February 2021

NORMAN Joint Programme of Activities (JPA 2021)

List of scientific activities organised by the NORMAN network in 2021

The *NORMAN Joint Programme of Activities* (JPA) is defined every year by the Steering Committee, after consultation with the membership (General Assembly meeting and e-mail survey).

The final JPA and the associated budget are approved by the Steering Committee, taking into account the following criteria:

- the level of interest of the members (results of the survey);
- the relevance of the research topic to European environmental policies;
- the balance between different sectors / fields of interest;
- the relative value of the proposed in-kind contribution *vs* amount of resources required.

The Steering Committee has approved a budget of € 229,745 for 2021, based on the expected income from membership fees of the Founding and Ordinary members. These resources will be allocated for scientific and coordination activities (including the NORMAN website), and regular updating and maintenance of the databases.

NOTE: The NORMAN network JPA is financed by the contributions of its members (membership fees and members' in-kind contributions), always with a view to maximising synergies between research teams in the field of contaminants of emerging concern (CECs).

The list of approved scientific activities for 2021 is as follows.

Scientific activities

NORMAN NDS	**NORMAN Database System** (Activity coordinated by EI, slobodnik@ei.sk) Major activities in 2020 were related to further development, update and curation of the integrated NORMAN Database System (NDS; https://www.norman-network.com/nds/). The NDS consists of 13 modules of which 11 (Suspect List Exchange and SusDat; Chemical Occurrence Data (EMPODAT); Ecotoxicology; Bioassays Monitoring Data; MassBank Europe; Digital Sample Freezing Platform (DSFP); Passive Sampling; Substance Factsheets; Prioritisation, NORMAN SCORE Database - SARS-CoV-2 in sewage) are already accessible, interlinked and populated with data. The Indoor Environment module will be populated with datasets provided by WG-6 experts in 2021. Data Collection Templates for Antibiotic Resistance Bacteria/Genes module were developed, and first datasets are available for upload. All databases can be searched either individually or starting from the module 'Search All Databases', where the presence of any substance from SusDat in any of the database modules is shown with all existing data. In 2020 SusDat contained 106,513 substances and their transformation products; information was added to in 2020 with data on Lowest PNECs predicted by QSAR (link to Ecotoxicology Database) on 64,448 substances and mass spectrometric information (exact masses of adduct ions; predicted/experimental fragments) allowing for direct link with DSFP. NORMAN MassBank was used to extract experimental fragments, which are essential for identification of suspects in DSFP. The EMPODAT contained 10,953,378 monitoring data for 3,433 substances. The Substance Factsheets module was improved, in particular as regards the regular feeding of new data needed for prioritisation, including Product and Use Categories and Chemical Functional Use information from the US EPA Chemical Dashboard. Specific exposure (94,270 substances) and hazard indices (74,184 substances) were developed for SusDat substances by KEMI (Sweden) and uploaded into the database.

	It is considered important to pursue this collective effort in gathering data on the annual production volumes, chemical use categories, classification & labelling (PBT, CMR, ED), Lowest PNECs, hazard properties, exposure indices, etc.
	
	In 2021 upgrade and maintenance of the NORMAN Database System will be pursued with a specific focus on:
	
	- **General:**
	  o Improvement of interlinking of all NDS modules, in particular as regards integration of DSFP, Retention Time Index and substance curation tools into the NORMAN Database System;
	  o Enhancement of visualisation (maps) and data analysis capabilities (customised queries, batch mode queries using e.g. chemical use categories, chemical functional use information etc.) of NDS.
	- **EMPODAT - Chemical Occurrence Data module:**
	  o Maintenance, upgrading and feeding of new data into the database;
	  o Sharing the data with IPCHEM by downloading and sharing the latest update of the EMPODAT Database (annual basis);
	  o Implementing data mining tools to extract raw data from IPCHEM, ICES database and other database systems and development of a workflow for their processing in the 'NORMAN format';
	  o Implementing automated quality control tools for identification/removal/flagging of outliers in the collected datasets in EMPODAT;
	  o Continuous upgrade of all Data Collection Templates (DCTs) for an extended list of NORMAN substances (SusDat), drop-down lists and definitions of obligatory parameters.
	- **Passive sampling module:**
	  o Populating the Passive Sampling module with new datasets.
	- **ARBs/ARGs module:**
	  o Finalisation of ARBs/ARGs module and upload of available data.
	- **Ecotoxicology database:**
	  o Population of the database with new datasets;
	  o Further upgrade of the functionalities of the database.
	- **NORMAN Suspect List Exchange (SLE):**
	  o Continuous addition of new lists with archiving on Zenodo to obtain DOIs and connections to the CompTox Chemicals Dashboard and PubChem, including metadata import.
	  o Record of substance sources being contributed to SusDat.
	- **SusDat:**
	  o Continuous upgrade and maintenance.
	- **Substance Factsheets:**
	  o Upgrade of Substance Factsheets module – collection of all data needed for the implementation of the NORMAN Prioritisation Framework;
	  o Automated calculation of exposure, hazard and risk scores based on the information available in NDS; implementing updates requested by WG-1 Prioritisation.
	- **Prioritisation module:**
	  o Implementation/programming of automated 'Prioritisation module' based on the prioritisation scheme by WG-1 combining information available on target and non-target screening (semi-quantified) substances (see WG-1 Prioritisation);
	  o Update of the Prioritisation results module – visualisation of the results from prioritisation case studies applying the NORMAN Prioritisation Framework as a reference.
	- **SARS-COV-2 module:**
	  o Further improvement, including development of visualisation tools.
	- **Digital Sample Freezing Platform (DSFP; see also section "DSFP upgrading"):**
	  o Continuous maintenance and upgrading of DSFP;
	  o Upload of new data;
	  o Further development and testing of the semi-quantification module;
	  o Further development and testing of the GC-HR-MS (EI and APCI) modules;
	- **Continuous implementation of FAIR requirements** in NDS.

MassBank Europe and RMassBank	**MassBank Europe and RMassBank (**Activity coordinated by UFZ tobias.schulze@ufz.de and LCSB - Luxembourg emma.schymanski@uni.lu**)** In 2021 the continuous development and upgrade of MassBank Europe and RMassBank will be pursued with a focus on: - Upload of mass spectra (UFZ, especially HBM4EU related, Eawag, LCSB and all NORMAN members willing to contribute); - Further development of RMassBank; - Further development of MassBank server platform (e.g. database and applications programming interface, curation of records, import and export of records, standardisation of curation rules); - Fostering the integration of MassBank Europe with other mass spectral and metadata platforms (incl. NORMAN SusDat, MoNA, ChemSpider, StoffIdent, US EPA CompTox, PubChem); - Fostering the discussion with vendors for better integration of vendors' software with MassBank Europe; - Fostering the discussion on prioritised compounds currently not present in MassBank (matches to SLE, priority mixtures etc.), create a list of most wanted spectra and establish a platform for exchange; - Establishment of a chemicals' exchange platform to share neat standards for the creation of MassBank records and confirmation of identified compounds; - Integration of NKUA RTI into records; - Integration of ionisation efficiency into records; - Making MassBank FAIR (e.g. better integration of ontologies, linked to NFDI4chem); - Integration of MassBank in NFDI4chem as central repository (2020-2025). Added value and links with other NORMAN activities and / or other projects: - Enhancement of non-target identification tools and workflows; - Integration with CompTox Dashboard including fragment list; - NORMAN Digital Sample Freezing Platform relies on the experimental fragments information; - Cross-Action Working Group NTS; - Interlink with planned ILS on ionisation efficiencies; - Integration into PubChem; - Interaction with NFDI4chem; - Bridging to WG-1 Prioritisation.
DSFP upgrading	**DSFP upgrading** (Leader: EI alygizakis@ei.sk) DSFP has been developed as a platform for archiving, processing, analysing, data mining and retrieving high resolution mass spectral (HRMS) information for thousands of CECs detected in environmental samples. DSFP supports several NORMAN activities, including prioritisation of CECs and the European Early Warning System for chemical risks. It is populated with HRMS data of more than 2,000 unique environmental samples around Europe and beyond. The platform has been used in several recent sampling campaigns and collaborative trials of NORMAN, where it demonstrated the capability to identify numerous, previously often overlooked, substances. DSFP became an indispensable part of monitoring programmes, where it acts as a safety net for the detection of potentially hazardous substances. DSFP is integrated in the NORMAN Database System. During the past three years, DSFP has been enriched with numerous datasets from various monitoring campaigns such as the Joint Danube Survey 4 (JDS4; International Commission for the Protection of the Danube River, 14 European countries and EU; http://www.danubesurvey.org/jds4), Joint Black Sea Surveys (EU/UNDP EMBLAS-II and EMPLAS-Plus projects; http://emblasproject.org), monitoring of Dnieper, Dniester, Siverskyi Donets rivers, Antarctica Station Vernadsky, EU LIFE APEX project dealing with the monitoring of top predators and their prey (https://www.lifeapex.eu), waste water effluents across Europe and many others. All these HRMS datasets can be revisited to retrieve information about the occurrence of CECs employing retrospective suspect screening workflow. Semi-quantitative estimates of concentrations of suspects detected in the samples can be obtained and used in the prioritisation process.

	Further enrichment of the database and application of critical updates related to functionalities and capabilities of the new HRMS instrumentation are of critical importance to expand its use. The activities in 2021 will therefore be aimed at upgrading DSFP to increase its efficiency, thereby stimulating the interest of additional research teams in uploading their data and improving identification of chemical pollutants via this joint effort. The following tasks are proposed for 2021: **Task 1:** Reprogramming of the user interface, which is to be made more user-friendly. **Task 2:** Implementation of modifications in the database that will improve its speed and efficiency. **Task 3:** Modifications in the workflow to follow the latest advances in mass spectrometry (new data acquisition methods). **Task 4:** Modifications in the current screening workflow, so that it integrates developments produced by NORMAN members in JPA 2020/2021 (improvements in Retention Time Index and semi-quantification). **Task 5:** Generation of API for command line retrieval of the occurrence of CECs in the contributed data. **Task 6:** Improvement of the data contributing procedure/workflow. **Task 7:** Automated generation of an indexed website for all contributed datasets.
NORMAN EMPODAT Suspect	**Development of a new NDS module to host suspect screening results (NORMAN EMPODAT - SUSPECT)** (Leader: EI alygizakis@ei.sk) The objective of this task is to perform a systematic retrieval of the occurrence data of all compounds in the NORMAN Substance database (106,551 compounds as of December 2020) in samples archived in DSFP and to transfer them to a new module that will be created this year in EMPODAT. At present, the compounds identified in individual samples (at differing confidence levels) and their semi-quantitative occurrence data (with varying uncertainties) are stored in spreadsheets and used for various project-specific purposes. The main goal of this activity is to bring this valuable information to the on-line platform in a harmonised format and make the data available for the NORMAN Prioritisation Scheme and any other purposes. The outcomes of the EMPODAT – SUSPECT database are expected to be an important building block of the European Early Warning System for chemical risks in the environment. The activity has been divided in the following tasks: **Task 1**: Design, programming and optimisation of the new NDS module. **Task 2**: Application of retrospective screening on selected DSFP datasets to cover the widest possible spatial and matrix distribution. **Task 3**: Import of the suspect screening results obtained by DSFP workflow in the newly created database. **Task 4**: Design and programming of the relational database between DSFP and the new NDS module, based on the experience from the pilot exercise and DSFP screening output. **Task 5**: Invitation of WG1 experts to rigorously evaluate the prioritisation output. The activity is planned for 2021. If successful, it will be proposed to become a permanent activity of the NORMAN network.
WG-1 Prioritisation of CECs	**Working Group N°1: Prioritisation of CECs** (Activity coordinated by INERIS valeria.dulio@ineris.fr in collaboration with EI slobodnik@ei.sk, alygizakis@ei.sk and UBA peter.vonderohe@uba.de). Risk Assessment and Prioritisation of substances of concern are still impeded by the lack of a holistic data collection. Regarding exposure data, the development of novel monitoring tools has great potential to improve the current situation. Thanks to DSFP and the set of fully integrated tools and databases developed by NORMAN, it is now 'easy' to get a first overview of the state of knowledge (spatial distribution of contaminants, degree of exceedance of threshold values based on semi-quantified data, etc.)

	for a large number of chemicals, including many never studied before, and to identify priority substances/groups of substances for which further actions need to be taken. Ecotoxicity data are a fundamental building block to support risk assessment and identification of CECs in need of priority actions. However, ecotoxicity raw data and respective PNECs are still lacking for many substances that are found to occur in different environmental compartments. Even data from different EU authorities are still only available in individual pdf documents. This largely hampers the European Commission's goal of "one substance - one assessment", because it is still not ensured that assessments for the same substance are built on the same data. The NORMAN ECOTOX database has been designed to assess data quality and address the current challenges in chemical risk assessment. Finally, data about physico-chemical properties, hazard classification of the substances (e.g. PBT/vPvB, PMT/vPvM, CMR, etc.) as well as information about their use category(ies), functional use(s), production and consumption represent another crucial building block to support prioritisation of chemicals. This information is stored in the Substance Factsheets of the NORMAN Database System and closely connected with SLE and the SusDat database. However, this type of data / information is still missing for many substances in the SusDat list. In 2021 WG-1 Prioritisation will pursue the work started in the previous JPAs focusing on the following objectives: **Task 1: Support the prioritisation work of the Commission services at European level** and comment on relevant documents and queries (review of WFD Priority Substances, Watch List, PARC, EWS, where relevant). **Task 2: Collection and compilation of compound-specific information in support of prioritisation:** continuation of the tasks started in the previous JPAs, extraction and compilation of additional experimental ecotoxicity data from relevant existing ecotoxicity databases, i.e. the REACH portal and the UBA ETOX database, which could not be performed and will be postponed to 2021. **Task 3: PNEC derivation module**: participation of ecotoxicity experts to derive and approve additional Lowest PNEC values for SusDat compounds, with a specific focus on substances that were highly prioritised in EU projects using the NORMAN Prioritisation Framework (to replace predicted PNEC values for substances prioritised in Cat. 3 and 5 by experimentally-based PNEC values). **Task 4 Compilation of data / information regarding 'Use categories' and 'Chemical Functional Use' for all SusDat compounds**. The final aim of this activity is to provide a list of 'NORMAN Use categories' and 'Chemical Functional Use categories' and to enable substance searches in SusDat by "use" and "functional use" category(ies). A strategy will be built within WG-1 in line with the on-going collaboration between NORMAN and PubChem in order to achieve the above-mentioned objectives. **Task 5: Prioritisation module**: testing the "revised methodology" on 5 case studies (action planned for 2020 not finalised - postponed to 2021). **Task 6: Prepare input to the Early Warning System for Europe (EWS).** **Task 7: Preparation of a proposal for a Mixture Toxicity Indicator.** It is expected that the activities of WG-1 will contribute to build fruitful synergies with the work plan of the European PARC partnership currently under construction. It is planned to organise at least 2 virtual meetings of WG-1 Prioritisation (the aim is to organise a first meeting in spring 2021).
WG-2 Bioassays	**Working Group N°2: The value of bioassays and biomarkers in water quality monitoring programmes** (Activity coordinated by Goethe University Frankfurt Hollert@bio.uni-frankfurt.de). **Task 1: NORMAN Bioactivity Database** (Leader: EI slobodnik@ei.sk, in collaboration with KWR Water Research Institute Milou.Dingemans@kwrwater.nl and VU timo.hamers@vu.nl). Mixture toxicity modelling can be used to assess the contribution of detected chemicals to the observed effect. In many cases, however, the lack of effect data for the detected micropollutants

	in the different assays is a major limitation and more data is needed for a significant improvement of mixture modelling. The objective of this activity is the development of a NORMAN Bioactivity Database for individual water-relevant chemicals to support the interpretation of effect-based monitoring data and potentially reveal CEC-induced bioassay activity that cannot be explained by measured concentrations of known individual chemicals. The bioactivity database will be developed as a new module of the existing NORMAN Database System linked with the Bioassays Monitoring Database (https://www.norman-network.com/nds/bioassay/) in which effect-based water quality monitoring data is collected. Further to the work done by KWR and VU under JPA2020, the requirements for a NORMAN Bioactivity Database were evaluated and next steps defined. The NORMAN Bioactivity Database will contain activity/toxicity data for individual water-relevant chemicals, which can be used for water quality research; i.e. mixture modelling, selection of a relevant bioassay battery for water quality monitoring, prioritisation of chemicals for inclusion in monitoring programmes, prioritisation of suspects for confirmation. The following actions will be performed in 2021: - defining the features of the prototype; - building / programming the prototype; - filling the prototype with data (ask questionnaire respondents); - test round of the prototype; - (more activities are recommended in the JPA2020 report (Pronk et al. 2020). **Task 2: Ecosystem level effects of CECs on aquatic ecosystems (database / WG)** (Leader: Wageningen Environmental Research paul.vandenbrink@wur.nl in collaboration with IMDEA andreu.rico@imdea.org Update of the already available database developed by Brock et al. (2000a; 2000b) and Van Wijngaarden et al. (2005), in which the effects of chemicals as observed in microcosm and mesocosm experiments were categorised into no effects, slight effects and clear effects using different structural and functional endpoints (e.g. zooplankton, phytoplankton, physico-chemical parameters, macro-invertebrates, fish). This database has been updated till 2009 and is behind the PERPEST model, which is able to predict the community and ecosystem-level effects of pesticides (Van den Brink et al. Ecological Modelling 191 (2006)). The aim for 2021 is to update the database, broaden it, as it currently only contains pesticides, and discuss whether it has the right structure for use within the NORMAN network. First, an online workshop will be organised by the end of April 2021 to introduce the activity to the interested people and to discuss the way forward. It is envisaged that different sub-groups will be created to address the different tasks. A physical workshop is planned in October- November 2021 at IMDEA to discuss and plan this initiative further. Rationale: it is important to include field assessment of ecosystems structure and functioning (aquatic monitoring) as well as semi-field studies performed with CECs using microcosms and mesocosms. These issues are not addressed in the current WGs. **Task 3: Follow-up of activities started in 2019 / 2020** The work of WG-2 Bioassays in 2020 will also cover the following on-going actions from previous JPAs: - Development of *in vivo* workflows to support explorative EDA studies - solving bottlenecks using zebrafish (*Danio rerio*) and marine medaka (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de and UFZ riccardo.massei@ufz.de). The work, delayed due to COVID-19 crisis, will be pursued in 2021. Expected outcomes, described in detail in JPA 2020, include concrete improvement in fine-tuning different steps such as sample preparation, exposure conditions and final volume of the exposure media for *in vivo* biotesting using standard chemicals. Suggestions and guidelines for high-throughput *in vivo* screening in the context of explorative EDA studies will be provided. The developed strategy will be discussed

	in a WG-2 meeting to be organised in 2021 jointly with the WG-3 workshop (see below WG-3 Task 2). - Finalise report (NORMAN internal use) about the CT on **Bioassays for the evaluation of neuroactive and neurotoxic emerging contaminants** and write a joint manuscript on the results of the ILS, with a view to the integration of neurotoxicity as an emerging mode of action (MOA) in a battery of EBMs relevant for water quality monitoring (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de). - Peer-reviewed publication on the results of the **NORMAN Genotoxicity ILS** (Leader: KWR Water Research Institute Milou.Dingemans@kwrwater.nl). **Task 4: Support the work of the Commission (EBM – CIS WFD Activity)** (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de) NORMAN WG-2 will continue its activities in support of the EBM – CIS WFD Activity (DG ENV - WG Chemicals), in particular as regards the EU guidance for use of effect-based tools in the aquatic environment and the follow-up actions (e.g. definition of effect-based trigger values for bioassays). with a particular focus on the aspects related to the derivation of trigger values to support implementation of effect-based methods in the WFD (TGD drafting, according to the plans of the Commission). All WG-2 activities are conducted in close co-operation with WG-3. It is planned that Goethe University Frankfurt will organise a wide-scope WG-2 meeting (planned to take place in 2020 and postponed to 2021) to discuss the outcomes of the last JPAs in a broader context, the status of the implementation of EBMs into the WFD, emerging topics related to EBMs and the future strategy and activities of WG-2 in synergy with the tasks organised under WG-3. Most likely the meeting will take place in Frankfurt, back-to-back to the workshop to be organised by UFZ and VU on "integrated chemical and bioanalytical approaches to identify toxicity drivers in multiple media". If a face-to-face meeting is not possible in October 2021 due to COVID, a virtual WG-2 meeting will be anyway organised.
WG-3 Effect-directed analysis - Source-related CECs	**Working Group N°3: Effect-directed analysis for hazardous pollutant identification** (Activity coordinated by UFZ werner.brack@ufz.de and VU marja.lamoree@vu.nl). **Task 1: Contamination patterns, toxicity fingerprints and toxicity drivers of source-related effluents** (Leader: UFZ werner.brack@ufz.de) Specific human activities (municipal, industrial, agricultural) will be addressed as specific sources in order to : 1) get an overview of possibly relevant sources emitting micropollutants to the water cycle; 2) identify source-related fingerprints and toxicity profiles in WWTP effluents and receiving waters and to characterise and prioritise source-related footprints for management; 3) identify discrepancies between toxicity profiles and identified mixtures in order to prioritise sources for toxicity driver identification (EDA). The activities will include: - Questionnaire for NORMAN partners and comprehensive review of existing knowledge of pollution sources and related chemicals. - Zoom meeting to evaluate the outcome and plan the sampling campaign. - Sampling campaign at sources and receiving waters (e.g. 30 samples) on priority sites of interest. - Chemical target screening (GC, LC, RP, HILIC, different ionisation techniques) and NTS and effect-based methods to identify chemical fingerprints and toxicity profiles of source-related effluents and investigate their recovery in receiving waters. Data will finally end up in NORMAN databases. - Mass balance/iceberg modelling to identify discrepancies between observed effects and explainable effects based on extensive chemical screening in order to identify drivers as well as sources with unknown drivers for subsequent EDA. - Screening of existing data on WW and SW contamination for the identified source-related chemical fingerprints and application of pattern analysis approaches. - Follow-up study including multivariate approaches and EDA for pattern and effect driver identification.

	Task 2: Preparatory meeting in May/June and Workshop on integrated chemical and bioanalytical approaches to identify toxicity drivers in multiple media and a first **evaluation of the outcomes from Task 1** in October 2021 (Activity coordinated by UFZ werner.brack@ufz.de and VU marja.lamoree@vu.nl) Monitoring, assessment and prioritisation of CECs and mixtures thereof rely heavily on smart combinations of chemical and bioanalytical tools which are relevant for many NORMAN working groups, including WG1, WG2, WG5 and WG6 as well as Cross-Working Groups on passive sampling and non-target screening. All these WGs are very powerful in their specific domain. However, we believe that further interaction and the development of common strategies for toxicity driver identification in different matrices from water and reused water to house dust, and the consideration of the results in prioritisation, could further strengthen the work and consistency in the NORMAN WGs and in the whole network. The objective is to organise a workshop on toxicity driver identification and compound/mixture prioritisation in different matrices involving all relevant WGs and the cross-WGs on passive sampling and NTS. The workshop will be prepared in a virtual pre-meeting. Contributions from all WGs will be welcome and required, possibly complemented by a few external speakers. Contributions will focus on classical EDA approaches, multivariate statistical tools to identify candidate drivers (virtual EDA) and mass balance approaches (e.g. TU). In addition to these presentations, the workshop will have at least half a day of group discussions for identification of knowledge gaps and defining cross-WG future activities to fill these gaps. This workshop will also serve as a platform to present first result of the study on sources (task 1) involving all participating groups and identifying follow-up activities. A particular focus will be on unexplained toxicities as a starting point for future risk driver identification studies. The workshop is planned to take place in October 2021 (date to be defined) in Frankfurt, Germany and will be prepared in a virtual pre-meeting in May/June. Expected outcomes: - Cross-WG workshop (autumn 2021, expected 50 to 60 participants) enhancing mutual understanding of requirements, achievements and ongoing activities (if possible, face-to-face, but virtually if COVID makes that impossible); - List of planned cross-WG JPAs as an input for NORMAN GA 2022; - Common position paper to be published in 2022.
WG-4 Nano- and micro-scale particulate contaminants	**Working Group N°4: Nano- and micro-scale particulate contaminants** (Activity coordinated by Eawag – Ralf.Kaegi@eawag.ch and NIVA Bert.vanBavel@niva.no **Task 1: Reference material and standards for micro- and nano-plastic research** (Leader: NIVA Bert.vanBavel@niva.no and Eawag – Ralf.Kaegi@eawag.ch) The environmental monitoring of plastics is positioned high on the agenda of countries and international organisations worldwide. Large scale national and regional monitoring programmes are, however, hampered by the lack of reference materials for QA/QC and standardisation of methods. Data on the presence of plastics in the environment varies largely regarding quality and comparability. Robust and validated harmonised methods and QA/QC tools are still not in place. To select candidate reference materials and produce size fraction is a major challenge. Currently no reference materials of micro-plastics (<10 µm) and nano-plastics (< 1 µm) are available. This activity regards the development of small sized micro- and nano-polymer reference materials. Available protocols will be used for the development and synthesis of plastic reference materials of different polymer types and of well-defined sizes. Such reference materials will in the future be used for exposure studies and for the analytical method development. A mechanical fragmentation setup developed by NIVA will be used to generate micro- and nano-fragments of the most commonly used polymer types, including polyethylene (PE), polypropylene (PP), polyamide or nylon (PA), polyethylene terephthalate (PET), PS (polystyrene) and PVC (polyvinylchloride). Two reference materials in the lower micron size range (< 10 µm) will be produced in the form of dissolvable soda tablets and submitted to strict QA/QC procedures. Physicochemical characterisation of the different reference particles will be performed using different techniques including dynamic light scattering techniques (particle size distribution and surface charge), resistive pulse sensing (particle size distribution) and electron microscopy (shape of the particles).

	This approach has been successfully used for QA/QC studies in Europe (http://www.quasimeme.org/) and the US (https://www.sccwrp.org/). **Task 2: Follow-up of activities started in JPA 2020 on Microplastics analytical development exercises** (Leader: QUASIMEME www.quasimeme.org; wim.cofino@wur.nl and NIVA Bert.vanBavel@niva.no Vrije Universiteit Amsterdam heather.leslie@vu.nl) As part of the collaboration between NORMAN, QUASIMEME, Vrije Universiteit Amsterdam and NIVA, the second round of the ILS on microplastics (including exercises with analysis of microplastics in more complex environmental samples as well as in tablets) was organised in 2020. Round 1 of the ILS consisted of a development exercise with a set of 12 different test samples sent to 34 registered participant laboratories for microplastics analysis. The first round was successfully completed with a final report in November 2019 and a paper with the results was published in 2020. For the second round 59 labs have received 8 samples including the microplastic tablet, 1 biota, 1 sediment and 5 soil samples. Due to COVID-19 the reporting of the results is somewhat delayed until February 2021. A virtual workshop to discuss the results is planned for May 2021. More info: https://science.vu.nl/en/research/environment-and-health/projects/microplastics-ws-and-ils/index.aspx
WG-5 Water reuse and policy support	**Working Group N°5: Water reuse and policy support** (Activity coordinated by DERAC, France genevieve.deviller@derac.eu in collaboration with LTU, Sweden lian.lundy@ltu.se). **Task 1: Development of a water reuse water quality database** to share existing data sets on the quality of treated wastewater and stormwater reused in irrigation or other reuse projects. The aim is to develop and disseminate a comprehensive overview of current knowledge status and to identify data gaps to inform future research activities (identification of priority CECs in reused waters and sludge and development of quality targets for risk management purposes). It is proposed to develop this new "module" as a "category" within the NORMAN EMPODAT (occurrence) and ECOTOX (quality target) databases in the NDS. Water Europe Urban Water Pollution WG has volunteered to support the activity as a joint initiative. **Task 2: Pursue the NORMAN-SCORE collaboration on SARS-CoV-2 in sewage water** - involving laboratories within and outside NORMAN. This collaborative initiative, which has led amongst others to the launch of the "NORMAN-SCORE SARS-CoV-2" open access database in 2020, greatly contributes to the development of robust best practice for monitoring and recommendations on minimum data requirements for WBE pathogen surveillance. WG-5 will pursue these activities with particular regard to the definition of harmonised sampling / sample preparation protocols and metadata for reporting and sharing data. A *Water Research Making Waves* contribution on the database has been accepted for publication. Further collaborative initiatives are possible according to the mandate approved by the WG https://www.norman-network.net/?q=node/142 Links with all the other WGs and in particular the newly set up Terrestrial Environment WG and the Prioritisation WG are envisaged.
WG-6 CECs in the indoor environment	**Working Group N°6: CECs in the indoor environment** (Activity coordinated by NILU Pernilla.Bohlin.Nizzetto@nilu.no in collaboration with VU pim.leonards@vu.nl and University of Antwerp adrian.covaci@uantwerpen.be). **Task 1: Follow-up of activities started in JPA 2019/2020** WG-6 will focus on finalising the ongoing activities: - The 2nd CT on non-target and suspect screening methods for organic substances in European indoor dust. Dust samples were collected in 15 countries in Europe – in total 75 house dust samples and 35 dust samples from public buildings. The samples were sieved and made into two pooled samples (house and public). After the workshop in September 2020, pooled samples together with extracts of each pool dust sample were sent out to 26 participating laboratories for analyses with GC-MS and LC-MS. The first data sets have been received and

	it is expected that all datasets will be in place for further data analysis by 30 April 2021. If so, we will present the results and have a draft publication ready at the NORMAN GA meeting at the end of 2021. - The comparison study of dust sampling methods. Extracts for chemical analysis have been distributed to participating laboratories within WG-6. Results of the chemical analysis should be ready by 30 April 2021. The final results and a manuscript draft will be presented at the NORMAN GA meeting in the end of 2021. - The geographical distribution of organic substances in European indoor dust. An aliquot of the 75 house dust samples from the CT was kept aside when possible. This ended up in about 60 dust samples. The individual dust samples will be analysed for a selection of prioritised target substances and for non-target screening by volunteer WG-6 laboratories. Extracts will be sent out in April 2021 and the deadline for data reporting will be after summer 2021 (exact date to be decided in 2021). The first results will be presented at the NORMAN GA meeting. Manuscript planned for 2022. **Task 2: Collection and uploading of indoor data in the NORMAN Database System (NORMAN Indoor Environment module)** To facilitate this, WG-6 has planned a joint activity in 2021. The goal of this activity is to improve the number of indoor data in the NORMAN database System by having members working together to curate and submit existing indoor data sets. By doing so we will establish routines for curation of indoor data, acquisition of metadata and submission of indoor data to the NORMAN Database System. An important objective is also to inspire other members to submit indoor data. Seven members of WG-6 have committed to provide available target and non-target datasets on CECs from dust samples and/or air samples collected in indoor environments: NILU; ORU; UA; UoA; UoB; UoQ; VU. Environmental Institute will support the seven institutes with the curation and submission protocol. The activity will be ongoing in 2021; data uploading is expected to happen in early summer and autumn. Two WG-6 meetings are planned for 2021, one in spring and one in autumn, dates to be decided.
Non-target Screening Cross-Working Group Activity (CWG-NTS)	**CWG-NTS: Cross-Working Group Activity on Non-target Screening** (Activity coordinated by Eawag juliane.hollender@eawag.ch in collaboration with EI slobodnik@ei.sk, University of Athens Nikolaos Thomaidis, ntho@chem.uoa.gr, LCSB - Luxembourg emma.schymanski@uni.lu). The following actions will be carried out as part of the CWG-NTS Activity in 2021: - NORMAN Suspect Lists Exchange and associated "SusDat" database: Database development and maintenance (EI, UoA and LCSB,) (see "Suspect List Exchange and SusDat"); - MassBank Europe - Continuous development and upgrade (UFZ, LCSB and IPB Halle) (see "MassBank Europe"); - Digital Sample Freezing Platform upgrading (EI) (see "Databases – NORMAN DSFP"); - Development of a new NDS module to host suspect screening results (EI) (see "NORMAN EMPODAT – SUSPECT"); - Development of the NORMAN GC-HRMS workflows (NKUA, NILU) (see "NORMAN GC-HRMS workflows"); - Interpretation of data from the interlaboratory study coupling a passive sampling approach with non-target screening (as a follow-up of the ILS on Impact of deconvolution and library search algorithms for non-target analysis based on a passive sampling approach for non-target analysis screening of polar substances) (NIVA and INRAE) (see "Passive Sampling Cross-Working Group Activity – Task 3"); - Workshop NTS - Analytical fundamentals – Data analysis – Implementation (KU) (see AW-1). The workshop could not take place in 2020 due to the COVID-19 crisis and it was postponed to 2021. **Follow-up of activities started in JPA 2019/2020** (these activities, started in 2019/2020, were delayed due to COVID-19 crisis and connected issues. NORMAN members can find the results

	so far available and plans for 2021 in the slides of the virtual CWG NTS meeting of 17 Nov 2020, - http://www.normandata.eu/?q=node/252 : - **NORMAN Non-target screening guidance paper** (UFZ) (see "NTS Guidance document" JPA 2020); a draft version is under discussion; publication in a peer-reviewed journal is expected by end of 2021; - **Collaborative trial on (semi-)quantitative non-targeted analysis with LC/ESI/HRMS** (Stockholm University and UoA) (see "CT NTS semi-quantification" JPA 2020); Due to unexpected results in the pre-study at the end of 2020 further laboratory work was needed to define the optimum extraction protocols. The samples will be sent to the participating labs as soon as the QA/QC protocol is fully under control; - 2nd round of the NORMAN Network Early Warning System initiative (NormaNEWS2) (NIVA, UoA) (see "NormaNEWS2" JPA 2020); all participants have submitted their data, data quality assurance and assessment are planned for 2021; - Open chemical data to extend the amount of available information for relevant substances in SusDat, especially as regards MS/MS spectra (see "Open Chemical data" JPA 2020); Some first contacts with ECHA were made through the Life APEX project; the follow-up actions will be carried out in collaboration with WG1; - **ILS on suspect screening in biota**: application of a wide-scope suspect screening to compare sample preparation techniques for suspect screening workflows (SLU) (see "ILS NTS biota" JPA 2020); work in progress; distribution of the samples in July 2020 and results to be submitted by December 2020. A workshop will be organised in 2021 (to be defined according to the progress of the work); - Explore the current **application domain of NTS methodologies**, aiming to specifically address the existing gaps on highly hydrophilic contaminants and hydrophobic compounds (see "Expanding and validating the chemical domain of current NTS methodologies"); work in progress; first results presented at the NTS meeting 17 Nov 2020; - **Target / suspect screening of indoor dust samples to investigate the geographical distribution** of organic substances in European indoor dust (see "WG-6 Task 1" JPA 2021); work in progress; - **ILS on non-target screening and suspect screening methods for organic substances in European indoor dust** (Umea University) (see "WG-6 Task 1" JPA 2021); work in progress; - **NTS of CECs in polar regions** (EI and UBA) (see "CECs in polar regions" JPA 2020); draft report submitted, finalisation expected in 2021.
Passive Sampling Cross-Working Group Activity (CWG-PS)	**CWG-PS - Passive Sampling Cross-Working Group Activity** (Activity coordinated by NIVA Ian.Allan@niva.no and INRAE cecile.miege@inrae.fr). **Task 1: CWG-PS Position paper / view as a follow up to the NORMAN workshop on "Passive sampling in support of chemical monitoring in biota under the WFD** The proposed activity will focus on maximising the impact of initiatives taken through NORMAN over the last few years and specifically the latest workshop (December 2020) with active participation of DG ENV WG Chemicals representatives. A position paper was originally published after the workshop in Lyon in 2014 (Miège et al., 2015 https://doi.org/10.1016/j.teac.2015.07.001). A tiered approach was proposed then for inclusion of PS into WFD monitoring. We feel now that further substantial progress has been made in the last 5 years to propose for 2021 a new position paper / viewpoint. This paper will be based on presentations from the December workshop. We will seek input from speakers and attendees wishing to be involved to draft a paper presenting a vision for PS inclusion in WFD monitoring of substances with EQSbiota based on the following aspects: Review of answers to a questionnaire (opinion poll) that will be sent to workshop participants: - Current status and remaining challenges with the application/use of biota for chemical monitoring; - -Presentation of a concrete, well defined tiered-approach for the implementation of passive sampling as a first step in biota monitoring and a road map for inclusion of PS in WFD monitoring; - -Remaining steps for a wide scale implementation of PS for hydrophobic, non-ionised substances in water.

	A detailed plan of the position paper will be drafted in the first quarter of 2021 to initiate the discussion with presenters of the workshop. The detailed plan will be validated at this meeting in April 2021. A first version of the position paper will aim to be drafted by September 2021 for a submission before the end of the year. **Task 2: CWG-PS: Workshop on PS for substances with EQS_{water} in support of chemical monitoring for the WFD** The application of PS alongside water monitoring has demonstrated how PS can be used to better assess water quality (a number of PS datasets already exist, e.g. AQUAREF study in France, 2020). Yet we feel this information has not reached those in charge of monitoring programmes in Europe. We propose to host a PS-Water workshop in 2021 as an option to reach at the EU level a common understanding on how chemical monitoring of surface waters is conducted across Europe and how to enable the implementation of new tools and techniques into routine monitoring. This workshop will address: - Proposals on how to implement passive sampling into WFD monitoring; - Presentations of case studies of passive sampling for water monitoring conducted alongside; - Presentations from members of the WG Chemicals (DG ENV); - Publication of a viewpoint on the outcomes (if relevant). The organisation of this workshop will be discussed during a cross-working group activity meeting planned for April 2021. We will collate information on relevant projects at national level through CWG-PS participants. The workshop will be organised in autumn 2021 and the date decided in summer 2021. This workshop will most likely be held through video-conferencing. **Task 3: CWG-PS / NTS Interpretation of data from the interlaboratory study coupling passive sampling approach with non-target screening** In 2019, we conducted an interlaboratory study on NTS analysis of PS deployed at a drinking water treatment plant. Passive sampling for polar substances was undertaken upstream before (river water) and after treatment (before emission). A data-note paper was submitted in December 2020 to Scientific Data journal (Title: Interlaboratory dataset from a collaborative trial for future use in the development of non-target analysis). We propose to further explore this dataset with a focus on passive sampling and how this tool contributes to identifying substances removed or generated during drinking water treatment, over increasing exposure time. Considering the very high amount of data generated from the 22 laboratories using different analytical instruments and workflows, we will first focus on one HRMS instrument to initiate the data treatment. This task will be initiated through a meeting of the steering committee for this interlaboratory trial. The meeting will be held in Spring 2021. We will organise one meeting with the NORMAN participants (CWG-PS) and we will submit an abstract for a poster or platform presentation at an international conference (e.g. SETAC, IPSW …) by the end of 2021. The objective is to finalise a scientific paper by 2022. The results of this activity will be of interest for analytical chemists as well as engineers and the general community in the field of environmental chemistry and public health.
CWG-NTS: NORMAN Suspect List Exchange (SLE) and Substance Database (SusDat)	**NORMAN Suspect List Exchange** (Leader: LCSB, Luxembourg emma.schymanski@uni.lu) and **SusDat** (Leader: EI slobodnik@ei.sk and Nikiforos Alygizakis alygizakis@ei.sk in collaboration with UoA Nikolaos Thomaidis ntho@chem.uoa.gr and Reza Aalizadeh raalizadeh@chem.uoa.gr) This activity involves the addition of new lists to the Suspect List Exchange, which can then feed into SusDat, which has become the chemical data basis behind all NORMAN databases. As NORMAN-SLE is gaining increasing attention as an expert knowledge base with high potential for greater impact, some additional resources are requested this year to help curate and add necessary lists already identified as critical gaps (increase coverage, including transformation

	products) and also work towards a more sustainable model following FAIR principles and allowing direct and automated (as far possible) integration into international resources. In 2021 we plan to continue and expand on the efforts from recent years, including: - Website maintenance and development; - Addition of new lists from external contributors when they become available; - Addition of new lists strategically selected to fill identified knowledge gaps; - Addition of lists to specifically save/register/link transformation product information; - Archiving of all datasets on Zenodo (https://zenodo.org/communities/norman-sle); - Progressive registration of prioritised compounds in CompTox Dashboard; - Deposition of all substances in PubChem; - Progressive addition of annotation content to PubChem to fill information gaps; - Integration of lists into CompTox Chemicals Dashboard and PubChem; - Development of new strategies to deal with UVCBs; - Further development of strategies to deal with tentative/unknown/related structures; - Publication(s) on methods and software behind Suspect List Exchange; - Open software/packages/approaches for curation/merging once appropriate. **Maintenance and improvement of NORMAN Substance Database (SusDat)** (El slobodnik@ei.sk and alygizakis@ei.sk) The Substance Database (Susdat) is the core module in the NDS, being strongly interlinked with all 'substance-based' modules (e.g. Digital Sample Freezing Platform (DSFP), Ecotoxicology database, Substance Factsheets, EMPODAT etc.). As such, SusDat deserves special attention, continuing updates and thorough evaluation to achieve the highest possible quality of archived information. This proposal aims to add missing information for the newly added compounds in the database and creation of infrastructure for automation of merging and chemical curation of the individual lists contained in the Suspect List Exchange (SLE). Moreover, additional mass spectral information on MS/MS fragments (predicted and experimental), physico-chemical properties (e.g. BCF, Kow, Koc, Koa etc.) and model-predicted PNEC (P-PNEC) values will be produced and added to the NDS. This information will be displayed in SusDat, in the Substance Factsheets, in the Ecotox Database (and wherever it is appropriate) and it will directly feed the Prioritisation tool. This information is crucial for understanding the fate of the CECs and for the prioritisation exercises of WG1. The following actions are proposed for 2021: Task 1: Addition of *in silico* predicted Retention Time Index (RTI) values for electrospray ionisation (both positive and negative ionisation). Task 2: Update of RTIs and P-PNECs for substances with updated chemical structure. Task 3: Application of an automated curation workflow developed in previous years to update the "curation level" field for individual substances. Incorporation of missing "curation level" information for newly added substances. Task 4: Introduction of qualifier fragments. Task 5: Addition of critical chemical identifiers for missing substances. Task 6: Prediction of fragmentation patterns for newly added substances. Task 7: Investigation of potential deployment of the automated curation workflow. Task 8: Addition of consensus model data for logBCF, logKoa, logKoc and logKow. Task 9: Addition of ionisation efficiency (logIE) values.
CWG-NTS: Development of the NORMAN GC-HRMS workflows	**CWG-NTS: Development of the NORMAN GC-HRMS workflows.** This activity is a follow-up from JPA 2020. (UoA, Nikolaos Thomaidis ntho@chem.uoa.gr; NILU Pawel.Rostkowski@nilu.no) Compared to the vast number of LC-HRMS oriented MassBank records, covering a wide variety of different ionisation techniques and mass spectrometers, the availability of the GC-HRMS records is scarce. Therefore, the need to enrich MassBank with GC-HRMS records obtained by different ionisation techniques and mass spectrometers (e.g. GC-APCI-QTOFMS, GC-EI-QTOFMS and GC-EI-Orbitrap) becomes evident. It has only recently become possible to use

	DSFP to store and to process GC-HRMS, and its GC-HRMS processing functionalities are far less developed than for the LC-HRMS data. Objectives of the proposed activity are: (1) development of an RMassBank workflow "adapted to the needs" of GC-HRMS data, (2) analysis of environmentally relevant GC-amenable reference standards for the creation of new MassBank records, (3) development of GC-HRMS processing capacity of the DSFP. The analyses will be conducted in different state-of-the-art GC-HRMS instruments by core members of this JPA (UoA: GC-APCI-QTOF; NILU: GC-EI-QTOF, GC-EI-Orbitrap, UFZ: GC-EI-Orbitrap and WRI: GC-EI-QTOFMS; UmU: GC-EI-QTOFMS and GC-APCI-QTOFMS). Other interested laboratories with complementary analytical equipment will be invited if they express interest in the exercise.
Workshop NTS - Analytical fundamentals – Data analysis – Implementation	**Non-target screening Analytical fundamentals – Data analysis – Implementation** (Leader: University of Copenhagen, Giorgio Tomasi gito@plen.ku.dk and Majbrit Delacruz analyticalchemistry@plen.ku.dk). Organisation of a 2-3 day workshop (expected in Nov 2021, date still to be fixed) at the University of Copenhagen with invited lectures, oral presentations and poster sessions. Joint activity between Norman network members and partners in Danish Innovation Fund Grand Solutions Projects GANDALF and VANDALF. The workshop will be divided into three sessions. The first one will be dedicated to next generation analytical platforms for NTS, e.g.: HILIC, SFC, ion mobility, 2D GC-MS and 2D LC-MS. The second will focus on data analysis, i.e. workflows for signal processing, chemo-informatics and identification and the challenges related to their high-throughput implementation in an industrial context and at a regulatory level. The third will display examples of implementation in regulation and industry with emphasis on successes and obstacles related to scale and outside-academia operationalisation. E.g. What can commercial products do today? How do regulatory bodies and industrial providers (plan to) prioritise CECs? How do they (plan to) use the information from the chemical fingerprints?
WG on CECs in the terrestrial environment	**NORMAN Cross-Working Group on CECs in the terrestrial environment** (Activity coordinated by NILU Dorte Herzke dhe@nilu.no and Wageningen University and Research Ivo Roessink ivo.roessink@wur.nl) This proposal builds on the conclusion that knowledge about the levels, bioaccumulation and risks of CECs in the terrestrial ecosystems is very limited. The setting up of a new WG on CECs in soil and the terrestrial environment was already approved as part of JPA 2020. However, the workshop due to take place in the second half of 2020 and aimed to kick-off the WG could not take place because of the coronavirus pandemic. A survey was sent out in November 2020 to: i) compile information on current activities in soil and the terrestrial environment; ii) Suggestions for the possible scope of the WG; iii) Proposals for priority pollutants/contaminants to be focused on. More than 20 institutes responded, which confirms the interest of the NORMAN members in this WG. The plan for this JPA 2021 is to organise a workshop in early 2021 (proposed date 20 April 2021) to: 1) Review the results of the questionnaire and the recent ILS studies (ILS "Determination of Pesticides in Agricultural Soil 2019" and ILS of PFAS in soils organised by WEPAL/Quasimeme); 2) Consider CECs, matrices and species with priority in the terrestrial environment and prepare an outline of a programme of next steps to be taken; 3) Discuss the possible development of databases. The activities under the scope of this new WG could include (to be discussed at the workshop): - Investigate levels of CECs in soil ecosystems, i.e. soil, plants, insects, primary and secondary predators; - Investigate biomagnification and risk potential associated with CECs, including microplastics; - Investigate potential local sources of regulated contaminants and CECs in densely populated areas; - Evaluate and select best, and preferably non-invasive, sampling strategies (already identified for birds);

	- Select and potentially develop sampling techniques for passive and active air samplers for CECs; - Assess whether the chemicals occurrence levels have any potential effects on environmental and human health (PNEC or QS, as an estimate for risk characterisation, are not available for most terrestrial species); - Recommendations for remediation and prevention actions. NOTE: A collaborative activity on CECs in terrestrial organisms from different trophic levels" is proposed by the NKUA (see task "**CECs in terrestrial organisms from different trophic levels"**).
CECs in terrestrial organisms from different trophic levels	**CECs in terrestrial organisms from different trophic levels** (Leader: NKUA, Nikolaos Thomaidis ntho@chem.uoa.gr) This collaborative programme aims to reduce knowledge gaps and investigate the presence of CECs in terrestrial biota specimens. The study will be performed in close collaboration with the new NORMAN WG on Soil and terrestrial environment. In particular, the WG on Soil and the terrestrial environment will be used as an opportunity to obtain expert advice on the monitoring strategy and the various activities of the study: - Review of sample preparation protocols and analytical strategies for the determination of CECs in soil and terrestrial biota samples; - Critical review of the profile of CECs detected in different matrices (soil, liver, muscle tissue, eggs, feathers, blood and faeces); - Investigation of potential bioaccumulation in the upper trophic levels of the terrestrial food chain; - Comparison of CECs detected in aquatic versus terrestrial biota samples based on their physico-chemical properties; - Collection of ca. 10 samples from a European country representing various trophic levels (e.g. worms, birds of prey, raptors) and their analysis by wide-scope target (>2,200 CECs), suspect (>65,000 CECs), and non-target screening methodologies through the participants of the WG on "CECs in Soil and the Terrestrial Environment"; - Collection of different matrices of analysis (ca. 4 samples) from the same specimen of a raptor (such as liver, muscle tissue, feathers, blood) and analysis by wide-scope target (>2,200 CECs), suspect (>65,000 CECs) and non-target screening methodologies. Publication on analytical methodologies for the presence of CECs in terrestrial biota samples. This collaborative activity is connected with the EU funded LIFE APEX program (LIFE17 ENV/SK/000355), coordinated by EI, and provides an opportunity to link with the start-up phase of the WG on CECs in Soil and the Terrestrial Environment.
Cross-Working Group Activity on Marine environment	**New Cross-Working Group Activity on Marine environment** (Leader: EI slobodnik@ei.sk in collaboration with Marine Institute, NIVA, NILU, UBA) Several large-scale marine environment specific projects were carried out in past years which demonstrated the feasibility of the use of many NORMAN-developed tools in support of the implementation of the Marine Strategy Framework Directive (MSFD), including NTS, passive sampling, prioritisation, setting up marine ecotoxicity threshold values and monitoring of microplastics. Prominent examples are the EU/UNDP EMBLAS-II and EMBLAS-Plus projects in the Black Sea region (2014 – 2020; http://emblasproject.org/ supporting i.e. activities of the Black Sea Commission. The obtained data are already in the NORMAN Database System (NDS – EMPODAT, DSFP, Passive sampling module). Another project was LIFE APEX 'Systematic use of contaminant data from apex predators and their prey in chemicals management' (2018 – 2022; https://lifeapex.eu/), which included analysis of marine mammals and their prey stored in the Environmental Specimen Banks and scientific sample collections in National History Museums (NHMs) across Europe by NORMAN NTS workflow. Further to several collaborative initiatives in past years, in December 2020 OSPAR became an Associate Member of NORMAN, with a specific interest in cooperating in the areas of ecotoxicology, passive sampling, wide-scope target and suspect screening, NORMAN CEC prioritisation tools, chemicals in top predators and in polar regions and microplastics. The above indicates that there is a strong and genuine interest of NORMAN members to address the marine-specific issues across many of the WGs and as a natural follow-up a Cross-Working

	Group Activity on the Marine Environment will be established in 2021 as a permanent platform in NORMAN. The following activities are proposed as possible tasks / collaboration areas in this new CWG (to be discussed in a kick-off meeting which will take place early in 2021): - Systematic sharing of published and proposed marine biota, water and sediment ecotoxicity thresholds for inclusion in NORMAN Ecotox Database (EI, UBA, all). - Sharing of existing passive sampling data (NIVA, RECETOX, Marine Institute, all). - Sharing of wide-scope target and suspect screening data (all). - First prioritisation of marine-specific CECs in European sea water, biota and sediments using (updated for NTS) the NORMAN Prioritisation Framework (EI, INERIS, UBA, all). - Chemicals in top predators and in polar regions (NKUA, EI, UBA, NILU, NIVA, all). - Microplastics (NIVA, all). - Virtual meeting of CWGA (all).
PFAS analytical exchange	**Per- and polyfluoroalkyl substances (PFAS) analytical exchange** (Leader: Environment Agency England kerry.sims@environment-agency.gov.uk) Analysis of PFAS presents a considerable challenge for many reasons, which includes but is not limited to the number of substances encompassed in the definition (~4,700 OECD, 2018), their intrinsic properties, unknown intermediates, concentrations in environmental matrices, availability of certified reference standards etc. Knowledge exchange between all stakeholders is required to identify the Best Available Technologies (BAT), practices and techniques in analytical quantification and identification. This would ultimately improve confidence that data sets can be compared and benchmarked on a global scale and subsequent risk assessment. In June 2020, the OECD hosted a webinar on the latest developments in analytical and monitoring methods for PFASs in the global environment, biota and products to enable actions to reduce environmental and human exposure. Development of validated methods for specific matrices is under way e.g. US EPA. On a global scale there is a lot of focus on developing robust, precise and accurate methodology. Interest in advances spans national and local regulatory, academic, NGOs and industrial organisations. There is value in the knowledge exchange of practice and experience for this shared challenge to limit duplication, maximise best practice and increase our understanding of PFAS exposure via the environment. The aim of this activity is to foster knowledge exchange on the analytical and monitoring approaches other countries are taking to detect and measure PFAS in the environment: - Exchange questionnaire across the network and beyond (May-Sep 2021); - Follow-up report (Sep-Oct); - Workshop in person (and video conference) (data still to be fixed, alongside Nov-Dec/GA 2021). Specific issues for exchange: - Which PFAS substances are organisations focussing on? Why? How have these been prioritised? - What analytical techniques are currently being used or developed? Which environmental media are they suitable for? Any limitations and advantages of different techniques and methodology? Detection limits? - Where are the gaps in capabilities? Are there other stakeholders outside of the NORMAN network who could inform this exchange and process? Expected outcomes to inform organisations' own PFAS method development: - Understanding the work of others' and their interest or focus in this area; - Better informed analytical development and identification of best practice; - Identification of potential opportunities for collaboration. Links identified with activities promoted under the 2020 NORMAN JPA and others: - ILS of PFAS in soils organised by WEPAL/Quasimeme, Wageningen Environmental Research (proposed first half of 2020) within the new WG on CECs in the terrestrial environment to help to shape further actions within this new WG. - Interlaboratory studies on alkylphenols and selected perfluorinated carboxylic and sulfonic acids in drinking water, organised by AQS BW, IWW Water Centre. Parameters proposed as:

	perfluorobutanic acid, perfluoropentanic acid, perfluorohexanoic acid, perfluoroheptanoic acid, perfluorooctanoic acid, perfluorononanoic acid, perfluorodecanoic acid, perfluorobutanesulfonic acid, perfluorohexanesulfonic acid, perfluorooctanesulfonic acid. Studies to combine proficiency testing of laboratories and evaluation of the suitability of methods used (NORMAN Validation level: V3 - routine). - On-going work at the level of EC DG ENV WG Chemicals for the review of Priority Substances under the WFD. - Findings from the recent June OECD webinar on analytical and monitoring methods for PFASs in the global environment, biota and products and any follow-up OECD webinars or knowledge exchange with third parties. - Research consortia that will be selected as a result of the EC Green Deal call 8.1 on systemic zero-pollution solutions to protect health, environment and natural resources from persistent and mobile chemicals.
ILS CECs in DW	**Interlaboratory studies on X-ray contrast media and selected pesticides of sulfonylurea compounds in drinking water** (Leader: IWW as full in-kind contribution, Gerhard Schertzinger g.schertzinger@iww-online.de) As an in-kind contribution, IWW Water Centre, together with AQS BW, will organise interlaboratory studies on the following compounds in drinking water. - An ILS on amidotrizoic acid, iodipamide, iohexol, iomeprol, iopamidol, iopromide, iothalamic acid, ioxaglic acid and ioxitalamic acid (scheduled for summer 2021); - An ILS on selected sulfonylurea compounds (scheduled for autumn 2021). Parameters will be: amidosulfuron, metsulfuron-methyl, rimsulfuron, thifensulfuron-methyl and triasulfuron. The studies will combine proficiency testing of laboratories and evaluation of the suitability of methods used. Dissemination of information about the ILS (announcement/invitation, registration form etc) through the NORMAN website and other dissemination channels. For more technical details and the dispatch dates www.iswa.uni-stuttgart.de/ch/aqs/index.en.html

The proposed budget for this JPA may be revised by the Steering Committee in May 2021. All approved scientific activities will be implemented, independently of the revision of the budget.