June 15, 2026

Assessing Chemical Risks to Biodiversity: Current Status, Gaps, and Recommendations for Future Action

Sarah Hughes
ECETOC Biodiversity Task Force

WORLD BIODIVERSITY FORUM

European Centre for Ecotoxicology and Toxicology of Chemicals

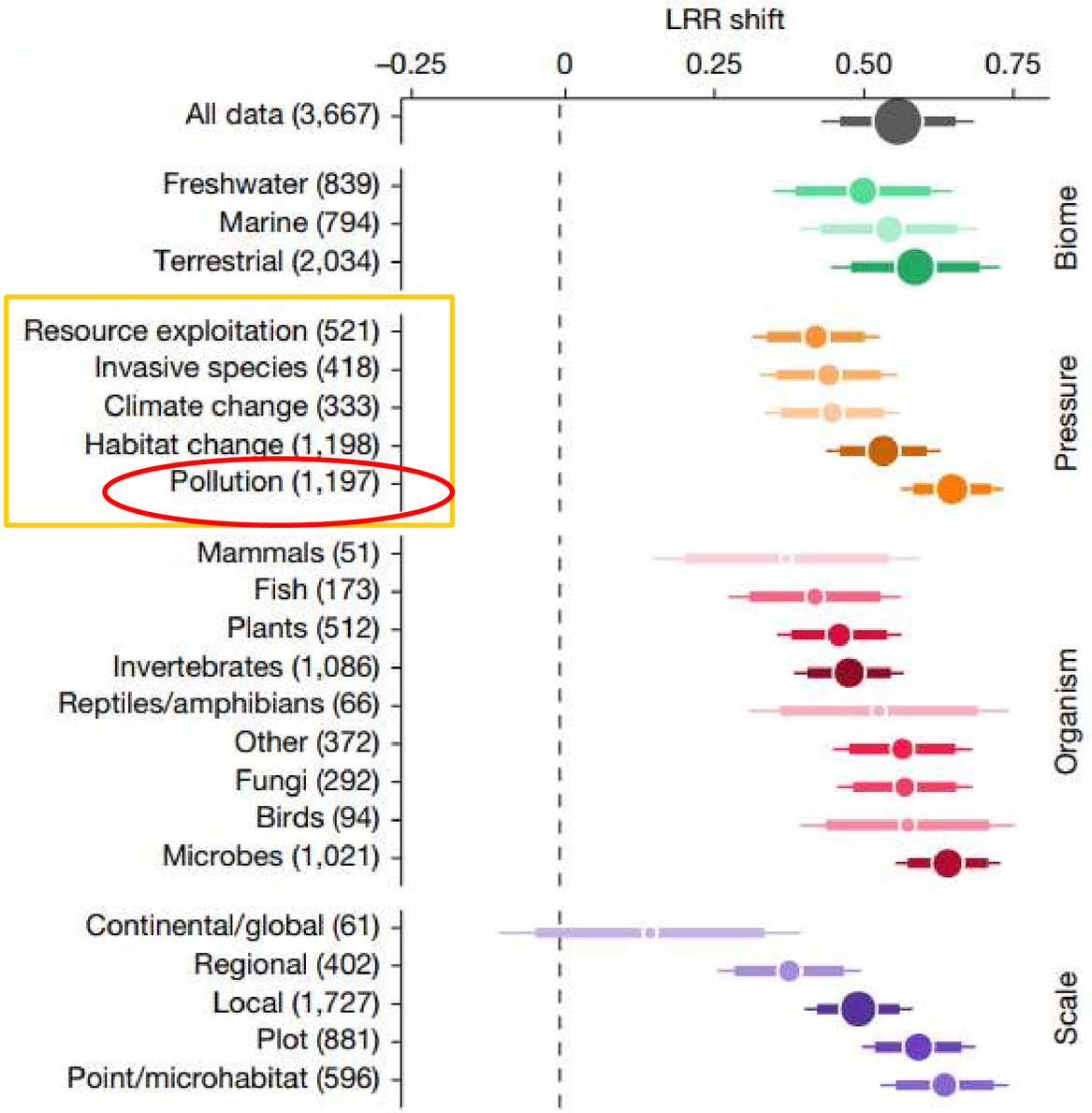
TASKFORCE: Biodiversity Task Force: Assessing risks to biodiversity from exposure to chemicals: Where are we and where should we be going?

1) EU chemical regulation and strategic documents,
2) EU commissioned research projects relevant to biodiversity
3) Definitions and metrics of biodiversity and currently used methodologies and approaches

What is causing biodiversity loss?

Functional Integrity

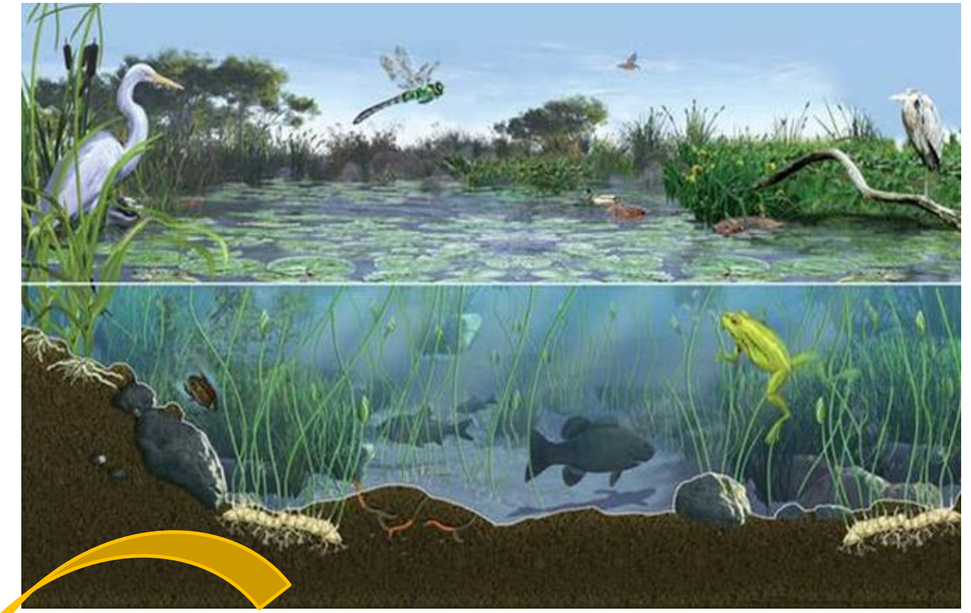
Genetic Diversity



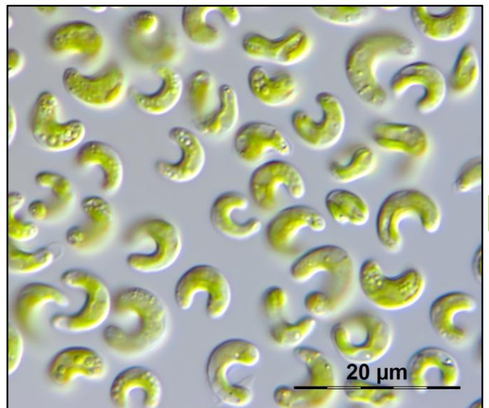
Sources: [Planetary Health Check 2025](); [Keck et al 2025]()

Isn’t the goal of ecotoxicology to ensure the risk of chemicals are adequately characterized to protect ecosystems?

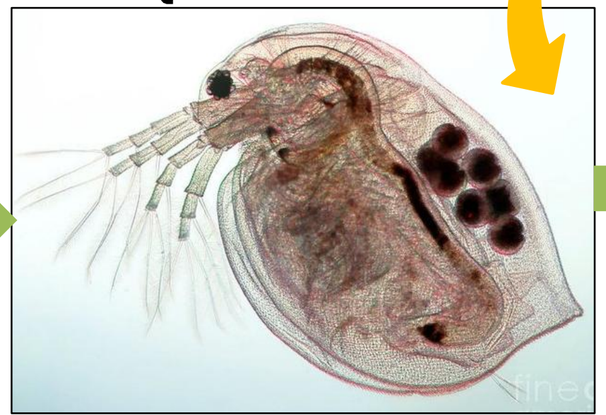
- **Risk** = exposure X hazard
- Industrial chemicals: Algae, invertebrate, and fish
- Typically, in freshwater aquatic organisms
- Apical endpoints of survival, growth & reproduction
- Pesticides and biocides: Significantly more comprehensive assessment required



Producer



Primary Consumer



Secondary Consumer

1) EU chemical regulation and strategic documents

There is increasing focus in the EU and globally on the potential impact of chemical exposure to biodiversity

41 Documents
Focus: EU
• Policies & Frameworks
• Legal documents
• Strategic documents
• Standards and initiatives

Biodiversity mentioned OR addressed via surrogate (e.g. *the environment, specific env. compartments*)?

OR

Specific focus on chemicals' impact on environment? OR Mitigation of impacts on the environment?

Exclusion of strategic documents:
Rather vague, still useful for discussion and next steps

AND

Data Requirements for PPP merged with PPP regulation (same framework)

25 Documents

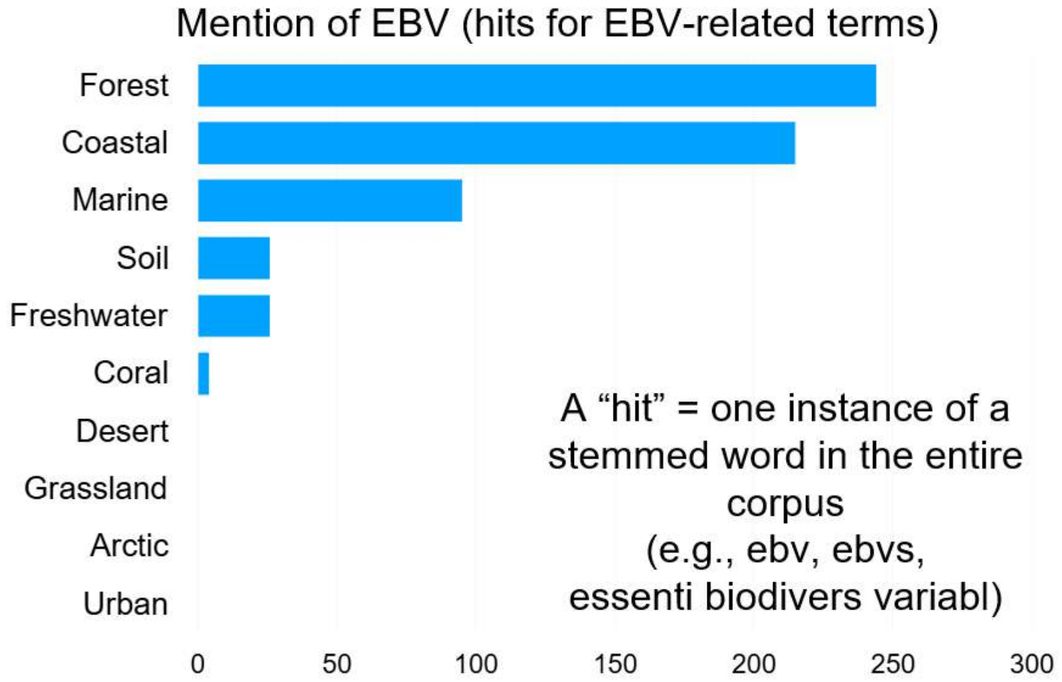
"Assessing the risk of chemicals on biodiversity (i.e. the "what") is currently hindered by a lack of unified approaches to quantifying the effects of chemical pollution (i.e. the "how")"

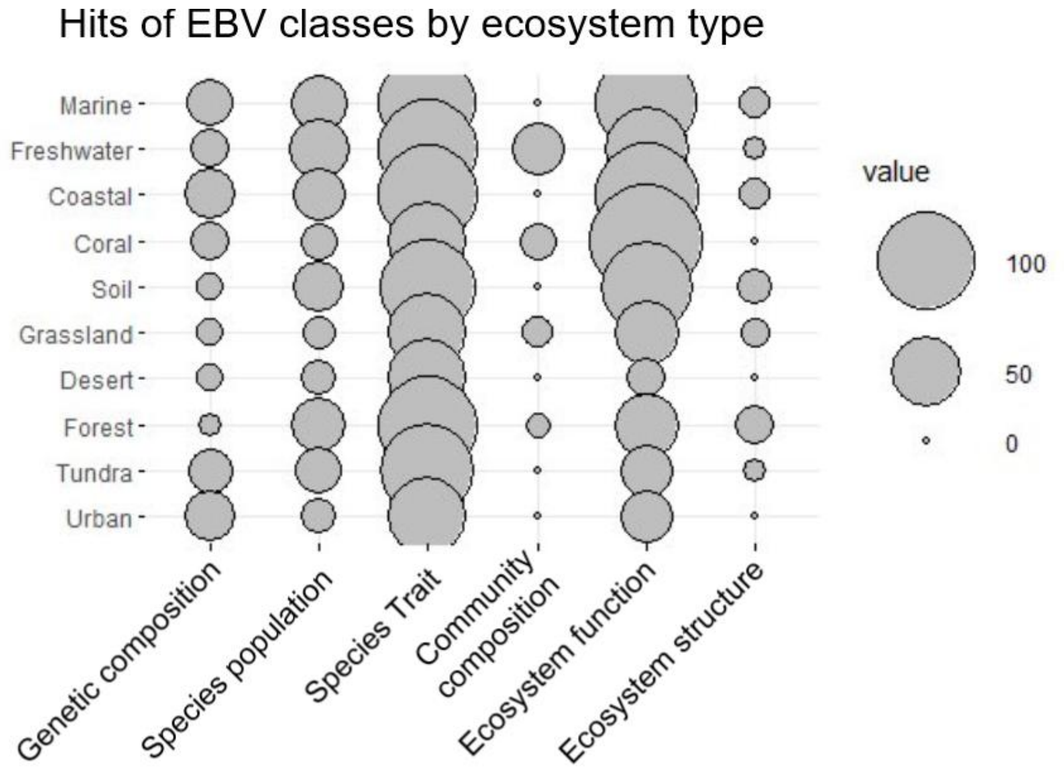
2) Active EU commissioned research projects relevant to biodiversity

- Searched EU Horizon projects projects 2017-2024 with the keywords "biodiversity“ and “chemicals” Result: **>>1250 projects**
- **3%** of studies were relevant “*Potentially informative for regulatory frameworks for the assessment of chemicals for effects on biodiversity*”:
- Current regulatory concepts and data requirements for chemicals are lacking
- Translation into actionable regulatory recommendations is lacking
- Update: 10% of total Horizon budget (2025-7) to address biodiversity loss directly or indirectly (~10 billion EUR).

3) Definitions and metrics of biodiversity, methodologies and approaches

- Surveyed the literature to better understand definitions, metrics, and methodologies.
- We used a text-mining approach in Google scholar 2014 – 2024 **(pre-AI!)**
- Biodiversity metrics and methods vary according to ecosystem
- Among essential biological variables (EBV) definitions, trait diversity and ecosystem function are the most widely applied definitions





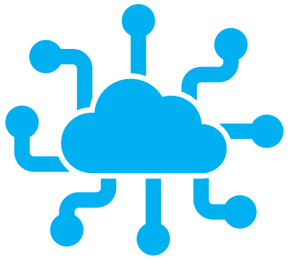
ECETOC Workshop: Advancing Biodiversity Protection - Unifying Approaches to Chemical Risk Assessment in the EU Context May 4-6 2026

Objective 1

Explore available and developing biodiversity definitions, metrics and methodologies relevant to chemical risk assessment.

Objective 2

Understanding the landscape of biodiversity metrics used in sustainable finance initiatives and their relationship to chemical safety assessment.

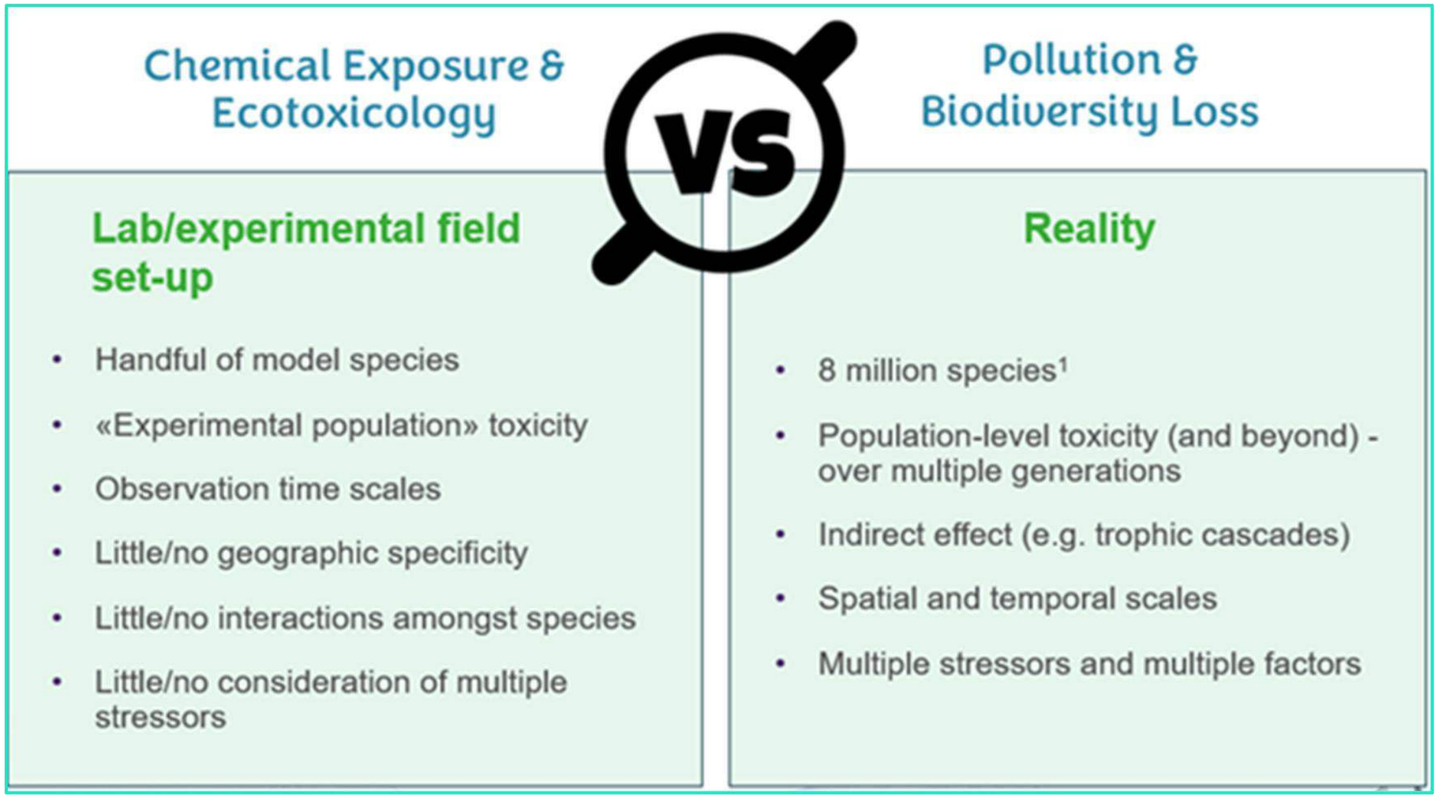


Objective 3

Aligning tools and methodologies to achieve the policy objectives: Identify key actions to bridge the gap between existing scientific understanding and policy objectives for better chemicals management.

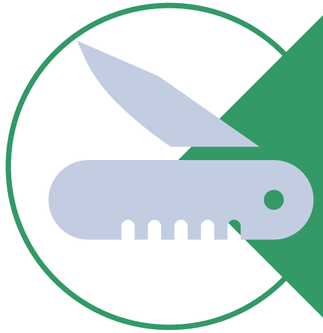
Objective 1a) Regulatory Landscape

- Across Europe, regulatory agencies align on biodiversity protection goals
- They diverge in what to protect and which approaches and tools to use.
- They struggle with the practical challenges of integrating system-level thinking into chemical risk assessment.



Objective 1) Definitions – Tools – Metrics

Definitions – Broad agreement to use the UN definition of biodiversity (genetic, species and ecosystem functional diversity), but with the need to make it operational for chemical regulation.

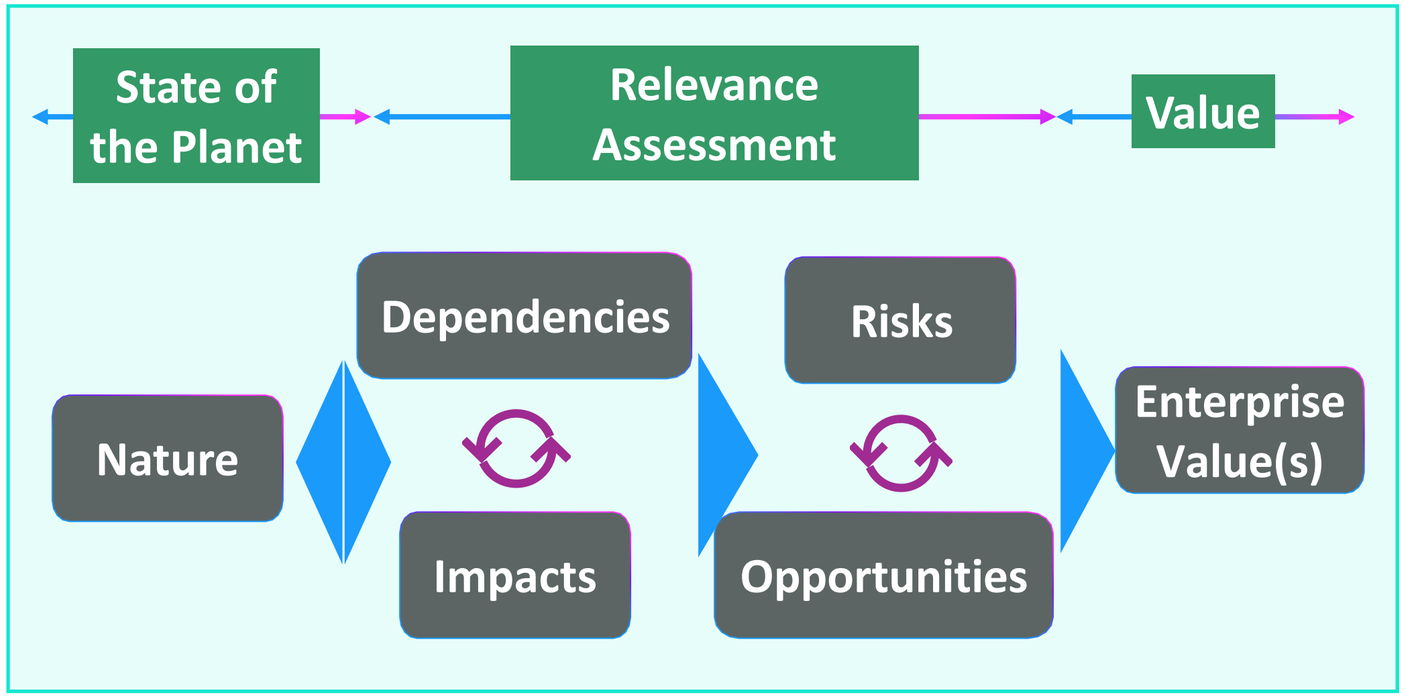


Tools – Shift from siloed approaches to integrated, system-level tools linking lab–organism–ecosystem–societal scales.

Metrics – Adopt complementary, scalable metrics beyond single-species endpoints to capture population, community, functional and taxonomic diversity.

Objective 2) Sustainable Finance & Chemicals Management

- Biodiversity accounting is emerging as a critical enabler for integrating nature into financial decision-making and corporate reporting.
- Considerations for linking biodiversity metrics (chemicals) to finance practices was discussed during the workshop:



- Align chemical metrics with financial materiality
- Move from hazard to impact pathways
- Enable aggregation and comparability
- Bridge monitoring and modelling
- Transparency and uncertainty handling

Objective 3) Research Priorities & Next Steps

- Develop system-based frameworks linking chemicals to biodiversity outcomes
- Define and operationalise biodiversity protection goals
- Improve lab-to-field extrapolation and ecological realism
- Create harmonised biodiversity metrics and monitoring systems
- Build integrated data and modelling tools
- Develop mitigation management levers

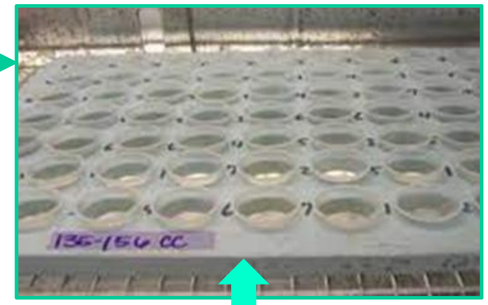
Conclusion

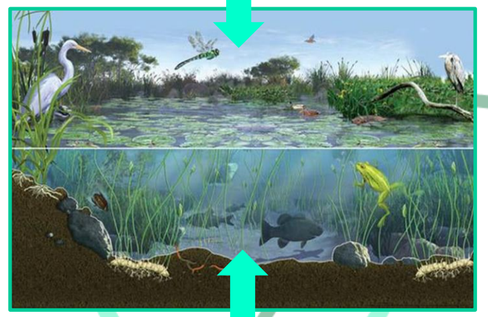
Need: Link chemical pressures to biodiversity outcomes by integrating ecotoxicology, ecology, and multiple stressors.

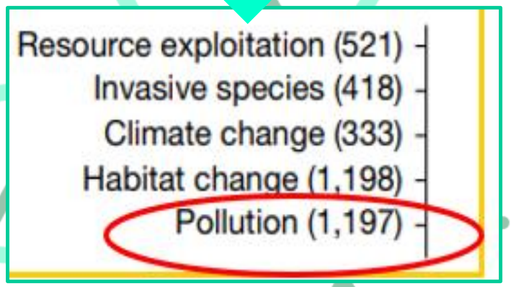
Gap: Defining clear, harmonised protection goals and metrics, aligned across stakeholders and regulations.

How:

- Include geographically explicit exposure data
- Improved modelling frameworks
- Validating approaches
- Ensure relevance to socio-economic and decision-making contexts.







Thank you

FOR MORE INFORMATION PLEASE VISIT WWW.ECETOC.ORG; Info@ecetoc.com

Nika Galic (Syngenta AG, CH)
Anja Gladbach (Bayer AG, DE)
Christoph Mayer (BASF, DE),
Aaron Stoler (Exponent, USA)
Sian Ellis (Corteva, UK),
Marta Baccaro (DG-JRC, IT),
Sarah A. Hughes (Shell Global Solutions (US) Inc, USA) – s.hughes@shell.com
Philippe Lemaire (TotalEnergies, FR)
Lorraine Maltby (University of Sheffield, UK)
Anna-Maija Nyman (ECHA, FI)
Hans Sanderson (Aarhus University, DK)
Johannes Tolls (Henkel AG, DE)
Lucy Wilmot (ECETOC)

ecetoc