

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Societal and Economic Applications, Challenges and Benefits (5)

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NATURE FIRST: FORENSIC INTELLIGENCE AND REMOTE SENSING TECHNOLOGIES FOR
NATURE CONSERVATION

Abstract

The EU biodiversity strategy contains concrete objectives to protect and restore biodiversity and to address the main pressures and threats to biodiversity. However, knowledge gaps exist for many habitats and species. More, and better, information is needed to support the Birds and Habitats Directives. In response, the consortium ‘Forensic Intelligence and Remote Sensing Technologies for nature conservation’ (Nature FIRST) proposes to develop improved capabilities for nature conservation by combining ecology sciences and environmental forensics with environmental observations (satellite-based and on-site). This paper examines how this novel approach results in propositions and related services for: 1. Biodiversity monitoring in Natura 2000 areas, for both habitats and species; 2. Early warning systems for Human-Wildlife Conflicts (HWC); 3. Management and compliance reporting. Services include tools as well as methods, including software, checklists, instruction videos and more. The research objective is to move from a reactive approach and remediation of biodiversity loss to a preventive approach and a move from Human-Wildlife Conflict to Human-Wildlife Co-existence (HWCo). This paper describes how new technologies combined with existing technologies and data science, allows proactive nature conservation management. Semantic web technology is used to create knowledge-graphs, visualizing links between data sources to provide new insights. Forensic data science and techniques are used to equip conservation managers with observation skills. These new observations will be combined with remote sensing information from wild-cams, drones and satellites, into an operational information system. Last but not least, predictive digital twins are being developed: two species related (bear and sturgeon) and one aimed at habitat monitoring (biodiversity). To ensure the tools and methods are fit-for-purpose, they are co-developed with four field site partners, representing different habitat-species combinations in Europe. The first is Ancares-Courel in Spain (key species: bear, wolf), the second Stara Planina Mountain (key species: bear, wolf) in Bulgaria, the third the Danube Delta (key species: sturgeon, pelican) in Romania, and the fourth the Maramures Transboundary Area (key species: bear, wolf, lynx, golden jackal) between Ukraine and Romania. Testing will take place in four field site workshops. These also feature a Policy Lab, to familiarize policy makers with the tools they can use for management as well as compliance assurance purposes.