

Defining and sustaining populations and communities

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Abstract—The UN Sustainable Development Goals (SDGs) cover subjects such as ending poverty, achieving gender equality, ensuring access to water, energy, and food, and protecting ecosystems. Every SDG includes wording that refers directly or indirectly to a population or community or organisms, humans or otherwise. Therefore, the Population and Community Ontology (PCO) plays a crucial role in defining the language of the SDGs and their targets and indicators. This talk will describe the PCO and its applicability to sustainability studies.

Keywords—ontology; population; community; sustainability; United Nations Sustainable Development Goals

I. REFINING THE POPULATION AND COMMUNITY ONTOLOGY FOR SUSTAINABILITY RESEARCH

The PCO provides a standardized set of terms that describe material entities, qualities, and processes related to collections of interacting organisms, for applications including community health care, plant pathology, animal behavior, sociology, and ecology. PCO is rooted in the Basic Formal Ontology (BFO) [1] and designed to be compatible with other OBO Foundry ontologies. The latest release of PCO is available at <http://purl.obolibrary.org/obo/pco.owl>, and source code is available at <https://github.com/PopulationAndCommunityOntology/pco>. Requests for new terms are welcome at <https://github.com/PopulationAndCommunityOntology/pco/issues>.

PCO curators are striving to capture the collective knowledge of the fields of population biology and community ecology, two large sub-disciplines ecology, each with a long history, well-established theories, and extensive literature. As in many well-established fields, the terminology used by population and community ecologists varies widely among studies and suffers from a lack of precision. Furthermore, the words “population” and “community” are used in many disciplines outside of ecology, each with meanings of their own. To be useful across as many applications as possible, PCO defines a very

high level term for populations and communities labeled “collection of organisms”. Subclasses are defined based on fundamental characteristics by which organisms are grouped in research, such as the processes in which they participate, common descent, phenotype, or social constructs. Design patterns for collections of organisms in PCO are described in more detail in [2].

PCO is a component of a new ontology, the SDG Interface Ontology (SDGIO). SDGIO aims to clearly and logically specify the language of the SDGs and their indicators, so that the data needed to assess the indicators will be more accessible and useful. Three representative SDGs:

- Goal 3: Ensure healthy lives and promote well-being for all at all ages
- Goal 10: Reduce inequality within and among countries
- Goal 14: and Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

suggest how the goals can only be achieved by the study of collections of organisms. For example, goals 3 and 10 cover well-being and equality. When assessing the targets and indicators for these goals on a global scale, these characteristics must be measured at the level of populations of humans (often referred to as communities). Sustainable use of the oceans in goal 14 must be measured in terms of ocean ecosystems that cannot be separated from the populations of organisms that inhabit them. Through the SDGIO, the PCO offers the opportunity to apply population biology and community ecology theory to sustainability research through data annotation based on PCO terms.

REFERENCES

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