



# BIOSCAN

**Revealing Species, their Dynamics, and Interactions**

Over 1000 researchers  
representing more than  
40 countries are using  
DNA-based technologies  
and biodiversity analysis  
to save our living planet



Convention on  
Biological Diversity

International  
BARCODE  
OF LIFE



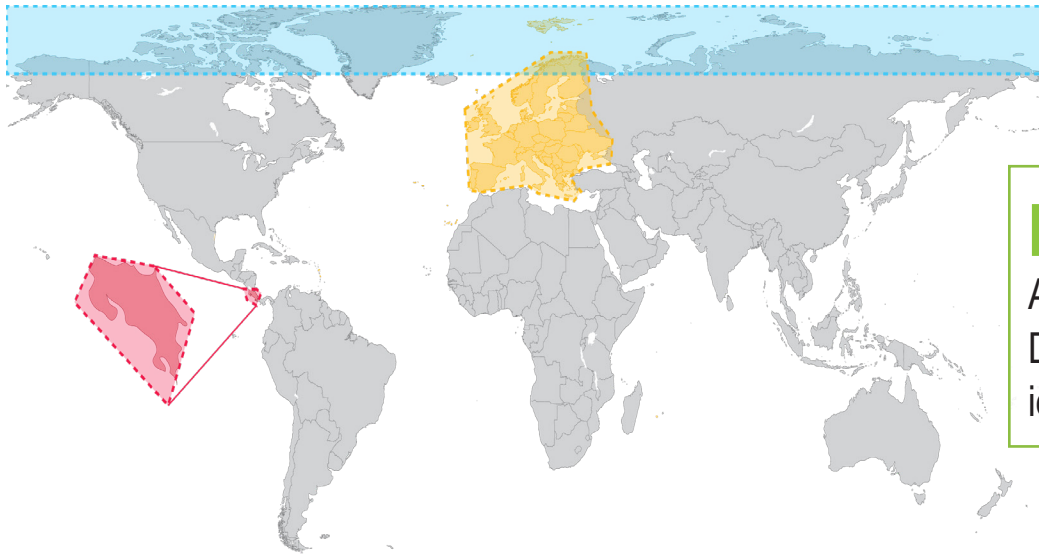


# Species Discovery

## 10 million specimens

DNA barcoding has been aiding specimen identification and species discovery for 15 years, but millions of species await analysis. BIOSCAN will use new protocols and new sequencing platforms to speed the pace of analysis and to lower costs. It will analyze 10 million specimens gathered from freshwater, marine, and terrestrial ecosystems around the world.

In addition, three regions with contrasting biodiversity, from 10,000 to one million species, will receive special attention. They will be targeted as model systems for the development of all-taxon DNA barcode libraries.



## DNA barcode

A short standardized segment of DNA used to reveal the species identity of a specimen.

**Arctic =  $10^4$**     **Europe =  $10^5$**     **Costa Rica =  $10^6$**

## Vision:

Assemble a DNA barcode reference library with records for each of the 20+ million species of multicellular organisms which share our planet.



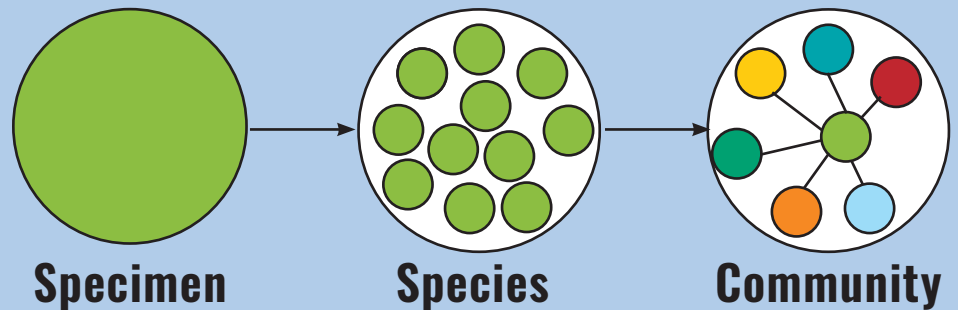
# Species Interactions

## 1 million specimens

Species interactions are central to the functioning of biological systems, but most remain unknown. DNA analysis shifts the situation; it can reveal interactions that would otherwise be invisible.

Sequence characterization of the amplicon pool generated through the use of taxonomically targeted primer sets on the DNA extract from a single specimen can disclose its commensals, mutualists, parasites, and parasitoids. This is the symbiome of an individual.

By analyzing multiple individuals, the species symbiome is detailed, while the community symbiome is revealed when analysis examines all species in an ecosystem. BIOSCAN will examine the symbiomes of one million insect specimens from sites around the world.



## Symbiome

A complex biotic community characterized by distinctive microbial, fungal, plant, and animal species associated with a host organism.

## Vision:

Detail the nature and intensity of interactions among all species to clarify their role in structuring biological communities.

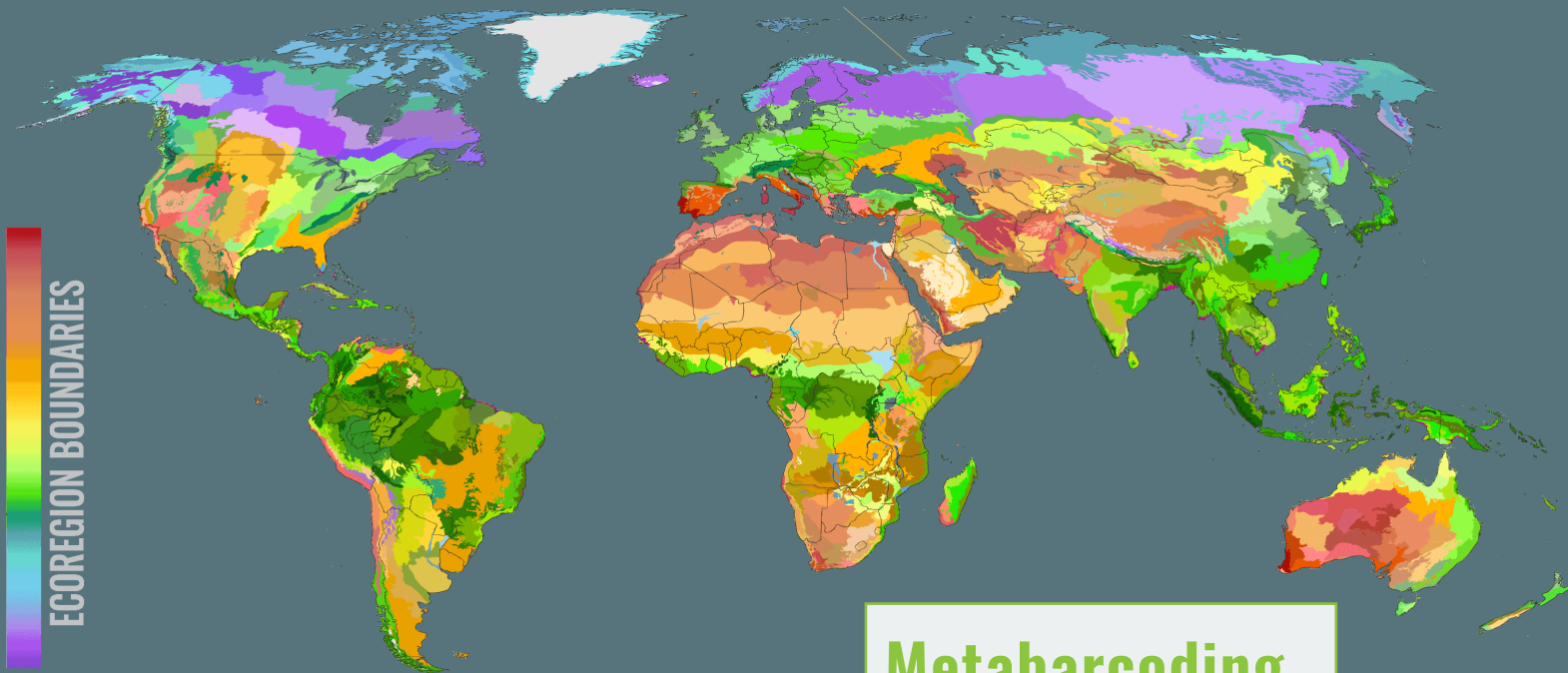
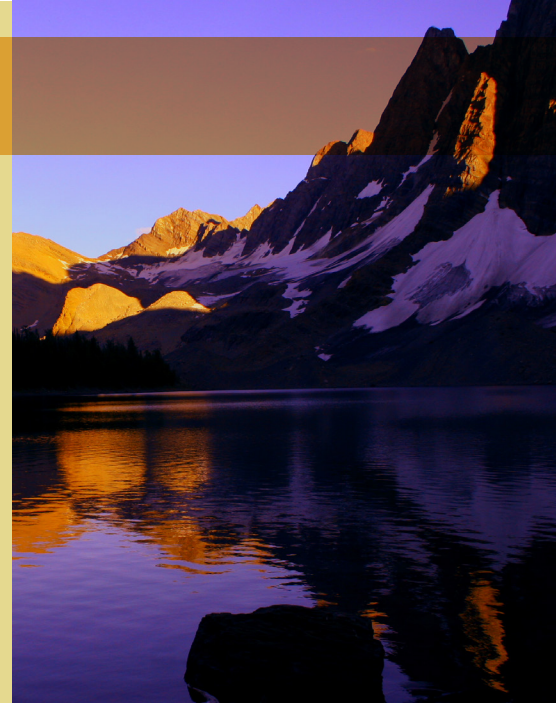


# Species Dynamics

## 100,000 bulk samples

In a wild world, the curation of biodiversity would be unnecessary, but 70% of our planet's land surface is now heavily impacted by human activity. Although biodiversity is unquestionably in retreat, current monitoring programs provide sparse insights into the shifting distributions and abundances of the millions of multicellular species.

BIOSCAN will employ metabarcoding to lay the foundation for a global biosurveillance system. It will examine the species composition of 100,000 bulk samples from sites around our planet to begin the task of compiling comprehensive biodiversity baselines.



## Metabarcoding

A technique which employs PCR amplification of the barcode region in DNA extracts from bulk samples to rapidly assess species composition.

## Vision:

Establish a DNA-based observation system that tracks the shifting distributions and abundances of species on a planetary scale.



# ILLUMINATE BIODIVERSITY

**BIOSCAN will revolutionize our understanding of biodiversity  
and our capacity to manage it**

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