living planet symposium | BONN 23–27 May 2022

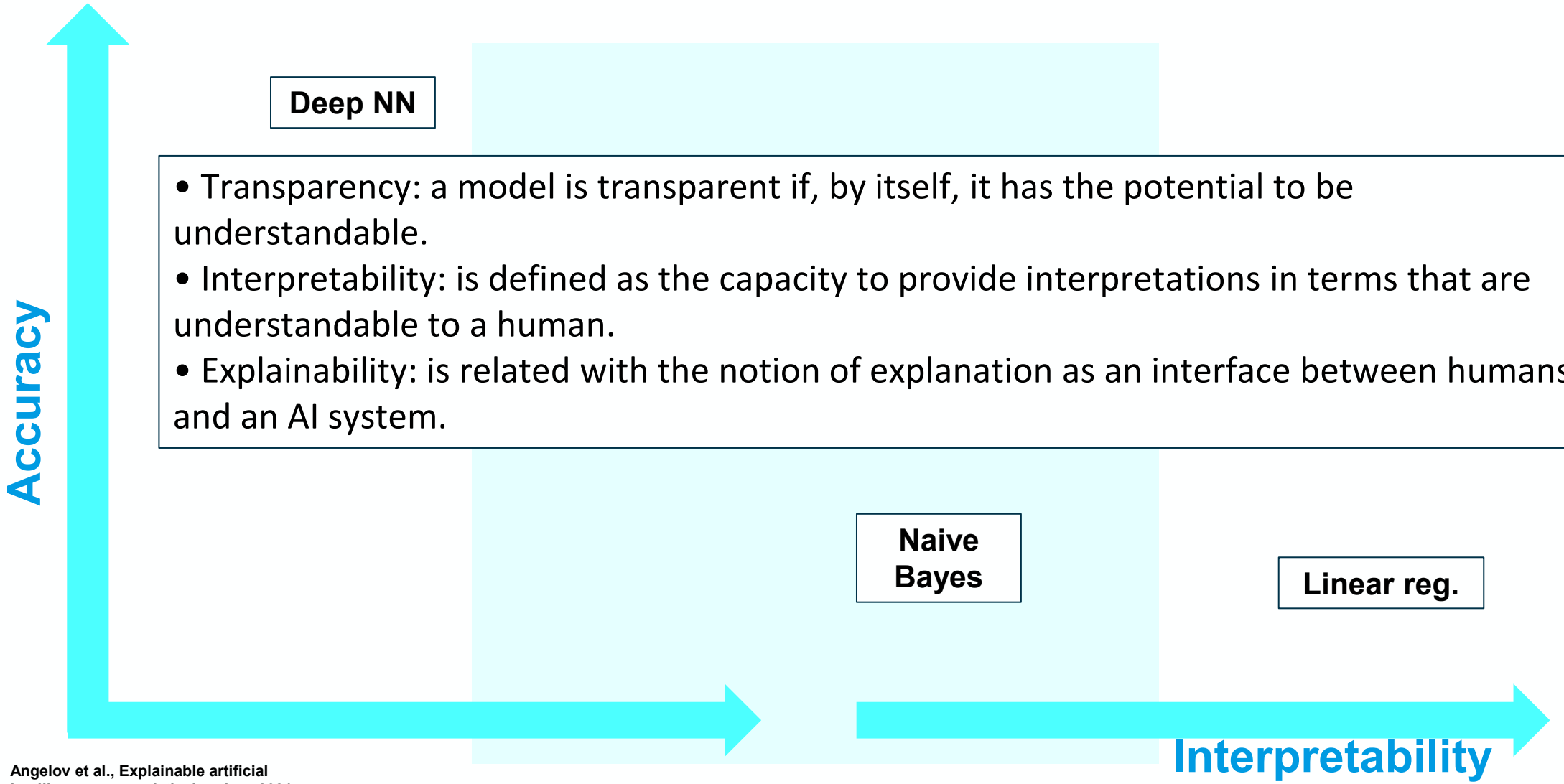
TAKING THE PULSE OF OUR PLANET FROM SPACE

Ecosystem Integrity from an Explainable Artificial Intelligence perspective

Dr. Miguel Equihua | Instituto de Ecología AC, México
Dr. Octavio Pérez-Maqueo | Instituto de Ecología AC, México
Julián Equihua | Helmholtz Centre for Environmental Research-UFZ, Germany

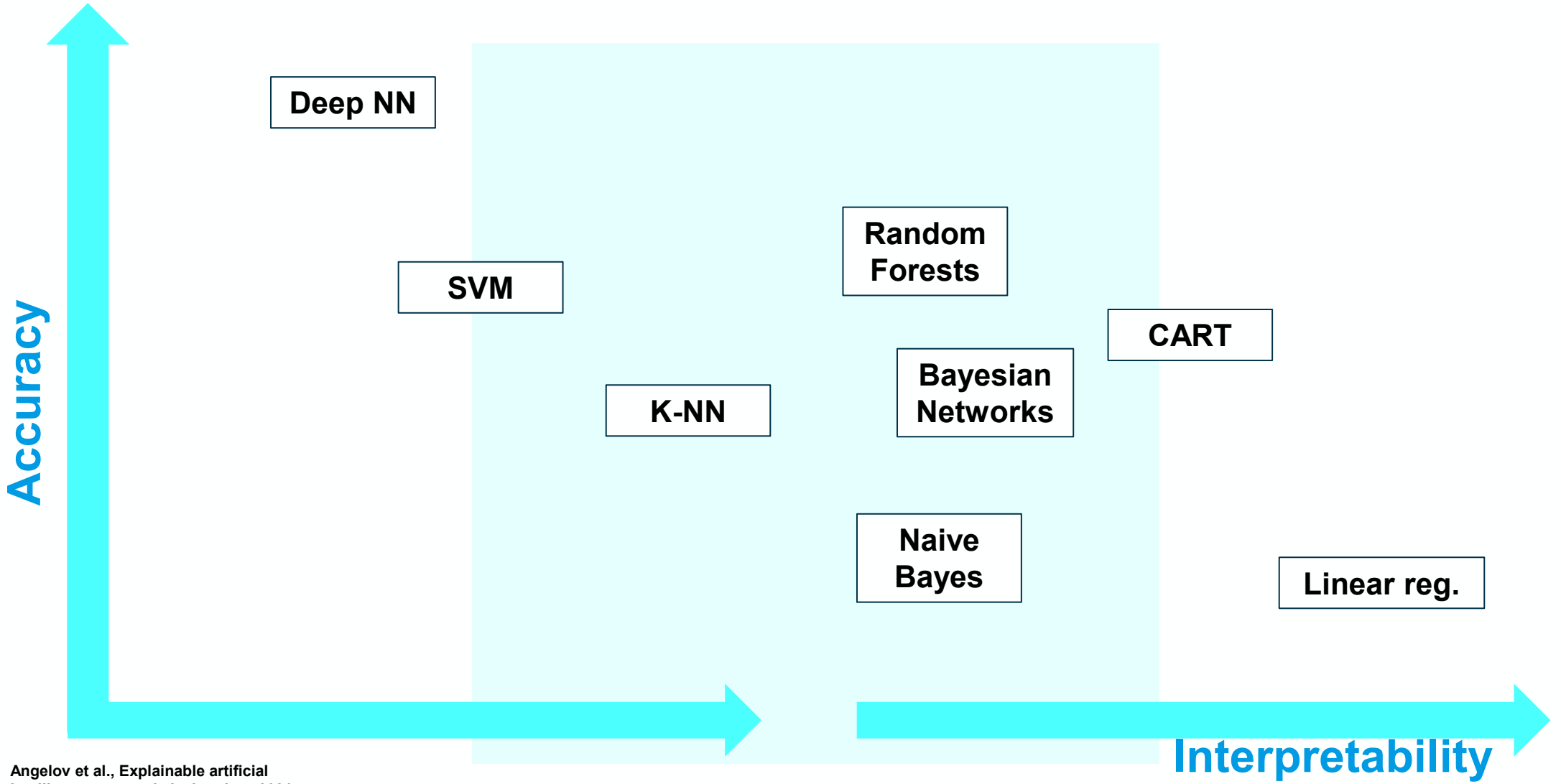
24.05.2022

Accuracy, explainability and interpretability



Angelov et al., Explainable artificial intelligence: an analytical review, 2021.

Accuracy, explainability and interpretability



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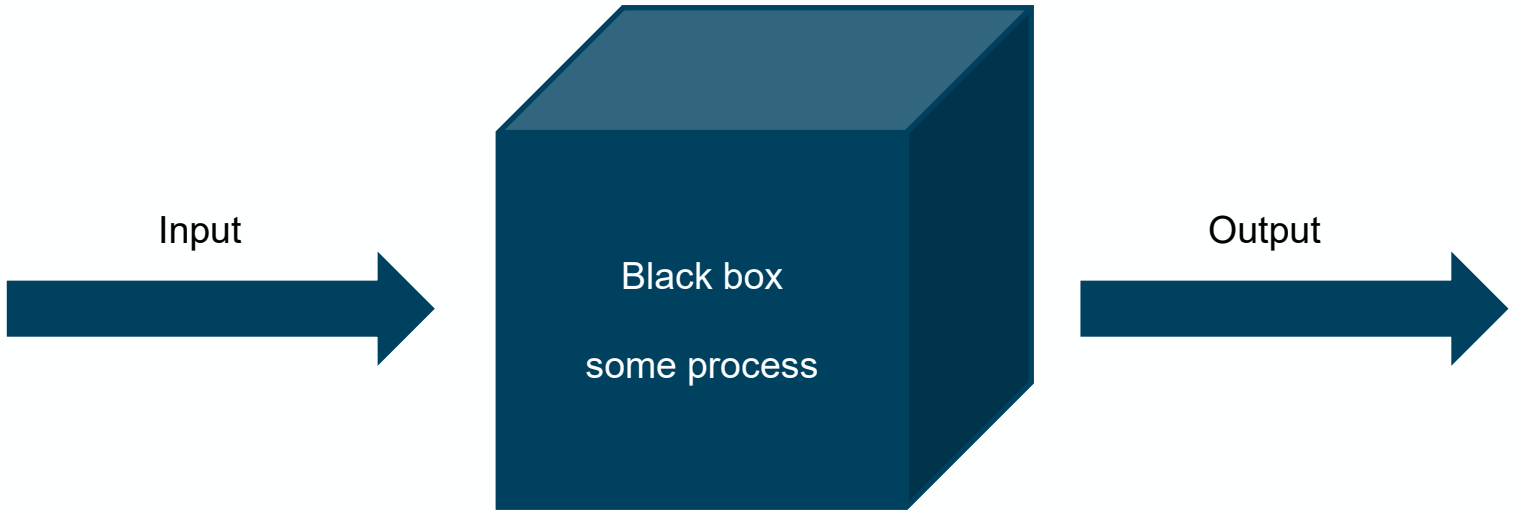
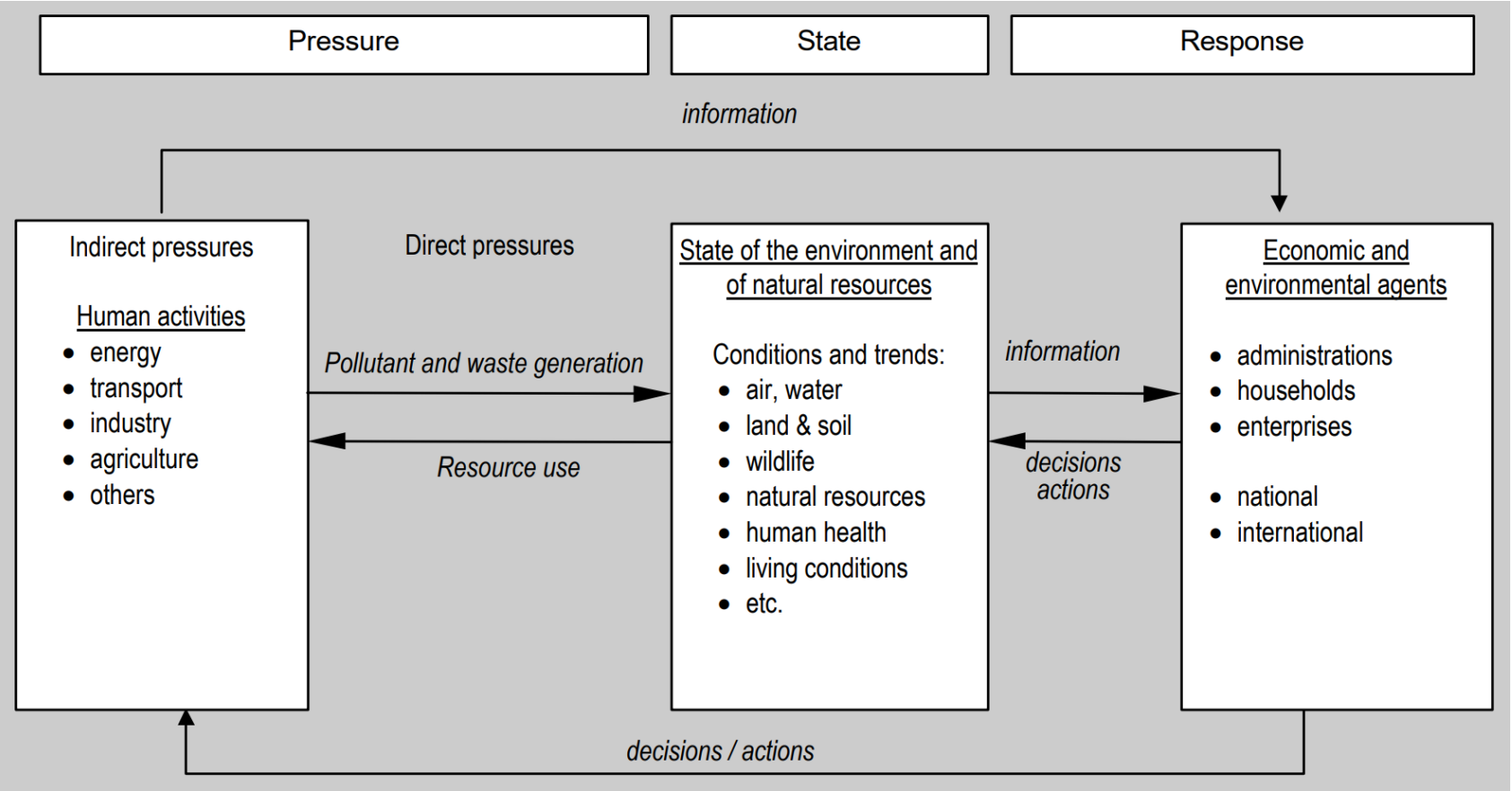


Stop Explaining Black Box Machine Learning Models for High Stakes Decisions and Use Interpretable Models Instead

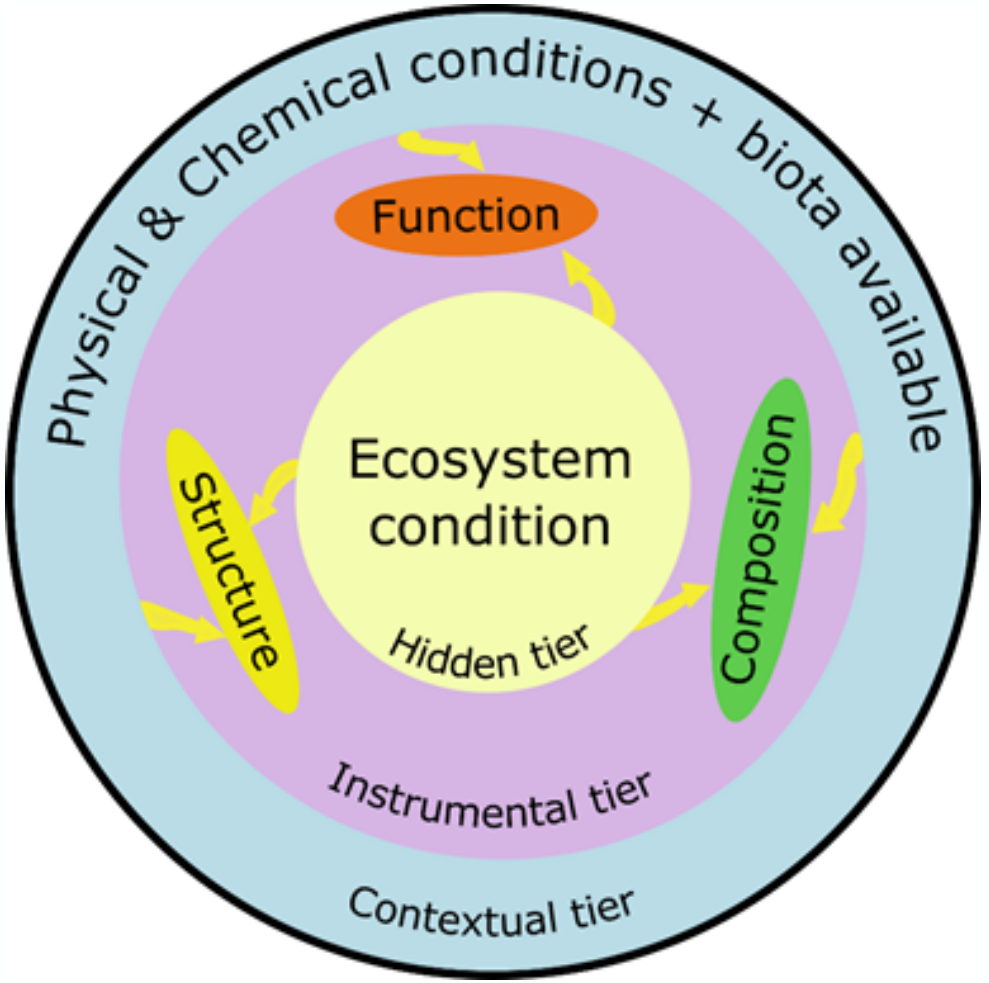
Cynthia Rudin
Duke University

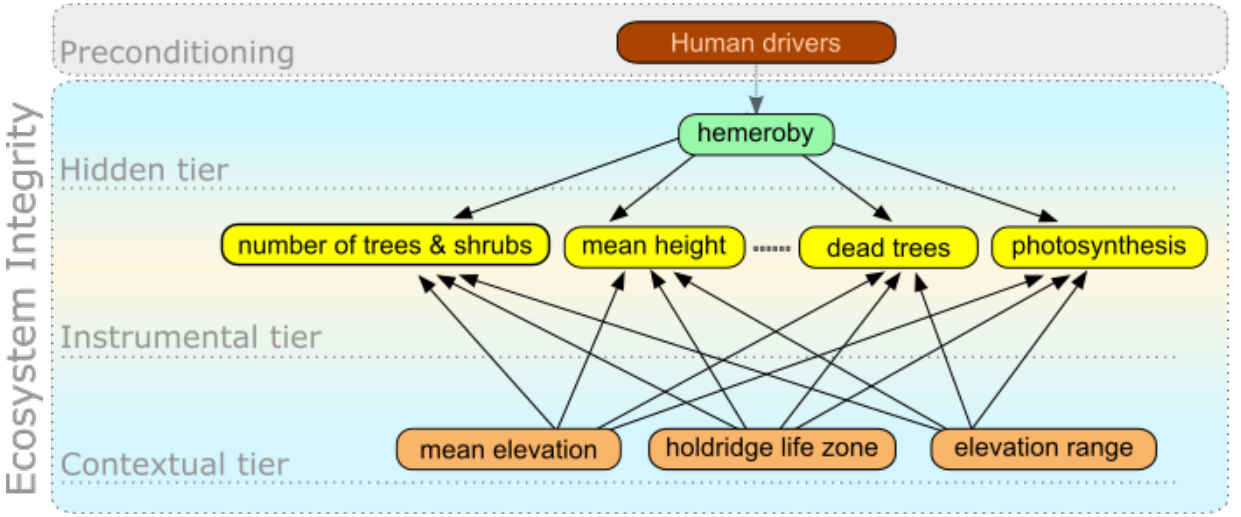
Sustainability is a high-stakes problem

Pressure, state, response models



Ecosystem integrity as a three tier DAG





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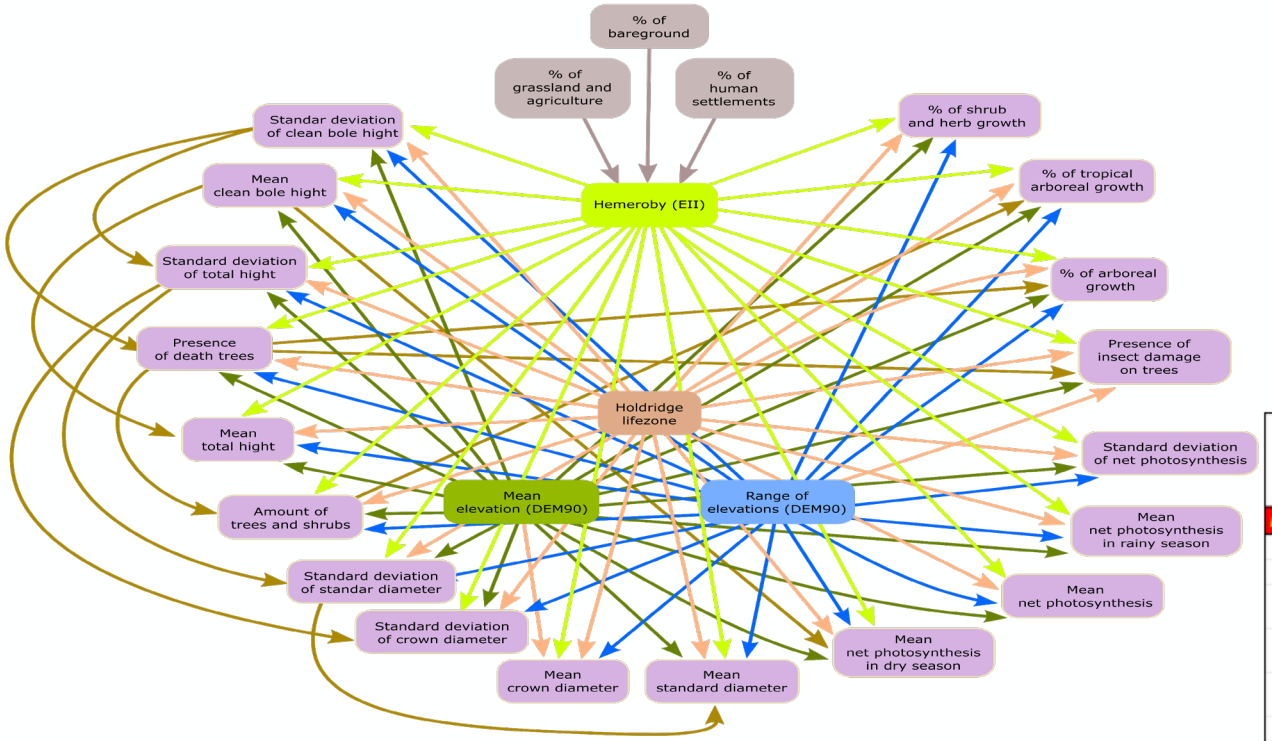
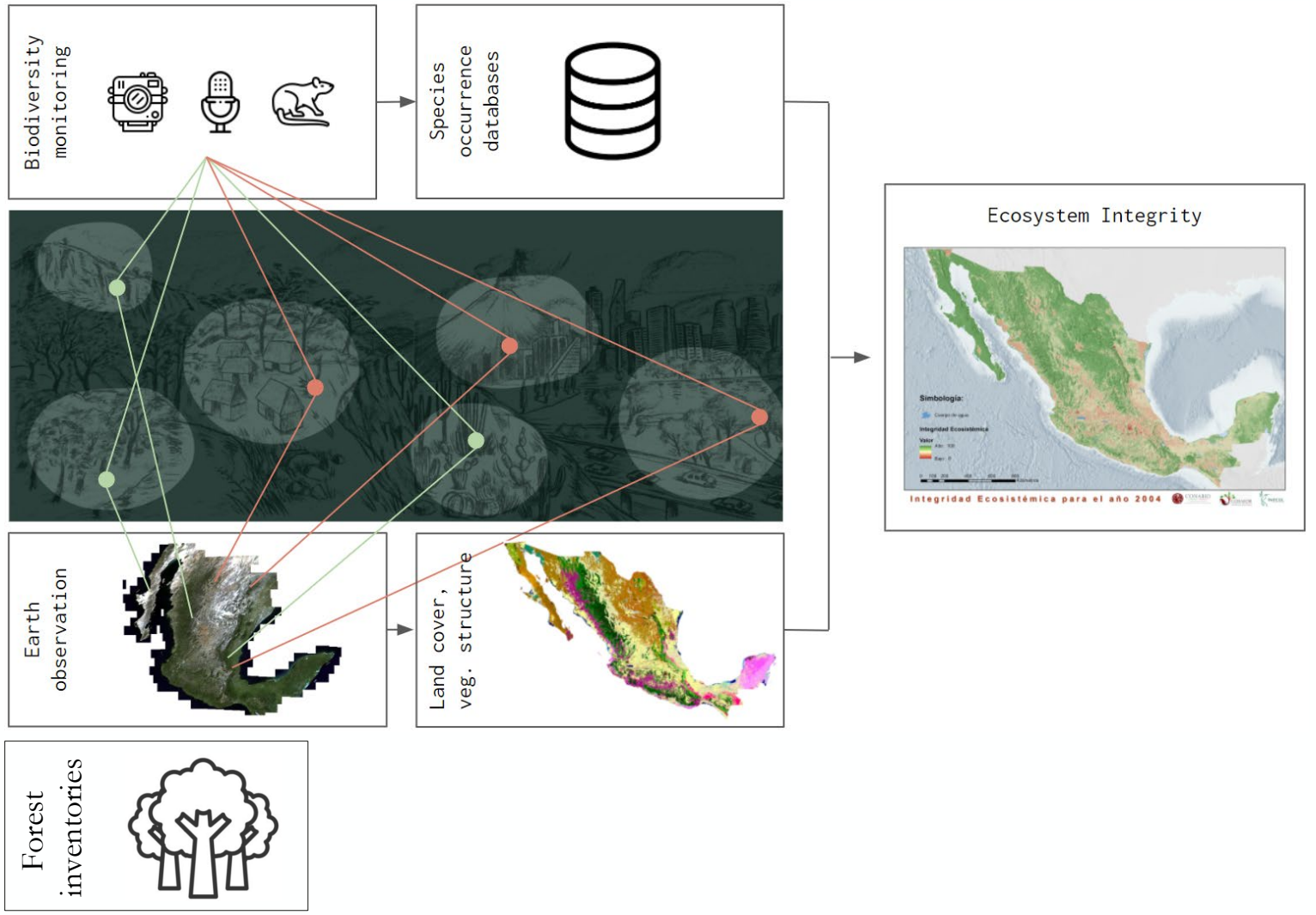


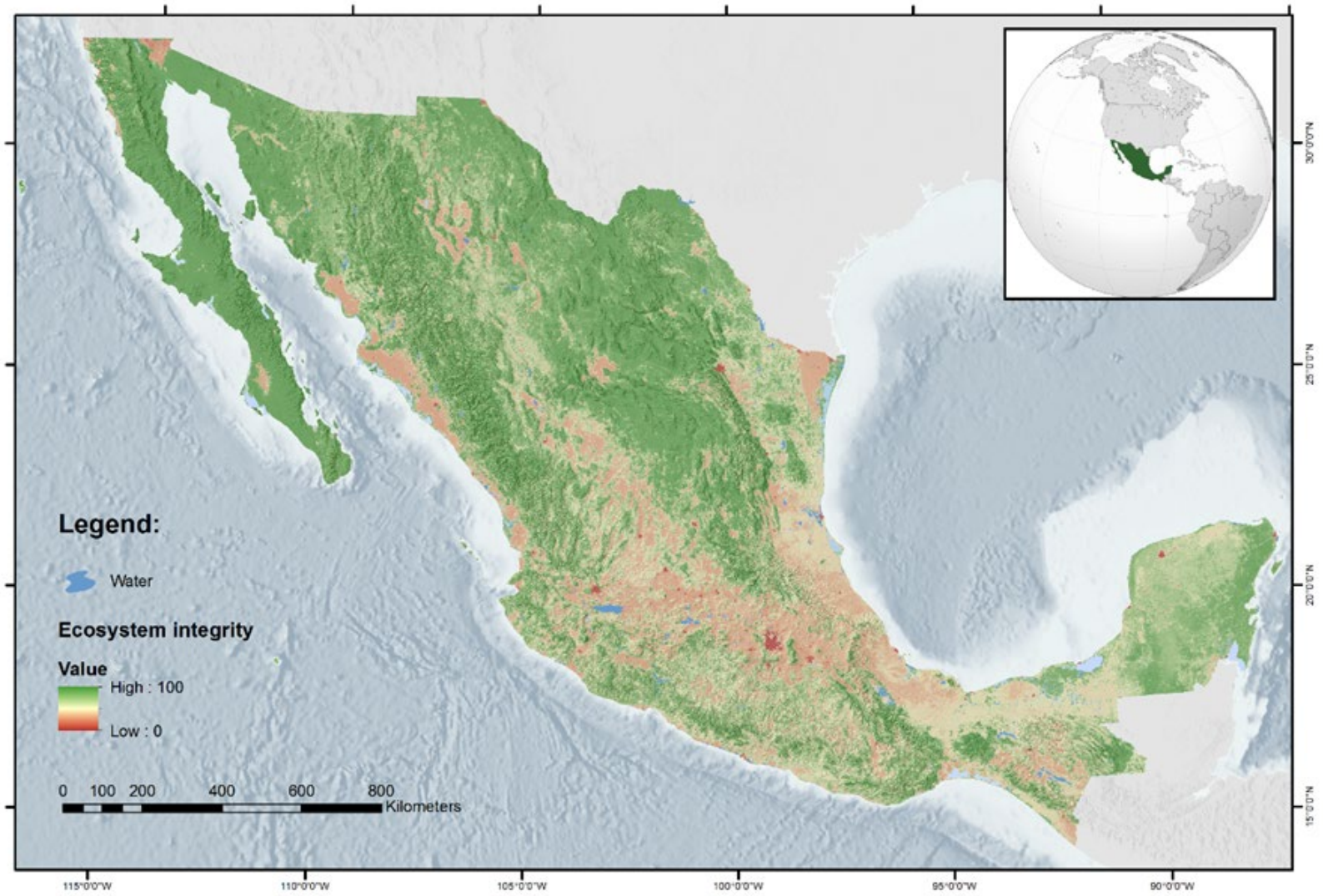
QUALITATIVE AMOUNT OF CHANGE FROM PRIMARY VEGETATION TO "CURRENT" LAND USE AND VEGETATION

DeltaP.V.	DESCRIPTION:	STATUS:
0	NO CHANGE OF VEGETATION OR PRIMARY STATE	STASIS
1	NO CHANGE IN PRIMARY STATE CONDITION, THE CHANGE IS IN VEGETATION TYPE BUT INSIDE THE SAME ECOVARIANT (e.g. FOREST, SHRUBLAN, GRASSLA	PSEUDOESTASIS
2	NO CHANGE IN PRIMARY STATE CONDITION, THE CHANGE IS IN VEGETATION TYPE TO ANOTHER ECOVARIANT BUT WITH INCREASE IN THE HEIGHT OF THE DOMINANT STRATUS (e.g. from SHRUBLAND to WOODLAND)	PSEUDOESTASIS
3	NO CHANGE IN PRIMARY STATE CONDITION, THE CHANGE IS IN VEGETATION TYPE TO ANOTHER ECOVARIANT BUT KEEPING THE HEIGHT OF THE DOMINANT STRATUS (e.g. FROM OAK FOREST TO TROPICAL DECIDUOUS FOREST)	PSEUDOESTASIS
4	NO CHANGE IN PRIMARY STATE CONDITION, THE CHANGE IS IN VEGETATION TYPE TO ANOTHER ECOVARIANT BUT DECREASING THE HEIGHT OF THE DOMINANT STRATUS (e.g. FROM SHRUBLAND TO GRASSLAND)	DEGRADATION
5	CHANGE FROM PRIMARY FORESTS TO ARBOREAL SECONDARY VEGETATION	DEGRADATION
6	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO INDUCED FOREST OR TREE PLANTATION	DEGRADATION
7	CHANGE FROM PRIMARY FORESTS, TROPICAL FORESTS, WOODLANDS OR SHRUBLANDS TO SHRUBBY SECONDARY VEGETATION	DEGRADATION
8	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO SAVANNA VEGETATION	DEGRADATION
9	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO HERBCEOUS SECONDARY VEGETATION	DEGRADATION
10	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO INDUCED PALM GROVE, OR INDUCED OR CULATIVATED PASTURE	DEGRADATION
11	CHANGE FROM NATURAL BODY OF WATER TO AQUACULTURAL USE	DEGRADATION
12	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO RAINFED AGRICULTURE	DEGRADATION
13	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO IRRIGATION AGRICULTURE	DEGRADATION
14	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO HUMIDITY AGRICULTURE	DEGRADATION
15	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO BODY OF WATER	DEGRADATION
16	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO BARE SOIL	DEGRADATION
17	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO HUMAN SETTLEMENTS OR IMPERILOUS SURFACES	DEGRADATION
18	CHANGE FROM ANY KIND OF PRIMARY VEGETATION TO URBAN ZONE OR IMPERILOUS SURFACE	DEGRADATION
-9999	NO DATA	~

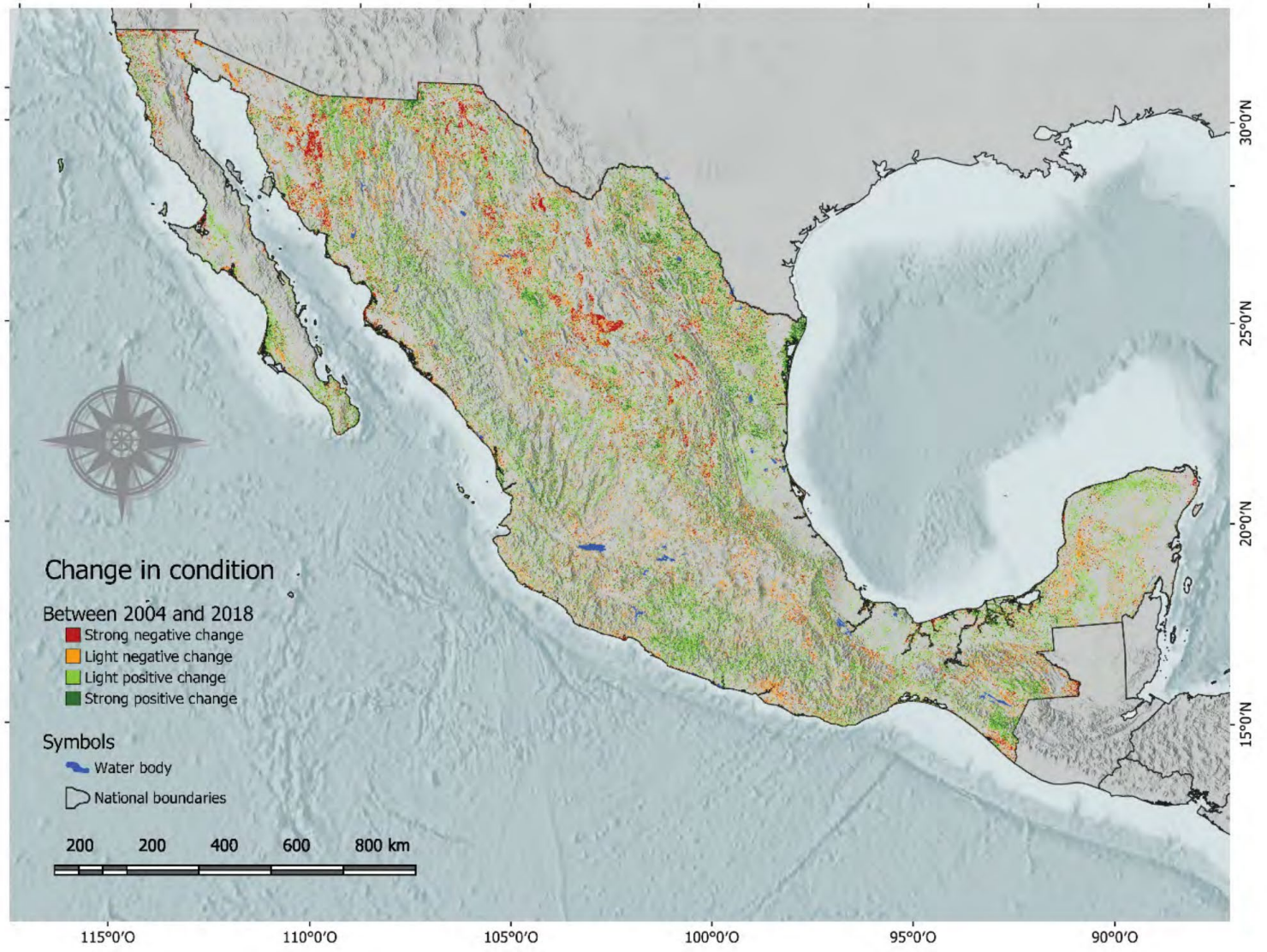
Data integration for ecosystem assessment



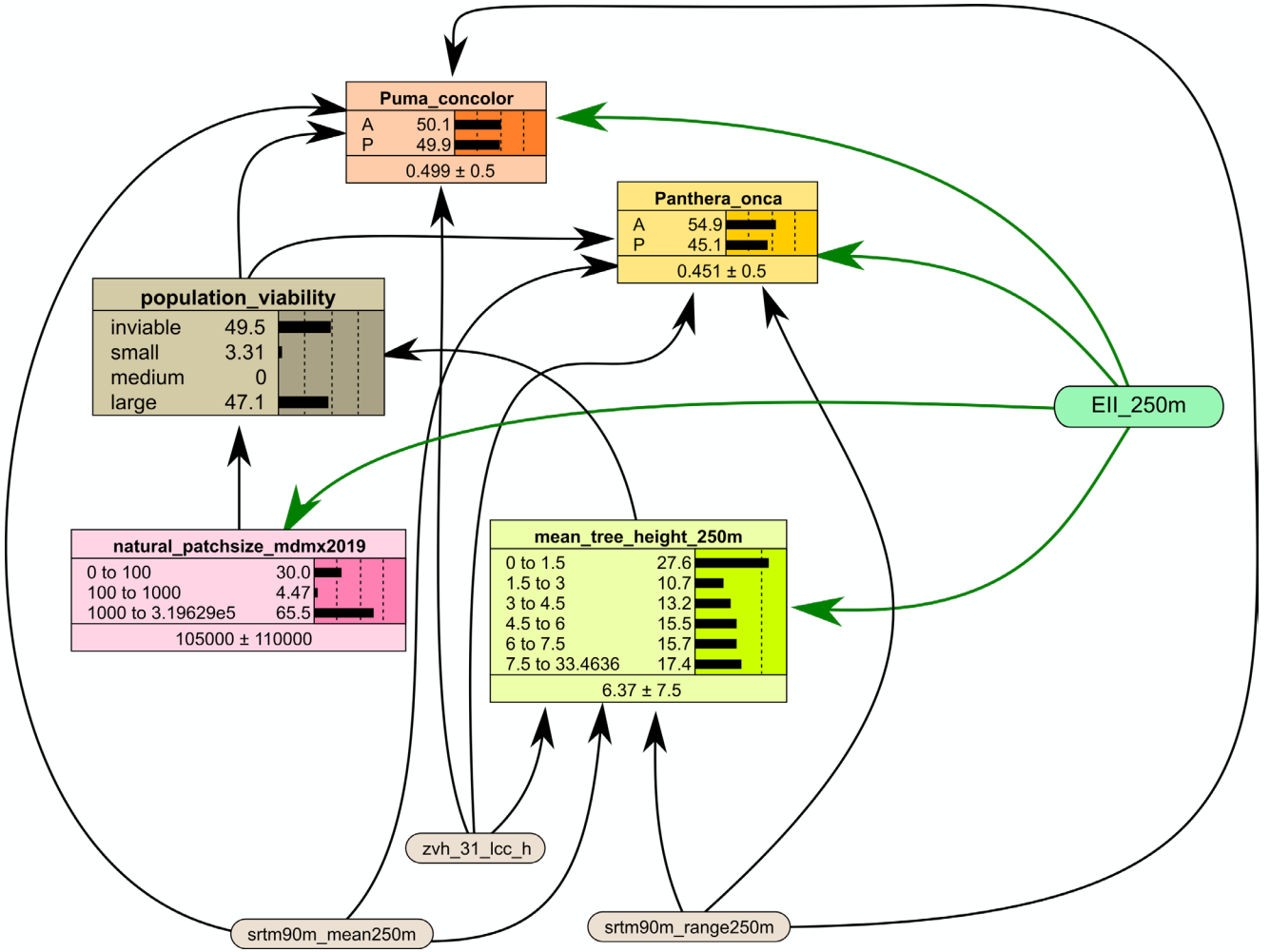
The mexican experience



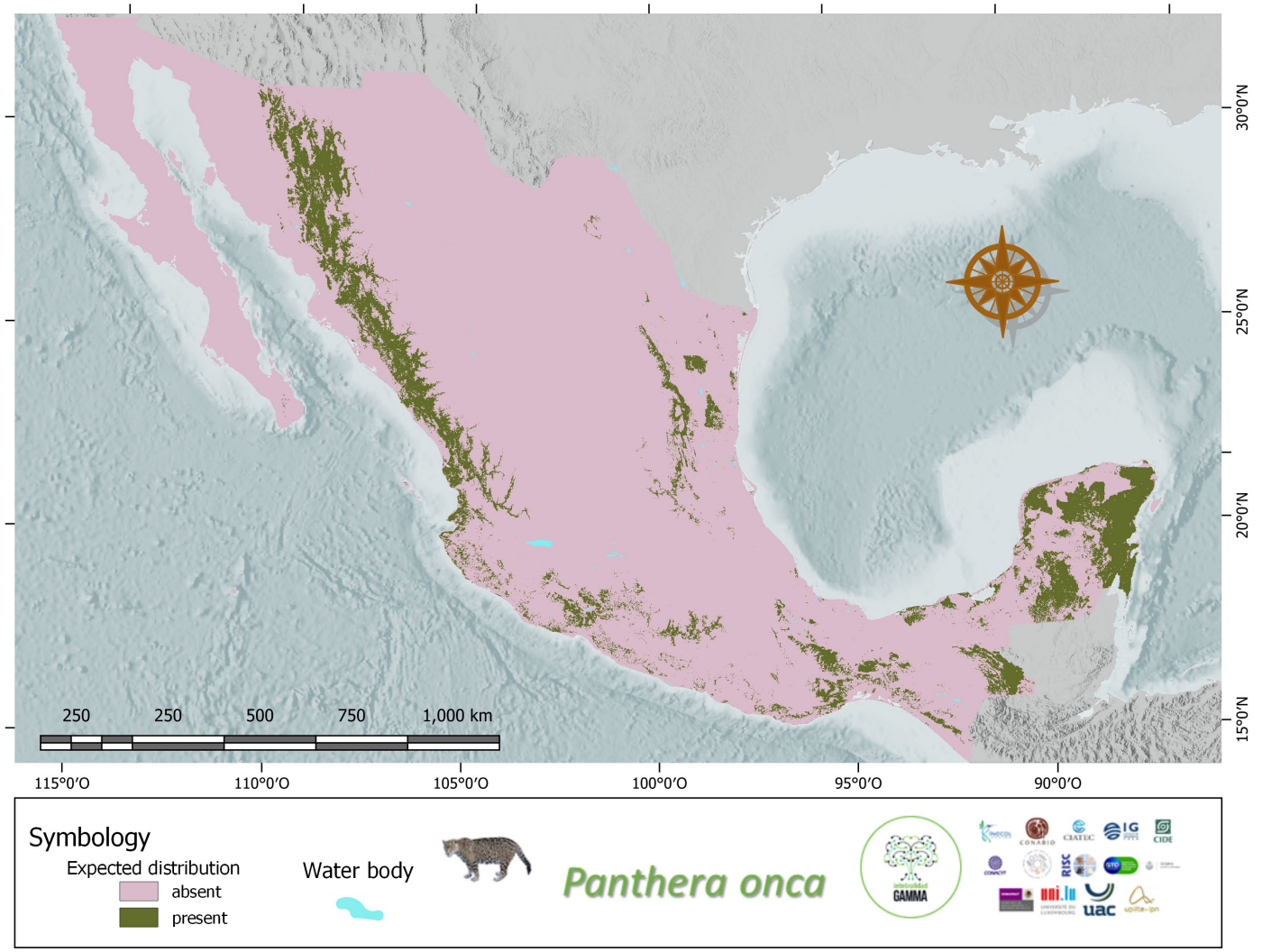
The mexican experience



Fauna and data centric machine learning

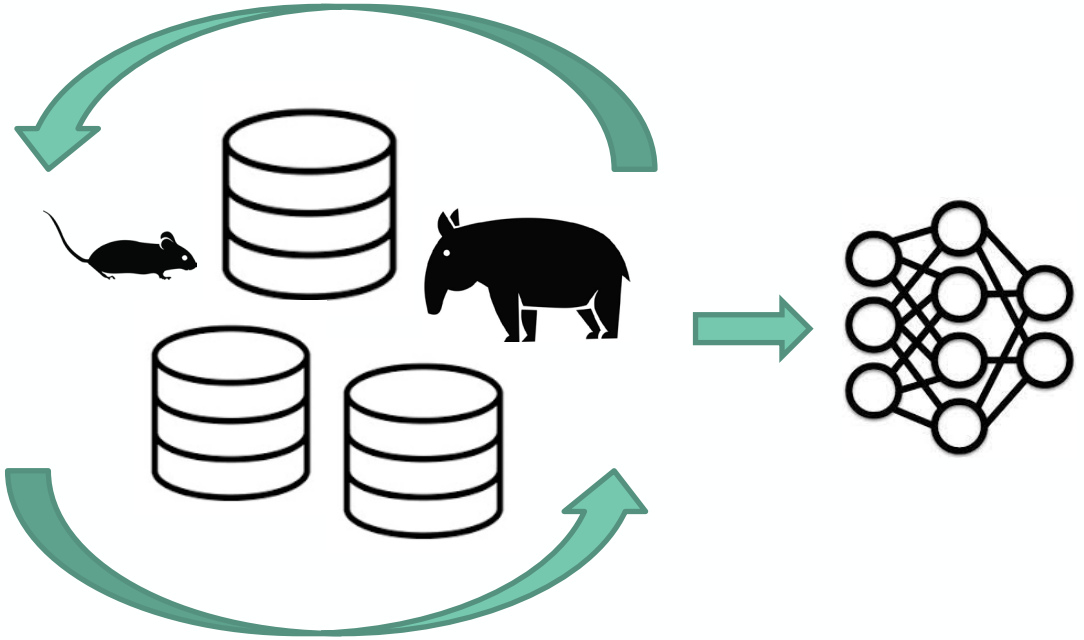


Fauna and data centric machine learning



Fauna and data centric machine learning

Data centric ML



Model centric ML