



EAZA Biobank: Towards the Increased Inclusion of EAZA Aquariums in Biobanking

Scope

The main priority of the EAZA Biobank currently is to increase the proportion of samples submitted from the aquarium community, as these samples are underrepresented, with a strong focus on securing samples from EEP or ESB populations, species which are under consideration for a programme, and species of immediate conservation concern. This document aims to outline the strategy to accomplish this.

What is a Biobank?

Biobanks are well-organized resources comprising biological samples such as blood, serum, tissue, whole specimens or simply DNA, in association with information regarding the sampled individual. Within the zoological community, individual institutions may or may not store some of their own samples on site, but usually not in a comprehensive way or for long-term needs. A professional, centralized Biobank can ensure optimal and long-term storage of high-quality material that will significantly impact on future population management and conservation research. The IUCN acknowledges the increasing value and potential of biobanking as an *ex-situ* conservation resource to secure genetic material, enable conservation-directed research, improve the viability of small populations, and provide a backstop against extinction in certain cases (see IUCN motion 094).

Why is Biobanking important for Aquaria and aquatic species?

Aquatic biodiversity is under severe threat. Over the last 30 years approximately 50% of the world's coral reefs have died and 25% of marine life depends on coral reefs for at least one phase of its life cycle. Almost half of the Earth's fish species live in freshwater – which represents only 1% of the world's water. Alarmingly, 75% of the world's inland waters may have been lost in the 20th century and freshwater populations alone have declined by 83% between 1970 and 2014. While it is possible to continue enumerating negative realities, it is clear that many aquatic species will need intensive support in order to avoid that they vanish in the near future.

Through the EAZA Regional Collection Planning (RCP) process, Taxon Advisory Groups have identified a number of EEP families that have an 'Insurance' role within aquariums, and which contain several species with an 'Ark' role. For these roles, and others, biobanking can be an important part of achieving the goals for the conservation of the species, including using genetic data for intensive population management.

Aquariums are uniquely placed to be able to significantly contribute to increased biobanking of samples from aquatic species. Having access to a large number of aquatic species, many under severe threat or even extinct in the wild, aquariums have the opportunity to collect a large number of valuable samples. The aim of the conservation community is to work towards sustainable populations, taking in consideration husbandry, veterinary, behavioral, and genetic health factors. With enough samples, biobanking can provide feedback about the genetic health of aquarium populations. Biobanked samples can, through genetic analyses, be relevant for future breeding management decisions and ensure healthy back-up populations to serve as supplementation for wild counterparts. They can also be potentially be used in veterinary diagnostics or exist simply to secure genetic material for future conservation research before it is lost.

What is the EAZA Biobank?

The EAZA membership has established dedicated biobanking facilities for the European and Middle Eastern zoo and aquarium community. The EAZA Biobank is comprised of four independent freezer sites (called 'Hubs') that feed into a centralized database using the Zoological Information Management Software (ZIMS). The four Hubs are located in Antwerp Zoo, Royal Zoological Society of Scotland (RZSS), Institute for Zoo and Wildlife Research (IZW) and Copenhagen Zoo, and have adequate facilities, staff, and ample freezer space available to keep, curate and register samples of all aquatic individuals sampled. The core focus of the EAZA Biobank is on population management and conservation research, as well as veterinary molecular diagnostics and other fundamental scientific research questions.

For more information on the EAZA Biobank, please see the [Vision](#) document for the EAZA Biobank.

How to increase sample submission from aquariums

Sample types and quantities vary depending on species but must be of sufficient quality and quantity to allow for a wide range of genetic techniques to potentially be employed. There may be varying opportunities at which to sample, including during routine veterinary procedures or testing, during animal transfer and quarantine, upon death, or other interactions for submission to the Biobank. For this, we seek to recruit the assistance of all aquatic vets, as well as curators, technicians, biologists or other appropriate staff, to conduct sample collection during these opportunities.

To this end, the EAZA Biobank and representatives from the aquarium community wish to promote sample collection and banking for long-term storage as well as immediate use in conservation research. Recognizing that aquariums have specific needs for the multitudes of species they hold, we aim to create specific resources to help staff at aquariums to collect samples and contribute to the conservation resource that is the EAZA Biobank. These include:

- 1) A sampling protocol with aquatic species-specific considerations. This protocol not only addresses collection of blood and tissue samples, but other possible samples such as fish fin clips, ray barb, or mucus. This protocol also details of proper handling, labeling, and shipping and is accessible online. (See EAZA Biobank Webpage; Sampling Protocol).
- 2) A 'species priority list', to allow for a more targeted approach to initial sampling. Understanding that there are large numbers of individual animals that must be cared for, and sampling from each animal would take considerable time and resources, we present a focused list that includes the most at-risk or in-need species to start a more systematic sample collection plan. This suggested list of priority species will be developed and updated regularly in consultation with the TAGs and will be distributed through EUAC and the TAGs. Please contact the [Biobank Coordinator](#) for a copy of the latest list.
- 3) Promotional and educational material including updates on the EAZA Biobank, sample holdings, and involvement in research, distributed through newsletters, articles or other media, and at conferences and meetings to increase the involvement and visibility of the EAZA Biobank in the aquarium community.

Sample Database and Management

The EAZA Biobank has now established a Biobank Institution within ZIMS, allowing us to utilize the Sample Storage module as the database for biobank sample management. This also enables EAZA members to easily gain an overview of samples their institution has already shared with the biobank. Sample records can be created within the Sample Storage module in ZIMS and can now be shared electronically with the Biobank Institution, which allows an immediate link to individual animal data collected within ZIMS. Non-ZIMS users can provide sample and animal information to the Hub they send their samples to and Biobank staff can create a third-party sample records within ZIMS on their behalf.