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## Whole System Approach for in-situ research on Life Supporting Systems in the Anthropocene (WAILS)

**Michael Mirtl**<sup>1,2</sup>, Ingolf Kuhn<sup>2</sup>, Don Montheith<sup>3</sup>, Jaana Bäck<sup>4</sup>, Daniel Orenstein<sup>5</sup>, Antonello Provenzale<sup>6</sup>, Steffen Zacharias<sup>2</sup>, Peter Haase<sup>7</sup>, and Mosche Shachak<sup>8</sup>

<sup>1</sup>Environment Agency Austria, Vienna, Austria

<sup>2</sup>Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany

<sup>3</sup>UK Research and Innovation, CEH, UK

<sup>4</sup>University of Helsinki, Helsinki, Finland

<sup>5</sup>Israel Institute of Technology, Israel

<sup>6</sup>National Research Council of Italy, Rome, Italy

<sup>7</sup>Senckenberg Gesellschaft für Naturforschung, Frankfurt, Germany

<sup>8</sup>Ben-Gurion University of Negev, Israel

Driven by the increasing awareness that innovative approaches to solving the problems at hand in our complex human-environment interactions require closer collaboration among scientific disciplines and communities, inter- and transdisciplinary integration is continuously gaining importance in R&D agendas and Research Infrastructure (RI) development strategies. In addition, the complexity and costs of RIs have substantively increased in many realms triggered by technological developments and the need to organize beyond national and continental boundaries. This suggests cross-disciplinary collaborations, sharing and multiple usage of infrastructures. Alignments of infrastructure developments needed for this purpose require a conceptual framework for disciplinary integration suited for identifying common approaches and resulting infrastructure design and service components. We will report on recent advancements in building a common theoretical base between major communities that is – inter alia – underlying the ongoing implementation of the Integrated European Ecosystem, critical zone and socio-ecological Research Infrastructure (eLTER RI). An overview of considered theories on within- and cross-scale interactions and feedback loops will be given and the pathway to the “Whole System Approach for in-situ research on Life Supporting Systems in the Anthropocene” (WAILS) will be presented. We will also expand on the potential of such unifying approach in theory-guided integration and division of tasks amongst related environmental RIs. Expected practical implications are answers to questions like where concretely existing and planned European environmental RIs are challenged to interact in response to common overarching questions, and what practical fora and mechanisms (across RIs) would be needed to bridge the gap between research teams driven (bottom-up) efforts and the centralistic RI design and operations.