An underwater photograph showing a large, dense school of small, silvery fish swimming in clear blue water. In the background, there are large, green and brown seaweed or kelp fronds. The scene is illuminated by natural light, creating a serene and vibrant marine environment.

The path to standardization and widespread adoption of **environmental DNA** technologies for biodiversity assessment

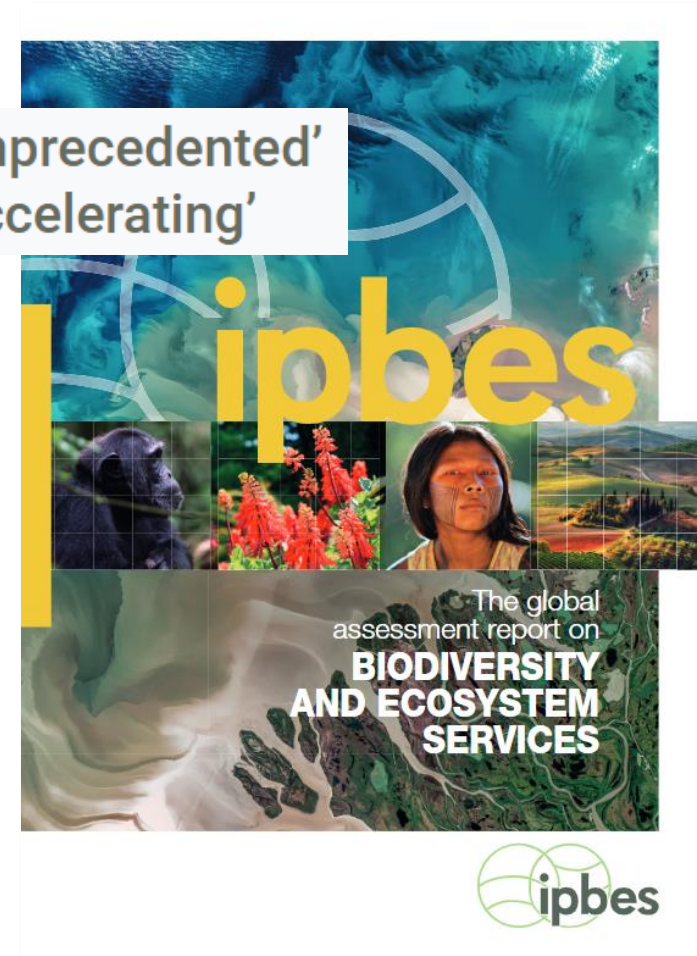
Beverly McClenaghan
Oceanology International
March 12th, 2024

Nature's Dangerous Decline 'Unprecedented'
Species Extinction Rates 'Accelerating'

High Demand for Biodiversity Data



**WILDLIFE POPULATIONS
PLUMMET BY 69%**



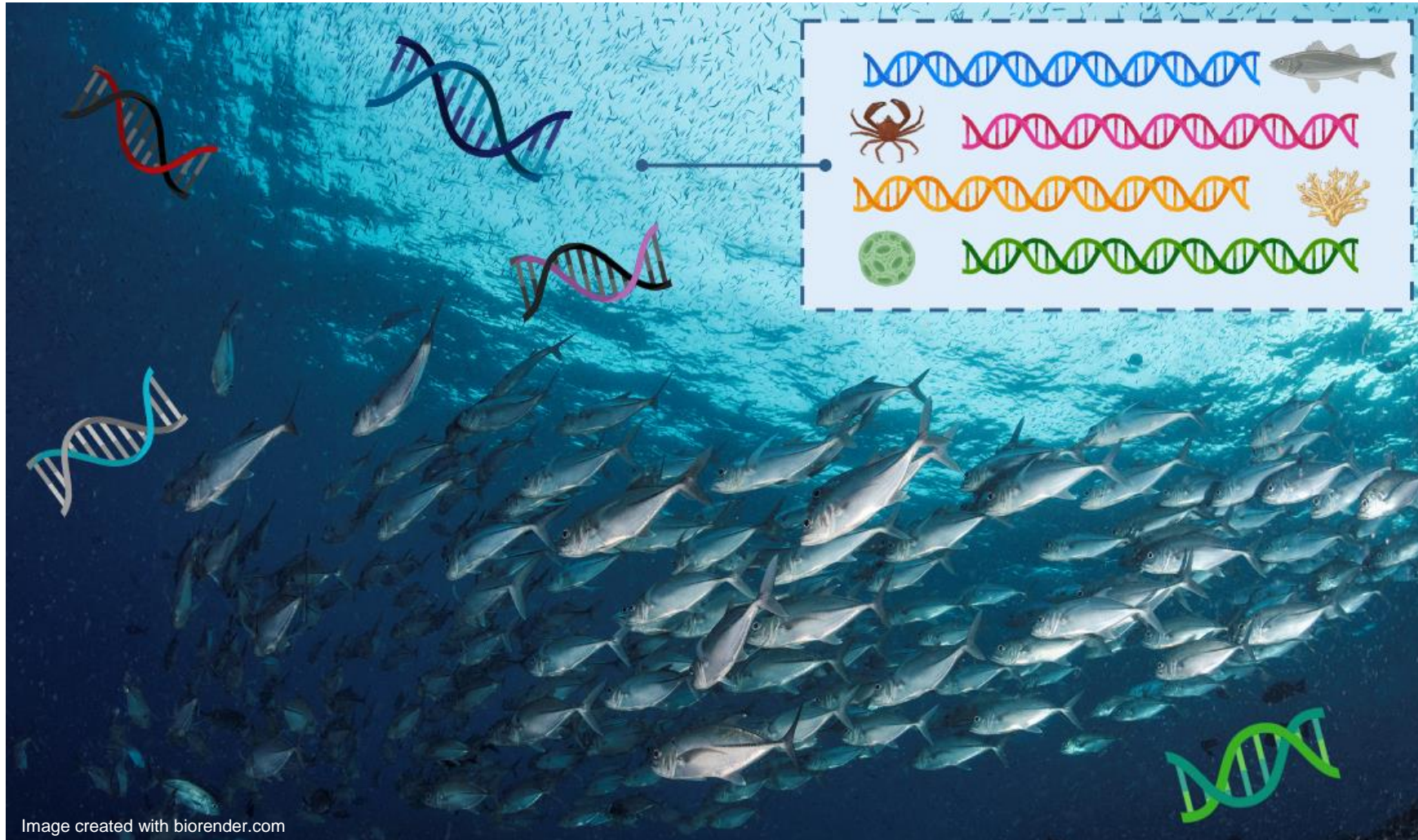
KUNMING-MONTREAL GLOBAL BIODIVERSITY FRAMEWORK

High Demand for Biodiversity Data

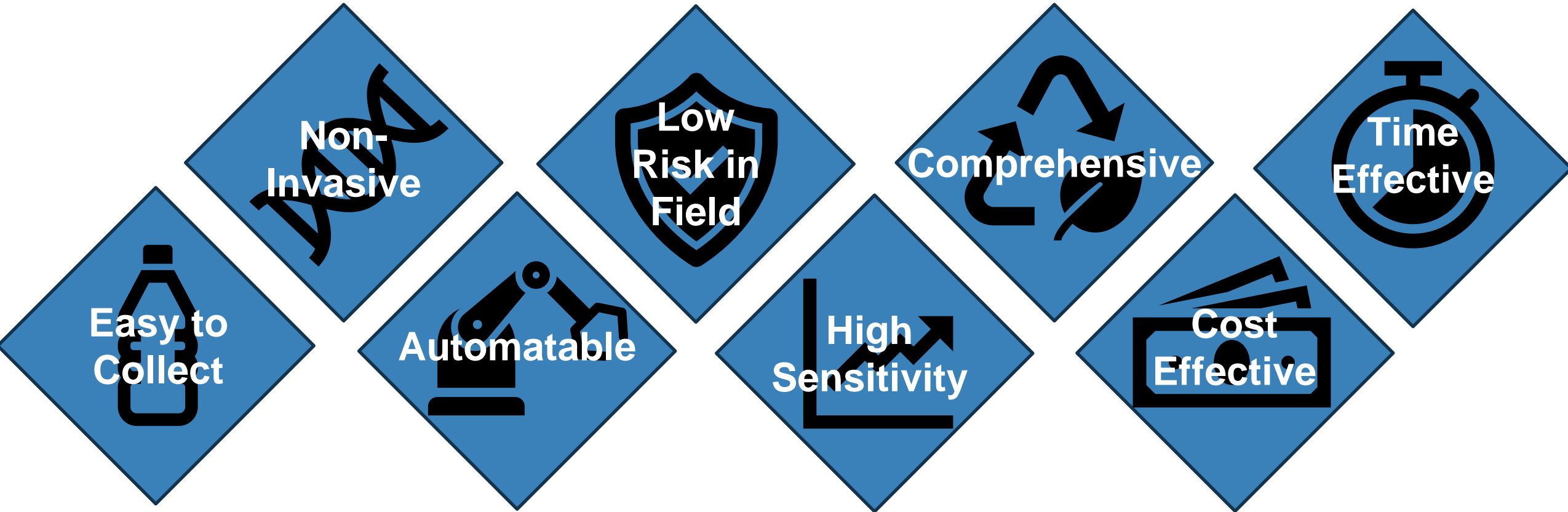


Taskforce on Nature-related
Financial Disclosures

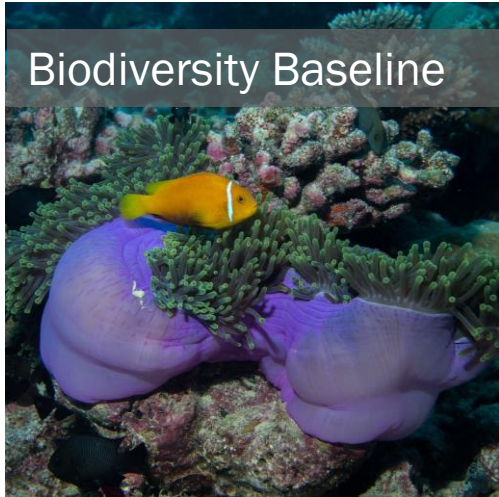
Measuring biodiversity with eDNA



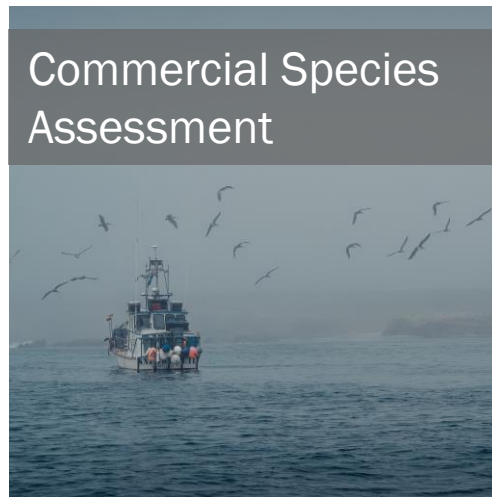
eDNA enables large-scale biodiversity measurement



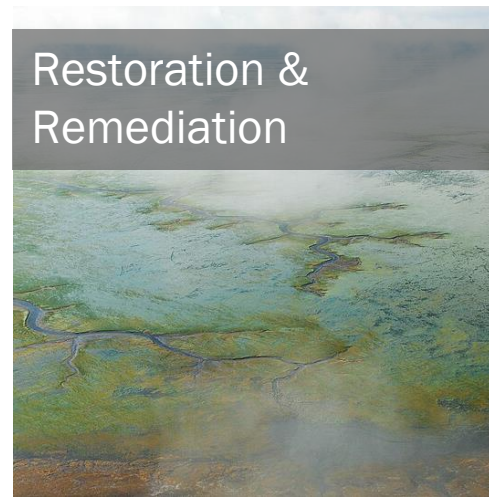
Biodiversity Baseline



Commercial Species Assessment



Restoration & Remediation



Impact Monitoring



Community-Based Monitoring



Ecosystem Health



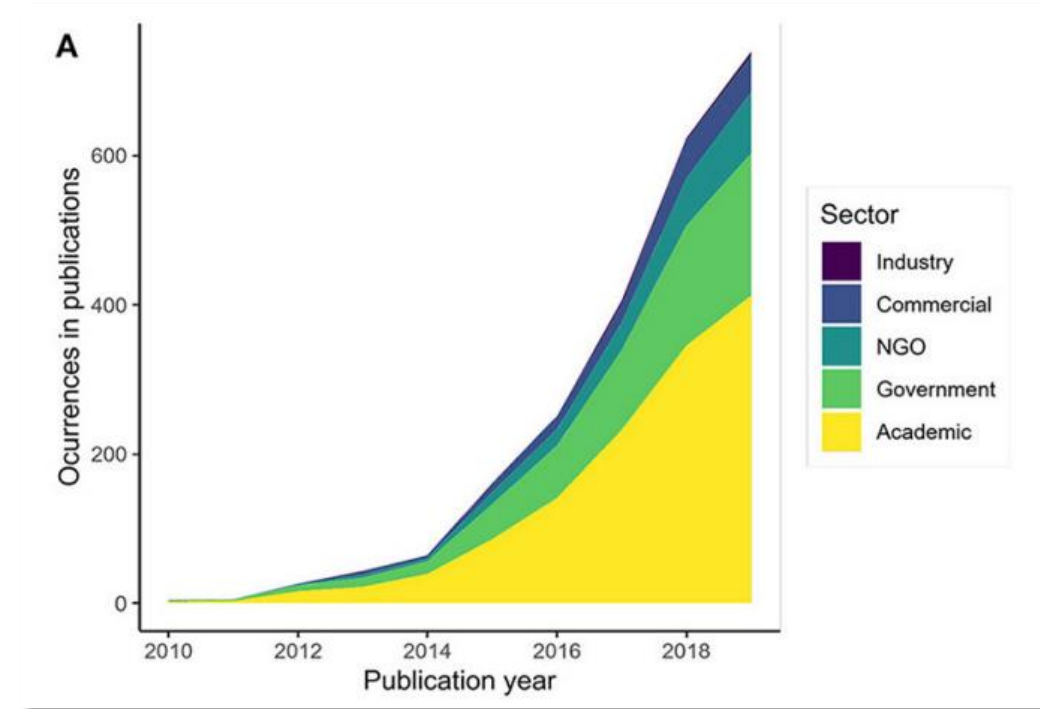
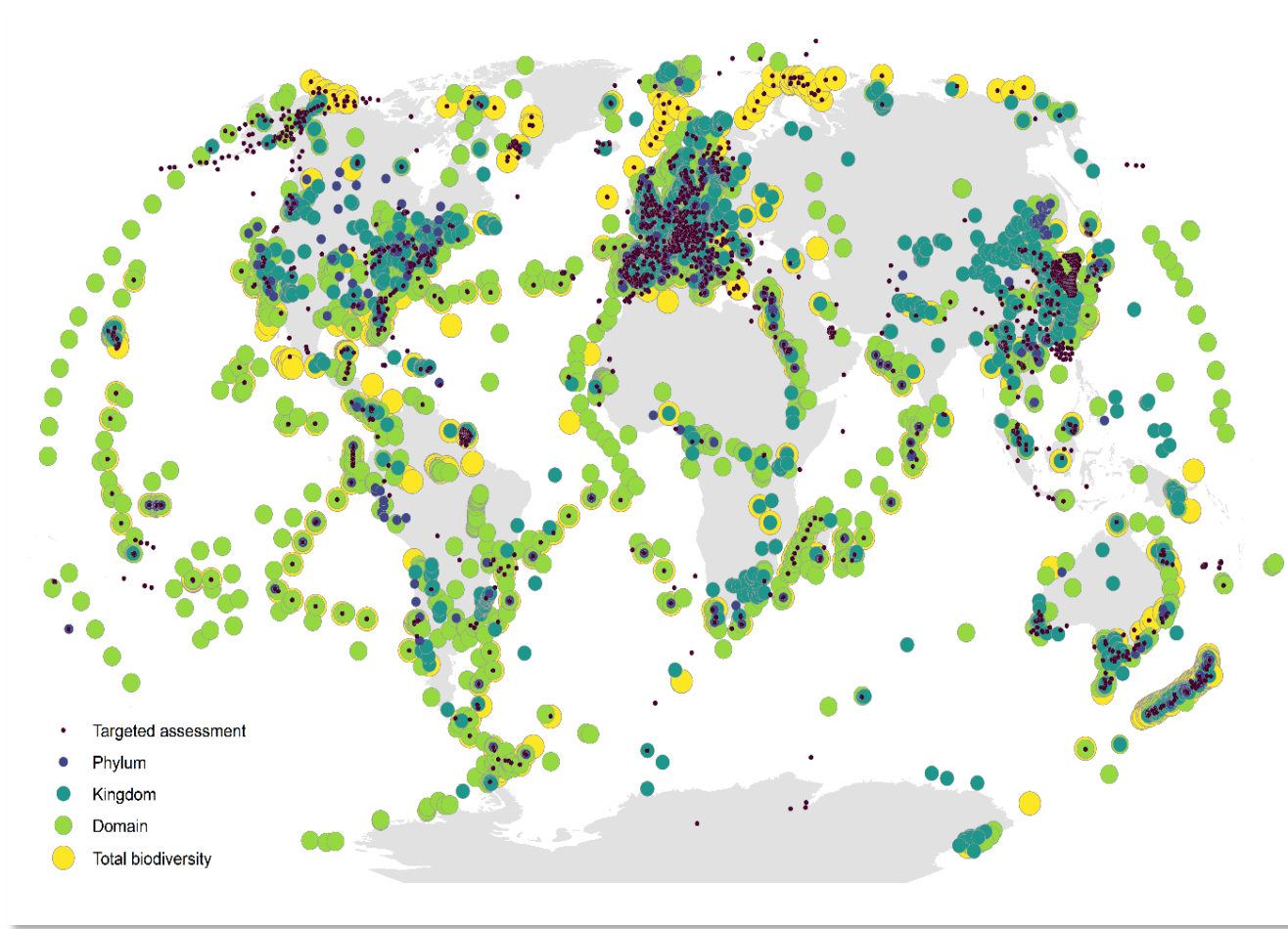
Rare & Endangered Species Monitoring



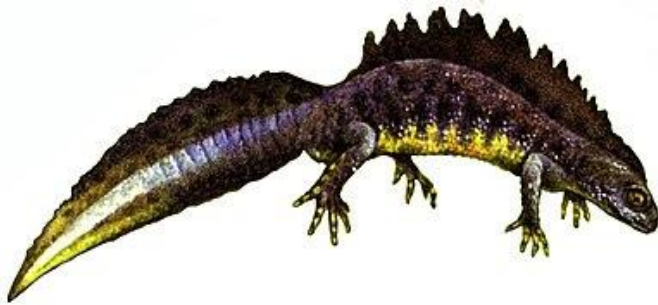
Invasive & Harmful Species Monitoring



Towards widespread adoption of eDNA



Making eDNA legally recognized



Guidance

Great crested newts: protection and licences

What you must do to avoid harming great crested newts and when you'll need a licence.

ALERT!
This Water Contains:
ASIAN CARP

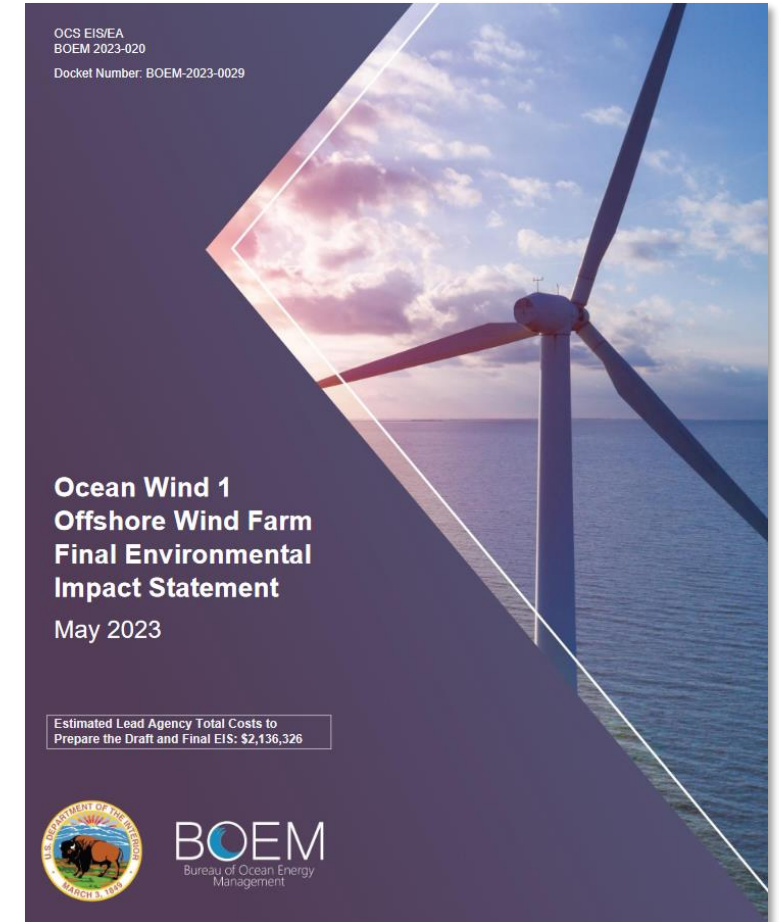
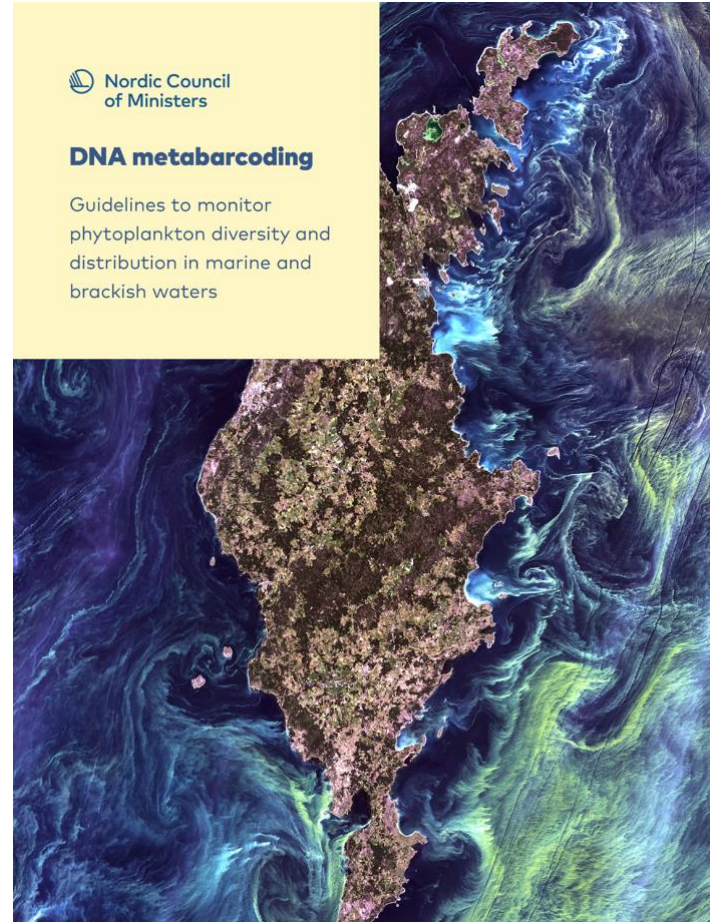


It is illegal to possess and transport this species alive (KAR 115-18-10)

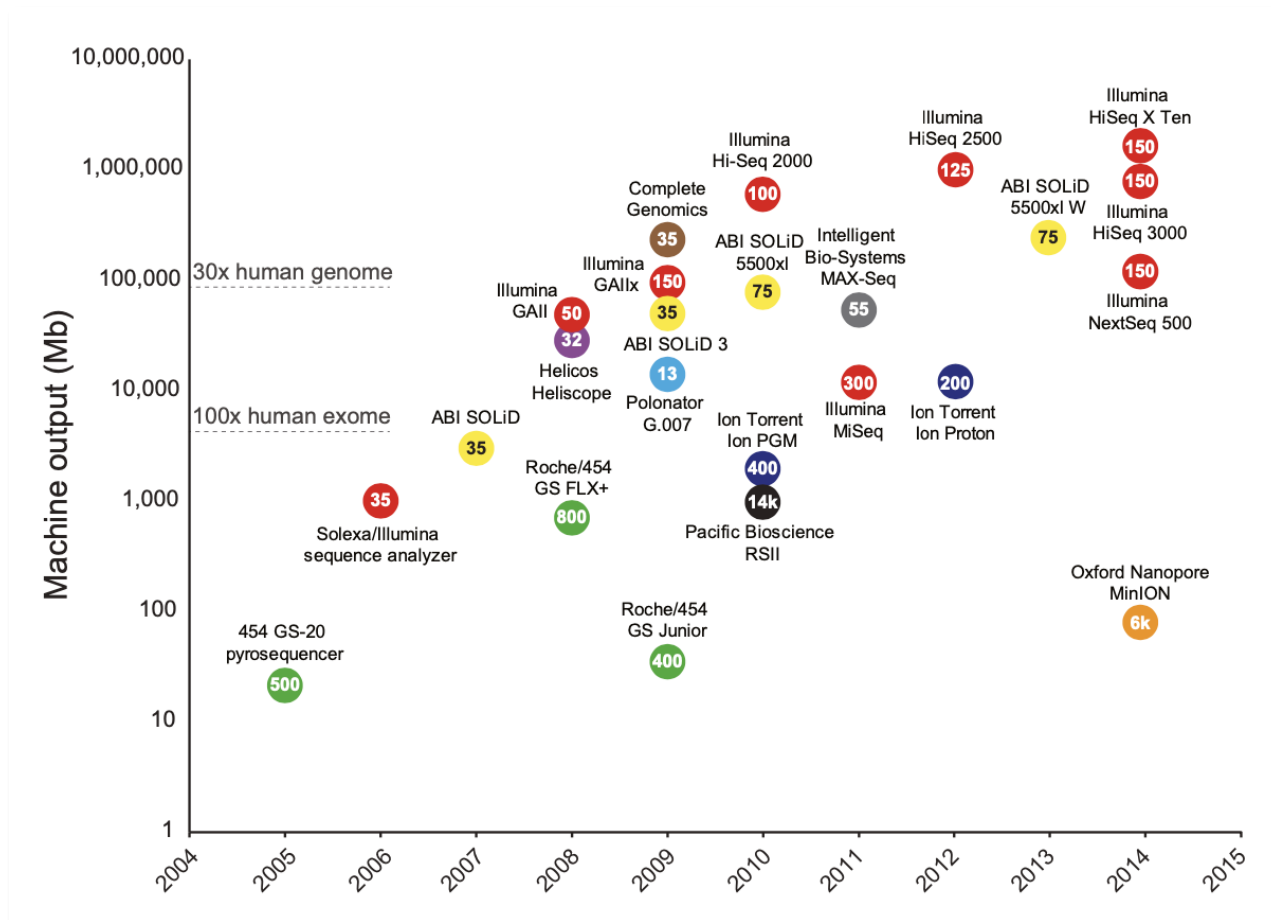
Before Leaving:

- Drain all water from equipment. (boat, livewell, bait bucket, bilge, duck decoys, etc.)
- Inspect equipment and remove any visible mud, plants, or animals.
- Dispose of unwanted bait and other animals or plants in the trash or on dry ground.

eDNA in a regulatory context



Standardizing eDNA technologies



A pile of pipelines: an overview of the bioinformatics software for metabarcoding data analyses

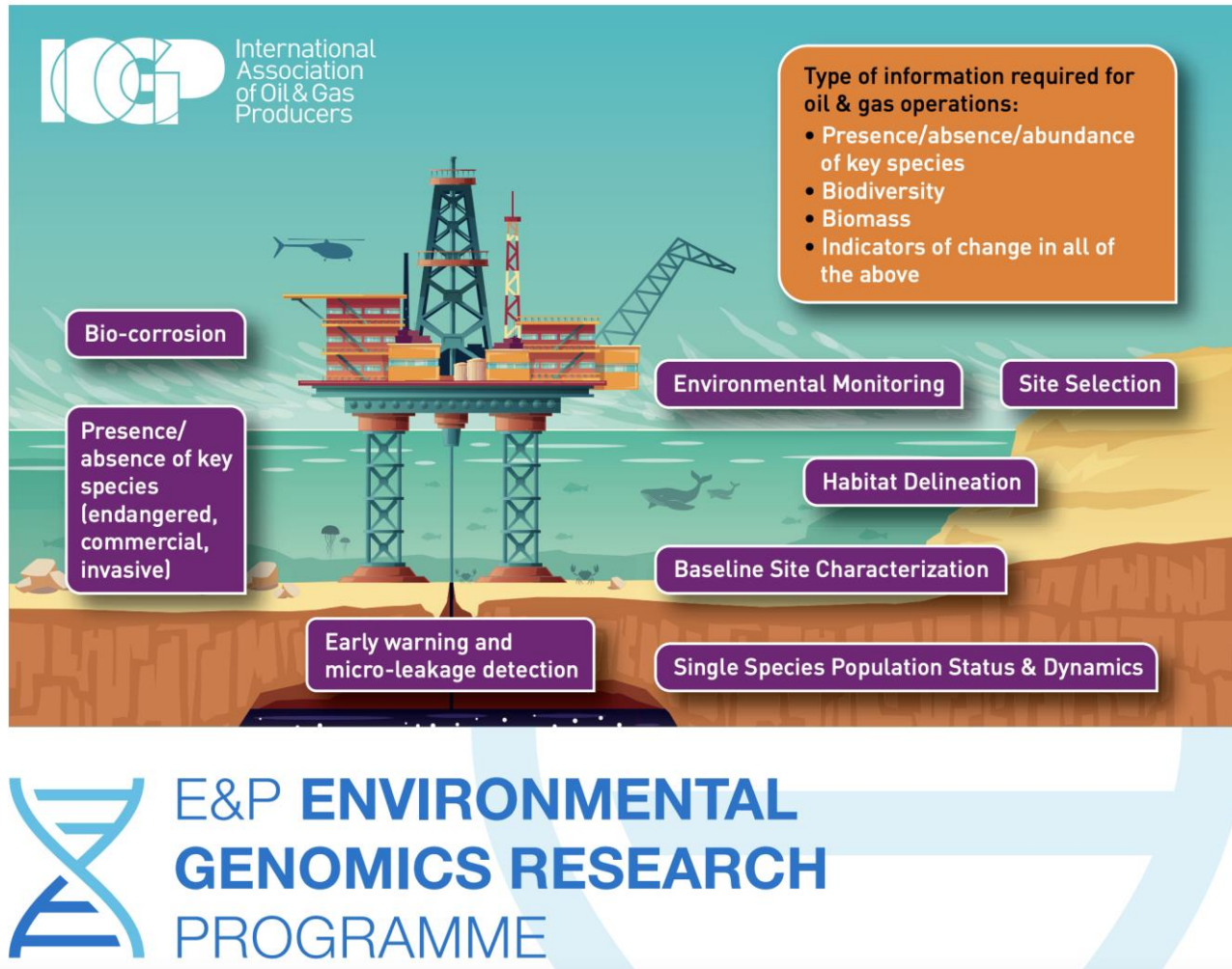
AMPLICON DATA ANALYSIS BIOINFORMATICS ENVIRONMENTAL DNA METABARCODING PIPELINE

REVIEW

Ali Hakimzadeh , Alejandro Abdala Asbun, Davide Albanese, Maria Bernard, Dominik Buchner, Benjamin Callahan, Gregory Caporaso , Emily Curd, Christophe DJEMIEL , Mikael Brandström Durling , Vasco Elbrecht , Zachary Gold, Hyun Gweon, Mehrdad Hajibabaei , Falk Hildebrand, Vladimir Mikryukov, Eric Normandeau, Ezgi Ozkurt, Jonathan M. Palmer , Géraldine Pascal , Teresita Porter, Daniel Straub, Martti Vasar , Tomáš Větrovský, Haris Zafeiropoulos, Sten Anslan

Reuter et al., 2015 Molecular Cell Review

Standardization initiatives



Industry Guidance:

- eDNA Sampling Standards and Guidelines
- Bioinformatics Analysis Standards and Guidelines for eDNA Data
- Laboratory Analysis Standards and Guidelines

Standardization initiatives

iESTF

International eDNA
Standardization Task
Force

www.iestf.global



Standardization initiatives



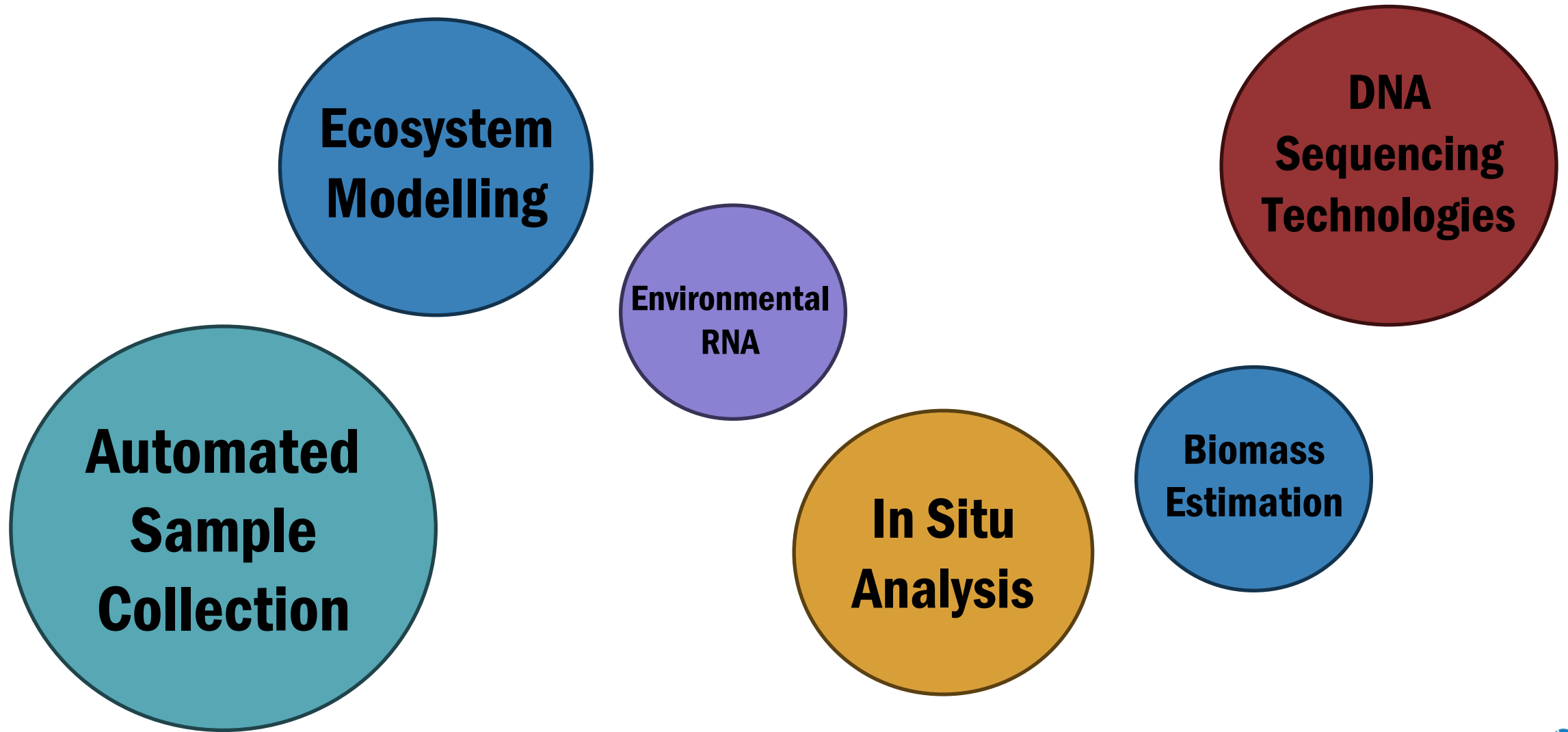
ISO/TC 147

ISO/TC 147/SC 5

Biological methods

Reference	ISO/TC 147/SC 5/WG 13 ⓘ
Title	eDNA, DNA and RNA methods
Type	Working group

Standardization & Innovation



Service Providers



Centre for Environmental Genomics Applications

- State-of-the-art laboratory facility dedicated to eDNA
- Client and collaborator project services
- Standardized end-to-end project support
- High-throughput workflow to support large-scale programs
- Internal R&D program to advance technology



Thank You

Questions?

Beverly McClenaghan
Ecology Lead



beverly@ednatec.com



www.eDNATec.com