

Hazardous Substances Advisory Committee (HSAC)

Environment Agency Prioritisation and Early Warning System (PEWS)

October 2020

Commission

The Environment Agency's Chemical Strategy and Planning team seeks HSAC comments on its proof of concept Prioritisation and Early Warning System (PEWS) and written advice on:

1. Where the Environment Agency should best source credible data to:
 - a. Inform which substances are emerging or increasing potential to cause environmental concern or concern to human health via the environment (nominations of concern)
 - b. Inform our assessment of exposure and impacts for these chemicals—especially where data is traditionally scarce, e.g. impacts, soil, sediments and biota
2. How the committee can routinely engage with the PEWS system by providing nominations for chemicals of emerging concern, using existing resources?

The Prioritisation and Early Warning System (PEWS) is a proof of concept approach developed by the Environment Agency to identify emerging substances of concern with a view to inform timely policy actions. It collects nominations, screens and prioritises emerging substances of concern to the environment in different environmental media to inform follow-up action and the national chemical strategy.

This work responds to the Government 25 Year Environment Plan goal of managing exposure to chemicals and reducing pollution and a commitment therein to explore development of an Early Warning System for Chemicals.

Delivery

The committee is asked to consider the commission posed in relation to the information included in this background document.

This will be discussed at the 27th HSAC Meeting on 10th November 2020, where outstanding questions from the committee will also be addressed by the Environment Agency and the role of HSAC in providing signals can be further discussed and defined.

Following the meeting HSAC will be asked to provide a short, written opinion answering the two questions above. Minutes from the 27th meeting may be used as the basis for this as they can be further developed and refined.

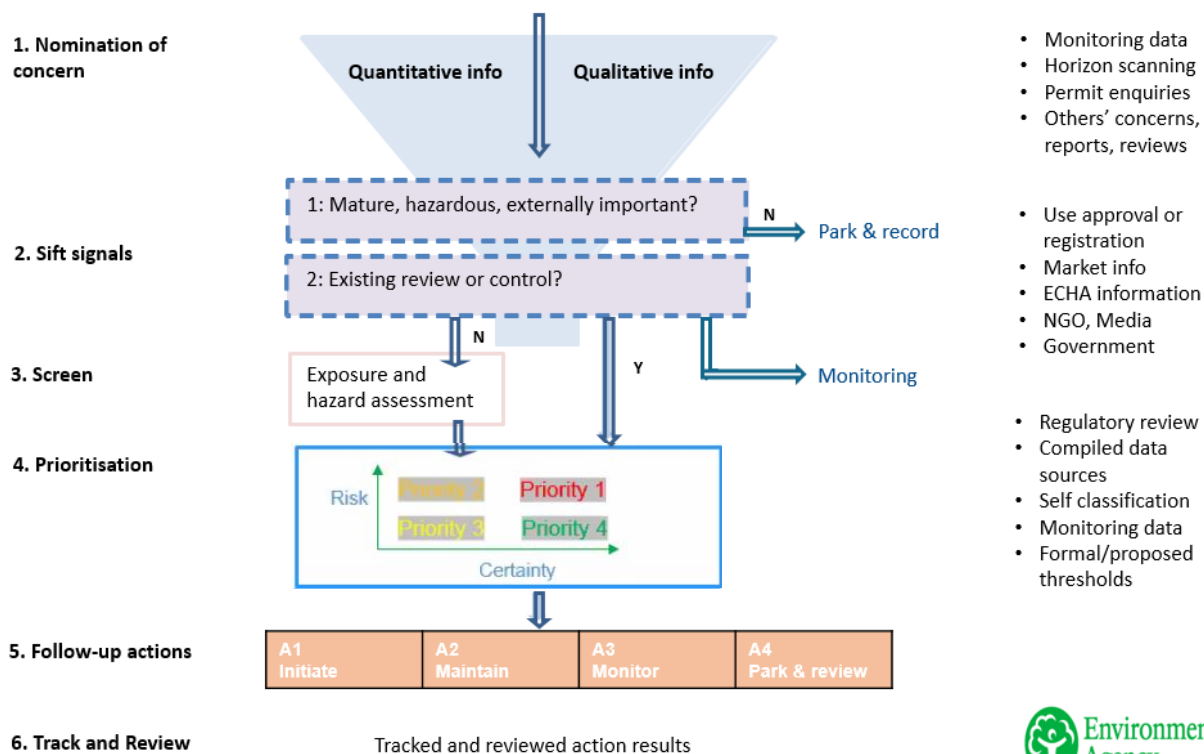
A final draft of the opinion paper is requested by 21st December and may be published on the HSAC website soon after.

Background

As indicated in the Commission above, the Prioritisation and Early Warning System (PEWS) is a proof of concept approach developed by the Environment Agency in response to the Government's 25 Year Environment Plan (2018) commitment to explore development of an early warning system to consolidate monitoring and horizon scanning data.

The approach includes governance, a process, tools and temporary resource in the Environment Agency to collect nominations, sift, screen and prioritise emerging substances of concern to the environment for a range of environmental media in a robust, peer reviewed process. As a result, we can define the need for further consideration and priority of concern for each screened substance to water, soil, sediment and biota to inform follow-up action.

Prioritisation and Early Warning System (PEWS)



(1) Nomination. Emerging substances of potential concern to and via the environment are nominated to PEWS via our [email address](#) and logged with reference to the basis or evidence of the concern in our internal nomination/tracker system (signals). Currently nominations are presented primarily by internal EA experts and reviews but also include some nominations identified from external studies and counterparts. For example emerging substances of concern are identified through EA chemical assessments, enquiries, environmental permit requests, reviews of our own monitoring data, chemicals of potential concern identified by EA horizon scanning and others beyond EA such as other environmental protection agencies in UK and Europe via expert forum and informal exchange.

Example 1, the industrial chemical 1,3-diphenylguanidine was nominated as being of concern by an EA expert following its detection in drinking water and indication of as potentially Persistent, Mobile and Toxic¹.

¹ <https://www.ngi.no/content/download/12331/file/>

Example 2, the biocide cyphenothrin was nominated as being of concern due to as used to control insect pests in non-agricultural situations, e.g. domestic, public health and industrial situations. Low persistence but chronic fish toxicity of 0.056 ug/l

Example 3, the pharmaceutical gabapentin was nominated as being of concern – 22nd most detected substance from EA surface water scan analysis (June 2019), with carbamazepine and lamotrigine represents over 25% of total detections in EA monitoring data (EA Initial review of Epilepsy and Anti-Seizure Drugs, June 2019) and was a late proposed candidate for monitoring for the WFD 3rd Watch List by Germany (Jan 2020)

Example 4, the degradation product N-nitrosopiperidine (NPIP) from carbon capture and storage scrubbing liquor. Is suspected of causing cancer and there is potential release to air and discharge to water.

Our nomination system currently holds over six hundred nominations of substances of concern cross-referenced with the basis for concern and nomination details. ***Currently we do not have a process to regularly draw out emerging substances from the scientific literature and journals and link to others' monitoring results and chemicals intelligence.***

(2) Sifting. The objective of the sifting process is to validate the nominations received (signals) and determine which substances should go forward for screening assessment and/or added to our monitoring analysis suite and the priority of doing so (High, Medium, Low or not valid).

This involves:

1. An initial sift and information gathering stage – determines
 - *Maturity of the issue* – is the nominated substance available for sale, in large scale production, registered, approved or advised for use?
 - *Hazard* – has the chemical at the time of nomination been flagged as persistent, bio accumulative, endocrine disruptor, carcinogen, mutagen or toxic to reproduction? What is the lowest PNEC value indicated for this substance in water?
 - *External interest and imperative* – is there political, regulatory or public interest or a need to respond to this chemical/group/issue? (NGO, media, government or online concern in relation to environment, or human health via environment)
2. Verification by an expert or an expert group
 - Is the substance subject to EU or other regulatory action, such as substance of very high concern (SVHC) designation under REACH, national assessment, POPs etc.?

In the absence of complete exposure data this step, and therefore PEWS, is currently geared towards higher volume, intentionally produced chemicals.

(3) Screening and (4) prioritisation. The objectives of these stages within the overall PEWS system are to:

- Quickly screen substances or issues flagged of concern to assess their relevance and likely level of risk or importance in the UK – based on readily available use, detection, hazard identification, likelihood of impact and confidence in the data/information used.
- Indicate priority for any follow-up consideration or action for a substance - based on likely level of risk/importance vs assessment of confidence in the assessment/information considered (surface and ground water), or detection, impact or potential pathway (soil, sediment and biota).

Supporting Document 1 ([PEWS screen template \(blank\)](#)) indicates the data collated for this step and how this data is used to define priority for follow-up action. Data collection can involve consulting other data providers. For example, we are working with other UK environment agencies to trial monitoring data exchange for several pilot substances. This will allow us to test the data exchange process and indicate exposure and therefore priority across the UK.

We are open to new methods to access exposure and impact data in the UK and relevant data beyond the UK. HSAC advice on other data sources that could tie into this assessment would be valuable.

Progress to date. Since 2019 this proof of concept approach, resource and tools have collected more than 600 substances of concern, the majority of which are now sifted to inform follow-up screening and investigation.

We focussed our initial screening effort on the top 50 detected substances by EA monitoring in surface water (2018) that we are now taking action on. For example, the plant protection product, tebuconazole was screened as a priority concern in surface water and has now been flagged to the Expert Committee on Pesticides who are now reviewing the authorisation. [Appendix 1](#) indicates the substances included in tranche 1 and 2 and peer reviewed screening/prioritisation results per environmental media.

Forward plans. If successfully funded beyond April 2021 we propose PEWS operation for:

- Nomination and sift – continuous process, operated by project support staff
- Screening and prioritisation – 2 tranches of c.30 substances a year via chemical assessment/ecotox staff
- Follow-up actions and review – 2 tranches processed a year via EA chemical leads for chemical assessment, regulation, stakeholder engagement and substance advice
- Annual reports – to indicate the work, results and progress of the system each year and follow-up actions achieved

Policy linkage

As indicated in preceding sections, the Prioritisation and Early Warning System (PEWS) is a proof of concept approach developed in response to the Government's 25 Year Environment Plan (2018) commitment to explore development of an early warning system to consolidate monitoring and horizon scanning data.

Supporting documents

PEWS screening data template (blank)

Appendix 1 – Screening and prioritisation results for PEWS Tranche 1

Appendix 2 – Screening and prioritisation results for PEWS Tranche 2

Appendix 1: Peer reviewed screening/prioritisation results for PEWS Tranche 1 substances

N.B. The colours used below indicate the priority of concern for surface and ground water in which Red = Priority 1, Orange = Priority 2, Yellow = Priority 3 and Green = Priority 4; For soil, biota and sediment the colours indicate need for further consideration (red), no further consideration (green) or insufficient information (white)

Chemical name	Use type	Overall	Surface water	Ground water	Soil	Biota	Sediment
Azoxystrobin	Fungicide	Green	Green	Green	Red	Green	Green
Bentazone	Herbicide	Red	Red	Red	Green	Green	Green
Bisphenol A (4,4'-Isopropylidenediphenol)	Plasticiser	Red	Red	Red	Red	Red	Red
Boscalid (Nicobifen)	Herbicide	Yellow	Yellow	Yellow	Green	Green	Red
Carbamazepine	Pharmaceutical	Yellow	Yellow	Yellow	Red	Green	Red
Chloridazon-desphenyl-methyl	Pesticide Degradation product	Yellow	Green	Yellow	Green	Green	Green
Clopidol	Vet med	Yellow	Yellow	Yellow	Green	Green	Green
Clothianidin	Insecticide	Yellow	Yellow	Yellow	Green	Green	Green
Desthio-Prothioconazole	Pesticide Degradation product	Green	Green	Green	Green	Green	Green
Diclofenac	Pharmaceutical	Red	Red	Green	Green	Green	Red
Fipronil	Biocide	Red	Red	Red	Red	Red	Green
Flufenacet (Fluthiamide)	Herbicide	Red	Red	Red	Green	Green	Green
Gabapentin	Pharmaceutical	Yellow	Yellow	Green	Green	Green	Green
Imidacloprid	Insecticide / Vet Med	Red	Red	Yellow	Green	Green	Green
Lamotrigine	Pharmaceutical	Green	Green	Green	Green	Green	Green
Lidocaine (Diocaine)	Pharmaceutical	Green	Green	Green	Red	Green	Green
MCPP / Mecoprop -p	Herbicide	Red	Red	Red	Green	Green	Green
Metazachlor	Herbicide	Red	Red	Yellow	Green	Green	Green
Propiconazole	Fungicide	Red	Red	Red	Green	Green	Red
Propyzamide (Pronamide)	Herbicide	Red	Red	Red	Green	Green	Green
Sucralose	Lifestyle	Green	Green	Green	Green	Green	Green
Tebuconazole (Terbuconazole)	Fungicide	Red	Red	Red	Green	Green	Green
Tramadol	Pharmaceutical	Green	Green	Green	Red	Green	Green
Trichloroethylene	Solvent	Red	Red	Red	Red	Green	Green

Appendix 2: Peer reviewed screening/prioritisation results for PEWS Tranche 2 substances

N.B. The colours used below indicate the priority of concern for surface and ground water in which Red = Priority 1, Orange = Priority 2, Yellow = Priority 3 and Green = Priority 4; For soil, biota and sediment the colours indicate need for further consideration (red), no further consideration (green) or insufficient information (white)

Chemical name	Use type	Overall	Surface water	Ground water	Soil	Biota	Sediment
1,4 Dioxane	Solvent						
2,4,7,9-Tetramethyl-5-decyne-4,7-diol	Other						
Atenolol	Pharmaceutical						
Benzenesulfonamide, N-butyl	Plasticiser						
Benzenesulfonanilide	Other						
Benzophenone	Lifestyle						
bis(2-ethylhexyl)phthalate (DEHP)	Plasticiser						
Bromoform	Biocide/Pesticide						
Caffeine	Lifestyle						
Cetirizine	Pharmaceutical						
Cholesterol	Other						
Clarithromycin	Pharmaceutical						
Codeine	Pharmaceutical						
Crotamiton	Pharmaceutical						
Cyclohexanone	Other						
Diphenyl sulfone	Other						
Fluoranthene	PAH						
Metalddehyde	Biocide/Pesticide						
N,N,N',N'-Tetraacetylenediamine	Other						
N,N-Diethyl-m-toluamide	Other						
Pyrene	PAH						
Pyriprole	Biocide/Pesticide						
Sotalol	Pharmaceutical						
Tri-(2-chloroethyl) phosphate	Flame retardant						
Triphenyl phosphate (TPPA)	Flame retardant						
Tris (1,3-dichloroisopropyl) phosphate	Other						