

Geneesmiddelen en matig polaire verbindingen in de Rijkswateren

Visualisatie monitoringdata 2010-2020

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Datum: Mei 2022

In opdracht van: RWS-WVL
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1. Inleiding

Rijkswaterstaat meet sinds 2010 de concentraties van een aantal geneesmiddelen (GM) en matig polaire verbindingen (MPV) in de Rijkswateren. Het betreft een serie van 111 GM en 50 MPV, die gemeten worden op respectievelijk 29 en 40 locaties. GM worden gemeten sinds 2010 en worden dat nog steeds; MPV worden gemeten sinds 2010, maar de analyse van deze stoffen is gestopt in 2018. De opgebouwde databestanden bevatten momenteel elk circa 20,000 datapunten. Het visualiseren van de data is wenselijk; echter, visualisatie van alle data is gezien de omvang van de databestanden niet realistisch. Daarom is een selectie gemaakt van stoffen en locaties, waarvoor een visualisatie het meest wenselijk is. De meetgegevens voor de geselecteerde stof/locatie combinaties zijn in deze rapportage gevisualiseerd in grafieken.

2. Selectie locaties

Voor alle locaties is de bemonsteringsfrequentie, het aantal beschikbare bemonsteringsjaren en het aantal stoffen dat gemeten is op de betreffende locatie in kaart gebracht. Locaties waarvoor slechts enkele (oudere) jaren aan data beschikbaar is (< 2013) zijn vervolgens uitgesloten van analyse. Hierdoor resteerden 20 locaties voor GM en 26 locaties voor MPV. Deze de-selectie is vervolgens in overleg met de opdrachtgever gecombineerd met een voorkeursselectie van belangrijke locaties. Dit leverde de volgende lijst van 18 locaties op, waarvoor datavisualisatie gewenst is (zie Tabel 1):

Tabel 1. *Overzicht van de geselecteerde locaties waarvoor datavisualisatie gewenst is.*

	Locatie	Afkorting	Waterlichaam/opmerking
1	Andijk	ANDK	IJsselmeer; innamepunt drinkwaterbereiding
2	Bocht van Watum	BOCHTVWT	Eems-Dollard
3	Brakel	BRAKL	Andelse Maas; innamepunt drinkwaterbereiding
4	Eijsden	EIJSDPTN	Maas
5	Heel	HEEL	Maas; innamepunt drinkwaterbereiding
6	IJmuiden	IJMDN1	Noordzeekanaal
7	Kampen	KAMPN	IJssel
8	Keizersveer	KEIZVR	Bergsche Maas; innamepunt drinkwaterbereiding
9	Ketelmeer	KETMR	Innamepunt drinkwaterbereiding
10	Lobith	LOBPTN	Rijn
11	Maassluis	MAASSS	Nieuwe Waterweg
12	Nieuwegein	NIEUWGN	Lek; innamepunt drinkwaterbereiding
13	Nieuwersluis	NIEUWSS	Vecht; innamepunt drinkwaterbereiding
14	Noordwijk	NOORDWK2	Noordzee; 2 km voor de kust
15	Sas van Gent	SASVGT	Kanaal van Gent naar Terneuzen
16	Schaar van Ouden Doel	SCHAARVODDL	Westerschelde
17	Stad aan 't Haringvliet	STADAHH	Haringvliet; innamepunt drinkwaterbereiding
18	Vrouwezand	VROUWZD	IJsselmeer

In Figuur 1 is een overzichtsk kaart gegeven met de geografische ligging van de geselecteerde locaties.



Figuur 1. Overzichtskaart van de ligging van de geselecteerde locaties.

3. Opschoning data

Alle datapunten met waarden onder de detectielimieten zijn verwijderd uit de databestanden. Dit betrof circa 57 % van de GM datapunten en circa 83% van de MPV datapunten. Het aantal stoffen reduceerde hierdoor van 111 tot 80 GM en van 50 tot 36 MPV. In Tabel 2 is deze reductie geïllustreerd door middel van een rode markering in de kolom “< detectielimiet”.

4. Selectie stoffen

Vervolgens is voor alle stoffen het aantal locaties waar de betreffende stof is aangetroffen en het totaal aantal beschikbare datapunten in kaart gebracht. Stoffen waarvoor slechts enkele datapunten beschikbaar zijn, zijn uitgesloten van analyse. Hierdoor resteerde circa 40 GM en 17 MPV. Deze selectie is vervolgens in overleg met de opdrachtgever gecombineerd met een voorkeursselectie van belangrijke stoffen. Hierbij is gekeken naar stoffen die voorkomen op de EU Watchlist en op de lijst van de Rijncommissie, waarop momenteel een aantal uiteenlopende stoffen (niet alleen GM of MPV) staan, die worden gemonitord met als doelstelling het behalen van 30% reductie in 2040. Van alle stoffen op beide lijsten worden/zijn er 31 gemeten binnen de GM en MPV monitoring (aangegeven met een gele markering in Tabel 2). Van deze 31 stoffen vielen er echter 6 af, omdat er of zeer weinig

datapunten voor zijn, of omdat er slechts zeer oude data (uit 2010/2011/2012) beschikbaar zijn. De resulterende lijst van 25 stoffen is vervolgens aangevuld met een 6-tal interessante stoffen op basis van expert judgement (EJ). Dit alles leverde de lijst van stoffen op, zoals die is weergegeven in Tabel 3 (zie ook de groene markeringen in de kolom "Geselecteerd" in Tabel 2). Merk op dat er sprake is van overlap tussen de GM en MPV groep van stoffen: 20 verbindingen zijn in beide stofgroepen gemeten. Van de uiteindelijk geselecteerde stoffen betreft dit echter slechts 5 verbindingen. Voor deze stoffen zijn de data uit beide databestanden gecombineerd. In de uiteindelijke datavisualisatie is aangegeven dat de gegevens uit de twee verschillende bestanden en dus analyseprocessen afkomstig zijn.

Tabel 2. Selectieproces van stoffen waarvoor datavisualisatie gewenst is. Rode blokken geven stoffen aan waarvoor de gemeten concentraties onder de detectielimiet liggen, waarvoor te weinig datapunten beschikbaar zijn of waarvoor alleen data uit 2010 tot 2012 beschikbaar zijn. Gele blokken geven stoffen aan die voorkomen op de EU Watchlist en/of de lijst van de Rijncommissie. Groene blokken vertegenwoordigen uiteindelijk geselecteerde stoffen voor datavisualisatie. 'EJ' staat voor 'expert judgement'.

		< detectielimiet	Te weinig datapunten	Alleen 2010..2012 data	Op lijst EU/Rijncommissie	Geselecteerd	Opmerking
	Geneesmiddelen						
1	1,3,5-Triazine-2,4,6-triamine (Melamine)				Geel	Groen	
2	1H-benzotriazole				Geel	Groen	
3	2-Hydroxibuprofen					Groen	Toegevoegd obv EJ
4	3-Methylpyridine						
5	4-Oxoisoforon						
6	Acesulfame K				Geel	Groen	
7	Acetaminofen (Paracetamol)		Rood	Rood			
8	Amidotrizonezuur						
9	Aminomethylfosfonzuur						
10	Atenolol			Rood			
11	Azoxystrobin						
12	Bezafibraat					Groen	Toegevoegd obv EJ
13	Bitertanol	Rood			Geel		
14	Bromoxynil	Rood					
15	Bupirimaat	Rood					
16	Caffeine			Rood			
17	Carbamazepine				Geel	Groen	
18	Carbaryl	Rood					
19	Carbofuran	Rood					
20	Cefalexine	Rood					
21	Chloorprofam					Groen	Toegevoegd obv EJ
22	Chloorxylenol						
23	Ciprofloxacine				Geel	Groen	
24	Cisplatine	Rood					

25	Claritromycine					Yellow	Green	
26	Clindamycine							
27	Clofibrinezuur	Red						
28	Clomazone							
29	Clozapine	Red						
30	Cyaanzuur						Green	Toegevoegd obv EJ
31	Cyclamaat							
32	Cyclofosfamide		Red					
33	Cyprodinil							
34	Dichlobenil							
35	Diclofenac					Yellow	Green	
36	Diflufenican							
37	Dimetridazol			Red				
38	Diocetylftalaat	Red						
39	Doxycycline HCl			Red				
40	Dypyridamol		Red					
41	Erythromycine		Red	Red	Yellow			
42	Ethofumesaat							
43	Etridiazol		Red	Red				
44	Famoxadone			Red	Yellow			
45	Fenazon						Green	Toegevoegd obv EJ
46	Fenhexamide	Red						
47	Flumequine		Red	Red				
48	Fluracil	Red						
49	Furosemide	Red						
50	Gabapentine					Yellow	Green	
51	Gemfibrozil			Red				
52	Glufosinaat		Red					
53	Glyfosaat					Yellow	Green	
54	Guanylureum					Yellow	Green	
55	Hexahydrohexamethylcyclopentabenzopyran							
56	Hexamethyleentetramine (Urotropine)						Green	Toegevoegd obv EJ
57	Hydrochloorthiazide					Yellow	Green	
58	Ibuprofen			Red	Yellow			
59	Ifosfamide	Red						
60	Iminostilbene	Red						
61	Irbesartan					Yellow	Green	
62	Irgarol							
63	Johexol							
64	Jomeprol					Yellow	Green	
65	Jopamidol					Yellow	Green	
66	Jopromide					Yellow	Green	
67	Joxitalaminezuur							
68	Ketoprofen		Red					
69	Lidocaine					Yellow	Green	
70	Lincomycine		Red	Red				
71	Mesalazine	Red						
72	Metformine					Yellow	Green	
73	Methotrexaat	Red						
74	Metoprolol					Yellow	Green	
75	N,N-diethyl-3-methylbenzamide							
76	Naproxen		Red	Red				
77	Oxazepam	Red						
78	Oxolinezuur	Red						

79	Oxytetracycline						
80	Paroxetine						
81	Penconazool						
82	Pentoxifylline						
83	Pipamperon						
84	Primidon						
85	propiconazol						
86	Propranolol						
87	Propyzamide						
88	Roxitromycine						
89	Saccharine						
90	Som 4- en 5-methyl-1H-benzotriazool						
91	Sotalol						
92	Sucralose						
93	Sulfachloorpyridazine						
94	Sulfadimethoxine						
95	Sulfamethoxazol						
96	Sulfaquinoxaline						
97	Tamoxifen						
98	Tebufenpyrad						
99	Terbutaline						
100	Terbutryne						
101	Tonalide						
102	Tramadol						
103	Triallaat						
104	Triazamaat						
105	Trifenyfosfineoxide						
106	Trifluorazijnzuur						
107	Trimethoprim						
108	Tris(2-butoxyethyl)fosfaat						
109	Tylosine						
110	Valsartan						
111	Venlafaxine						
	Matig Polaire Verbindingen						
1	1H-benzotriazole						Ook in GM database
2	2,4,6-tribroomfenol						
3	2,6-dichloorbenzamide						
4	Cyclopenta (def)fenantrenon						
5	4-Oxoisoforon						
6	Antrachinon						
7	Azoxystrobin						
8	Bis(2-methoxyethyl)ether						
9	Bisfenol-A						
10	Bitertanol						
11	Bromoxynil						
12	Bupirimaat						
13	N-ethyl-2-methylbenzenesulfonamide						
14	Carbofuran						
15	Carbamazepine						Ook in GM database
16	Carbaryl						
17	Clomazone						
18	Chloorprofam						Ook in GM database
19	Chloorxylenol						

20	Cyprodinil						
21	Diethyleenether (1,4-dioxaan)	■					
22	Dioctylftalaat	■					
23	Dichlobenil						
24	Dicofol	■					
25	N,N-diethyl-3-methylbenzamide						
26	Diflufenican						
27	Etridiazol		■				
28	Ethofumesaat						
29	Famoxadone	■					
30	Fenhexamide	■					
31	Fytol						
32	Hexahydrohexamethylcyclopentabenzopyran						
33	Isoforon						
34	Iminostilbene	■					
35	Irgarol						
36	N-ethyl-4-methylbenzenesulfonamide						
37	o-Tolueensulfonamide						
38	Penconazool		■				
39	Propyzamide						
40	p-Tolueensulfonamide						
41	Tonalide						
42	Triallaat		■	■			
43	Tris(2-butoxyethyl)fosfaat		■	■			
44	Triethylfosfaat						
45	Triclosan		■		■		
46	Tebufenpyrad	■					
47	Terbutryne				■	■	Ook in GM database
48	Trifenyfosfinesulfide						
49	Trifenyfosfineoxide				■	■	Ook in GM database
50	Triazamaat	■					

In Tabel 3 is een overzicht gegeven van de geselecteerde stoffen, waarbij naast de naam (op alfabetische volgorde), de molecuulformule en het CAS nummer, ook de belangrijkste toepassing van de stof is gegeven.

Tabel 3. Naam, CAS nummer, molecuulformule en toepassing van de geselecteerde stoffen.

	Triviale naam	CAS nummer	Molecuulformule	Toepassing
1	Acesulfame-K	55589-62-3	C ₄ H ₄ KNO ₄ S	Synthetische zoetstof
2	Bezafibraat	41859-67-0	C ₁₉ H ₂₀ ClNO ₄	Statine; cholesterolverlaging
3	1H-benzotriazole	95-14-7	C ₆ H ₅ N ₃	Anti-corrosie/vries, cheleermiddel, in antimycotica, antiseptica, anthelminthica
4	Bisfenol-A	80-05-7	C ₁₅ H ₁₆ O ₂	Vele industriële toepassingen, o.a. in plastics
5	Carbamazepine	298-46-4	C ₁₅ H ₁₂ N ₂ O	Anti-epilepticum

6	Chloorprofam	101-21-3	$C_{10}H_{12}ClNO_2$	Herbicide (carbamaat)
7	Ciprofloxacin	85721-33-1	$C_{17}H_{18}FN_3O_3$	Antibioticum
8	Clarithromycine	81103-11-9	$C_{38}H_{69}NO_{13}$	Antibioticum
9	Cyaanzuur	420-05-3	HOCN	Hulpstof bij diverse industriële processen
10	Diclofenac	15307-86-5	$C_{14}H_{11}Cl_2NO_2$	Pijnstiller/ontstekingsremmer (NSAID)
11	Fenazon	60-80-0	$C_{11}H_{12}N_2O$	Pijnstiller/ontstekingsremmer (NSAID)
12	Gabapentine	60142-96-3	$C_9H_{17}NO_2$	Anti-epilepticum
13	Glyfosaat	1071-83-6	$C_3H_8NO_5P$	Herbicide
14	Guanylureum	141-83-3	$C_2H_6N_4O$	Metaboliet van metformine
15	Hydrochloorthiazide	58-93-5	$C_7H_8ClN_3O_4S_2$	Behandeling hypertensie
16	2-Hydroxibuprofen	51146-55-5	$C_{13}H_{18}O_3$	Metaboliet van ibuprofen
17	Irbesartan	138402-11-6	$C_{25}H_{28}N_6O$	Behandeling van hypertensie
18	Jomeprol	78649-41-9	$C_{17}H_{22}I_3N_3O_8$	Röntgencontrastmiddel
19	Jopamidol	60166-93-0	$C_{17}H_{22}I_3N_3O_8$	Röntgencontrastmiddel
20	Jopromide	73334-07-3	$C_{18}H_{24}I_3N_3O_8$	Röntgencontrastmiddel
21	Lidocaïne	137-58-6	$C_{14}H_{22}N_2O$	Lokaal anestheticum
22	Melamine	108-78-1	$C_3H_6N_6$	Grondstof voor harsen en coatings
23	Metformine	657-24-9	$C_4H_{11}N_5$	Behandeling van diabetes mellitus type 2
24	Metoprolol	37350-58-6	$C_{15}H_{25}NO_3$	Behandeling van hypertensie, migraine, cardiologische aandoeningen
25	Sotalol	3930-20-9	$C_{12}H_{20}N_2O_3S$	Behandeling van hartritme stoornissen
26	Sucralose	56038-13-2	$C_{12}H_{19}Cl_3O_8$	Synthetische zoetstof
27	Sulfamethoxazol	723-46-6	$C_{10}H_{11}N_3O_3S$	Antibioticum
28	Terbutryne	886-50-0	$C_{10}H_{19}N_5S$	Herbicide
29	Trifenylfosfineoxide	791-28-6	$C_{18}H_{15}OP$	Reagens t.b.v. uitkristallisatie van stoffen
30	Urotropine (Hexamine)	100-97-0	$C_6H_{12}N_4$	Antisepticum, conserveermiddel (E239), vele industriële toepassingen
31	Valsartan	137862-53-4	$C_{24}H_{29}N_5O_3$	Behandeling van hypertensie

5. Data visualisatie

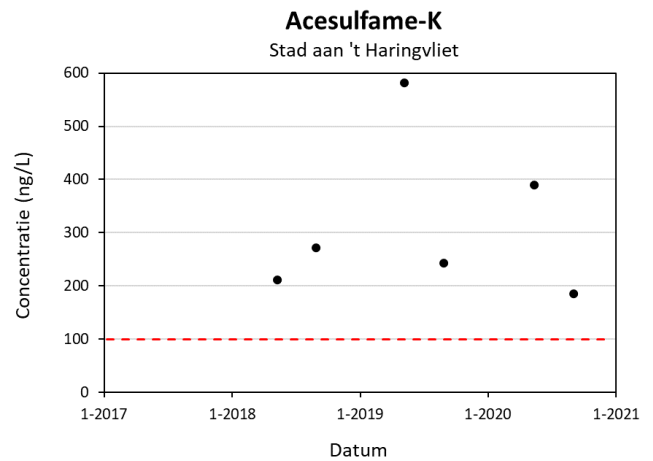
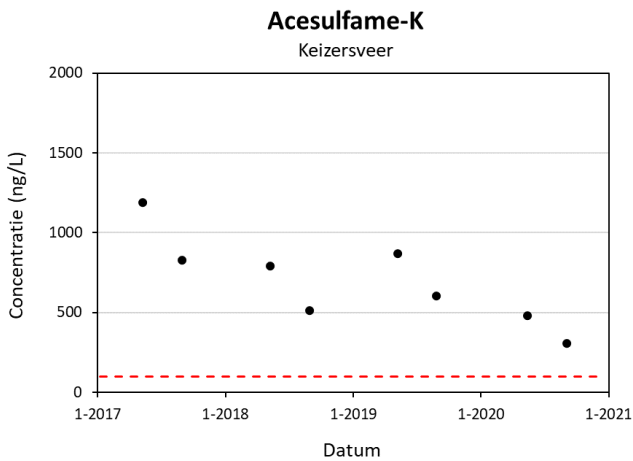
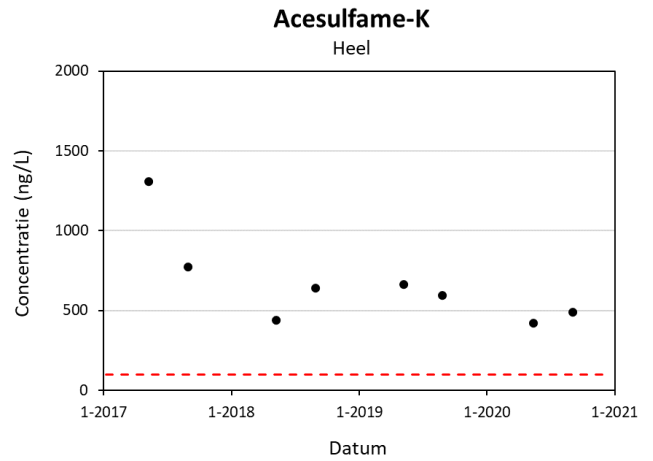
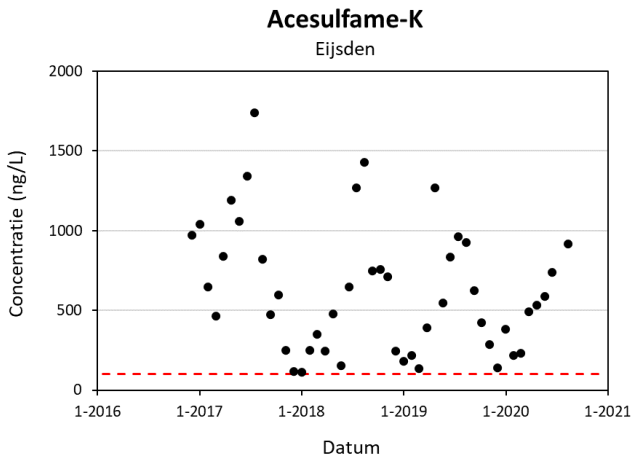
Voor alle combinaties van de geselecteerde stoffen (31) en locaties (18) zijn grafieken gemaakt van de beschikbare data, waarbij de gemeten concentraties in de waterfase (in ng/L) zijn uitgezet als functie van de tijd (meetdatum). Deze grafieken zijn weergegeven op de volgende 124 pagina's. De grafieken zijn geclusterd per stof, waardoor er sprake is van 31 clusters. Deze zijn gerangschikt op alfabetische volgorde (zoals in Tabel 3) en niet naar toepassing. Binnen ieder cluster zijn de data voor de verschillende locaties weergegeven. De locaties zijn hierbij geclusterd op basis van stroomgebied, waarbij de volgende vier stroomgebieden zijn onderscheiden: Maas, Rijn, Schelde en Eems/zee.

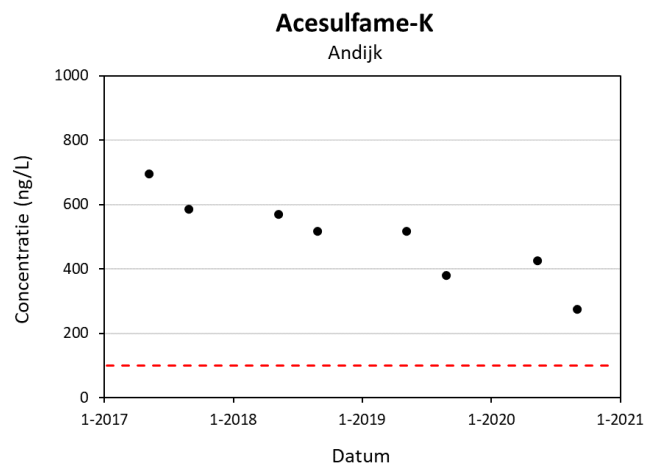
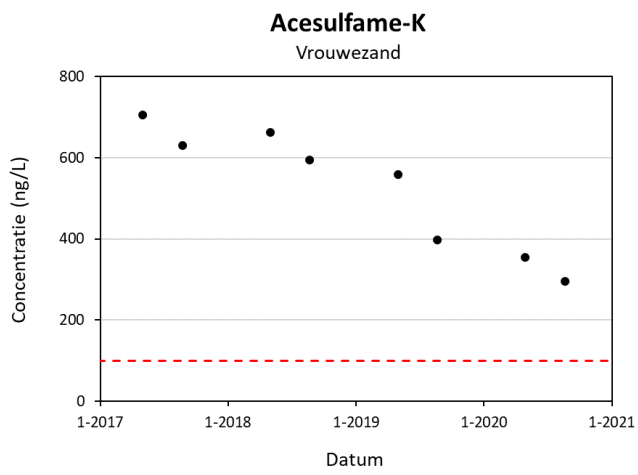
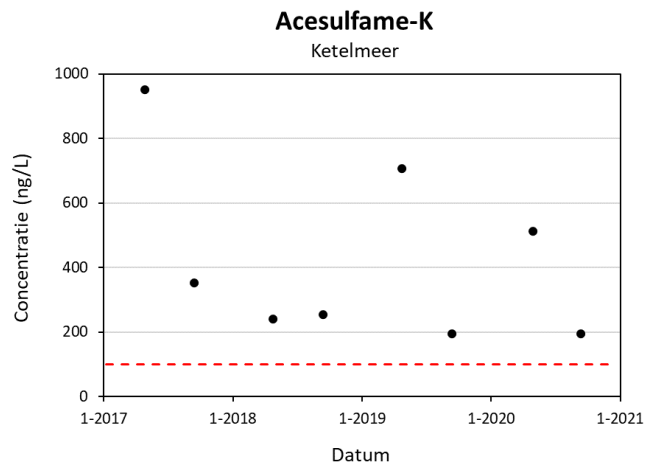
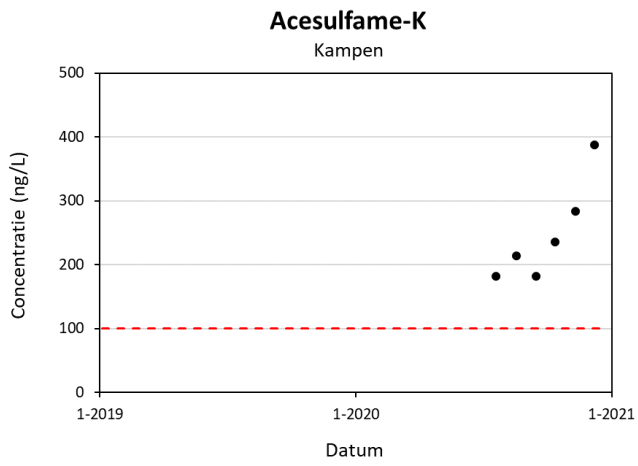
Voor de grafieken gelden de volgende opmerkingen:

- Niet alle stoffen zijn aangetroffen op alle locaties. Hierdoor mist een aantal grafieken. Met andere woorden, ontbrekende grafieken geven het ontbreken van meetdata aan.
- Zwarte datapunten vertegenwoordigen meetdata uit de GM database; grijze datapunten uit het MPV databestand.
- Alle grafieken bevatten een rode stippellijn. Deze geeft de signaleringswaarde voor nieuwe, opkomende stoffen aan, welke is vastgesteld op 0.1 µg/L.
- De assen van de grafieken zijn aangepast aan de meetgegevens. Zodoende zijn de assen verschillend voor verschillende stoffen en locaties.
- In zes gevallen is sprake van zeer hoge meetwaarden. Deze 'uitschieters' zijn in de betreffende grafieken weergegeven door middel van rode datapunten op de bovenas. De werkelijke meetwaarden zijn gegeven onder de grafieken.

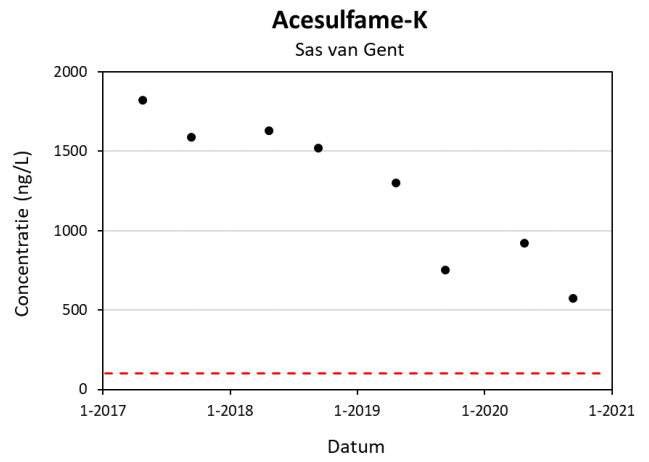
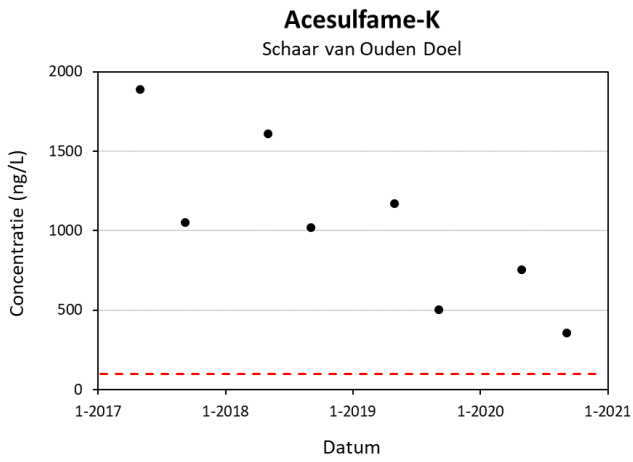
1. Acesulfame-K

Stroomgebied Maas

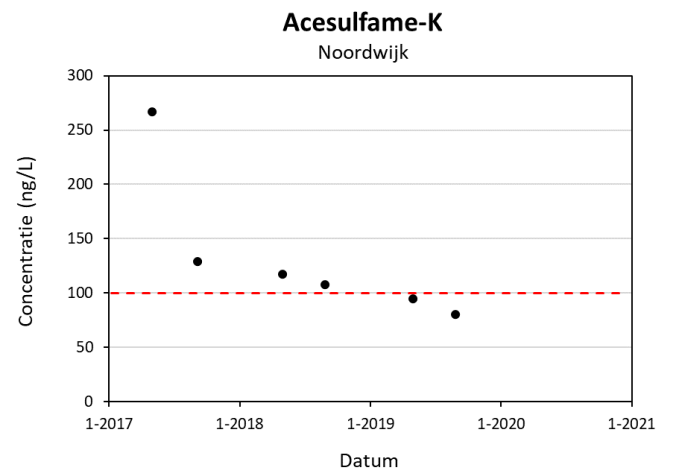
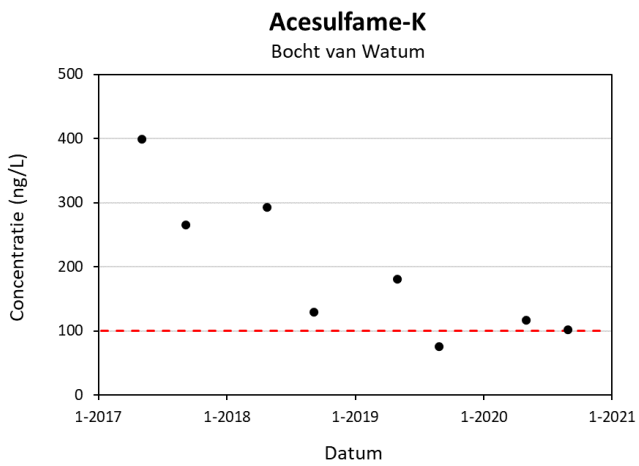




Stroomgebied Schelde

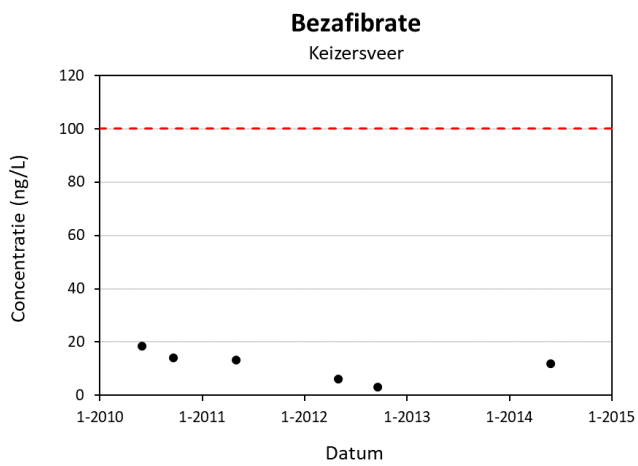
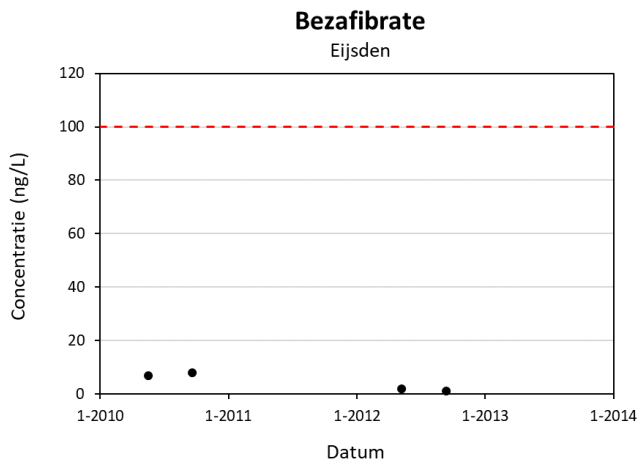


Eems + zee

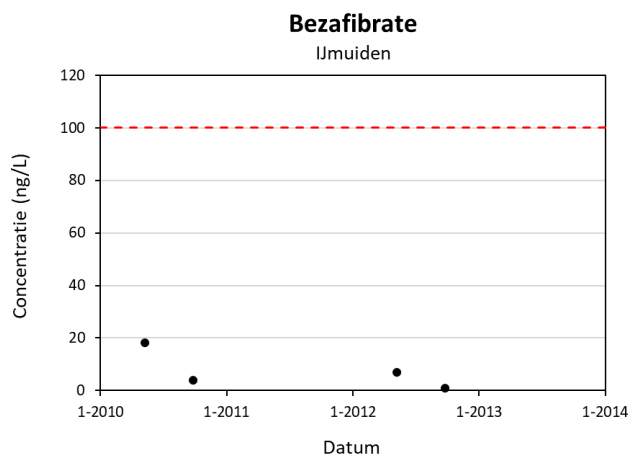
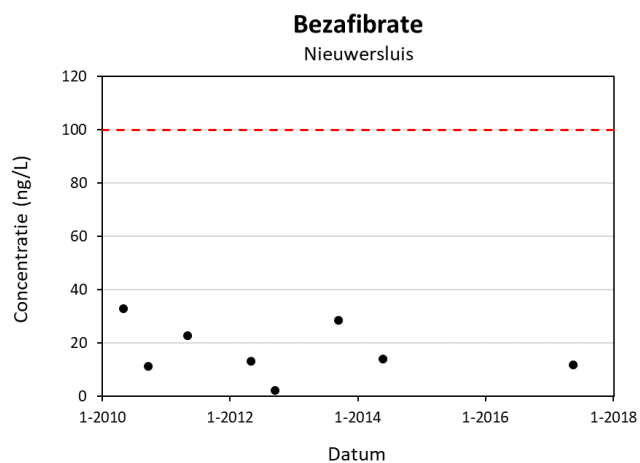
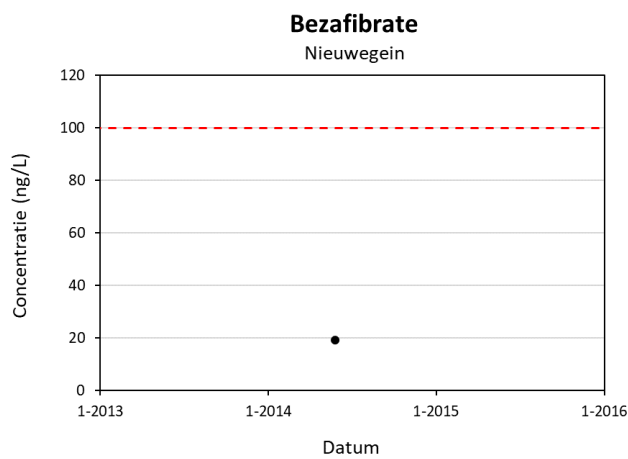
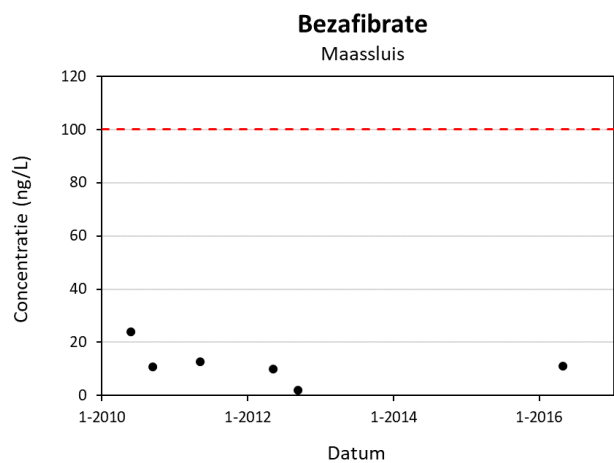
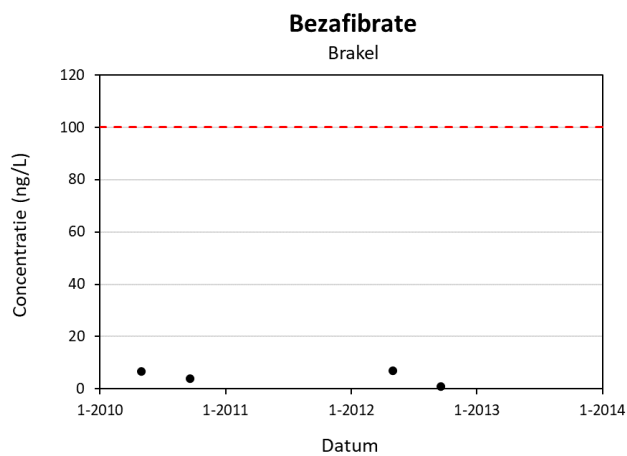
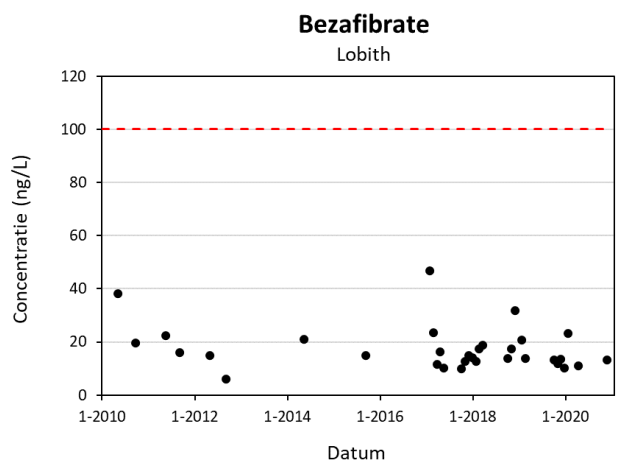


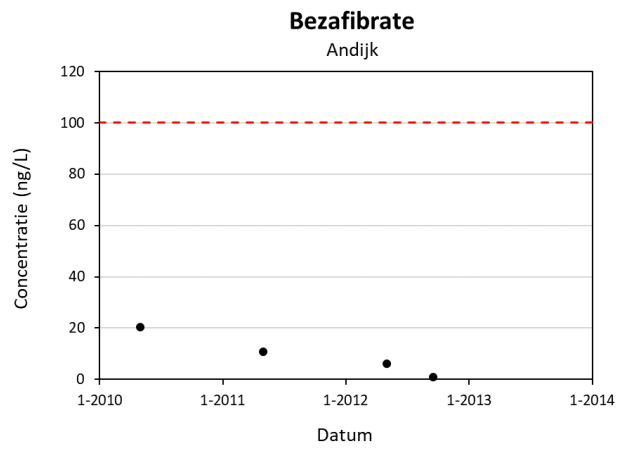
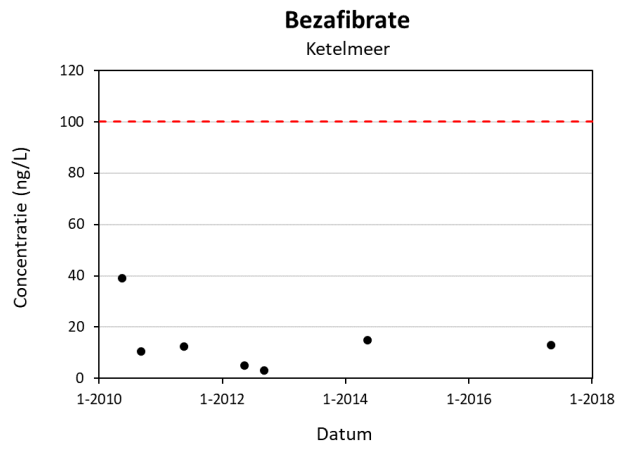
2. Bezafibraat

Stroomgebied Maas

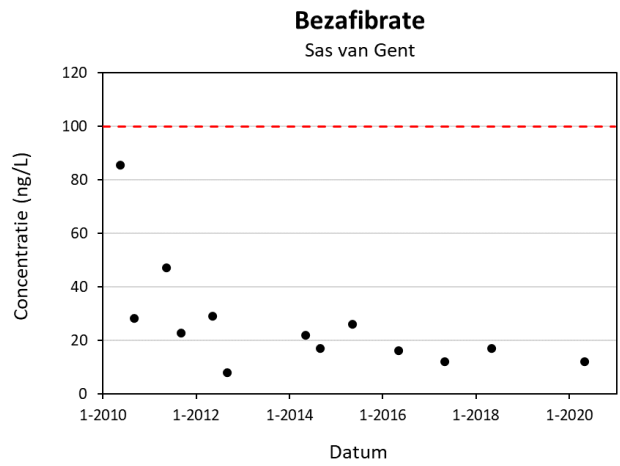
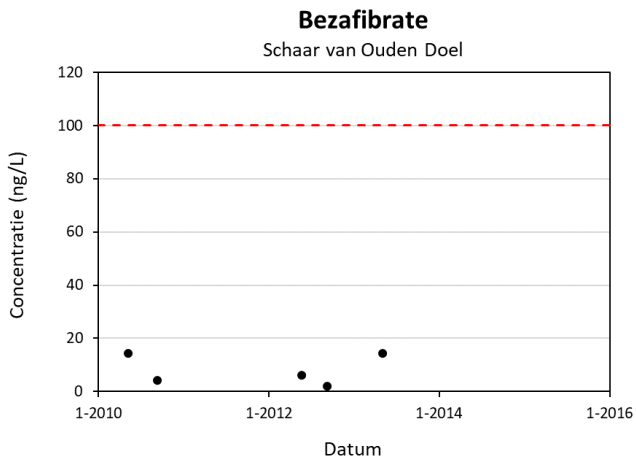


Stroomgebied Rijn

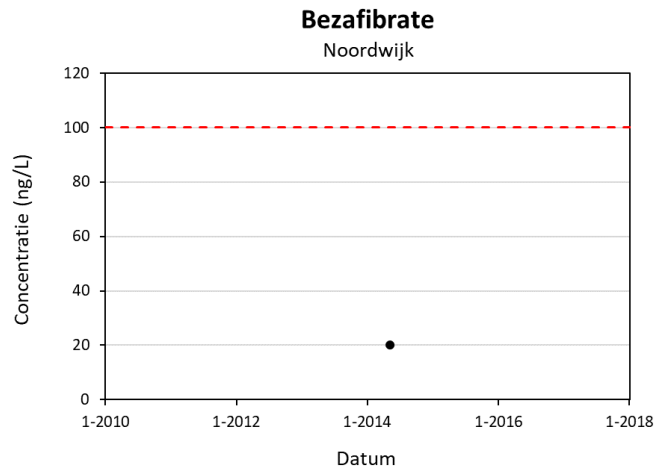
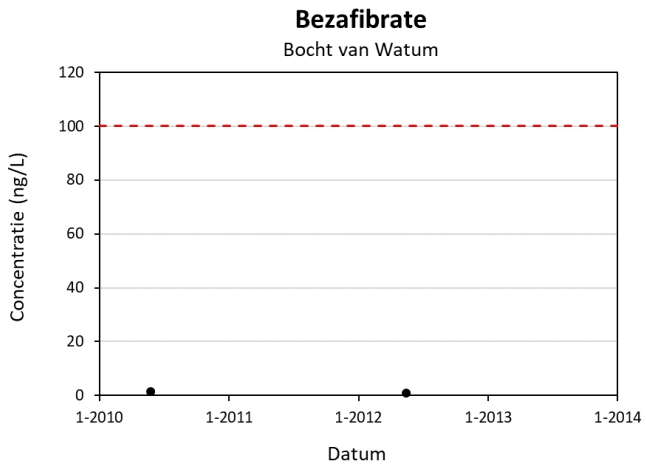




Stroomgebied Schelde

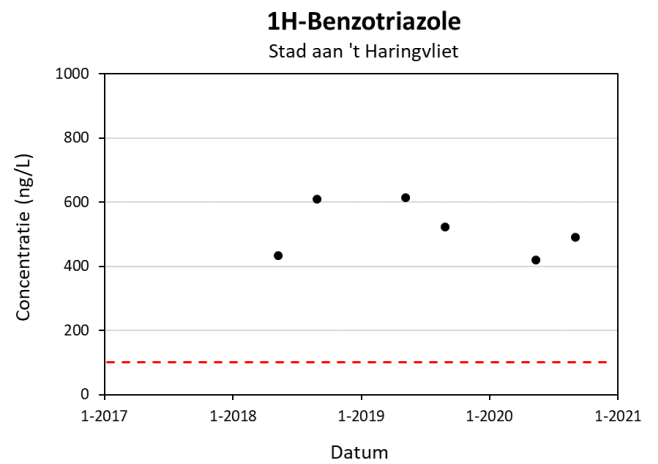
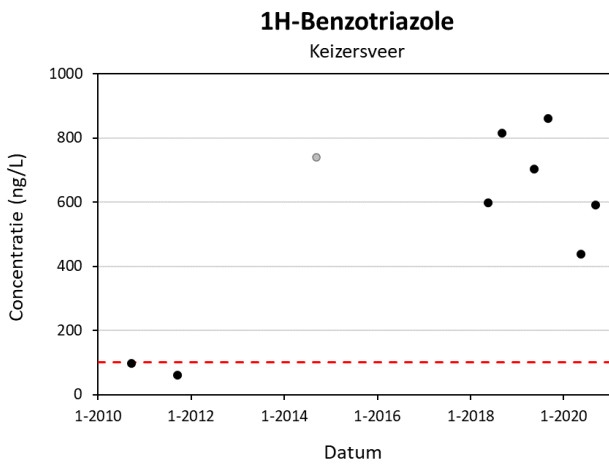
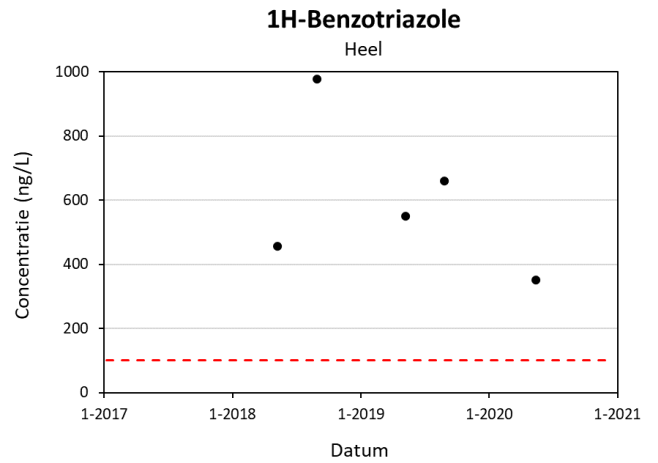
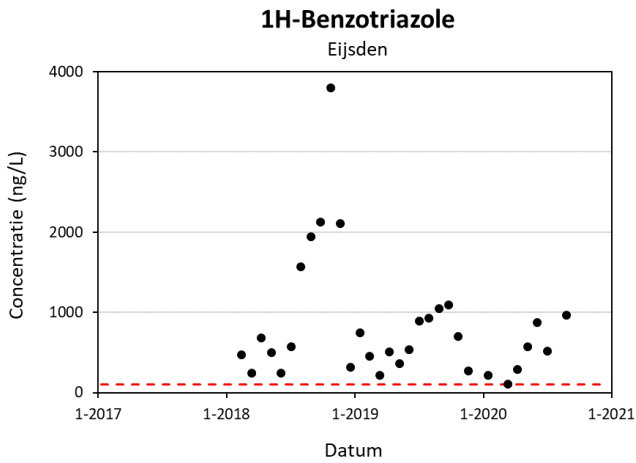


Eems + zee

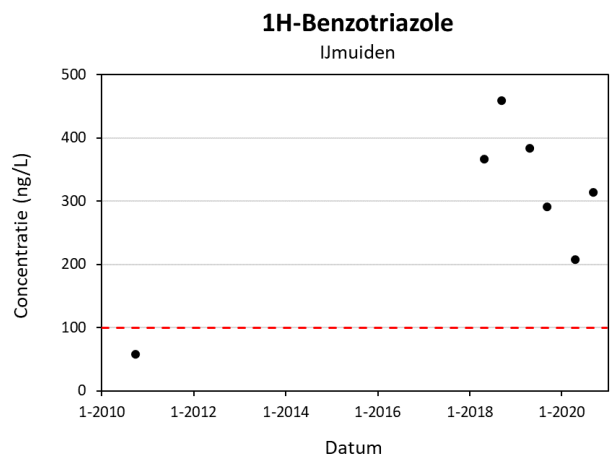
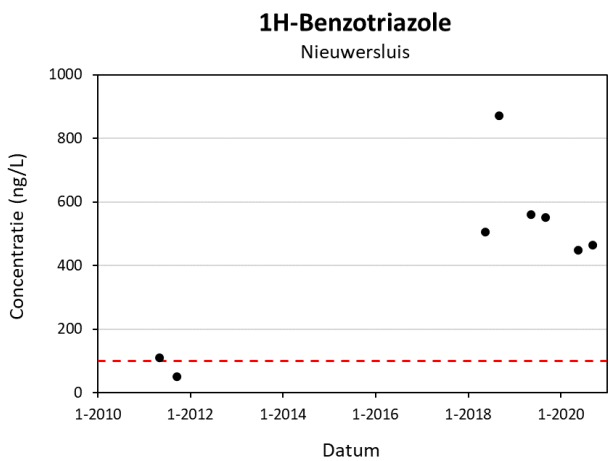
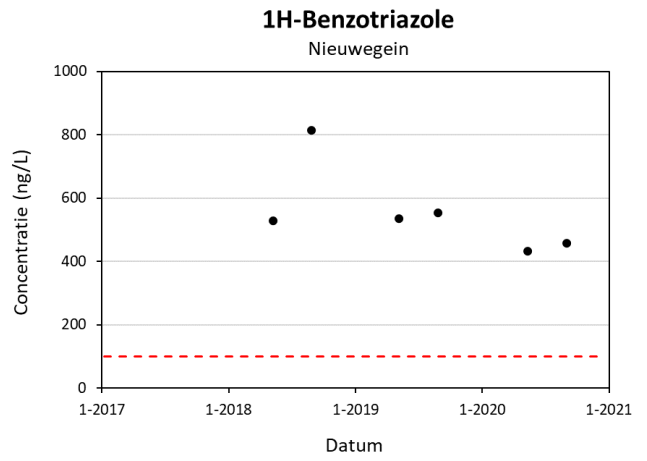
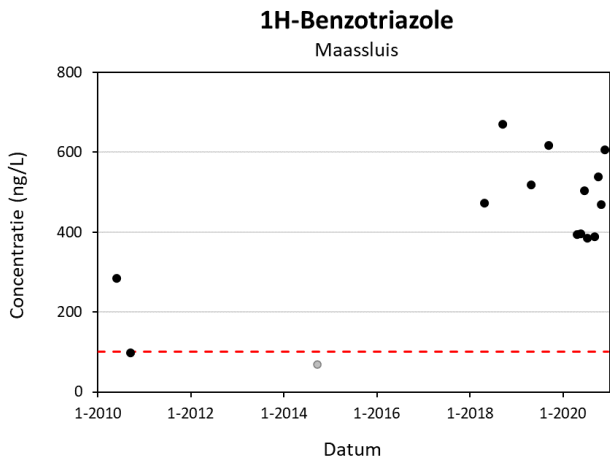
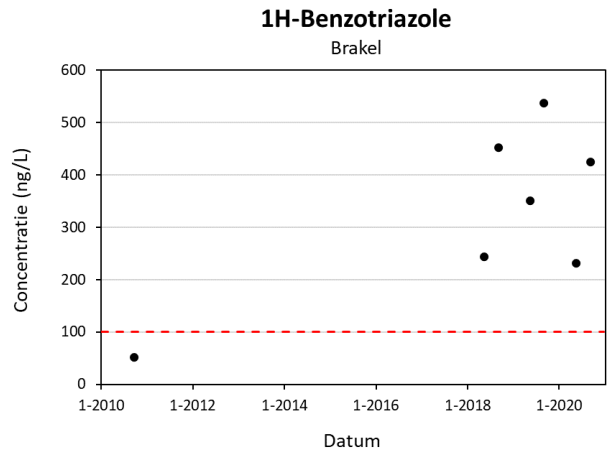
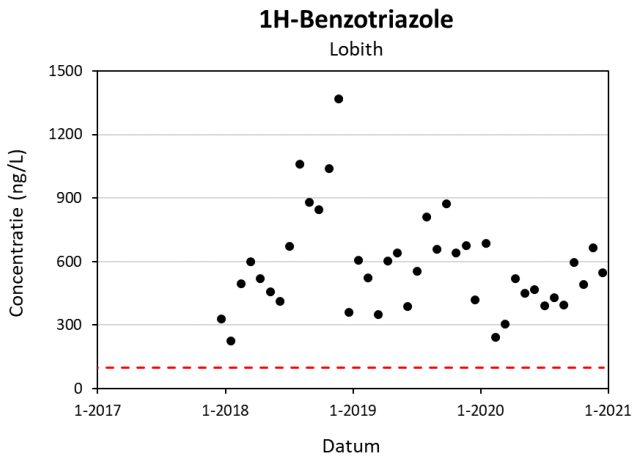


3. 1H-benzotriazole

Stroomgebied Maas

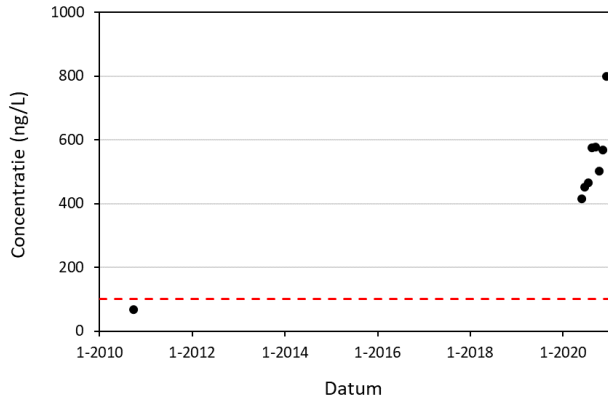


Stroomgebied Rijn



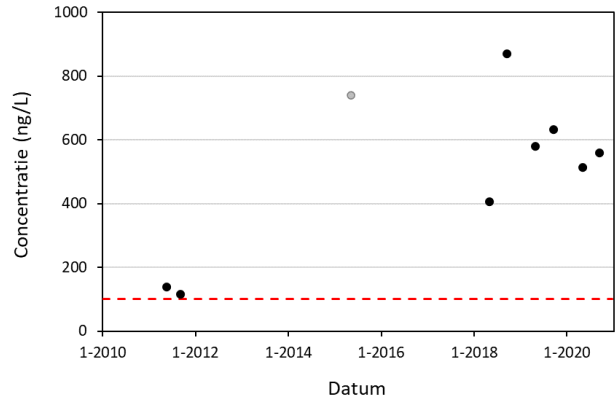
1H-Benzotriazole

Kampen



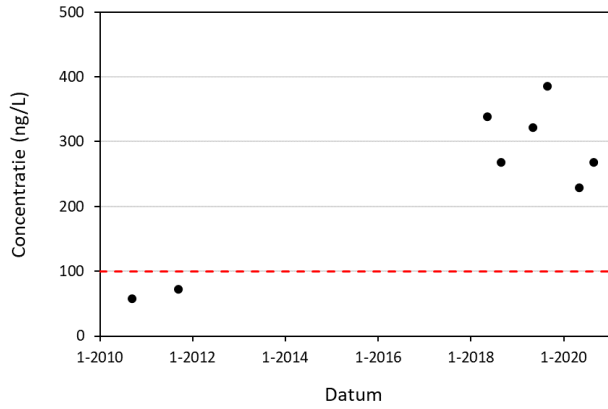
1H-Benzotriazole

Ketelmeer



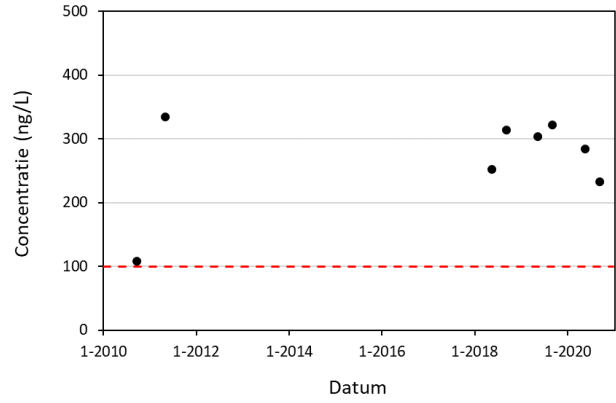
1H-Benzotriazole

Vrouwezand



1H-Benzotriazole

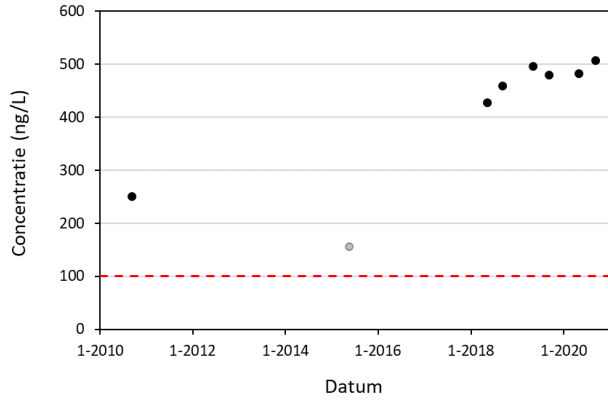
Andijk



Stroomgebied Schelde

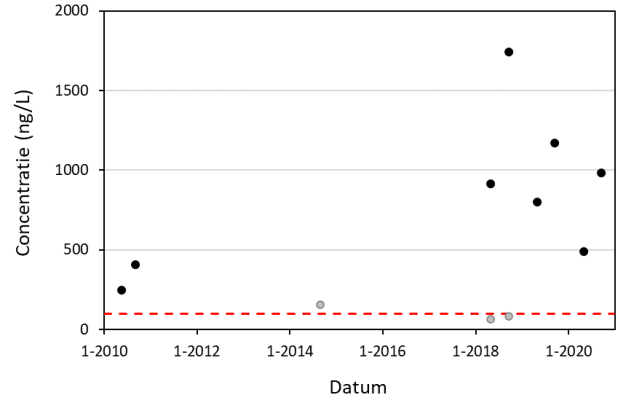
1H-Benzotriazole

Schaar van Ouden Doel



1H-Benzotriazole

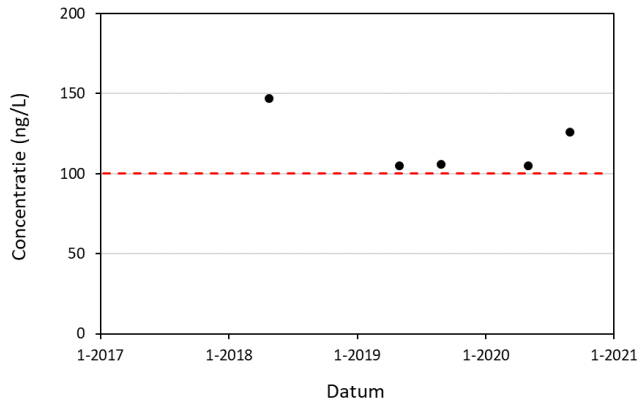
Sas van Gent



Eems + zee

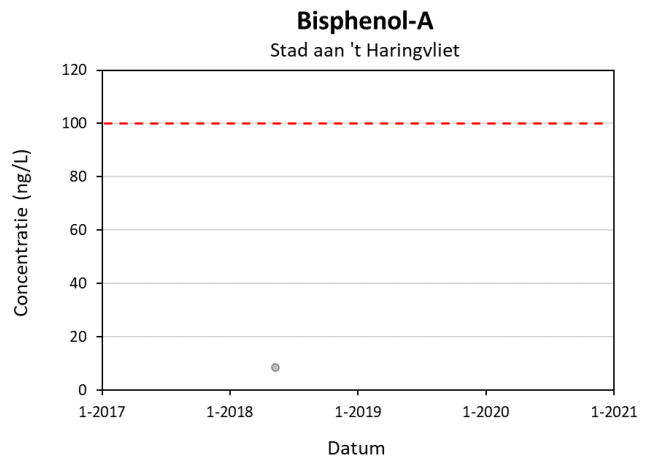
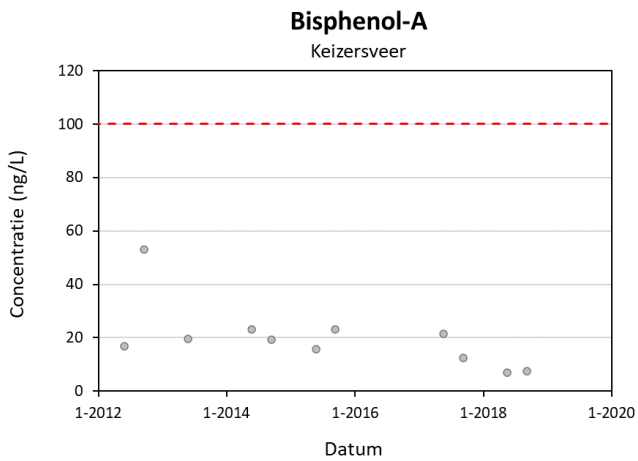
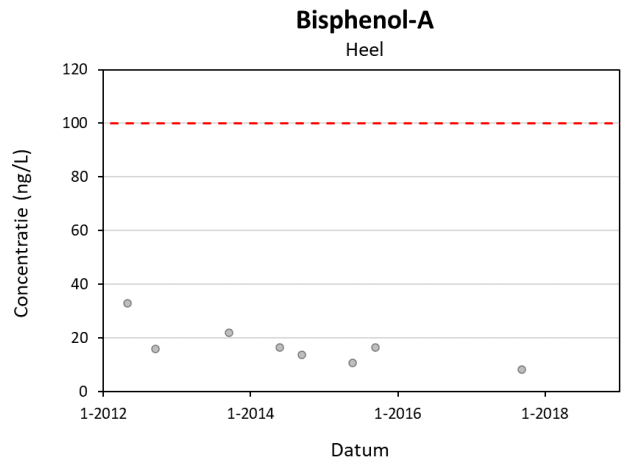
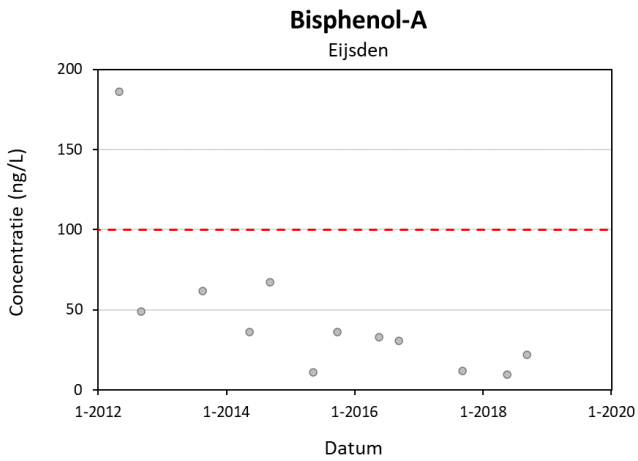
1H-Benzotriazole

Bocht van Watum

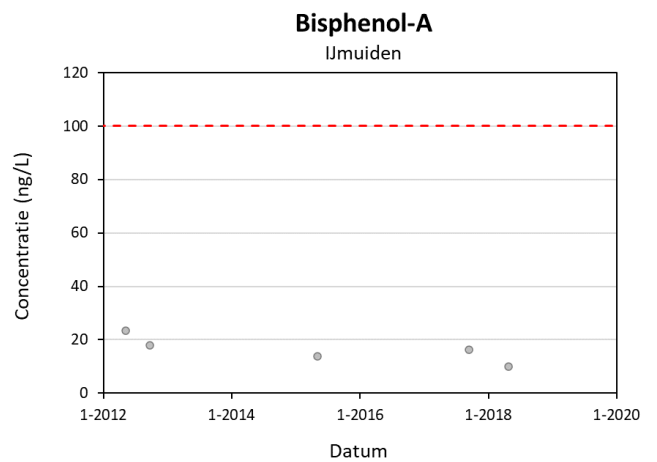
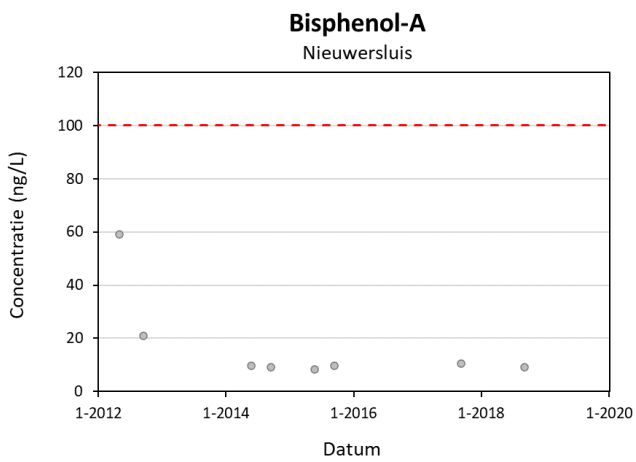
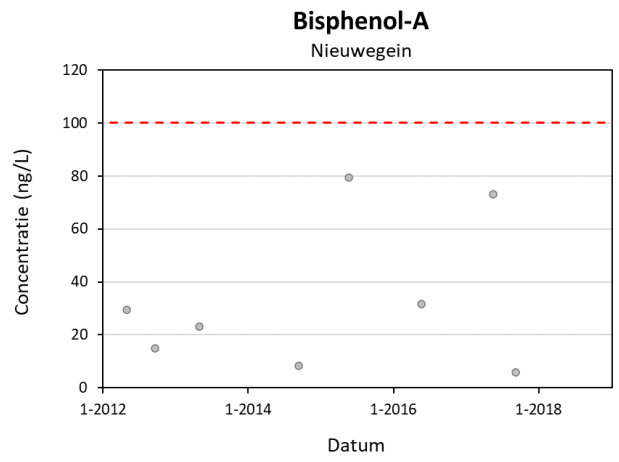
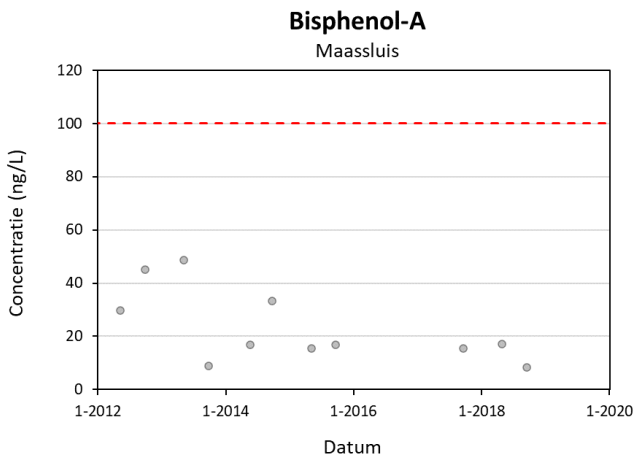
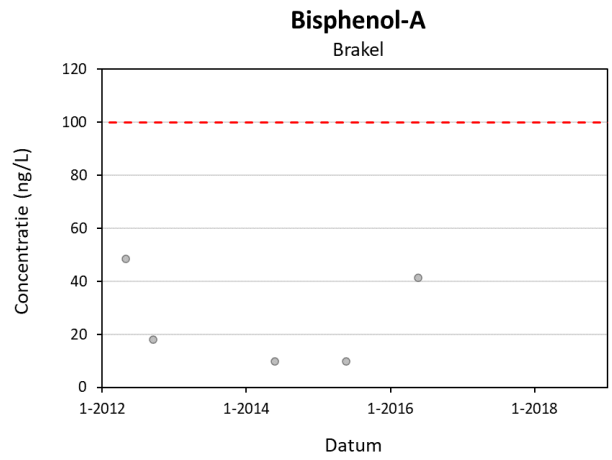
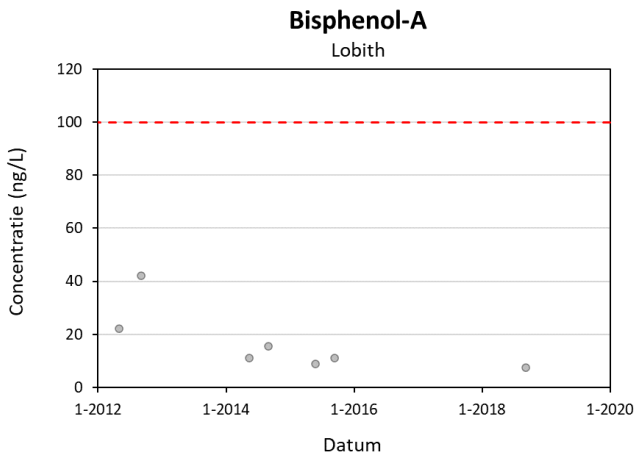


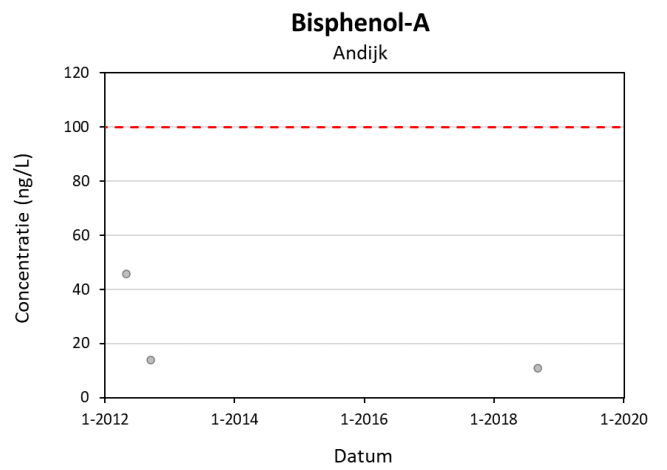
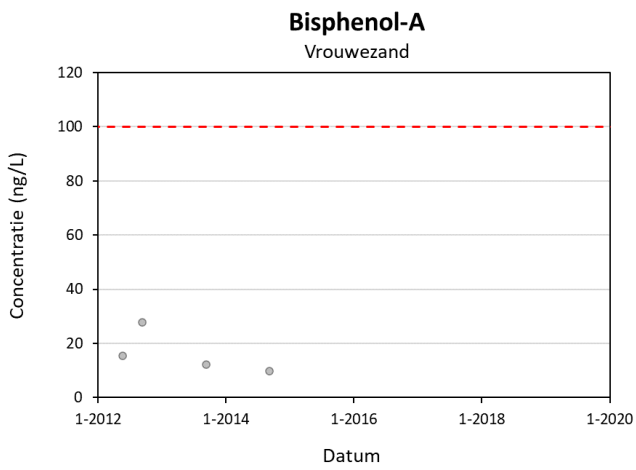
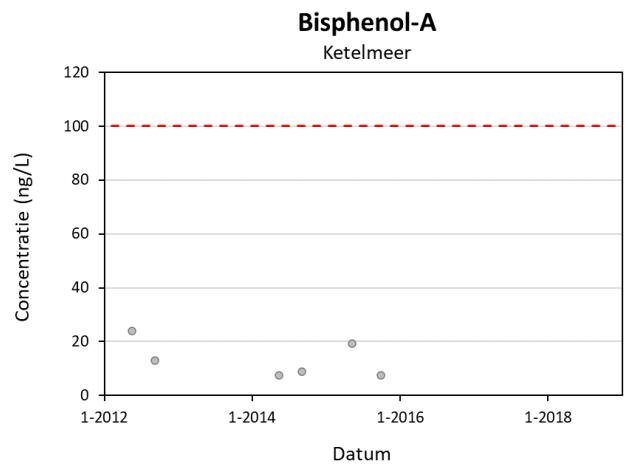
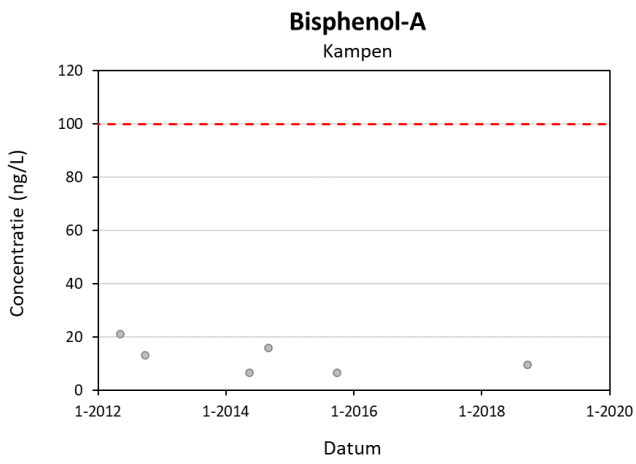
4. Bisfenol-A

Stroomgebied Maas

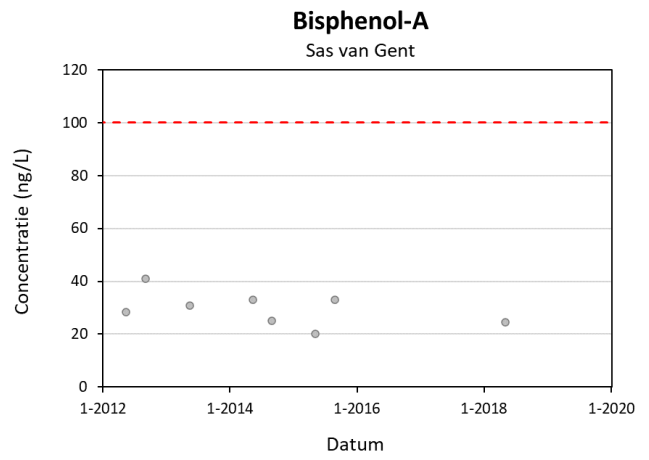
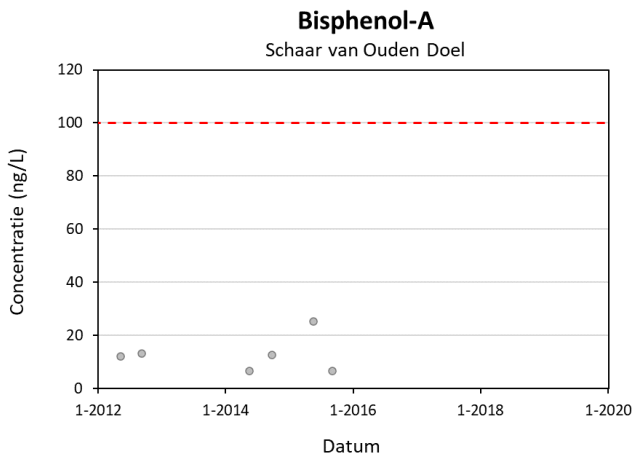


Stroomgebied Rijn

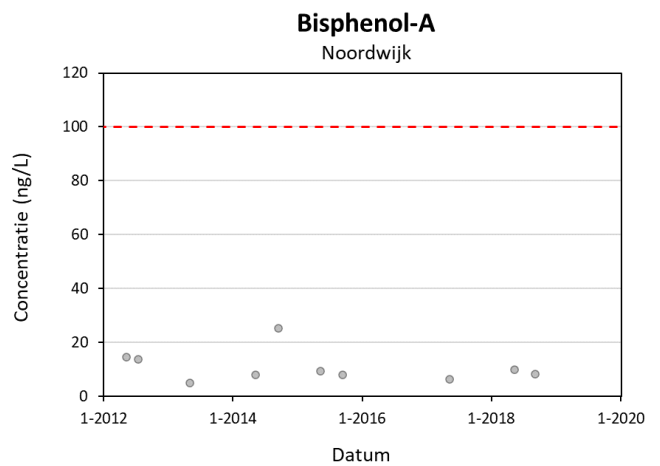
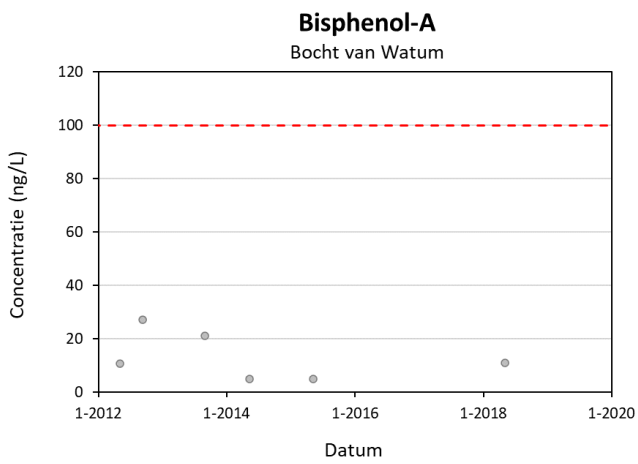




Stroomgebied Schelde

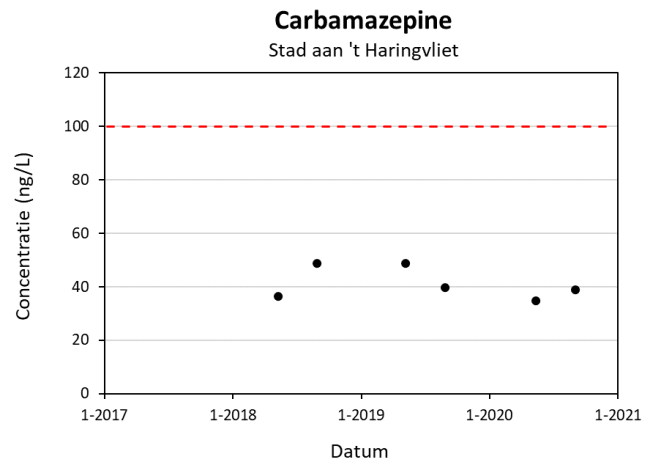
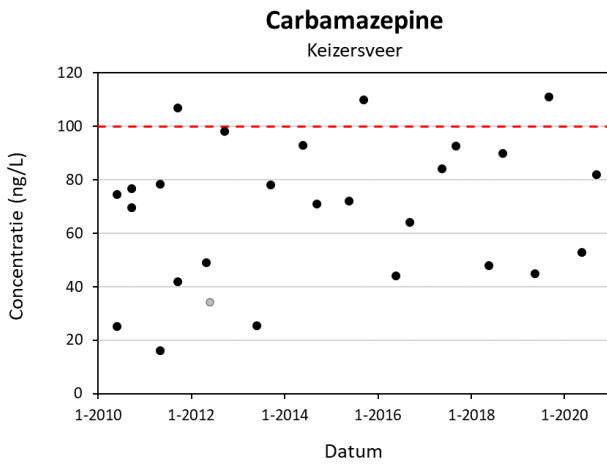
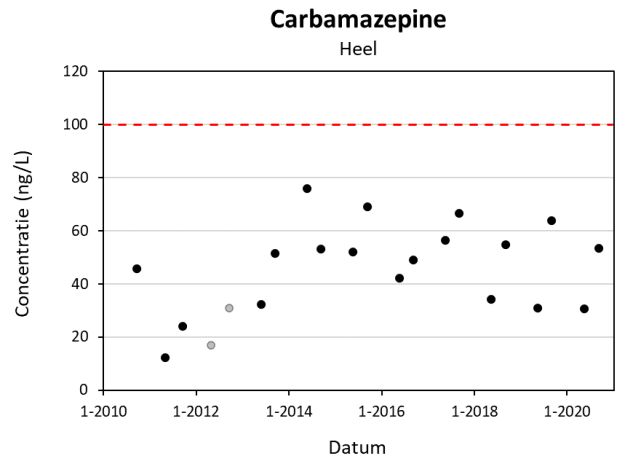
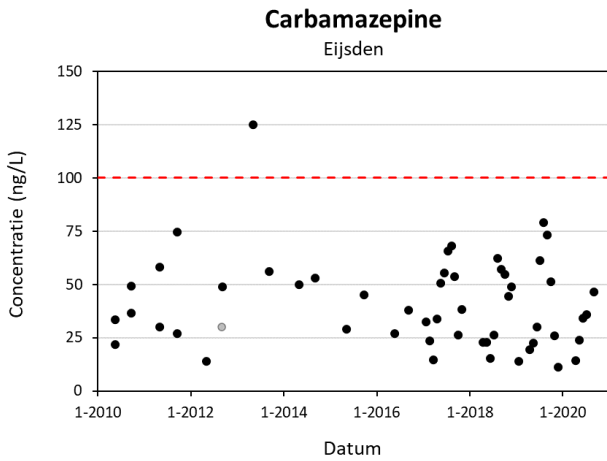


Eems + zee



5. Carbamazepine

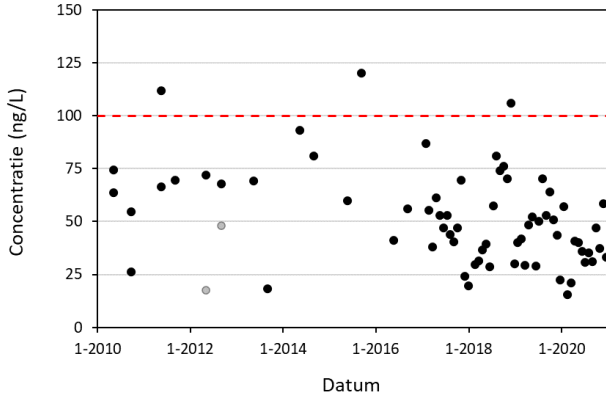
Stroomgebied Maas



Stroomgebied Rijn

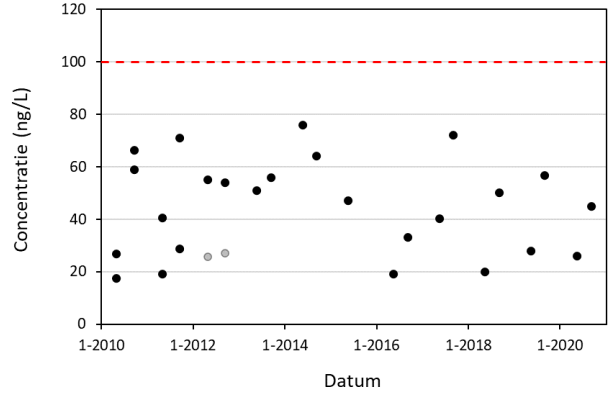
Carbamazepine

Lobith



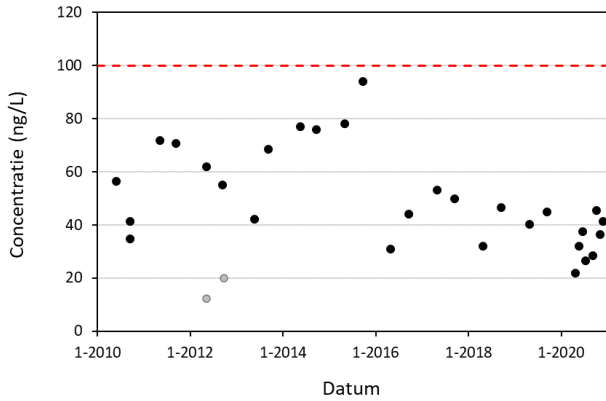
Carbamazepine

Brakel



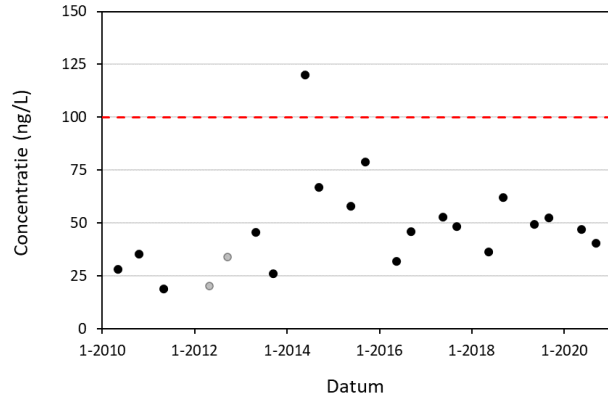
Carbamazepine

Maassluis



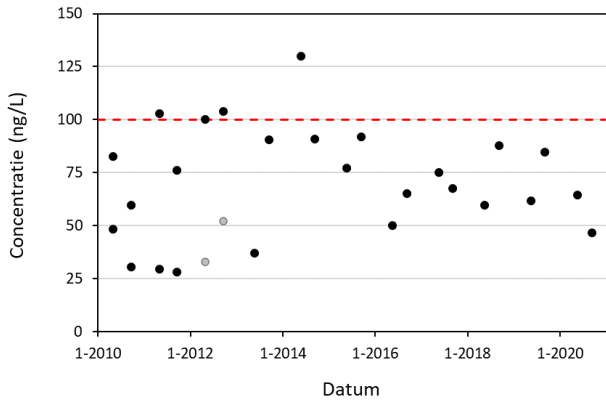
Carbamazepine

Nieuwegein



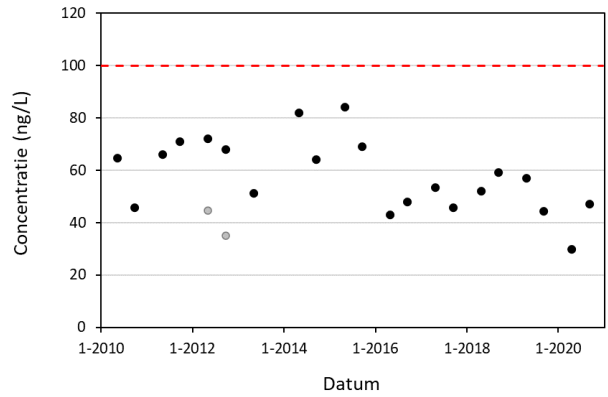
Carbamazepine

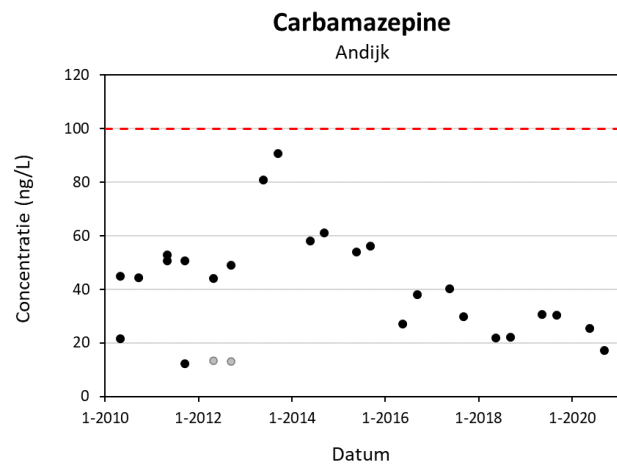
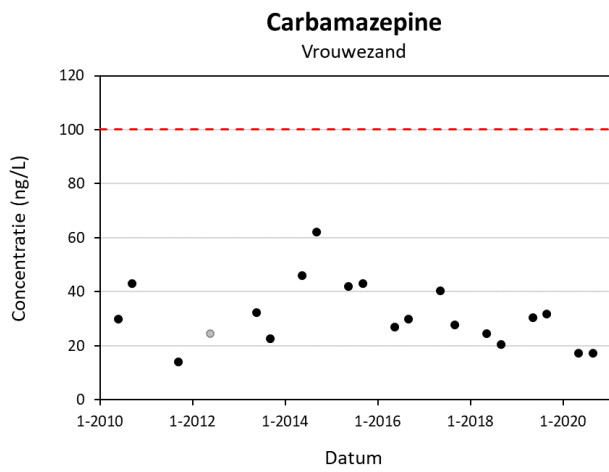
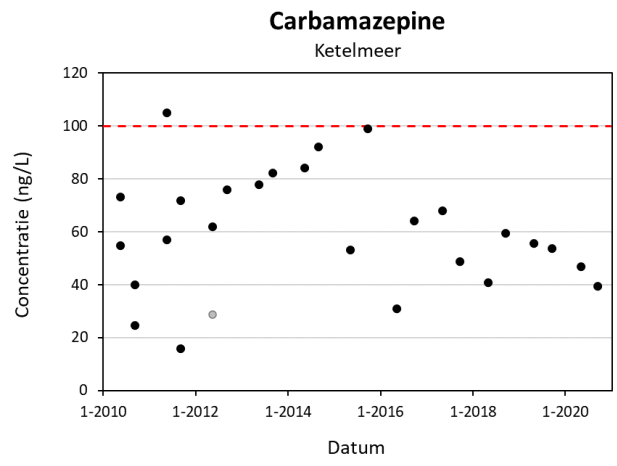
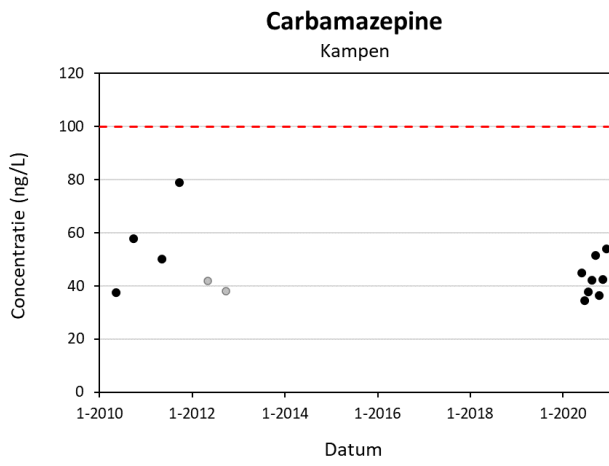
Nieuwersluis



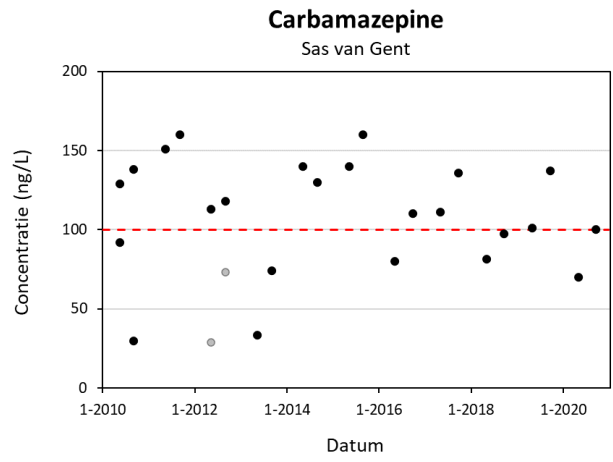
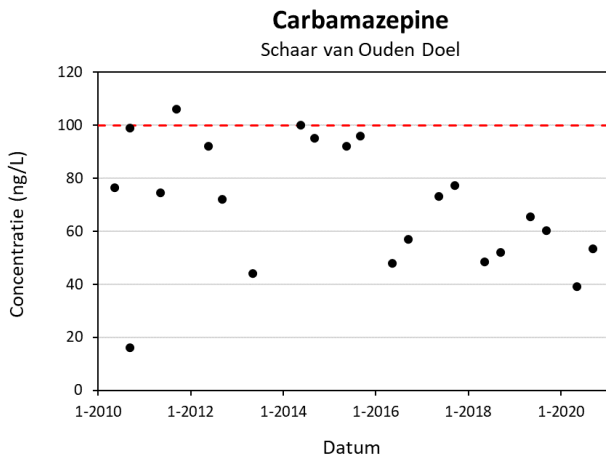
Carbamazepine

Ijmuiden

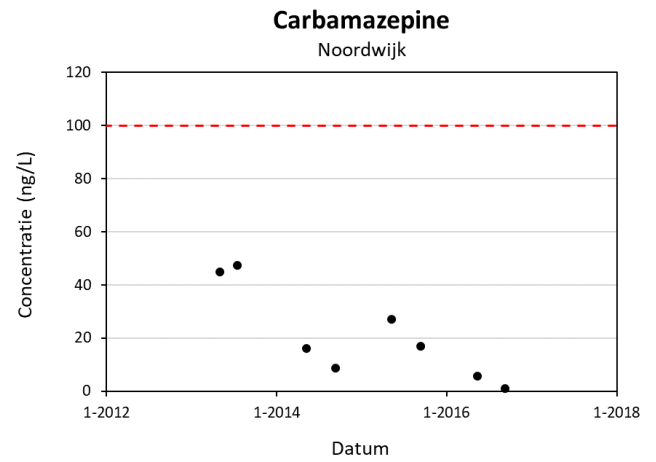
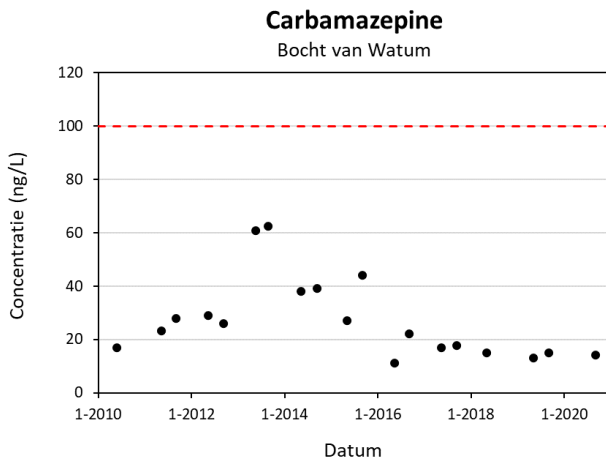




Stroomgebied Schelde

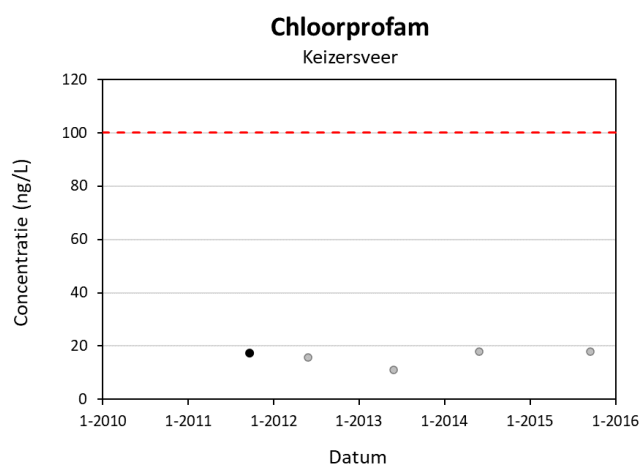
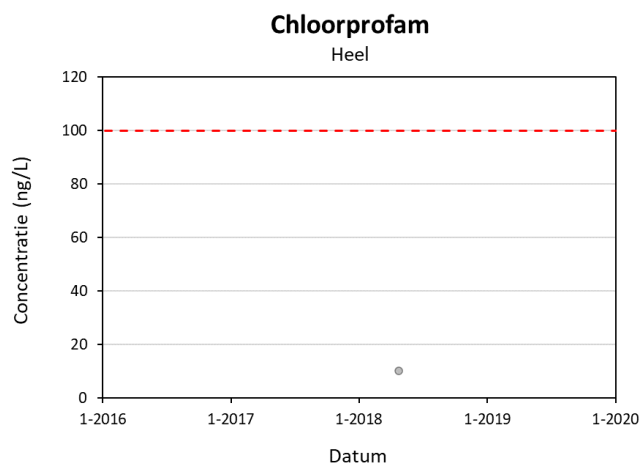
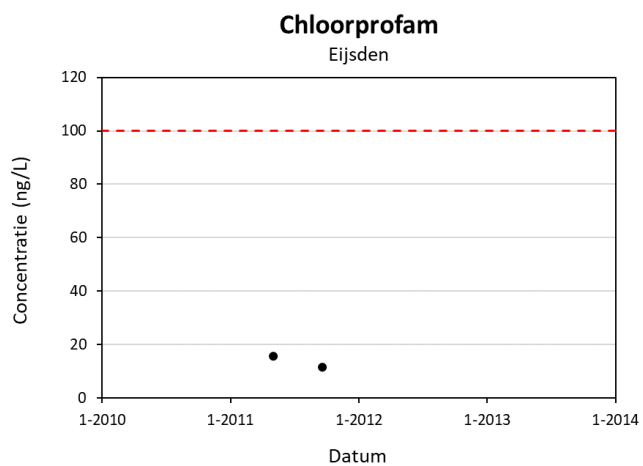


Eems + zee



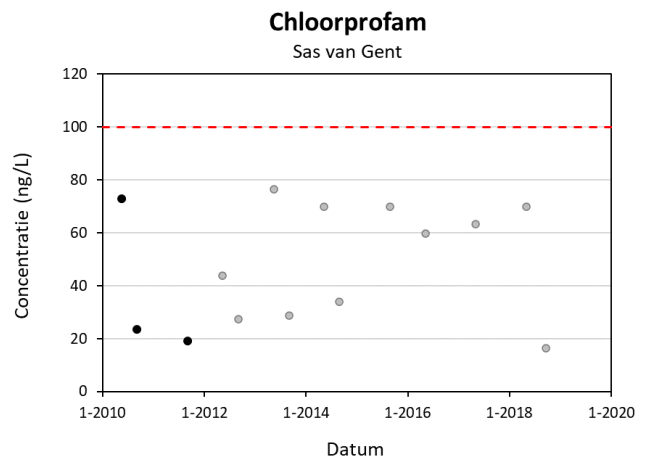
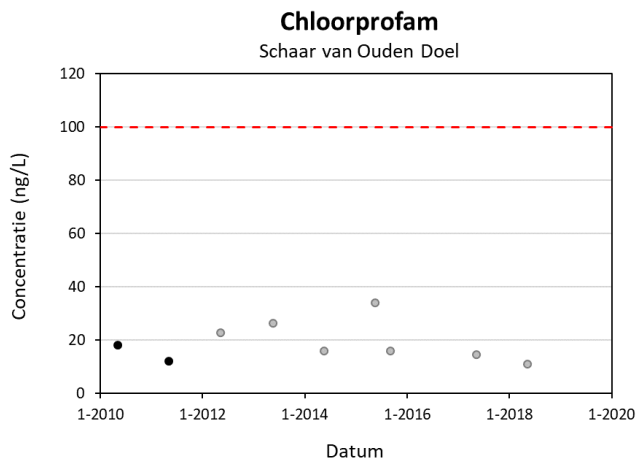
6. Chloorprofam

Stroomgebied Maas



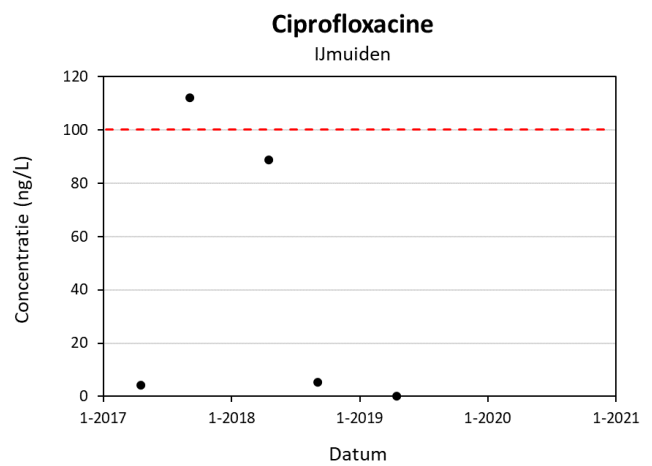
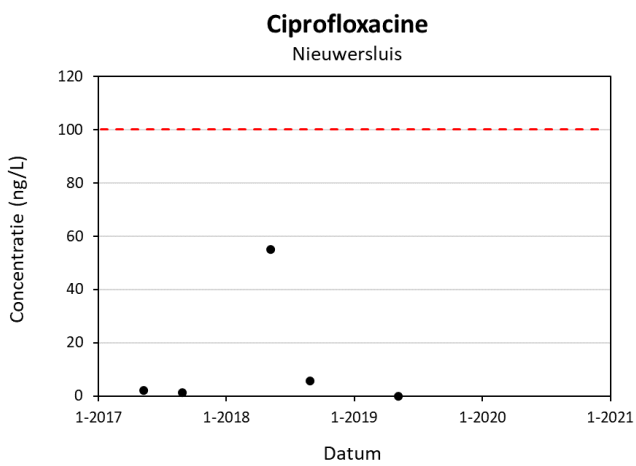
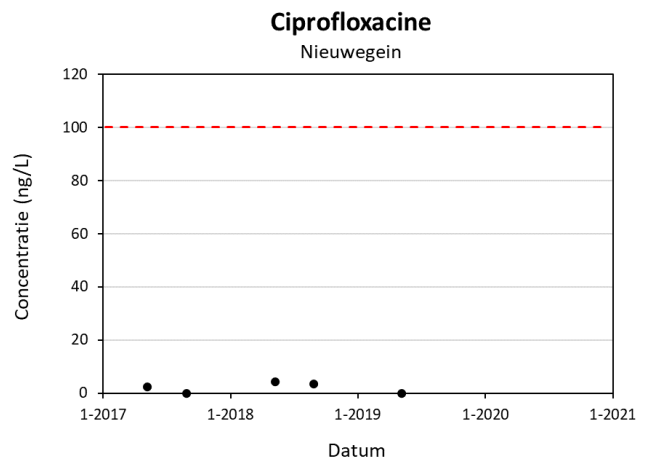
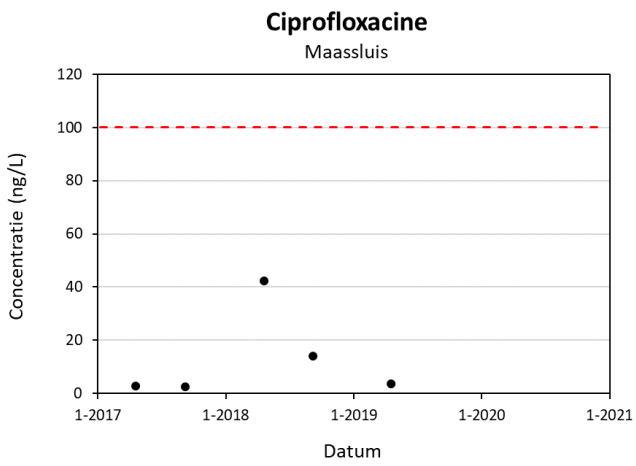
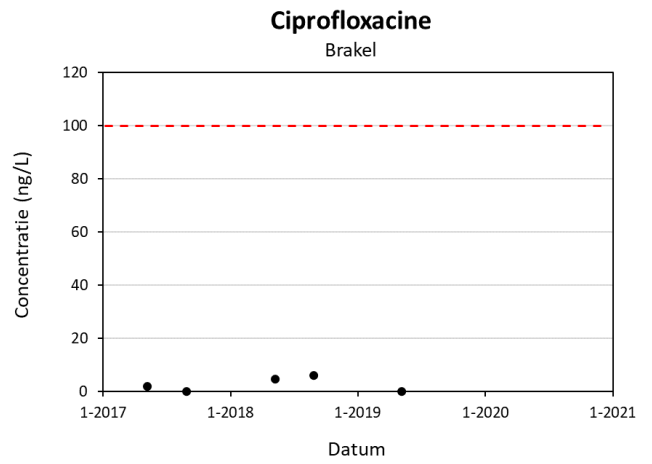
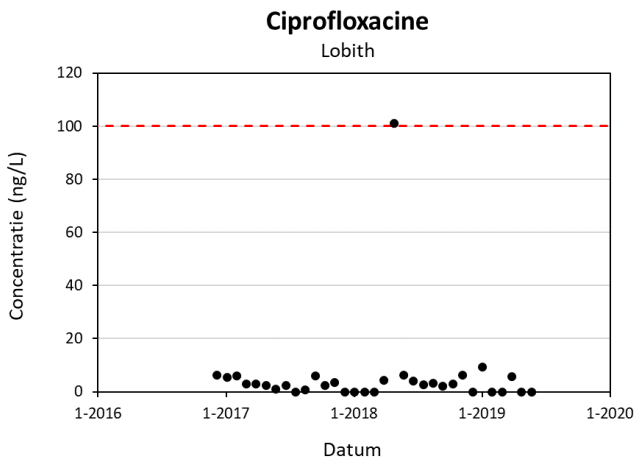
Stroomgebied Rijn

Stroomgebied Schelde



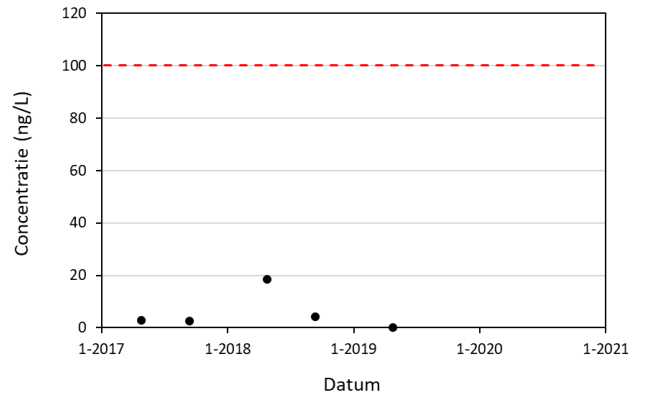
Eems + zee

Stroomgebied Rijn



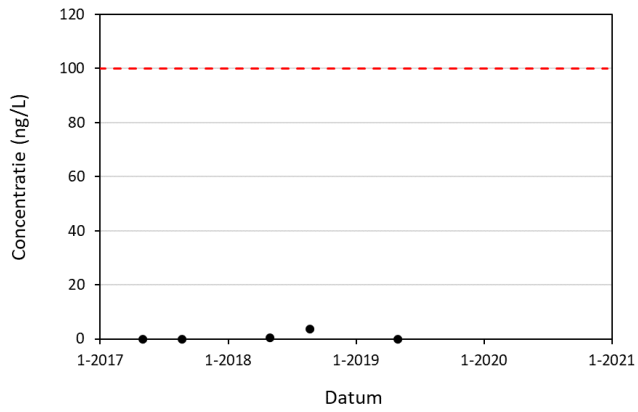
Ciprofloxacin

Ketelmeer



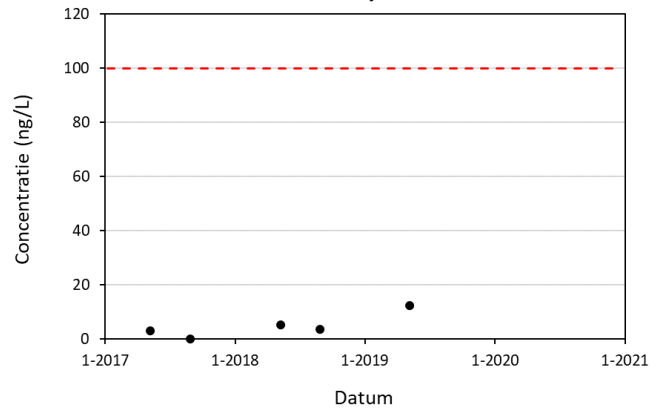
Ciprofloxacin

Vrouwezand

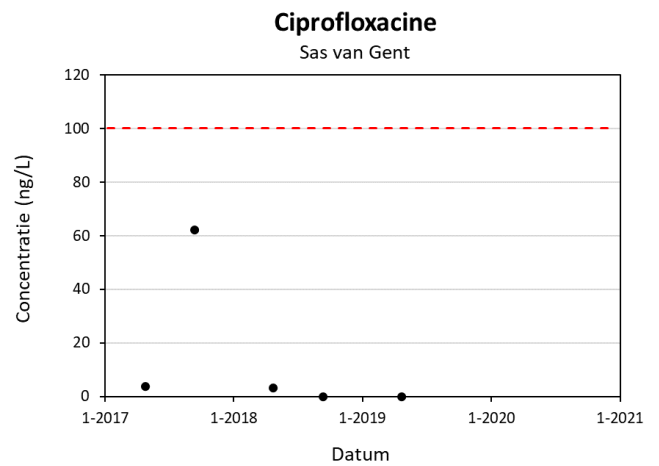
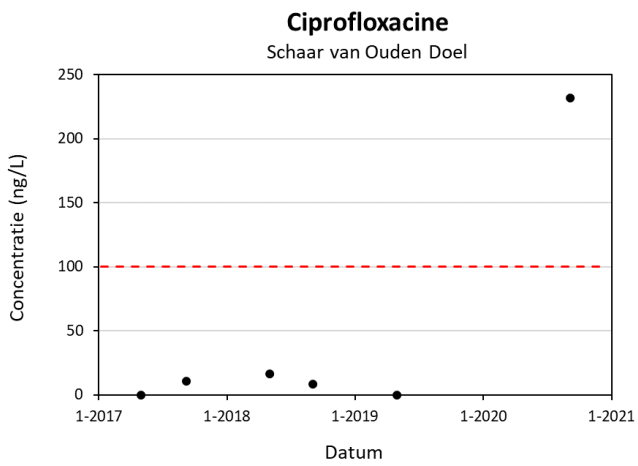


Ciprofloxacin

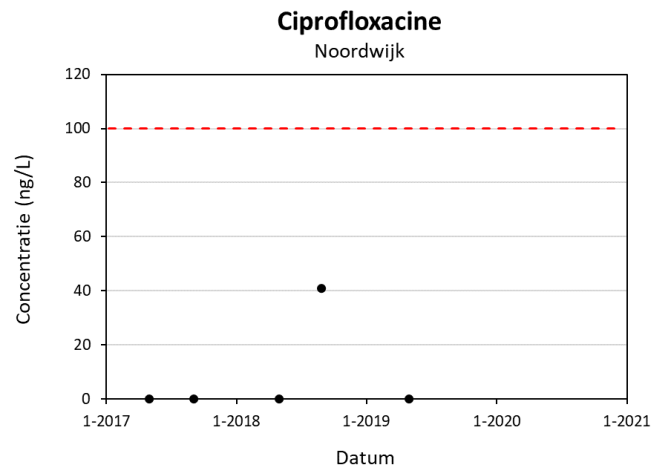
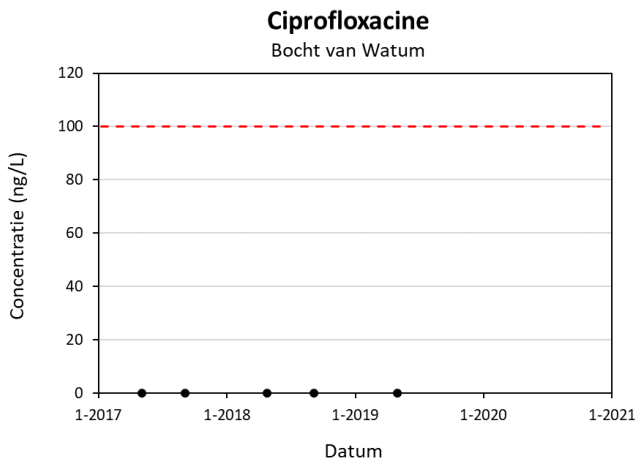
Andijk



Stroomgebied Schelde



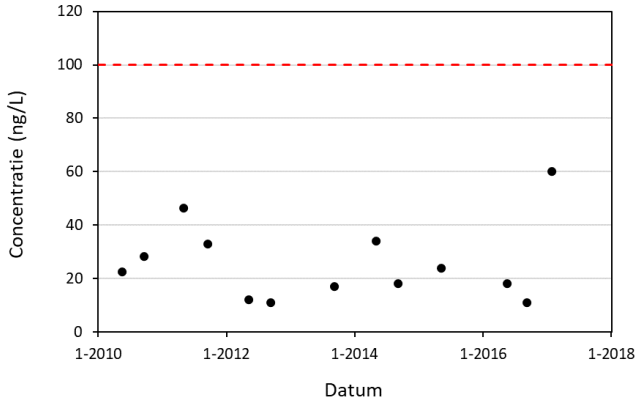
Eems + zee



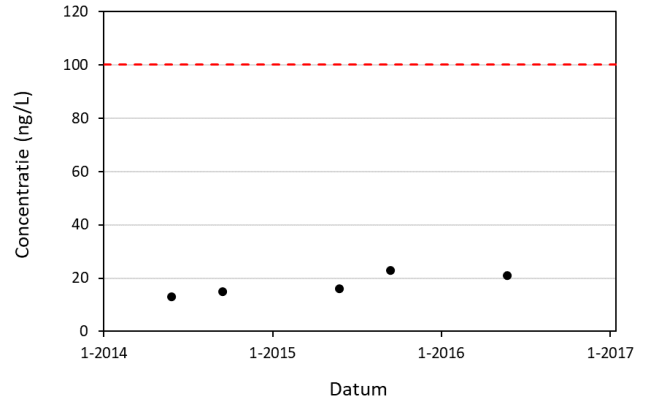
8. Claritromycine

Stroomgebied Maas

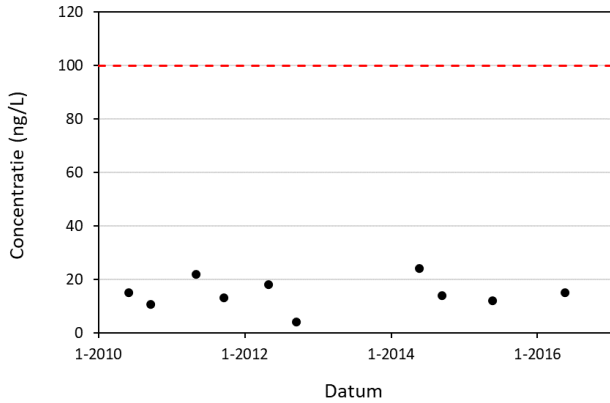
Claritromycine
Eijsden



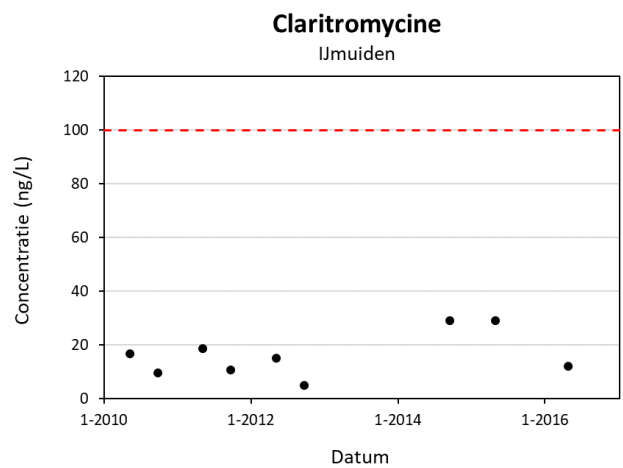
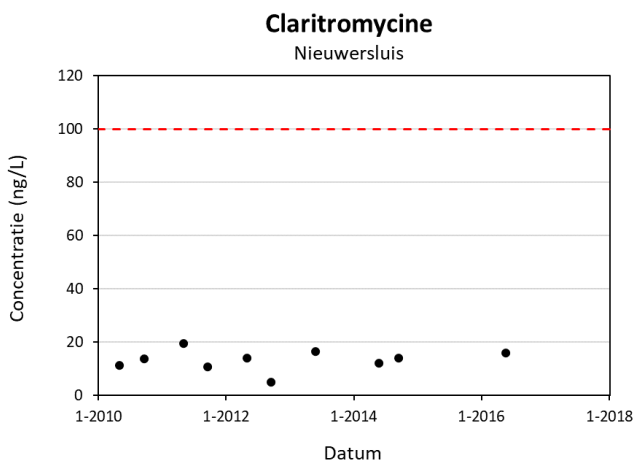
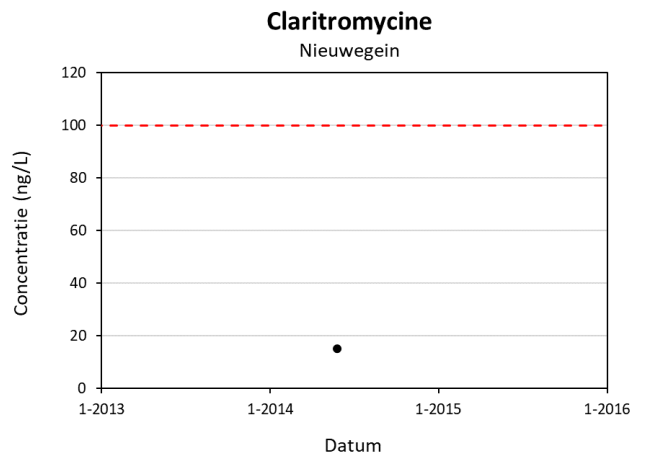
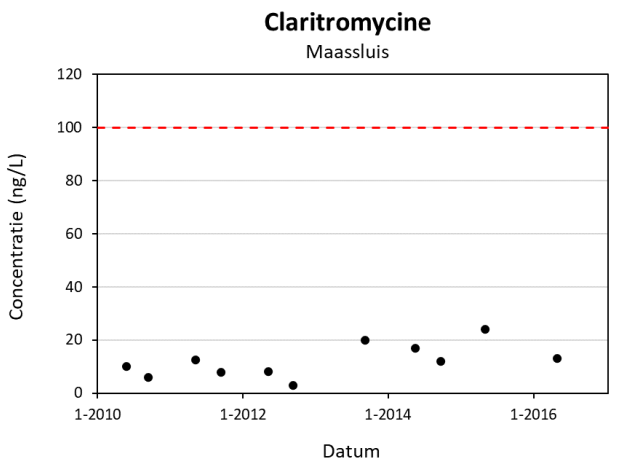
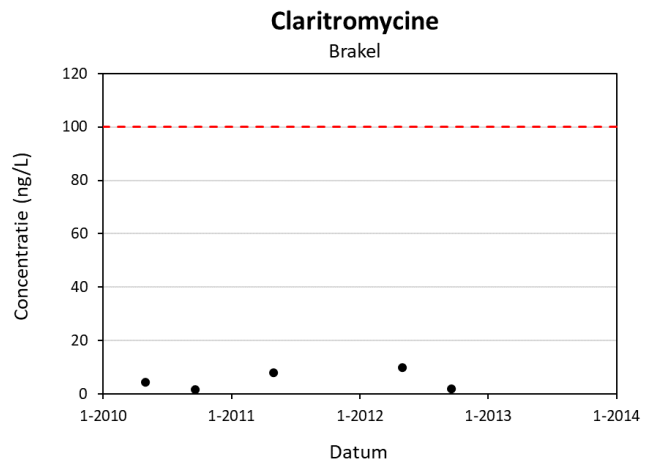
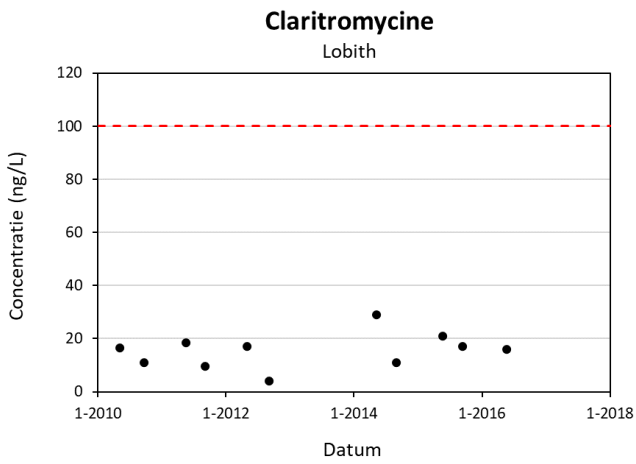
Claritromycine
Heel



Claritromycine
Keizersveer

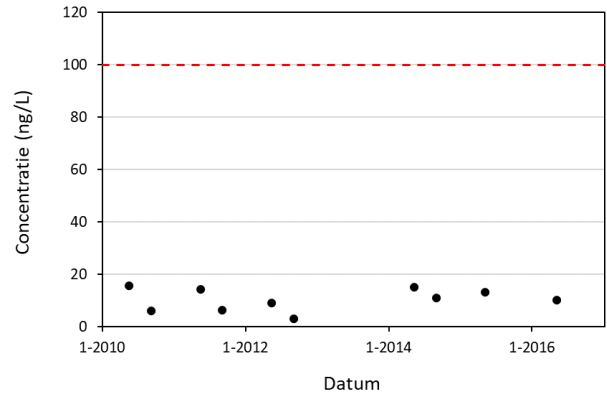


Stroomgebied Rijn



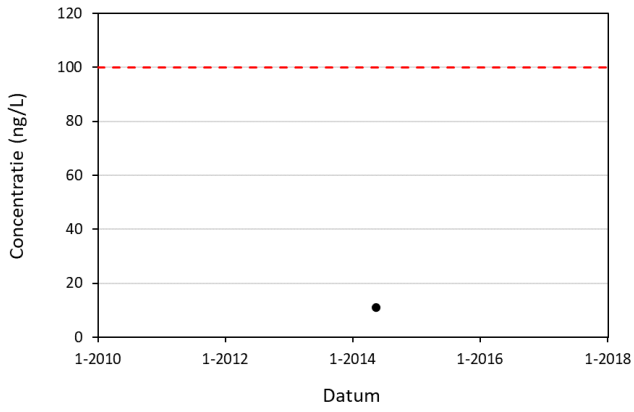
Claritromycine

Ketelmeer



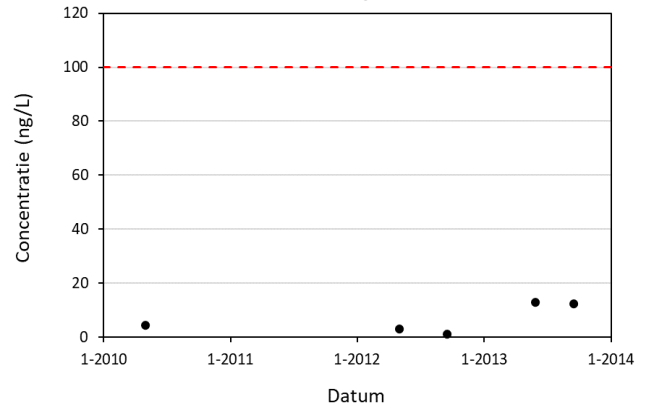
Claritromycine

Vrouwezand

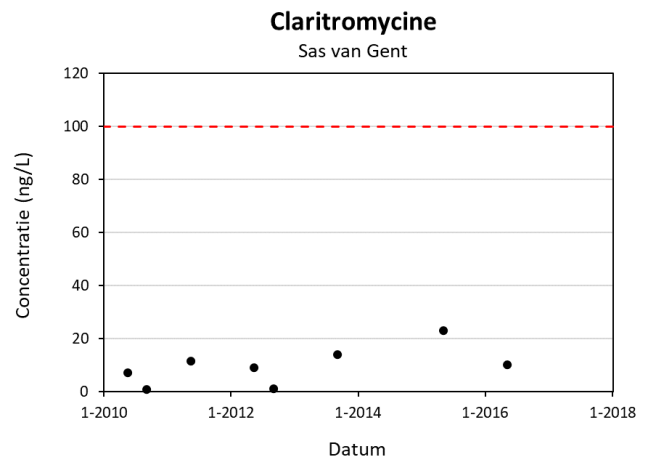
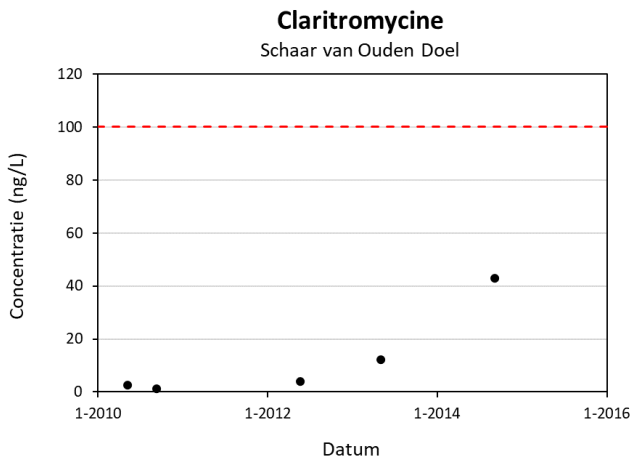


Claritromycine

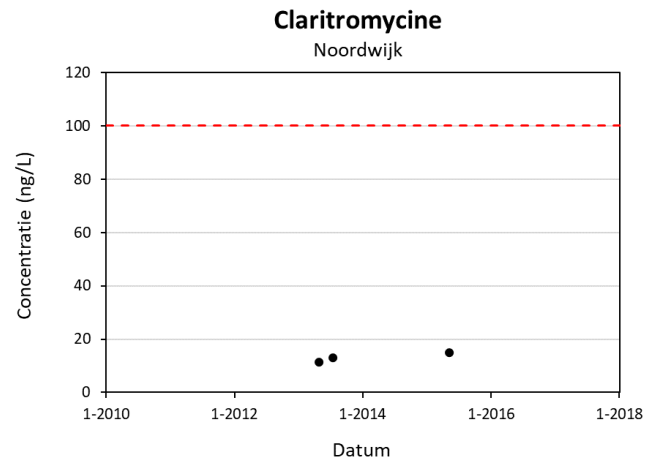
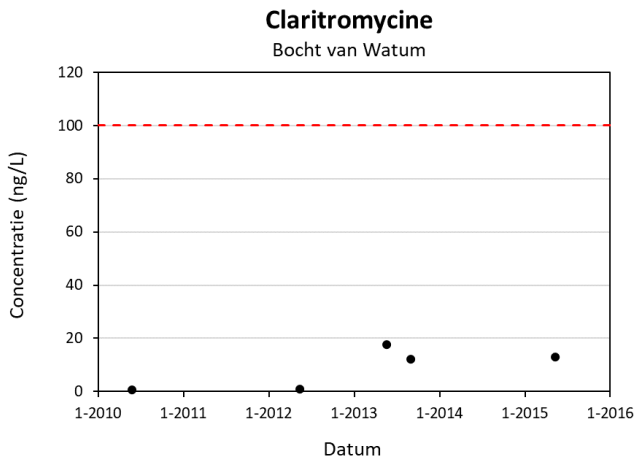
Andijk



Stroomgebied Schelde

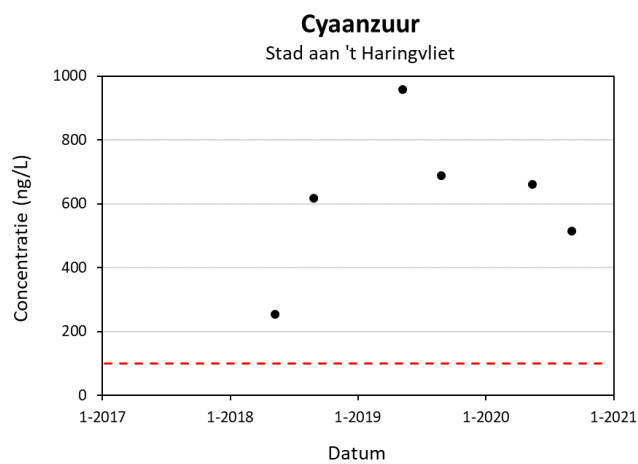
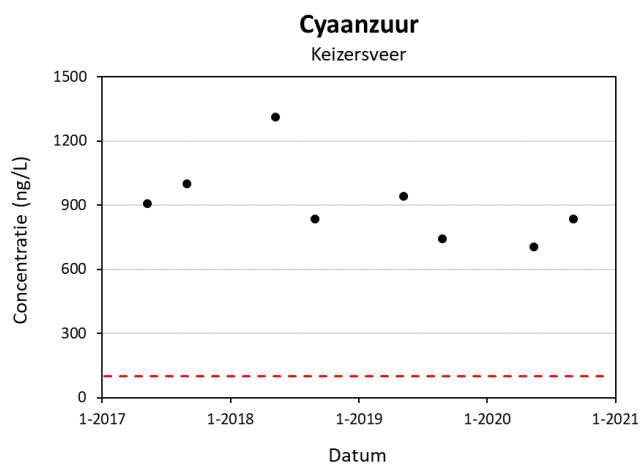
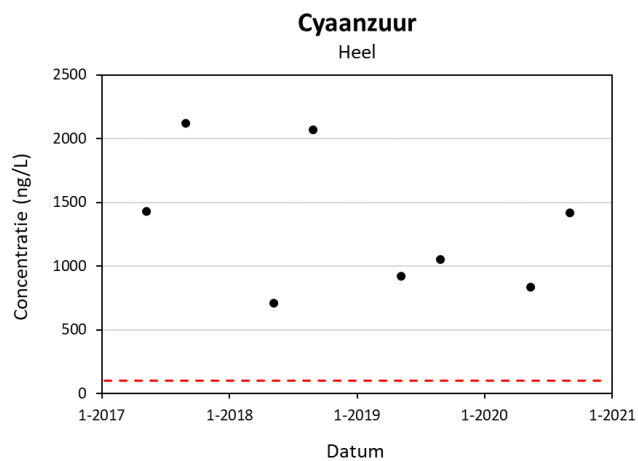
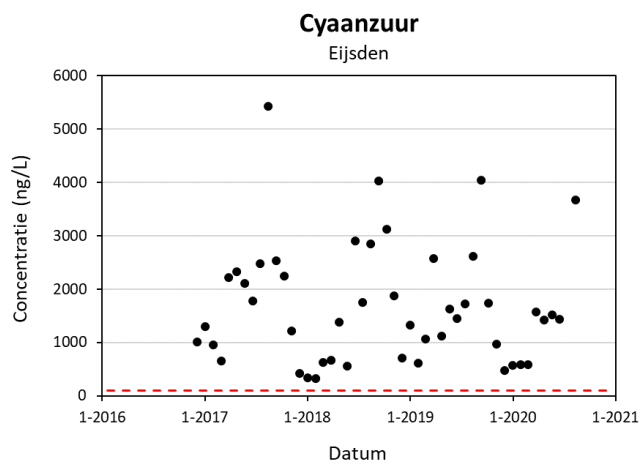


Eems + zee

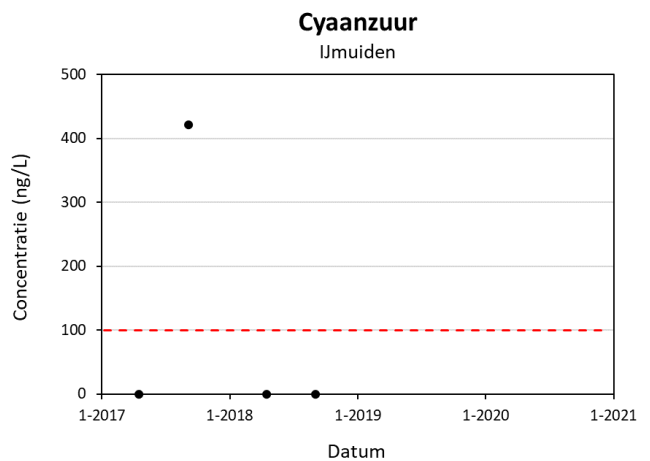
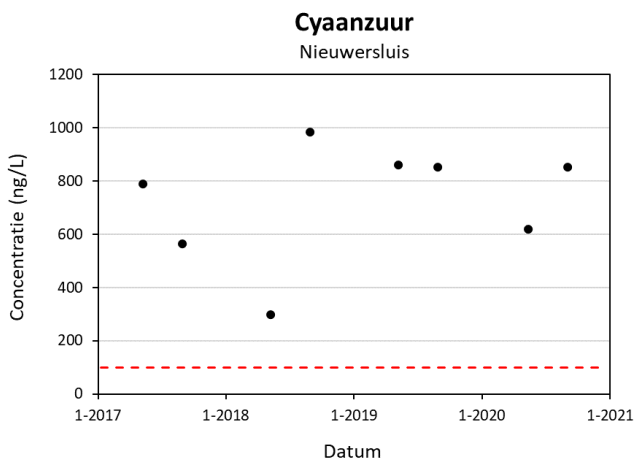
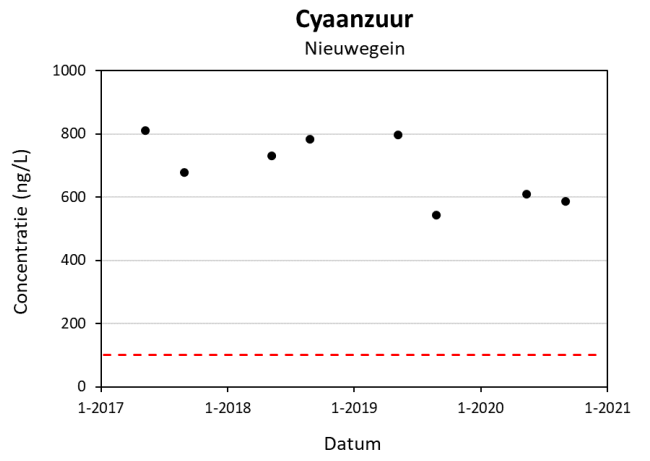
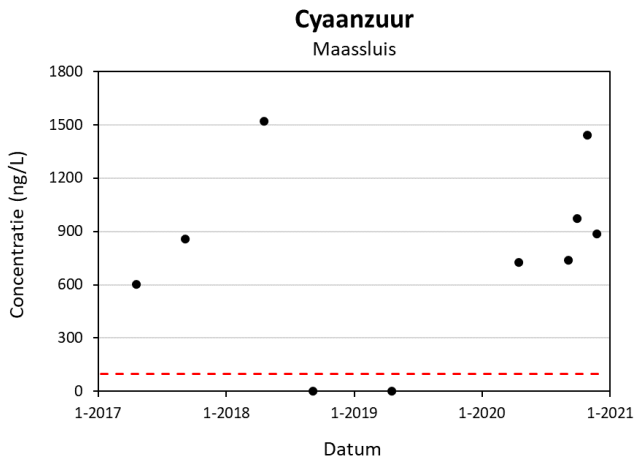
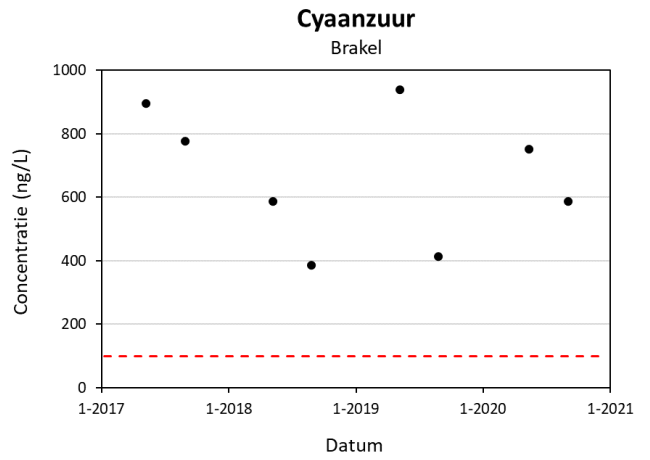
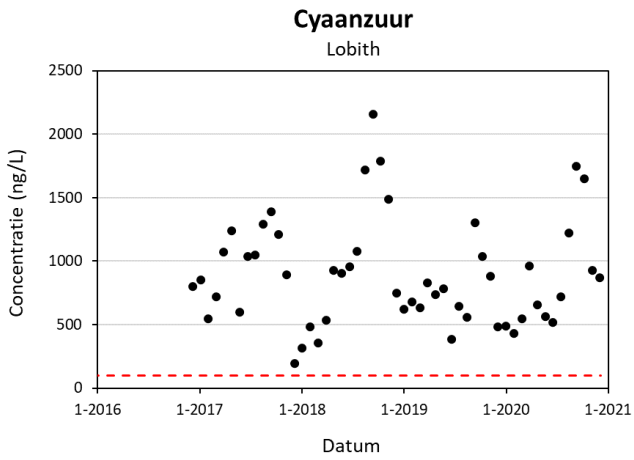


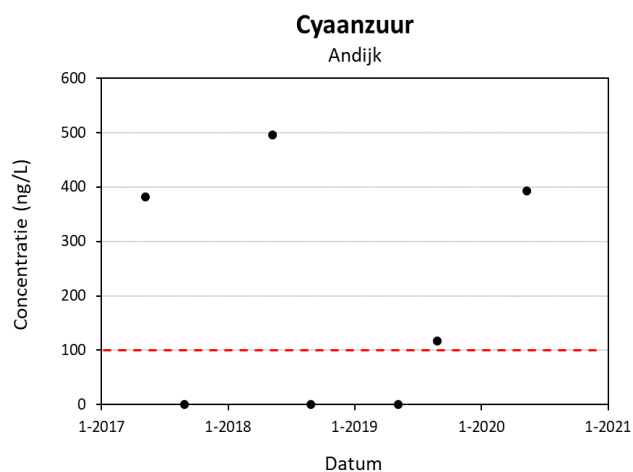
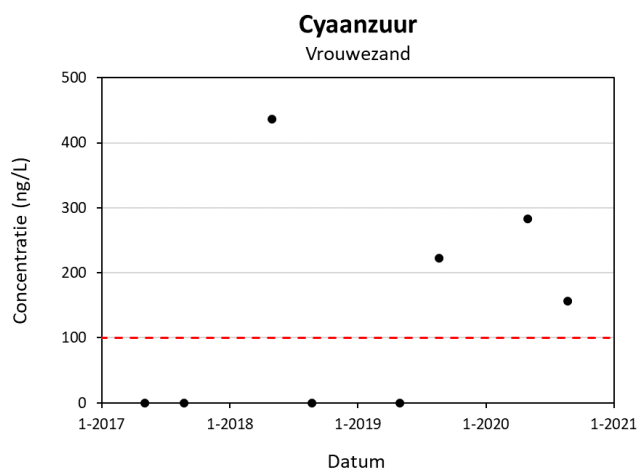
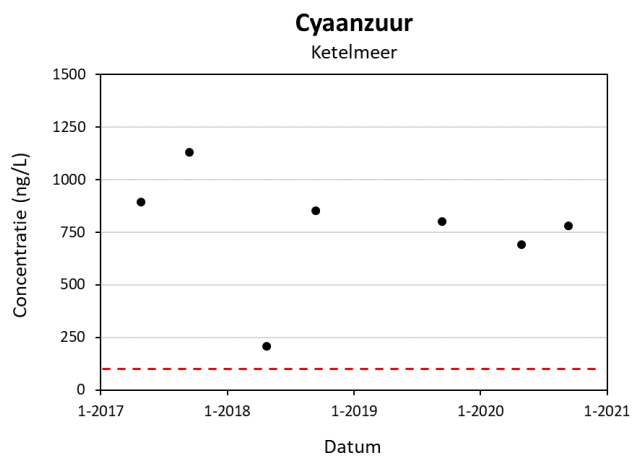
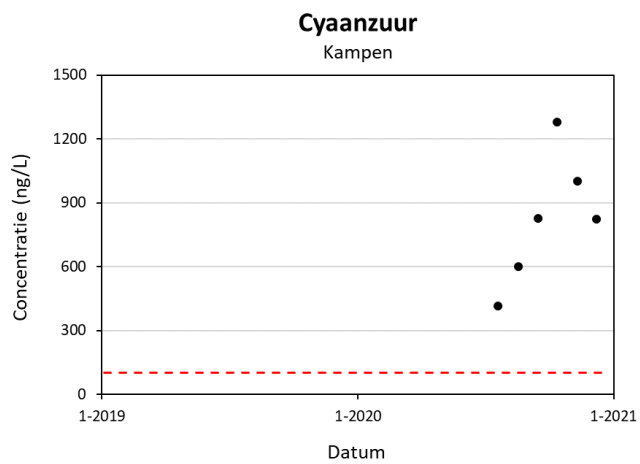
9. Cyaanzuur

Stroomgebied Maas

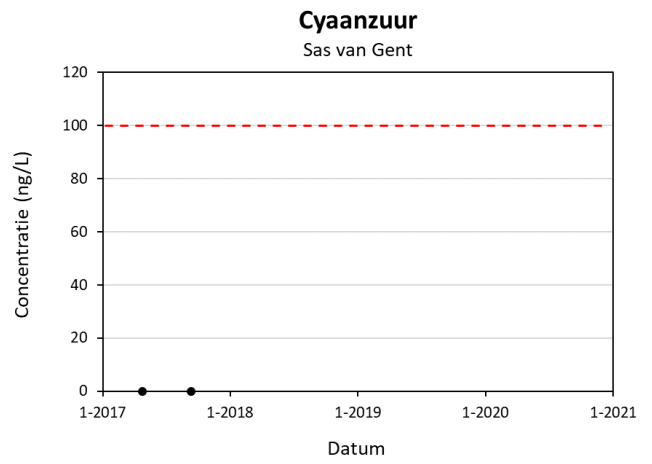
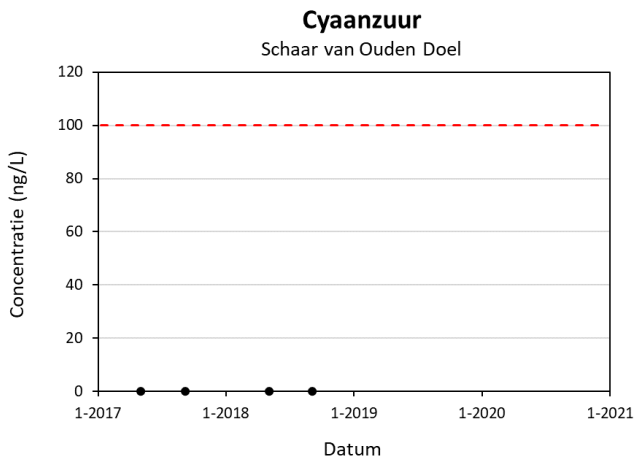


Stroomgebied Rijn

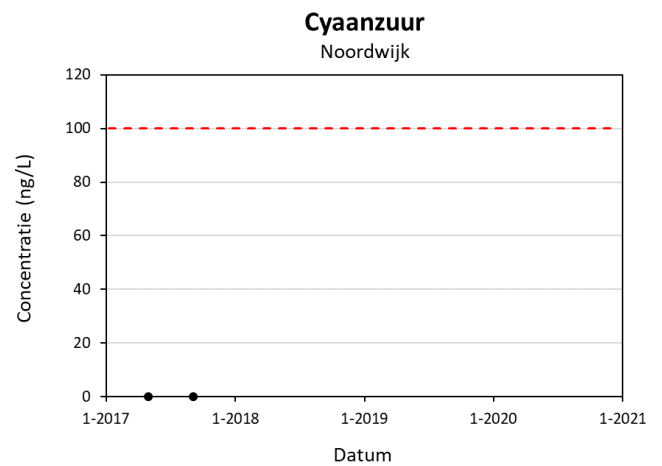
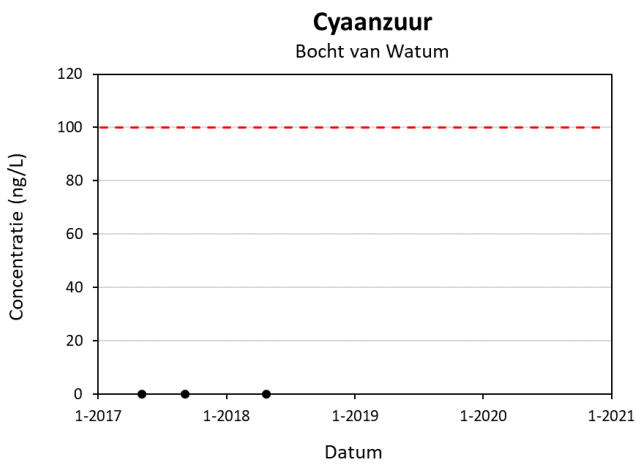




Stroomgebied Schelde

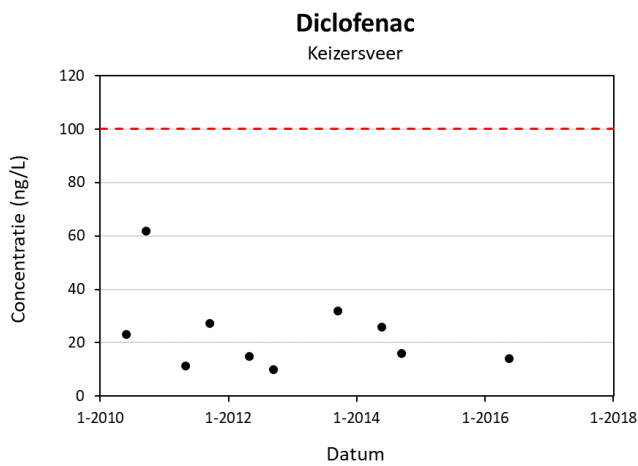
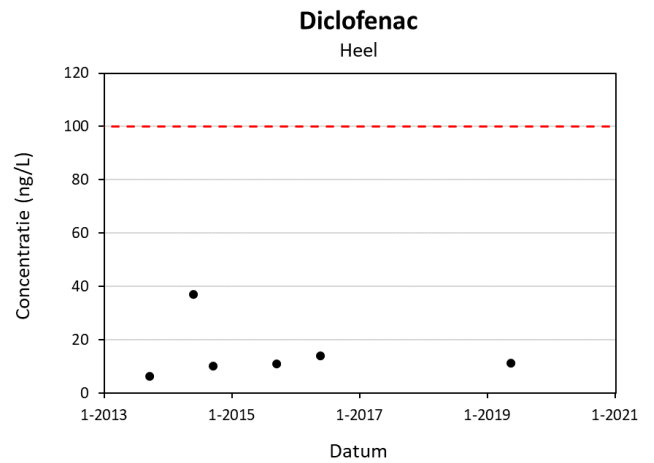
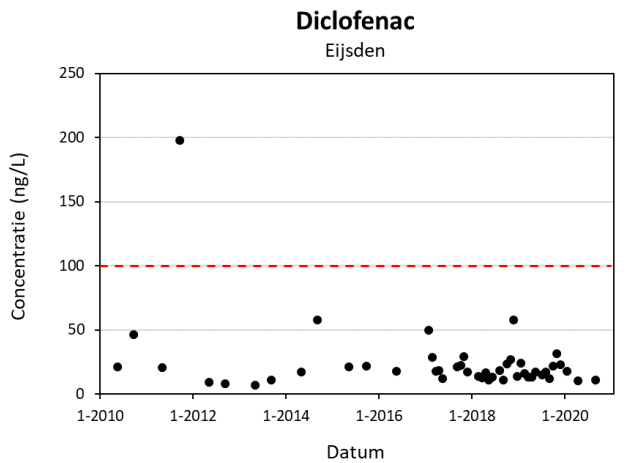


Eems + zee

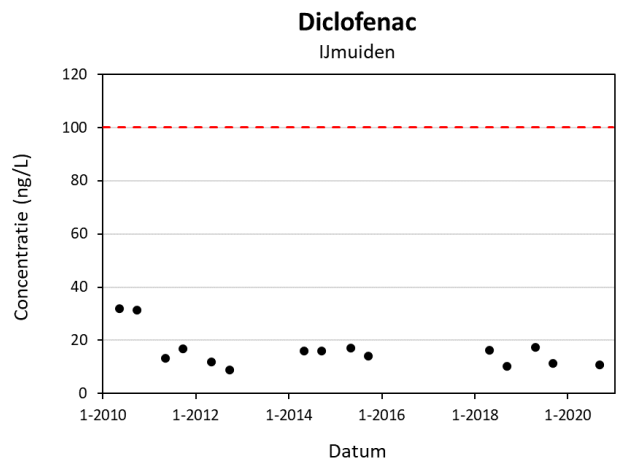
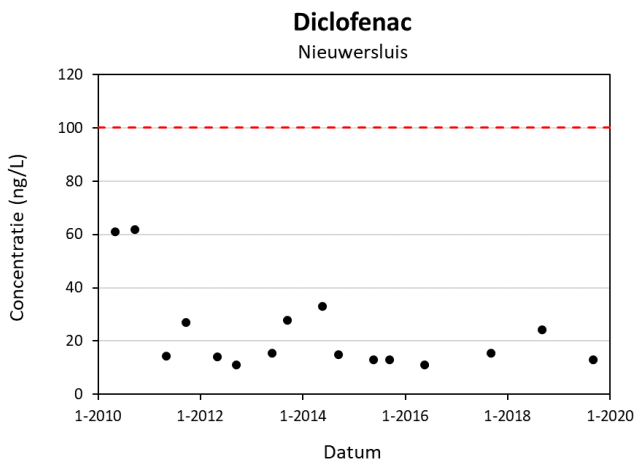
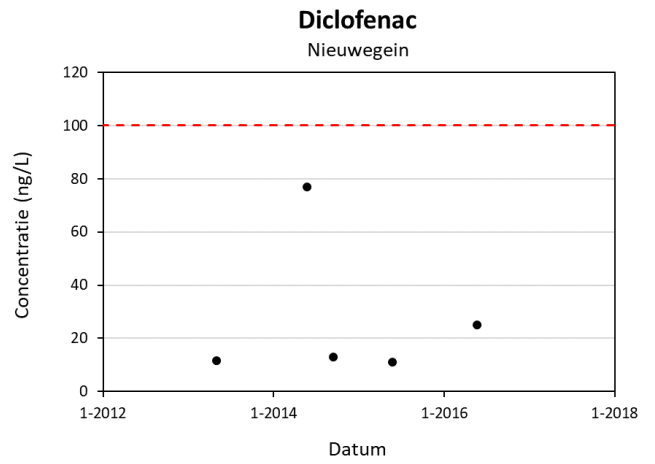
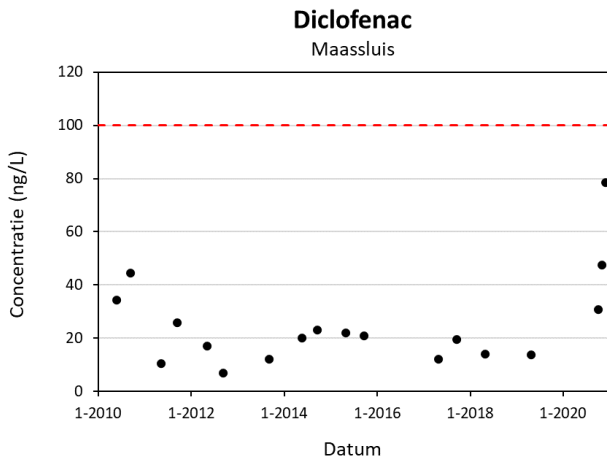
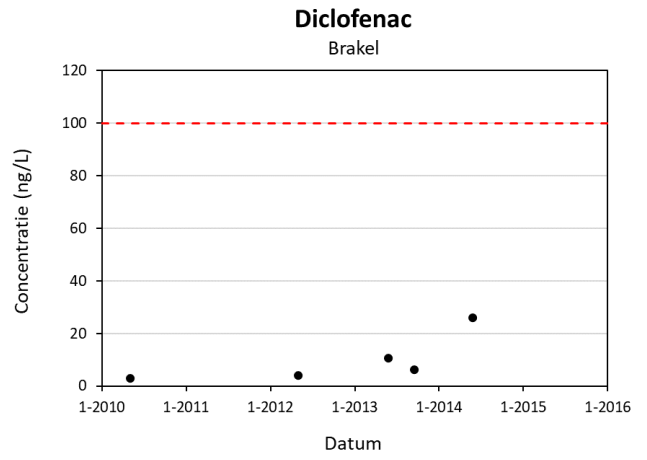
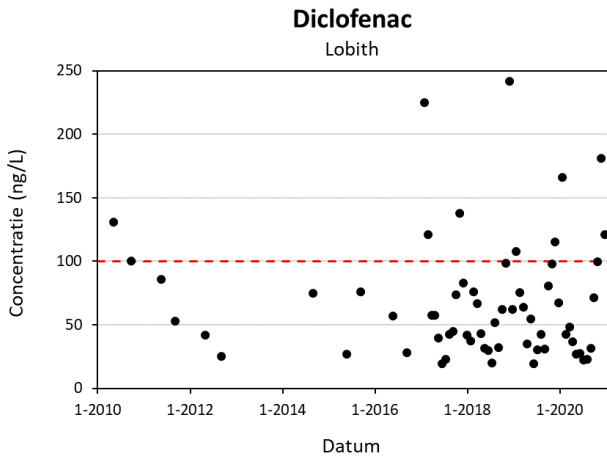


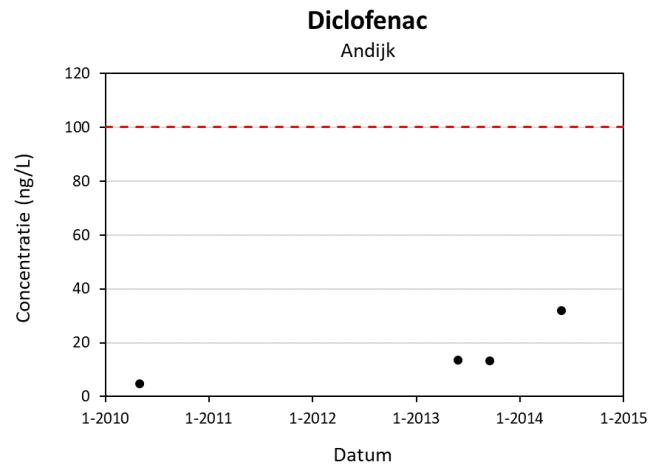
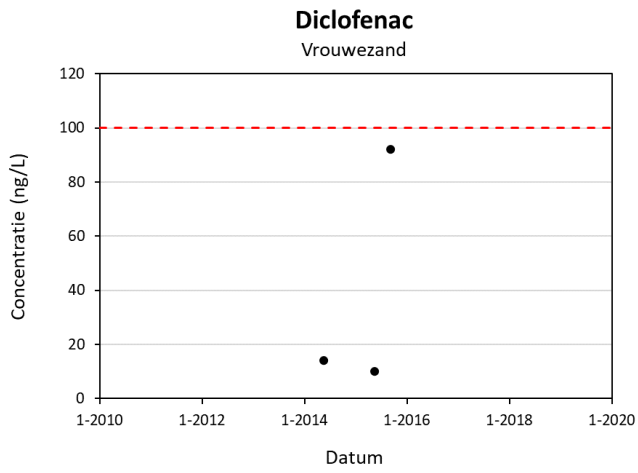
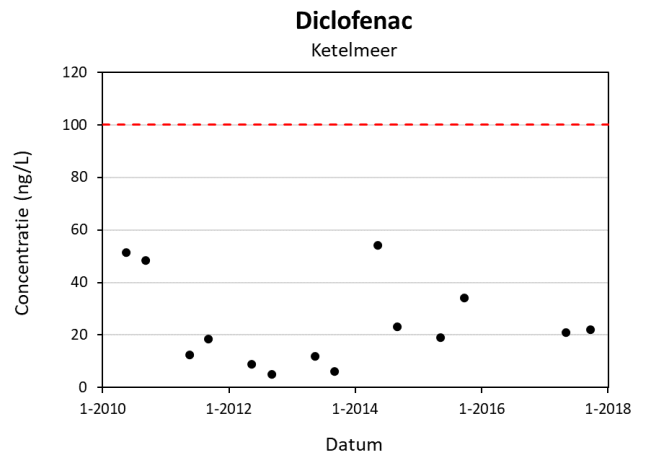
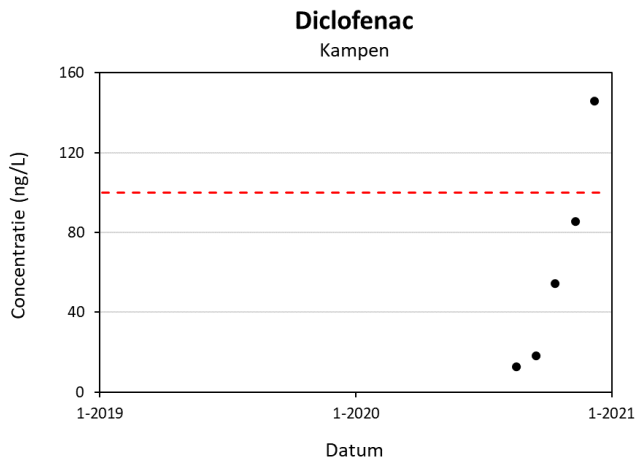
10. Diclofenac

Stroomgebied Maas

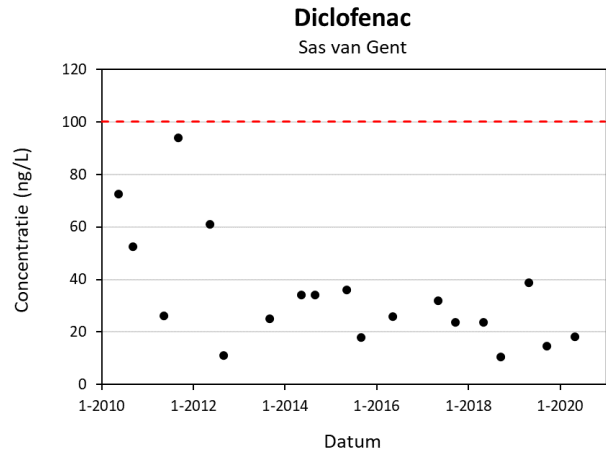
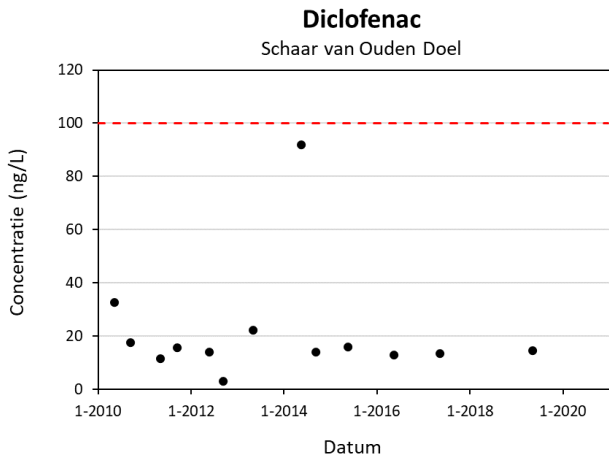


Stroomgebied Rijn

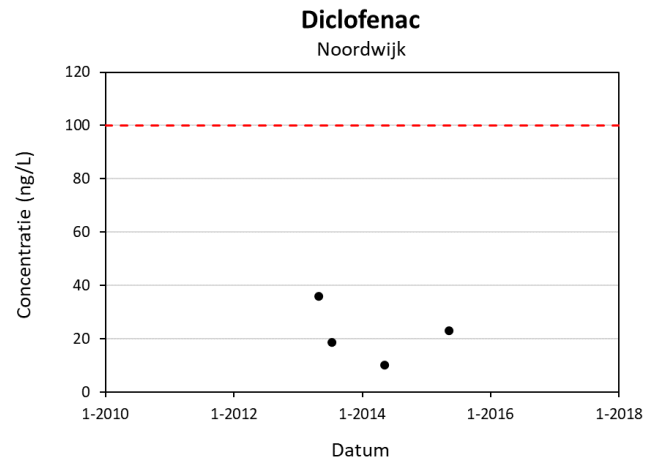
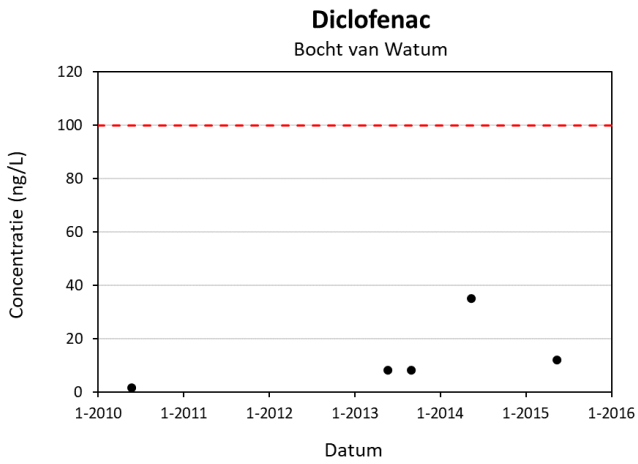




Stroomgebied Schelde

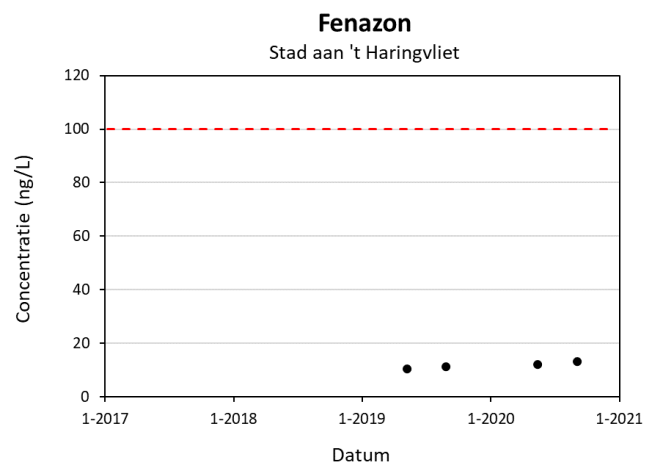
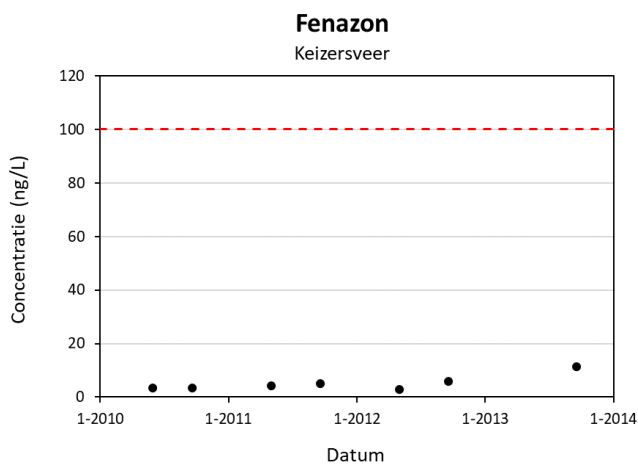
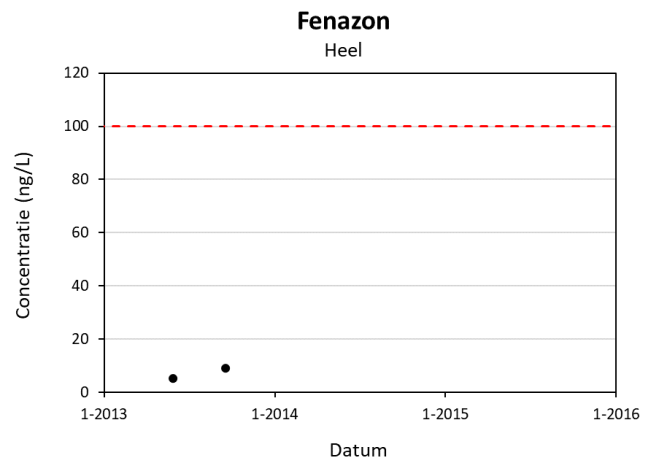
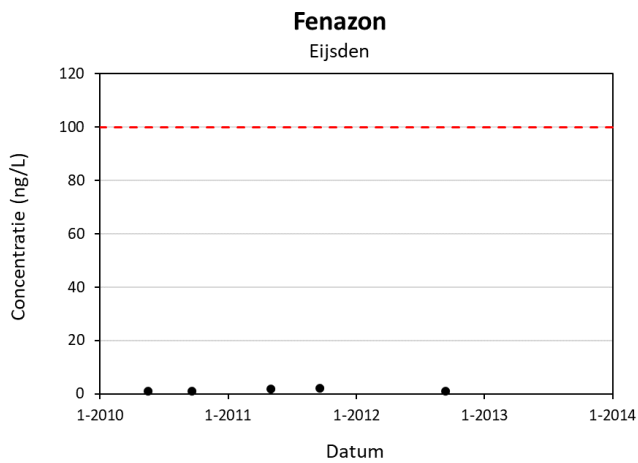


Eems + zee

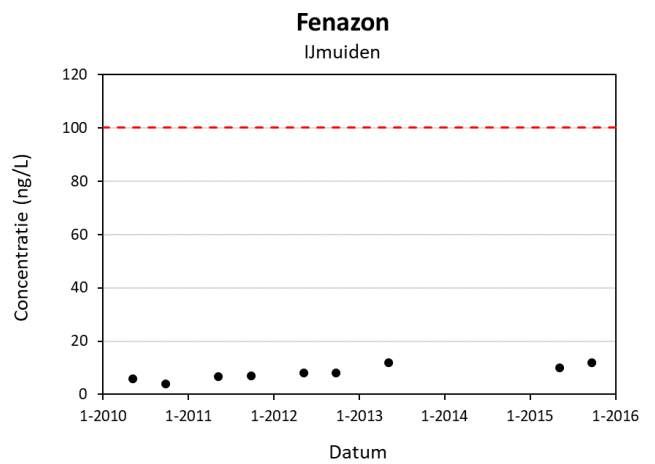
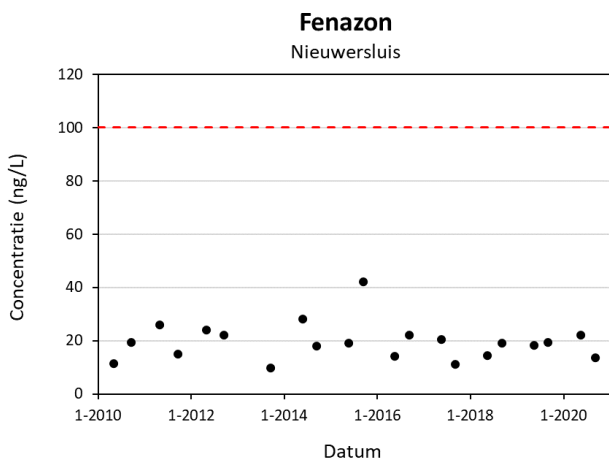
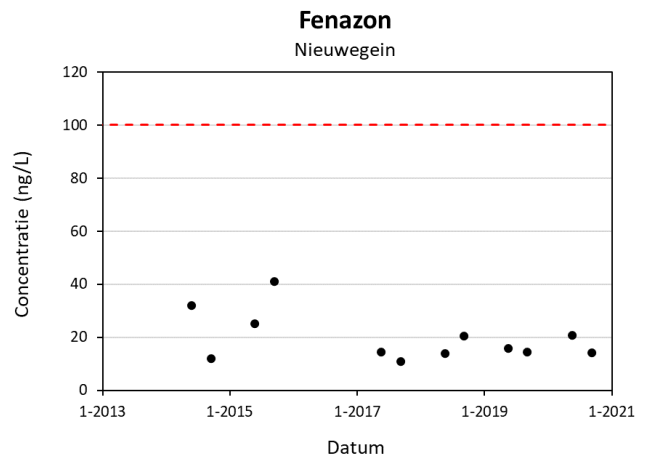
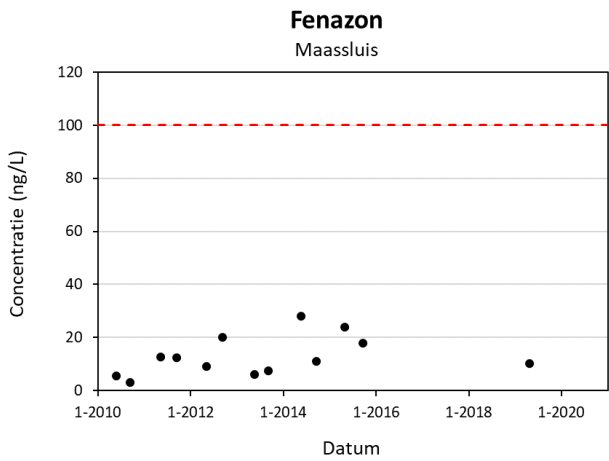
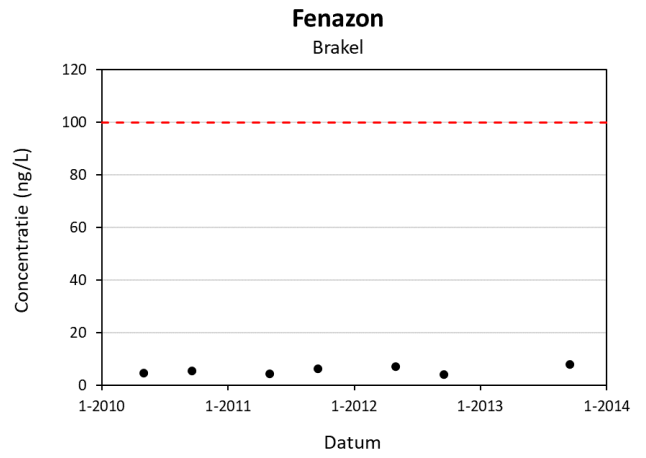
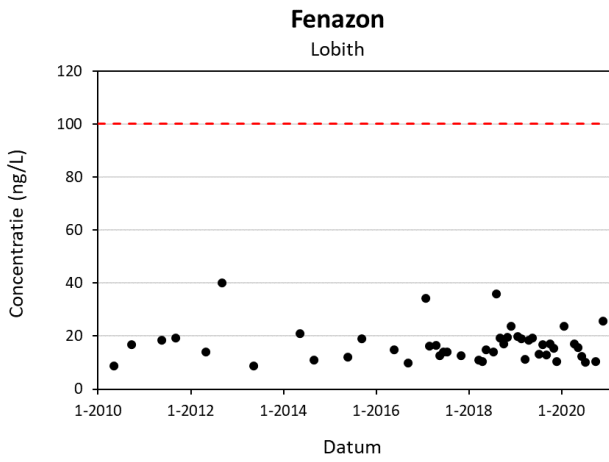


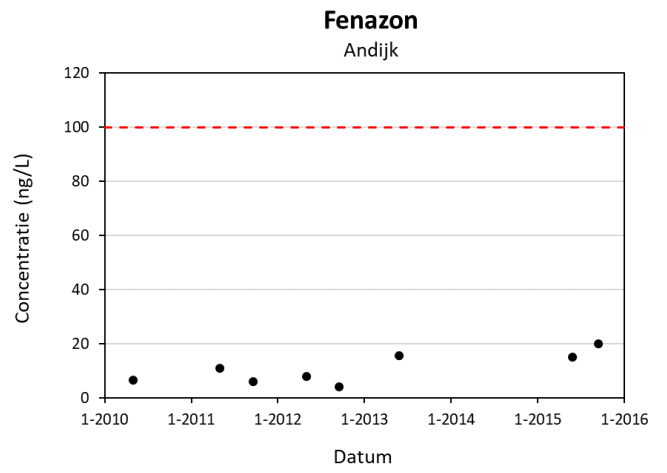
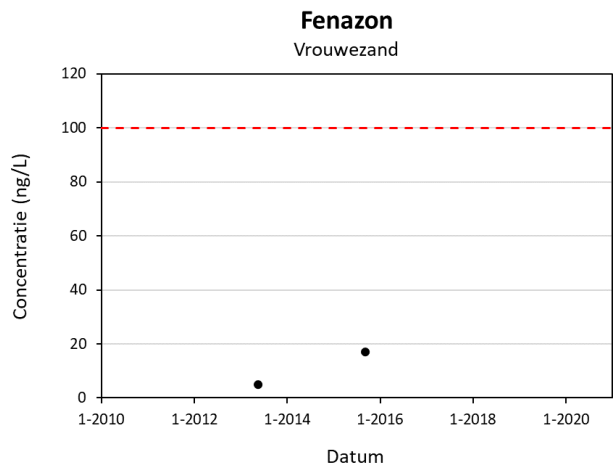
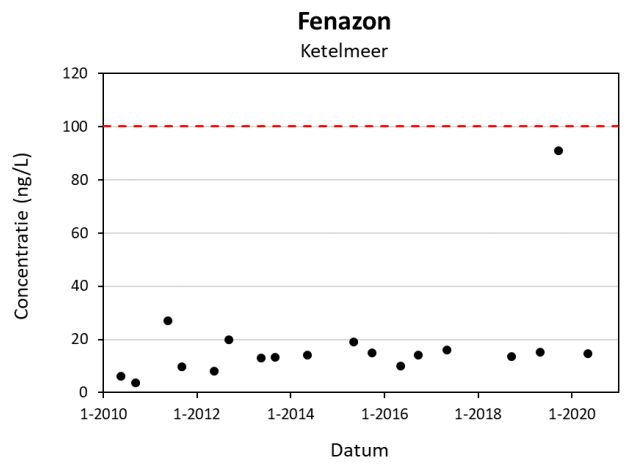
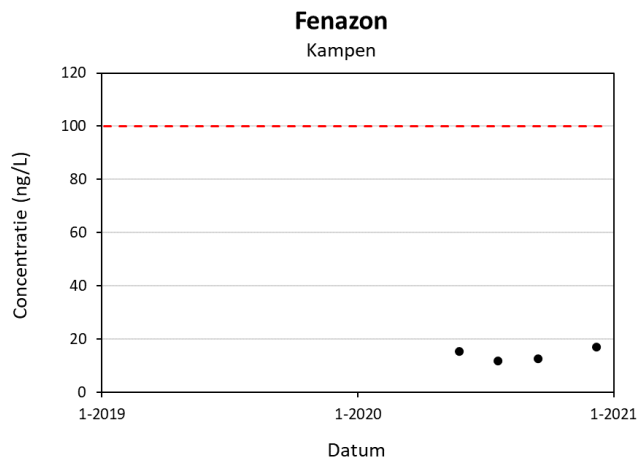
11. Fenazon

Stroomgebied Maas

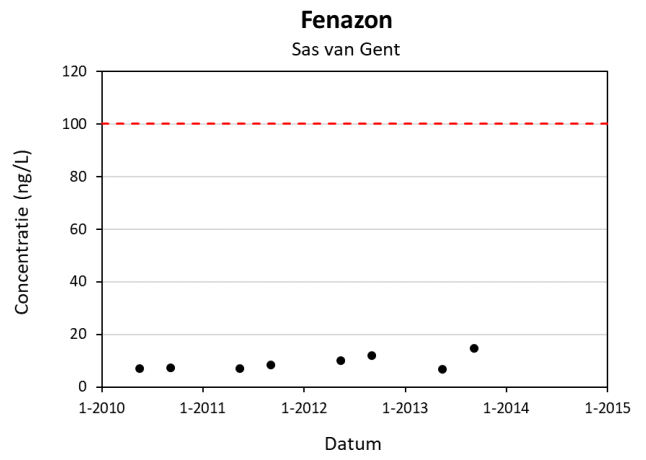
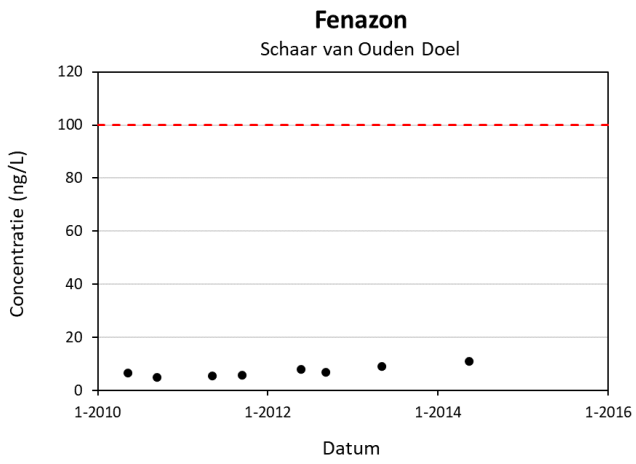


Stroomgebied Rijn

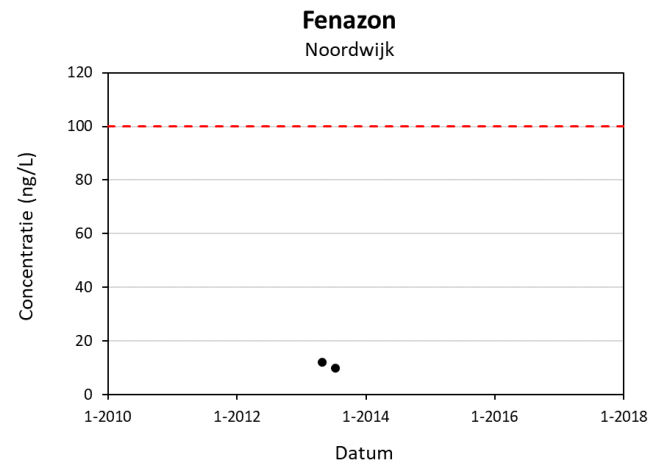
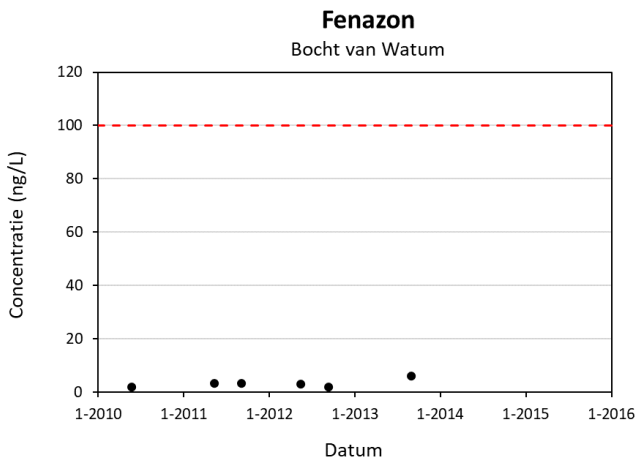




Stroomgebied Schelde

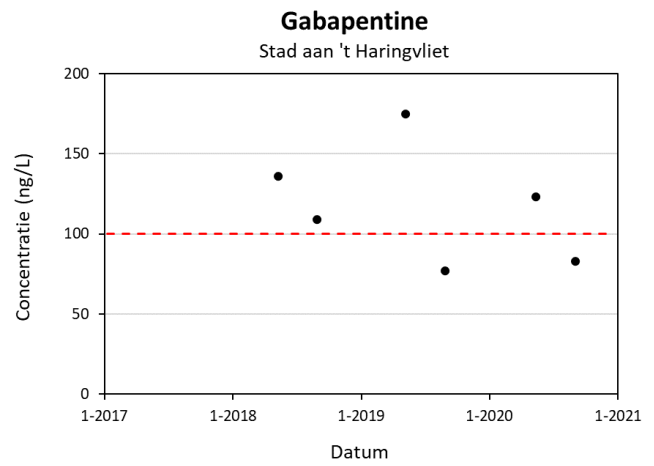
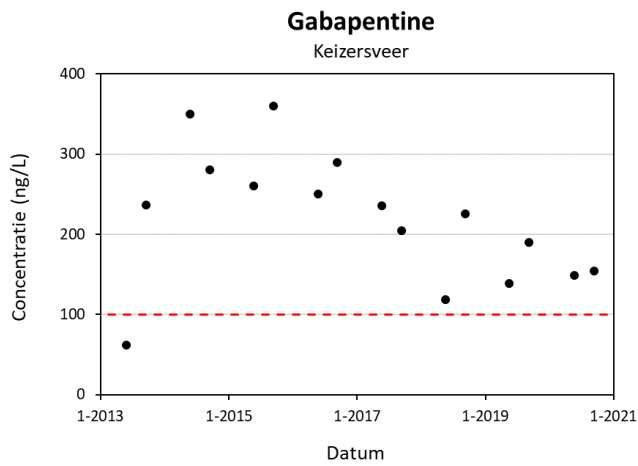
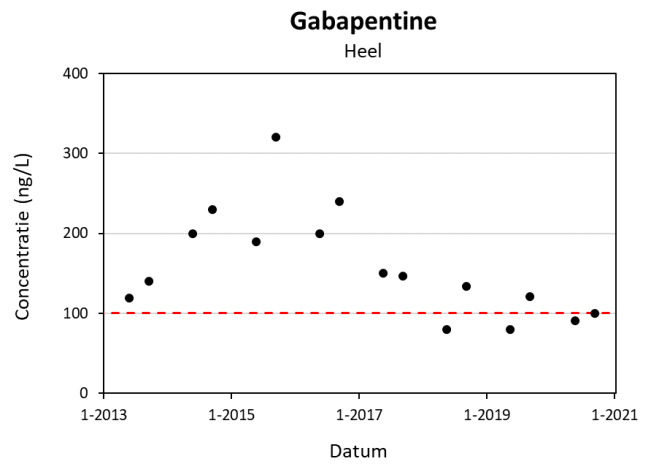
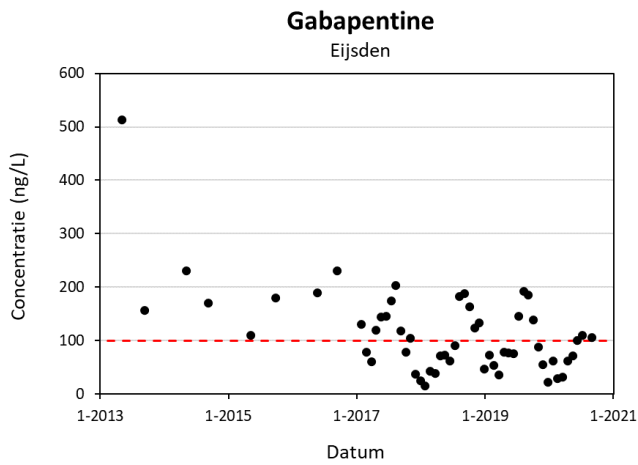


Eems + zee

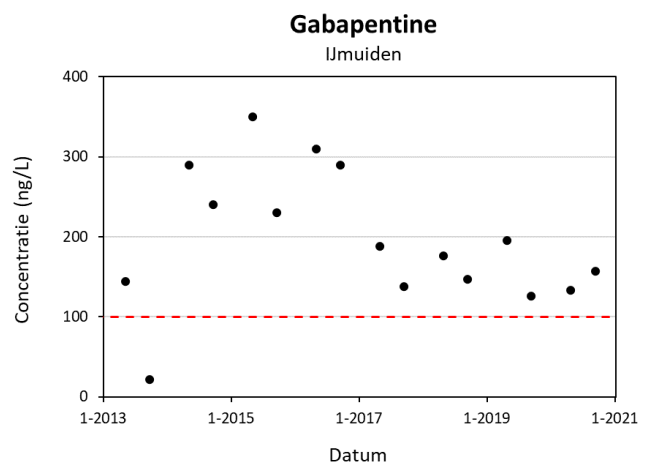
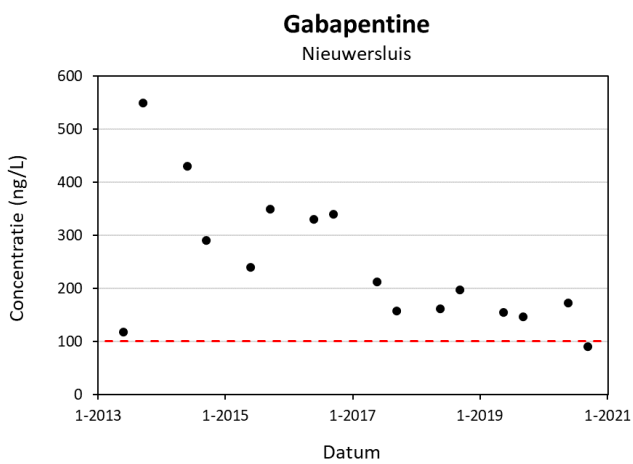
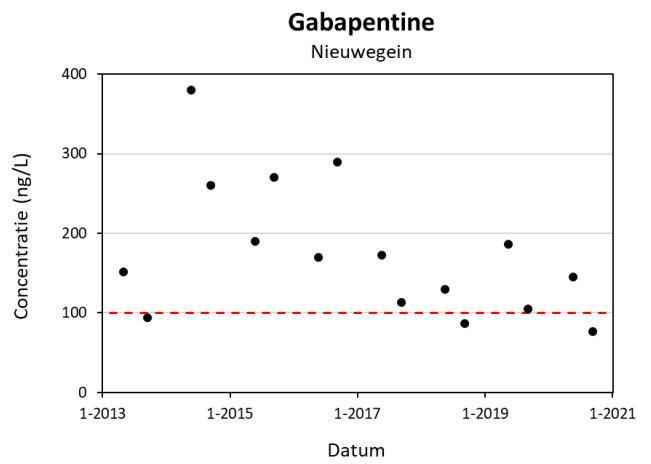
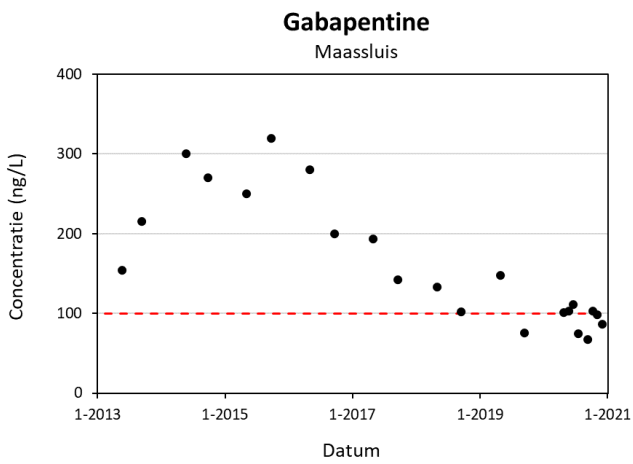
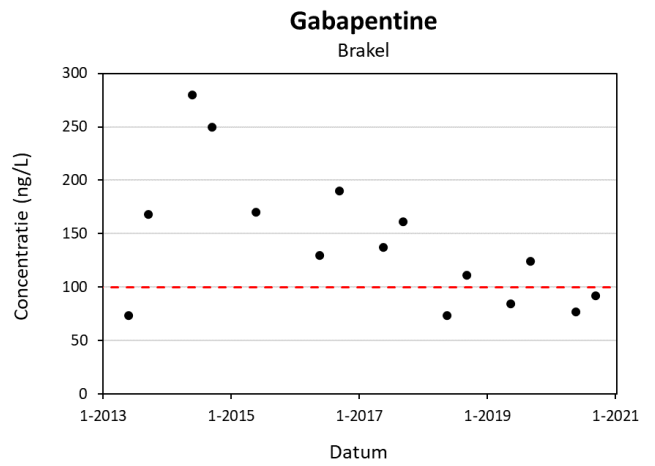
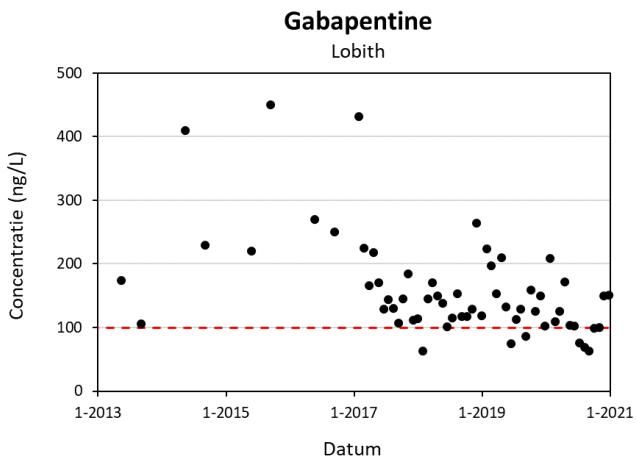


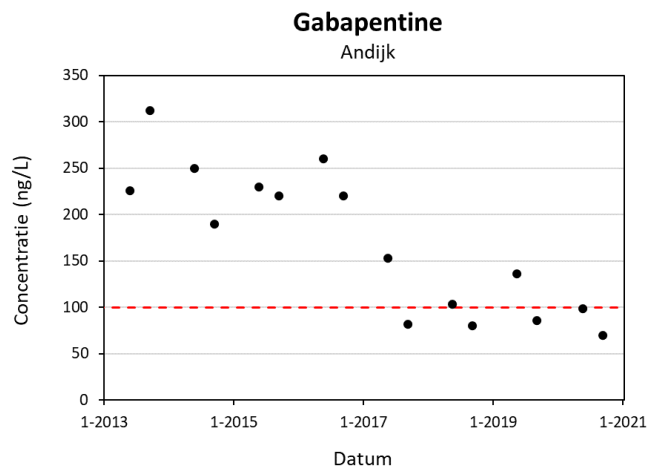
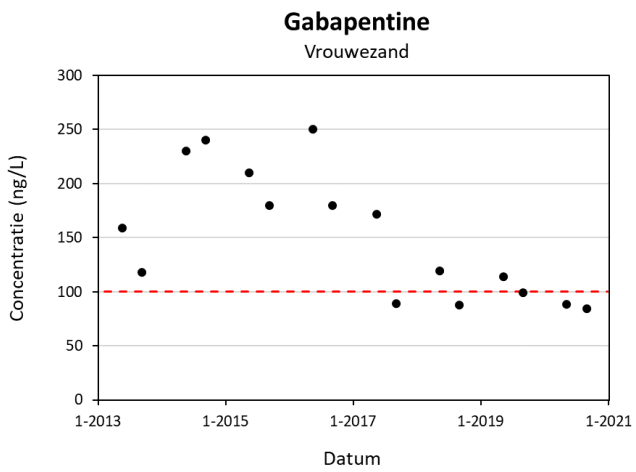
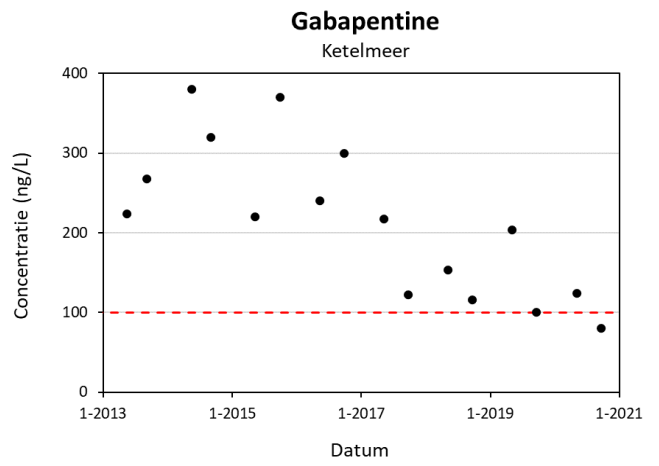
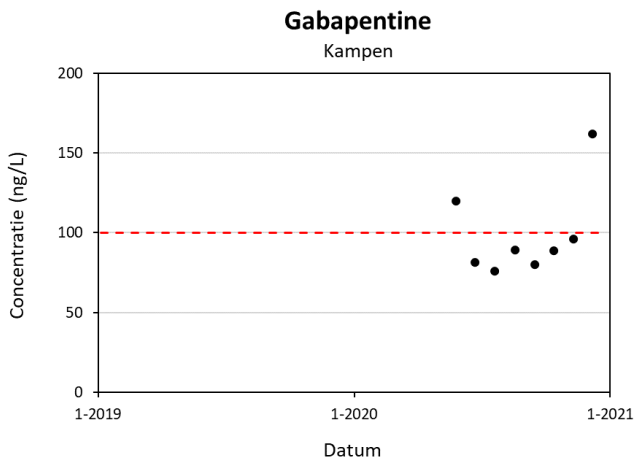
12. Gabapentine

Stroomgebied Maas

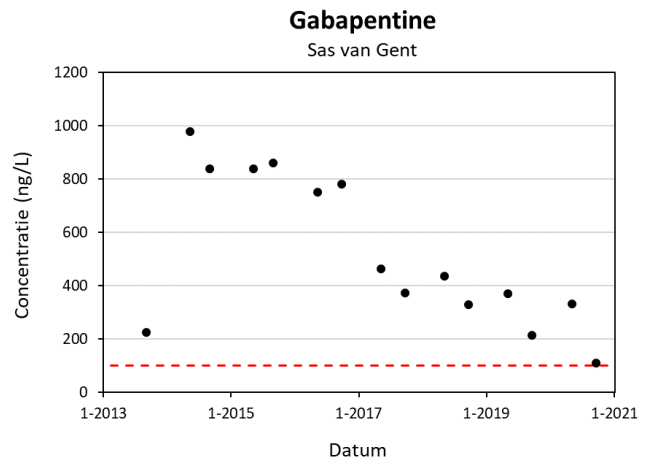
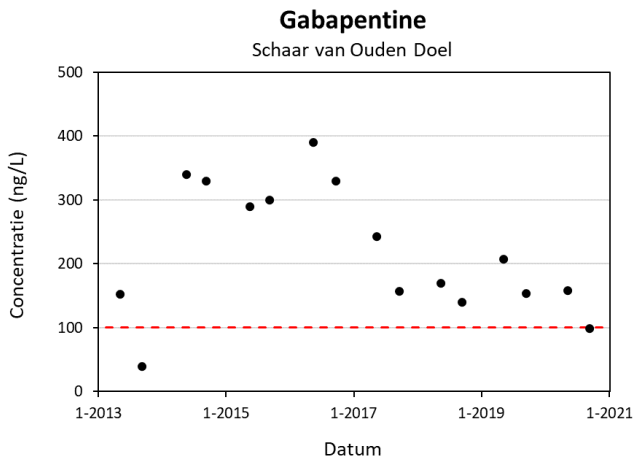


Stroomgebied Rijn

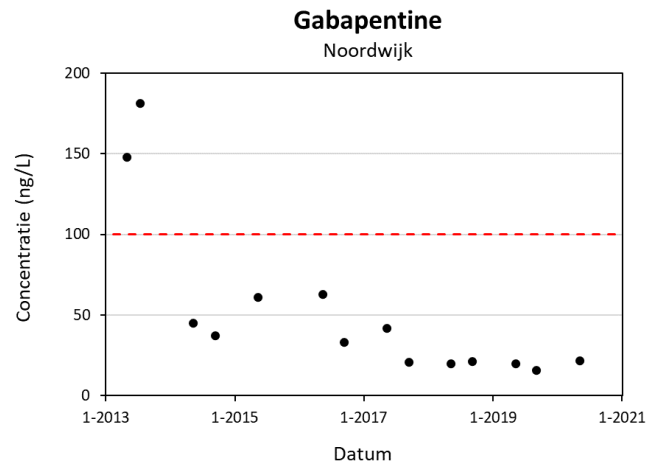
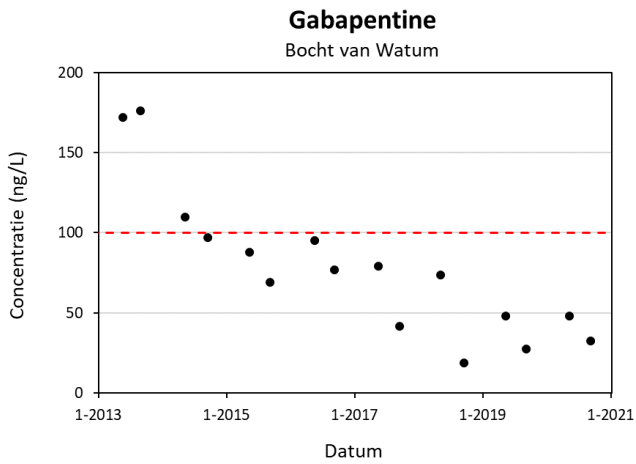




Stroomgebied Schelde

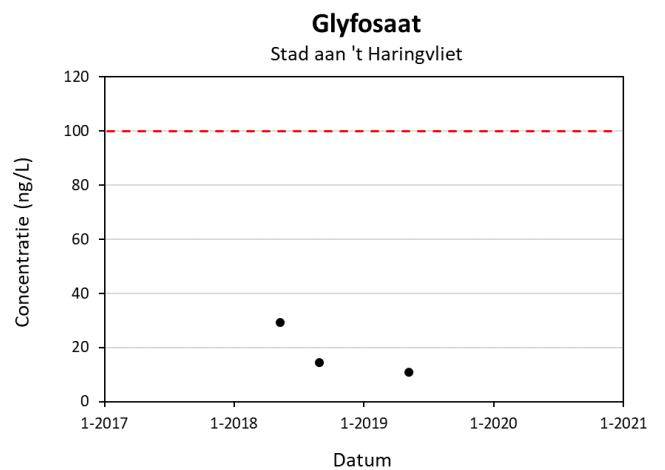
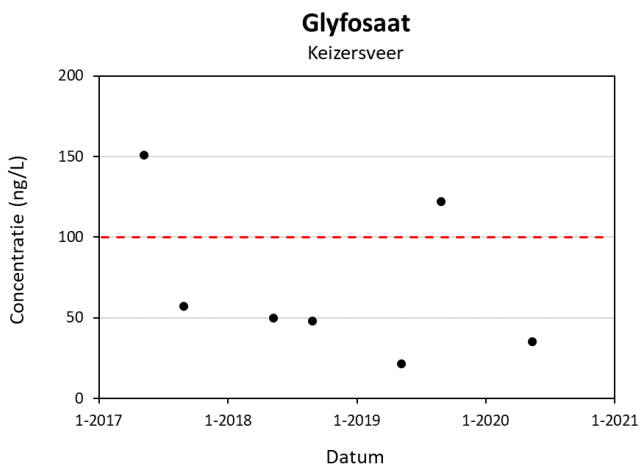
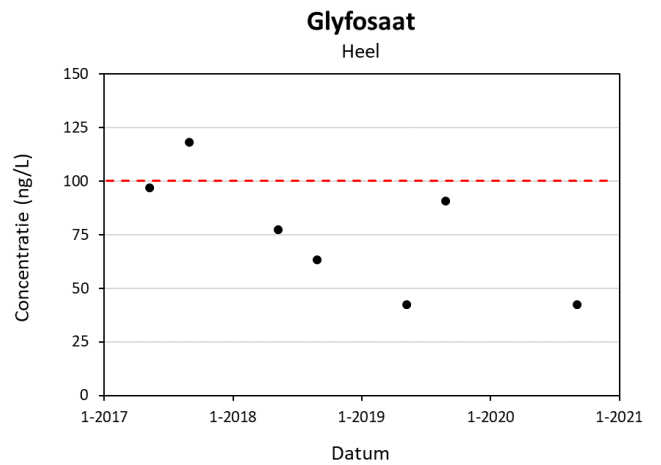
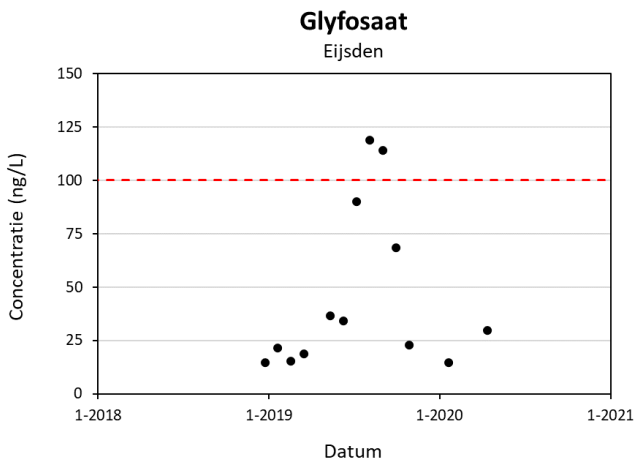


Eems + zee



13. Glyfosaat

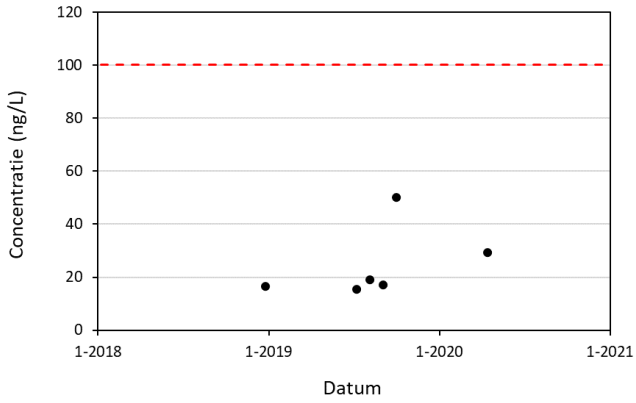
Stroomgebied Maas



Stroomgebied Rijn

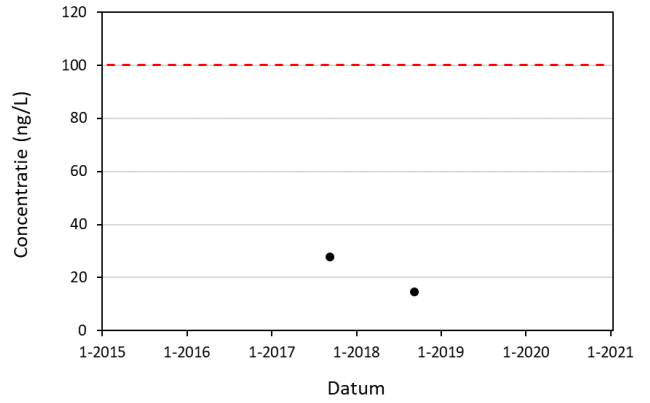
Glyfosaat

Lobith



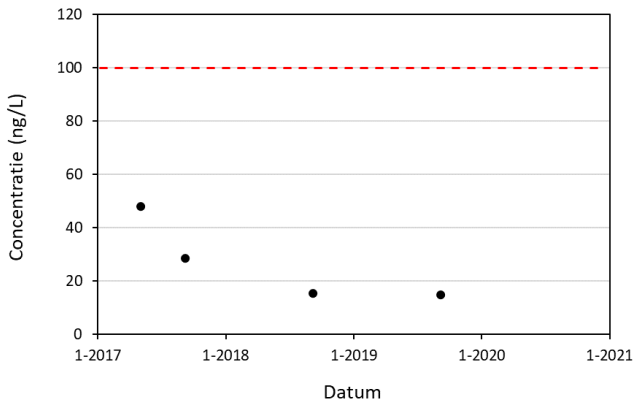
Glyfosaat

Brakel



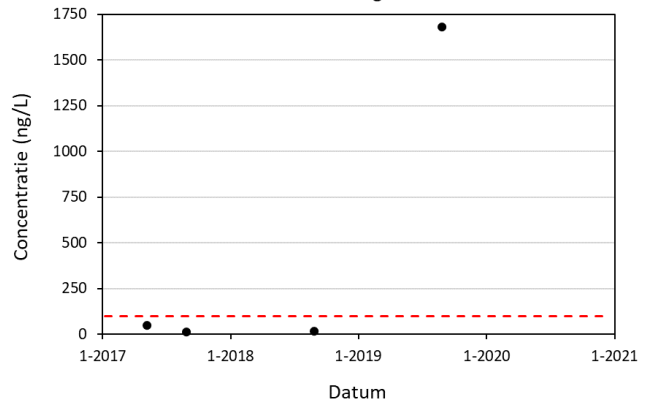
Glyfosaat

Maassluis



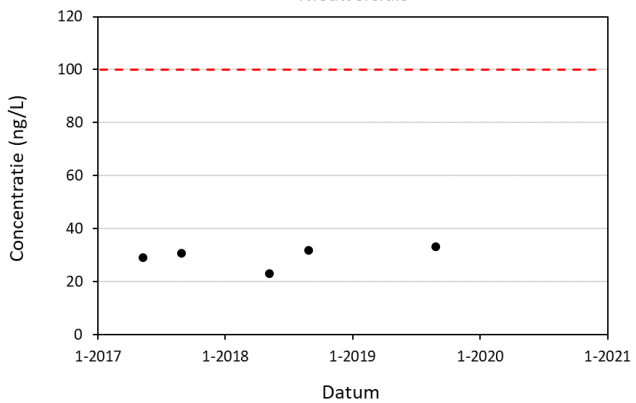
Glyfosaat

Nieuwegein

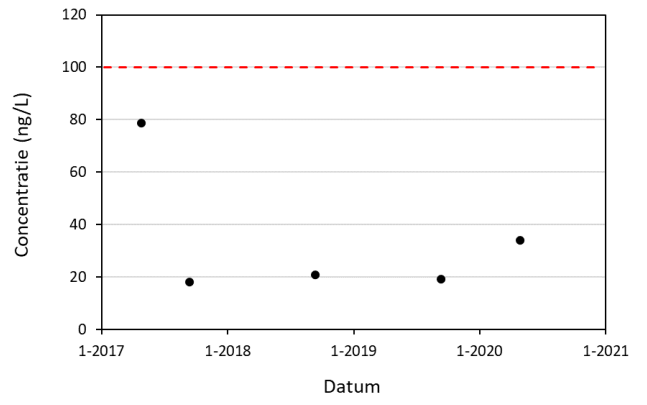


Glyfosaat

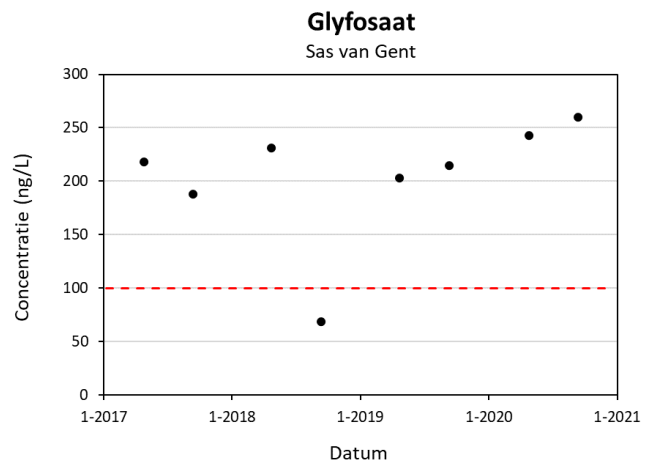
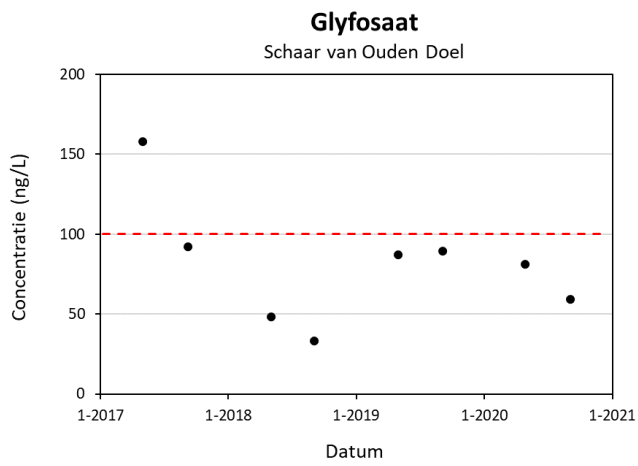
Nieuwersluis



Glyfosaat Ketelmeer



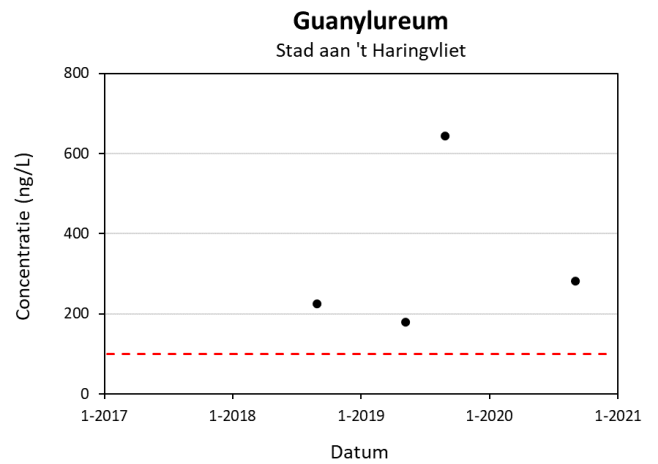
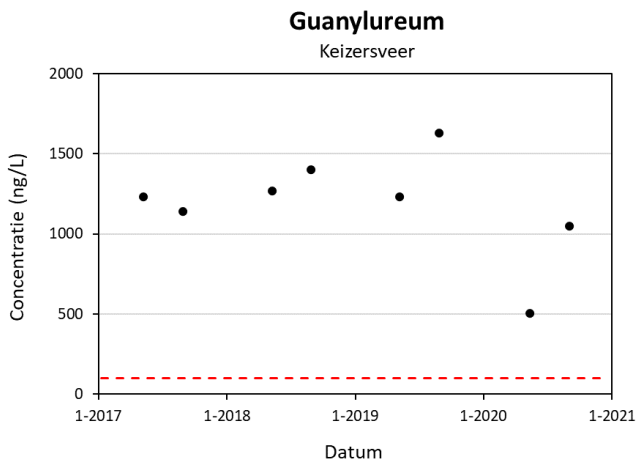
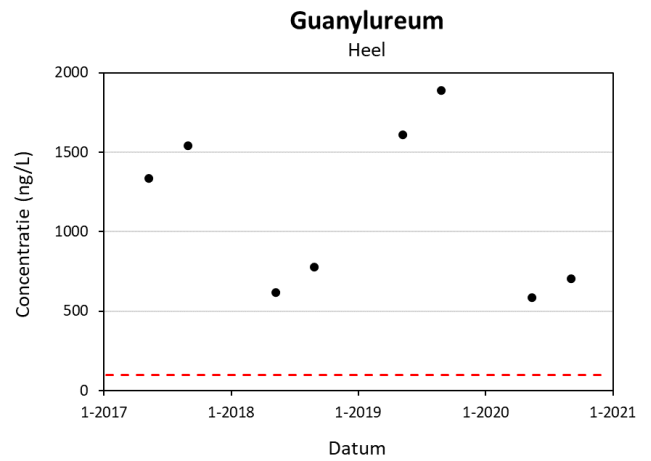
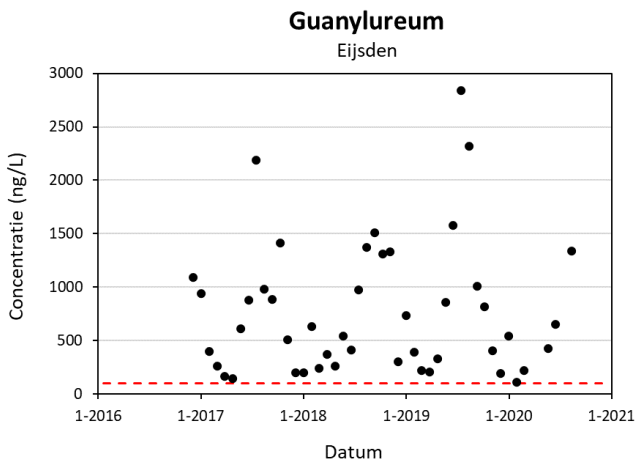
Stroomgebied Schelde



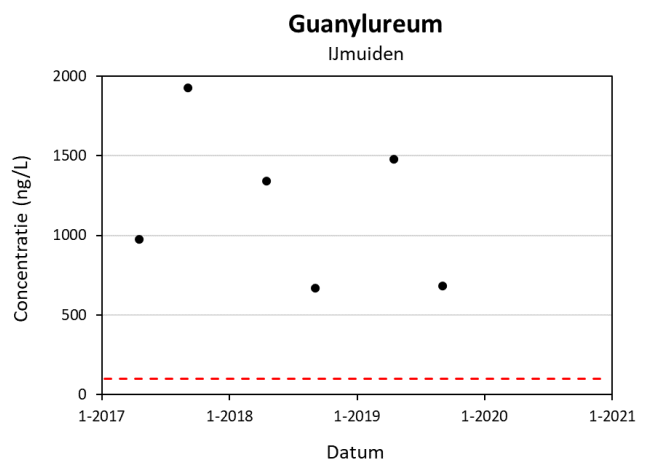
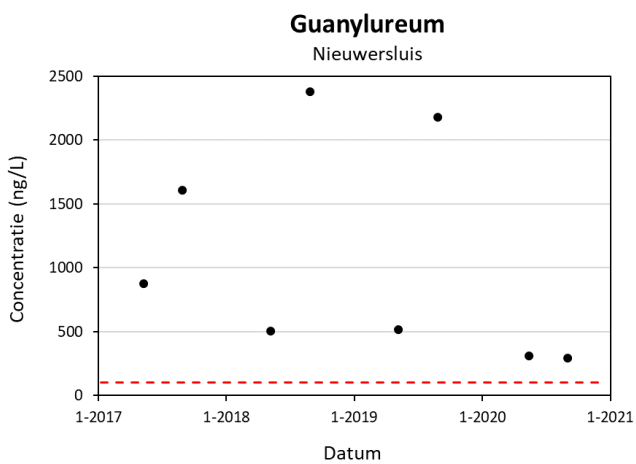
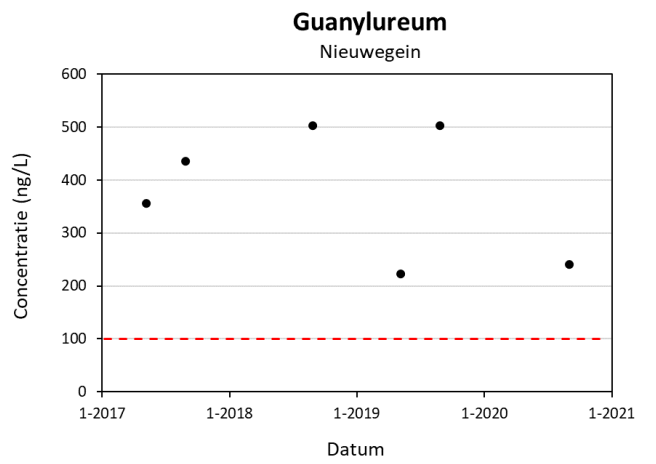
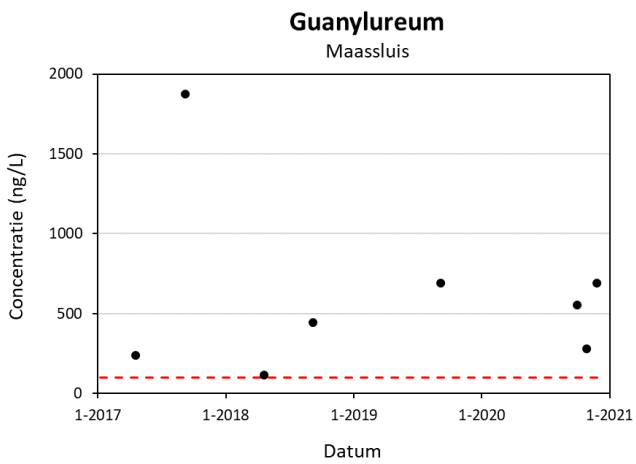
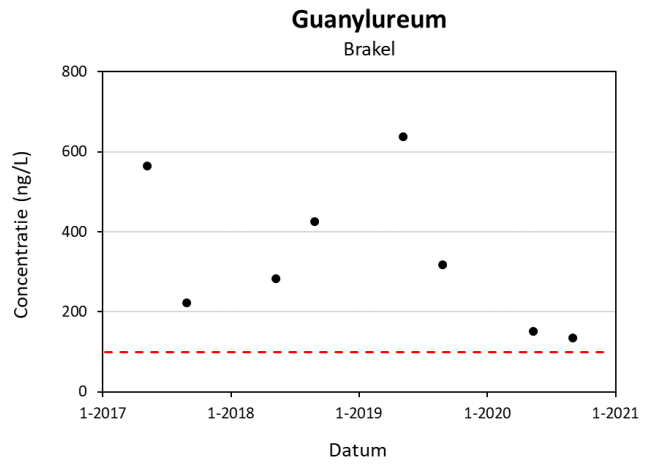
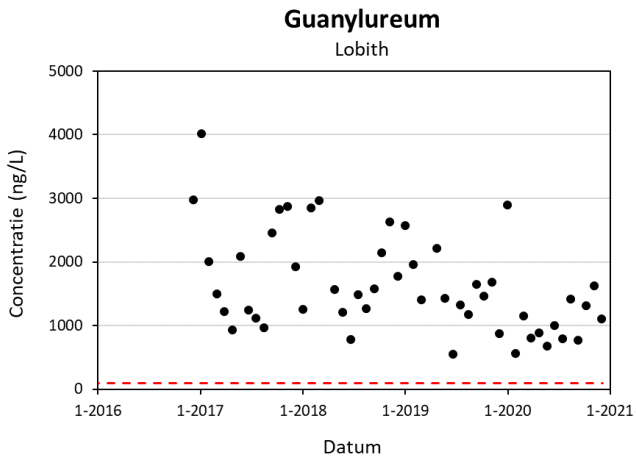
Eems + zee

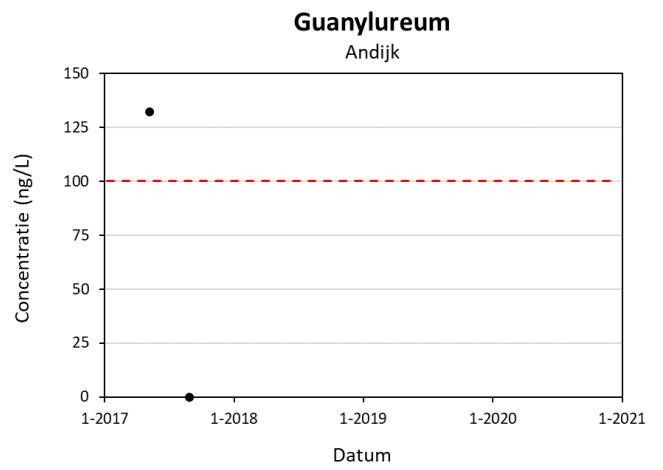
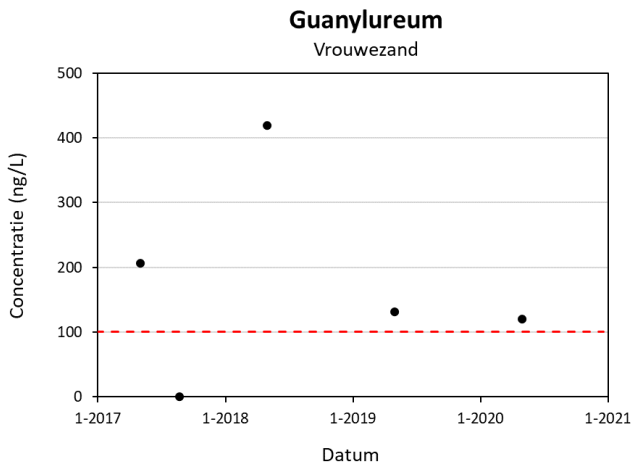
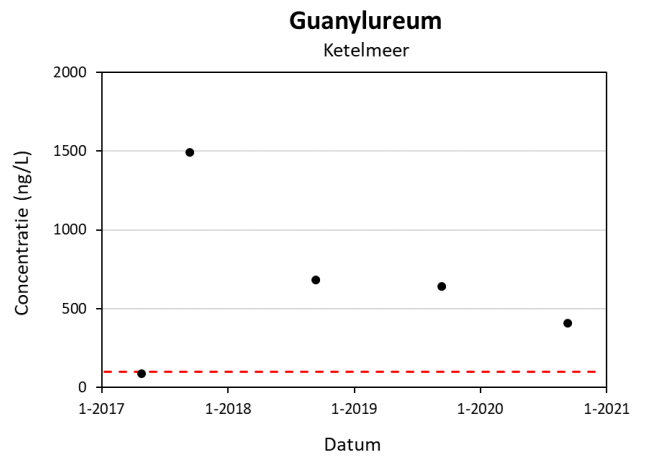
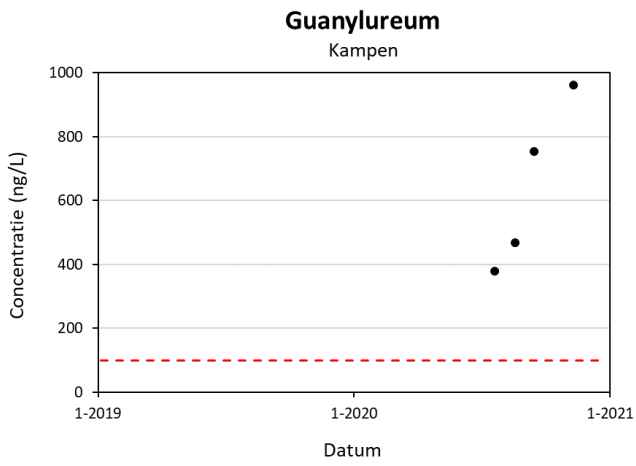
14. Guanylureum

Stroomgebied Maas

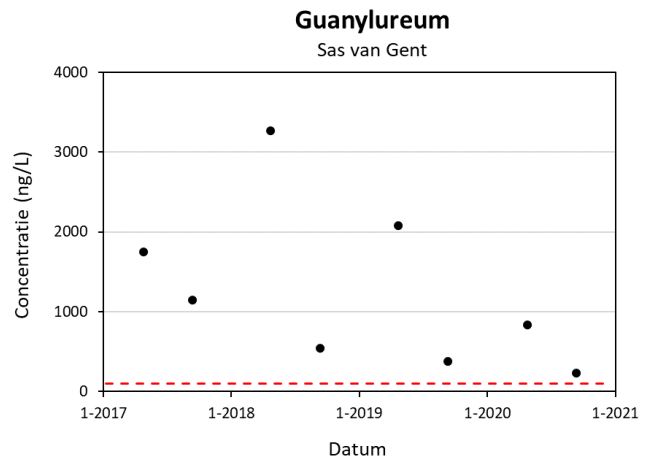
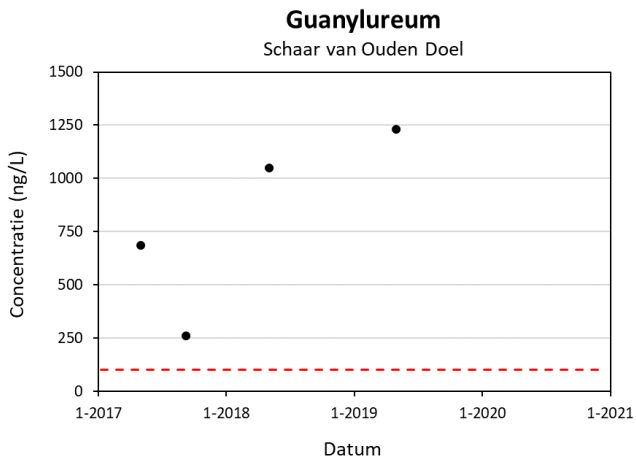


Stroomgebied Rijn

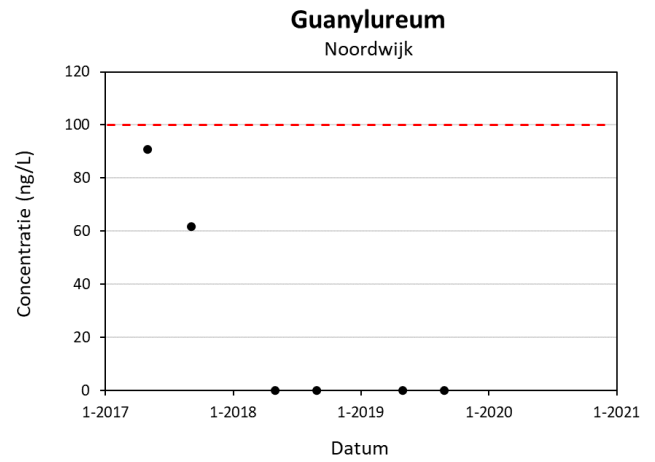
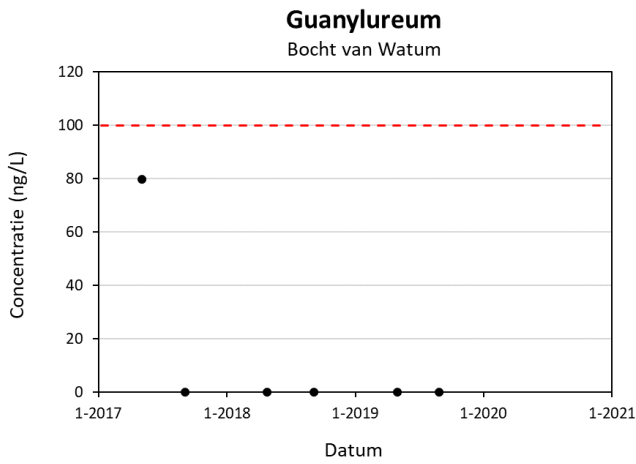




Stroomgebied Schelde

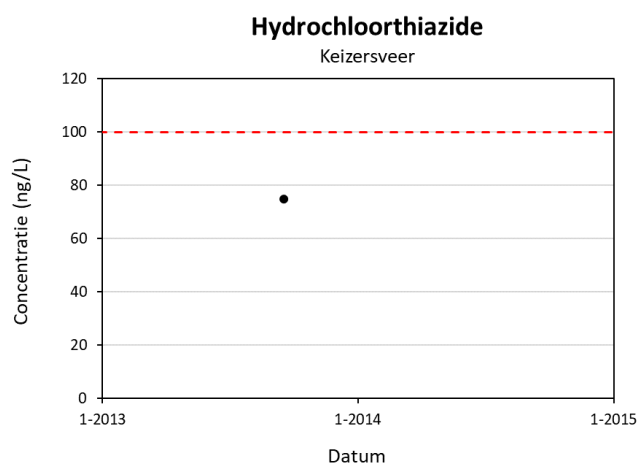


Eems + zee



15. Hydrochloorthiazide

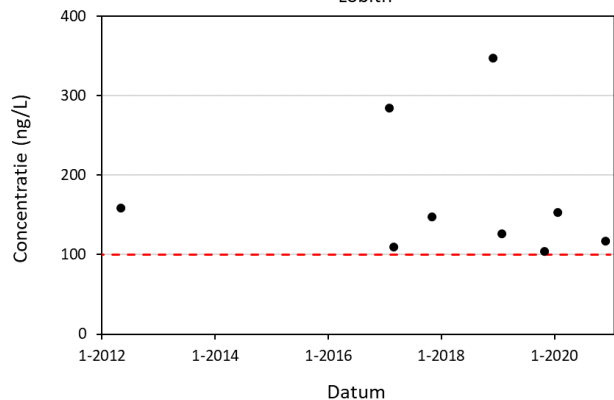
Stroomgebied Maas



Stroomgebied Rijn

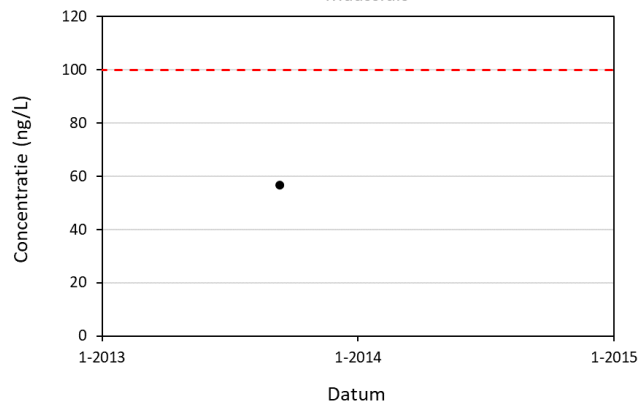
Hydrochloorthiazide

Lobith



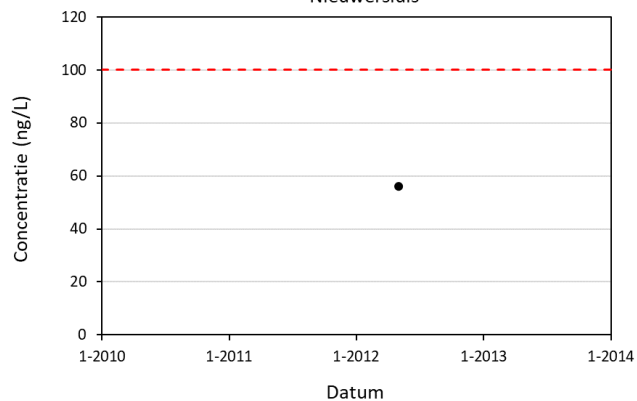
Hydrochloorthiazide

Maassluis



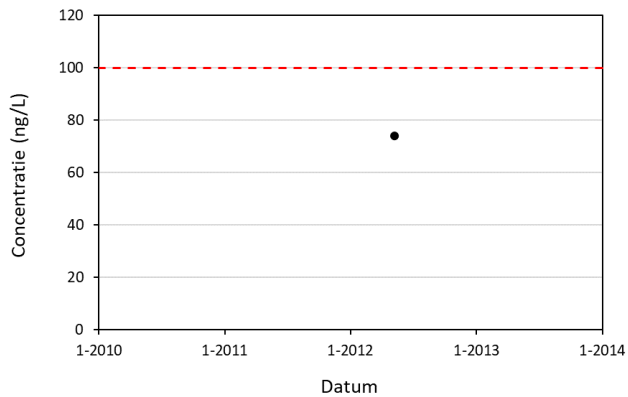
Hydrochloorthiazide

Nieuwersluis



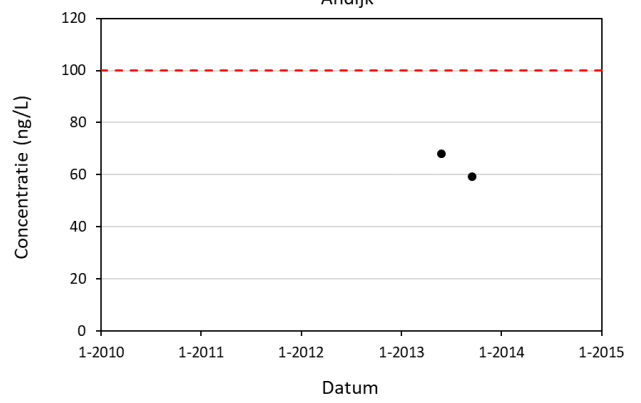
Hydrochloorthiazide

Ijmuiden

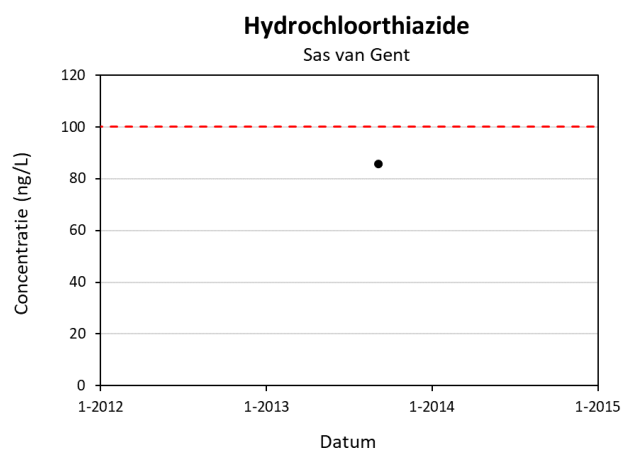


Hydrochloorthiazide

Andijk



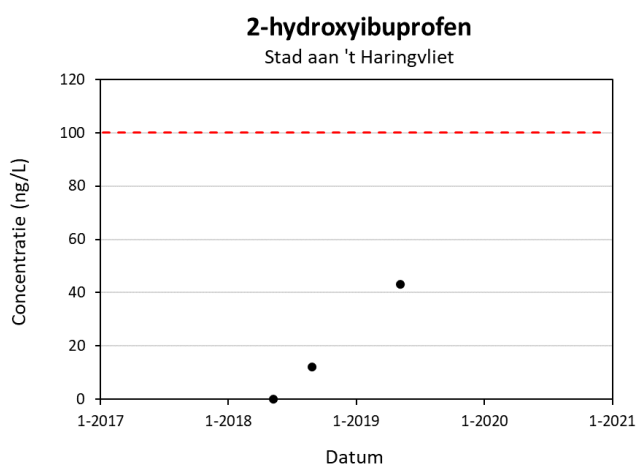
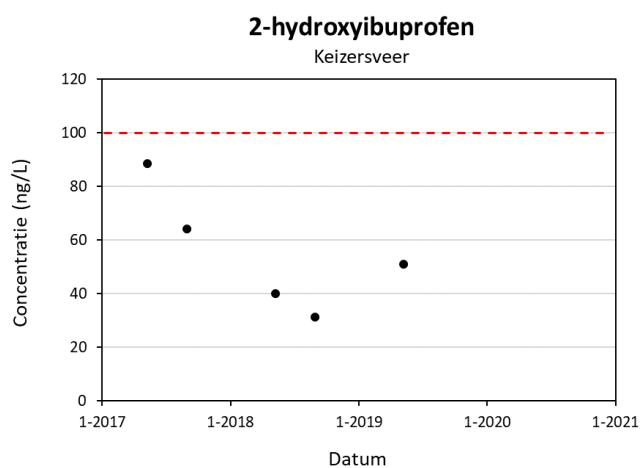
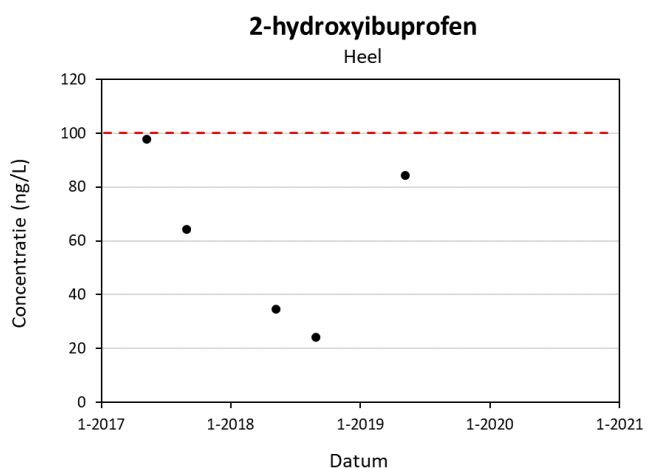
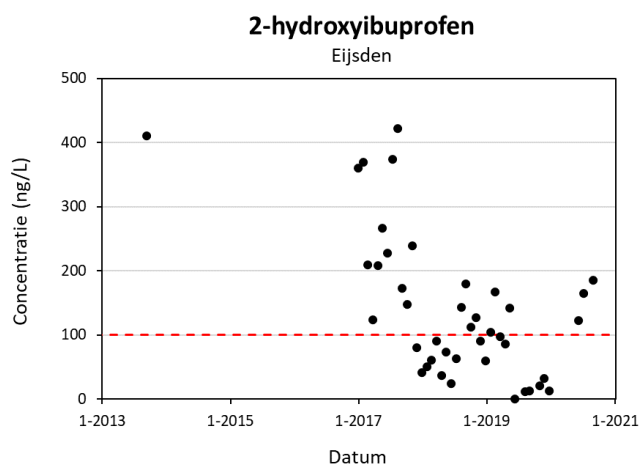
Stroomgebied Schelde



Eems + zee

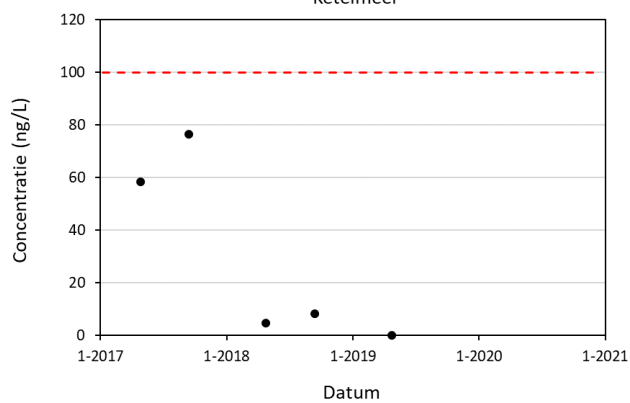
16. 2-Hydroxyibuprofen

Stroomgebied Maas



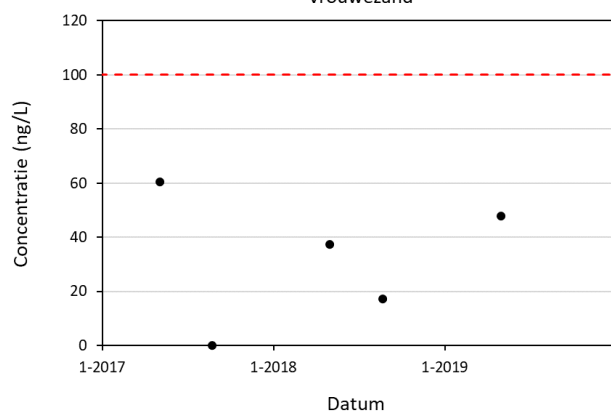
2-hydroxyibuprofen

Ketelmeer



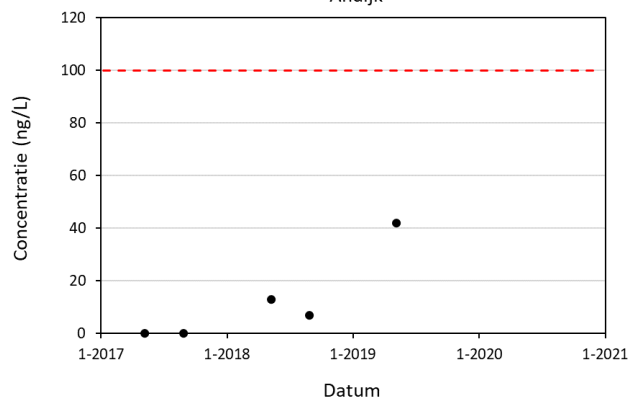
2-hydroxyibuprofen

Vrouwezand



2-hydroxyibuprofen

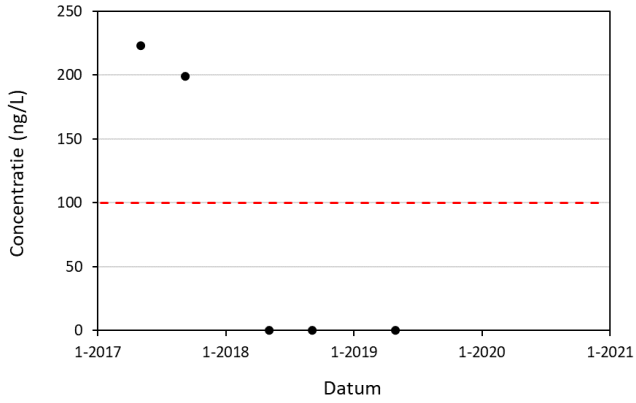
Andijk



Stroomgebied Schelde

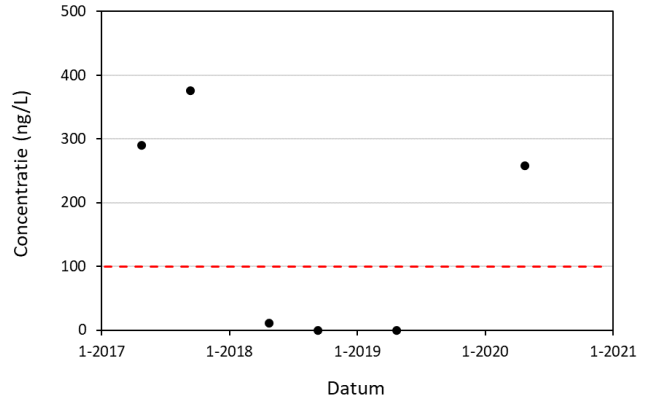
2-hydroxyibuprofen

Schaar van Ouden Doel



2-hydroxyibuprofen

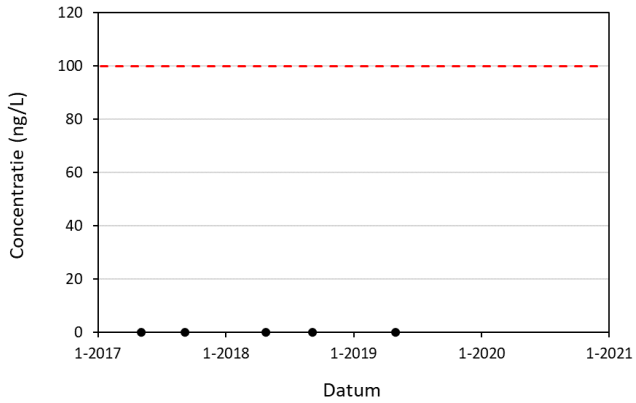
Sas van Gent



Eems + zee

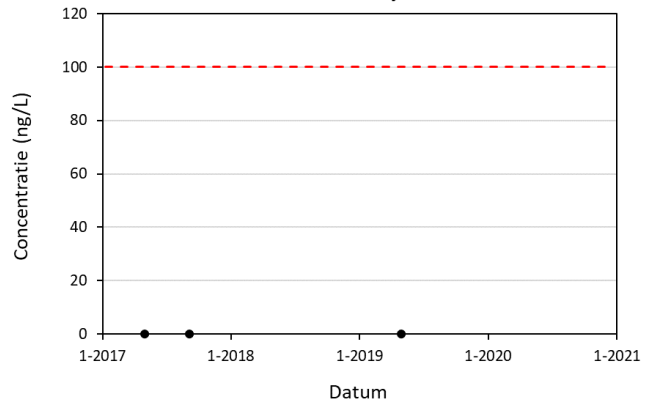
2-hydroxyibuprofen

Bocht van Watum



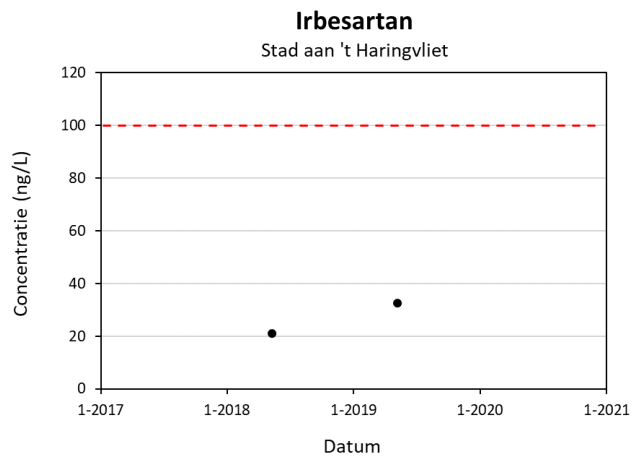
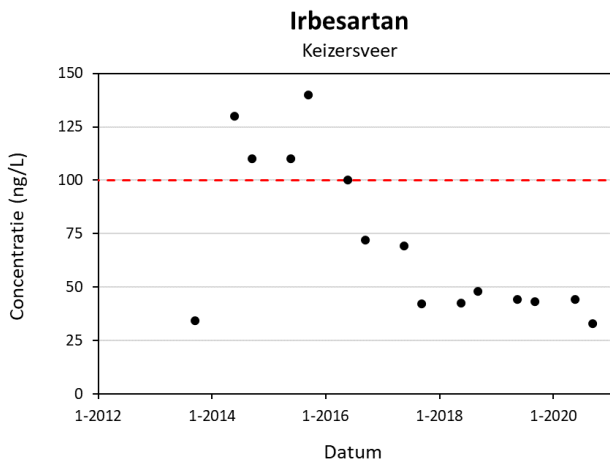
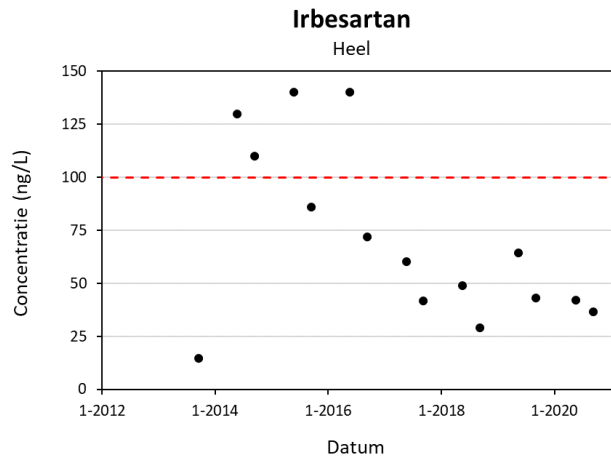
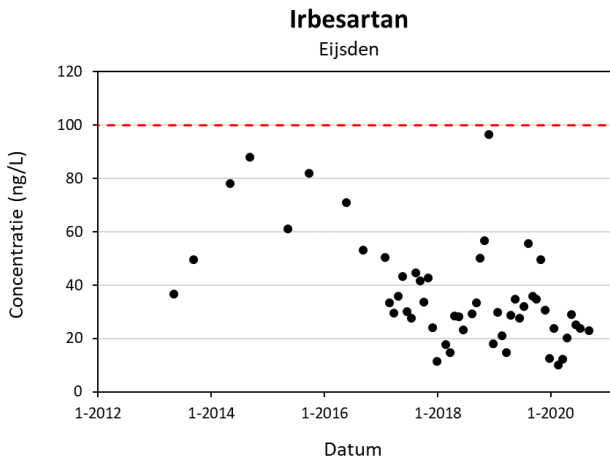
2-hydroxyibuprofen

Noordwijk

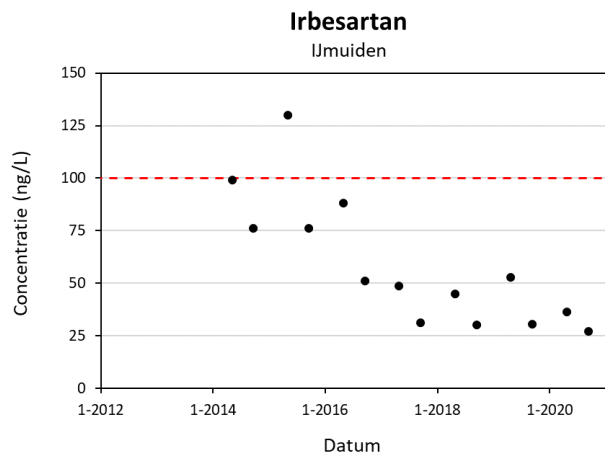
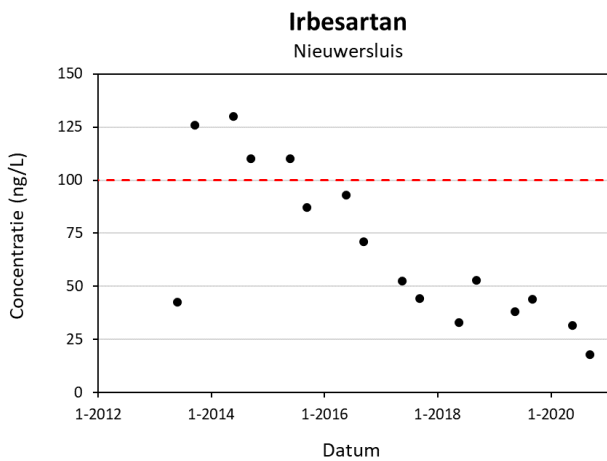
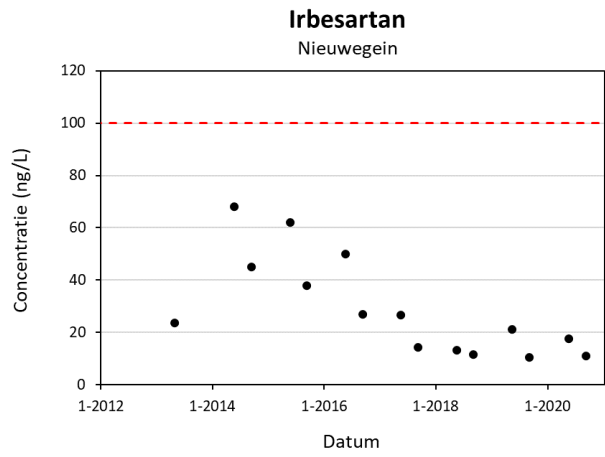
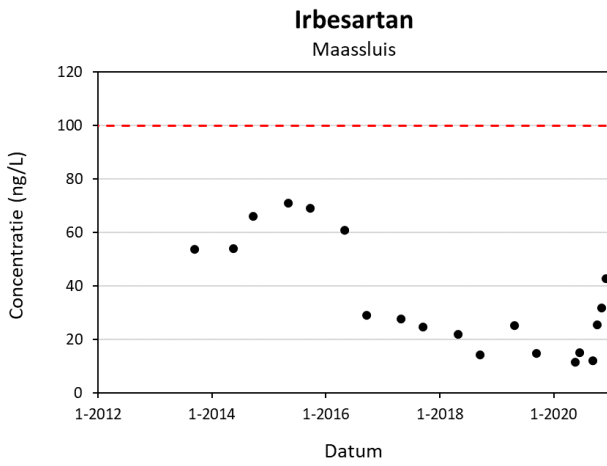
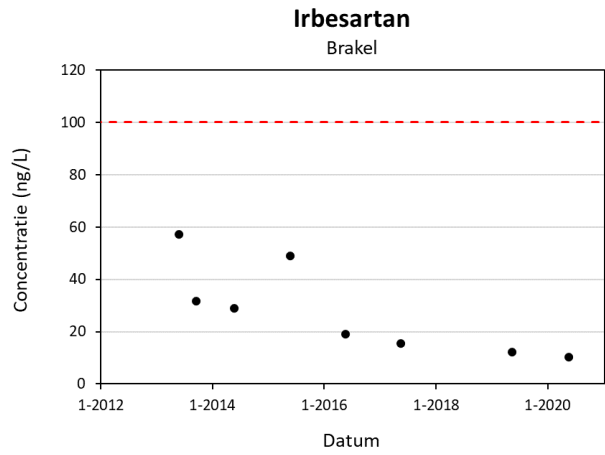
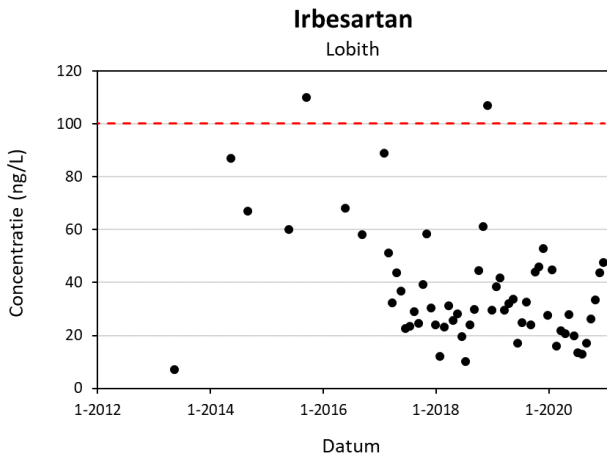


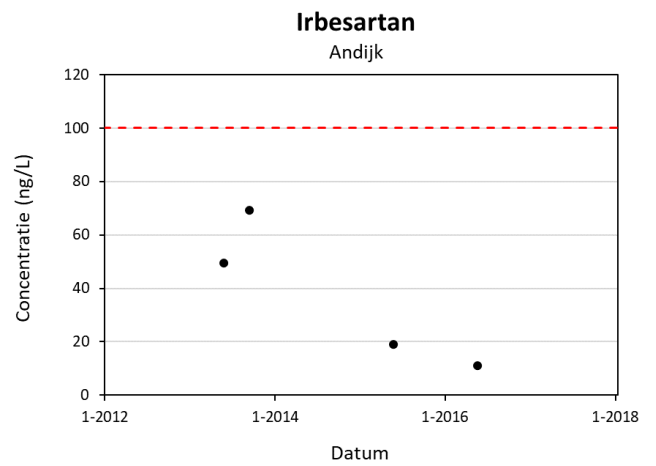
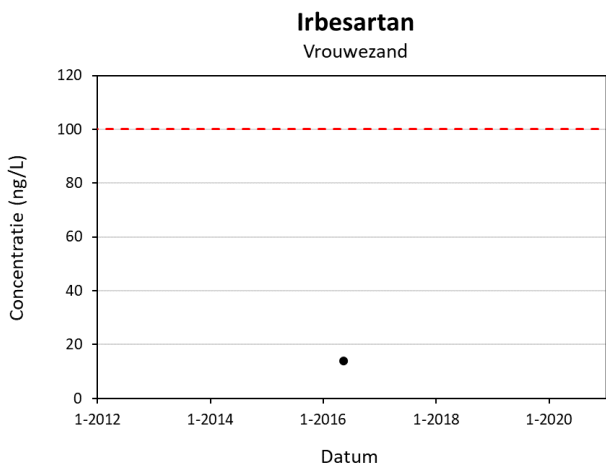
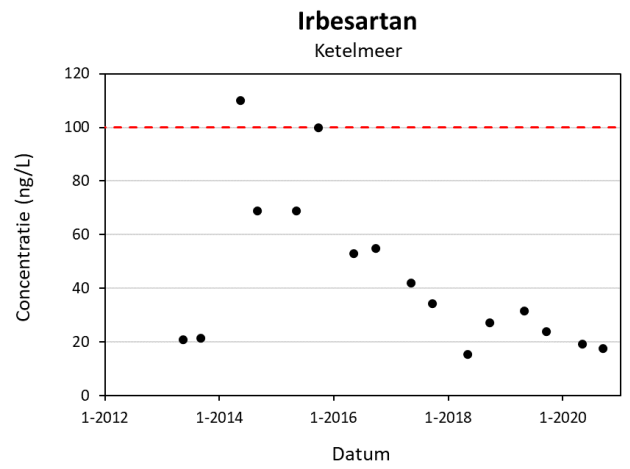
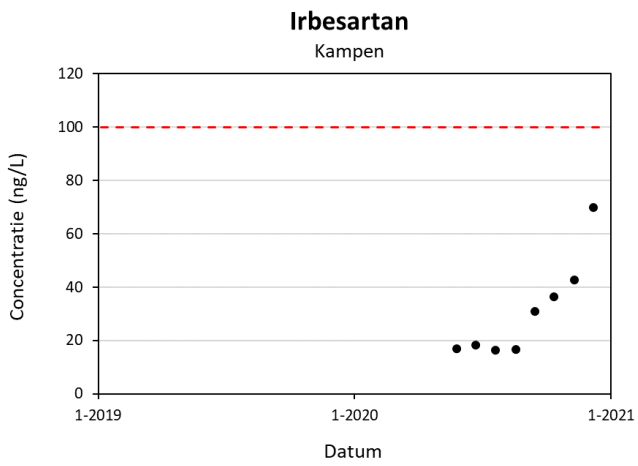
17. Irbesartan

Stroomgebied Maas

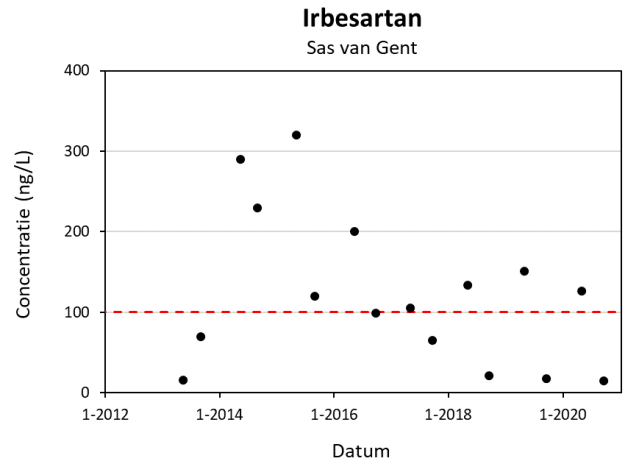
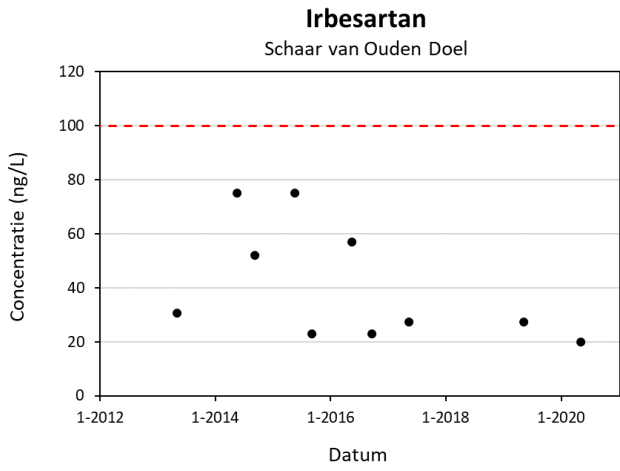


Stroomgebied Rijn

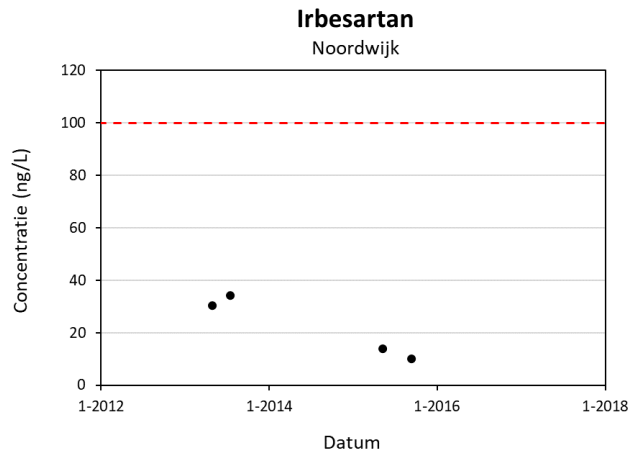
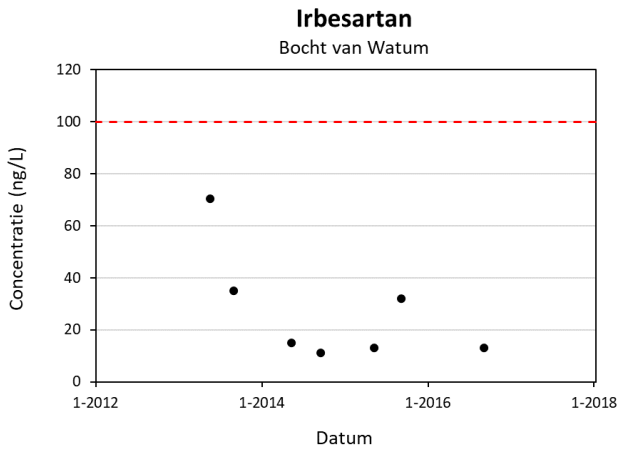




Stroomgebied Schelde

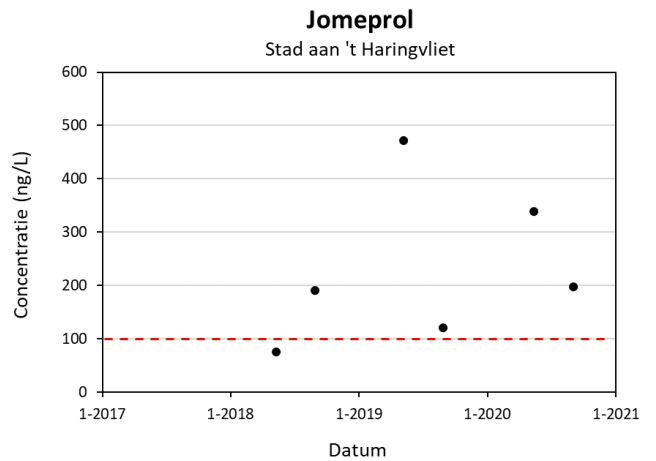
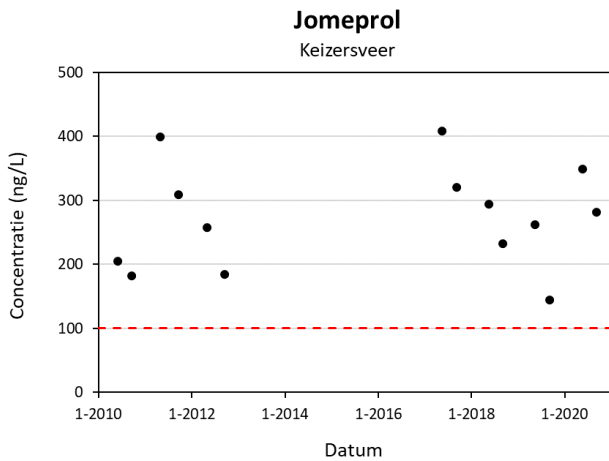
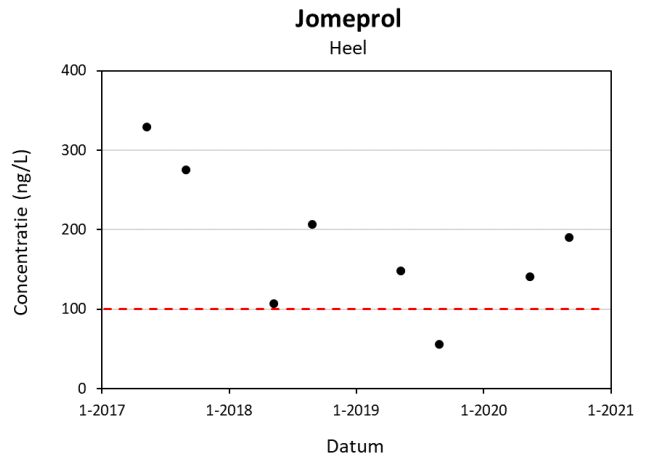
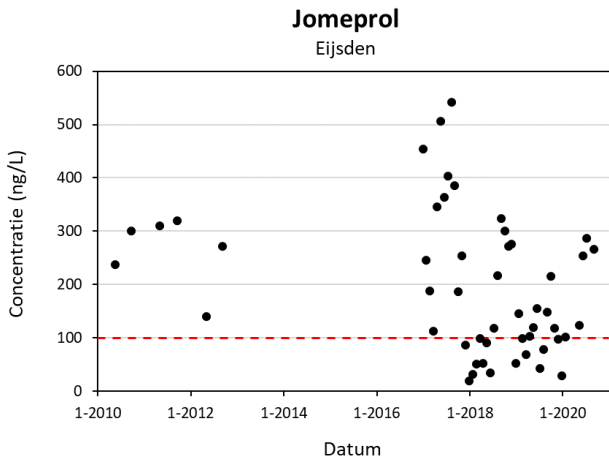


Eems + zee

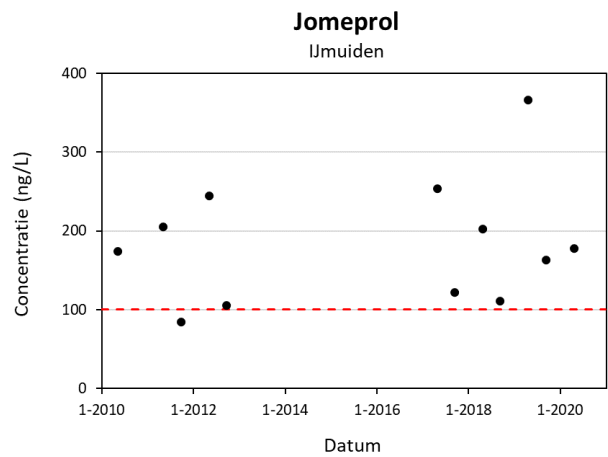
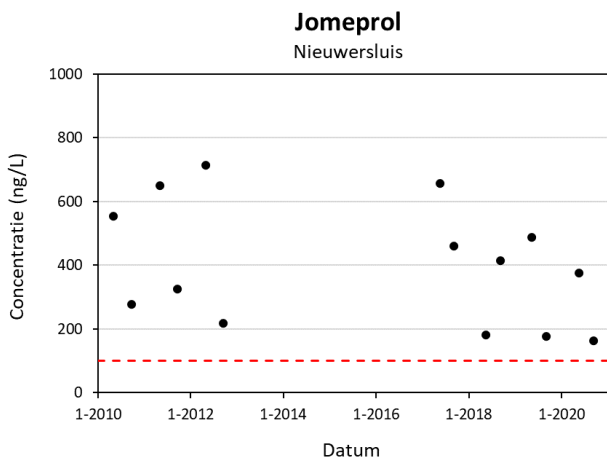
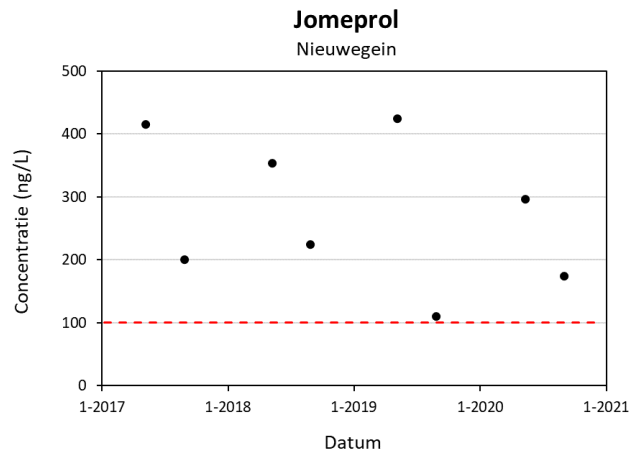
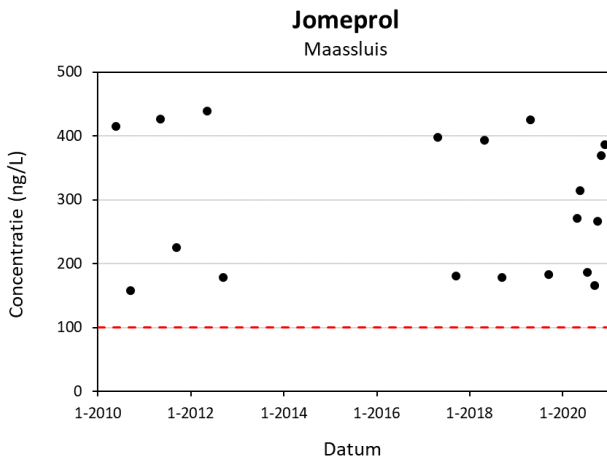
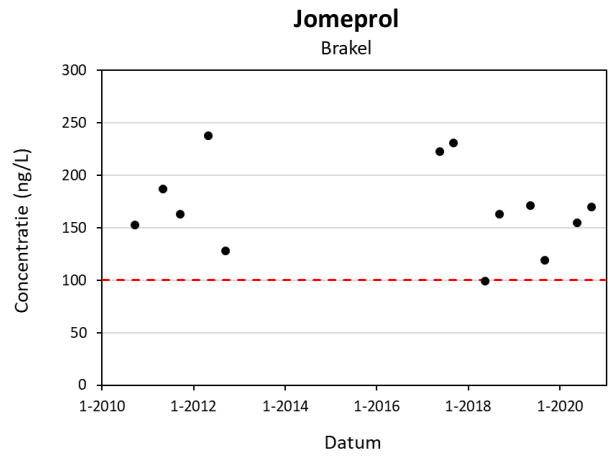
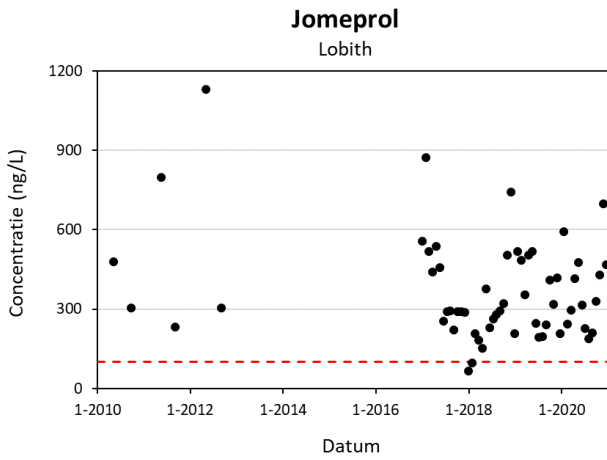


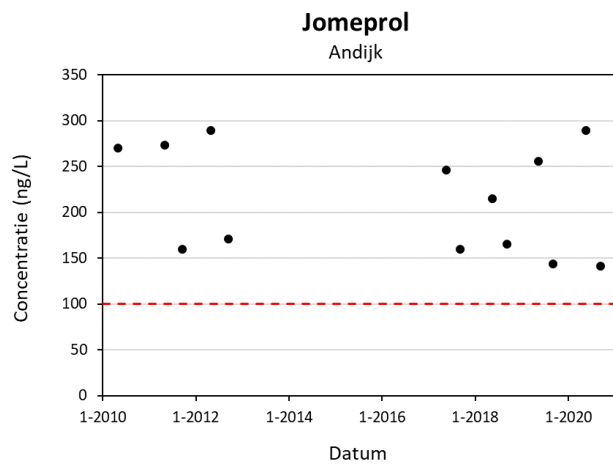
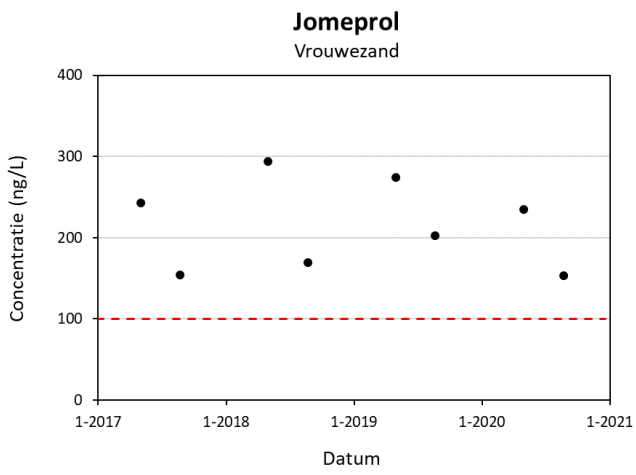
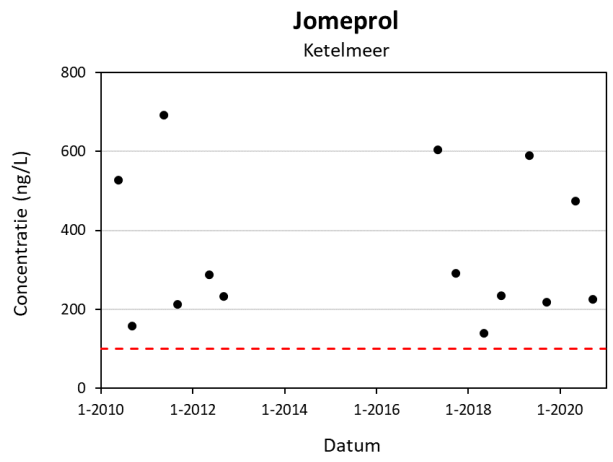
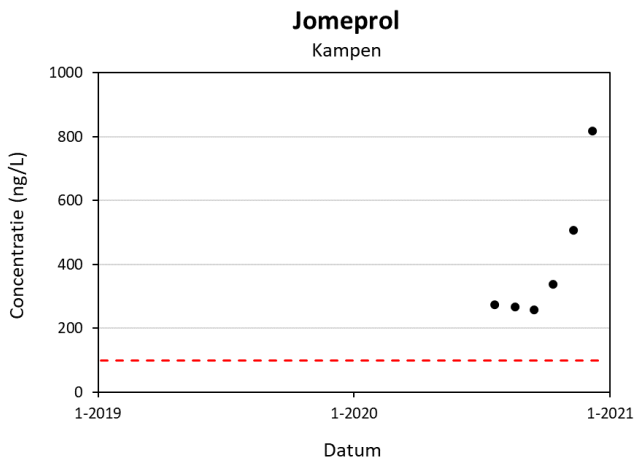
18. Jomeprol

Stroomgebied Maas

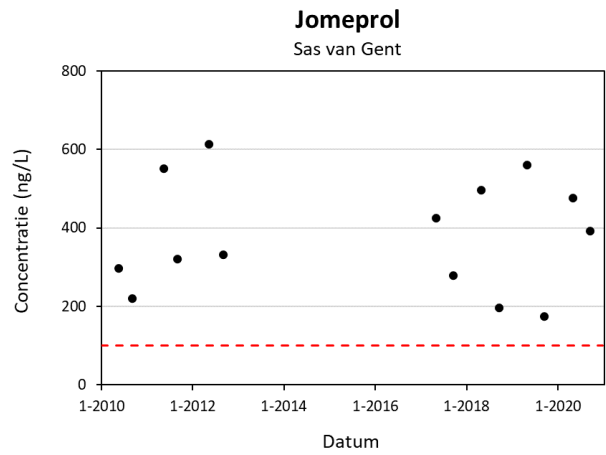
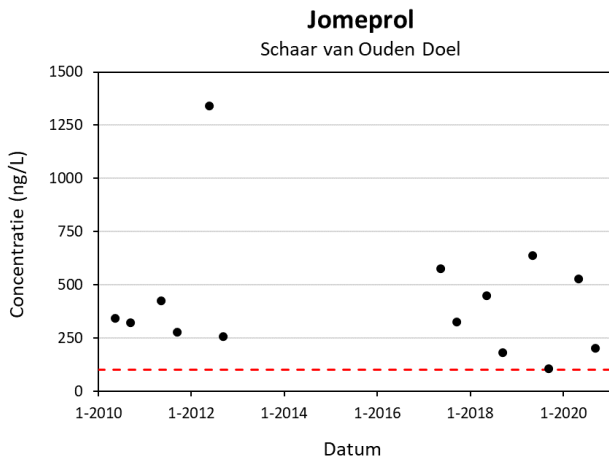


Stroomgebied Rijn

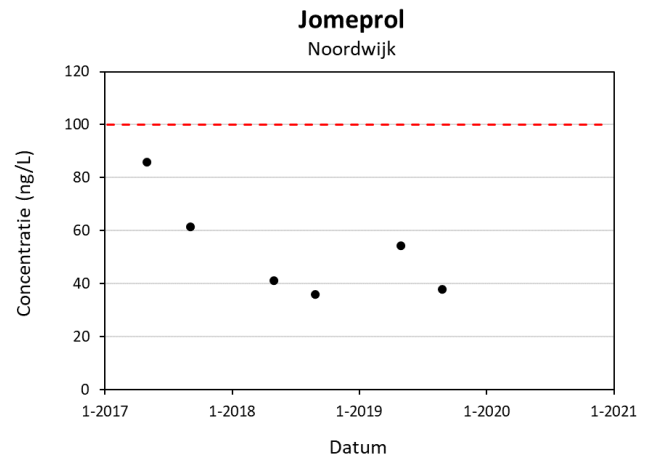
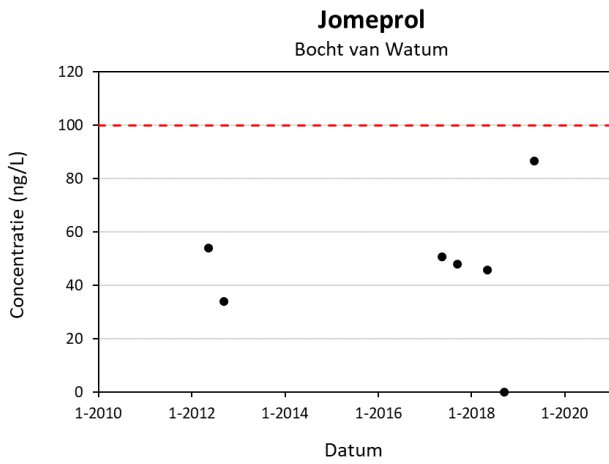




Stroomgebied Schelde

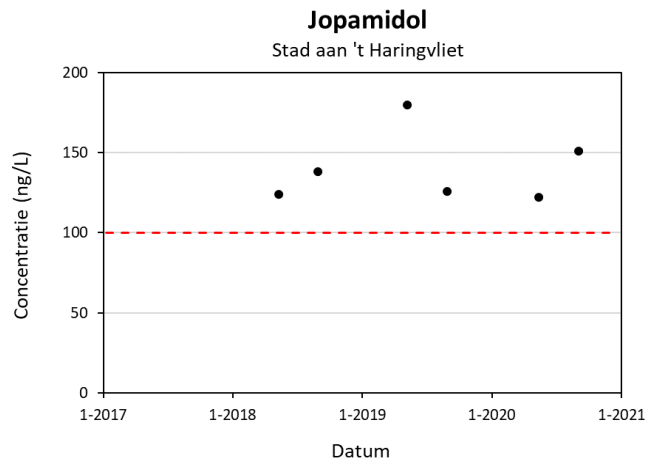
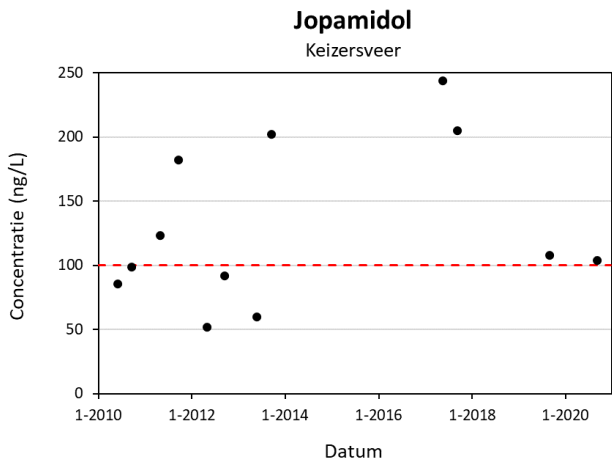
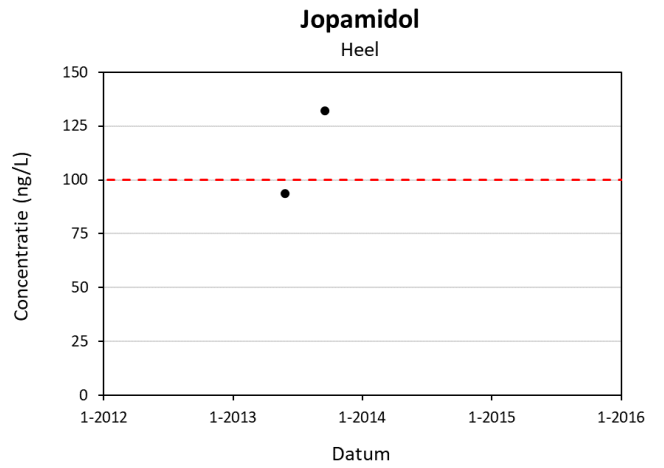
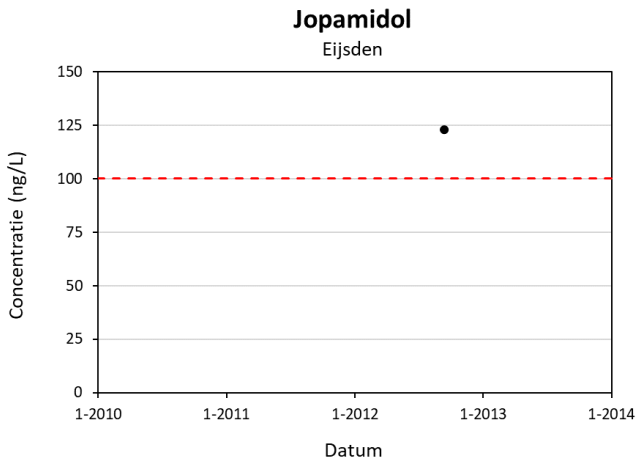


Eems + zee

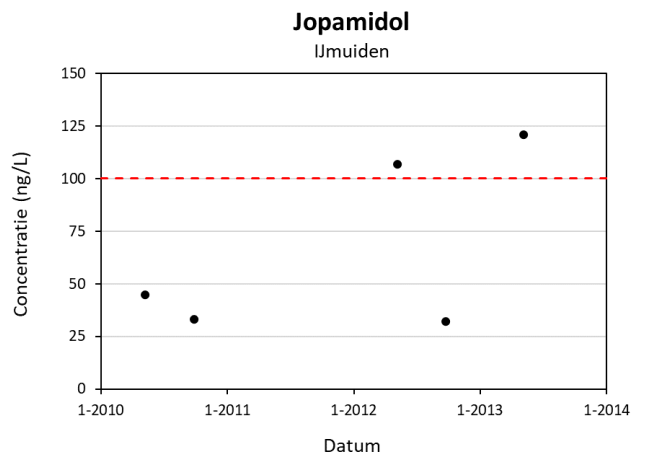
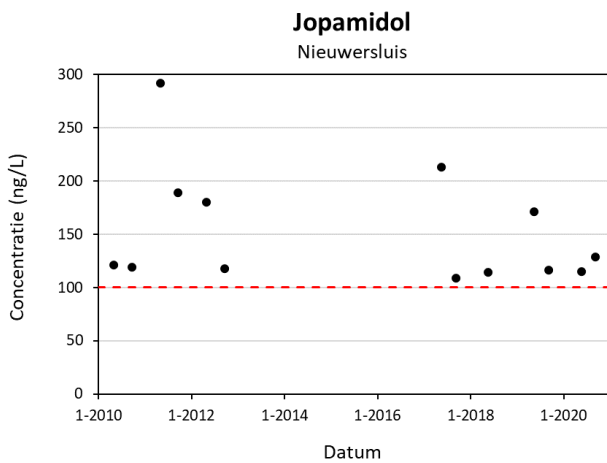
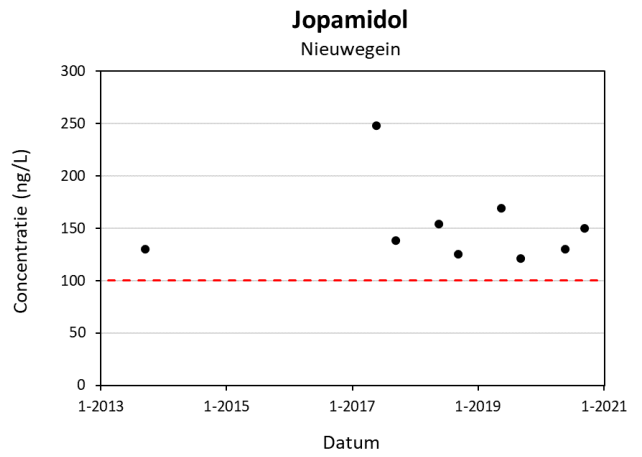
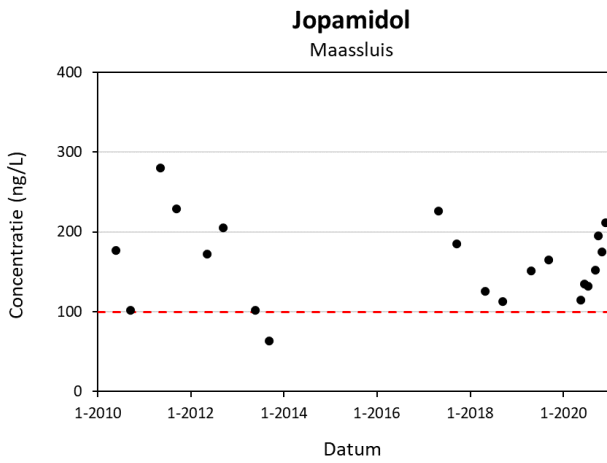
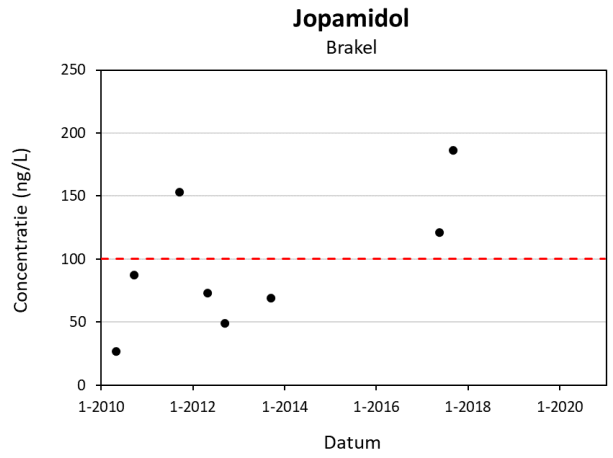
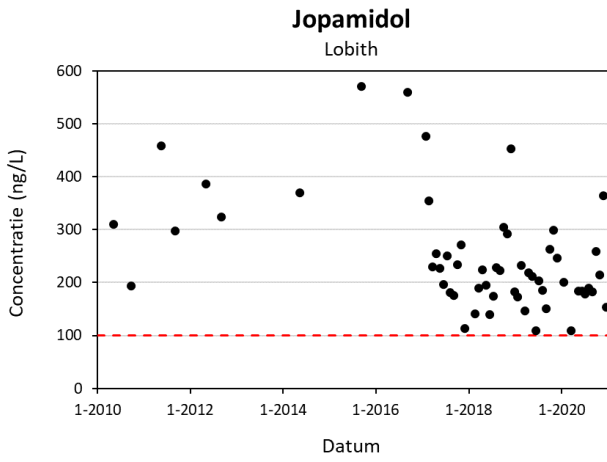


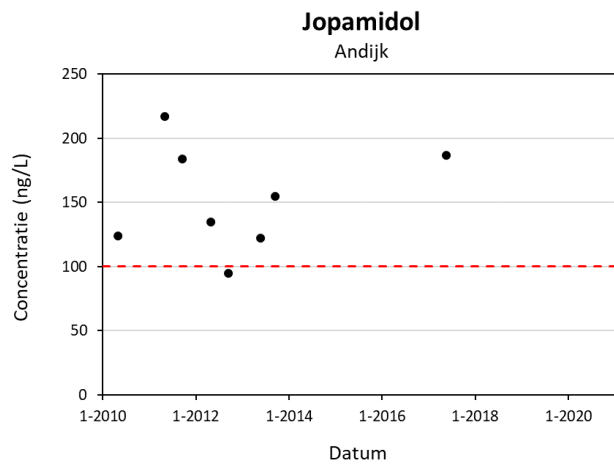
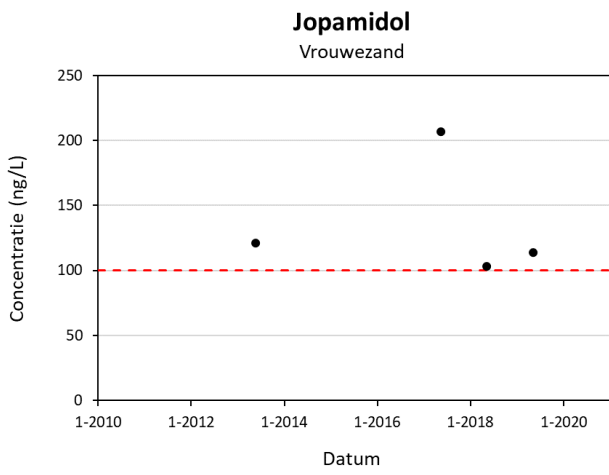
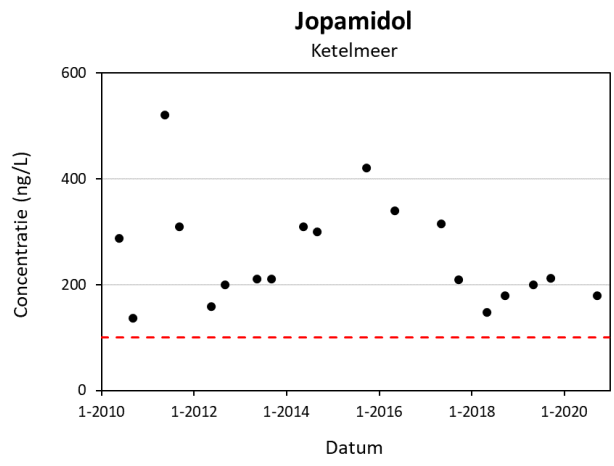
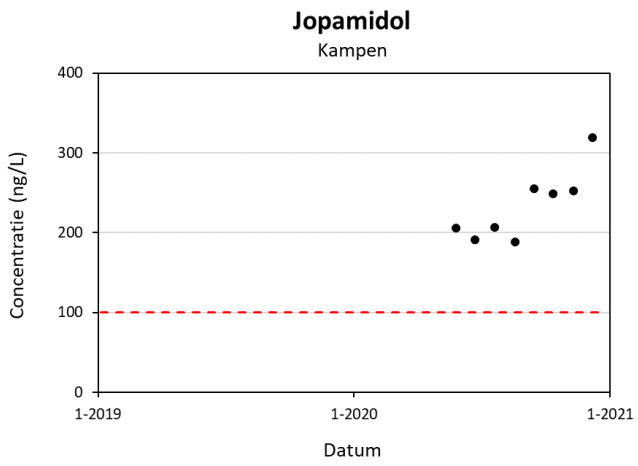
19. Jopamidol

Stroomgebied Maas

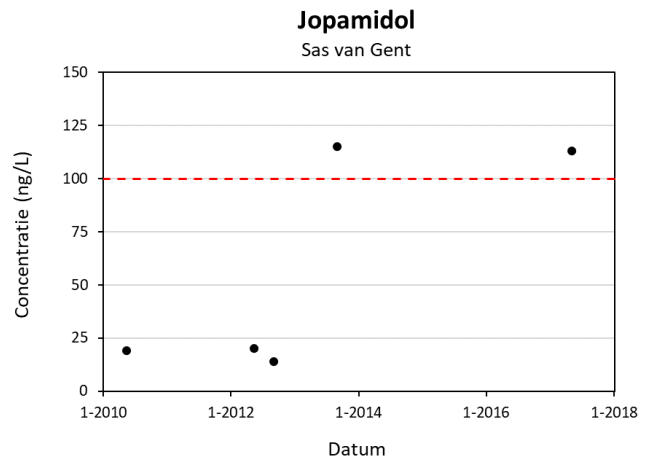
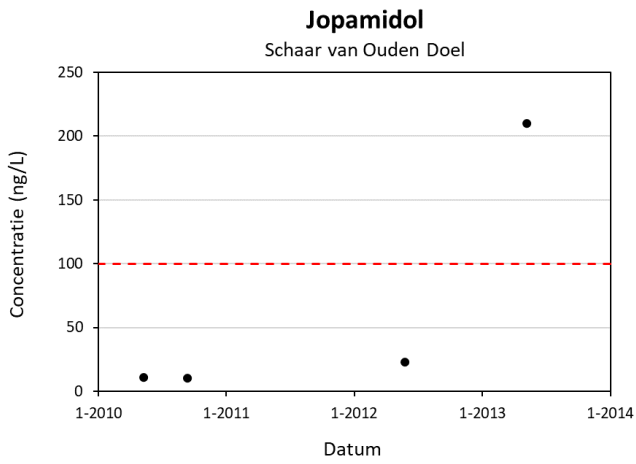


Stroomgebied Rijn

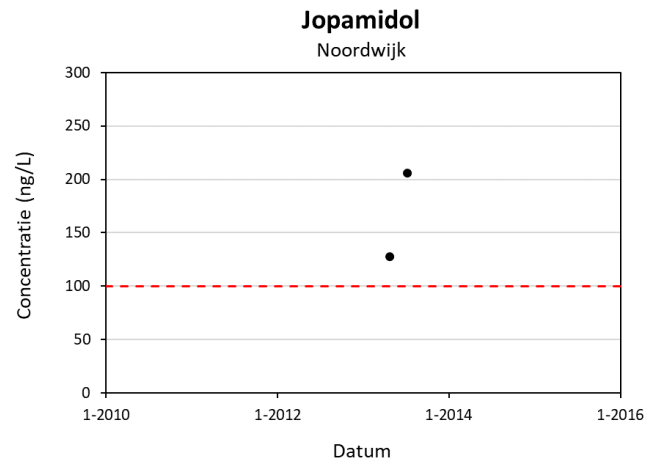
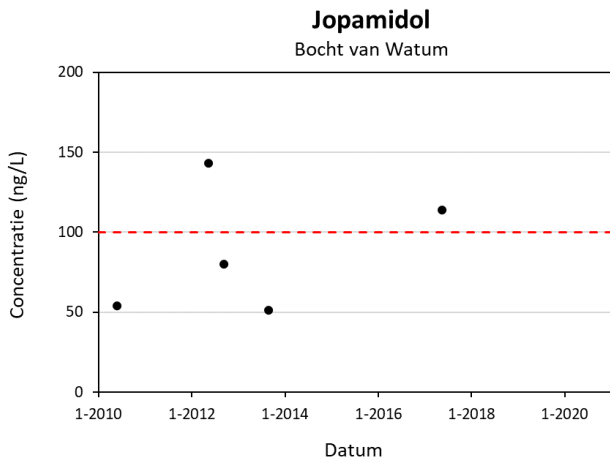




Stroomgebied Schelde

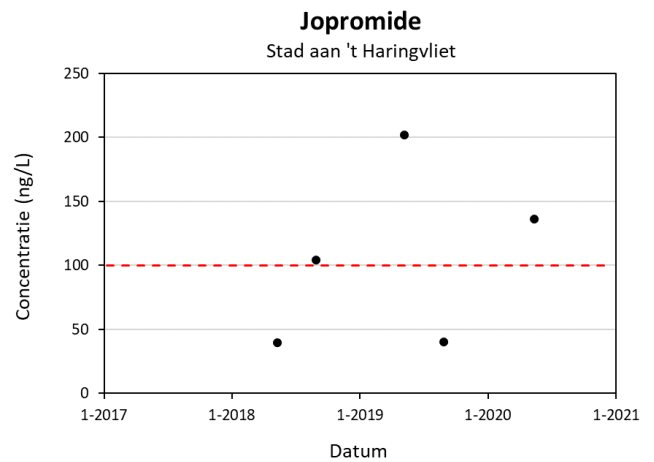
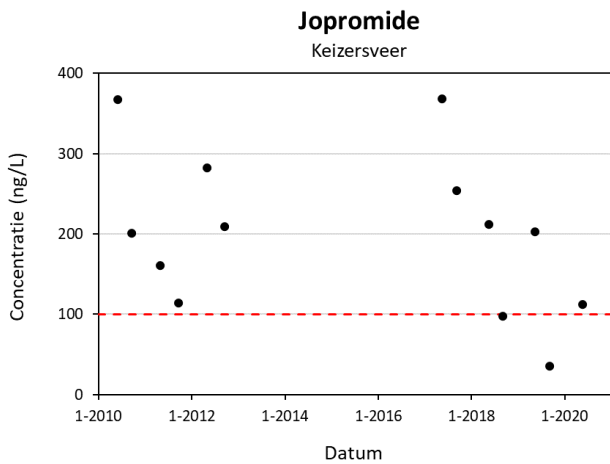
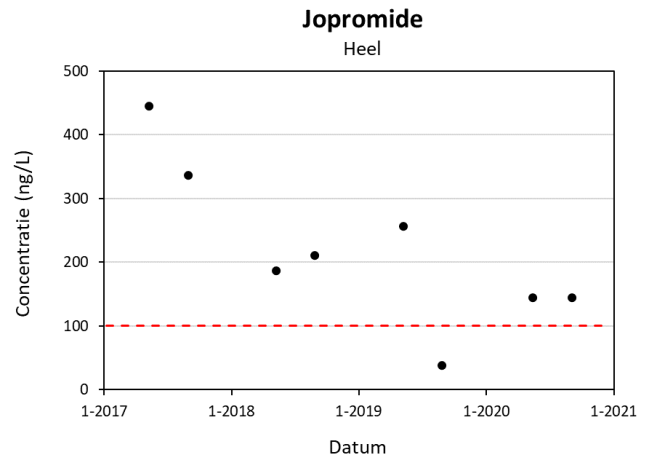
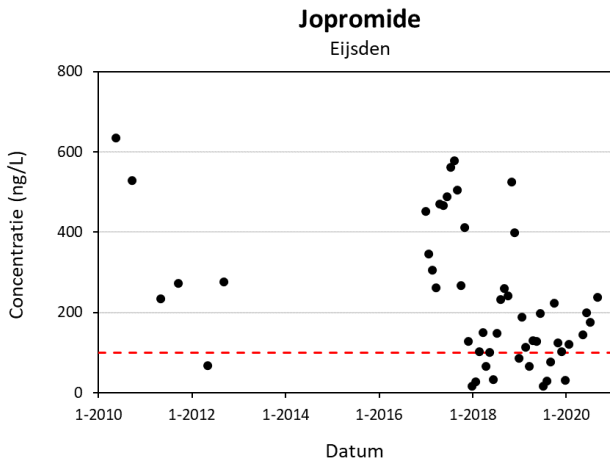


Eems + zee

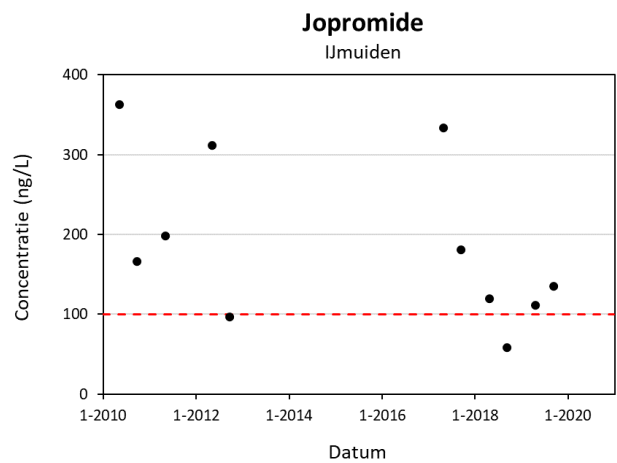
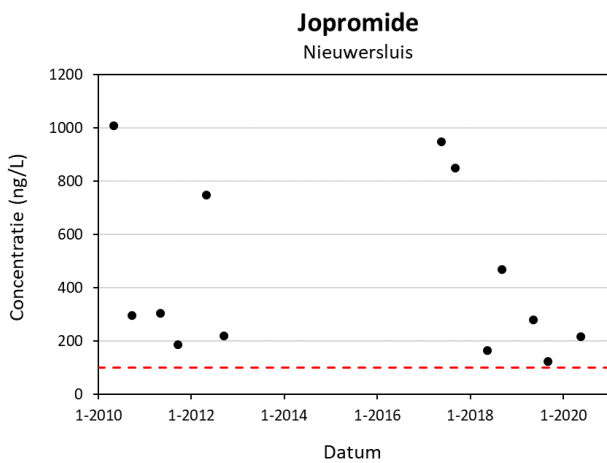
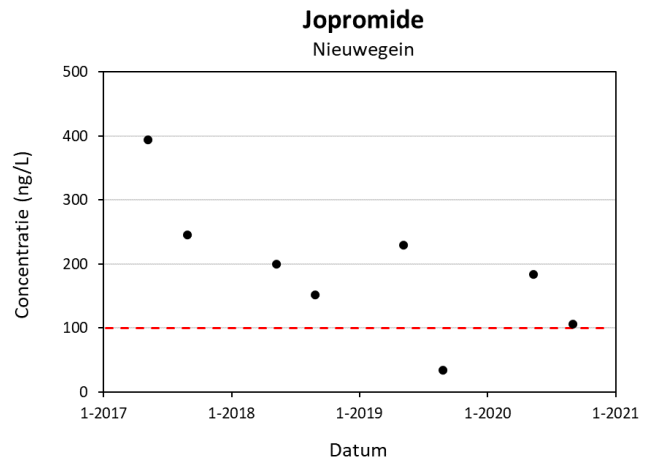
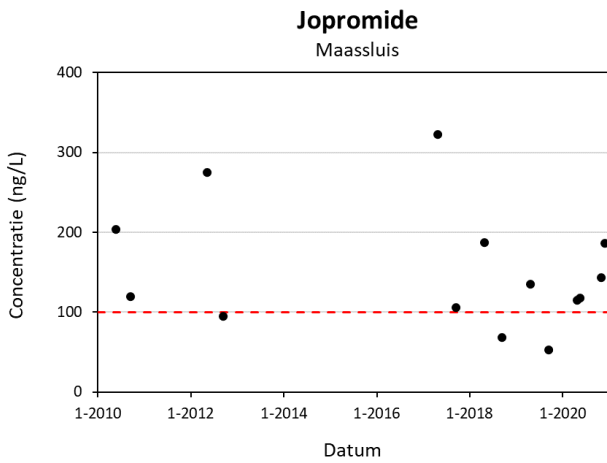
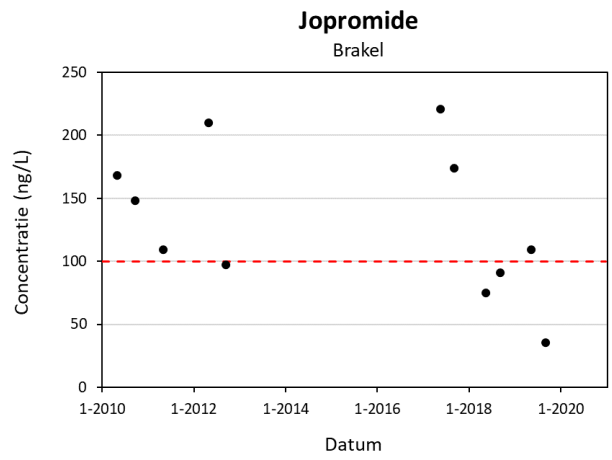
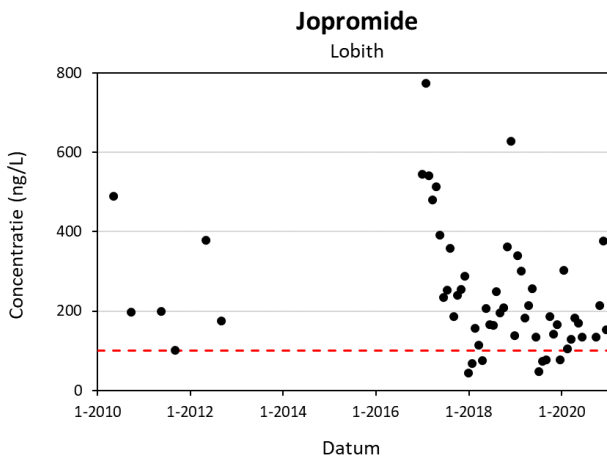


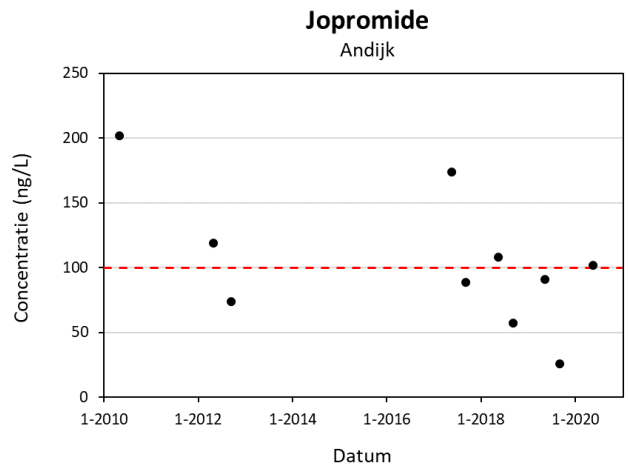
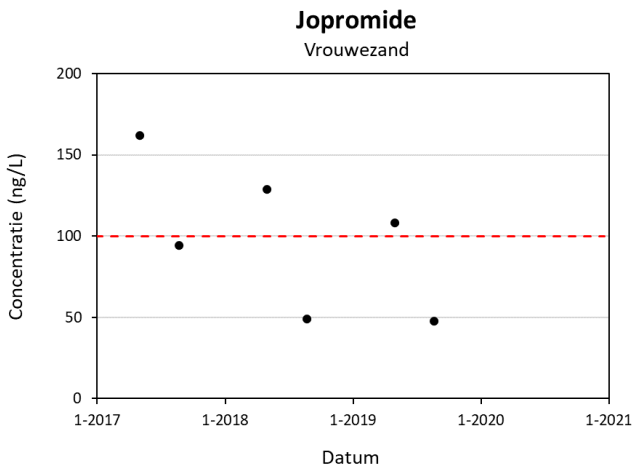
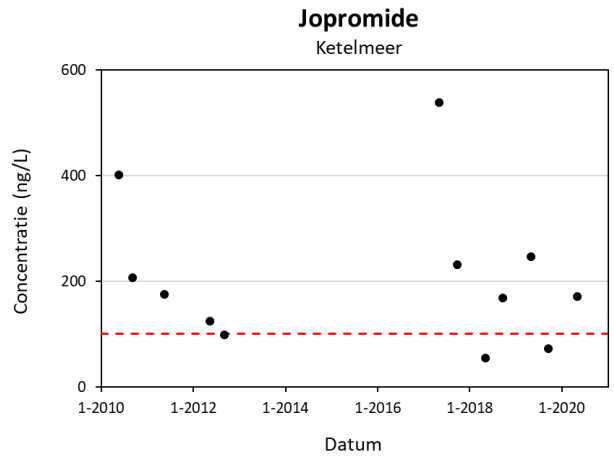
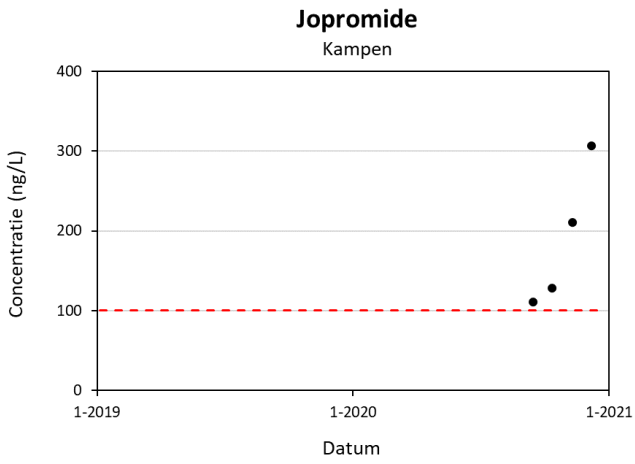
20. Jopromide

Stroomgebied Maas

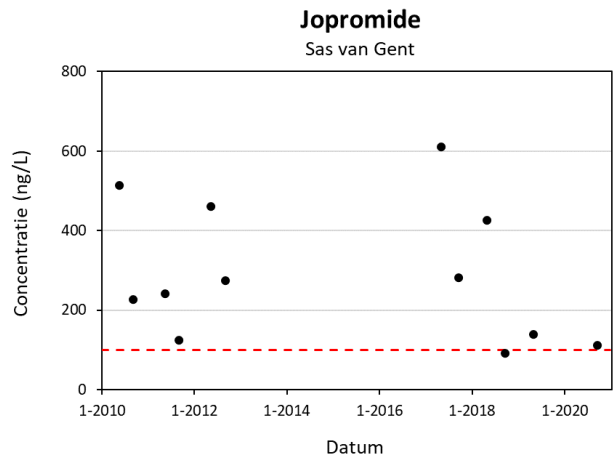
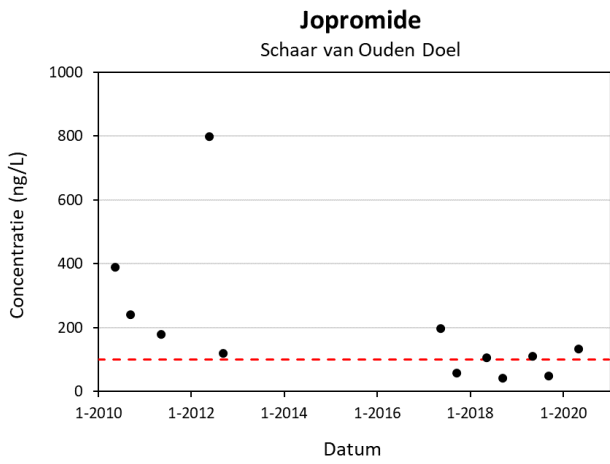


Stroomgebied Rijn

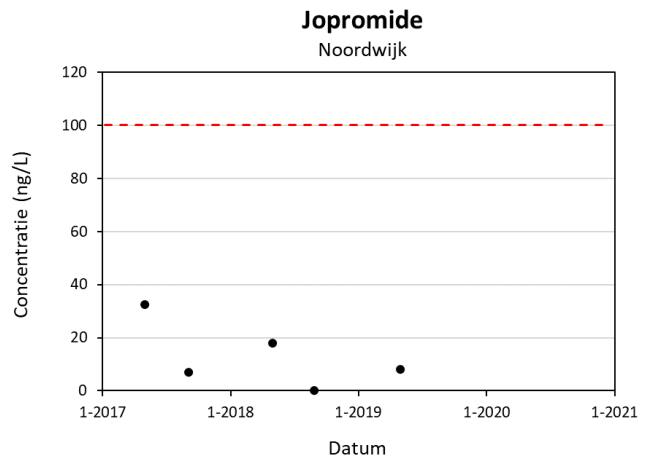
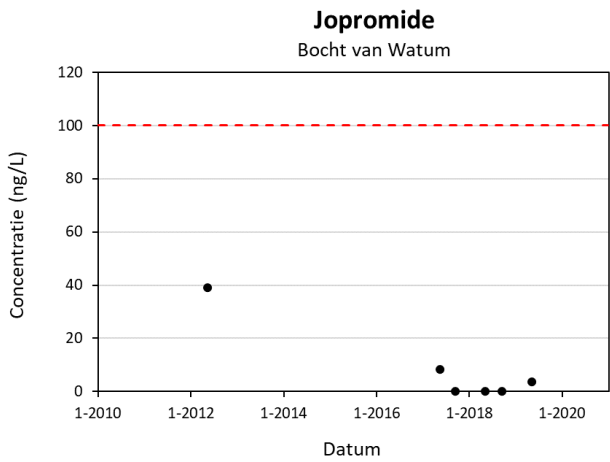




Stroomgebied Schelde

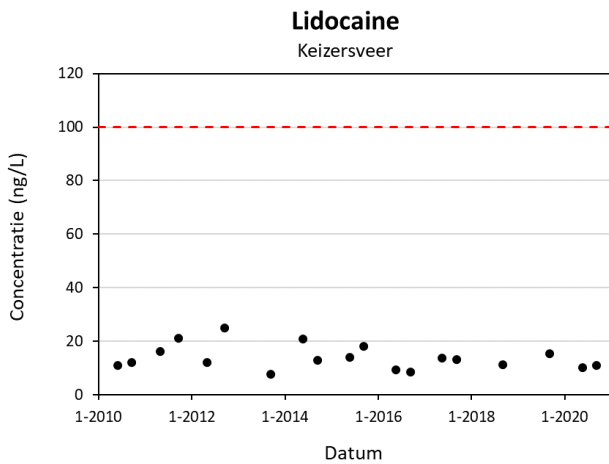
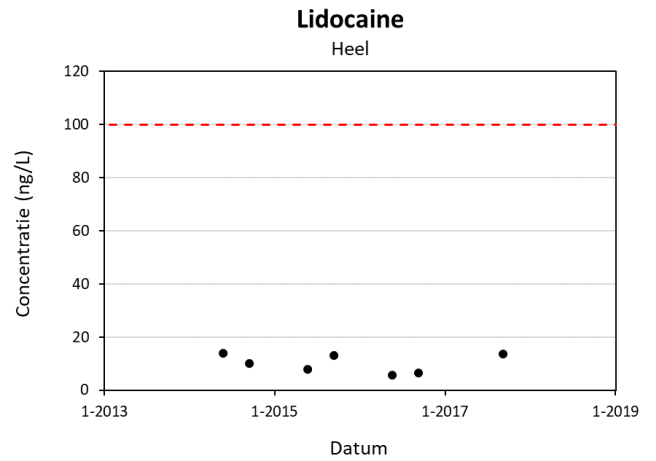
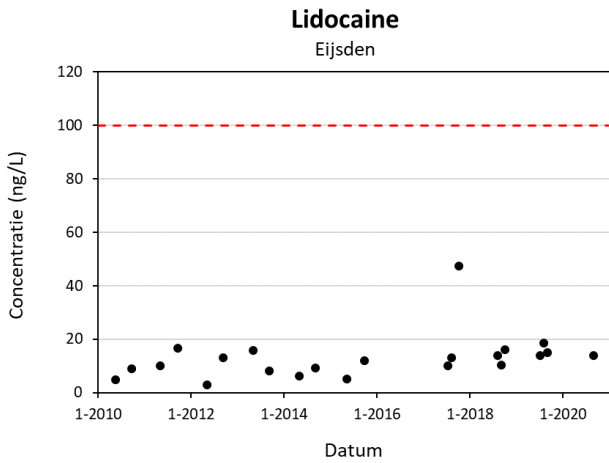


Eems + zee

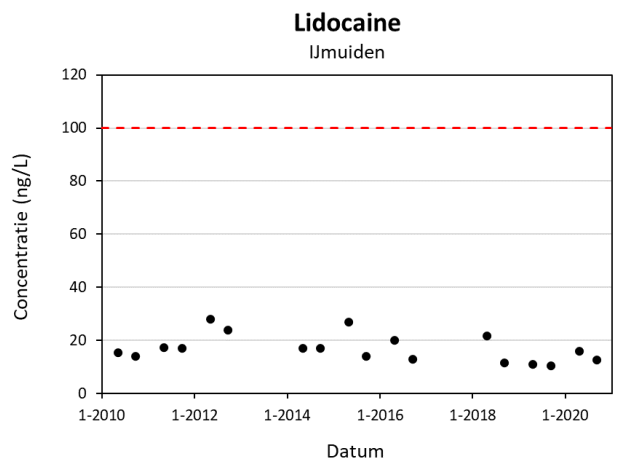
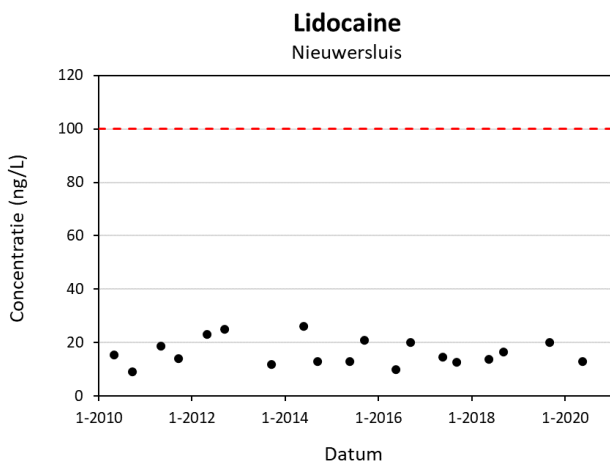
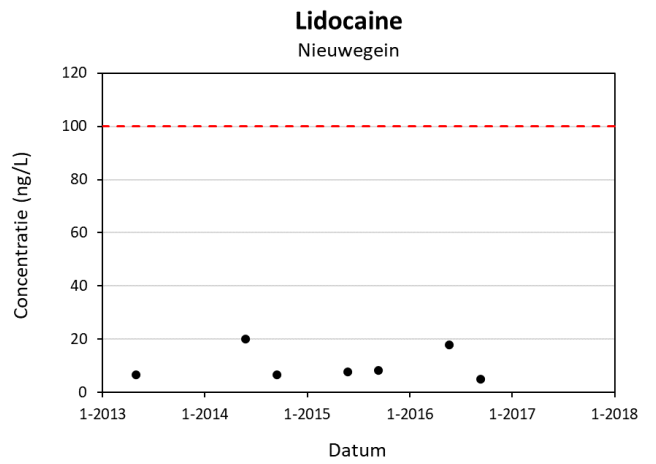
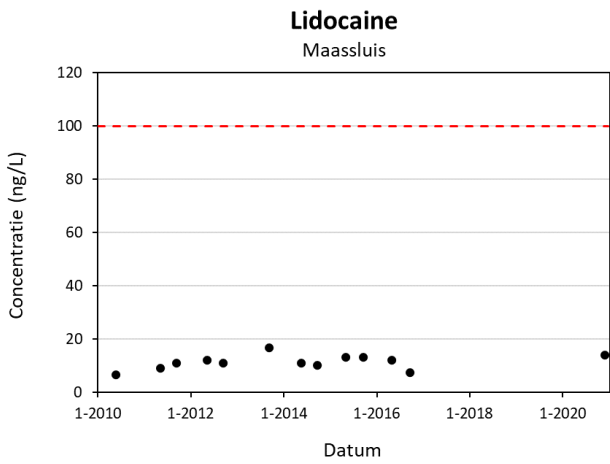
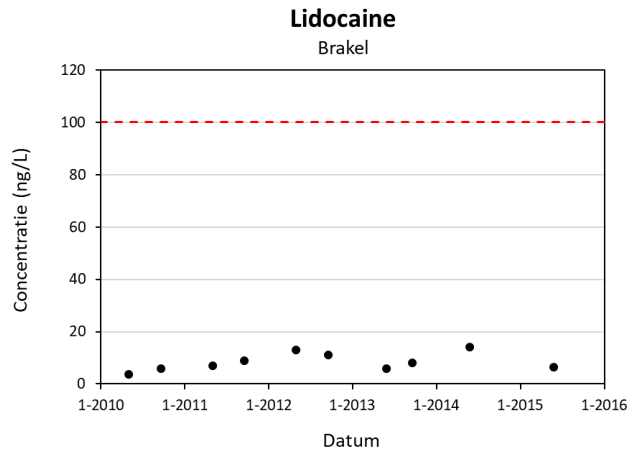
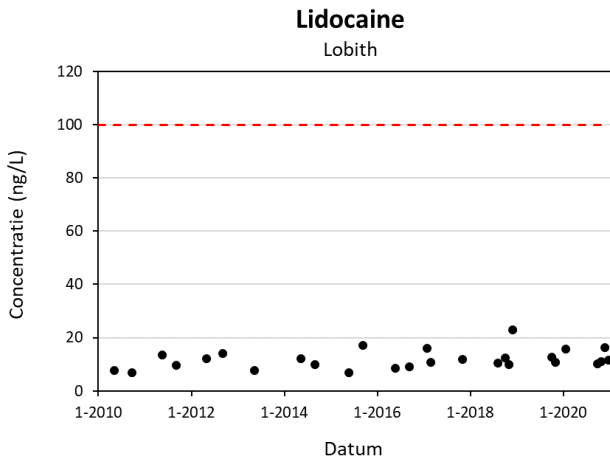


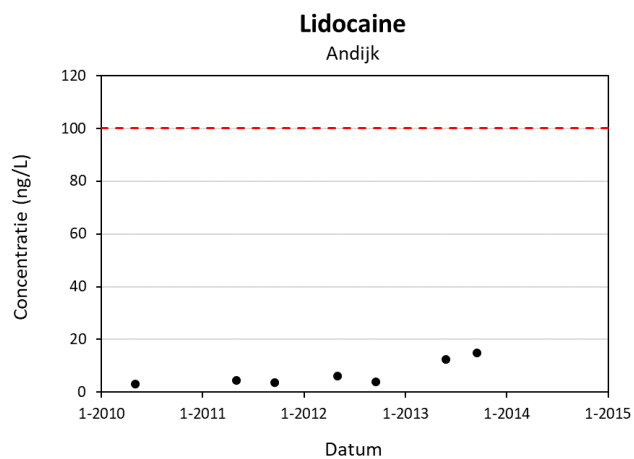
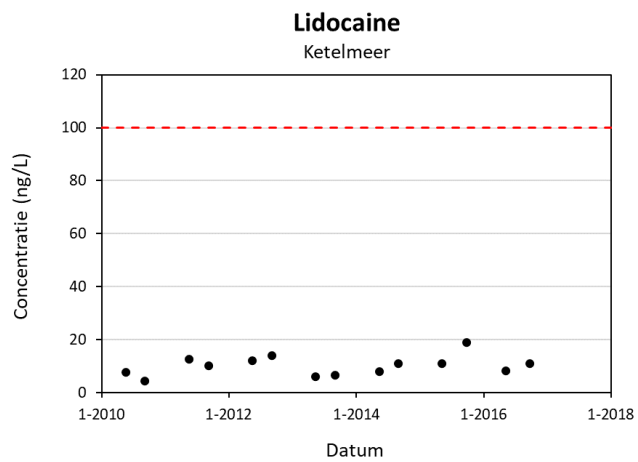
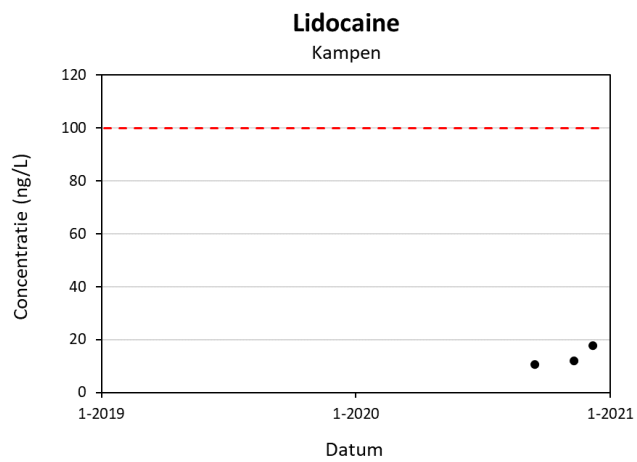
21. Lidocaine

Stroomgebied Maas

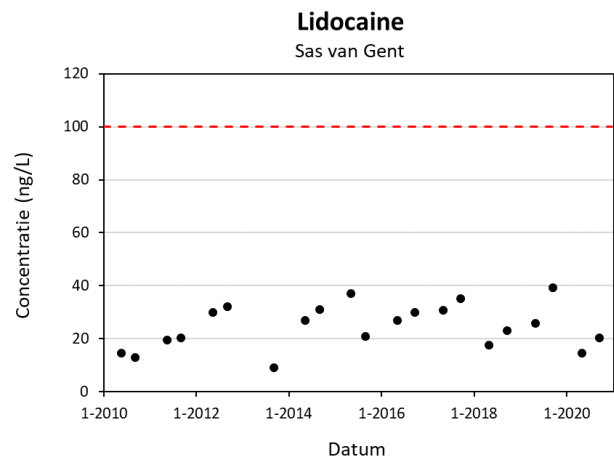
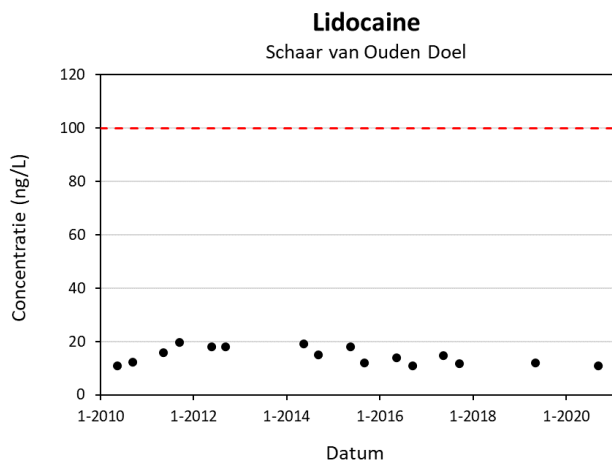


Stroomgebied Rijn

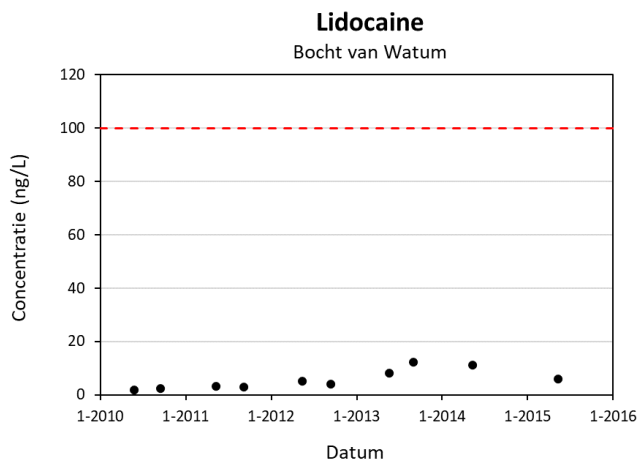




Stroomgebied Schelde

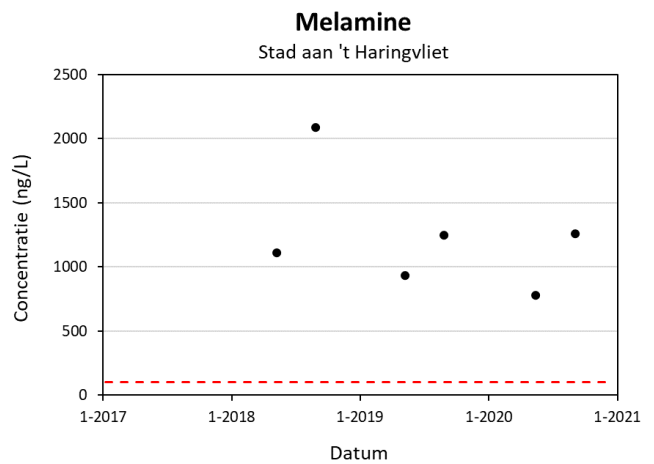
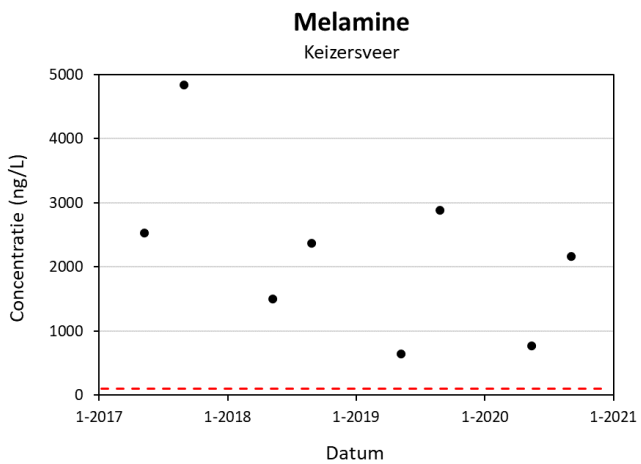
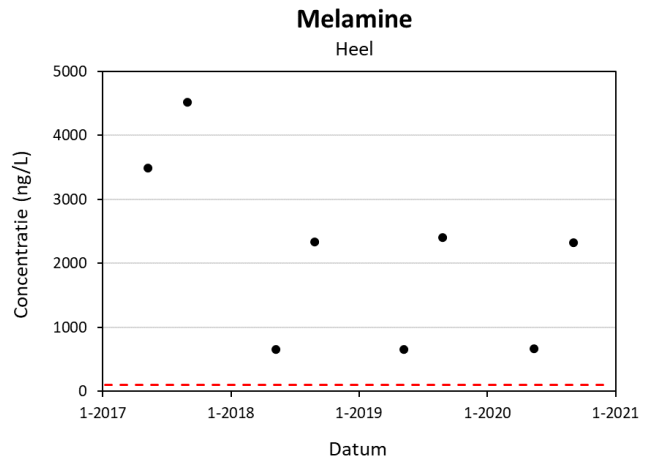
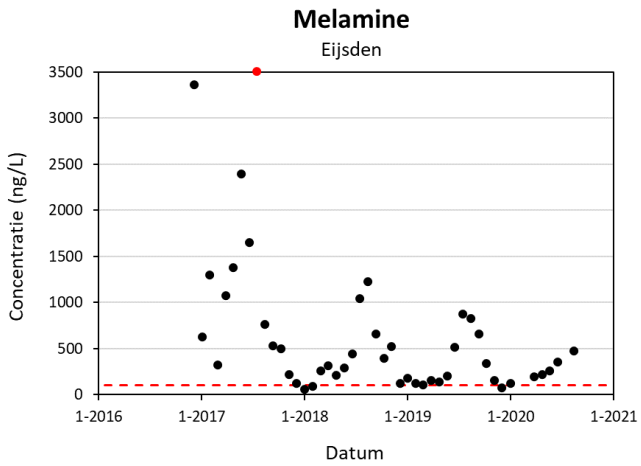


Eems + zee



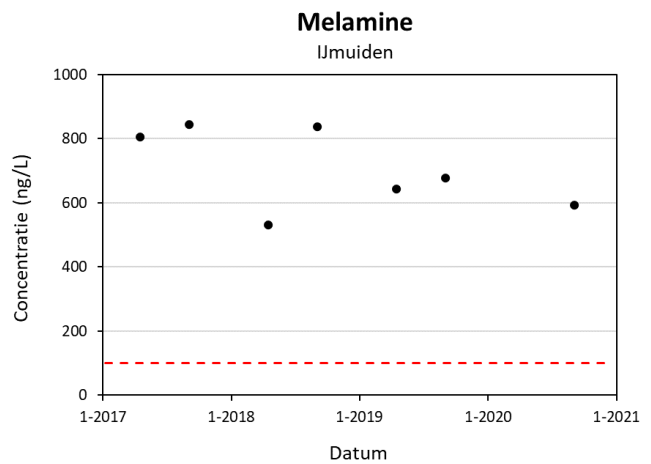
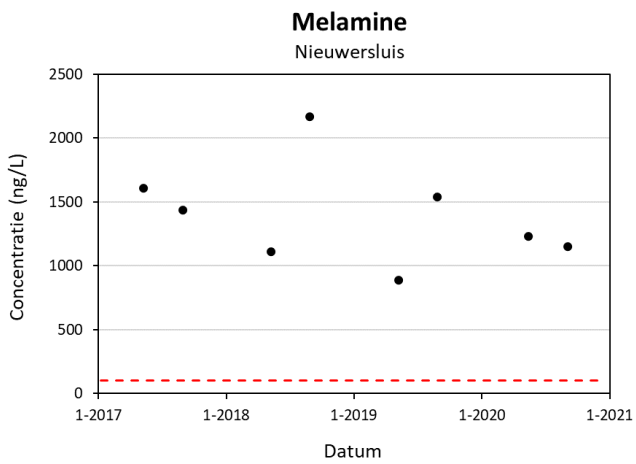
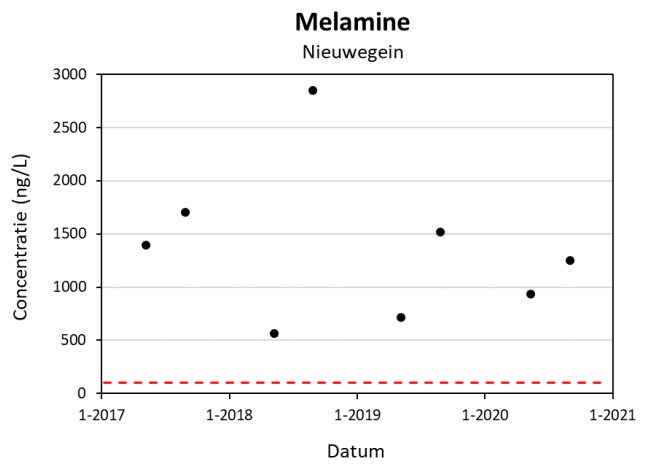
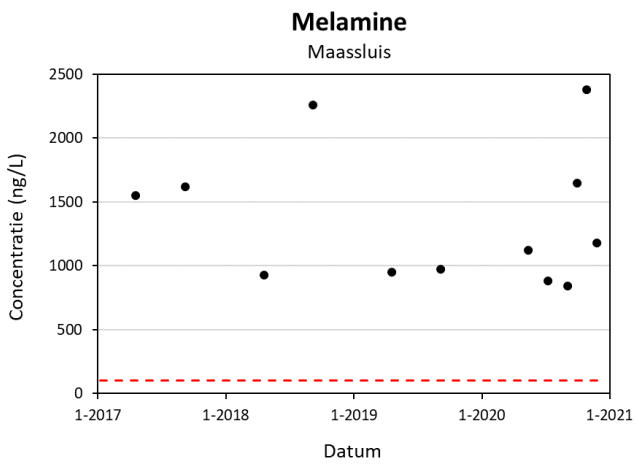
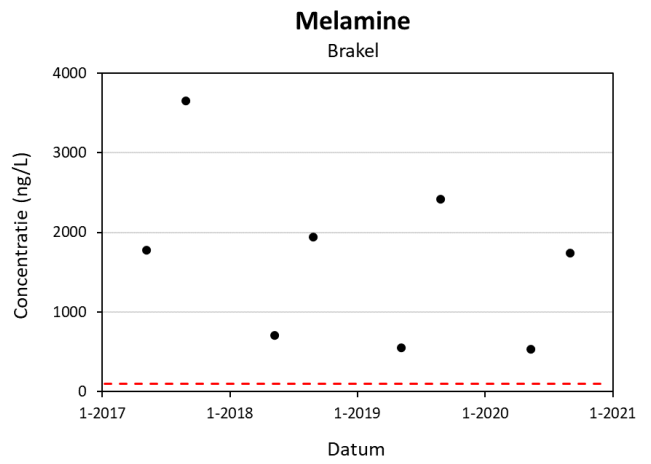
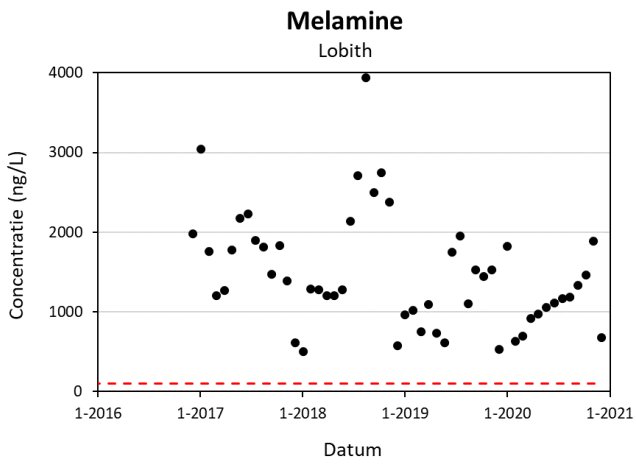
22. Melamine

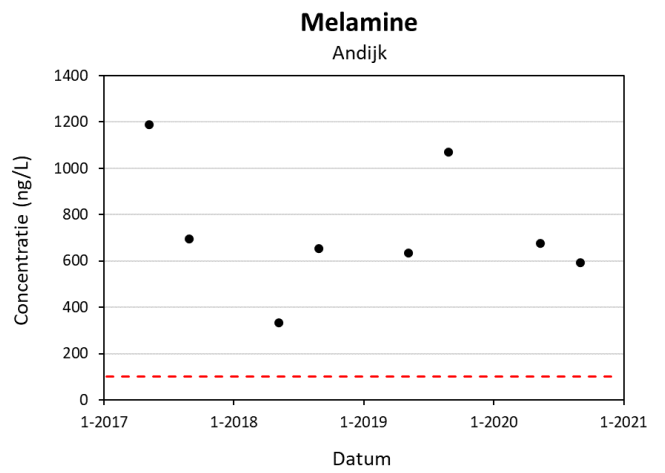
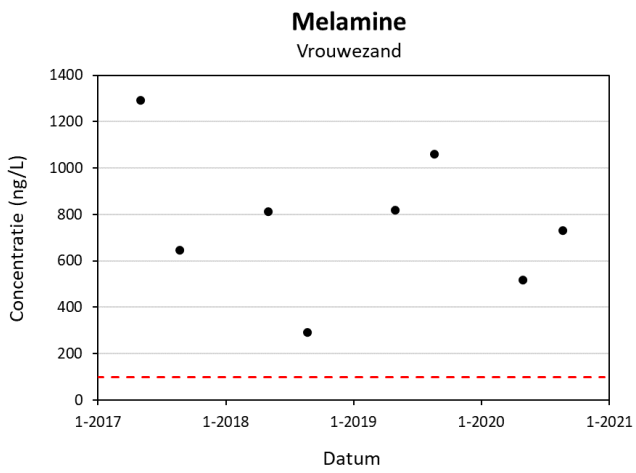
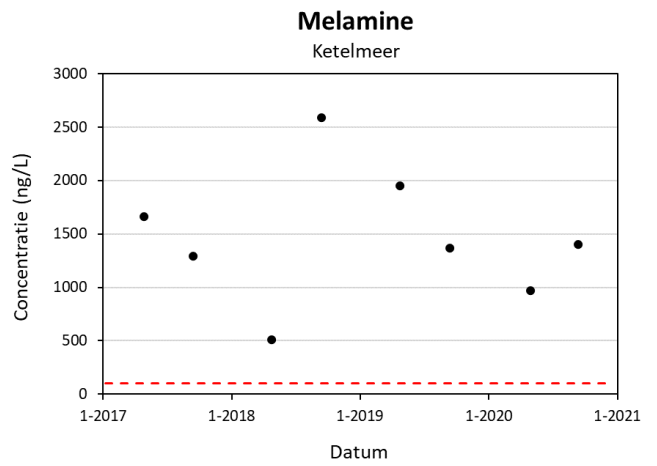
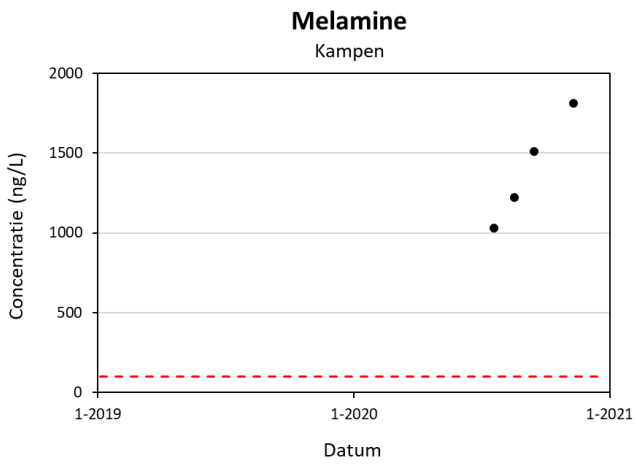
Stroomgebied Maas



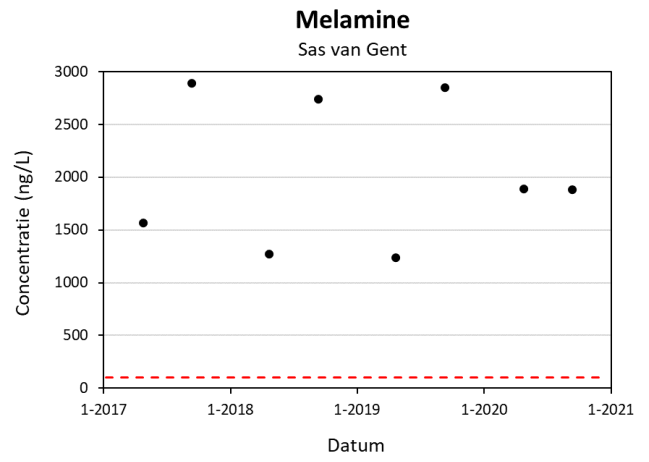
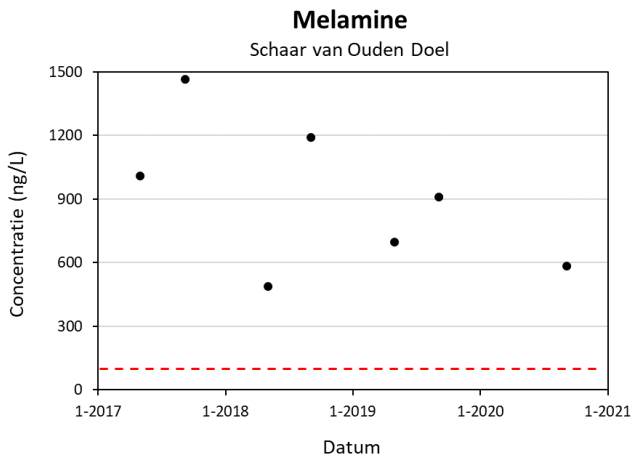
NB: Het rode datapunt voor locatie Eijsden betreft een uitschieter die ver buiten de schaal valt. Het vertegenwoordigt in werkelijkheid een waarde van 10129 ng/L.

Stroomgebied Rijn

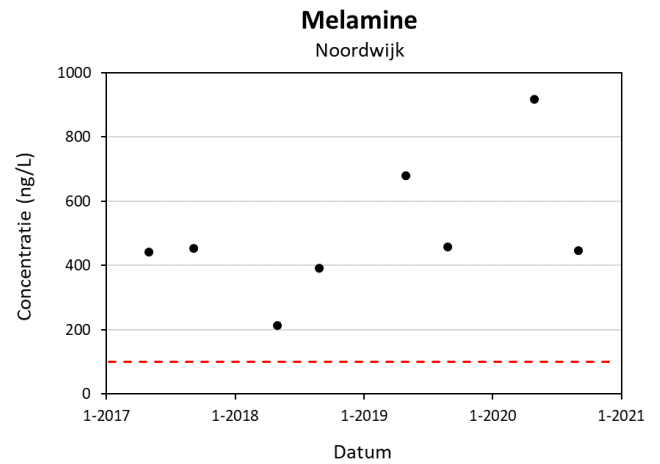
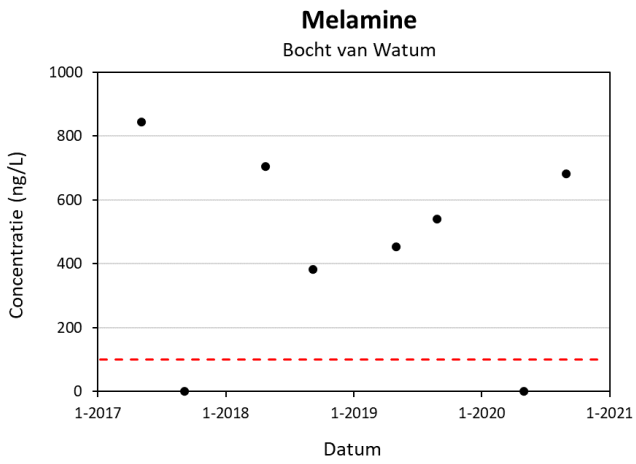




Stroomgebied Schelde

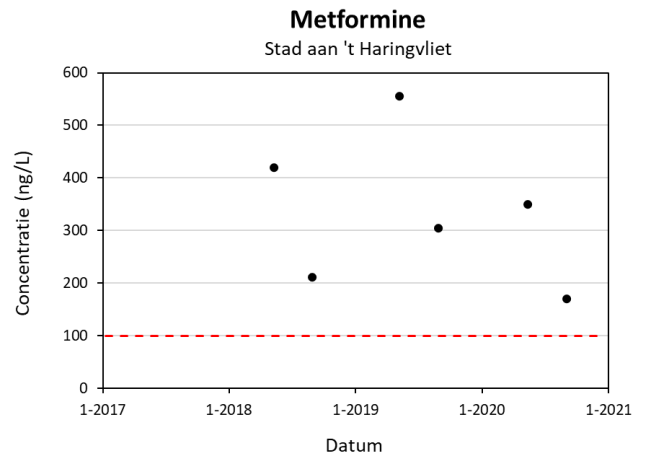
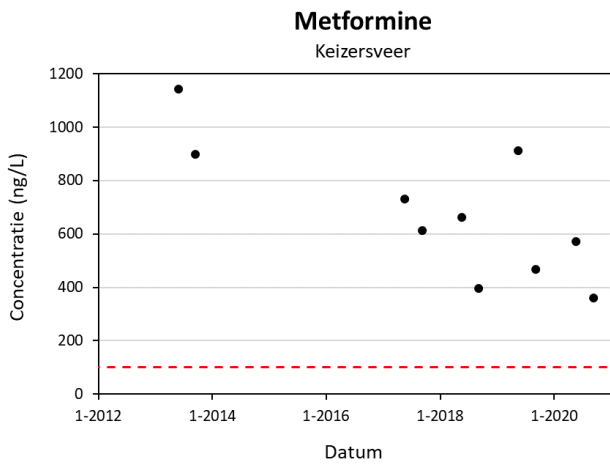
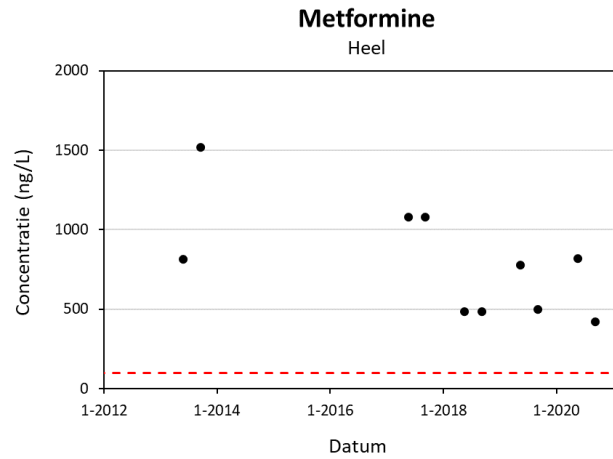
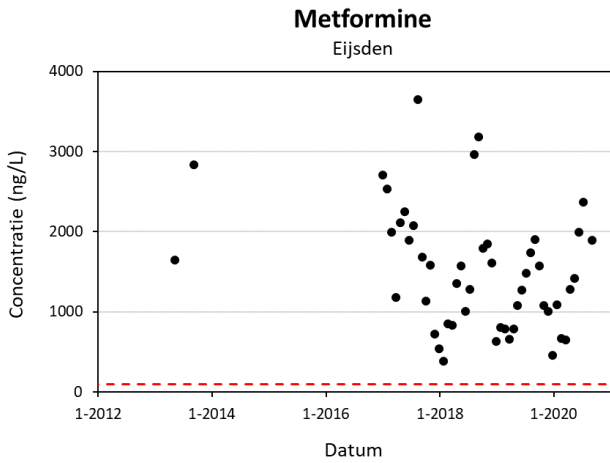


Eems + zee

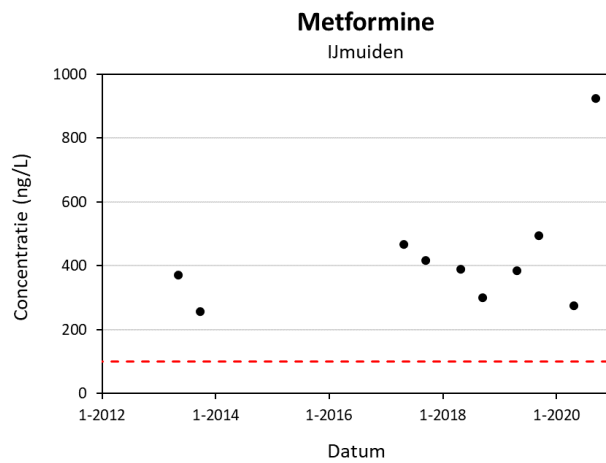
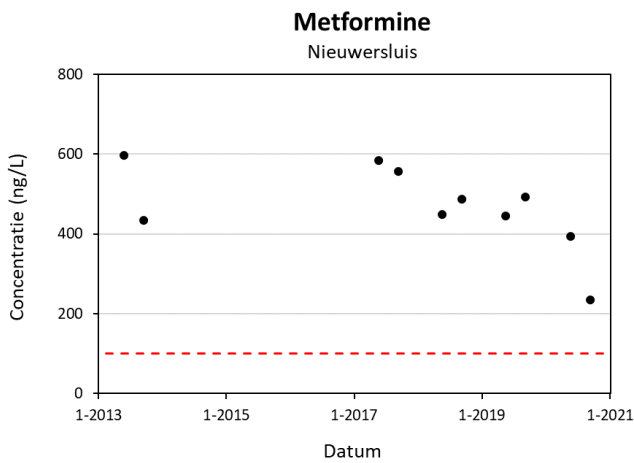
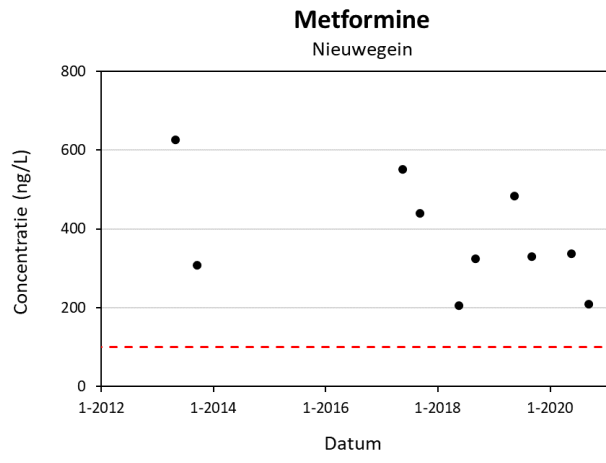
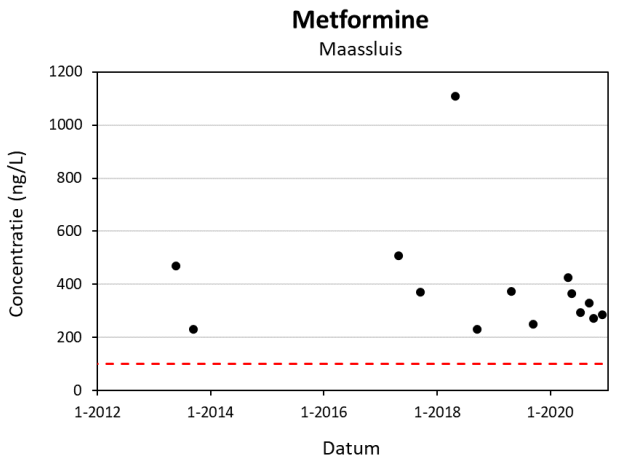
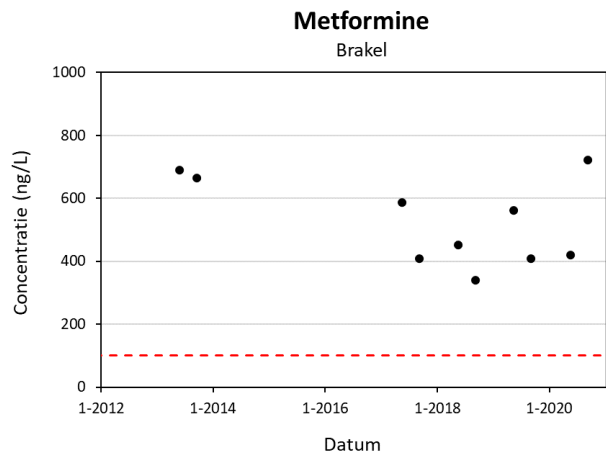
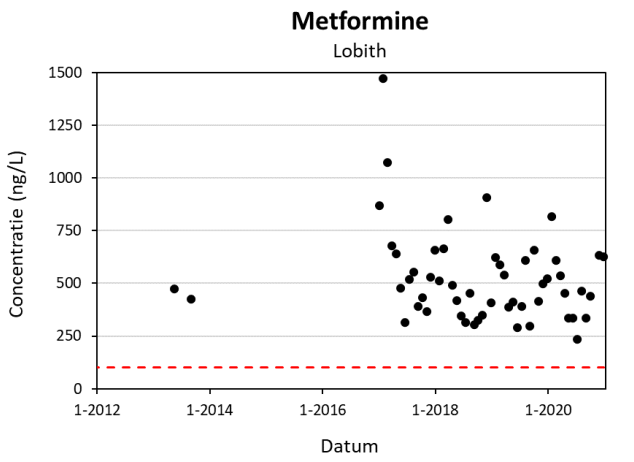


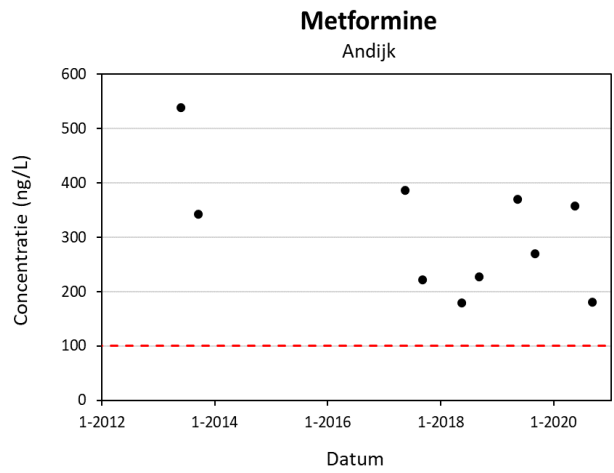
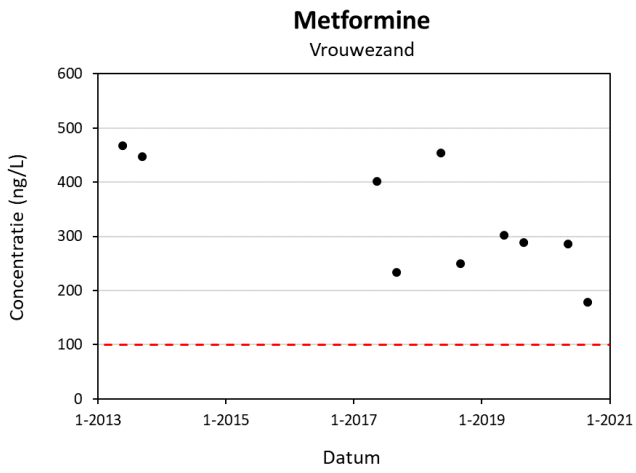
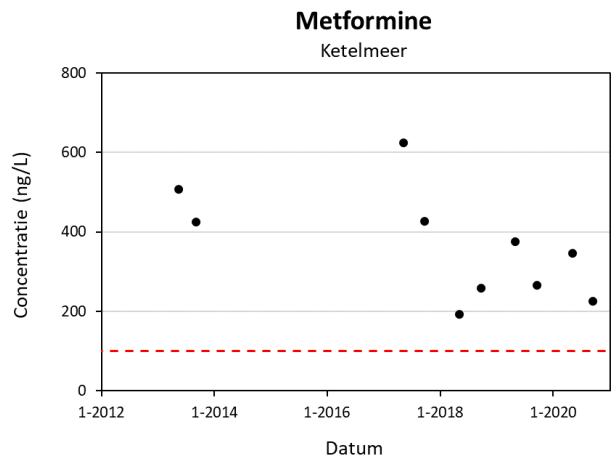
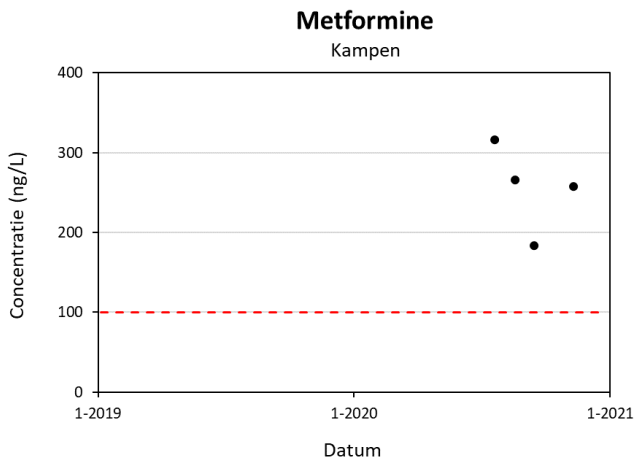
23. Metformine

Stroomgebied Maas

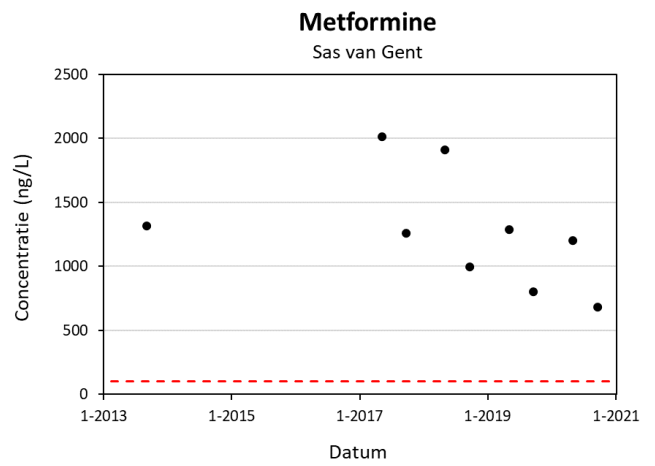
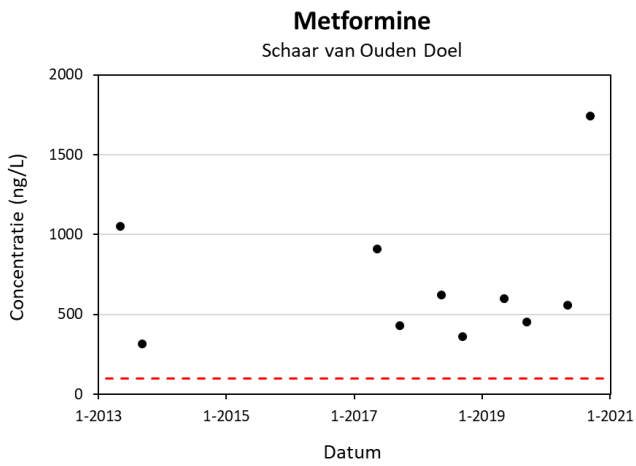


Stroomgebied Rijn

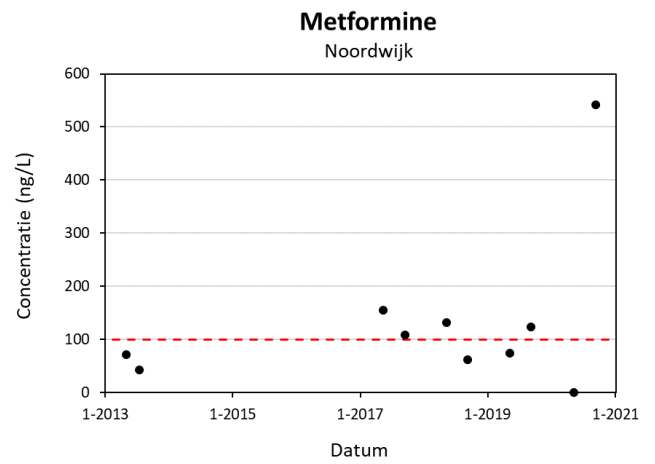
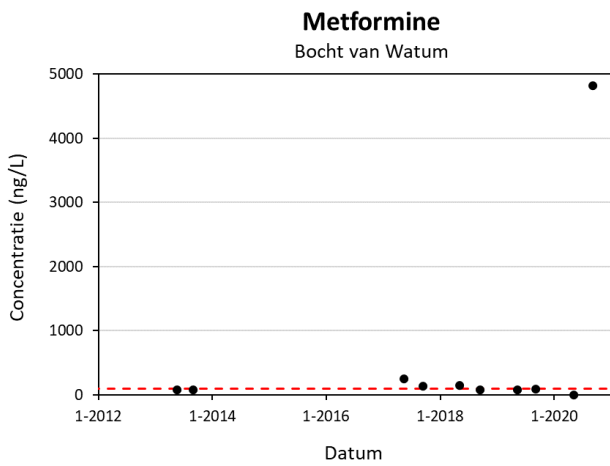




Stroomgebied Schelde

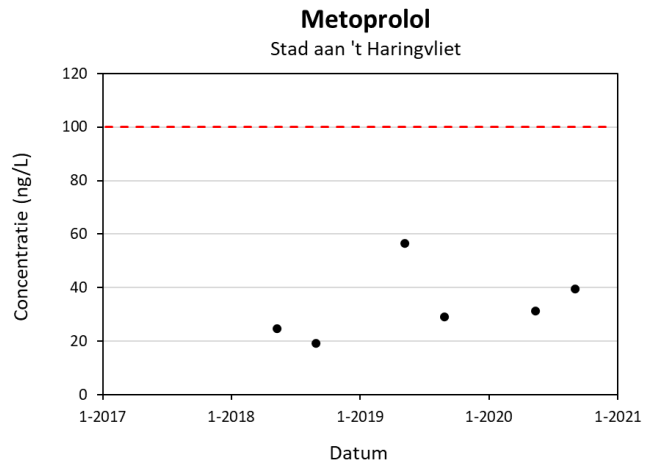
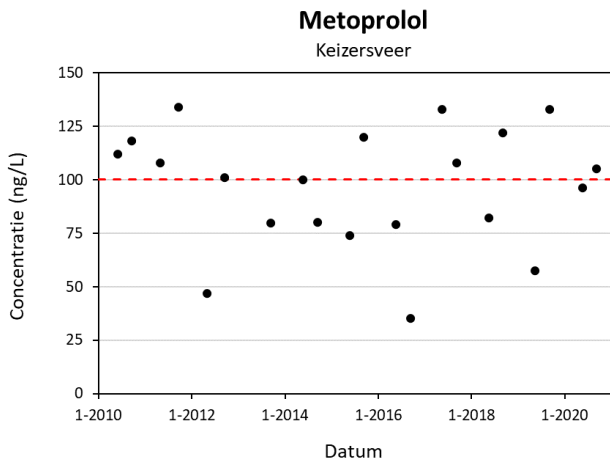
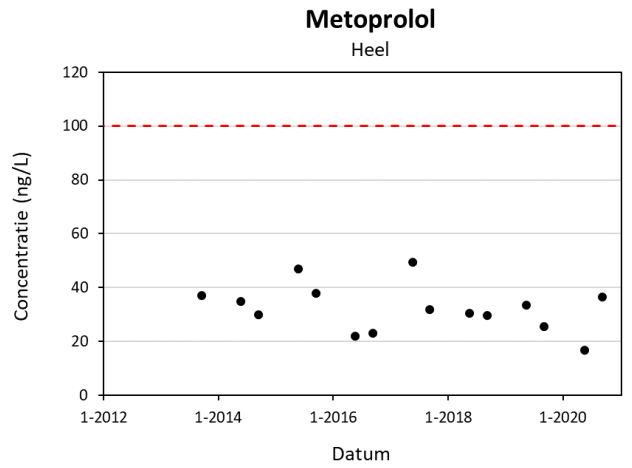
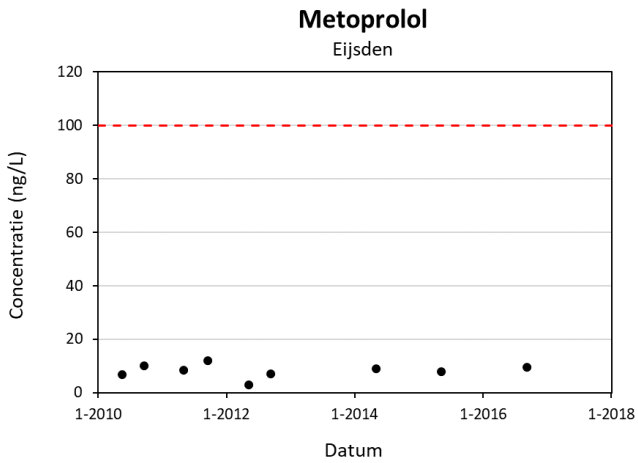


Eems + zee

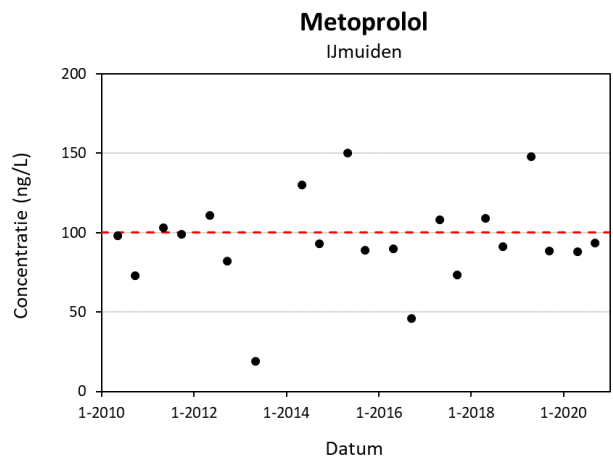
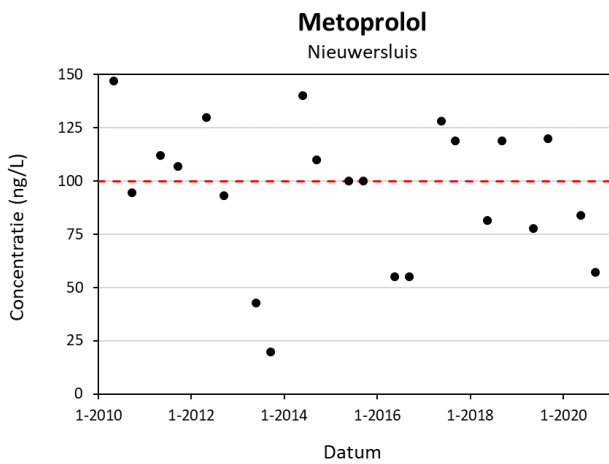
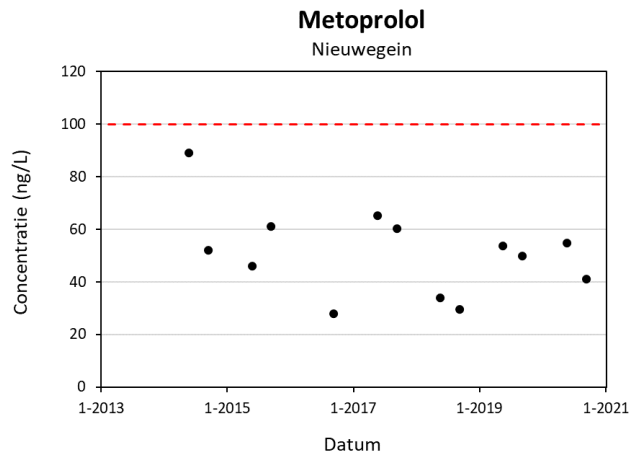
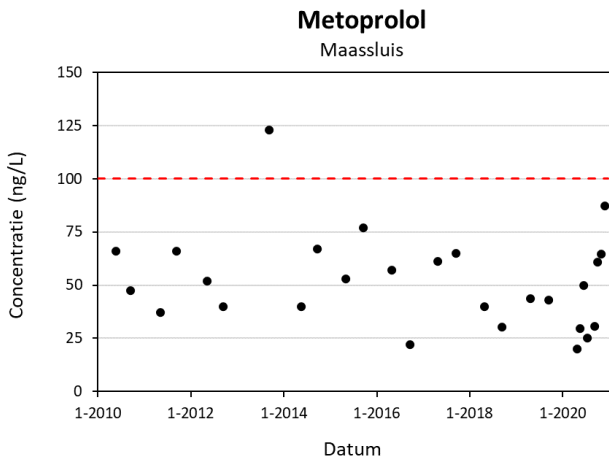
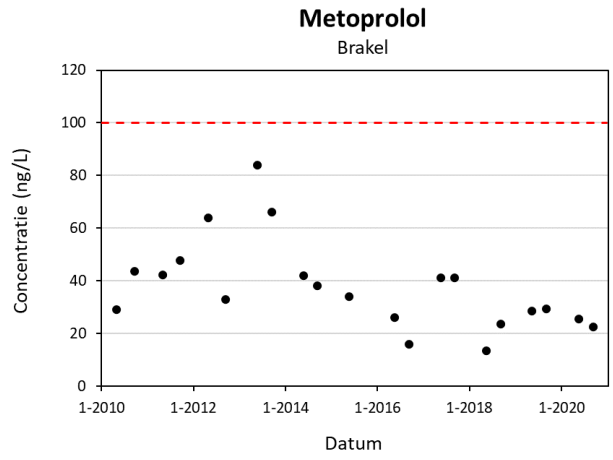
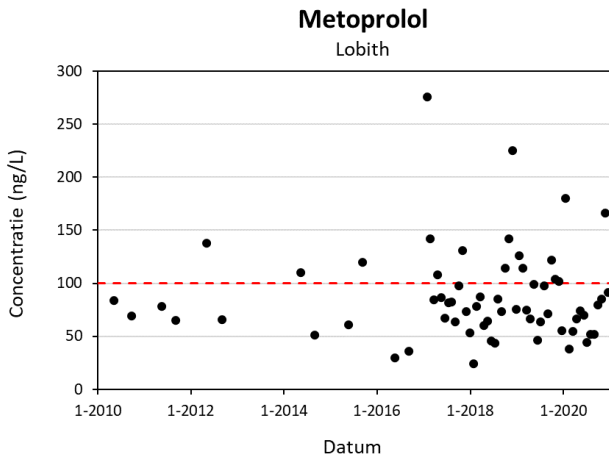


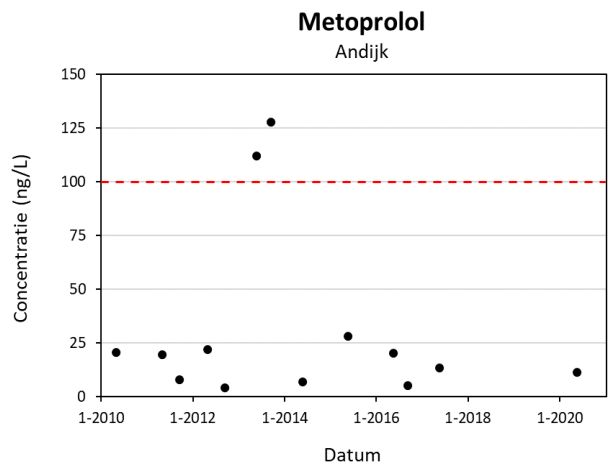
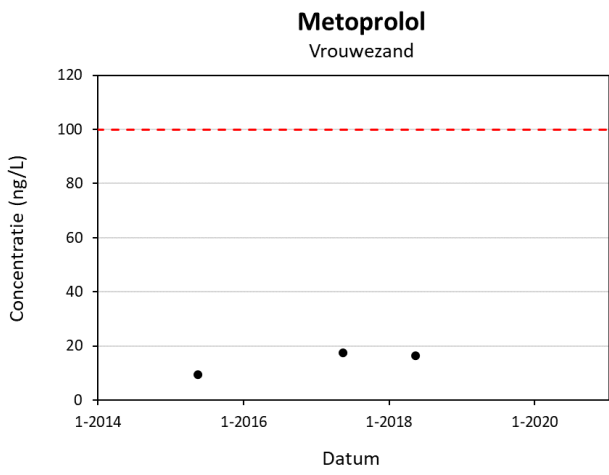
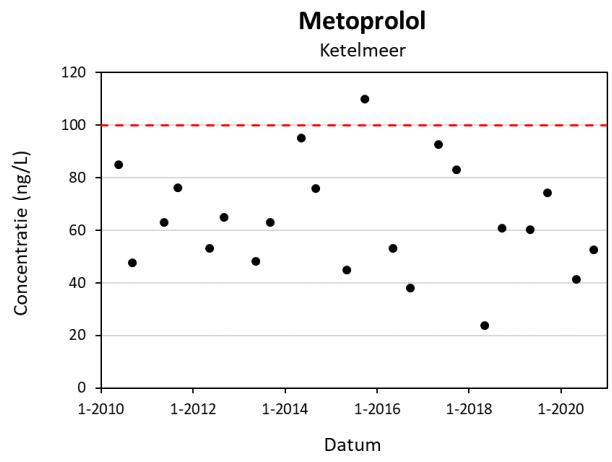
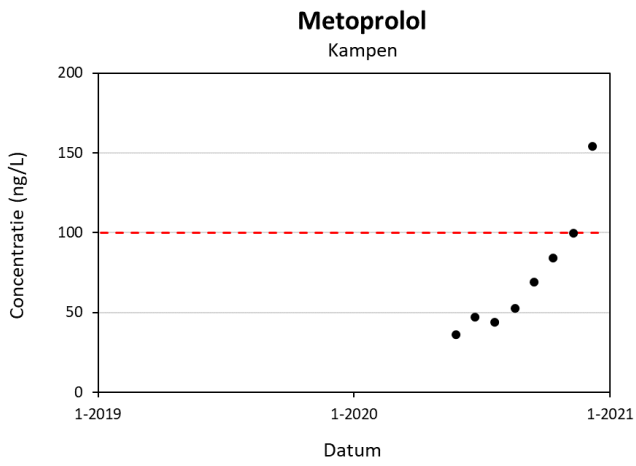
24. Metoprolol

Stroomgebied Maas

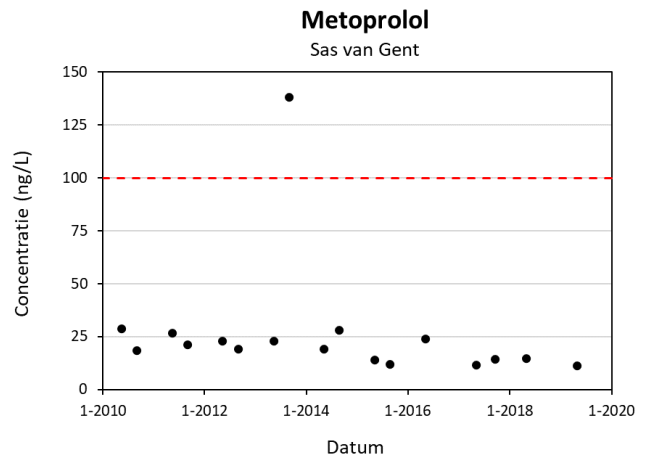
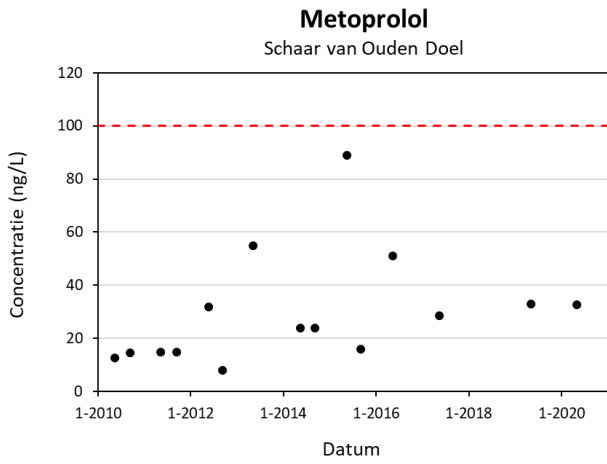


Stroomgebied Rijn

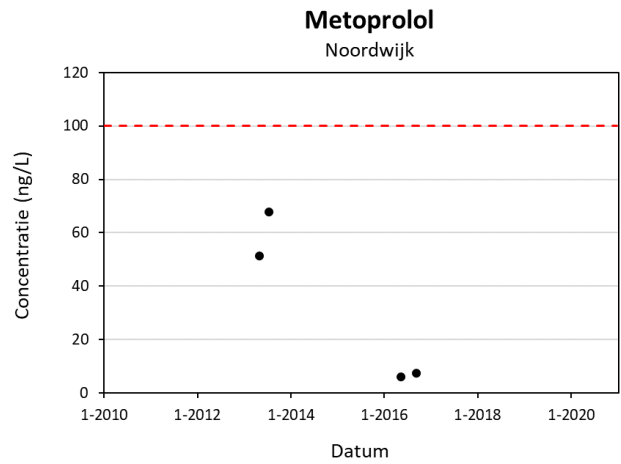
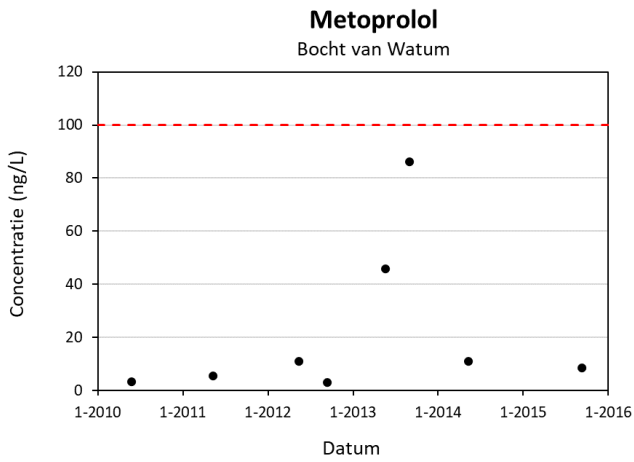




Stroomgebied Schelde

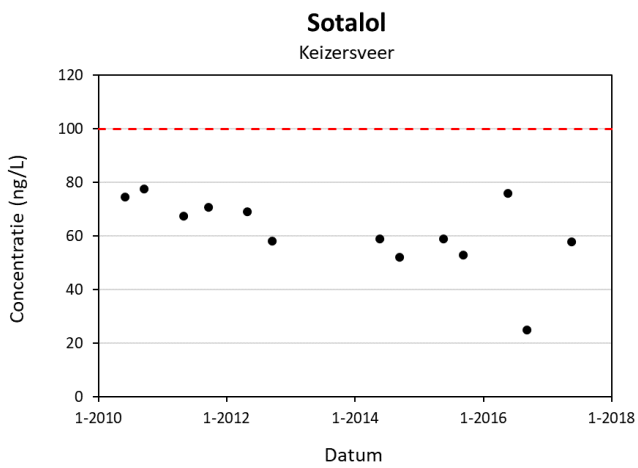
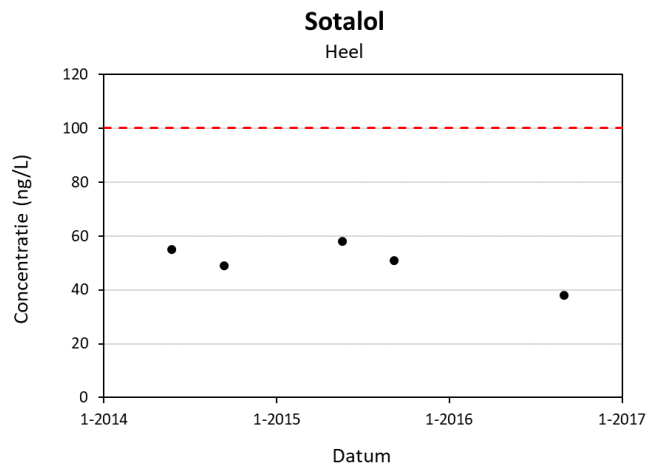
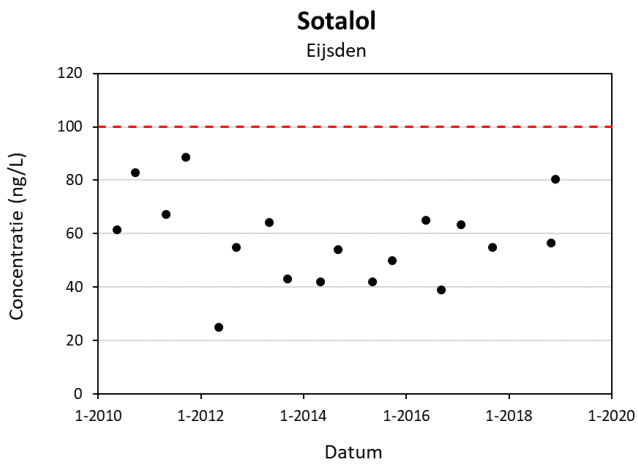


Eems + zee

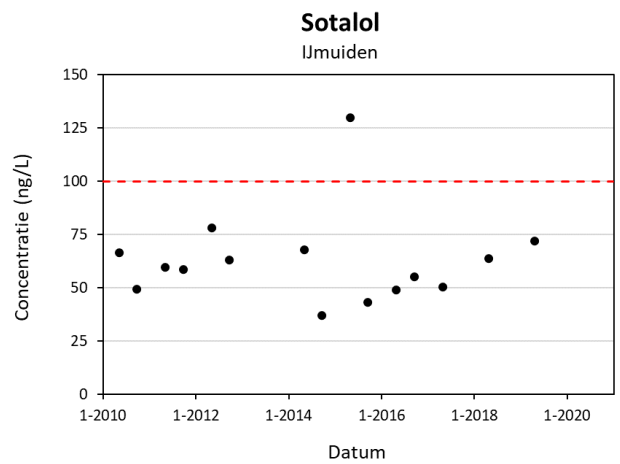
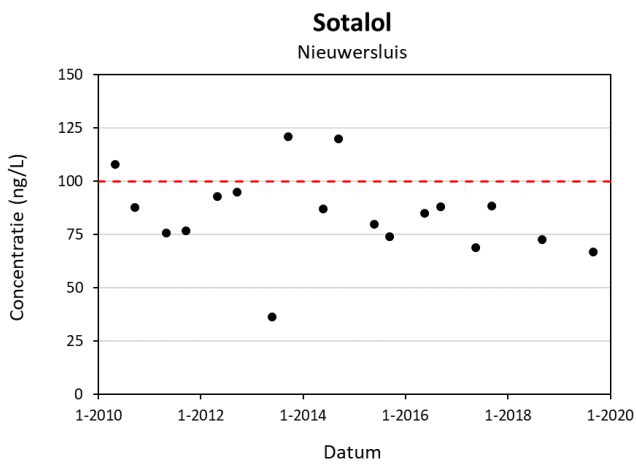
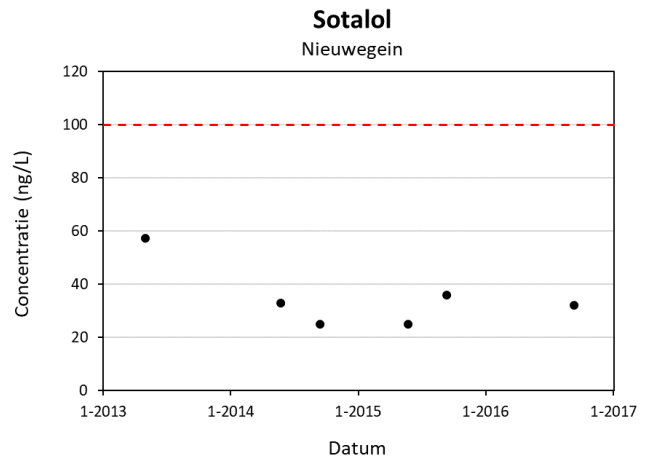
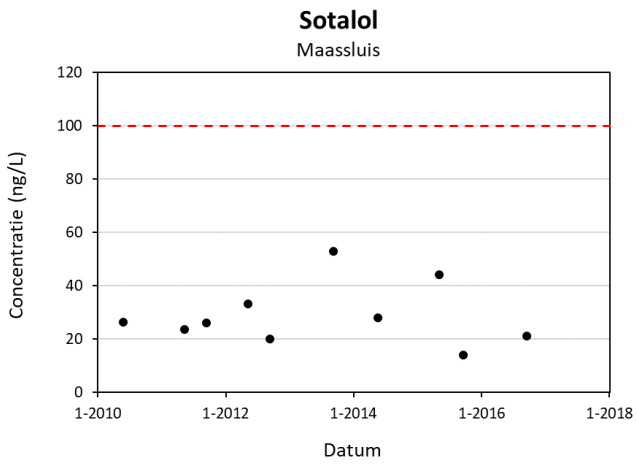
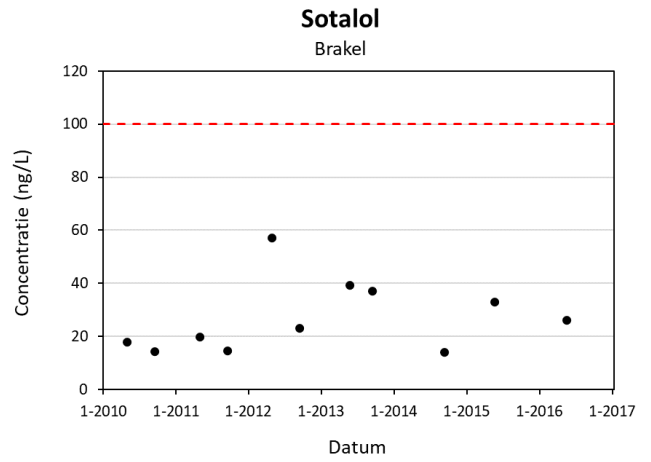
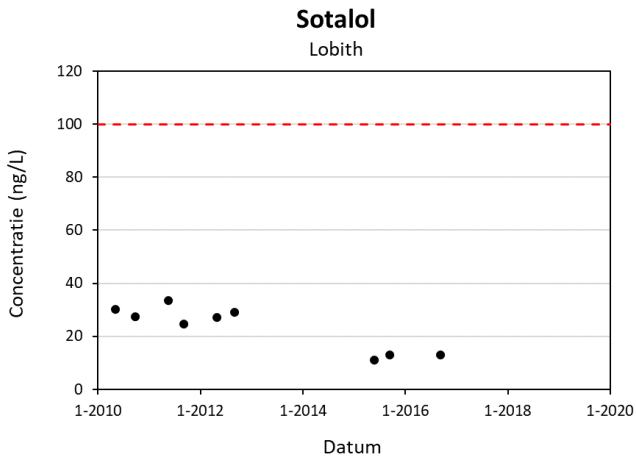


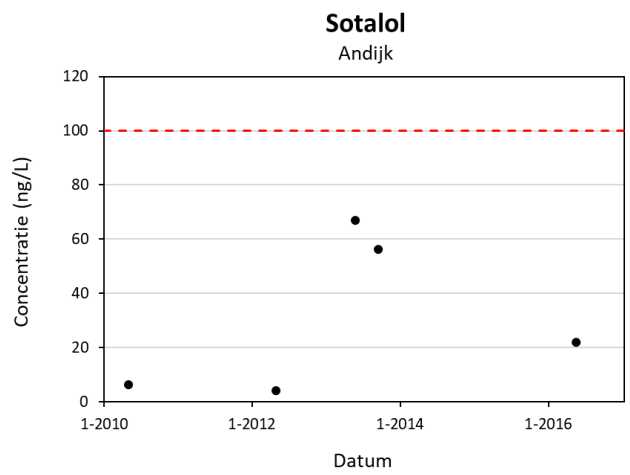
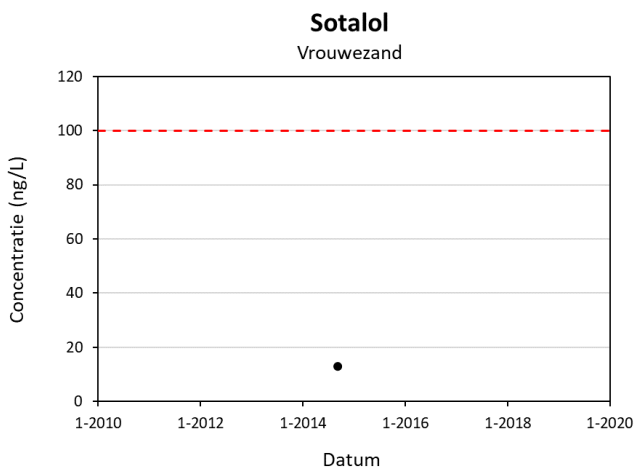
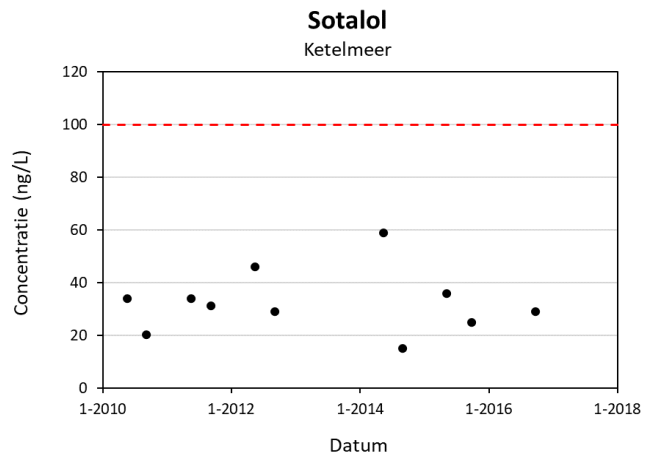
25. Sotalol

Stroomgebied Maas

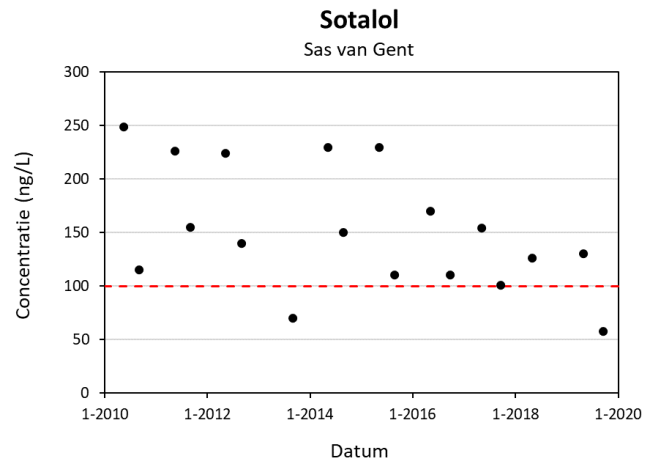
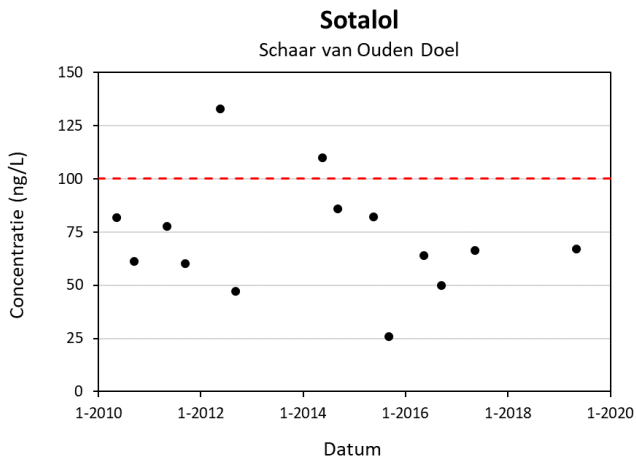


Stroomgebied Rijn

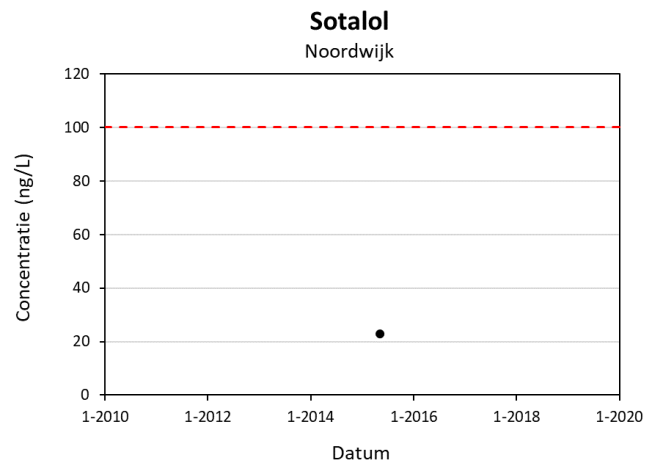
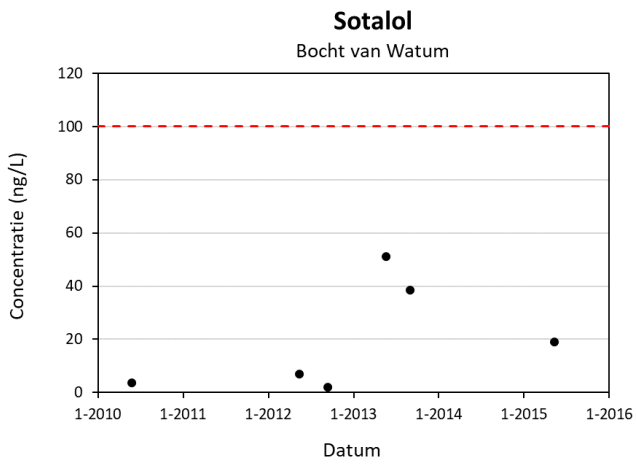




Stroomgebied Schelde

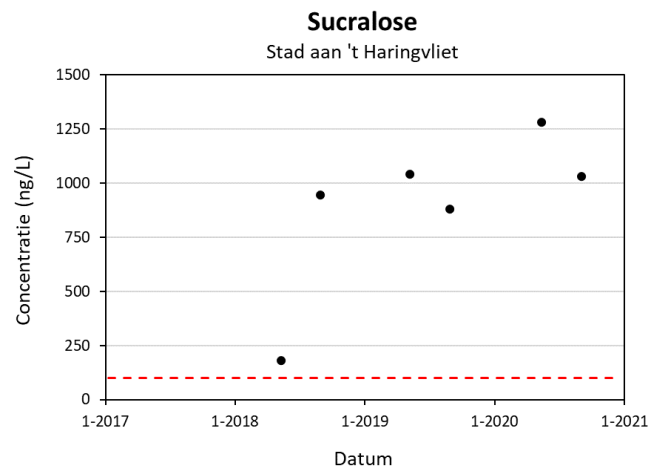
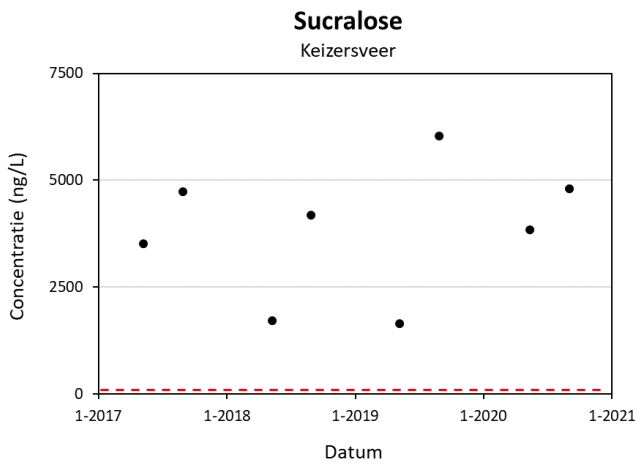
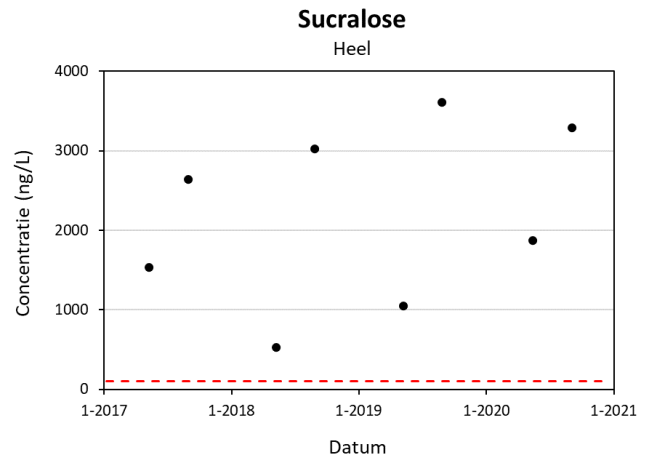
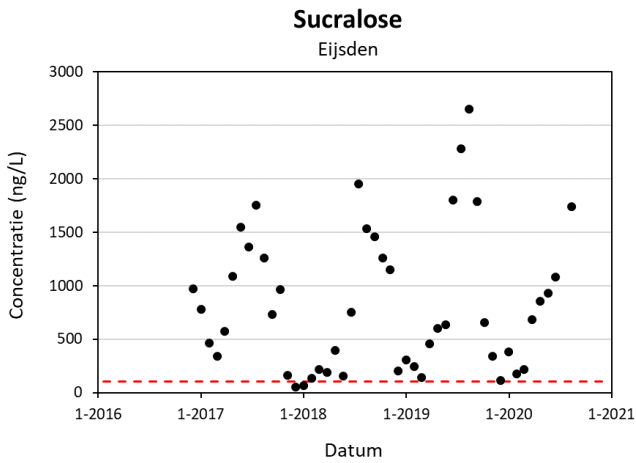


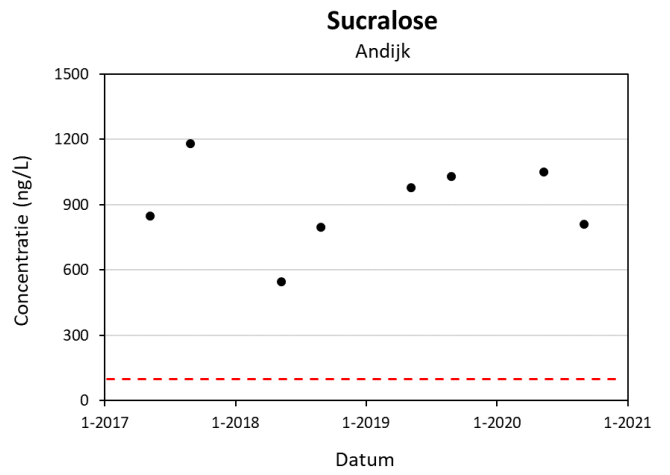
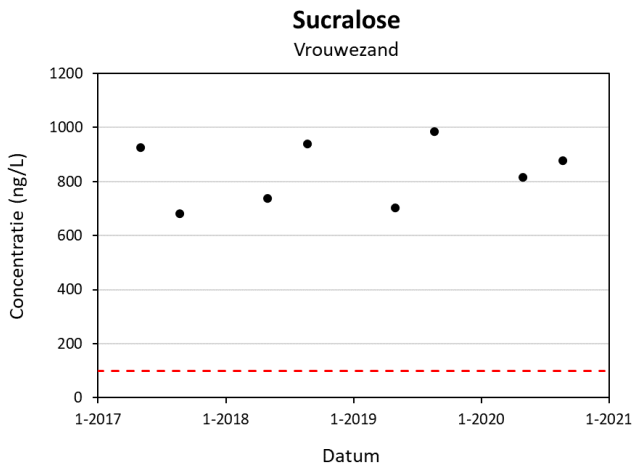
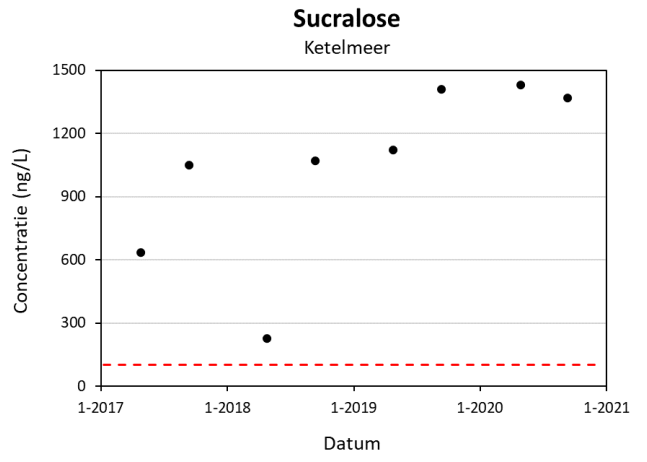
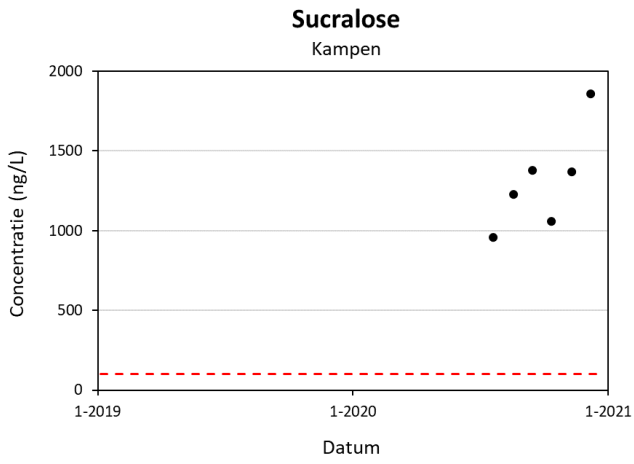
Eems + zee



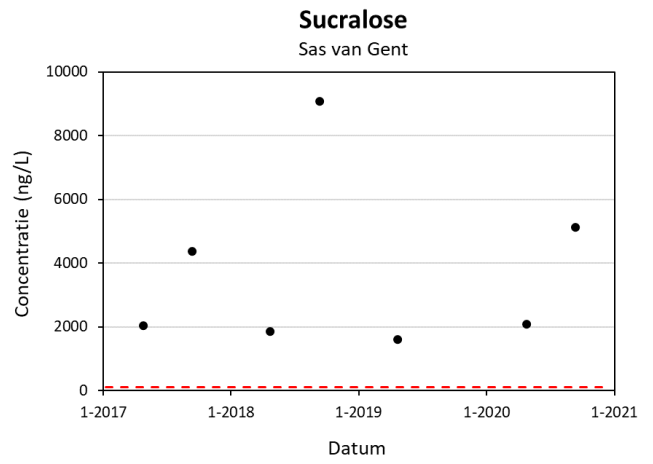
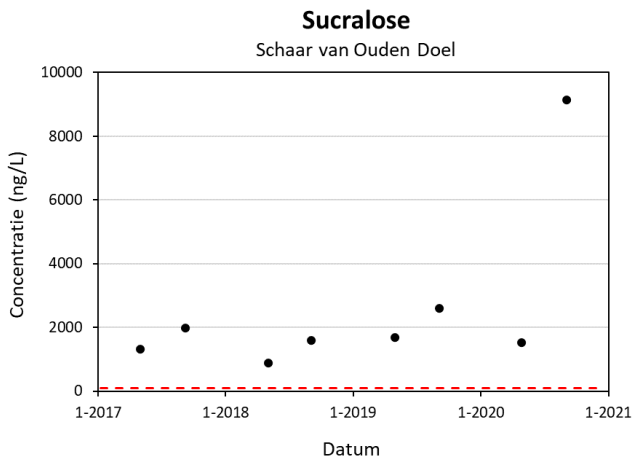
26. Sucralose

Stroomgebied Maas

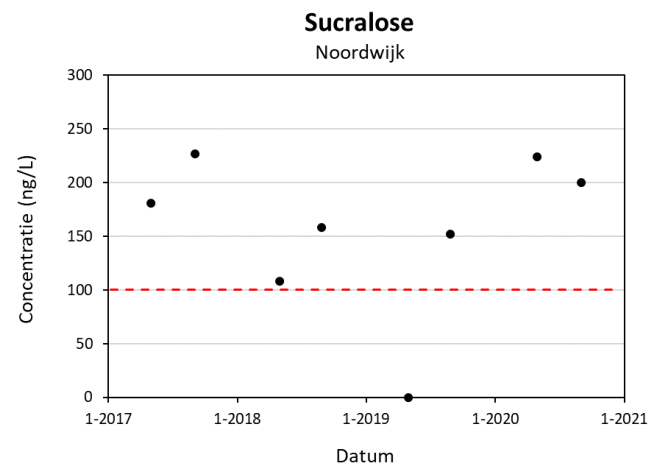
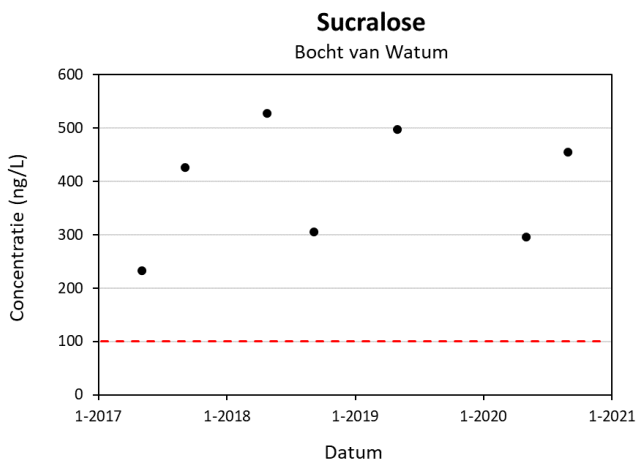




Stroomgebied Schelde

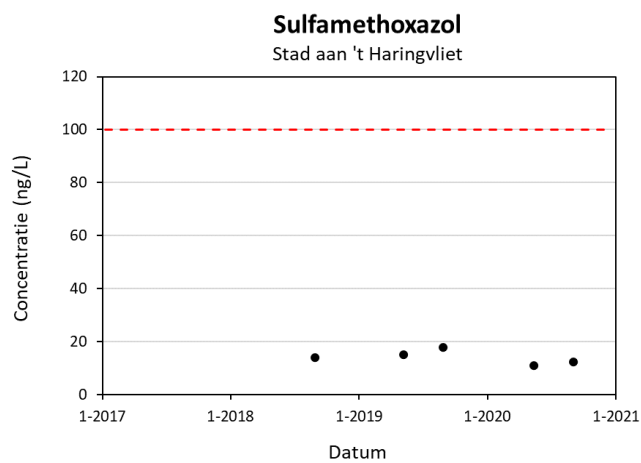
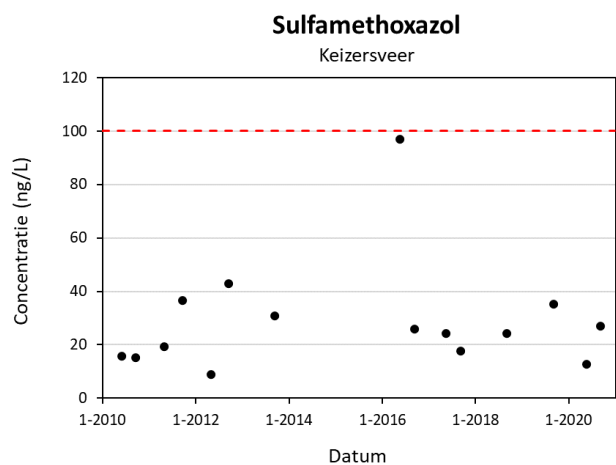
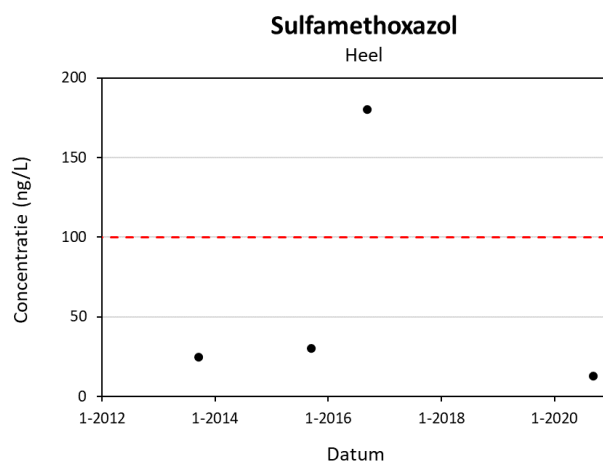
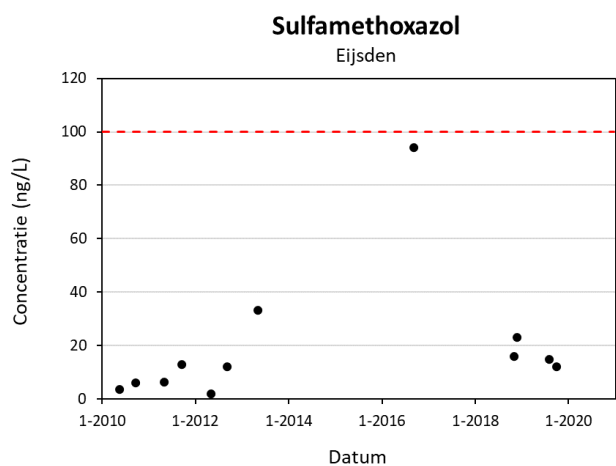


Eems + zee



27. Sulfamethoxazol

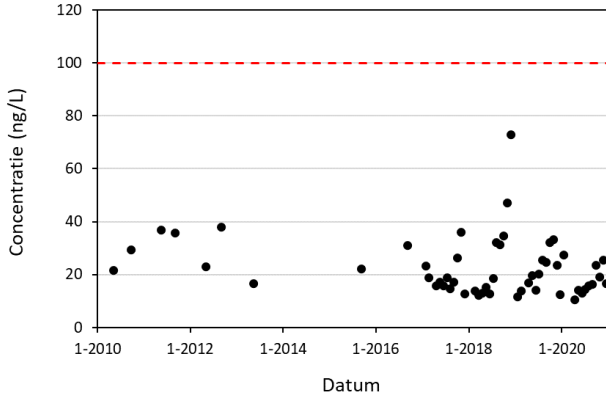
Stroomgebied Maas



Stroomgebied Rijn

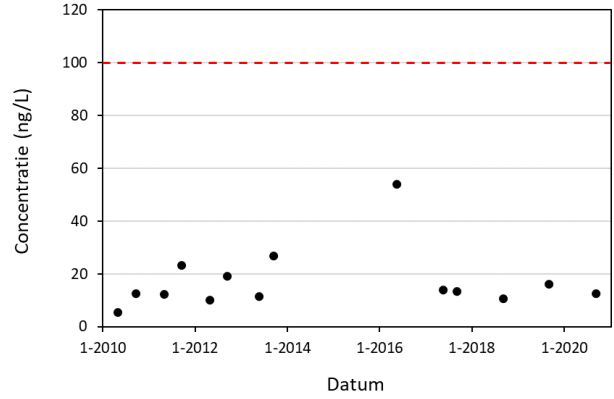
Sulfamethoxazol

Lobith



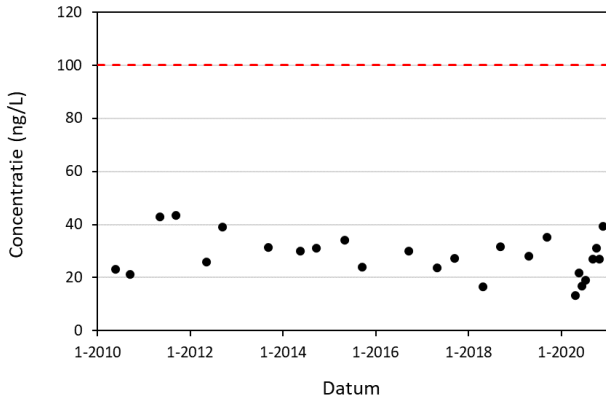
Sulfamethoxazol

Brakel



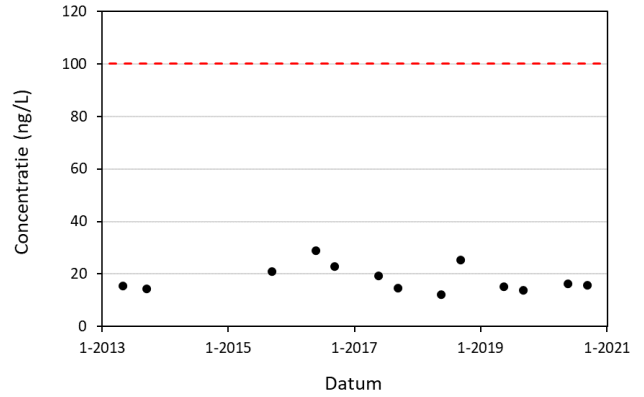
Sulfamethoxazol

Maassluis



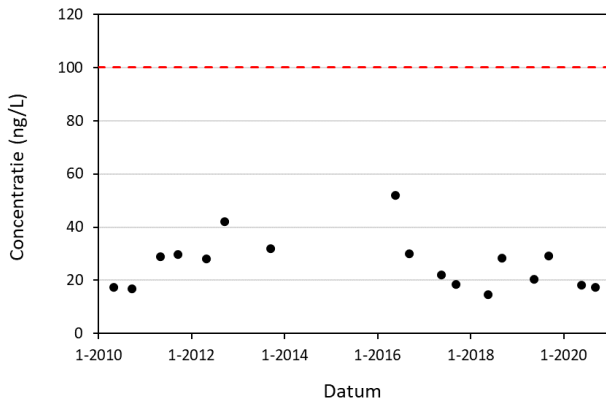
Sulfamethoxazol

Nieuwegein



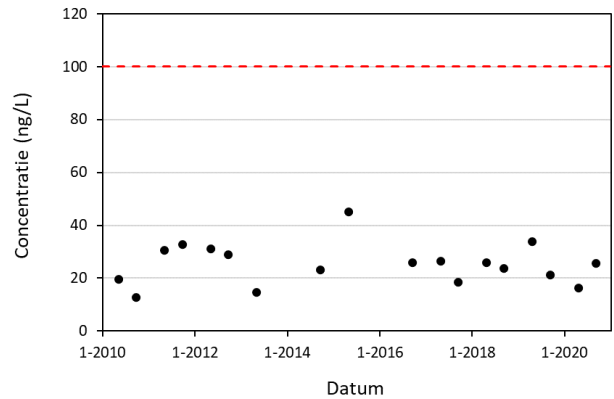
Sulfamethoxazol

Nieuwersluis



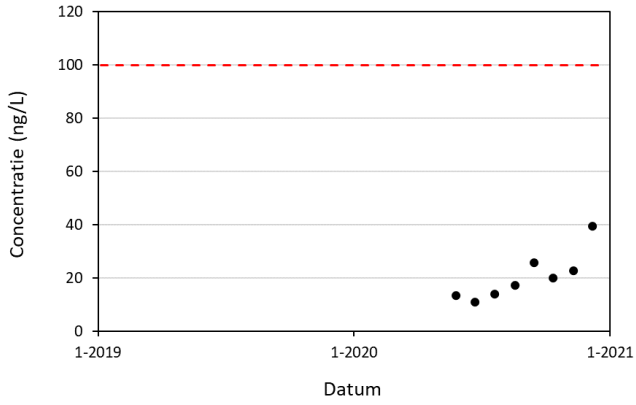
Sulfamethoxazol

IJmuiden



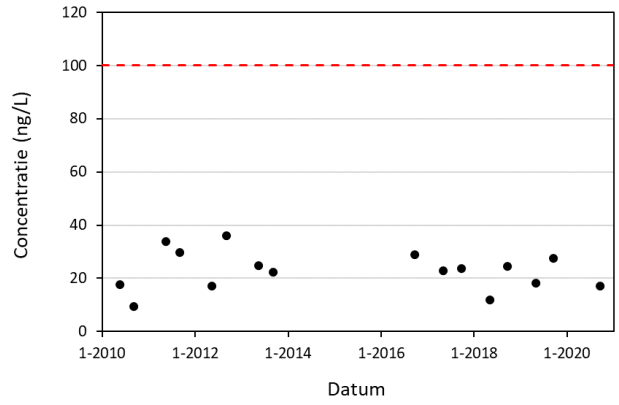
Sulfamethoxazol

Kampen



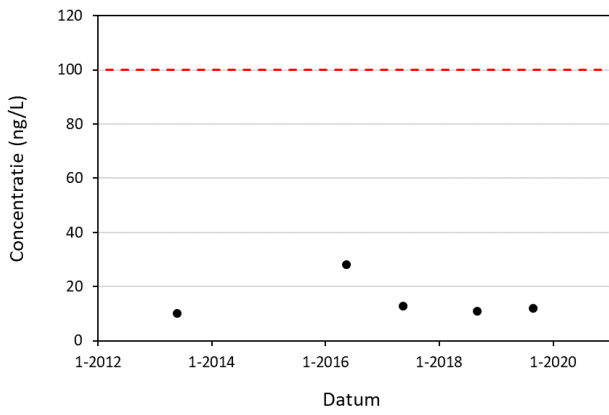
Sulfamethoxazol

Ketelmeer



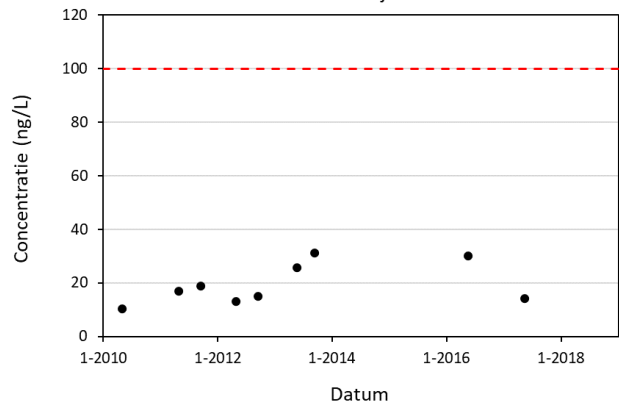
Sulfamethoxazol

Vrouwezand

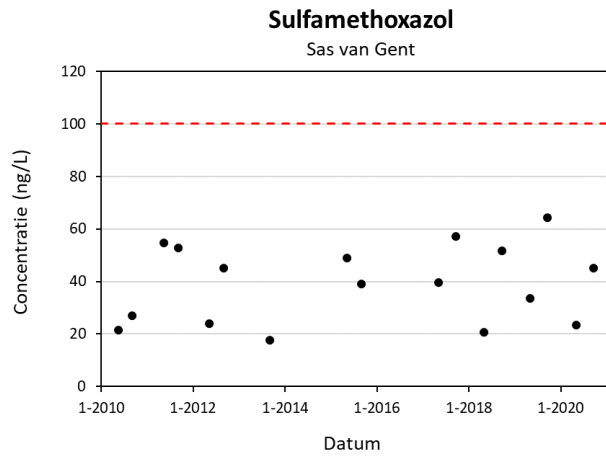
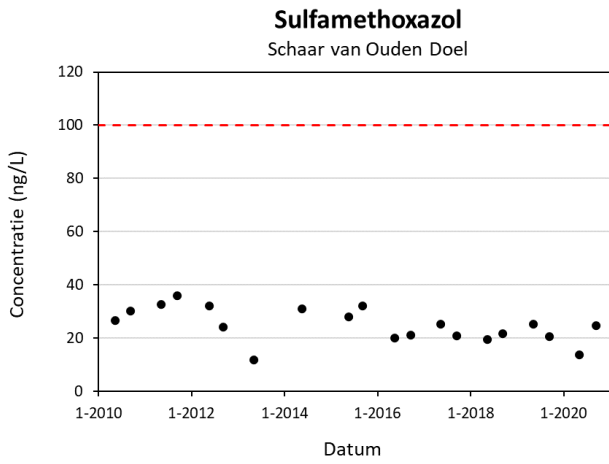


Sulfamethoxazol

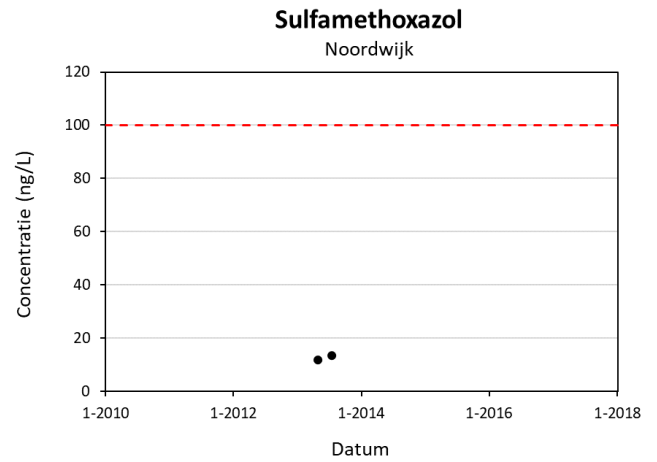
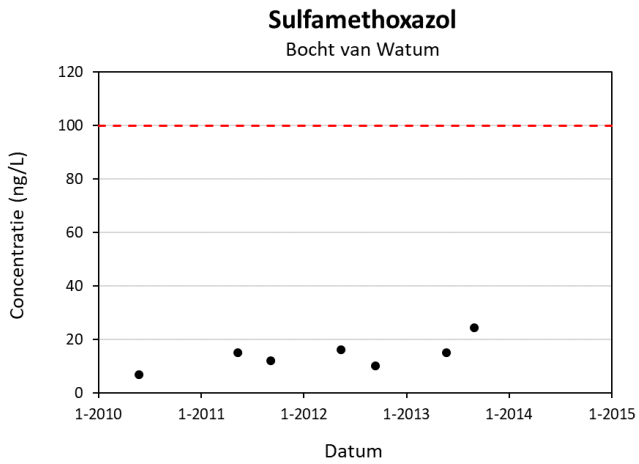
Andijk



Stroomgebied Schelde

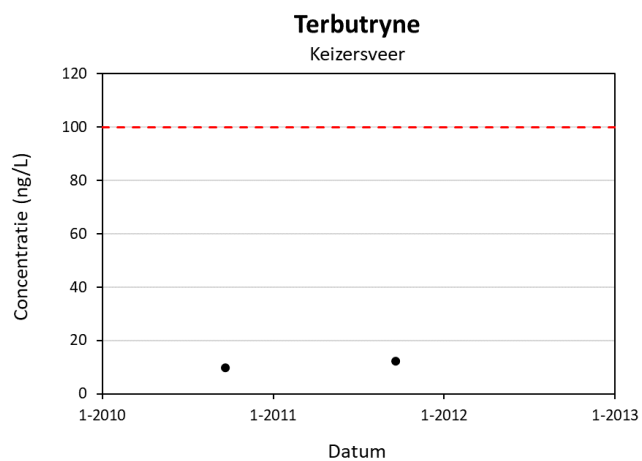
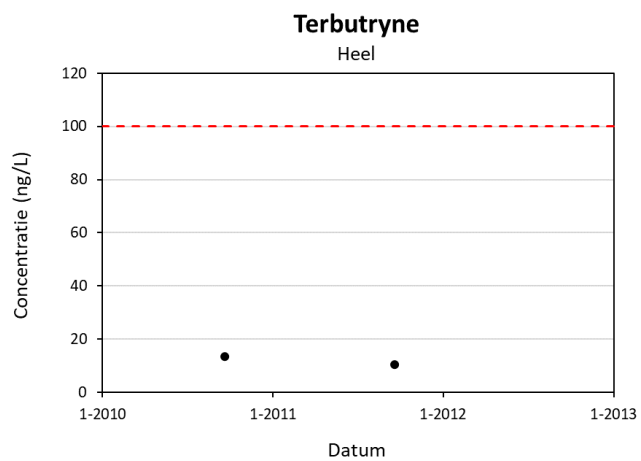
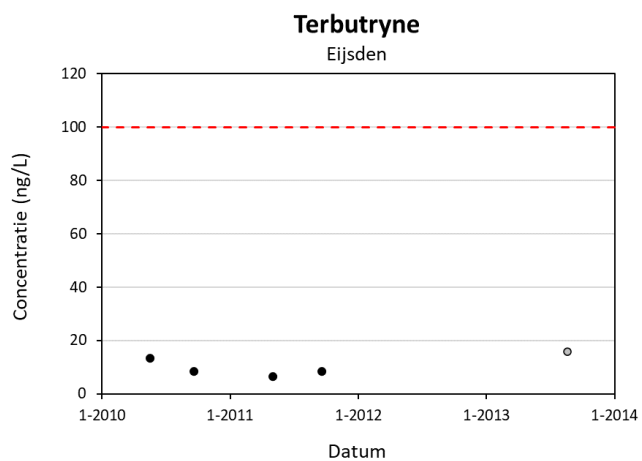


Eems + zee

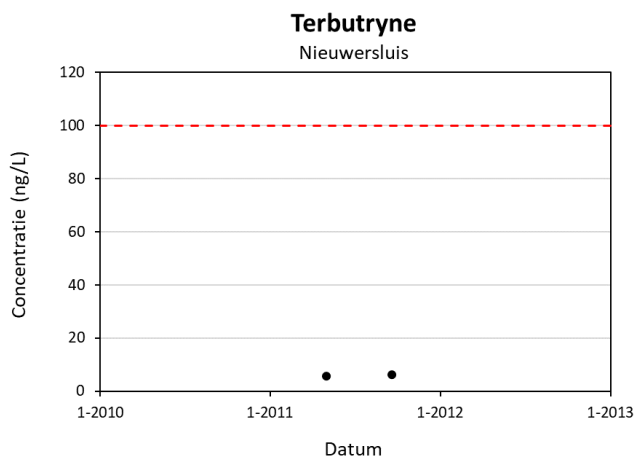
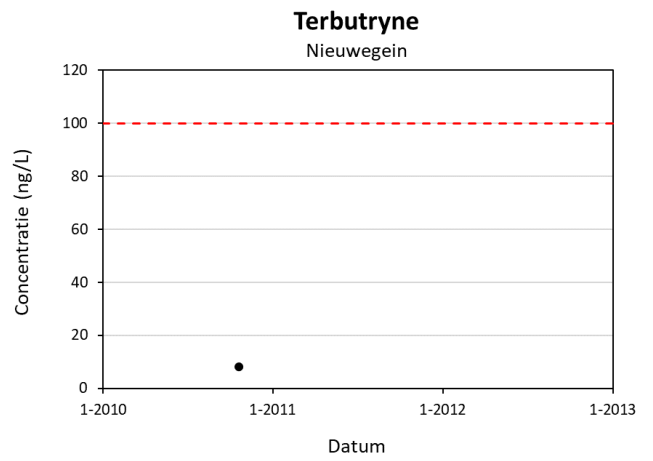
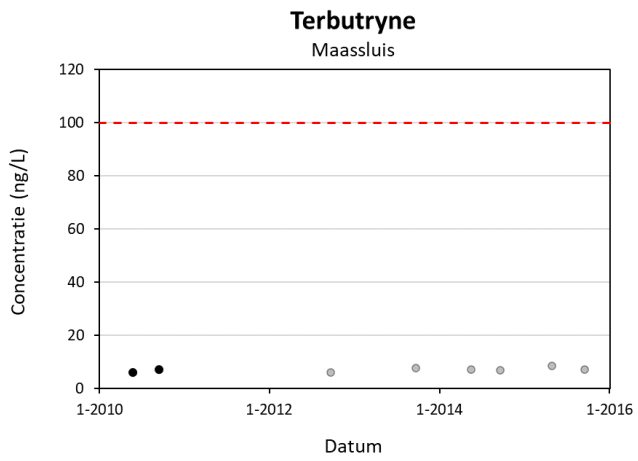
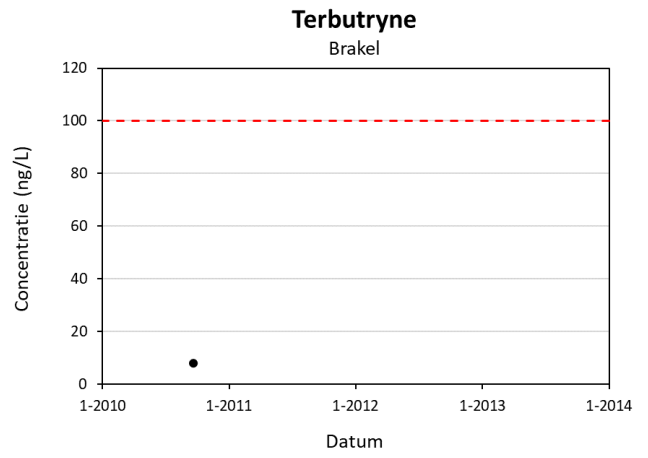
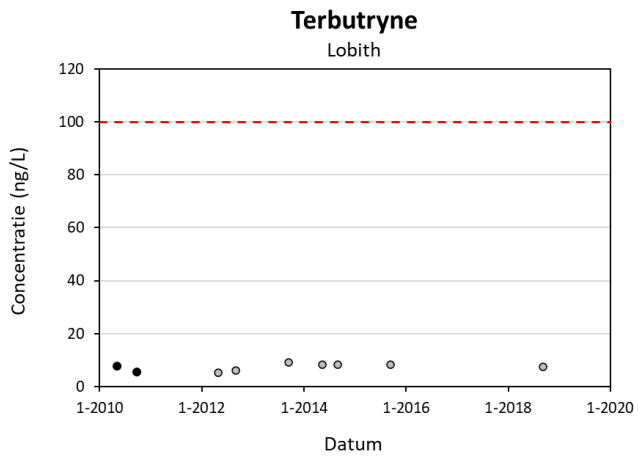


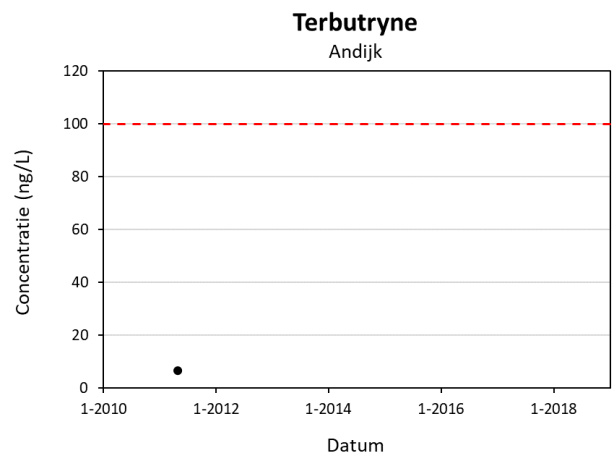
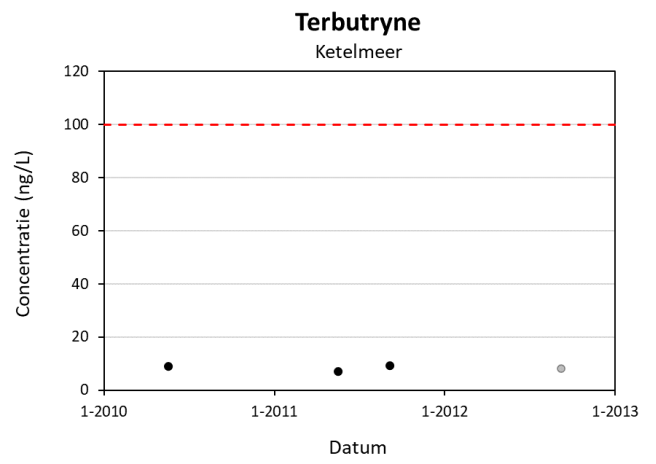
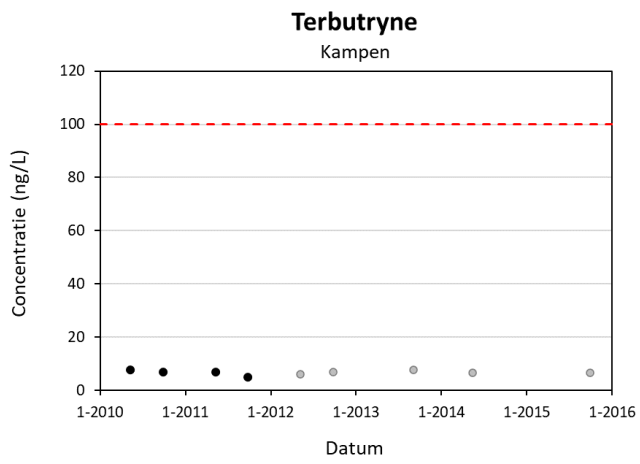
28. Terbutryne

Stroomgebied Maas

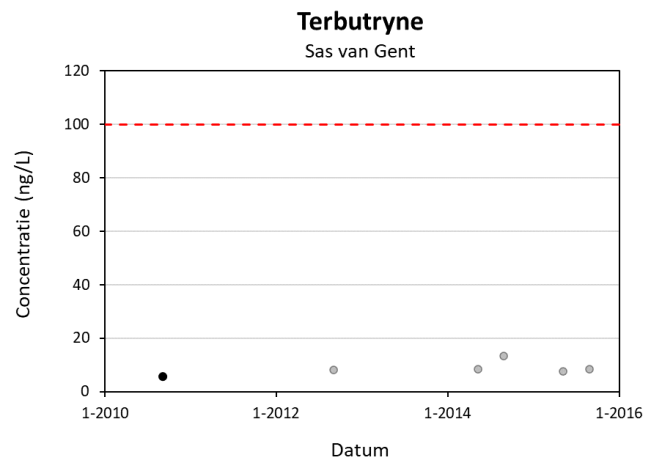
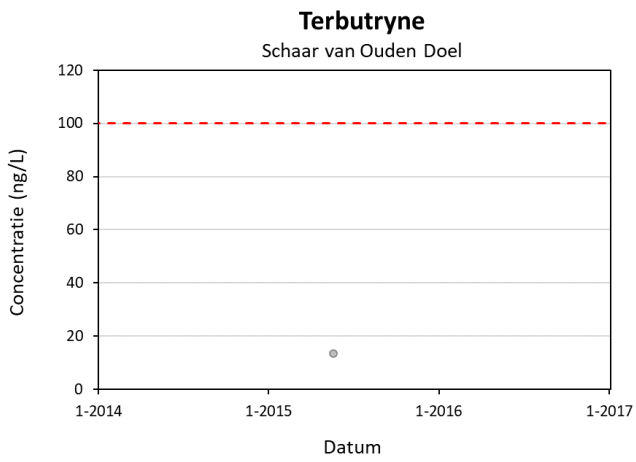


Stroomgebied Rijn





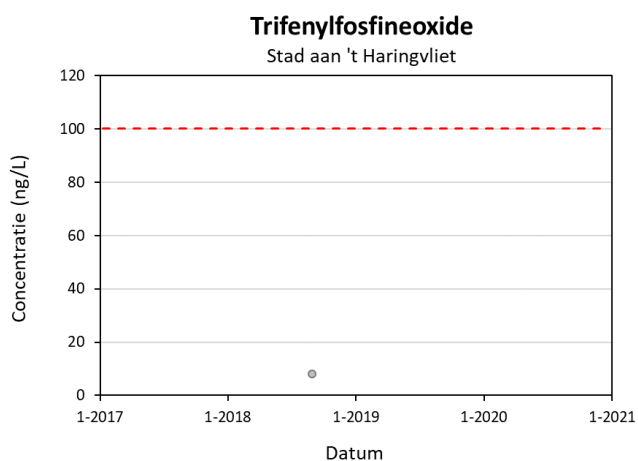
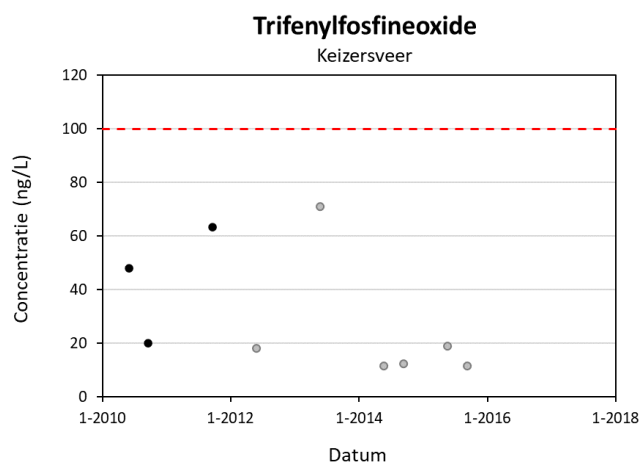
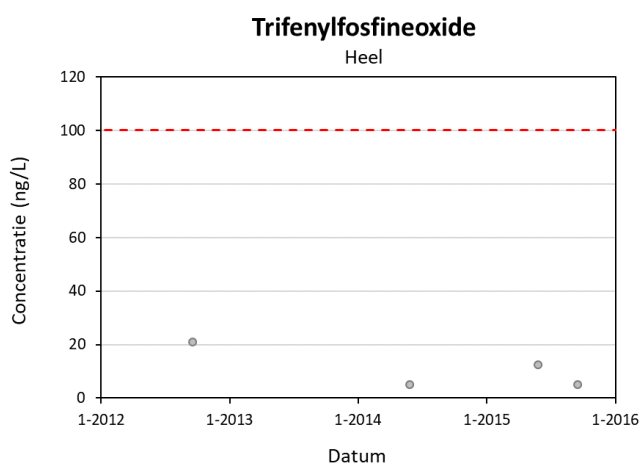
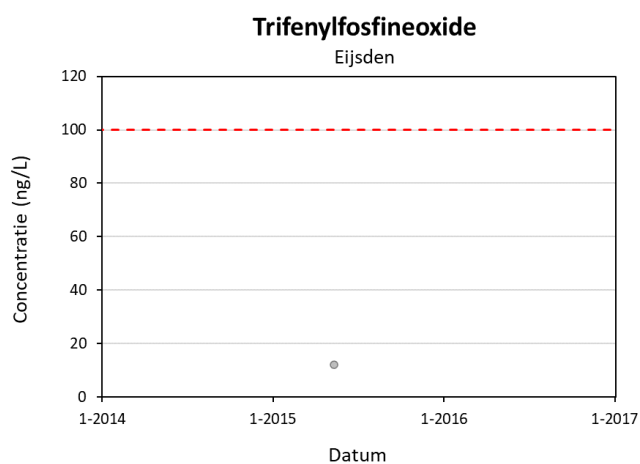
Stroomgebied Schelde



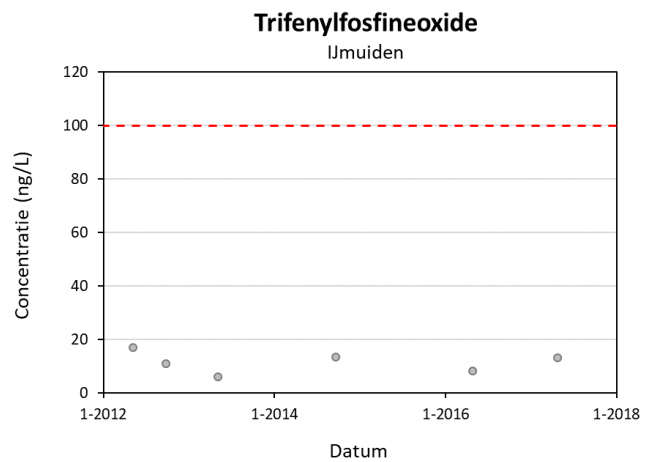
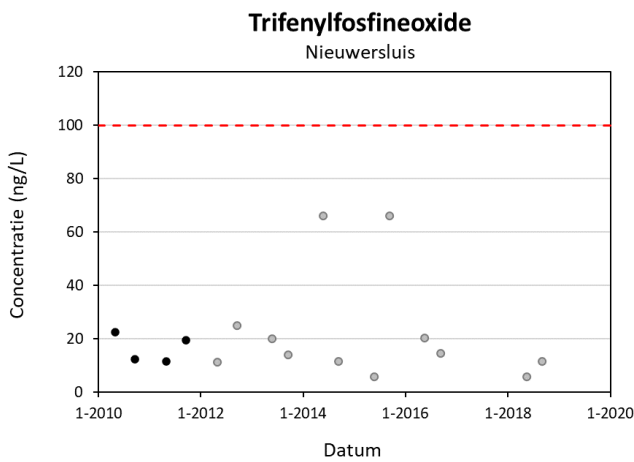
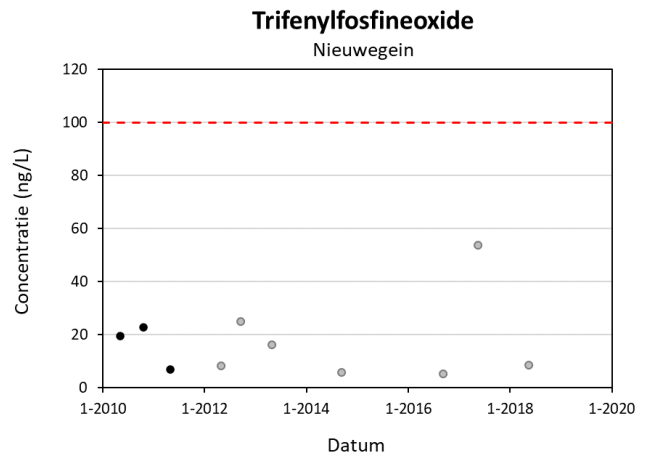
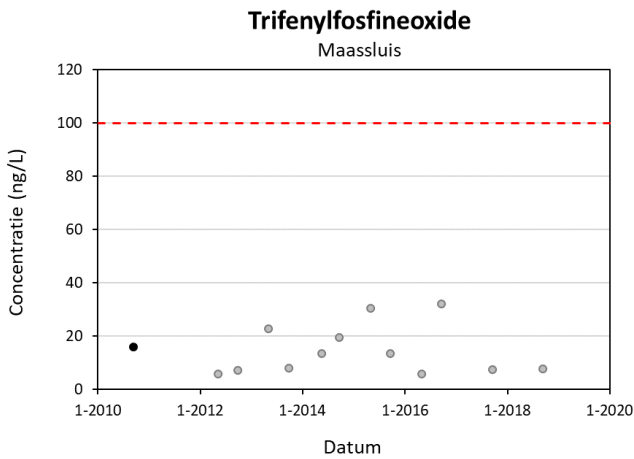
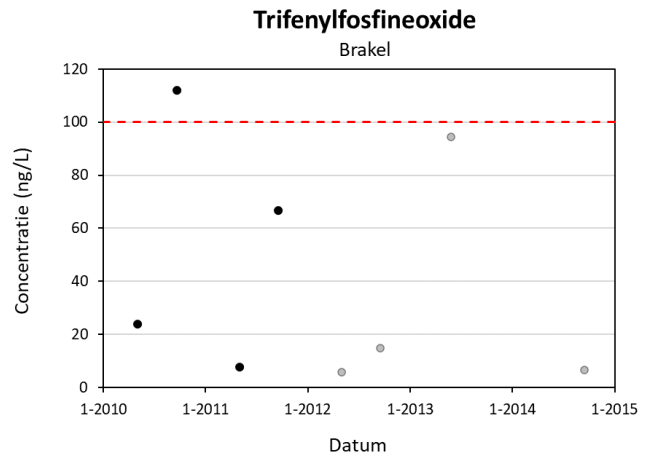
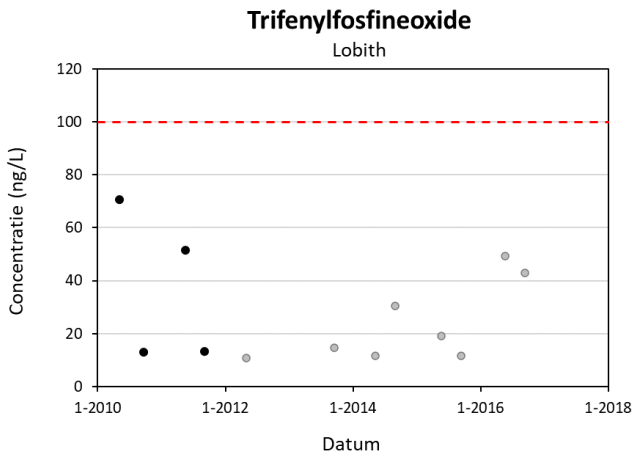
Eems + zee

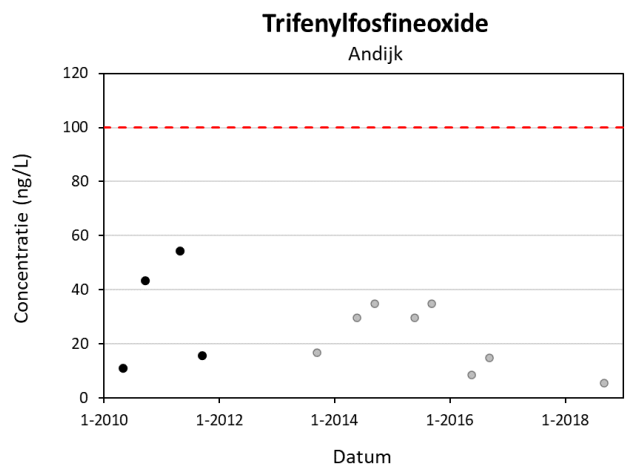
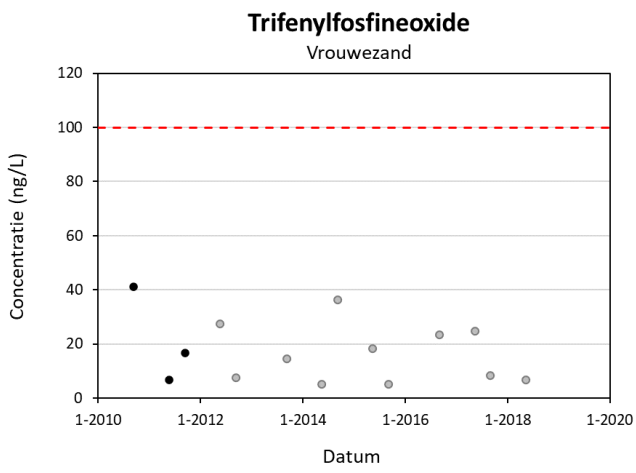
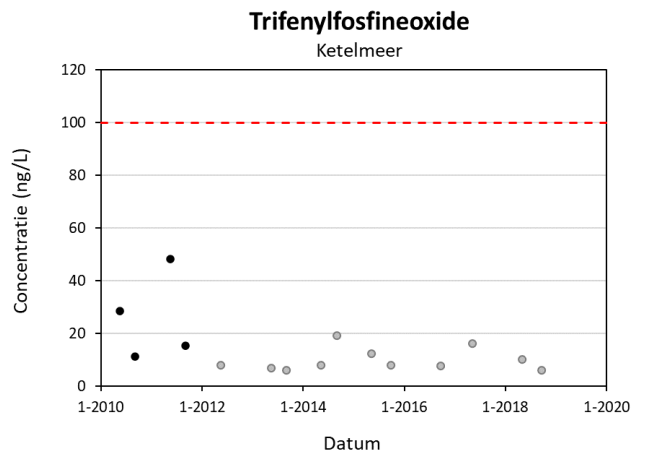
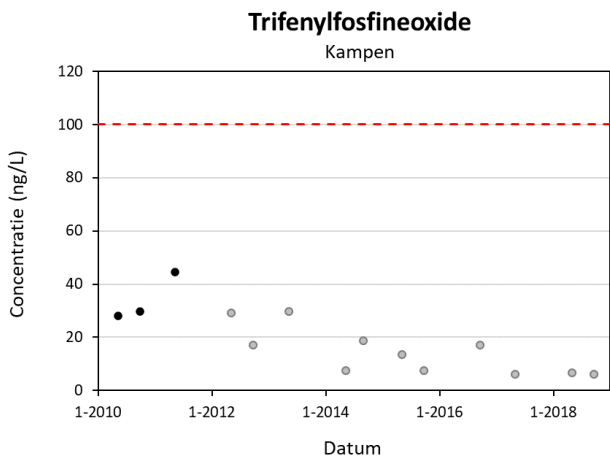
29. Trifenyfosfineoxide

Stroomgebied Maas

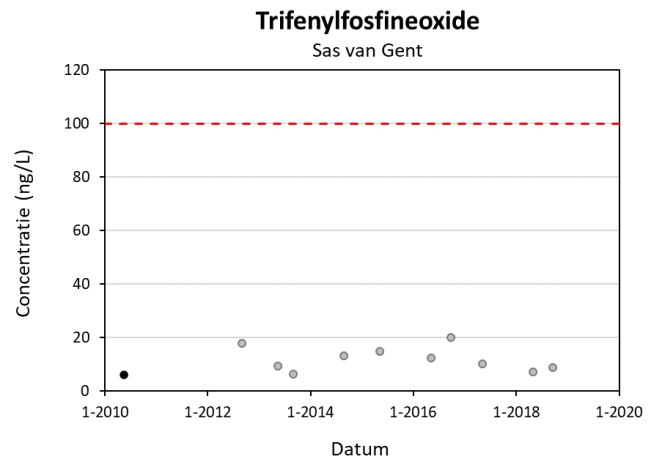
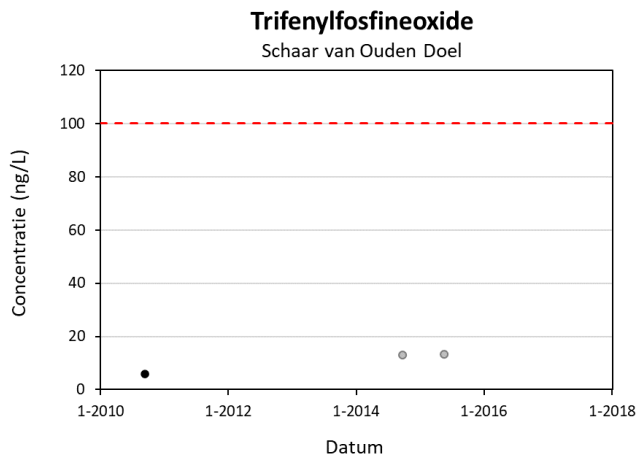


Stroomgebied Rijn

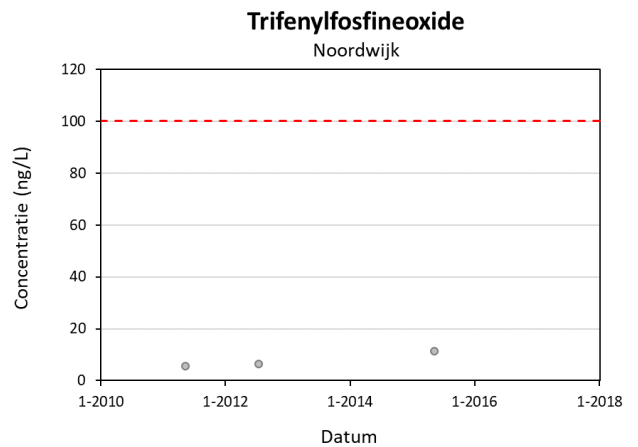




Stroomgebied Schelde

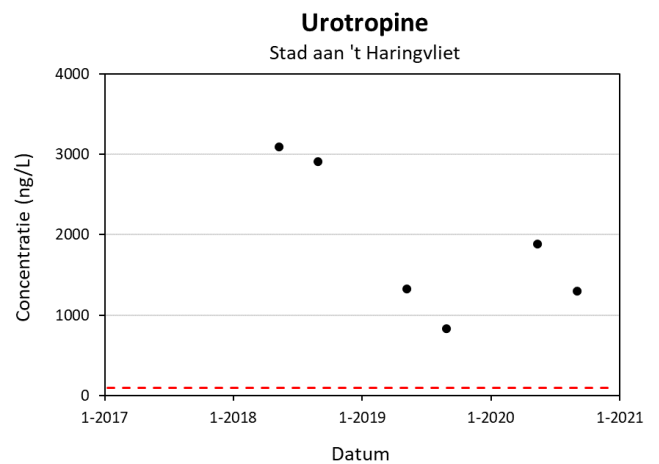
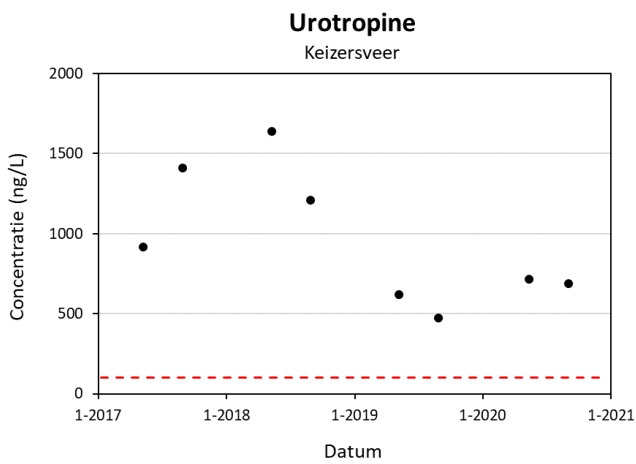
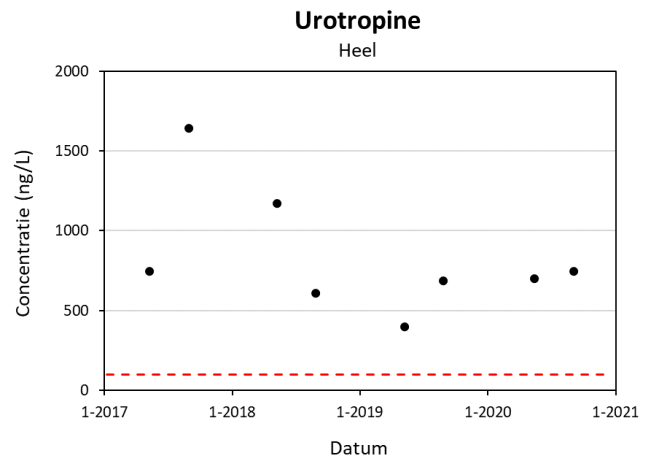
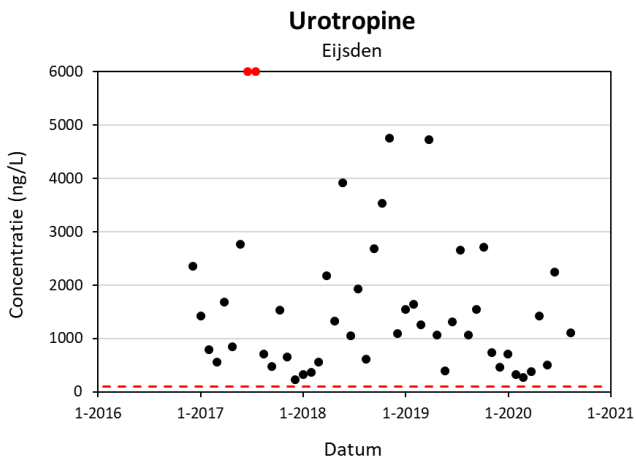


Eems + zee



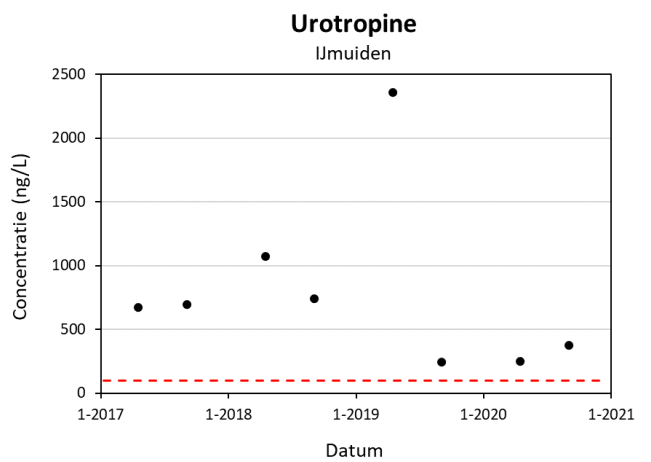
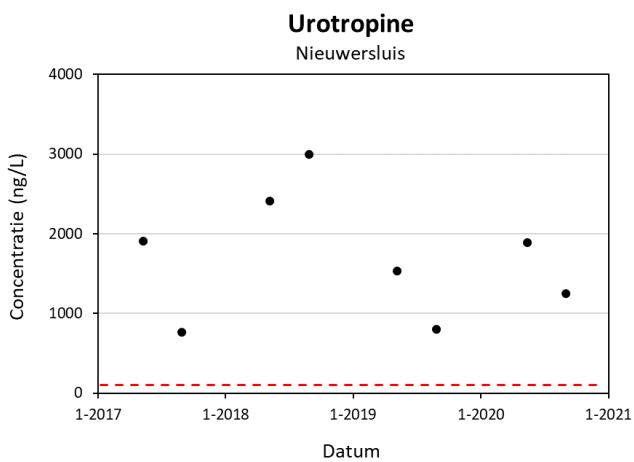
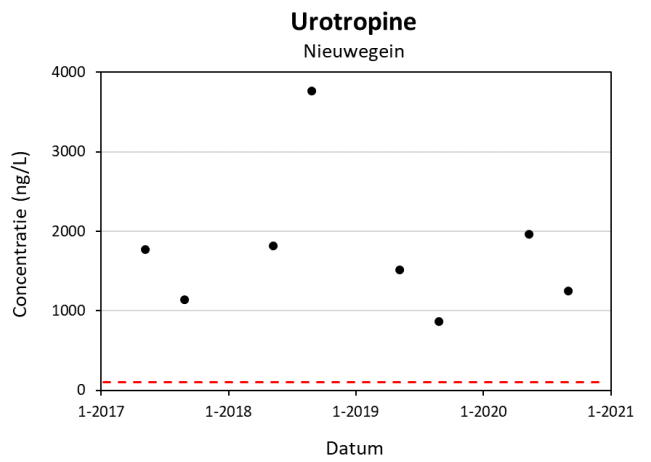
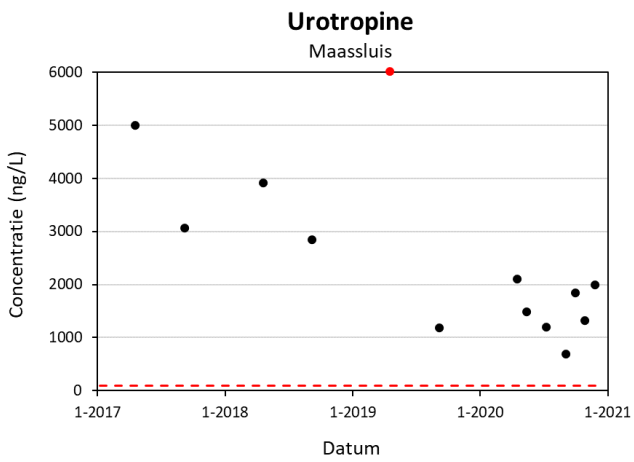
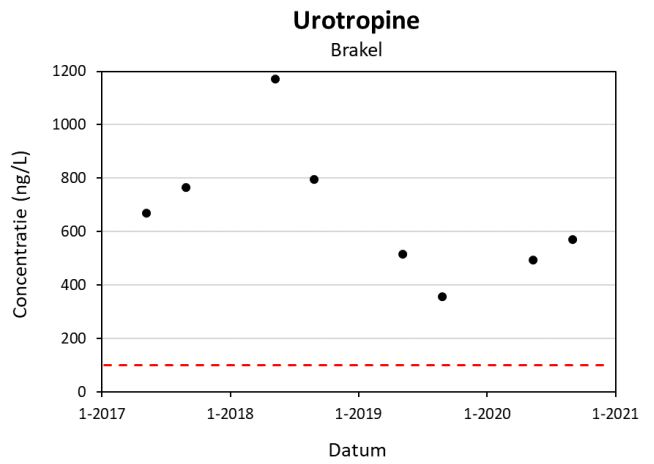
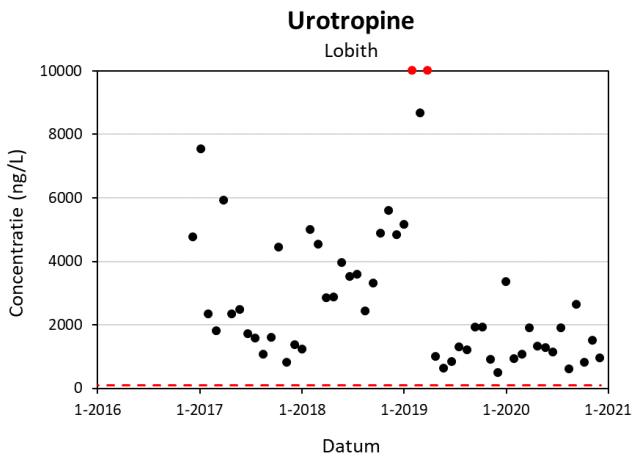
30. Urotropine

Stroomgebied Maas

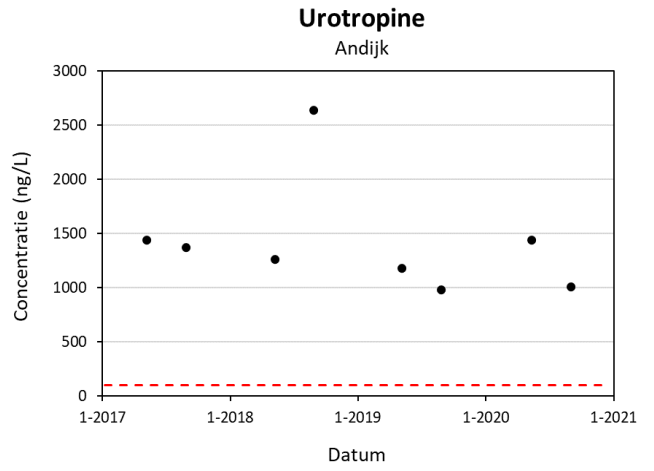
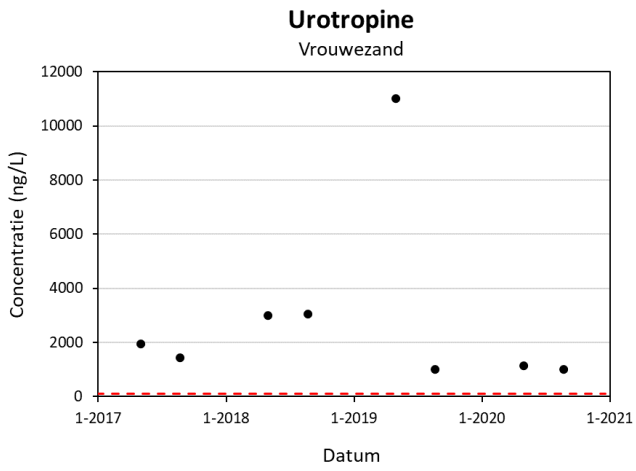
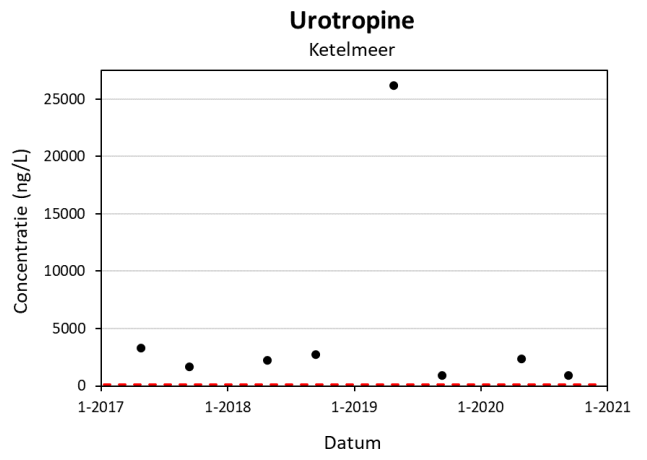
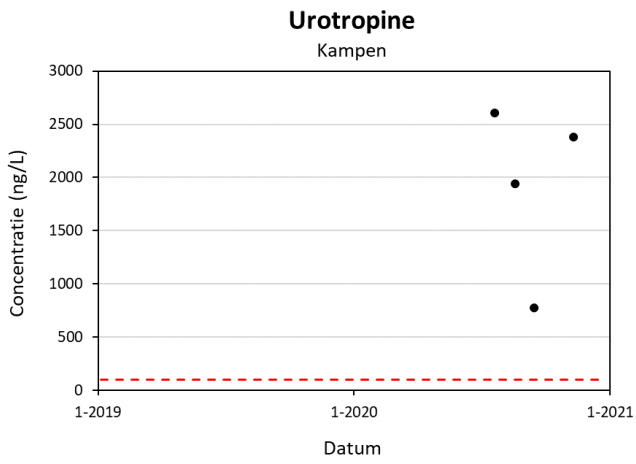


NB: De rode datapunten voor locatie Eijsden betreffen uitschieters die ver buiten de schaal vallen. Ze vertegenwoordigen in werkelijkheid waarden van respectievelijk 11167 en 18183 ng/L.

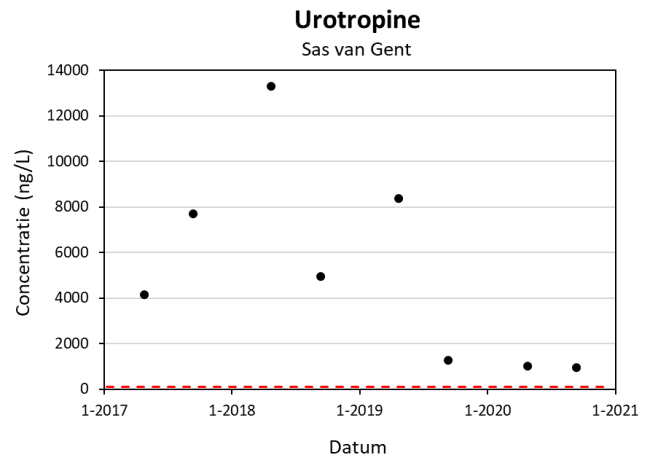
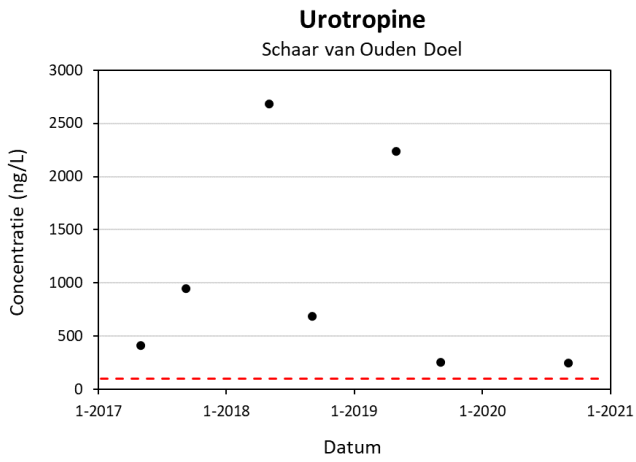
Stroomgebied Rijn



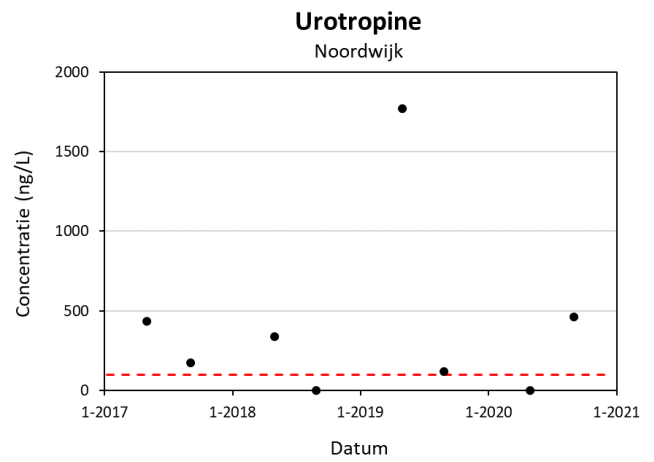
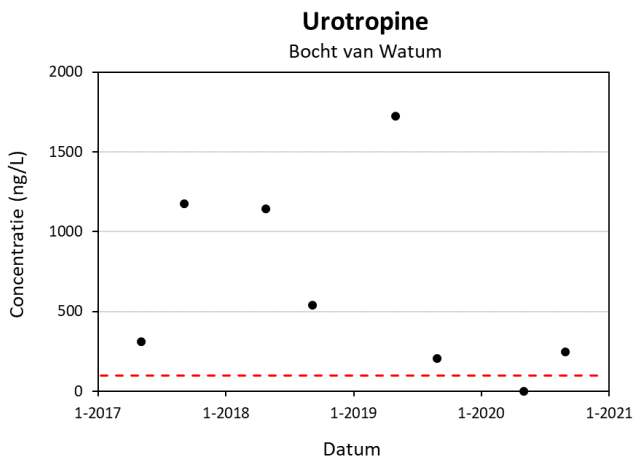
NB: De rode datapunten voor locaties Lobith en Maassluis betreffen uitschieters die ver buiten de schalen vallen. Ze vertegenwoordigen in werkelijkheid waarden van respectievelijk 10200 en 20200 (Lobith) en 18700 (Maassluis) ng/L.



Stroomgebied Schelde

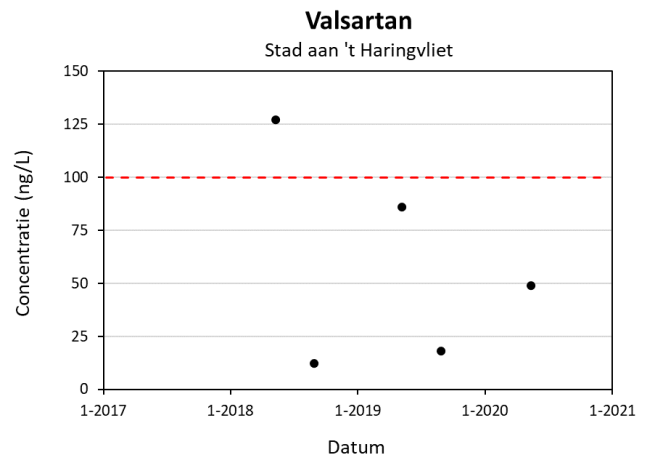
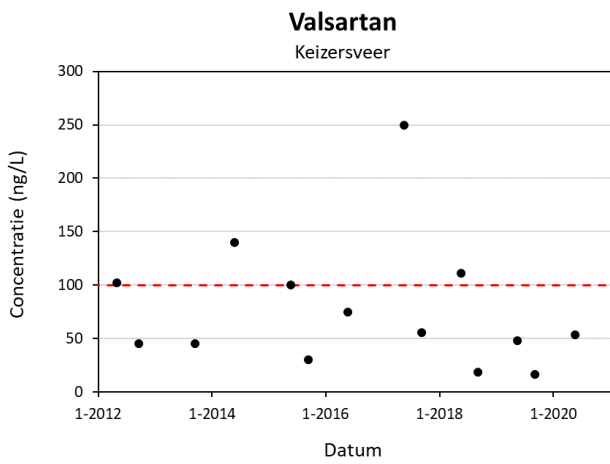
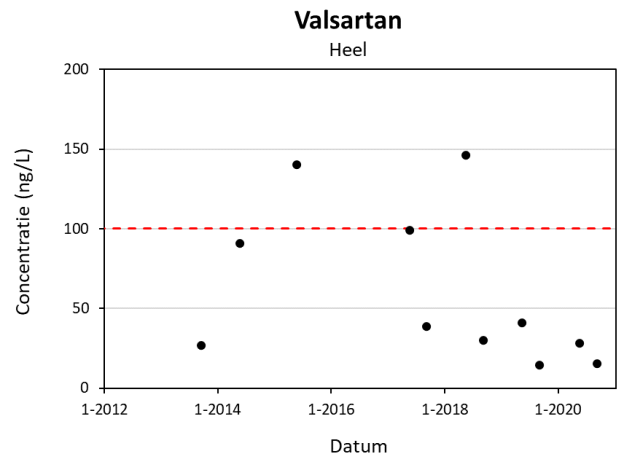
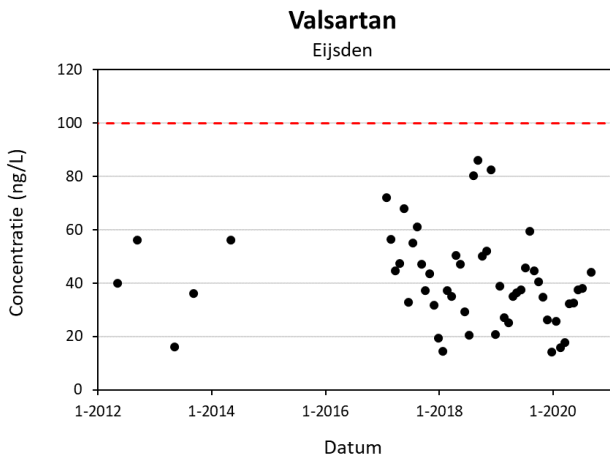


Eems + zee

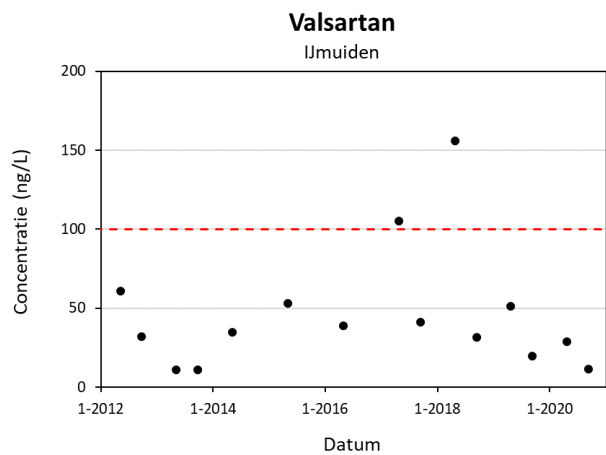
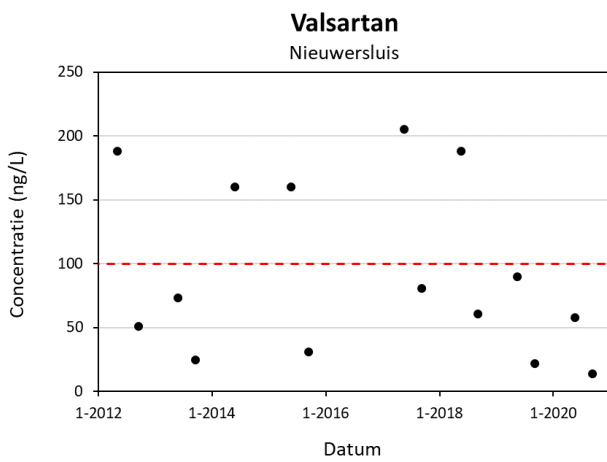
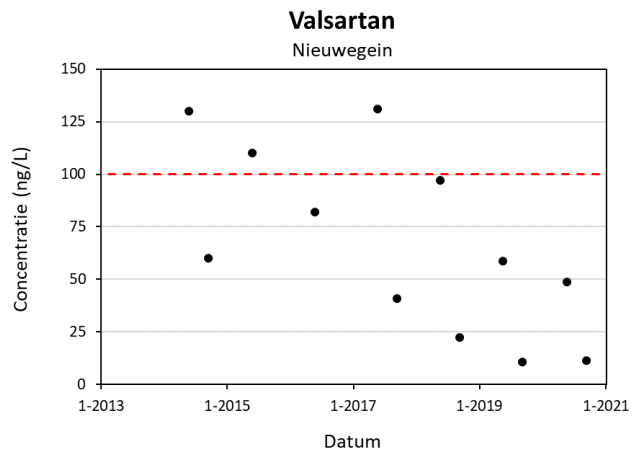
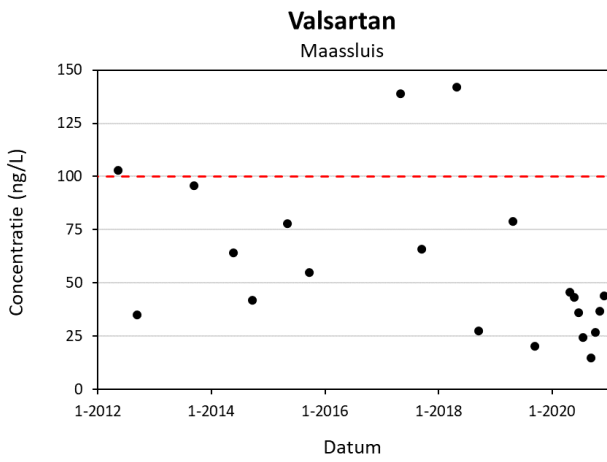
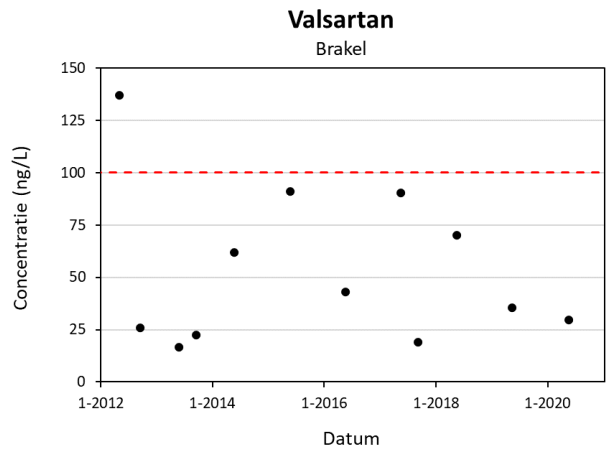
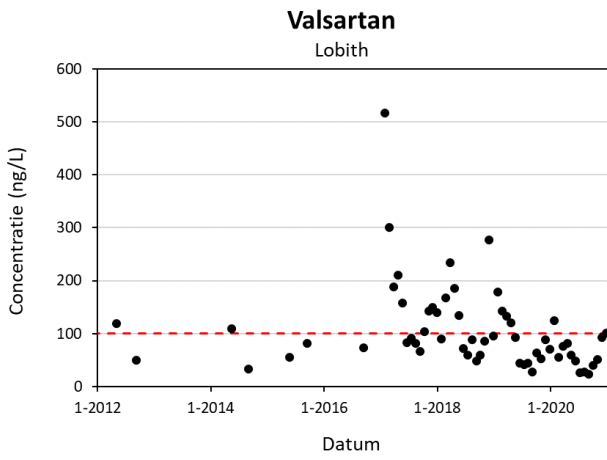


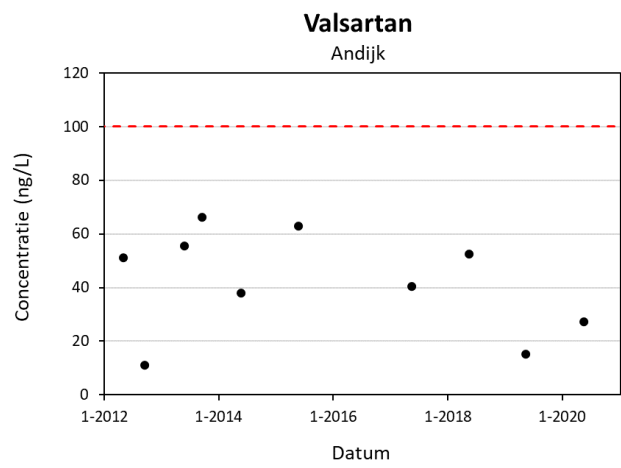
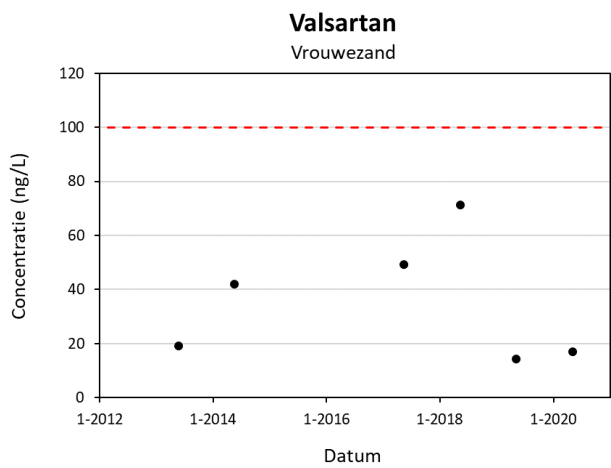
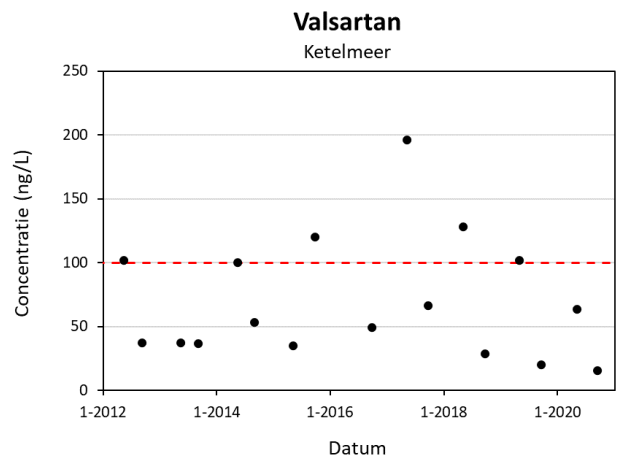
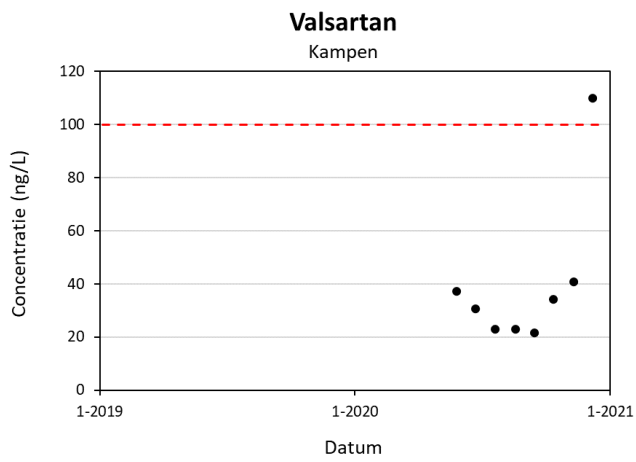
31. Valsartan

Stroomgebied Maas

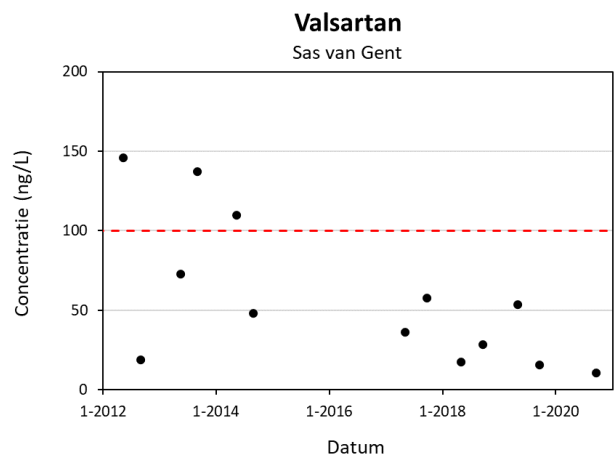
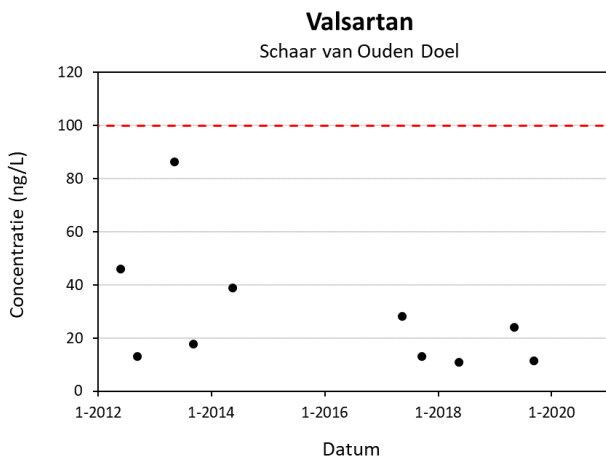


Stroomgebied Rijn





Stroomgebied Schelde



Eems + zee

