.7	3.1	0.64	21	0.853	1.00	Simmonds, 2010
Hagen	5.3	5.5	5.7	2.9	0.98	34	0.926	1.00	Simmonds, 2010
Mean (pH <5.5), (n = 3)						146 [†]	0.70 [#]		
Mean (pH >5.5), (n = 7)						21 [†]	0.92 [#]		Plainfield soil excluded as outlier

%OC = %OM/1.724

* Calculated from pH(H₂O) = 0.820pH(KCl) + 1.69

** Solution not reported in study, assumed to be H₂O

#Arithmetic mean

†Geometric mean, according to EFSA Journal 2014:12(5): 3662

B.8.2. PREDICTED ENVIRONMENTAL CONCENTRATIONS IN SOIL (PEC_s)

Previous evaluation:	None: New data submitted for the purpose of renewal under Regulation 844/2012. New PEC _s calculations have been submitted to reflect the re-analysis of aerobic soil kinetics.
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The applicant calculated PECs for grassland use at a dose rate of 1380kg a.s/ha using the longest normalised DT₅₀ of 6.8 days taken from the study Hauck, 2003. Grassland is no longer a representative use and Hauck, 2003, is not to current kinetics guidance and was superseded by Hazlerigg, 2015. The RMS has recalculated the PECs for use on spring cereals (1 x 1.2 kg a.s/ha, 0% crop interception) using the longest non-normalised laboratory DT₅₀ from Hazlerigg, 2015 – pseudo-SFO DT₅₀ 10.12 days, Speyer 2.2 soil (see Table B. 8.3). A soil layer of 5cm depth with density of 1.5g/cm³ was assumed.

Table B. 8.5. PEC_s concentrations for mecoprop-P

	Actual (mg/kg)	TWA (mg/kg)
Initial	1.600	-
24h	1.494	1.546
24	1.395	1.495
4d	1.217	1.400
7d	0.991	1.271
28d	0.613	1.029
50d	0.235	0.712
100d	0.052	0.452

The DT₉₀ of mecoprop-P in soil is less than 1 year, therefore plateau concentrations have not been calculated.

B.8.3. PREDICTED ENVIRONMENTAL CONCENTRATIONS IN GROUND WATER (PEC_{gw})

RMS comments:	New groundwater modelling has been submitted to reflect the updated soil kinetics and sorption endpoints. 2 studies were submitted by the applicant in the original dossier, Simmons, 2014a and 2014b, for cereals and grassland uses respectively. As grassland is no longer a representative use, only Simmons, 2014a, has been considered by the RMS.
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Report:	CP 9.2.4.1/01 Simmons K (2014a) Calculation of Predicted Environmental Concentrations (PEC) of Mecoprop-P in groundwater following the application to Spring and Winter Cereals using FOCUS PEARL, PELMO and MACRO Nufarm UK Ltd. Report number: NUF2014-44
Models:	FOCUS PEARL, PELMO and MACRO
GLP:	Not applicable as this is a computer simulation.

Previous evaluation:	None: New data submitted for the purpose of renewal under Regulation 844/2012.
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The input values for mecoprop-P used in groundwater modelling in Simmons, 2014a, are listed in Table B. 8.6. Groundwater modelling was carried out using K_{foc} values for pH > 5.5 to represent the most conservative values. The application patterns considered for spring and winter cereals are given in Table B. 8.7. Crop

interception was assumed to be 0% for application to spring cereals at BBCH 13 and 20% for winter cereals at BBCH 20 as recommended in EFSA (2014¹).

Table B. 8.6. Applicants input values for groundwater modelling

Parameter	Mecoprop-P	References
Molecular mass [g/mol]	214.65	SANCO/3065/99-Final
Solubility in water [mg/L] Temperature [°C]	250000 at 20°C	Comb AL (2000) NUF004/993523
Vapour pressure [Pa] Temperature [°C]	7.3×10^{-4} at 20°C	Comb AL (2000) NUF004/993523 Recalculated to 20°C from 25°C
Biodegradation in soil D(e.g.)T ₅₀ soil [d]	6.0	Normalised geometric mean of 4 soils
K(f) _{OC} / K(f) _{OM} [mL/g]	K _{OC} = 23.3 at pH > 5.5* K _{OM} = 13.52 at pH > 5.5	Geometric mean of 8 soils (> pH 5.5)
Freundlich exponent (1/n) [-]	0.875	Arithmetic mean of 11 soils
Plant uptake factor [-]	0	Default value

Table B. 8.7. Application patterns of mecoprop-P for groundwater modelling

Crop	Growth stage	Application rate (g a.s./ha)	Interception by vegetation	Amount reaching soil (g a.s./ha)	Application timing
Spring cereal	13 - 32	1200	0%	1200	Spring (1 st March)
Winter cereal	20 - 32	1200	20%	960	Spring (1 st March)

The application date selected for use within the models was 1st March. Simmons considers this represents a worst-case timing for applications made in spring based on dates predicted using PELMO AppDate calculator which demonstrate that BBCH 13 for spring cereals is likely to occur after 1st March (Table B. 8.8). The RMS notes that applications from 1st March for both spring and winter cereals are specified in the GAP table for the representative uses (Table B.8.1).

Table B. 8.8. Emergence and application date at BBCH 13 for spring cereals using PELMO AppDate

Crop	Scenario	Emergence date	Application at BBCH 13
Spring Cereals	Châteaudun	10th March	16th March
	Hamburg	1st April	6th April
	Jokioinen	18th May	21st May
	Kremsmünster	1st April	6th April
	Okehampton	1st April	5th April
	Piacenza	-	-
	Porto	10th March	16th March
	Sevilla	-	-
	Thiva	-	-

- Spring cereals not relevant for this scenario

¹ EFSA (2014) EFSA Guidance Document for evaluating laboratory and field dissipation studies to obtain DegT50 values of active substances of plant protection products and transformation products of these active substances in soil, EFSA Journal 2014;12(5):3662

Groundwater exposure following application of mecoprop-P to spring and winter cereals on 1st March was modelled using PEARL v 4.4.4, PELMO v 5.5.3 and MACRO v 4.4.2 (Chateaudun). PEC_{GW} as reported in Simmons, 2014a, are given in Table B. 8.9 and Table B. 8.10.

Table B. 8.9. Simmons PEC_{GW} following application to spring cereals on 1st March

Scenario	PEC _{GW} (µg/L) following application rate of 1200 g a.s. /ha (1200 g a.s. /ha to soil)		
	PEARL	PELMO	MACRO
Châteaudun	<0.001	<0.001	0.007
Hamburg	0.015	0.029	-
Jokioinen	0.001	0.009	-
Kremsmünster	0.009	0.007	-
Okehampton	0.023	0.029	-
Porto	<0.001	0.001	-

Table B. 8.10. Simmons PEC_{GW} following application to winter cereals on 1st March

Scenario	PEC _{GW} (µg/L), following application rate of 1200 g a.s./ha (960 g a.s. /ha to soil)		
	PEARL	PELMO	MACRO
Châteaudun	<0.001	<0.001	0.004
Hamburg	0.008	0.040	-
Jokioinen	0.001	0.023	-
Kremsmünster	0.007	0.013	-
Okehampton	0.028	0.060	-
Piacenza	0.010	0.025	-
Porto	0.001	0.002	-
Sevilla	<0.001	<0.001	-
Thiva	<0.001	<0.001	-

The RMS has validated the results from Simmons, 2014a, and repeated the modelling using amended soil DT₅₀, K_{foc} and 1/n as determined in DRAR, Volume 3 CA (Table B. 8.11) with PEARL v4.4.4, PELMO v5.5.3 and MACRO v4.4.2 (Chateaudun). Sorption values for pH > 5.5 have been used to represent the most conservative case. For application to spring cereals, the RMS has modelled application on 1st March (as a conservative date) and 5 days post emergence (as representative dates for BBCH 13) with 0% crop interception. For winter cereals, the RMS has repeated the groundwater modelling with 20% crop interception and applications made on 1st March. PELMO AppDate calculator predicts winter cereals BBCH 20 will occur between 15th November and 3rd January and BBCH 32 will occur between 9th January and 27th May (Table B. 8.12). Therefore, Member States may wish to consider whether applications from 1st March will be appropriate for winter cereals between BBCH 20 and 32.

Table B. 8.11. RMS input values for groundwater modelling

Parameter	Mecoprop-P	Comments
Molecular mass [g/mol]	214.65	SANCO/3065/99-Final
Solubility in water [mg/L] Temperature [°C]	250000 at 20°C	Comb AL (2000) NUF004/993523
Vapour pressure [Pa] Temperature [°C]	0.0014 at 25°C	Comb AL (2000) NUF004/993523
Biodegradation in soil D(e.g.)T ₅₀ soil [d]	5.24	Normalised geometric mean of 4 soils
K(f) _{OC} / K(f) _{OM} [mL/g]	K _{OC} = 21 at pH > 5.5 K _{OM} = 12.18 at pH > 5.5	Geometric mean of 7 soils (pH > 5.5)
Freundlich exponent (1/n) [-]	0.92 at pH > 5.5	Arithmetic mean of 7 soils (pH > 5.5)
Plant uptake factor [-]	0	Default value

Table B. 8.12. Winter cereals - FOCUS GW emergence dates and predicted dates for BBCH 20 and 32 using PELMO AppDate

Crop	Scenario	FOCUS GW	PELMO AppDate	
		Emergence date	BBCH 20	BBCH 32
Winter Cereals	Châteaudun	26 th October	9 th December	24 th February
	Hamburg	1 st November	14 th December	22 nd April
	Jokioinen	20 th September	15 th November	27 th May
	Kremsmünster	5 th November	14 th December	22 nd April
	Okehampton	17 th October	29 th November	17 th April
	Piacenza	1 st December	3 rd January	12 th April
	Porto	30 th November	25 th December	1st April
	Sevilla	30 th November	19 th December	9 th January
	Thiva	30 th November	25th December	4 th March

RMS groundwater modelling results are given in table Table B. 8.13 to 8.15 below. For application to spring cereals, PEC_{GW} are <0.1 µg/l following application on either 1st March or 5 days post emergence (max 0.056 µg/l, PELMO, Okehampton, 1st March application). Following application to winter cereals on 1st March, 0.1 µg/l is exceeded in one scenario (Okehampton) with one model (PELMO v5.5.3) (Table B. 8.15).

Table B. 8.13. RMS PEC_{GW} following application to spring cereals on 1st March

Spring Cereals	PEC _{GW} (µg/L) following application rate of 1200 g a.s. /ha (1200 g a.s. /ha to soil)		
	PEARL	PELMO	MACRO
Châteaudun	<0.001	<0.001	0.010
Hamburg	0.024	0.052	-
Jokioinen	0.005	0.035	-
Kremsmünster	0.010	0.007	-
Okehampton	0.023	0.056	-

Porto	<0.001	0.002	-
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Table B. 8.14. RMS PEC_{GW} following application to spring cereals, 5 days post emergence

Spring Cereals	PEC _{GW} (µg/L) following application rate of 1200 g a.s. /ha (1200 g a.s. /ha to soil)		
	PEARL	PELMO	MACRO
Châteaudun	<0.001	<0.001	0.007
Hamburg	0.008	0.002	-
Jokioinen	0.006	0.009	-
Kremsmünster	0.013	0.011	-
Okehampton	0.010	0.012	-
Porto	<0.001	0.002	-

Table B. 8.15. RMS PEC_{GW} following application to winter cereals on 1st March

Winter Cereals	PEC _{GW} (µg/L), following application rate of 1200 g a.s./ha (960 g a.s. /ha to soil)		
	PEARL	PELMO	MACRO
Châteaudun	<0.001	<0.001	0.002
Hamburg	0.015	0.073	-
Jokioinen	0.005	0.076	-
Kremsmünster	0.009	0.017	-
Okehampton	0.031	0.115	-
Piacenza	0.015	0.047	-
Porto	0.001	0.006	-
Sevilla	<0.001	<0.001	-
Thiva	<0.001	<0.001	-

Report:	CP 9.2.4.1/02 Simmons K (2014b) Calculation of Predicted Environmental Concentrations (PEC) of Mecoprop-P in groundwater following application to Amenity Grassland using FOCUS PEARL, PELMO and MACRO Nufarm UK Ltd. Report number: NUF2014-45
Models:	FOCUS PEARL, PELMO and MACRO
GLP:	Not applicable as this is a computer simulation.

Previous evaluation:	None: New data submitted for the purpose of renewal under Regulation 844/2012. This study presents groundwater modelling for use of mecoprop-P on amenity grassland. As this is no longer a representative use, the RMS has <u>not</u> evaluated this study. The study is not relied on for the risk assessment therefore has not been summarised here.
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B.8.4. FATE AND BEHAVIOUR IN WATER AND SEDIMENT

B.8.4.1. Aerobic mineralisation in surface water

No studies with Mecoprop-P K 600 have been carried out.

The active substance, mecoprop-P, is considered persistent in surface water. Please refer to DRAR, Volume 3 CA 8 for details.

B.8.4.2. Water/sediment study

No studies with Mecoprop-P K 600 have been carried out.

The rate of degradation of the active substance, mecoprop-P, in aerobic water/sediment studies are summarised in Table B. 8.16 below.

Table B. 8.16 Rate of degradation of mecoprop-P in aerobic water/sediment studies

Water/sediment system	DT ₅₀ whole system (days)	DissT ₅₀ water (days)
Manningtree	59	83
Ongar	163	86
Calwich Abbey	171	73
Swiss Lake	244	171
Geometric mean	141	92

B.8.4.3. Irradiated water/sediment study

No studies with Mecoprop-P K 600 have been carried out.

Irradiated water/sediments studies were not carried out for the active substance, mecoprop-P.

B.8.5. PREDICTED ENVIRONMENTAL CONCENTRATIONS IN SURFACE WATER AND SEDIMENT (PEC_{sw}, PEC_{sd})

RMS comments:	<p>New surface water modelling has been submitted to reflect the updated water/sediment kinetics.</p> <p>2 studies addressing surface water exposure of mecoprop-P at FOCUS Steps 1 and 2 were submitted by the applicant in the original dossier, Simmons, 2014c and 2014d, for cereals and grassland uses respectively. As grassland is no longer a representative use, only Simmons, 2014c, has been considered by the RMS.</p> <p>An additional surface water modelling study was submitted following, (Simmons, 2015), addressing surface water exposure for winter and spring cereals up to FOCUS Step 4.</p>
Report:	<p>CP 9.2.5/01 Simmons K (2014c)</p> <p>Calculation of Predicted Environmental Concentrations (PEC) of Mecoprop-P in surface water and sediment following application to Spring and Winter Cereals using Step 1-2 in FOCUS</p>

	Nufarm UK Ltd. Report number: NUF2014-46
Models:	FOCUS Steps 1-2, version 2.1
GLP:	Not applicable as this is a computer simulation.

Previous evaluations:	None: New data submitted for the purpose of renewal under Regulation 844/2012.
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PEC_{sw} and PEC_{sed} were calculated for application of mecoprop-P to spring and winter cereals using standard FOCUS Steps 1-2. The application pattern is summarised in Table B. 8.17. No interception (0%) was selected for spring cereals and minimal crop interception (25%) was selected for winter cereals. Input parameters used by Simmons for mecoprop-P are summarised in table Table B. 8.18.

Table B. 8.17. Application pattern of Mecoprop-P K 600

Crop	Growth stage	Application rate (g a.s./ha)	Interception by vegetation	Amount reaching soil (g a.s./ha)	Application timing
Spring cereal	13 - 32	1200	No interception (0%)	1200	Spring (Mar-May)
Winter cereal	20 - 32	1200	Minimal crop cover (25%)	900	Spring (Mar-May)

Table B. 8.18. Environmental fate parameters of mecoprop-P used in surface water modelling used by the Applicant.

Parameter	Value	Remarks
Molecular mass [g mol ⁻¹]	214.65	SANCO/3065/99-Final
Water solubility [mg L ⁻¹] Temperature [°C]	250000 at 20°C	Comb AL (2000) NUF004/993523
Vapour pressure [Pa] Temperature [°C]	7.3 x 10 ⁻⁴ at 20°C	Comb AL (2000) NUF004/993523 Recalculated to 20°C from 25°C
Degradation in soil		
Biodegradation in soil Deg(T) ₅₀ (soil) [d]	6.0	Normalised geometric mean of 4 soils
Sorption to soil		
K _{foc} /K _{oc} [L kg ⁻¹]	23.3	Geometric mean of 8 soils (> pH 5.5)
1/n [-]	0.875	Arithmetic mean of 11 soils
Method of sorption	pH dependent	SANCO/3065/99-Final
Degradation in aquatic systems		
DT ₅₀ water [d]	46	Hazlerigg & Garratt (2014)
DT ₅₀ sediment [d]	46	Hazlerigg & Garratt (2014)
DT ₅₀ water/ sediment [d] (Step 3)	46	Hazlerigg & Garratt (2014)
Management related parameters		
Crop uptake factor [-]	0	Default value

Parameter	Value	Remarks
Wash off coefficient [mm ⁻¹]	0.5	Default value

Table B. 8.19. Maximum PEC_{SW} and PEC_{SED} for mecoprop-P using FOCUS STEP 1 and 2 as reported in Simmons, 2014c

FOCUS Step	Crop	Substance	Region	Application scenario	PEC _{SW} (µg/L)	PEC _{SED} (µg/kg)
Step 1	Spring and Winter Cereals	Mecoprop-P	-	-	398.98	91.50
Step 2	Spring Cereals	Mecoprop-P	North Europe	March - May	59.06	13.53
			South Europe		107.94	24.75
	North Europe		46.84		10.73	
	South Europe		83.50		19.14	
Winter Cereals						

The RMS has recalculated FOCUS Step 1 and 2 PEC_{SW} and PEC_{SED} for mecoprop-P using amended input parameters to reflect the soil DT₅₀, water/sediment results and sorption values as determined in DRAR, Volume 3 CA (Table B. 8.20). Additionally, the RMS has calculated PEC_{SW} and PEC_{SED} for the aqueous photolysis metabolite, *o*-cresol, using worst case assumptions. Maximum PEC_{SW} and PEC_{SED} are summarised in Table B. 8.21. FOCUS Step 1 and 2 results for mecoprop-P and *o*-cresol are given in Table B. 8.22 to B. 8.29 below.

Table B. 8.20. RMS input parameters for FOCUS Step 1 and 2

Substance	Parameter	Value	Remarks
Mecoprop-P	Molar mass (g/mol)	214.65	-
	Water solubility (mg/l)	250 000	-
	Kfoc (ml/g)	21	Geometric mean (pH>5.5)
	DT ₅₀ soil (d)	5.24	Geometric mean (n = 4)
	DT ₅₀ water/sediment (d)	141	Geometric mean (n = 4)
	DT ₅₀ water (d)	141	Geomean whole system
	DT ₅₀ sediment (d)	1000	Default worst case
<i>o</i> -Cresol	Molar mass (g/mol)	108.14	Calculated
	Water solubility (mg/l)	100 000	Conservative assumption
	Kfoc (ml/g)	1	Default worst case
	DT ₅₀ soil (d)	1000	Default worst case
	DT ₅₀ water/sediment (d)	1000	Default worst case
	DT ₅₀ water (d)	1000	Default worst case
	DT ₅₀ sediment (d)	1000	Default worst case
	Max in water/sediment (%)	30.4	Max observed in aqueous photolysis study
	Max in soil (%)	0.001	Formation not reported in soil degradation studies. 0.001 %AR assumed as FOCUS Steps 1+2 require a non-zero value.

Table B. 8.21. RMS maximum PEC_{SW} and PEC_{SED} for mecoprop-P and *o*-cresol using FOCUS STEP 1 and 2

FOCUS Step	Crop	Substance	Region	Application scenario	PEC _{SW} (µg/L)	PEC _{SED} (µg/kg)
Step 1	Spring and Winter Cereals	Mecoprop-P	-	-	400.14	83.55
		<i>o</i> -Cresol	-	-	1.68	0.17
Step 2	Spring Cereals	Mecoprop-P	North Europe	March - May	56.47	11.83
			South Europe		102.32	21.45
			North Europe		45.01	9.43
			South Europe		79.39	16.64
	Winter Cereals	<i>o</i> -Cresol	North Europe	March - May	1.68	0.017
			South Europe		1.68	0.017
			North Europe		1.68	0.017
			South Europe		1.68	0.017

Table B. 8.22. RMS FOCUS Step 1 PEC_{SW} and PEC_{SED} for mecoprop-P application to spring cereals

FOCUS STEP 1 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Spring Cereals	0 h	400.14		81.71	
	24 h	397.88	399.01	83.55	82.63
	2 d	395.93	397.96	83.15	82.99
	4 d	392.05	395.97	82.33	82.86
	7 d	386.32	393.06	81.13	82.38
	14 d	373.25	386.40	78.38	81.06
	21 d	360.62	379.90	75.73	79.72
	28 d	348.42	373.55	73.17	78.40
	42 d	325.25	361.27	68.30	75.84
	50 d	312.71	354.49	65.67	74.42
100 d	244.56	315.87	51.36	66.32	

Table B. 8.23. RMS FOCUS Step 2 PEC_{SW} and PEC_{SED} for mecoprop-P application to spring cereals

FOCUS STEP 2 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU (Spring Cereals / March-May)	0 h	56.47		11.83	
	24 h	56.10	56.29	11.77	11.80
	2 d	55.83	56.13	11.72	11.77
	4 d	55.30	55.84	11.61	11.72
	7 d	54.51	55.44	11.44	11.63
	14 d	52.71	54.52	11.06	11.44
	21 d	50.96	53.62	10.70	11.25
	28 d	49.28	52.77	10.34	11.07
	42 d	46.08	51.05	9.67	10.71
	50 d	44.34	50.12	9.31	10.52
Southern EU (Spring Cereals / March-May)	100 d	34.88	44.77	7.32	9.40
	0 h	102.32		21.45	
	24 h	101.72	102.01	21.35	21.40
	2 d	101.23	101.79	21.25	21.35
	4 d	100.27	101.29	21.04	21.25
7 d	98.83	100.52	20.74	21.10	

FOCUS STEP 2 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
	14 d	95.57	98.86	20.06	20.75
	21 d	92.40	97.23	19.39	20.41
	28 d	89.35	95.64	18.75	20.07
	42 d	83.55	92.57	17.53	19.43
	50 d	80.40	90.87	16.874	19.07
	100 d	63.24	81.17	13.27	17.04

Table B. 8.24. RMS FOCUS Step 1 PEC_{SW} and PEC_{SED} for mecoprop-P application to winter cereals

FOCUS STEP 1 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Winter Cereals	0 h	400.14		81.71	
	24 h	397.88	399.01	83.55	82.63
	2 d	395.93	397.96	83.15	82.99
	4 d	392.05	395.97	82.33	82.86
	7 d	386.32	393.06	81.13	82.38
	14 d	373.25	386.40	78.38	81.06
	21 d	360.62	379.90	75.73	79.72
	28 d	348.42	373.55	73.17	78.40
	42 d	325.25	361.27	68.30	75.84
	50 d	312.71	354.49	65.67	74.42
	100 d	244.56	315.87	51.36	66.32

Table B. 8.25. RMS FOCUS Step 2 PEC_{SW} and PEC_{SED} for mecoprop-P application to winter cereals

FOCUS STEP 2 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU (Winter Cereals / March-May)	0 h	45.01		9.43	
	24 h	44.69	44.85	9.38	9.40
	2 d	44.48	44.72	9.34	9.38
	4 d	44.05	44.49	9.25	9.34
	7 d	43.43	44.17	9.11	9.27
	14 d	41.99	43.44	8.81	9.12
	21 d	40.60	42.72	8.52	8.97
	28 d	39.26	42.02	8.24	8.82
	42 d	36.71	40.67	7.70	8.54
	50 d	35.33	39.93	7.41	8.38
Southern EU (Winter Cereals / March-May)	0 h	79.39		16.64	
	24 h	78.91	79.15	16.56	16.60
	2 d	78.53	78.94	16.48	16.56
	4 d	77.78	78.55	16.32	16.48
	7 d	76.67	77.98	16.09	16.36
	14 d	74.14	76.69	15.56	16.09
	21 d	71.69	75.43	15.05	15.83
	28 d	69.32	74.19	14.55	15.57
	42 d	64.81	71.81	13.60	15.07
	50 d	62.37	70.49	13.09	14.79
100 d	49.06	62.97	10.30	13.22	

Table B. 8.26. RMS FOCUS Step 1 PEC_{SW} and PEC_{SED} for aqueous photolysis metabolite, *o*-cresol, following application to spring cereals

FOCUS STEP 1 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Spring Cereals	0 h	1.68		<0.001	
	24 h	1.68	1.68	0.017	0.008
	2 d	1.68	1.68	0.017	0.013
	4 d	1.67	1.68	0.017	0.015
	7 d	1.67	1.68	0.017	0.016
	14 d	1.66	1.67	0.017	0.016
	21 d	1.65	1.67	0.017	0.016
	28 d	1.65	1.66	0.017	0.016
	42 d	1.63	1.65	0.016	0.016
	50 d	1.62	1.65	0.016	0.016
100 d	1.57	1.62	0.016	0.016	

Table B. 8.27. RMS FOCUS Step 2 PEC_{SW} and PEC_{SED} for aqueous photolysis metabolite, *o*-cresol, following application to spring cereals

FOCUS STEP 2 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU (Spring Cereals / March-May)	0 h	1.68		0.017	
	24 h	1.68	1.68	0.017	0.017
	2 d	1.68	1.68	0.017	0.017
	4 d	1.67	1.68	0.017	0.017
	7 d	1.67	1.67	0.017	0.017
	14 d	1.66	1.67	0.017	0.017
	21 d	1.65	1.67	0.017	0.017
	28 d	1.65	1.66	0.016	0.017
	42 d	1.63	1.65	0.016	0.017
	50 d	1.62	1.65	0.016	0.016
100 d	1.56	1.62	0.016	0.016	
Southern EU (Spring Cereals / March-May)	0 h	1.68		0.017	
	24 h	1.68	1.68	0.017	0.017
	2 d	1.68	1.68	0.017	0.017
	4 d	1.67	1.68	0.017	0.017
	7 d	1.67	1.67	0.017	0.017
	14 d	1.66	1.67	0.017	0.017
	21 d	1.65	1.67	0.017	0.017
	28 d	1.65	1.66	0.016	0.017
	42 d	1.63	1.65	0.016	0.017
	50 d	1.62	1.65	0.016	0.016
100 d	1.57	1.62	0.016	0.016	

Table B. 8.28. RMS FOCUS Step 1 PEC_{SW} and PEC_{SED} for aqueous photolysis metabolite, *o*-cresol, following application to winter cereals

FOCUS STEP 1 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Winter Cereals	0 h	1.68		<0.001	
	24 h	1.68	1.68	0.017	0.008
	2 d	1.68	1.68	0.017	0.013
	4 d	1.67	1.68	0.017	0.015
	7 d	1.67	1.68	0.017	0.016
	14 d	1.66	1.67	0.017	0.016
	21 d	1.65	1.67	0.017	0.016
	28 d	1.65	1.66	0.017	0.016
	42 d	1.63	1.65	0.016	0.016
	50 d	1.62	1.65	0.016	0.016
100 d	1.57	1.62	0.016	0.016	

Table B. 8.29. RMS FOCUS Step 2 PEC_{SW} and PEC_{SED} for aqueous photolysis metabolite, *o*-cresol, following application to winter cereals

FOCUS STEP 2 Scenario	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU (Winter Cereals / March-May)	0 h	1.68		0.017	
	24 h	1.68	1.68	0.017	0.017
	2 d	1.68	1.68	0.017	0.017
	4 d	1.67	1.68	0.017	0.017
	7 d	1.67	1.67	0.017	0.017
	14 d	1.66	1.67	0.017	0.017
	21 d	1.65	1.67	0.017	0.017
	28 d	1.65	1.66	0.016	0.017
	42 d	1.63	1.65	0.016	0.017
	50 d	1.62	1.65	0.016	0.016
100 d	1.56	1.62	0.016	0.016	
Southern EU (Winter Cereals / March-May)	0 h	1.68		0.017	
	24 h	1.68	1.68	0.017	0.017
	2 d	1.68	1.68	0.017	0.017
	4 d	1.67	1.68	0.017	0.017
	7 d	1.67	1.67	0.017	0.017
	14 d	1.66	1.67	0.017	0.017
	21 d	1.65	1.67	0.017	0.017
	28 d	1.65	1.66	0.016	0.017
	42 d	1.63	1.65	0.016	0.017
	50 d	1.62	1.65	0.016	0.016
100 d	1.57	1.62	0.016	0.016	

Report:	CP 9.2.5/03 Simmons K (2015) Calculation of Predicted Environmental Concentrations (PEC) of Mecoprop-P and its metabolite <i>o</i> -cresol in surface water and sediment following application to Spring and Winter Cereals using Step 1-2 in FOCUS and FOCUS SWASH Nufarm UK Ltd. Report number: NUF2015-45
Models:	FOCUS Steps 1-2, version 2.1 FOCUS SWASH FOCUS SWAN
GLP:	Not applicable as this is a computer simulation.

Previous evaluation:	None: Submitted for the purpose of renewal under Regulation 844/2012.
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Simmons (2015) includes FOCUS_{sw} modelling for mecoprop-P at Steps 1, 2, 3 and 4 and for aqueous photolysis metabolite *o*-cresol at Steps 1 and 2. Steps 1 and 2 modelling for mecoprop-P were presented in Simmons (2014c) so have not been evaluated for this study. Step 1 and 2 for *o*-cresol were calculated by the RMS in the section above describing Simmons (2014c) using worst case assumptions. No additional data have been submitted for *o*-cresol and the applicants modelling in Simmons (2015) is also based on worst case assumptions, therefore the Step 1 and 2 modelling for *o*-cresol have not been evaluated for this study. Only Steps 3 and 4 for mecoprop-P are considered by the RMS in the evaluation of this study.

Predicted Environmental Concentrations in surface water (PEC_{SW}) and sediment (PEC_{SED}) were calculated for mecoprop-P after application of the product Mecoprop-P K 600 to spring and winter cereals, SWASH v3.1 and SWAN v3.0.

Table B. 8.30. Modelling software used by applicant

SWASH shell	SWASH – version 3.1
Drainage	MACRO – version 4.4.2 Model: v.4.3b Shell: v.4.4.2 Database: v.4.4.2
Run Off	PRZM – version 3.1.1 Model: v.3.1.1 Shell: v.4 Database: v.1
Spray Drift, Surface Water + Sediment	TOXSWA – 3.3.1 Model: v.2 (3.3.1)
	SWAN (Step 4) v 3.0.0

FOCUS Step 3

The application patterns for winter and spring cereals are summarised in Table B. 8.31. For spring cereals the application window was 7 days post emergence until 31st July and for winter cereals from 1st March to 31st July.

Table B. 8.31. FOCUS Step 3 application pattern of Mecoprop-P K 600

Crop	Growth stage	Application rate (g a.s./ha)	Application timing
Spring cereal	13 - 32	1200	7 days after emergence to 31 st July

Winter cereal	20 - 32	1200	1 st March to 31 st July
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For Step 3 the interception is as set in SWASH. For R scenarios, Chemical Application Method (CAM) was set to 2 (foliar linear) including a standard application depth of 4 cm. Input parameters for mecoprop-P used by the applicant are given in

Table B. 8.32. The study report provides SWASH reports for both uses, however the RMS notes that these refer to applications of a different active substance (2,4-DB Na 400) and are for an application rate of 1.800 kg a.s/ha.

Table B. 8.32. Input parameters for mecoprop-P used by the applicant in FOCUS Step 3

Parameter	Applicant input values	Remarks
Molecular mass [g mol ⁻¹]	214.65	SANCO/3065/99-Final
Water solubility [mg L ⁻¹] Temperature [°C]	250000 at 20°C	Comb AL (2000) NUF004/993523
Vapour pressure [Pa] Temperature [°C]	7.3 x 10 ⁻⁴ at 20°C	Comb AL (2000) NUF004/993523 Recalculated to 20°C from 25°C
DEGRADATION IN SOIL		
Biodegradation in soil Deg(T)50 (soil) [d]	6.0	Normalised geometric mean of 4 soils
SORPTION TO SOIL		
K _{foc} /K _{oc} [L kg ⁻¹]	23.3	Geometric mean of 8 soils (> pH 5.5)
1/n [-]	0.875	Arithmetic mean of 11 soils
DEGRADATION IN AQUATIC SYSTEMS		
DT50 water [d]	61.9	Geometric mean of DT50wholesystem in 4 water/sediment systems
DT50 sediment [d]	1000	Default
DT50 water/ sediment [d]	61.9	Geometric mean of DT50wholesystem in 4 water/sediment systems
MANAGEMENT RELATED PARAMETERS		
Crop uptake factor [-]	0	Default value
Wash off coefficient [mm ⁻¹]	0.5	Default value

Table B. 8.33. FOCUS Step 3 results for application of Mecoprop-P K 600 as reported in Simmons 2015

Crop	Main Entry Route	Scenario	Mecoprop-P	
			Max PEC _{sw} (µg/L)	Max PEC _{sed} (µg/kg)
Spring Cereals	Drainage	D1 ditch	11.215	7.888
	Upstream boundary	D1 stream	6.912	4.118
	Drift	D3 ditch	7.599	0.912
	Drift	D4 pond	0.263	0.263
	Drift	D4 stream	6.304	0.26
	Drift	D5 pond	0.262	0.279
	Drift	D5 stream	5.958	0.115
	Upstream boundary	R4 stream	32.901	3.767
Winter Cereals	Drainage	D1 ditch	157.11	59.226
	Upstream boundary	D1 stream	97.943	36.779
	Drainage	D2 ditch	183.977	37.38
	Upstream boundary	D2 stream	116.235	21.501
	Drift	D3 ditch	7.583	0.816
	Drift	D4 pond	0.263	0.323
	Upstream boundary	D4 stream	6.187	0.224
	Drift	D5 pond	0.262	0.279
	Drift	D5 stream	5.978	0.117
	Drainage	D6 ditch	8.124	1.598
	Runoff	R1 pond	0.671	0.683
	Upstream boundary	R1 stream	20.283	2.086
	Upstream boundary	R3 stream	44.795	4.684
	Drift	R4 stream	5.012	0.293

Emboldened text indicates the maximum PEC for each crop and compartment.

The RMS has repeated the FOCUS Step 3 modelling for mecoprop-P using amended input parameters to reflect the soil DT₅₀, water/sediment kinetics and sorption values as determined in DRAR, Volume 3 CA (Table B. 8.34). The application pattern is the same as that reported by the applicant in Table B. 8.31. RMS Step 3 results for spring cereals are given in

Table B. 8.35 and Table B. 8.37. RMS Step 3 results for winter cereals are given in

Table B. 8.36 and Table B. 8.38.

Table B. 8.34. Input parameters for mecoprop-P used by the RMS in FOCUS Step 3

Parameter	RMS input values	Remarks
Molecular mass [g mol ⁻¹]	214.65	SANCO/3065/99-Final
Water solubility [mg L ⁻¹] Temperature [°C]	250000 at 20°C	Comb AL (2000) NUF004/993523
Vapour pressure [Pa] Temperature [°C]	1.4 x 10 ⁻³ at 25 °C	Comb AL (2000) NUF004/993523
DEGRADATION IN SOIL		
Biodegradation in soil Deg(T)50 (soil) [d]	5.24	Normalised geometric mean of 4 soils (Hazlerigg & Garratt, 2015)
SORPTION TO SOIL		
K _{foc} /K _{oc} [L kg ⁻¹]	21	Geometric mean of 7 soils (> pH 5.5)
1/n [-]	0.92	Arithmetic mean of 7 soils (> pH 5.5)

Parameter	RMS input values	Remarks
DEGRADATION IN AQUATIC SYSTEMS		
DT50 water [d]	141	Geometric mean of DT50wholesystem in 4 water/sediment systems (Hazlerigg & Garratt, 2014, Roohi, 2015)
DT50 sediment [d]	1000	Default
DT50 water/ sediment [d]	141	Geometric mean of DT50wholesystem in 4 water/sediment systems (Hazlerigg & Garratt, 2014, Roohi, 2015)
MANAGEMENT RELATED PARAMETERS		
Crop uptake factor [-]	0	Default value
Wash off coefficient [mm-1]	0.05 MACRO 0.5 PRZM	Default value
Q10	2.58	

Table B. 8.35. RMS Step 3 results summary for mecoprop-P following application to spring cereals

Spring Cereals – FOCUS Step 3					
Scenario	Application Window	Actual Application Date	Date of max PEC _{sw}	Global Max PEC _{sw} (µg/L)	Global Max PEC _{sed} (µg/kg)
D1 (Ditch)	12-May to 31 July	14-May-82	28-May-82	13.363	8.248
D1 (Stream)	12-May to 31 July	14-May-82	27-May-82	8.276	4.214
D3 (Ditch)	08 –Apr to 31 July	07-Apr-92	07-Apr-92	7.599	0.810
D4 (Pond)	03-May to 31 July	30-May-85	30-May-85	0.263	0.249
D4 (Stream)	03-May to 31 July	30-May-85	30-May-85	6.304	0.235
D5 (Pond)	22-Mar to 31 July	08-Apr-78	08-Apr-78	0.262	0.257
D5 (Stream)	22-Mar to 31 July	08-Apr-78	08-Apr-78	5.958	0.107
R4 (Stream)	22-Mar to 31 July	04-May-84	15-May-84	32.316	3.377

Emboldened text indicates the maximum PEC for each compartment.

Table B. 8.36. RMS Step 3 results summary for mecoprop-P following application to winter cereals

Winter Cereals – FOCUS Step 3					
Scenario	Application Window	Actual Application Date	Date of max PEC _{sw}	Global Max PEC _{sw} (µg/L)	Global Max PEC _{sed} (µg/kg)
D1 (Ditch)	01-Mar to 31 July	07-Mar-82	16-Mar-82	158.372	54.830
D1 (Stream)	01-Mar to 31 July	07-Mar-82	15-Mar-82	98.801	33.949
D2 (Ditch)	01-Mar to 31 July	12-Mar-86	23-Mar-86	184.278	33.285
D2 (Stream)	01-Mar to 31 July	12-Mar-86	23-Mar-86	116.438	19.447
D3 (Ditch)	01-Mar to 31 July	29-Feb-92	29-Feb-92	7.583	0.724
D4 (Pond)	01-Mar to 31 July	01-Mar-85	01-Mar-85	0.263	0.314
D4 (Stream)	01-Mar to 31 July	01-Mar-85	01-Mar-85	6.187	0.203
D5 (Pond)	01-Mar to 31 July	07-Mar-78	07-Mar-78	0.262	0.250
D5 (Stream)	01-Mar to 31 July	07-Mar-78	07-Mar-78	5.978	0.109
D6 (Ditch)	01-Mar to 31 July	05-Mar-86	05-Mar-86	8.127	1.397
R1 (Pond)	01-Mar to 31 July	17-Mar-84	01-Apr-84	0.662	0.598
R1 (Stream)	01-Mar to 31 July	17-Mar-84	01-Apr-84	19.599	1.825
R3 (Stream)	01-Mar to 31 July	01-Mar-80	08-Mar-80	44.152	4.230
R4 (Stream)	01-Mar to 31 July	05-Mar-84	05-Mar-84	5.012	0.261

Emboldened text indicates the maximum PEC for each compartment.

Table B. 8.37. RMS Step 3 PEC_{sw} results for mecoprop-P following application to spring cereals

Spring Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{sw} (µg/L)		PEC _{sed} (µg/kg)	
			Actual	TWA	Actual	TWA
D1	Ditch	0	13.363		8.248	
		24	13.320	13.359	8.244	8.247
		2d	13.214	13.347	8.232	8.246
		4d	12.883	13.301	8.187	8.242
		7d	12.225	13.176	8.078	8.231
		14d	9.855	12.634	7.679	8.180
		21d	7.724	11.749	7.153	8.099
		28d	5.956	10.789	6.584	7.987
		42d	3.440	9.011	5.481	7.685
		50d	2.504	8.194	4.918	7.480
		100d	0.407	5.032	2.744	6.076
D1	Stream	0 h	8.276		4.214	
		24 h	8.233	8.272	4.177	4.212
		2 d	8.122	8.260	4.023	4.204
		4 d	7.764	8.220	3.280	4.172
		7 d	6.899	8.108	2.732	4.085
		14 d	0.0238	7.179	2.135	3.730
		21 d	0.00797	5.392	1.793	3.359
		28 d	0.00460	4.140	1.548	3.055
		42 d	0.00231	2.865	1.201	2.604
		50d	0.00175	2.447	1.057	2.407
		100d	0.000624	1.331	0.569	1.666

Spring Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D3	Ditch	0 h	7.599		0.810	
		24 h	3.405	5.881	0.577	0.765
		2 d	0.346	3.664	0.414	0.676
		4 d	0.00663	1.871	0.295	0.536
		7 d	0.00183	1.070	0.225	0.424
		14 d	0.000583	0.536	0.161	0.310
		21 d	0.000317	0.357	0.131	0.256
		28 d	0.000200	0.268	0.112	0.223
		42 d	0.000112	0.179	0.0868	0.182
		50d	0.000106	0.150	0.0763	0.166
		100d	0.000059	0.0751	0.0404	0.111
D4	Pond	0 h	0.263		0.249	
		24 h	0.260	0.261	0.249	0.249
		2 d	0.257	0.260	0.249	0.249
		4 d	0.253	0.257	0.249	0.249
		7 d	0.246	0.254	0.248	0.249
		14 d	0.233	0.247	0.247	0.249
		21 d	0.221	0.240	0.245	0.248
		28 d	0.210	0.234	0.243	0.248
		42 d	0.190	0.223	0.237	0.247
		50 d	0.178	0.216	0.233	0.247
		100 d	0.125	0.183	0.203	0.241
D4	Stream	0 h	6.304		0.235	
		24 h	0.000523	0.714	0.0581	0.108
		2 d	0.000333	0.357	0.0421	0.0791
		4 d	0.000269	0.179	0.0304	0.0574
		7 d	0.000233	0.102	0.0233	0.0442
		14 d	0.000177	0.0512	0.0169	0.0319
		21 d	0.000113	0.0343	0.0138	0.0264
		28 d	0.000067	0.0258	0.0119	0.0230
		42 d	0.000003	0.0173	0.00938	0.0188
		50 d	0.000002	0.0146	0.00834	0.0172
		100 d	0.000005	0.00755	0.00464	0.0117
D5	Pond	0 h	0.262		0.257	
		24 h	0.258	0.260	0.257	0.257
		2 d	0.256	0.259	0.256	0.257
		4 d	0.251	0.256	0.256	0.257
		7 d	0.245	0.252	0.256	0.256
		14 d	0.233	0.245	0.255	0.256
		21 d	0.222	0.239	0.252	0.256
		28 d	0.211	0.234	0.250	0.256
		42 d	0.191	0.223	0.243	0.255
		50 d	0.182	0.217	0.239	0.254
		100 d	0.134	0.187	0.210	0.248

Spring Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D5	Stream	0 h	5.958		0.107	
		24 h	0.000028	0.221	0.0172	0.0329
		2 d	0.000014	0.110	0.0124	0.0237
		4 d	0.000009	0.0552	0.00894	0.0171
		7 d	0.000007	0.0316	0.00682	0.0131
		14 d	0.000005	0.0158	0.00489	0.00940
		21 d	0.000004	0.0105	0.00401	0.00774
		28 d	0.000004	0.00789	0.00345	0.00673
		42 d	0.000003	0.00526	0.00274	0.00551
		50 d	0.000002	0.00442	0.00245	0.00504
		100 d	0.000000	0.00222	0.00139	0.00344
R4	Stream	0 h	32.316		3.377	
		24 h	0.0137	20.891	1.474	2.627
		2 d	0.00494	10.459	1.106	2.056
		4 d	2.125	6.808	1.515	1.746
		7 d	0.00175	4.202	0.968	1.545
		14 d	0.000494	2.119	0.664	1.181
		21 d	0.000252	1.463	0.530	0.988
		28 d	0.000159	1.098	0.447	0.864
		42 d	0.000084	0.732	0.340	0.707
		50 d	0.000064	0.615	0.296	0.645
		100 d	0.000000	0.308	0.150	0.428

Table B. 8.38. RMS Step 3 PEC_{SW} results for mecoprop-P following application to winter cereals

Winter Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D1	Ditch	0	158.372		54.830	
		24	151.690	157.712	54.787	54.826
		2d	137.512	155.477	54.678	54.813
		4d	115.752	148.964	54.342	54.764
		7d	93.779	136.698	53.696	54.641
		14d	63.302	113.633	53.411	54.199
		21d	48.843	96.932	51.260	53.806
		28d	43.743	85.352	48.167	53.420
		42d	28.095	69.997	42.473	51.824
		50d	22.108	63.250	40.343	50.667
		100d	5.275	39.194	22.103	42.679

Winter Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D1	Stream	0 h	98.801		54.830	
		24 h	94.401	98.359	54.787	54.826
		2 d	84.822	96.907	54.678	54.813
		4 d	71.331	92.690	54.342	54.764
		7 d	57.289	84.881	53.696	54.641
		14 d	37.524	70.062	53.411	54.199
		21 d	27.780	59.367	51.260	53.806
		28 d	26.634	51.864	48.167	53.420
		42 d	12.373	42.412	42.473	51.824
		50d	0.0583	37.357	40.343	50.667
100d	0.0118	19.873	22.103	42.679		
D2	Ditch	0 h	184.278		33.285	
		24 h	87.999	123.356	33.210	33.269
		2 d	70.834	101.589	33.053	33.241
		4 d	142.741	86.134	32.203	33.113
		7 d	69.496	86.917	30.734	32.720
		14 d	31.306	67.277	30.488	32.067
		21 d	34.689	55.979	31.307	31.885
		28 d	25.102	50.034	27.755	31.570
		42 d	10.230	38.696	22.525	29.729
		50 d	8.723	34.042	19.842	28.569
100 d	2.614	19.395	10.900	22.134		
D2	Stream	0 h	116.438		19.447	
		24 h	43.514	66.450	19.402	19.427
		2 d	35.416	58.294	19.237	19.395
		4 d	89.013	50.030	18.405	19.206
		7 d	39.606	48.060	17.195	18.815
		14 d	16.457	36.518	16.809	18.179
		21 d	25.885	30.464	18.191	18.031
		28 d	15.550	27.436	16.093	17.934
		42 d	4.855	21.426	12.729	16.879
		50 d	4.606	18.763	11.388	16.196
100 d	1.364	10.849	6.281	12.601		
D3	Ditch	0 h	7.583		0.724	
		24 h	2.091	7.583	0.470	0.666
		2 d	0.104	2.091	0.333	0.568
		4 d	0.00345	0.104	0.238	0.439
		7 d	0.00129	0.00345	0.182	0.345
		14 d	0.000448	0.00129	0.130	0.251
		21 d	0.000247	0.000448	0.106	0.207
		28 d	0.000160	0.000247	0.0909	0.180
		42 d	0.000092	0.000160	0.0707	0.147
		50d	0.000078	0.000092	0.0624	0.134
100d	0.000057	0.000078	0.0333	0.0901		

Winter Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D4	Pond	0 h	0.263		0.314	
		24 h	0.260	0.261	0.314	0.314
		2 d	0.257	0.260	0.314	0.314
		4 d	0.253	0.258	0.314	0.314
		7 d	0.248	0.255	0.313	0.314
		14 d	0.235	0.248	0.311	0.314
		21 d	0.221	0.241	0.309	0.313
		28 d	0.208	0.237	0.306	0.313
		42 d	0.246	0.233	0.297	0.312
		50 d	0.238	0.235	0.291	0.311
	100 d	0.173	0.220	0.249	0.303	
D4	Stream	0 h	6.187		0.203	
		24 h	0.000421	0.545	0.0440	0.122
		2 d	0.000308	0.297	0.0320	0.122
		4 d	0.000261	0.280	0.0232	0.121
		7 d	0.000306	0.250	0.0178	0.119
		14 d	0.000560	0.193	0.0130	0.112
		21 d	0.00136	0.148	0.0111	0.104
		28 d	0.0383	0.116	0.0157	0.0963
		42 d	0.102	0.0808	0.114	0.0846
		50 d	0.0278	0.0745	0.0881	0.0795
	100 d	0.000382	0.0409	0.0368	0.0575	
D5	Pond	0 h	0.262		0.250	
		24 h	0.258	0.260	0.250	0.250
		2 d	0.256	0.259	0.250	0.250
		4 d	0.251	0.256	0.249	0.250
		7 d	0.244	0.252	0.249	0.250
		14 d	0.232	0.245	0.248	0.249
		21 d	0.218	0.238	0.246	0.249
		28 d	0.204	0.231	0.244	0.249
		42 d	0.183	0.218	0.238	0.248
		50 d	0.175	0.212	0.233	0.248
	100 d	0.132	0.182	0.203	0.242	
D5	Stream	0 h	5.978		0.109	
		24 h	0.000037	0.225	0.0176	0.0336
		2 d	0.000023	0.113	0.0127	0.0243
		4 d	0.000018	0.0563	0.00915	0.0175
		7 d	0.000016	0.0322	0.00698	0.0134
		14 d	0.000014	0.0161	0.00501	0.00961
		21 d	0.000010	0.0107	0.00411	0.00792
		28 d	0.000009	0.00806	0.00354	0.00689
		42 d	0.000008	0.00538	0.00282	0.00564
		50 d	0.000007	0.00452	0.00252	0.00517
	100 d	0.000000	0.00227	0.00143	0.00353	

Winter Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D6	Ditch	0 h	8.127		1.397	
		24 h	4.483	6.680	1.176	1.357
		2 d	1.059	4.526	1.009	1.274
		4 d	0.530	2.587	0.888	1.133
		7 d	0.491	1.703	0.819	1.021
		14 d	0.450	1.100	0.761	0.906
		21 d	0.316	0.887	0.702	0.851
		28 d	0.347	0.779	0.664	0.806
		42 d	0.115	0.673	0.590	0.761
		50 d	0.0140	0.675	0.486	0.728
		100 d	0.00141	0.499	0.237	0.586
R1	Pond	0 h	0.662		0.598	
		24 h	0.655	0.658	0.598	0.598
		2 d	0.648	0.655	0.598	0.598
		4 d	0.636	0.649	0.597	0.598
		7 d	0.619	0.640	0.595	0.598
		14 d	0.582	0.620	0.589	0.597
		21 d	0.547	0.602	0.581	0.596
		28 d	0.515	0.584	0.568	0.595
		42 d	0.453	0.551	0.541	0.591
		50 d	0.418	0.533	0.524	0.588
		100 d	0.249	0.430	0.411	0.562
R1	Stream	0 h	19.599		1.825	
		24 h	0.0120	9.963	0.737	1.334
		2 d	0.00277	4.984	0.553	1.027
		4 d	0.000898	2.493	0.407	0.764
		7 d	0.000368	1.425	0.316	0.595
		14 d	0.000133	0.715	0.230	0.434
		21 d	0.000072	0.525	0.188	0.359
		28 d	0.000046	0.395	0.161	0.313
		42 d	0.000024	0.264	0.125	0.257
		50 d	0.000022	0.221	0.111	0.235
		100 d	0.000008	0.111	0.0584	0.158
R3	Stream	0 h	44.152		4.230	
		24 h	0.0466	27.071	1.956	3.411
		2 d	0.0126	13.603	1.461	2.680
		4 d	0.00451	6.806	1.071	2.012
		7 d	0.00193	3.891	0.829	1.569
		14 d	1.397	2.089	0.761	1.141
		21 d	0.000454	1.418	0.514	0.961
		28 d	0.000341	1.079	0.434	0.840
		42 d	0.000180	0.719	0.332	0.688
		50 d	0.000140	0.604	0.291	0.628
		100 d	0.000054	0.302	0.150	0.419

Winter Cereals						
FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC _{SW} (µg/L)		PEC _{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
R4	Stream	0 h	5.012		0.261	
		24 h	0.000545	0.952	0.0755	0.141
		2 d	0.000161	0.476	0.0549	0.104
		4 d	0.000055	0.238	0.0396	0.0758
		7 d	0.000023	0.136	0.0302	0.0582
		14 d	0.000008	0.0681	0.0216	0.0418
		21 d	0.000005	0.0454	0.0177	0.0344
		28 d	0.000017	0.0355	0.0178	0.0303
		42 d	0.000002	0.0237	0.0129	0.0251
		50 d	0.000002	0.0199	0.0114	0.0231
		100 d	0.000001	0.0102	0.00656	0.0159

Step 4 – SWAN

Step 4 modelling with SWAN was conducted including several different mitigation options:

- No spray buffer zones
- Drift reduction
- Vegetated filter strips
- No spray buffer zones + vegetated filter strips

The vapour pressure of mecoprop-P exceeds the threshold of 10^{-4} Pa at 20°C if applied to soil and 10^{-5} Pa at 20°C if applied to plants and drift mitigation is required, therefore, dry deposition following volatilisation of mecoprop-P needs to be considered in the Step 4 surface water modelling (Commission Regulation (EU) 284/2013, Annex, Part A, Section 9, point 9.3.1). In SWAN, the dry deposition after volatilisation process is a time-dependent process that is modelled with a resolution of one hour. A user-specified hourly loading due to deposition after volatilisation is added to the loadings due to run-off and drainage for the 24 hours following each application and is always applied after any required run-off mitigation has been taken into account. Simmons (2015) provides a list of dry deposition values (

Table B. 8.39) for mecoprop-P at 5, 10 and 20m based on calculations using the model EVA 2.1 (EVA 2.1; Exposure Via Air. Assessment of the short range transport and deposition of pesticides for aquatic and terrestrial ecosystems). No units are given in the table and details of the calculation of these values were not provided; therefore the applicant was asked to provide details of how the dry deposition values were calculated and to provide the SWAN modelling files to demonstrate how dry deposition had been implemented in SWAN. The values appear to have been calculated assuming 0% crop interception (as for spring cereals) and are in g/ha. The RMS notes that EVA 2.1 assumes volatilisation from soil is 1/3 that from plants therefore assuming 20% crop interception as appropriate for winter cereals at BBCH20 would provide the most conservative values. The SWAN modelling files show that dry deposition values in g/ha were used directly in SWAN, however SWAN requires figures in mg/m² and therefore dry deposition in the modelling was overestimated by a factor of 10. Additionally, the dry deposition values reported in Simmons (2015) are for 5, 10 and 20m buffer zones, however the SWAN modelling files show that values for 1m, 5m and 10m were necessary for modelling purposes.

Table B. 8.39. Dry deposition values for mecoprop-P as reported in Simmons (2015)

Time (hours)	Buffer width		
	5m	10m	20m
0-1	0.065	0.0625	0.0275
1-2	0.065	0.0625	0.0275
2-3	0.065	0.0625	0.0275
3-4	0.065	0.0625	0.0275
4-5	0.0325	0.0175	0.015
5-6	0.0325	0.0175	0.015
6-7	0.0325	0.0175	0.015
7-8	0.0325	0.0175	0.015
8-9	0.0325	0.0175	0.015
9-10	0.0325	0.0175	0.015
10-11	0.0325	0.0175	0.015
11-12	0.0325	0.0175	0.015
12-13	0.0158	0.0125	0.0067
13-14	0.0158	0.0125	0.0067
14-15	0.0158	0.0125	0.0067
15-16	0.0158	0.0125	0.0067
16-17	0.0158	0.0125	0.0067
17-18	0.0158	0.0125	0.0067
18-19	0.0158	0.0125	0.0067
19-20	0.0158	0.0125	0.0067
20-21	0.0158	0.0125	0.0067
21-22	0.0158	0.0125	0.0067
22-23	0.0158	0.0125	0.0067
23-24	0.0158	0.0125	0.0067

The RMS repeated the SWAN modelling for both winter and spring cereals. Dry deposition values were calculated using EVA 2.1 separately for winter and spring cereals using the input values listed in Table B. 8.40. RMS calculated dry deposition values are given in Table B. 8.41 and input values for SWAN in Table B. 8.42. The mitigation measures considered for both winter and spring cereals are listed in

Table B. 8.43. PEC_{SW} and PEC_{SED} results following application to winter cereals are summarised in Table B. 8.44 and Table B. 8.45. PEC_{SW} and PEC_{SED} results following application to spring cereals are summarised in Table B. 8.46 and

Table B. 8.47. Detailed results following application to winter and spring cereals for the different mitigation measures are given in Table B. 8.48 to

Table B. 8.58 and Table B. 8.59 to Table B. 8.69 respectively. The RMS notes that for winter cereals PEC_{sw} with a 5m no spray buffer zone are slightly higher (0.01µg/l) than the FOCUS Step 3 values in the pond scenarios (D4, D5 and R1) (Table B. 8.44). This is the result of the deposition following volatilisation loadings being added to the run-off and drainage loadings. Dry deposition values are lower for spring cereals than winter cereals as EVA 2.1 assumes volatilisation from soil is lower than from plants, therefore this increase in PEC_{sw} with a 5m no spray buffer zone is not evident for the D4 and D5 pond scenarios for spring cereals. Reductions in erosion and run-off were taken from the FOCUS Landscape and Mitigation Report (2007) for 10m and 20m vegetated filter strips (VFS). For 5m VFS, reductions in erosion and run-off were calculated within SWAN using VFSmod, which in some scenarios resulted in lower PEC_{sw} than 10 or 20m VFS.

Table B. 8.40. RMS input values for EVA 2.1

Parameter		Value
Vapour pressure		7.34 x 10 ⁻⁴ at 20°C
Dose Rate		1200 g a.s/ha
Crop interception	Winter Cereals	20%
	Spring Cereals	0%
Crop type		Agricultural

Table B. 8.41. RMS values; PEC(volatilisation) at 1, 5 and 10m for winter and spring cereals as calculated by EVA 2.1

Time (h)	Winter Cereals (g/ha)			Spring Cereals (g/ha)		
	1 m	5 m	10 m	1 m	5 m	10 m
0-1	0.11223	0.09026	0.06874	0.08016	0.06447	0.04910
0-2	0.22445	0.18052	0.13749	0.16032	0.12894	0.09820
0-3	0.33668	0.27077	0.20623	0.24048	0.19341	0.14731
0-4	0.44890	0.36103	0.27497	0.32064	0.25788	0.19641
0-6	0.56113	0.45129	0.34371	0.40081	0.32235	0.24551
0-9	0.72947	0.58668	0.44683	0.52105	0.41905	0.31916
0-12	0.89781	0.72206	0.54994	0.64129	0.51576	0.39282
0-24	1.23448	0.99284	0.75617	0.88177	0.70917	0.54012

Table B. 8.42. RMS values; Hourly deposition from volatilisation (mg/m²) as input into SWAN

Time (h)	Winter Cereals (mg/m ²)			Spring Cereals (mg/m ²)		
	1 m	5 m	10 m	1 m	5 m	10 m
0-1	0.01122	0.00903	0.00687	0.00802	0.00645	0.00491
1-2	0.01122	0.00903	0.00687	0.00802	0.00645	0.00491
2-3	0.01122	0.00903	0.00687	0.00802	0.00645	0.00491
3-4	0.01122	0.00903	0.00687	0.00802	0.00645	0.00491
4-5	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246
5-6	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246
6-7	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246
7-8	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246
8-9	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246

9-10	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246
10-11	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246
11-12	0.00561	0.00451	0.00344	0.00401	0.00322	0.00246
12-13	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
13-14	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
14-15	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
15-16	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
16-17	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
17-18	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
18-19	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
19-20	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
20-21	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
21-22	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
22-23	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123
23-24	0.00281	0.00226	0.00172	0.00200	0.00161	0.00123

Table B. 8.43. Mitigation measures considered in SWAN modelling

Mitigation	SWAN Parameters		
	Spray Drift Mitigation	Run-off Mitigation	Dry Deposition
5m NSBZ	5m buffer	-	5 m values
10m NSBZ	10m buffer	-	10 m values
5m VFS	-	Calculated; VFSmod - 5m	-
10m VFS	-	Run off reduction – 0.6 Erosion reduction – 0.85	-
20m VFS	-	Run off reduction – 0.8 Erosion reduction – 0.95	-
50% Drift Reduction	Nozzles 50% FOCUS Step 3 loading	-	1 m values
75% Drift Reduction	Nozzles 75% FOCUS Step 3 loading	-	1 m values
95% Drift Reduction	Nozzles 95% FOCUS Step 3 loading	-	1 m values
5m NSBZ + 5m VFS	5m buffer	Calculated; VFSmod - 5m	5 m values
10m NSBZ + 5m VFS	10m buffer	Calculated; VFSmod - 5m	10 m values
10m NSBZ + 10m VFS	10m buffer	Run off reduction – 0.6 Erosion reduction – 0.85	10 m values

NSBZ – no spray buffer zone, VFS – vegetated filter strips

Table B. 8.44. RMS values: Summary of Step 4 maximum PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals

Winter Cereals – Surface Water												
Scenario	Max PEC _{sw} (µg/L)											
	Step 3	Step 4										
	-	5m NSBZ	10m NSBZ	5m VFS	10m VFS	20m VFS	50% DRT	75% DRT	95% DRT	5m NSBZ + 5m VFS	10m NSBZ + 5m VFS	10m NSBZ + 10m VFS
D1 (Ditch)	158.37	158.37	158.37	N/A	N/A	N/A	158.37	158.37	158.37	158.37	158.37	158.37
D1 (Stream)	98.80	98.80	98.80	N/A	N/A	N/A	98.80	98.80	98.80	98.80	98.80	98.80
D2 (Ditch)	184.28	184.28	184.28	N/A	N/A	N/A	184.28	184.28	184.28	184.28	184.28	184.28
D2 (Stream)	116.44	116.44	116.44	N/A	N/A	N/A	116.44	116.44	116.44	116.44	116.44	116.44
D3 (Ditch)	7.58	2.06	1.09	N/A	N/A	N/A	3.79	1.90	0.52	2.06	1.09	1.09
D4 (Pond)	0.26	0.27	0.20	N/A	N/A	N/A	0.20	0.15	0.12	0.27	0.20	0.20
D4 (Stream)	6.19	2.31	1.24	N/A	N/A	N/A	3.15	1.61	0.37	2.31	1.27	1.24
D5 (Pond)	0.26	0.27	0.20	N/A	N/A	N/A	0.19	0.13	0.07	0.27	0.20	0.20
D5 (Stream)	5.98	2.21	1.18	N/A	N/A	N/A	3.02	1.53	0.33	2.21	1.18	1.18
D6 (Ditch)	8.13	2.59	1.64	N/A	N/A	N/A	4.33	2.45	1.11	2.59	1.64	1.64
R1 (Pond)	0.66	0.67	0.61	0.26	0.40	0.32	0.60	0.55	0.50	0.27	0.21	0.35
R1 (Stream)	19.60	19.60	19.60	5.03	8.87	5.03	19.60	19.60	19.60	1.84	1.83	8.87
R3 (Stream)	44.15	44.15	44.15	7.04	20.08	10.52	44.15	44.15	44.15	2.57	1.36	20.08

R4 (Stream)	5.01	1.83	0.97	5.01	5.01	5.01	2.51	1.25	0.25	1.83	0.97	0.97
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Table B. 8.45. RMS values: Summary of Step 4 maximum PEC_{SED} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals

Winter Cereals - Sediment												
Scenario	Max PEC _{sed} (µg/kg)											
	Step 3	Step 4										
	-	5m NSBZ	10m NSBZ	5m VFS	10m VFS	20m VFS	50% DRT	75% DRT	95% DRT	5m NSBZ + 5m VFS	10m NSBZ + 5m VFS	10m NSBZ + 10m VFS
D1 (Ditch)	54.83	54.77	54.76	N/A	N/A	N/A	54.79	54.77	54.75	54.77	54.76	54.76
D1 (Stream)	33.95	33.95	33.95	N/A	N/A	N/A	33.95	33.95	33.95	33.95	33.95	33.95
D2 (Ditch)	33.29	32.61	32.47	N/A	N/A	N/A	32.84	32.60	32.40	32.61	32.47	32.47
D2 (Stream)	19.45	19.01	18.89	N/A	N/A	N/A	19.11	18.93	18.79	19.01	18.90	18.89
D3 (Ditch)	0.72	0.23	0.13	N/A	N/A	N/A	0.40	0.22	0.07	0.23	0.13	0.13
D4 (Pond)	0.31	0.33	0.26	N/A	N/A	N/A	0.25	0.20	0.15	0.33	0.26	0.26
D4 (Stream)	0.20	0.12	0.12	N/A	N/A	N/A	0.12	0.12	0.12	0.12	0.12	0.12
D5 (Pond)	0.25	0.26	0.19	N/A	N/A	N/A	0.12	0.12	0.07	0.26	0.19	0.19
D5 (Stream)	0.11	0.04	0.02	N/A	N/A	N/A	0.06	0.03	0.01	0.04	0.02	0.02
D6 (Ditch)	1.40	0.82	0.70	N/A	N/A	N/A	1.02	0.81	0.64	0.82	0.70	0.70
R1 (Pond)	0.60	0.61	0.55	0.26	0.38	0.31	0.54	0.49	0.44	0.28	0.21	0.33
R1 (Stream)	1.83	1.81	1.81	0.28	0.86	0.47	1.82	1.81	1.81	0.19	0.19	0.84
R3 (Stream)	4.23	4.20	4.18	0.43	2.00	1.10	4.20	4.19	4.18	0.16	0.09	1.96
R4 (Stream)	0.26	0.10	0.05	0.26	0.26	0.26	0.13	0.07	0.02	0.10	0.05	0.05

Table B. 8.46. RMS values: Summary of Step 4 maximum PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals

Spring Cereals – Surface Water												
Scenario	Max PEC _{sw} (µg/L)											
	Step 3	Step 4										
	-	5m NSBZ	10m NSBZ	5m VFS	10m VFS	20m VFS	50% DRT	75% DRT	95% DRT	5m NSBZ + 5m VFS	10m NSBZ + 5m VFS	10m NSBZ + 10m VFS
D1 (Ditch)	13.36	13.36	13.36	N/A	N/A	N/A	13.36	13.36	13.36	13.36	13.36	13.36
D1 (Stream)	8.28	8.28	8.28	N/A	N/A	N/A	8.28	8.28	8.28	8.28	8.28	8.28
D3 (Ditch)	7.60	2.06	1.09	N/A	N/A	N/A	3.80	1.90	0.49	2.06	1.09	1.09
D4 (Pond)	0.26	0.26	0.19	N/A	N/A	N/A	0.17	0.11	0.06	0.26	0.20	0.19
D4 (Stream)	6.30	2.33	1.25	N/A	N/A	N/A	3.19	1.62	0.37	2.33	1.26	1.25
D5 (Pond)	0.26	0.26	0.19	N/A	N/A	N/A	0.17	0.11	0.06	0.26	0.20	0.19
D5 (Stream)	5.96	2.19	1.17	N/A	N/A	N/A	3.00	1.51	0.32	2.19	1.17	1.17
R4 (Stream)	32.32	32.32	32.32	5.03	14.62	7.64	32.32	32.32	32.32	1.84	0.98	14.62

Table B. 8.47. RMS values: Summary of Step 4 maximum PEC_{SED} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals

Spring Cereals - Sediment												
Scenario	Max PEC _{sed} (µg/kg)											
	Step 3	Step 4										
	-	5m NSBZ	10m NSBZ	5m VFS	10m VFS	20m VFS	50% DRT	75% DRT	95% DRT	5m NSBZ + 5m VFS	10m NSBZ + 5m VFS	10m NSBZ + 10m VFS
D1 (Ditch)	8.25	8.10	8.07	N/A	N/A	N/A	8.15	8.10	8.06	8.10	8.07	8.07
D1 (Stream)	4.21	4.21	4.21	N/A	N/A	N/A	4.21	4.21	4.21	4.21	4.21	4.21
D3 (Ditch)	0.81	0.25	0.14	N/A	N/A	N/A	0.44	0.23	0.07	0.25	0.14	0.14
D4 (Pond)	0.25	0.25	0.18	N/A	N/A	N/A	0.17	0.11	0.06	0.25	0.19	0.18
D4 (Stream)	0.24	0.09	0.05	N/A	N/A	N/A	0.12	0.06	0.02	0.09	0.05	0.05
D5 (Pond)	0.26	0.26	0.19	N/A	N/A	N/A	0.17	0.11	0.060	0.26	0.20	0.19
D5 (Stream)	0.11	0.04	0.02	N/A	N/A	N/A	0.06	0.03	0.01	0.04	0.02	0.02
R4 (Stream)	3.38	3.36	3.36	0.28	1.57	0.85	3.37	3.36	3.35	0.15	0.15	1.55

Table B. 8.48. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 5m no spray buffer zone

Winter Cereals - 5m No Spray Buffer Zone												
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)										
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day	
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.193	
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872	
D2 (Ditch)	184.278	123.353	101.584	86.132	86.913	67.272	55.975	50.031	38.693	34.039	19.053	
D2 (Stream)	116.438	66.450	58.294	50.030	48.059	36.518	30.464	27.436	21.426	18.763	10.623	
D3 (Ditch)	2.055	1.574	0.929	0.470	0.269	0.135	0.090	0.067	0.045	0.038	0.019	
D4 (Pond)	0.273	0.272	0.271	0.269	0.266	0.260	0.253	0.246	0.244	0.246	0.229	
D4 (Stream)	2.308	0.303	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.069	0.038	
D5 (Pond)	0.272	0.270	0.269	0.267	0.263	0.256	0.250	0.243	0.229	0.223	0.192	
D5 (Stream)	2.208	0.094	0.047	0.024	0.013	0.007	0.004	0.003	0.002	0.002	0.001	
D6 (Ditch)	2.586	2.366	1.767	1.170	0.892	0.694	0.618	0.575	0.540	0.562	0.442	
R1 (Pond)	0.674	0.670	0.667	0.661	0.651	0.631	0.612	0.595	0.561	0.542	0.438	
R1 (Stream)	19.599	9.962	4.984	2.493	1.425	0.715	0.496	0.374	0.249	0.209	0.105	
R3 (Stream)	44.152	27.071	13.603	6.806	3.891	2.006	1.364	1.037	0.691	0.581	0.291	
R4 (Stream)	1.830	0.389	0.200	0.100	0.057	0.029	0.019	0.016	0.011	0.009	0.005	

Table B. 8.49. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 10m no spray buffer zone

Winter Cereals – 10m No Spray Buffer Zone											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.193
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872
D2 (Ditch)	184.278	123.352	101.583	86.132	86.912	67.271	55.974	50.030	38.692	34.038	19.052
D2 (Stream)	116.438	66.450	58.294	50.030	48.059	36.518	30.464	27.436	21.426	18.763	10.574
D3 (Ditch)	1.090	0.871	0.521	0.264	0.151	0.076	0.050	0.038	0.025	0.021	0.011
D4 (Pond)	0.204	0.204	0.204	0.204	0.203	0.202	0.199	0.197	0.190	0.186	0.177
D4 (Stream)	1.236	0.303	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.069	0.037
D5 (Pond)	0.197	0.196	0.196	0.194	0.191	0.186	0.181	0.176	0.167	0.162	0.139
D5 (Stream)	1.177	0.052	0.026	0.013	0.008	0.004	0.003	0.002	0.001	0.001	0.001
D6 (Ditch)	1.638	1.542	1.220	0.886	0.730	0.635	0.618	0.565	0.513	0.540	0.430
R1 (Pond)	0.609	0.605	0.602	0.596	0.588	0.570	0.553	0.536	0.506	0.489	0.395
R1 (Stream)	19.599	9.962	4.984	2.493	1.425	0.715	0.487	0.367	0.244	0.205	0.103
R3 (Stream)	44.152	27.071	13.603	6.806	3.891	1.979	1.347	1.024	0.683	0.573	0.287
R4 (Stream)	0.971	0.216	0.112	0.056	0.032	0.016	0.011	0.010	0.006	0.005	0.003

Table B. 8.50. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 5m vegetated filter strip

Winter Cereals – 5m Vegetated Filter Strips											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
R1 (Pond)	0.262	0.260	0.259	0.257	0.253	0.246	0.247	0.245	0.237	0.231	0.192
R1 (Stream)	5.030	1.057	0.529	0.264	0.151	0.076	0.095	0.071	0.047	0.040	0.020
R3 (Stream)	7.039	2.012	1.007	0.504	0.288	0.144	0.096	0.072	0.048	0.040	0.020
R4 (Stream)	5.012	0.952	0.476	0.238	0.136	0.068	0.045	0.034	0.023	0.019	0.010

Table B. 8.51. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 10m vegetated filter strip

Winter Cereals – 10m Vegetated Filter Strips											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
R1 (Pond)	0.402	0.400	0.398	0.394	0.389	0.377	0.366	0.356	0.336	0.325	0.275
R1 (Stream)	8.866	4.501	2.252	1.126	0.644	0.323	0.265	0.199	0.133	0.112	0.056
R3 (Stream)	20.082	12.325	6.194	3.099	1.772	1.030	0.697	0.530	0.354	0.297	0.149
R4 (Stream)	5.012	0.952	0.476	0.238	0.136	0.068	0.045	0.035	0.023	0.019	0.010

Table B. 8.52. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 20m vegetated filter strip

Winter Cereals – 20m Vegetated Filter Strips											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
R1 (Pond)	0.315	0.314	0.312	0.310	0.305	0.296	0.288	0.279	0.268	0.263	0.224
R1 (Stream)	5.030	2.352	1.177	0.589	0.336	0.169	0.163	0.122	0.082	0.068	0.034
R3 (Stream)	10.519	6.459	3.246	1.624	0.929	0.608	0.411	0.312	0.208	0.175	0.088
R4 (Stream)	5.012	0.952	0.476	0.238	0.136	0.068	0.045	0.034	0.023	0.019	0.010

Table B. 8.53. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with 50% drift reduction

Winter Cereals – 50% Drift Reduction											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.194
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872
D2 (Ditch)	184.278	123.354	101.586	86.133	86.914	67.274	55.976	50.032	38.694	34.040	19.161
D2 (Stream)	116.438	66.450	58.294	50.030	48.060	36.518	30.464	27.436	21.426	18.763	10.673
D3 (Ditch)	3.792	2.809	1.641	0.829	0.474	0.237	0.158	0.119	0.079	0.067	0.033
D4 (Pond)	0.198	0.198	0.198	0.198	0.198	0.196	0.194	0.191	0.185	0.181	0.172
D4 (Stream)	3.154	0.309	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.070	0.039
D5 (Pond)	0.189	0.188	0.187	0.186	0.183	0.178	0.174	0.169	0.159	0.155	0.133
D5 (Stream)	3.020	0.127	0.064	0.032	0.018	0.009	0.006	0.005	0.003	0.003	0.001
D6 (Ditch)	4.327	3.818	2.722	1.663	1.174	0.836	0.711	0.646	0.586	0.601	0.462
R1 (Pond)	0.602	0.598	0.595	0.589	0.581	0.563	0.546	0.530	0.500	0.483	0.390
R1 (Stream)	19.599	9.962	4.984	2.493	1.425	0.715	0.504	0.379	0.253	0.212	0.106
R3 (Stream)	44.152	27.071	13.603	6.806	3.891	2.027	1.378	1.048	0.699	0.587	0.294
R4 (Stream)	2.506	0.527	0.271	0.136	0.078	0.039	0.026	0.021	0.014	0.012	0.006

Table B. 8.54. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with 75% drift reduction

Winter Cereals – 75% Drift Reduction											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.193
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872
D2 (Ditch)	184.278	123.353	101.584	86.132	86.913	67.272	55.975	50.031	38.693	34.039	19.053
D2 (Stream)	116.438	66.450	58.294	50.030	48.059	36.518	30.464	27.436	21.426	18.763	10.582
D3 (Ditch)	1.896	1.502	0.896	0.454	0.260	0.130	0.087	0.065	0.043	0.036	0.018
D4 (Pond)	0.154	0.154	0.154	0.154	0.153	0.152	0.150	0.148	0.143	0.141	0.127
D4 (Stream)	1.607	0.303	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.069	0.037
D5 (Pond)	0.125	0.124	0.123	0.122	0.120	0.117	0.114	0.111	0.105	0.102	0.088
D5 (Stream)	1.526	0.071	0.035	0.018	0.010	0.005	0.003	0.003	0.002	0.001	0.001
D6 (Ditch)	2.450	2.279	1.722	1.147	0.879	0.688	0.618	0.572	0.537	0.561	0.441
R1 (Pond)	0.545	0.541	0.538	0.533	0.526	0.509	0.494	0.479	0.452	0.437	0.353
R1 (Stream)	19.599	9.962	4.984	2.493	1.425	0.715	0.491	0.370	0.246	0.207	0.104
R3 (Stream)	44.152	27.071	13.603	6.806	3.891	1.991	1.354	1.030	0.687	0.577	0.289
R4 (Stream)	1.253	0.289	0.152	0.076	0.043	0.022	0.015	0.012	0.008	0.007	0.004

Table B. 8.55. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with 95% drift reduction

Winter Cereals – 95% Drift Reduction											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.193
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872
D2 (Ditch)	184.278	123.352	101.582	86.132	86.911	67.270	55.973	50.030	38.692	34.037	19.051
D2 (Stream)	116.438	66.450	58.294	50.030	48.059	36.518	30.464	27.436	21.426	18.763	10.574
D3 (Ditch)	0.522	0.456	0.301	0.154	0.088	0.044	0.029	0.022	0.015	0.012	0.006
D4 (Pond)	0.119	0.119	0.119	0.119	0.118	0.117	0.116	0.114	0.111	0.108	0.095
D4 (Stream)	0.370	0.303	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.069	0.036
D5 (Pond)	0.073	0.073	0.072	0.071	0.071	0.069	0.067	0.065	0.061	0.060	0.051
D5 (Stream)	0.330	0.026	0.013	0.006	0.004	0.002	0.001	0.001	0.001	0.001	0.000
D6 (Ditch)	1.105	1.055	0.922	0.735	0.685	0.635	0.618	0.565	0.513	0.528	0.424
R1 (Pond)	0.499	0.496	0.493	0.488	0.481	0.466	0.452	0.439	0.414	0.400	0.323
R1 (Stream)	19.599	9.962	4.984	2.493	1.425	0.715	0.481	0.362	0.241	0.203	0.102
R3 (Stream)	44.152	27.071	13.603	6.806	3.891	1.963	1.348	1.015	0.677	0.569	0.285
R4 (Stream)	0.251	0.098	0.057	0.028	0.016	0.008	0.005	0.006	0.004	0.003	0.002

Table B. 8.56. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 5m no spray buffer zone and 5m vegetated filter strip

Winter Cereals – 5m No Spray Buffer Zone + 5m Vegetated Filter Strips											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.193
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872
D2 (Ditch)	184.278	123.353	101.584	86.132	86.913	67.272	55.975	50.031	38.693	34.039	19.053
D2 (Stream)	116.438	66.450	58.294	50.030	48.059	36.518	30.464	27.436	21.426	18.763	10.623
D3 (Ditch)	2.055	1.574	0.929	0.470	0.269	0.135	0.090	0.067	0.045	0.038	0.019
D4 (Pond)	0.273	0.272	0.271	0.269	0.266	0.260	0.253	0.246	0.244	0.246	0.229
D4 (Stream)	2.308	0.303	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.069	0.038
D5 (Pond)	0.272	0.270	0.269	0.267	0.263	0.256	0.250	0.243	0.229	0.223	0.192
D5 (Stream)	2.208	0.094	0.047	0.024	0.013	0.007	0.004	0.003	0.002	0.002	0.001
D6 (Ditch)	2.586	2.366	1.767	1.170	0.892	0.694	0.618	0.575	0.540	0.562	0.442
R1 (Pond)	0.273	0.272	0.271	0.269	0.265	0.257	0.259	0.257	0.247	0.241	0.201
R1 (Stream)	1.837	0.926	0.463	0.232	0.132	0.066	0.065	0.049	0.033	0.028	0.014
R3 (Stream)	2.571	0.813	0.424	0.212	0.121	0.061	0.040	0.030	0.020	0.017	0.009
R4 (Stream)	1.830	0.389	0.200	0.100	0.057	0.029	0.019	0.014	0.010	0.008	0.004

Table B. 8.57. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 10m no spray buffer zone and 5m vegetated filter strip

Winter Cereals – 10m No Spray Buffer Zone + 5m Vegetated Filter Strips											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.193
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872
D2 (Ditch)	184.278	123.352	101.583	86.132	86.912	67.271	55.974	50.030	38.692	34.038	19.052
D2 (Stream)	116.438	66.450	58.294	50.030	48.059	36.518	30.464	27.436	21.426	18.763	10.574
D3 (Ditch)	1.090	0.871	0.521	0.264	0.151	0.076	0.050	0.038	0.025	0.021	0.011
D4 (Pond)	0.204	0.204	0.204	0.204	0.203	0.202	0.199	0.197	0.190	0.186	0.177
D4 (Stream)	1.236	0.303	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.069	0.037
D5 (Pond)	0.197	0.196	0.196	0.194	0.191	0.186	0.181	0.176	0.167	0.162	0.139
D5 (Stream)	1.177	0.052	0.026	0.013	0.008	0.004	0.003	0.002	0.001	0.001	0.001
D6 (Ditch)	1.638	1.542	1.220	0.886	0.730	0.635	0.618	0.565	0.513	0.540	0.430
R1 (Pond)	0.208	0.207	0.206	0.204	0.201	0.195	0.191	0.191	0.185	0.181	0.151
R1 (Stream)	1.829	0.926	0.463	0.232	0.132	0.066	0.056	0.042	0.028	0.024	0.012
R3 (Stream)	1.363	0.449	0.238	0.119	0.068	0.034	0.023	0.017	0.011	0.010	0.005
R4 (Stream)	0.971	0.216	0.112	0.056	0.032	0.016	0.011	0.008	0.005	0.005	0.002

Table B. 8.58. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to winter cereals with a 10m no spray buffer zone and 10m vegetated filter strip

Winter Cereals – 10m No Spray Buffer Zone + 10m Vegetated Filter Strips											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	158.372	157.712	155.477	148.964	136.698	113.633	96.932	85.352	69.997	63.250	39.193
D1 (Stream)	98.801	98.359	96.907	92.690	84.881	70.062	59.367	51.864	42.412	37.357	19.872
D2 (Ditch)	184.278	123.352	101.583	86.132	86.912	67.271	55.974	50.030	38.692	34.038	19.052
D2 (Stream)	116.438	66.450	58.294	50.030	48.059	36.518	30.464	27.436	21.426	18.763	10.574
D3 (Ditch)	1.090	0.871	0.521	0.264	0.151	0.076	0.050	0.038	0.025	0.021	0.011
D4 (Pond)	0.204	0.204	0.204	0.204	0.203	0.202	0.199	0.197	0.190	0.186	0.177
D4 (Stream)	1.236	0.303	0.297	0.280	0.250	0.193	0.148	0.116	0.081	0.069	0.037
D5 (Pond)	0.197	0.196	0.196	0.194	0.191	0.186	0.181	0.176	0.167	0.162	0.139
D5 (Stream)	1.177	0.052	0.026	0.013	0.008	0.004	0.003	0.002	0.001	0.001	0.001
D6 (Ditch)	1.638	1.542	1.220	0.886	0.730	0.635	0.618	0.565	0.513	0.540	0.430
R1 (Pond)	0.349	0.347	0.345	0.342	0.337	0.327	0.317	0.308	0.290	0.281	0.234
R1 (Stream)	8.866	4.501	2.252	1.126	0.644	0.323	0.226	0.170	0.114	0.096	0.048
R3 (Stream)	20.082	12.325	6.194	3.099	1.773	0.920	0.625	0.475	0.317	0.266	0.133
R4 (Stream)	0.971	0.216	0.112	0.056	0.032	0.016	0.011	0.009	0.006	0.005	0.003

Table B. 8.59. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 5m no spray buffer zone

Spring Cereals – 5m No Spray Buffer Zone											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.361	13.357	13.345	13.299	13.174	12.631	11.745	10.785	9.006	8.190	4.907
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.131	2.860	2.442	1.329
D3 (Ditch)	2.060	1.713	1.097	0.563	0.322	0.161	0.107	0.081	0.054	0.045	0.023
D4 (Pond)	0.259	0.258	0.257	0.255	0.252	0.245	0.239	0.233	0.222	0.216	0.183
D4 (Stream)	2.334	0.288	0.145	0.072	0.042	0.021	0.014	0.011	0.007	0.006	0.003
D5 (Pond)	0.258	0.257	0.256	0.253	0.250	0.244	0.238	0.233	0.222	0.216	0.187
D5 (Stream)	2.193	0.089	0.045	0.022	0.013	0.006	0.004	0.003	0.002	0.002	0.001
R4 (Stream)	32.316	20.891	10.459	6.808	4.202	2.119	1.432	1.075	0.717	0.602	0.301

Table B. 8.60. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 10m no spray buffer zone

Spring Cereals – 10m No Spray Buffer Zone											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.360	13.356	13.345	13.299	13.174	12.631	11.745	10.784	9.005	8.189	4.883
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.128	2.858	2.441	1.328
D3 (Ditch)	1.092	0.936	0.606	0.311	0.178	0.089	0.060	0.045	0.030	0.025	0.013
D4 (Pond)	0.188	0.187	0.187	0.185	0.183	0.178	0.173	0.169	0.161	0.157	0.132
D4 (Stream)	1.245	0.159	0.080	0.040	0.023	0.012	0.008	0.006	0.004	0.004	0.002
D5 (Pond)	0.187	0.186	0.185	0.184	0.181	0.177	0.173	0.169	0.161	0.157	0.135
D5 (Stream)	1.167	0.049	0.025	0.012	0.007	0.004	0.002	0.002	0.001	0.001	0.001
R4 (Stream)	32.316	20.891	10.459	6.808	4.202	2.119	1.423	1.068	0.712	0.598	0.299

Table B. 8.61. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 5m vegetated filter strip

Spring Cereals – 5m Vegetated Filter Strip											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
R4 (Stream)	5.033	1.079	0.540	0.270	0.154	0.077	0.095	0.072	0.048	0.040	0.020

Table B. 8.62. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 10m vegetated filter strip

Spring Cereals – 10m Vegetated Filter Strip											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
R4 (Stream)	14.620	9.427	4.720	3.083	1.905	0.961	0.691	0.519	0.346	0.291	0.145

Table B. 8.63. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 20m vegetated filter strip

Spring Cereals – 20m Vegetated Filter Strips											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
R4 (Stream)	7.640	4.923	2.465	1.612	0.996	0.502	0.386	0.290	0.193	0.162	0.081

Table B. 8.64. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with 50% drift reduction

Spring Cereals – 50% Drift Reduction											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.361	13.357	13.346	13.300	13.175	12.632	11.747	10.787	9.008	8.191	4.949
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.133	2.861	2.443	1.329
D3 (Ditch)	3.800	3.089	1.961	1.005	0.575	0.288	0.192	0.144	0.096	0.081	0.040
D4 (Pond)	0.173	0.172	0.172	0.170	0.168	0.164	0.159	0.155	0.148	0.144	0.122
D4 (Stream)	3.192	0.391	0.196	0.098	0.056	0.028	0.019	0.014	0.010	0.008	0.004
D5 (Pond)	0.172	0.171	0.170	0.169	0.167	0.163	0.159	0.155	0.148	0.144	0.124
D5 (Stream)	3.001	0.121	0.060	0.030	0.017	0.009	0.006	0.004	0.003	0.002	0.001
R4 (Stream)	32.316	20.891	10.459	6.808	4.202	2.119	1.440	1.081	0.721	0.605	0.303

Table B. 8.65. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with 75% drift reduction

Spring Cereals – 75% Drift Reduction											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.361	13.357	13.345	13.299	13.174	12.631	11.745	10.785	9.006	8.190	4.905
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.130	2.859	2.441	1.328
D3 (Ditch)	1.900	1.619	1.045	0.537	0.307	0.154	0.103	0.077	0.051	0.043	0.022
D4 (Pond)	0.108	0.108	0.107	0.106	0.105	0.102	0.100	0.097	0.093	0.090	0.076
D4 (Stream)	1.617	0.212	0.107	0.054	0.031	0.016	0.011	0.008	0.005	0.005	0.003
D5 (Pond)	0.107	0.107	0.106	0.105	0.104	0.101	0.099	0.097	0.092	0.090	0.078
D5 (Stream)	1.511	0.065	0.033	0.016	0.009	0.005	0.003	0.002	0.002	0.001	0.001
R4 (Stream)	32.316	20.891	10.459	6.808	4.202	2.119	1.427	1.071	0.714	0.600	0.300

Table B. 8.66. RMS values: PEC_{sw} of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with 95% drift reduction

Spring Cereals – 95% Drift Reduction											
Scenario	Max PEC _{sw} (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.360	13.356	13.345	13.299	13.174	12.630	11.744	10.784	9.005	8.188	4.869
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.127	2.857	2.440	1.328
D3 (Ditch)	0.487	0.443	0.312	0.163	0.093	0.047	0.031	0.023	0.016	0.013	0.007
D4 (Pond)	0.057	0.056	0.056	0.056	0.055	0.053	0.052	0.051	0.048	0.047	0.040
D4 (Stream)	0.373	0.070	0.036	0.018	0.010	0.005	0.004	0.003	0.002	0.002	0.001
D5 (Pond)	0.056	0.055	0.055	0.055	0.054	0.053	0.051	0.050	0.048	0.047	0.040
D5 (Stream)	0.320	0.021	0.011	0.005	0.003	0.002	0.001	0.001	0.001	0.000	0.000
R4 (Stream)	32.316	20.891	10.459	6.808	4.202	2.119	1.417	1.063	0.709	0.596	0.298

Table B. 8.67. RMS values: PECsw of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 5m no spray buffer zone and 5m vegetated filter strip

Spring Cereals – 5m No Spray Buffer Zone + 5m Vegetated Filter Strips											
Scenario	Max PECsw (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.361	13.357	13.345	13.299	13.174	12.631	11.745	10.785	9.006	8.190	4.907
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.131	2.860	2.442	1.329
D3 (Ditch)	2.060	1.713	1.097	0.563	0.322	0.161	0.107	0.081	0.054	0.045	0.023
D4 (Pond)	0.259	0.258	0.257	0.255	0.252	0.245	0.239	0.233	0.222	0.216	0.183
D4 (Stream)	2.334	0.288	0.145	0.072	0.042	0.021	0.014	0.011	0.007	0.006	0.003
D5 (Pond)	0.258	0.257	0.256	0.253	0.250	0.244	0.238	0.233	0.222	0.216	0.187
D5 (Stream)	2.193	0.089	0.045	0.022	0.013	0.006	0.004	0.003	0.002	0.002	0.001
R4 (Stream)	1.838	0.864	0.461	0.231	0.132	0.066	0.065	0.049	0.032	0.027	0.014

Table B. 8.68. RMS values: PECsw of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 10m no spray buffer zone and 5m vegetated filter strip

Spring Cereals – 10m No Spray Buffer Zone + 5m Vegetated Filter Strips											
Scenario	Max PECsw (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.360	13.356	13.345	13.299	13.174	12.631	11.745	10.785	9.005	8.189	4.884
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.129	2.858	2.441	1.328
D3 (Ditch)	1.093	0.965	0.630	0.325	0.186	0.093	0.062	0.047	0.031	0.026	0.013
D4 (Pond)	0.196	0.195	0.195	0.193	0.191	0.186	0.181	0.176	0.168	0.163	0.138
D4 (Stream)	1.255	0.166	0.083	0.042	0.024	0.012	0.008	0.006	0.004	0.004	0.002
D5 (Pond)	0.195	0.194	0.193	0.192	0.189	0.184	0.180	0.176	0.168	0.164	0.141
D5 (Stream)	1.172	0.051	0.026	0.013	0.007	0.004	0.002	0.002	0.001	0.001	0.001
R4 (Stream)	0.975	0.864	0.461	0.231	0.132	0.066	0.056	0.042	0.028	0.024	0.012

Table B. 8.69. RMS values: PECsw of mecoprop-P following application of Mecoprop-P K 600 to spring cereals with a 10m no spray buffer zone and 10m vegetated filter strip

Spring Cereals – 10m No Spray Buffer Zone + 10m Vegetated Filter Strips											
Scenario	Max PECsw (µg/L)	TWA (µg/L)									
		1 day	2 day	4 day	7 day	14 day	21 day	28 day	42 day	50 day	100 day
D1 (Ditch)	13.360	13.356	13.345	13.299	13.174	12.631	11.745	10.784	9.005	8.189	4.883
D1 (Stream)	8.276	8.272	8.260	8.220	8.108	7.179	5.392	4.128	2.858	2.441	1.328
D3 (Ditch)	1.092	0.936	0.606	0.311	0.178	0.089	0.060	0.045	0.030	0.025	0.013
D4 (Pond)	0.188	0.187	0.187	0.185	0.183	0.178	0.173	0.169	0.161	0.157	0.132
D4 (Stream)	1.245	0.159	0.080	0.040	0.023	0.012	0.008	0.006	0.004	0.004	0.002
D5 (Pond)	0.187	0.186	0.185	0.184	0.181	0.177	0.173	0.169	0.161	0.157	0.135
D5 (Stream)	1.167	0.049	0.025	0.012	0.007	0.004	0.002	0.002	0.001	0.001	0.001
R4 (Stream)	14.620	9.427	4.720	3.083	1.905	0.961	0.651	0.489	0.326	0.274	0.137

Report:	CP 9.2.5-02 Simmons K (2014d) Calculation of Predicted Environmental Concentrations (PEC) of Mecoprop-P in surface water and sediment following application to Amenity Grassland using Step 1-2 in FOCUS Nufarm UK Ltd. Report number: NUF2014-47
Models:	FOCUS STEPS 1-2, version 2.1
GLP:	Not applicable as this is a computer simulation.

Previous evaluation:	None: New data submitted for the purpose of renewal under Regulation 844/2012. This study presents surface water modelling for use of mecoprop-P on amenity grassland. As this is no longer a representative use, the RMS has not evaluated this study. The study is not relied on for the risk assessment therefore has not been summarised here.
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B.8.6. FATE AND BEHAVIOUR IN AIR

B.8.6.1. Route and rate of degradation in air and transport via air

No studies with Mecoprop-P K 600 have been carried out.

Previous evaluation:	In DAR for original approval (1998), data on the fate and behaviour of mecoprop-P in air were evaluated and considered acceptable. The summary is reproduced below.
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The volatilization from plant surfaces of mecoprop-P in formulated products was found to be below the detection limit (0.1% of applied) in laboratory studies. The volatilization from soil surfaces was less than 1%. The laboratory results are in contrast to a field study where mecoprop-P was concluded to volatilize to some extent. The results could not be quantified because several processes, ex. degradation, take part in such a field study.

The photochemical degradation in the atmosphere was calculated and resulted in estimated half-life of approximately 1-2 days.

B.8.6.2. Predicted environmental concentrations from airborne transport

Previous evaluation:	In DAR for original approval (1998). No additional studies have been performed or are required.
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The PECA has not been calculated by the notifier. However, the vapour pressure is low and as observed in the volatilization studies, the volatilization potential is also low from soil as well as from plants. The oxidative photochemical degradation in air was estimated to be relatively fast with a half-life within 1 or 2 days, indicating that MCPP-P released to air would be expected to be degraded by photochemical transformation. It is assessed that further action with respect to this issue need not to be taken at the present.

B.8.7. PREDICTED ENVIRONMENTAL CONCENTRATIONS FROM OTHER ROUTES OF EXPOSURE

Environmental exposure is not expected to occur via other routes. The product, Mecoprop-P K 600, is a soluble concentrate formulation; therefore dust drift is not considered a relevant route of exposure. Indirect surface water exposure via a sewage treatment plant is not considered relevant as mecoprop-P was determined to be readily biodegradable (CA 7.22.1/01, Feil, N).

B.8.8. REFERENCES RELIED ON

See Volume 3 CA Section B.8.5 for details of the literature search.

Data Point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
CP 9.2.4.1/0 1	Simmons, K	2014a	Calculation of Predicted Environmental Concentrations (PEC) of Mecoprop-P in groundwater following the application to Spring and Winter Cereals using FOCUS PEARL, PELMO and MACRO Nufarm UK Ltd. NUF2014-44 Not GLP Unpublished`	N	Y	New guideline requirement	Nufarm	None, submitted for the purpose of renewal
CP 9.2.5/01	Simmons, K	2014c	Calculation of Predicted Environmental Concentrations (PEC) of Mecoprop-P in surface water and sediment following application to Spring and Winter Cereals using Step 1-2 in FOCUS Nufarm UK Ltd. NUF2014-46 Not GLP Not published	N	Y	New guideline requirement	Nufarm	None, submitted for the purpose of renewal
CP 9.2.5/03	Simmons, K	2015	Calculation of Predicted Environmental	N	Y	New guideline requirement	Nufarm	None, submitted for the

Data Point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
			Concentrations (PEC) of Mecoprop-P and its Metabolite o- cresol in Surface Water and Sediment following Application to Spring and Winter Cereals using Step 1-2 in FOCUS and FOCUS SWASH and SWAN Nufarm UK Ltd. NUF2015-45 Not GLP Unpublished					purpose of renewal