



PERSPECTIVES

Special

April 2026

Advancing ocean knowledge: Our eDNA partnership



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01

Introduction

Recent events in the Middle East demonstrate how even localised disruption to our use of the Ocean for transport can have major implications for the global economy. They also remind us how vulnerable our ocean use can be to geopolitical as well as environmental pressures. But, of course, the Ocean's role goes far beyond transport: it is also an essential source of biodiversity, climate regulation, food and many other essentials to life, as we have detailed in a [separate report](#).

Despite its great importance to both human and planetary well-being, scientific knowledge and understanding of how the Ocean functions is still only partial. We lack full understanding of the functioning of ocean currents, ocean deoxygenation and acidification, its carbon cycle and its ecosystems. Building this understanding is being made more difficult by the complex geopolitics around the Ocean and its development. Geopolitical tensions, often driven by economic considerations, are evident in countries' varying attitudes to existing and new international agreements (notably the UN High Seas Treaty, which entered into force in January 2026). National ambitions, in existing or new marine industries, can often still dominate sustainability concerns. Public awareness of the Ocean's functioning and importance also still appears limited.

Deutsche Bank is deeply involved in developing ocean finance with a focus on sustainability. We are very proud to have been the **first bank to join the #BackBlue** Ocean Finance Commitment in 2023 to drive financial system policy change and invest in nature-positive outcomes. In 2024 we made important updates to our policy on ocean-related finance. And in November 2025, at our investor day, we announced our new "nature ambition": 300 nature-related transactions over 2026-2027.

As part of our Ocean commitment, in early 2024 we established an eDNA partnership with **SailGP Germany**, **ORRAA** (Ocean Risk and Resilience Action Alliance) and **NatureMetrics**.

This partnership takes water samples with the help of local scientists at the locations of SailGP races around the world. The samples are analysed, with the results intended to help scientific understanding of species presence, raise local awareness of marine conservation issues and provide evidence for local nature-protection initiatives. We summarize the findings of our surveys from 2024-2025 later in this report.

In the remainder of 2026, we plan surveys mainly in repeat locations – New York (3rd time), Sydney (2nd time), Rio (2nd time), Bermuda (2nd time), Sassnitz (2nd time) and Rio (2nd time). One particular focus will be on education; we believe this is a good way to foster public interest, knowledge, support and participation by local communities to sustain ocean conservation.



Markus Müller

Chief Investment Officer for
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Deutsche Bank – Private Bank



Our eDNA partners



SailGP Germany participates in the highly popular SailGP races around the world. Through large and growing broadcast audiences (estimated at over 200mn over a season) these races provide a highly-effective way of promoting ocean-related conservation.



ORRAA (the Ocean Risk and Resilience Action Alliance) is the only multi-sector body collaboration bringing together governments, the financial sector, multilateral organisations, civil society organisations and other local partners to encourage investment in ocean and coastal resilience.



NatureMetrics provides technical expertise for the project through water sampling kits, analysis, training and related issues such as data visualisation and sampling strategy. It uses eDNA to provide biodiversity monitoring and nature impact reporting to companies.



Local scientists play a fundamental role in our project. They help us identify ideal sampling spots in their respective locations, work with us to assess the data and make substantial contributions to our reports on ocean biodiversity metrics.

02

What eDNA is

Developing **knowledge** about which species live in specific parts of the Ocean is usually expensive and difficult; it is challenging to observe life underwater. As a result, it is estimated that sustained biological observations have covered only 7% of the Ocean surface.¹

But eDNA (environmental DNA) technology offers a new and relatively inexpensive way of conducting biodiversity surveys – and one which can also be easily used by **local scientists** and **local communities** as a way of boosting knowledge of the Ocean.

eDNA identifies the traces left behind by organisms in marine or other environments. **Water samples** in a marine environment can be taken manually from small boats using simple water containers (of 2 litres or more) with appropriate filtration. Depending on water conditions, eDNA can be identified in water samples for up to around 24 hours after the organisms have been present in the location. Samples are usually taken from multiple sites within an area: the choice of sites may be determined by the type of ecosystem, seasonal or other factors.

Water samples are then, at present, sent to a laboratory for analysis. This will provide evidence of the presence of a particular species or (if the strength of the reading is insufficient), a broader level of classification such as family or genus.

As a result eDNA provides evidence of **what** species are **where**; repeated sampling over a year can indicate **when** species are present in sampled waters. Sample information can also highlight endangered or invasive species, species richness (the number of species in the tested area) and evolutionary diversity (the variety of species) can be

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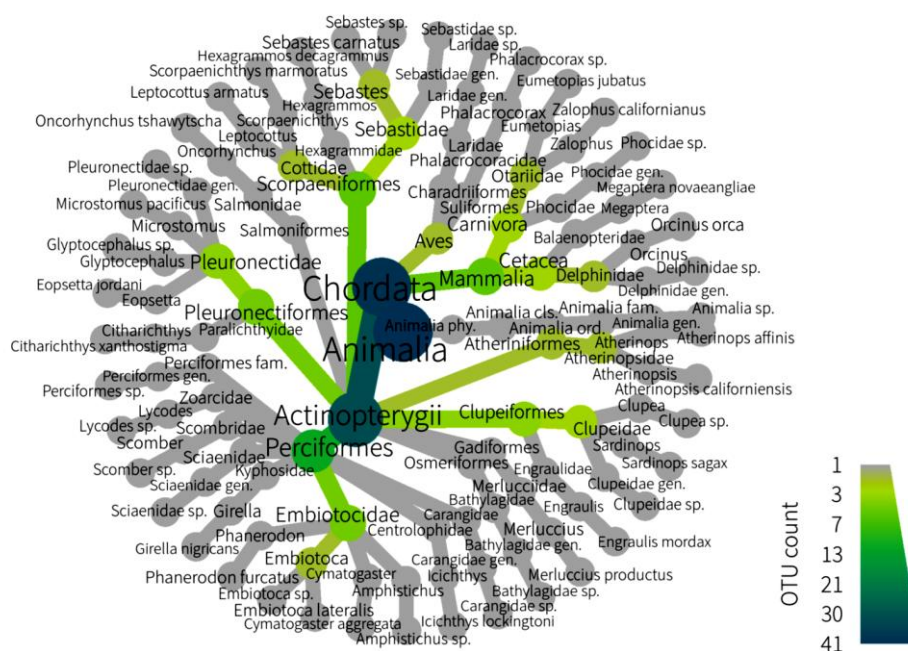


estimated. Each sample collected can therefore contribute to our understanding of how ecosystems are structured. Results from eDNA sampling can be analysed and visualized in a variety of ways. For example, the Clade chart shown below (Figure 1, in this case from our sampling in Monterey Bay in California) is a visualization of the “family tree” of Chordate animals detected by the analysis.

eDNA has its limits: a strong signal on the presence of a species in a sample cannot, for instance, provide an accurate estimate of the number of individuals of this particular species within a given area. eDNA samples are also impacted by biological (e.g., biomass, life stage, activity, body condition), environmental (e.g., temperature, pH, salinity, conductivity), and technical factors (e.g. imperfections in the process used to amplify the DNA signal). Species detections within a given area can also be affected by tides or, in coastal areas, rainfall and associated water run-off. Certain species or animal divisions also tend to leave behind more eDNA traces than others.

In the future, eDNA may also be combined with other technologies (including artificial intelligence) to give additional insights on marine life. Sampling and analysis methods for eDNA may improve further.²

Figure 1: Example Clade chart – from our Monterey Bay sampling



Source: NatureMetrics, Deutsche Bank AG. Data as of June 2025.

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03

Sites visited to date

So far we have conducted eDNA tests in seven locations over the last two years. At each location between 3 to 8 samples at different sites with varying physical and species characteristics were collected.

The locations and results summarized on the table below. In the following paragraphs we highlight a few general observations.

First, **every location is different** and that, within them, each site can be quite different: **“local” is important.** (As is the seasonal timing of samples.)

Second, that **every site is interesting.** Essentially urban locations reveal complex species assemblages as do well-known but less-developed coastal locations.

Third, that **citizen scientists, conservation groups and educational institutions** are a great and knowledgeable resource of their local site – and that there is a significant commitment around the world to protect the Ocean and expand our understanding of this important resource.

Our survey programme started in May 2024 with sampling at six sites off the North Atlantic archipelago of **Bermuda**. Three of these locations were in the natural harbour of the Great Sound and three further offshore. Bermuda’s varied marine life is supported by coral reefs (the northernmost in the world) with offshore waters connecting to the Sargasso Sea, an area of floating seaweed. The islands are a principal migratory waypoint for North Atlantic humpback whale migrations and there are resident populations of North Atlantic bottlenose dolphins and Cuvier’s beaked whales.

eDNA testing revealed evidence of humpback whales at three of the six sample locations: the strongest evidence of their presence was at a location close to shore, posing interesting questions about their resting and migratory patterns. Andrew Stevenson of **Whales Bermuda** says that humpbacks have not previously been reported inshore: the timing of the testing corresponded with the usual annual arrival of humpback mothers and calves off Bermuda. It may also support the possibility that Bermuda is being recolonised as a birthing ground by these whales. Sadly, our testing also revealed a less welcome visitor, the red lionfish, *Pterois volitans* (an invasive species).

Figure 2: 2024-2025 test locations

Testing dates	Locations	Sample no.	Species richness*
May 1-5, 2024	Bermuda	6	31
June 19, 2024	New York	3	6
June 22, 2024	Juneau (Alaska)	4	22
February 6, 2025	Sydney	5	20
June 3, 2025	New York	4	37
June 11-16, 2025	Monterey Bay (California)	8	48
July 20, 2025	Rio de Janeiro	6	44
August 13-14, 2025	Sassnitz (Germany)	8	30

*Species or higher operational taxonomic units (OTU) reported.
Source: Deutsche Bank AG. Data as of April 2026.



Our next testing location, **New York**, couldn't be more different. We were testing close inshore, near the Statute of Liberty in busy New York harbour. Our first sampling in New York, during July 2024, picked up evidence of relatively few marine vertebrate species, with no eDNA from **whales** and **dolphins** – which are frequently sighted further offshore, away from the harbour. (Only three samples were usable.) But there was considerable evidence of shore-dwelling mammals – chipmunk and racoon eDNA was to be expected, given known local populations, but beaver eDNA provided welcome evidence of the species reestablishing itself in the city after a two-century absence.

When we went back to New York for another round of testing in June 2025, we found many more species/genus – 37 in total for marine vertebrates, birds and mammals – the number probably boosted by having more usable samples. Figure 2 illustrates for the 19 identified at an individual species level. Perhaps the most welcome surprise was eDNA of the endangered migratory **American eel**, a fish with a remarkable lifecycle involving migration from freshwater habitats all the way to the Sargasso Sea. Evidence an intact migration pathway for these eels is welcome: disruption of routes may lie behind rapidly falling American eel numbers in recent years. We also found evidence of a top-tier pelagic predator, Bluefish, confirming a robust food chain.

Figure 3: Example location survey result – New York (Second survey species identification)

Latin name	Species/genus name	S1 Statue of Liberty	S2 Governors Island	S3 Brooklyn Bridge	S4 Staten Island
<i>Ameiurus catus</i>	White Catfish				
<i>Anchoa mitchilli</i>	Bay Anchovy				
<i>Anguilla rostrata</i>	American Eel				
<i>Castor canadensis</i>	North American Beaver				
<i>Etropus microstomus</i>	Smallmouth Flounder				
<i>Fundulus heteroclitus</i>	Mummichog				
<i>Gobiosox strumosus</i>	Skilletfish				
<i>Gobiosoma ginsburgi</i>	Seaboard Goby				
<i>Hypsoblennius hertz</i>	Feather Blenny				
<i>Menidia menidia</i>	Atlantic Silverside				
<i>Microgadus tomcod</i>	Frostfish				
<i>Morone saxatilis</i>	Striped Bass				
<i>Phalacrocorax auritus</i>	Double-Crested Cormorant				
<i>Poecilia reticulata</i>	Guppy				
<i>Pomatomus saltatrix</i>	Bluefish				
<i>Tamias striatus</i>	Eastern Chipmunk				
<i>Tautoga onitis</i>	Tautog				
<i>Tautoglabrus adspersus</i>	Cunner				
<i>Trinectes maculatus</i>	Hogchoker				

Source: NatureMetrics, Deutsche Bank AG. Data as of June 2025.

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At the time, Bob Hyldborg, executive director of **Gotham Whale**, noted that the “survey provides us with more great information on New York harbour and helps both support and encourage our citizen sightings and advocacy of whales and other cetaceans”.

The beautiful surrounds of **Sydney Harbour** provided another example of a testing environment where, again, marine species co-exist with large human populations and economic activity. Our eDNA sampling in February 2025 revealed evidence of 20 distinct species. Testing in Sydney was carried out by Dr. Vanessa Pirotta, founder and chief scientist of the **Wild Sydney Harbour project**, and Gamay Ranger April Allende. Sample locations varied from close to the Heads (the harbour mouth, where there was dolphin eDNA) to Sydney’s commercial centre. These results, said Vanessa, will “directly contribute to the study of dolphins within Sydney Harbour. Sampling over time would also help build a better picture of species occurrence across different times of the year.”

At the other end of the Pacific, **Juneau, Alaska** is another place where the forces of nature and human activity come face to face: striking a sustainable balance between the two is essential. The city is also surrounded by glaciers and, as climate patterns shift, these are melting – altering the salinity and composition of seawater and thus the food chain. Samples taken for a particular area appeared to show a **self-reinforcing whale feeding process** in action.

In Alaska, samples were taken by Dr. Heidi Pearson from our project partners at the **University of Alaska Southeast**. The four chosen locations were not far off-shore – inlets surrounded by mountains – and showed evidence of 22 species or genus, from the small (e.g. tidepool sculpin) to the massive (humpback whales). The high level of diversity in one sample area, a known humpback whale feeding hotspot, was particularly interesting: as Heidi said “These results reinforce why humpback whales return each year to feed. eDNA can help us to better monitor these waters to assess the effects of climate change and other human-induced stressors.”

Further down North America’s west coast, **Monterey Bay** hosts another remarkable ecosystem, with one of the continent’s largest deep ocean canyons and kelp forests. Biodiversity is further aided by nutrient-rich water rising from the deep sea. Sampling here in June 2025 identified eDNA for 48 species/genus including the Northern Right Whale Dolphin. The range of species identified – including Orcas, sealions, seals and sea otters, as well as many others – indicate a robust food web. “This kind of information” said Francisco Chavez of the **Monterey Bay Aquarium Research Institute** (MBARI) “helps us understand how the biodiversity in this region is responding to climate change and how we can better protect its ecological balance”.

After Monterey Bay, our next testing was off **Rio de Janeiro** in July 2025, at the mouth of Guanabara Bay (Figure 4). The narrowness of the entrance to the bay means rapid inflows and outflows of relatively cold water twice a day. The area poses a range of hazards for marine life. Local ecosystems have come under heavy pressure in recent decades. Water in the bay is often **heavily polluted**, due to the large human populations and industries in multiple metropolitan areas around it, and deforestation is also an issue. The existence of large islands within the bay also makes water circulation difficult.

Nonetheless, sampling revealed 44 species. As expected, there was a large and welcome variety of **bony fish** – e.g. herrings, croakers, anchovies – together with birds (e.g. parrots, pigeons). But the most dramatic find – in two of the six locations – was eDNA evidence of **humpback whales** – which were also visually spotted from the boat doing the sampling. As marine mammals expert Salvatore Siciliano of Escola Nacional de Saúde Pública/Fiocruz in Rio de Janeiro, and Grupo de Estudos de Mamíferos Marinhos da Região dos Lagos noted, humpback whales, migrating north, are known to

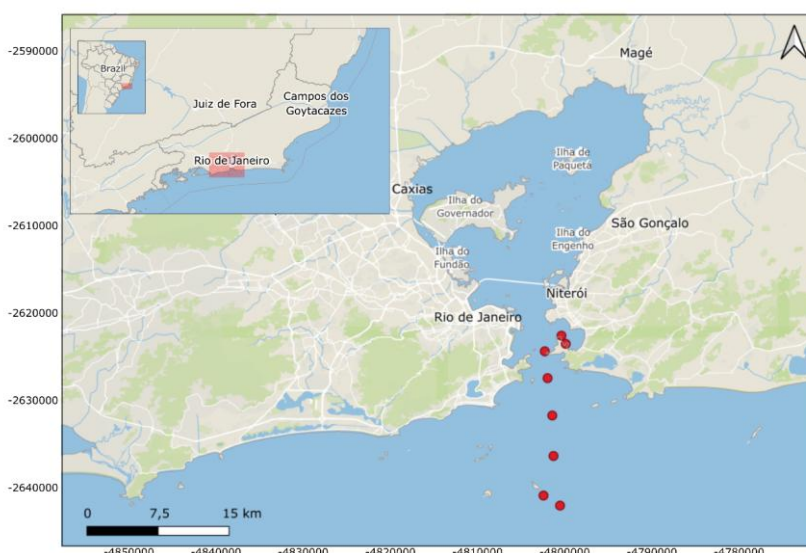


usually remain close to the coastline (despite associated dangers, for example from shipping) because they use acoustic methods (e.g. assessment of the sound patterns breaking waves) to assist navigation. This eDNA and visual evidence of humpback whales further supports evidence of a recovery of humpback whale numbers in this region, from an estimated 1,000 at their low point in the 1960s to approximately 25-30,000 or more now.

eDNA, as we noted above, has **limitations**. The lack of eDNA evidence of sharks and rays, known to exist in this area, was not a complete surprise: passing through an area, they can run deep, requiring intensive sampling to find evidence. Our researchers would also have expected eDNA evidence of green turtles, of which there is a large population off Rio, or seabirds such as terns, boobies or frigate birds.

The Rio results also demonstrate the importance of **sample timing**. Our sampling took place when the tide was coming in – i.e. moving eDNA towards the shore. This may account for the lack of eDNA evidence of dolphins, despite a small colony being known to exist deep within the bay. Rain – and the resulting run-off of water into the bay – might also have affected the test results.

Figure 4: Example sample areas – Rio de Janeiro/Guanabara Bay sampling areas



Source: NatureMetrics, Deutsche Bank AG. Data as of July 2025.

Our first sampling campaign within Europe took place off the German Baltic coast town **Sassnitz** in August 2025. This revealed 30 species over seven locations. These included bream, sand and freshwater eels, gobies, garfish and flounders as well as different types of pipefish – from the same family as seahorses, but straight-bodied and with an unusual lifecycle. Unsurprisingly the invasive Round Gobey was the only organism being present in all four Sassnitz test locations. Although they are native to the Black and Caspian Seas, they have an established non-native population in the Baltic. A team of researchers from **GEOMAR Helmholtz Centre for Ocean Research Kiel** lent scientific hands-on support in planning and taking samples. As Dr. Clemens von Scheffer, GEOMAR Helmholtz Centre for Ocean Research Kiel, noted: “Raising awareness about the health status of our oceans, threatened by so many factors, is more important than ever. Collaborations of different societal actors at events like the SailGP are valuable and promising initiatives”.



04

What comes next

eDNA sampling has proved to be a powerful tool for providing evidence of **what** species are **where** and (given seasonal sampling) **when**. Every sample taken contributes to our understanding of **why**.

In 2026, we have already taken samples in Sydney and plan four other sets of repeat eDNA tests at the locations given below. Tests at the same locations – which are again sites for SailGP races – allow us to deepen our understanding of these marine environments and continue our support for local scientists and associated educational programmes. Testing at different times of the year can help show the changing seasonal presence of marine species, year-on-year fluctuations and can highlight different species (as in the case of the first two New York samples, discussed above).

Figure 5: 2026 test locations

Date	Area	Visit no.
February	Sydney	2nd
April	Rio de Janeiro	2nd
May	Bermuda	2nd
May	New York	3rd
August	Sassnitz	2nd

Source: Deutsche Bank AG. Data as of April 2026.

One priority for 2026 is to use the eDNA testing programme to build local awareness of ocean issues and local involvement (often via education). Our DB Corporate Social Responsibility (CSR) colleagues together with NatureMetrics, for example, have started an educational programme related to eDNA testing in a New York City school, providing youth with an introduction both to advanced scientific methods in practice and career scientists. In addition, we are planning further children’s workshops in collaboration with Enovation Consulting at selected future SailGP race locations, including New York, Portsmouth, Sassnitz and Valencia. These workshops will focus on ocean health and aim to explain eDNA technology in an accessible and engaging way, highlighting what it is and why it matters.

Our experience so far working with individuals and other local groups or research centres such as Whales Bermuda, the Wild Sydney Harbour Project, Gotham Whale, the GEOMAR Helmholtz Centre for Ocean Research Kiel and its SOOP (“Shaping an Ocean of Possibilities”) innovation platform, along with educational centres such as the University of Alaska Southeast and Universidade do Estado do Rio de Janeiro convince us that there is considerable appetite for this.

As Markus Müller, CIO for Sustainability at Deutsche Bank Private Bank emphasises: “Awareness and education can help build a long-term foundation for local initiatives and policy to support marine life and resilience. In these and other ways, eDNA analysis can raise awareness of the wonders of the Ocean – and, most importantly, what we can do to conserve it.”



Focus: advancing ocean science education with New York Harbor School

In 2025, Deutsche Bank's Corporate Social Responsibility (CSR) team, in collaboration with NatureMetrics, established a hands-on eDNA testing program at the Urban Assembly New York Harbor School. The initiative was structured as a funded, cross-sector partnership, with the objective of developing a student pathway programme into marine science.

Working closely with Harbor School staff, Deutsche Bank introduced our technical partner, NatureMetrics, to guide students in researching local aquatic biodiversity. NatureMetrics provides comprehensive nature intelligence and technical expertise, supplying the water sampling kits, laboratory analysis, and specialized training.

This model demonstrates how Deutsche Bank can leverage its resources and technology partners to advance education, creating a blueprint with the potential for replication and scale in other educational settings and communities. The programme features:

- **Hands-on eDNA sampling:** Students conduct manual marine eDNA sampling. Using specialized filtration methods, they capture the environmental DNA traces left behind by marine organisms in the seawater.
- **NatureMetrics Intelligence Platform:** Following NatureMetrics' lab analysis, each student is granted access to their data on a platform that enables them to explore their results, visualize complex biodiversity metrics, and assess the species richness of New York's local waters.
- **Mentorship & career development:** NatureMetrics scientists and Deutsche Bank professionals provide comprehensive mentoring throughout the programme. . Students will write reports and present their scientific research projects, inspiring pathways into the life sciences sector, a field where NYC ranks second nationally in the US for startups.



Appendix

Bibliography

1. [Frontiers | Establishing the Foundation for the Global Observing System for Marine Life](#)
2. [A systematic review on environmental DNA \(eDNA\) Science: An eco-friendly survey method for conservation and restoration of fragile ecosystems - ScienceDirect](#)

Glossary

Acidification is due to the absorption of carbon dioxide (CO₂) in seawater, with a series of chemical reactions ultimately resulting in a higher concentration of hydrogen ions.

American Eel (*Anguilla rostrata*) is a migratory fish species that lives in freshwater and estuarine habitats but spawns in the Sargasso Sea during its lifecycle.

The **#BackBlue Ocean Finance Commitment**, launched in 2021, is designed to incorporate the Ocean in finance and insurance decision making.

Bluefish (*Pomatomus saltatrix*) is a fast-swimming predatory marine fish that forms schools and occupies coastal and offshore waters.

Carbon cycle describes how carbon (in various forms) moves through our planetary systems.

Clade is a group of organisms derived from a common ancestor; a Clade chart illustrates this relationship.

Deoxygenation is when oxygen levels in water decline, making the habitat more difficult for marine life.

Environmental DNA (eDNA) refers to DNA taken from an environmental sample (e.g. water) rather than directly sampled from an organism.

Family refers to taxonomic rank between order and genus.

Genus is a taxonomic rank below family but above species; members share some characteristics.

Gotham Whale is a citizen science organisation that aims to study, advocate for, and educate about the whales and marine mammals of the New York Bight.

Grupo de Estudos de Mamíferos Marinhos da Região dos Lagos (GEMM) is a research group in Brazil studying marine mammals.

Humpback whale (*Megaptera novaeangliae*) is a migratory baleen whale species.

Monterey Bay Aquarium Research Institute is a non-profit oceanographic research institute centre advancing marine science and engineering.

Operational Taxonomic Unit (OTU) is a group of closely-related individual species, based on specific gene sequences.

Wild Sydney Harbour Project is a citizen science project designed to promote an understanding of wildlife in and around Sydney Harbour, Australia.



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