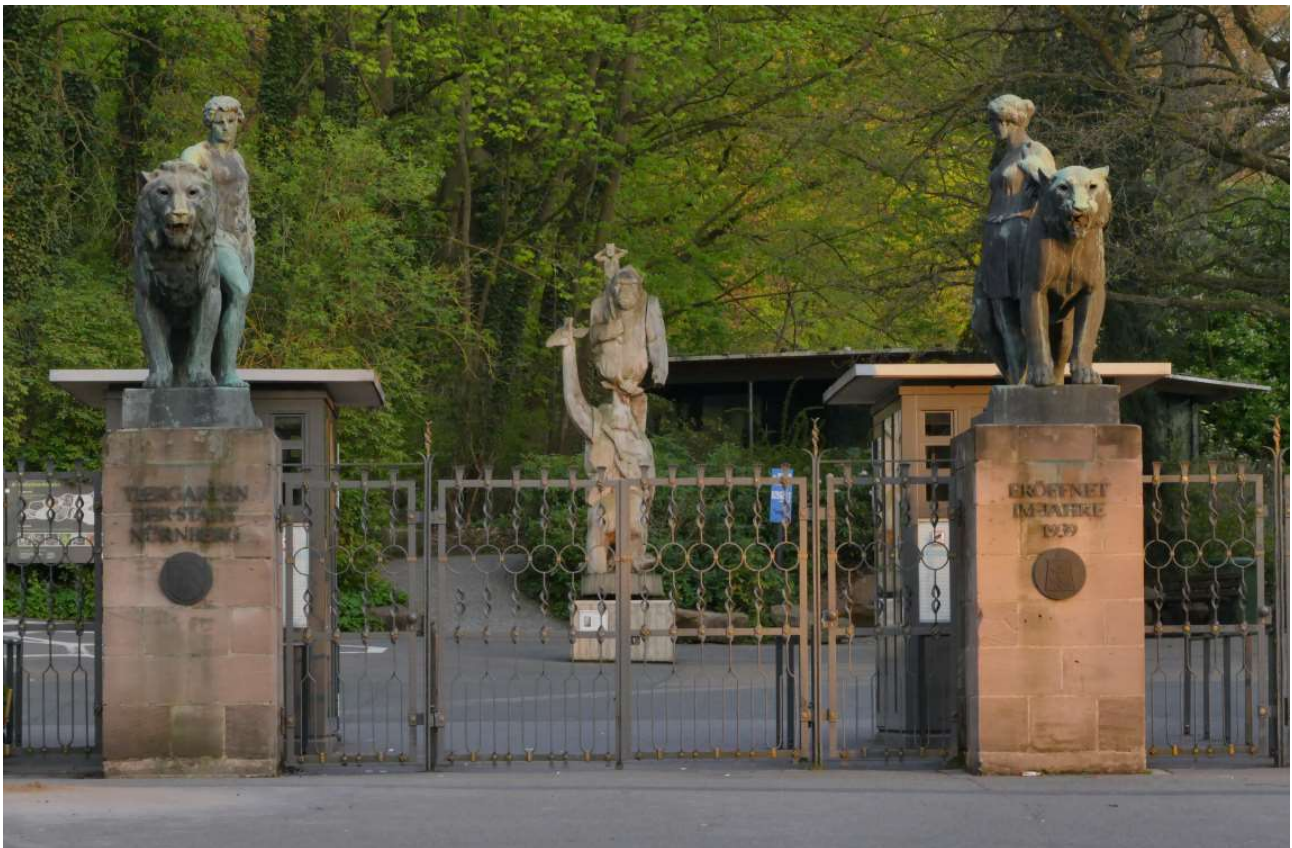


Structure and Development Concept for the Nuremberg Zoo

Report to the City of Nuremberg
Cultural Committee
February 23, 2018



Requirements

Visitors experience the zoo mainly as a recreational facility and therefore have specific expectations for service, development and improvement. The citizens of the city, in turn, follow the public debate regarding the legitimacy and meaningfulness of animal husbandry in general and specifically using the zoo as an example. Their decision to visit the zoo depends increasingly on whether they wish to continue supporting such institutions for moral considerations.

Therefore, development of investment measures in the zoo as a recreational facility and consumptive measures to fulfill the requirements of a wildlife conservation center are needed.

The *Structural and Development Concept 2018* is the continuation of the zoo's *Development Concept* presented in 2008. The principles formulated there regarding the development of the appearance and the animal population of the zoo (Appendix 1 - Excerpt from the Development Concept from 2008) have not fundamentally changed, but are updated here.

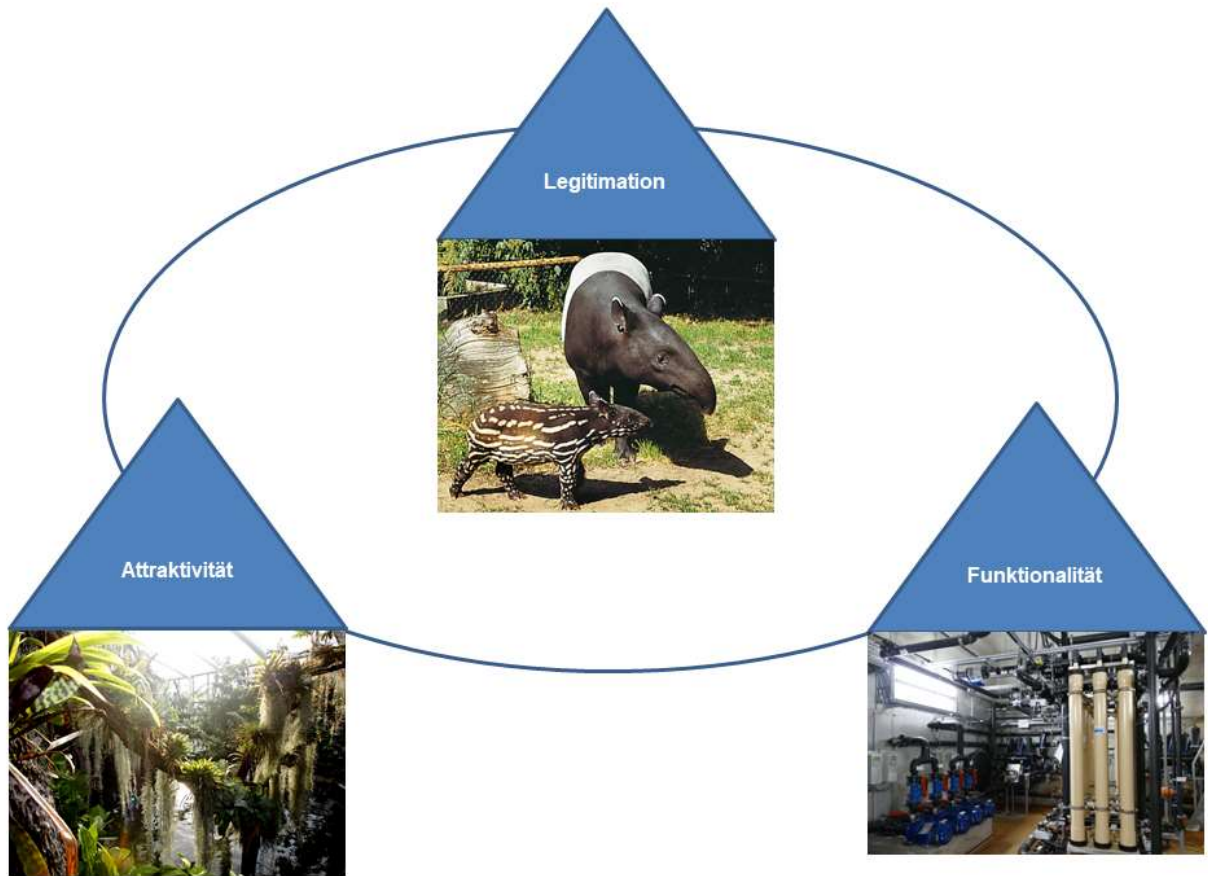
The aim of the investment plan is to preserve the original character of the zoo in the long term and in a timely manner through structural and landscape design measures. This means that the zoo should not change fundamentally, it should simply be improved.

The focus of the update this time outlines the social and legal context in which zoos have to maintain and develop their position in the coming years. The resulting operational structure along with the associated financial impact on operating costs, entrance fees and the total city budget is presented.

The structure and development concept of the zoo is a working document that is constantly adapted and updated.

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A – Considerations



I. Cultural aspects of zoo animal husbandry

The oldest cultural written records of modern man are, in addition to fertility symbols, animal illustrations.



Zoo animals are not only part of a scientific collection, but part of our urban culture. The zoo cultivates an image of animals that the City of Nuremberg wants to convey to its citizens.

Animals, which humans have close contact with, have shaped the culture of humans, showcased through performing arts. The animal has remained a frequent motif and an integral part of human culture to this day, and in the private sector has become a cultural asset in the form of "fashion breeding" and in industrial agriculture, a commodity, beyond the performing arts itself.

"Useful" animals are now commodities in industrial production processes, which are no longer used for basic nutrition, but rather, are produced for consumption and export. In particular pigs, cattle and poultry have become mass consumer goods and thus, completely de-individualised.

Attitudes towards animals have changed, along with the cultural development of society and the advance of knowledge in biological sciences. Animals are increasingly recognised as sensitive and capable individuals and consequently, recognised as legal objects by the inclusion of animal protection in common law and stricter criteria in the Animal Protection Act. In particular, pets are less and less defined as working assistants, but rather seen as partners and friends of humans.

These completely contradictory cultures within society, which deal with animals in industrial animal production and pet ownership, have resulted in polarized and sometimes unforgiving policy debates.

In the midst of this binary, wild animals are seen in circuses, zoos and in living rooms. Through progressive urbanisation, a romanticized picture of animals in their natural habitat has been depicted and has become iconic in animal protection debates, although this picture no longer reflects reality.

Debates about the quality and meaningfulness of animal husbandry in the public space, i.e. in the zoo, are thereby conducted with greater vehemence than debates about the loss of entire species out of public view, because zoo animals are part of our urban culture and at our disposal.

Although zoos are now legally defined as biodiversity conservation sites, in social debates animal husbandry in zoos is, in the first instance, a cultural guide as to how we deal with the living environment over time.

The way in which zoo animals are kept in the City of Nuremberg Zoo, and presented to the public, is a cultural commitment to how the city wants to portray its relationship with animals and a common future for humans and animals.

II. Ethical aspects of zoo keeping

For a long time, western ethics has taken as a given the prominent position of man as strictly separate from animals. Today, this objectification of animals is inconceivable, at least for vertebrates. The proven capability for suffering of (some) animals makes them moral subjects.



From a biological point of view, two giraffes met the same fate here: they were overpowered by a predator that just took one of their legs. For ethicists the situation is a bit more complex ...

The formulation of an animal rights philosophy, in which the concept of non-human animals is redefined, represents a milestone in western animal ethics. Scientific knowledge of animal abilities and cognitive functions, defined so far as being purely human, increasingly support the newly supported claim that animals have human-like moral concepts. (Some) animals use tools, make plans, solve complex problems, act purposefully, make friends, lead wars, have traditions which we understand to be part of their culture.

Animal rights philosophies have become a socially relevant perspective that manifests itself in veganism and influences political decision-making in the fields of animal welfare, agricultural policy, nutrition, climate protection and trade through organized interest groups, professional lobbying and academic chairs. This social current has also reached the established political parties in Germany and achieved partial success in legislation. In Europe, the animal rights philosophy, with the Animal Protection Party was first introduced to European Parliament in 2014.

The zoo not only has to formulate consistent, scientifically founded ethical standards, but also act according to its code of conduct. The zoo shows an ethical concept for zoos, which relies on needs-based ethics for the individual protection of animals, which is consistent with the fundamentals of animal protection law. For the population protection of animal species, the needs-based ethics fall short because they do not address the killing dilemma. An ethics of

responsibility must be able to represent the legitimacy for interventions in animal life through to the killing of animals through defined consideration processes and decision hierarchy channels.

Although the number of zoo animals is negligible relative to all other population systems, the relevance of zoo keeping is prominent in public and other related debates. While the keeping of farm animals bound for slaughterhouses are more or less operated away from the public eye, and also private animal farming largely elude the debate, zoos offer an ideal platform to conduct ethical policy debates which are factual, accessible to the public and comprehensive.

After the progressive dissolution of wild animal husbandry in circuses, the next goal of the animal rights movement will be animal husbandry in zoos. The debate can be managed constructively if zoos provide proof, not only through their communication, but also through their structure, that they manage their clearly defined responsibilities with clearly defined action.

Basically, the work of zoos requires that they always have zoo keepers looking after individual animals as well as species conservationists who look after entire animal populations. Their responsibility therefore extends to the living conditions of specific animal individuals as well as to the chances of survival of entire animal populations. Ethical dilemmas arise when it is necessary to decide between the life or survival of individuals within an animal population, in order to ensure the survival of the entire population, for which the zoos has been held responsible.

Only consistent and coherent ethics can gain social acceptance. Zoos, with their purposeful actions, follow a consequentialist ethical responsibility. Thus, in contradiction to animal rights philosophies, which do not hold humans responsible for populations and endorse the passive protection of species as a normative counter-concept.

In order to be able to cope with the responsibility of the individual animals, as well as the animal populations, the zoo will have to look at its own operational structure to meet the requirements in research, education and population management, in order to reach its potential in these areas and to live up to its own ethical standards.

Specifically, this means that the zoo needs to put biodiversity conservation (i.e. conservation and/or research and/or education) at the forefront of all animal husbandry. Animals which do not serve this purpose adequately must be gradually replaced by other species.



The bearded vultures bred in Nuremberg will reintroduce this species into the wild throughout Europe.

This requires personnel development in the operational structure, to build an effective conservation center that cares for and researches its animal populations in an international context and shows this to its visitors.

The zoo must continue to generate commercial stability by increasing attractiveness in the future, so that it remains the most popular recreation facility in the City of Nuremberg. They also have to take the necessary steps to ensure they gain lasting social relevance and acceptance from the public.

III. Relevance of zoo keeping on biodiversity

In addition to the fact that biodiversity is rapidly declining, it is most frightening that individual animal populations of the majority of known mammals, and a large number of known birds, only live in small fractions of their original numbers on the earth.



The population of bottlenose dolphins (left) in the world's oceans is estimated to total well over 600,000 animals. The European breeding program alone lists more than 250 animals. The remainder of the Vaquita (right), a porpoise from Baja California, was estimated to be 38 in early 2017 and 10-25 at the end of 2017. There is no breeding program for this species. They would have had the chance to escape, like the Californian Condor or the Prince Alfred's deer, if they had decided earlier to capture wild animals and build an insurance population in zoos. Now they will probably share the same fate as the species lost in 2007, Baiji, the Chinese river dolphin: functionally extinct ...

Unprotected species are particularly affected by the dramatic loss of viable individuals, as a study of the decline in the number of European birds shows, which attests to the loss of 421 million individuals, especially those of previously common species such as the sparrow, starling, lark and partridge. The Bundesamt für Naturschutz (BfN) estimates that bird populations of the 36 most common species have fallen by 49% in our country's agricultural areas.

Among the most extreme cases is the Philippine Prince Alfred deer, whose numbers were estimated to total 2,500 animals in the wild in the 1980s. There are thought to only be 100 - 200 animals left today. The European conservation program for this species can maintain a population of around 100 animals in European zoos, promising salvation for this species, as has been done for the Californian condor and several other species.

Overall, European zoos currently ensure the survival of 400 species through internationally coordinated breeding programs.

Awe-inspiring animal documentaries and visits to national parks, especially in Africa, insinuates the survival of species that are particularly "likeable" to humans (cheetahs, elephants, etc.). Captivating images of "wild" dolphins obscure the fact that we will lose three species of dolphins forever, within a decade. The Chinese river dolphin "Baiji" was listed as "functionally extinct" in 2007, i.e. eradicated. In 2014, there were only 65 individuals spotted of the New Zealand Maui dolphin. The Gulf of California porpoise, also known as Vaquita, endemic to Baja California, was first classified as "critically endangered" in 1996, with an estimated remaining population of less than 600 individuals. In 2016, the estimate was just under 100 animals, and by the end of 2017, there were thought to be only 10-25 animals left. In 2017, in a last ditch attempt to save the porpoise species, animals were caught to participate in captive breeding programs. This project was stopped in November 2017, after a trapped animal died.

Other species have already taken part in similar programs, and eventually almost all of them have been returned to the wild after successful protection and/or restoration to their native habitats. Przewalski's horse, Mendes antelope, Milu, California condor, bearded vulture, ibex, McCord's turtle, Batagur turtles, Mhorr gazelles and many other species have only survived because they have been rescued by zoos.

The need for zoos grows daily and for dolphinariums, the question is no longer whether dolphins should be kept in captivity, but which dolphins must be kept in captivity if we do not want to continue losing species after species.



Nuremberg Przewalski's horses live in the zoo, in the grazing project Tennenlohe and were the reason for the expulsion of the Gobi B National Park in Mongolia (picture), where they had been extinct since 1968 and reintroduced by zoos since 1992.

Basically, one distinguishes different functions of animal species in conservation breeding programs. Species that are not endangered themselves ("least concern") and whose endangered relatives are not yet taken from the wild, are used for basic research and the development of housing systems for reproduction. They are representative species. The zoo has, for example, tanagers, various frog species and Yellow-spotted river turtles in the Manatee House. Species that are not, or only slightly endangered ("vulnerable") and are popular among humans are ambassadors for their endangered relatives ("ambassador species"). These include, for example, bottlenose dolphins, reticulated giraffes (whose populations in East Africa have fallen from 36,000 to 8,000 individuals in the last 30 years) and manatees. Many critically endangered species can not currently be reintroduced to the wild. They are managed in zoos as insurance populations. In the zoo these include gorillas, gibbons, Prince Alfred stags and Siberian tigers. Due to threatened habitats, only a few species can currently be reintroduced to the wild. All the more important are successful releases that, in principle, are mostly effective by protecting the entire habitat into which a species is to be reintroduced. An example is the protected area Gobi-B in Mongolia where the zoo reintroduced horses, but also work to protect the native flora and fauna. Such species are therefore called "umbrella species". They form a protective screen for other species. From the zoo these include, for example, the ibex, Ural owl, bearded vulture, Przewalski's horses and European ground squirrel which have been reintroduced. Projects for beavers and otters have ceased, as these species have since been re-established.

The zoo has 34 species in the European Conservation Breeding Programs (Europäischen Erhaltungszucht-Programmen - EEP).

The goal is to continuously increase this number, which will mean significant intervention in the current animal population and will entail a whole range of purely animal-related investments. The zoo coordinates conservation breeding programs for Malayan tapirs and manatees.

At the Annual General Meeting of the EAZA (European Zoo Association), the conversion of the conservation breeding programs into EAZA ex-situ programs (still referred to as EEP) was adopted in April 2017, in line with the One Plan Approach of the EAZA IUCN (International

Conservation Union) will follow. Each species will be assigned a specific function in international conservation within their breeding program. The resolution came into force on 01.01.2018.

This restructuring of the breeding programs will require enormous changes and staffing resources for all EAZA zoos.



The Zoo coordinates the European Conservation Breeding programs for the Malayan tapir and Manatee. Negotiations are already under way to amalgamate the European and South American manatee breeding populations.

IV. Relevance of zoo education on biodiversity

The International Union for Conservation of Nature (IUCN), which compiles the "Red List" of endangered plant and animal species, assumes that all mammals in Southeast Asia weighing more than one kilogram will inevitably be eradicated, unless the trend reverses via effective protective measures.

All commercially fished species in the ocean will be extinct in about 30 years, unless there is a dramatic reversal in the setting of fishing quotas.

With these numbers and an estimated biodiversity of well over 10 million species, of which the threat status is only around 85,000 species, it is clear that 400 conservation breeding programs in Europe cannot halt the overall trend of global species decline.

It requires a comprehensive shift in consciousness of the entire population, so a decline in the destruction of nature can be accomplished.

This requires both targeted sensitization and concrete knowledge. It requires professional education programs.

The zoo's Zoo School reaches over 15,000 people annually with their educational offerings. This is a tremendous achievement for a single facility, with a staff of 1.3 FTE Zoo School teachers, 1.0 FTE administrative staff, and a group of interchangeable payroll staff. However, there is potential for an estimated increase of more than 50,000 interested annual "customers". In particular, the multi-day programs, with overnight stays at the tented camp in the nature experience garden, or in the Blue Salon of the lagoon, could guarantee an increase of at least 500% ad hoc.



The opportunity to let people experience the most diverse animal and plant species through unique encounters is a privilege of the extracurricular learning zoo.

This requires a department that teaches educational content, prepares recreational programs in the educational sense of Education for Sustainable Development (Bildung für nachhaltige Entwicklung) and carries out professional evaluations of the teaching units. Since the principle of the original encounters provide the basis for the pedagogical lesson, appropriate capacity adjustments in animal care must be made available for the programs to run. There are already 1,400 guided tours in animal areas each year, which require zookeeper's time, which has not been taken into account.

V. Relevance of horticulture on zoo education

Plants and cyanobacteria are the only organisms that can transform solar energy into usable food. Without vegetation, there can be no animal life - with the exception of highly specialised deep-sea dwellers.



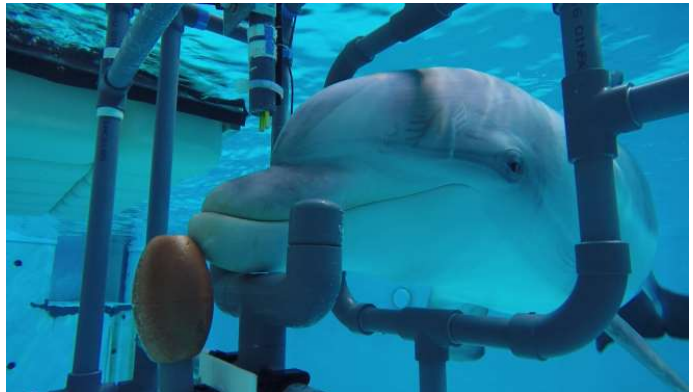
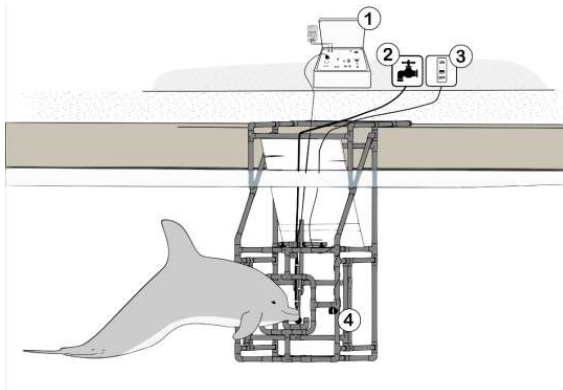
Plants carry information that can tell more stories than information boards can hold.

In fact, if zoos are to be developed into the most important extracurricular learning venues for biodiversity issues, then plants need to be more involved in zoo concepts. Plants play a prominent role in habitat design, which is the zoo's core business. The vegetation tells visitors where they are and where the animals they are viewing come from. In order to be able to represent atmospherically exotic habitats in our climate by targeted outdoor plant selection,

corresponding botanical knowledge is required. Zoo educators need the systematic integration of botany for descriptive teaching and the comprehensive presentation of learning content via unique encounters with plants.

VI. Relevance of zoos on biodiversity conservation research

Generating knowledge is as important as providing knowledge to prepare our society for the future. Research and education go hand in hand. Zoos have tremendous potential to undertake biodiversity research thanks to their animal population and their semi-controllable conditions, which in the first instance, give many research methods the opportunity to answer scientific questions.



Many scientific questions about animals need controllable conditions, like in zoos.

In addition, only a few species are kept or can be kept at universities themselves. The demand of biological faculties is growing more and more and the zoo is involved in more and more research projects. Cooperation with several universities at the same time, however, is made more difficult by the fact that there is insufficient infrastructure on the zoo site. There is a lack of space, equipment, software and support capacities to be able to carry out several scientific studies at the same time and on-demand.

The zoo specializes in fundamental research in the fields of sensory physiology (e.g. bioacoustics and electroreception), hormone physiology (e.g. stress research and reproductive biology), behavioral science and veterinary research (e.g. nutritional physiology and parasitology).

Unlike in the education sector, when it comes to research, the zoo itself is not doing the work, but students and doctoral students. Universities increasingly want to use the zoo and local scientific support for their projects, and include research projects on zoo issues in their research programs.

The zoo will need to expand and professionalize its offerings to universities. The Natural History House is to have its own laboratory for hormone physiological analysis and bioacoustics evaluations. Jobs for students need to be maintained, and universities and their students need to find permanent contacts and supervisors through their own scientific staff in the zoo.

B. Attractiveness

VII. The zoo as a leisure facility

A visit to the zoo should inspire well-being in every aspect. As described above, people should visit the zoo with a clear conscience because they can see that the zoo is working to fulfill their role sufficiently: they guarantee the well-being of their animals and serve to preserve biodiversity through their animal husbandry, educational offerings and research projects.

In addition, the visit itself needs to be a positive experience. **Visitors must be able to relax on their walk through the grounds, make lasting memories through fascinating animal encounters, take beautiful pictures amidst stunning surrounds and enjoy all the creature comforts they could possibly need.**

To make this happen we need beautiful and well maintained facilities, many opportunities to rest, good service with excellent customer service, plenty of clean sanitary facilities available, diverse gastronomic offerings in a pleasant atmosphere and of course enough well maintained playgrounds for children.



Relaxation, natural beauty and plenty of animal experiences are the core concepts of the recreation center zoo.

To allow visitors to relax, we have a growing number of picnic and resting places, branching off from the main pathways, a newly constructed kiosk at the entrance with quality amenities and animal exhibits where the inhabitants can be discovered amongst natural vegetation and topography. Natural beauty refers to the character of the zoos landscape, which is characterised by vegetation and rock formations. The botanical concept will be expanded upon to produce a greater variety of flowers, autumn colors and shapes that will be more closely connected to the animals' areas of origin.

The availability of animal experiences is emphasized more and more by accessible animal facilities and the continuation of barrier-free viewing into animal enclosures.

VIII. Infrastructure

Each recreational facility requires infrastructure that depends on the length of the guests visit, the demographic composition of the visitors as well as their expectations, and the size of the site.

The zoo is spread over an unusually large area. In Germany, only the Tierpark Berlin Friedrichsfelde (160 ha), the Europa Park Rust (95 ha) and the Heidepark Soltau (85 ha) are larger than Nuremberg Zoo (65 ha).

Visitors to the zoo represent a demographic mirroring the inhabitants of Nuremberg. All age groups and social classes are proportional to the city population represented in the zoo. This makes the zoo the only cultural institution that is actually visited by all sections of the population. This means that the zoo, as well as the swimming pools, proportionally reaches all social groups

of the city with its offering. Singles, couples, families, school classes, kindergartens, academics and illiterates from different age groups must be catered to equally. Retreat spaces and picnic areas have to be created for visitors wanting to relax, special offers and playgrounds must be available for eager students and children, easily understandable but never lowbrow information needs to be provided.

On average, visitors to the zoo spend four hours outdoors, so spend a "half" day at the zoo. Only holders of annual passes will often spend less than two hours, but come to the zoo on average 30 times a year. The long visits to the zoo imply that people will need a hot meal, but also snacks on hand, drinks, ice cream and plenty of toilets. The gastronomic and sanitary offerings must be constantly updated.



The increased availability of picnic areas did not affect sales in the restaurants. Playgrounds are essential.

While in the last 10 years, handicapped toilets and changing rooms have been retrofitted nationwide, the really essential and severely handicapped sanitary facilities are missing. Also in the last 10 years the zoo has been equipped in central places with digitally controlled info-monitors. Now, however, a site wide WLAN network is missing, which can be used by both visitors and employees scattered around the site for seamless communication.

Although the zoo has dedicated itself to the principle of an analogous experience space, the goal of inclusion includes the development of an audio guide for the visually impaired and foreign-language visitors, available as an app for smartphones. Analogue experience sometimes requires modern digital technology.

Impeccable and high-quality service offerings are increasingly expected by customers. Decentralized gastronomic structures are required to service the spacious grounds.

When it comes to animal facilities, visitors expect impeccable and high-quality equipment such as crystal-clear water, well-tempered exhibits, bright daylight and a structurally flawless conditions in the facilities. Incidentally, employees of the zoo expect the same.

The technical infrastructure of the zoo came in large parts from the time the zoo was founded, the gastronomic infrastructure is largely modernized aside from the kiosk at the entrance. The condition of supply lines and channel systems remains a challenge.

In order to offer visitors a carefree visit, good working conditions for employees and good living conditions for the animals, infrastructure has to be continuously repaired, renewed and modernized.



In the zoo, old and modern technology coexist and are complexly interlinked.

C. Functionality

IX. Sustainability

The zoo is a public information platform for sustainability development with exemplary function. From its forestry roots as part of the Reichswald Forest, to its modern role as a conservation center and as an extracurricular learning place for education on sustainability development, the zoo has adopted sustainability criteria for all its activities and operations.

Gradually, all heating and ventilation systems are being modernized. Due to its decentralized heating structure, individually adapted energy solutions are used. Wood chip heating, combined heat and power plants, heat exchangers, fuel cell, photovoltaic, solar thermal, water recovery and passive house standards are used. **Bit by bit, the efficiency of resource use is increasing. Minimizing the consumption of resources and the production of emissions are part of the zoos investment program, in line with the company's consistent ethics of responsibility.**



Solar thermal, photovoltaic, BHKW and wood chip heating in the zoo

This includes the conversion of agriculture to organic production, the introduction of organic certified gastronomic offerings, the purchasing of MSC certified fish and FSC certified wood and paper. Not to mention the forest management plan for urban forest land, which aims to improve the ecological value of urban forest land.

As an EU bird sanctuary, the zoo manages 450 species-specific nesting boxes, maintains a rescue station for injured owls, griffins and storks and ensures at least 10% deadwood in the forest, taking traffic safety into consideration. (Deadwood is the prerequisite for almost 3,000 species of insects and fungi in our forests, not taking into account the species which depend on tree hollows.)



The forest with both its living and dead trees, provides a habitat to a variety of native animals, which is preserved in the zoo specifically for a variety of species such as the middle spotted woodpecker, blindworm and flower chafer.

The zoo is a FFH and bird sanctuary, therefore actively involved in the implementation of the European Biodiversity Strategy under the Natura 2000. 31 mammal species, 111 bird species, 6 amphibian species, 6 reptile species and 3,000 identified species of invertebrates, live in and around the enclosures of the exotic wildlife. Protecting their habitats is part of the zoo's conservation program.

This sustainability program requires an investment program that creates value that no visitor to the zoo can visually see. The visitor does not consciously experience the added

ecological value; but they have to pay for it if the costs can no longer be borne by taxpayers alone.

X. Technology in the Zoo

A scenic zoo must not show that it is a high-tech facility. For visitors who have been visiting the zoo for decades, the appearance has evolved, but not fundamentally changed. By all means, the architectural landscape design, embedding new buildings comes first.

Thus, the largest construction ever built in the zoo for visitors was unimaginable. It is a three-storey, 150-meter-long engineered building, housing the lagoon and manatee water treatment and processing and the Manatee House and Blue Salon heating and ventilation systems. With 50,000 m³ of soil, this structure was overlaid and covered with a landscaped surface, which fits seamlessly into the natural landscape of the zoo. It is no longer noticeable that the terrain had to be raised up to 17m in some places.



Of the 25,000 m² construction site for the lagoon, around 20,000 m² is now covered with vegetation.

It is also easy to overlook the fact that there are technical facilities in and below the zoo that are in no way inferior to a medium-sized industrial complex, and whose complexity is pushing tradesmen and engineers to their technical limits.

On 65 hectares of naturally landscaped topography, lies a "village" with over 100 properties, which annually welcomes one million visitors with service, gastronomic offerings as well as animal and nature experiences, while keeping 2,500 animals and providing diverse climatic conditions that the animals need. From rainforests, steppes or the arctic - all for their welfare. Experts from seven technical professions operate, maintain and monitor the technical equipment 365 days a year - around the clock.



The zoo's technical equipment has developed rapidly in the last 20 years.

The technology and equipment used to run modern zoos today has developed rapidly and in many cases, faster than zoos can keep up with. The adaptation of the operations could not keep up with the changes. As a result, structural deficits in the operation of modern technical equipment have greatly increased the technical risks. Structural adjustment is therefore necessary and unavoidable when considering the extent of damage if the zoo was to experience system failure.

An onsite technical manager with engineering qualifications is essential in the future, as well as an increase in the number of tradesmen.

XI. Legal framework of the zoo

For a long time, it was in the hands of the City of Nuremberg alone to define and develop the conditions for animal husbandry in the zoo. Ever since the ratification of the CITES (Washingtoner Artenschutzabkommens) in the Federal Republic of Germany in 1975, the zoo was subject to the rules of this trade agreement in the procurement of new animals from the wild. The license requirement of zoological gardens according to § 11 of the animal protection law changed the sphere of influence of the city and zoo management. All animal husbandry must be periodically checked to ensure animal welfare compliance. For the first time, assessment criteria from the Federal Government on the keeping of wild animals, provided the criteria for evaluation, which had been compiled since the 1990s and have since been successively updated.

At the Rio Conference in 1992, the European Union signed the Convention on Biological Diversity (CBD). For the implementation in to European law, the fulfillment of Article 9 (ex situ-conservation) was transferred to zoos in Europe and regulated by law in 1999 in the EU zoo directive.

This EU zoo directive, which was reflected in § 24 of the Bavarian Nature Conservation Act in 2005, represents the legislator's largest turning point in the local authorities' decision-making freedom. According to this EU zoo guidelines, zoos must prove that they make a measurable contribution to the preservation of biodiversity.

How this contribution should be made was also defined:

1. Education on the protection of species
2. Research on the protection of species
3. Targeted establishment of ex-situ animal populations of endangered species
4. Proper keeping of the animals
5. Prevent the escape of kept animals
6. Registration of all kept animals



Convention on
Biological Diversity



§ 42 of the Federal Nature Conservation Act transposes the EU Zoo Directive, which inserts Article 9 of the Convention on Biological Diversity into European law, into German law.

Zoo schools have become an indispensable part of zoos, research projects have been accelerated, and EEPs are coordinating the establishment of animal populations whose animals are registered as individually as possible and, if technically possible, individually labeled.

Clear requirements that are easy to understand, plausible, and meaningful, but which may present major challenges to communities.

It is no longer enough to do many of the other things that you do in a zoo, but also do a good job protecting species, there is an increasing demand for zoos to focus all their attention on the above-mentioned points 1-4. The fact that points 5 and 6 are also very important does not make a difference to public attitude.

However, the legal requirement that animals kept in zoos or elsewhere should not escape has a very serious impact on the conservation of biodiversity. It is estimated that so-called invasive species account for about half of the total species decline globally. As zoos host many non-native species, a threat to native fauna should also be prevented by escaping zoo animals.

This legal guideline for zoos was strengthened in July 2016 by the Invasive Garden Ordinance and the so-called Union List, which lists all plants and animals classified as invasive for Europe, and which grows each year, with a breeding and transportation ban on of these species. This ban affects a number of common animal species in zoos, such as raccoons, coatis and muntjacs. Therefore the zoo no longer has a muntjac population.

Negotiations with the EU Commission to create a general exemption for zoos have not been successful to date. However, it was possible to successfully prevent the listing of potentially invasive species in Europe in 2017, which are endangered in their country of origin and are therefore propagated in zoos (e.g. the sika deer in the zoo). Whether this principle will be maintained in the following years is uncertain.

For urban households, this means not only high investments in animal welfare compliant animal husbandry, which are definitely appreciated by visitors, but increasingly higher operating costs for "soft" factors (e.g. research, education, scientific population management, field work), that visitors can not necessarily experience. The zoo is directly affected by regulations and directives, which are based on the Biodiversity Strategy, the Animal Welfare Strategy, the ratification of the CBD and their following agreements, and the reformulation of a new Animal Health Directive that replaces all individual regulations. For the representation of the interests of the zoological gardens and scientifically managed dolphinariums, the zoo participates in the financing of two lobbyists in Brussels.

Biodiversity is a public good that needs to be protected by the state. At least since the inclusion of species protection and animal welfare as licensed national objectives in common law, zoos have become nature conservation centers for the preservation of biodiversity through the EU zoo directive and the BNatSchG as well as the BayNatSchG and thus, for all intents and purposes at least partially government funded institutions. However, this has never been enforced, and so today the municipalities have the choice to either abolish their zoo (the municipalities have this freedom) or to ensure that the municipal zoos meet the states obligations.

XII. Importance of zoo associations

The Association of German Zoo Directors (Verband der Deutschen Zoodirektoren VDZ) was founded in 1887 and is the oldest zoo association in the world. It was a professional association in which directors exchanged technical knowledge. The VDZ was also the first association to pass an appendix to its statutes in 1977, defining the four pillars of science-managed zoos: biodiversity conservation, education, research and recreation. Almost completely unchanged in 1999, the first three pillars were adopted as mandatory requirements in the EU Zoo Directive.

The VDZ also initiated the establishment of the International Union of Directors of Zoological Gardens (IUDZG), which became known as the World Association of Zoos and Aquariums (WAZA).

In 1984, Cologne Zoo Director Gunther Nogge founded the European Conservation Breeding Program (EEP), which triggered the founding of the European Zoo Association (EAZA). The main objective of EAZA was to organize the European breeding programs and to strengthen and establish the importance of zoos as species protection facilities. In this, EAZA was successful. Then they were endorsed to the EU member states in the EU Zoo Directive as an authoritative organization to advice on the implementation of the directive.

This made EAZA an entity that had to define and implement the standards and working methods of European zoos within the meaning of the EU zoo directive. EAZA is, so to speak, a non-governmental institution for the implementation of the EU zoo directive.



World Association of Zoos and Aquariums | **WAZA**
United for Conservation™



VdZ
Verband der Zoologischen Gärten e.V.

Zoos are organized into worldwide, European and national associations. Species protection can only be effective through global and/or regional cooperation.

This little digression is important to understand why the association structure is of vital importance for the zoo and why the zoo has to adhere to the guidelines of the association, which in turn is shaped by its professional and personal commitment.

The close intertwining of law enforcement and association work shows for example, in the case of protected species, whose populations are coordinated in the EEP, no import or export permit is issued if the official program coordinator appointed by EAZA does not make a written recommendation for the transfer of the animals concerned to the relevant government department.

German law enforcement agencies may also issue their husbandry permits to the EAZA housing guidelines for the species concerned, if the standards of the German husbandry guidelines from the Federal Ministry do not authorise a clear judgement.

Only as a member of the EAZA and as a participant in the EAZA EEPs can the zoo maintain its valuable animal population.

The VDZ in turn reformed in 2014 and is now no longer a professional association, but as a federation of zoological gardens (VdZ) a lobbyist for all major zoos in Germany, Switzerland and Austria. Because of its strong membership, it holds enormous weight within the EAZA, so the zoo asserts its influence in the EAZA through its board work in the VdZ, which in turn has a strong influence on European legislation.

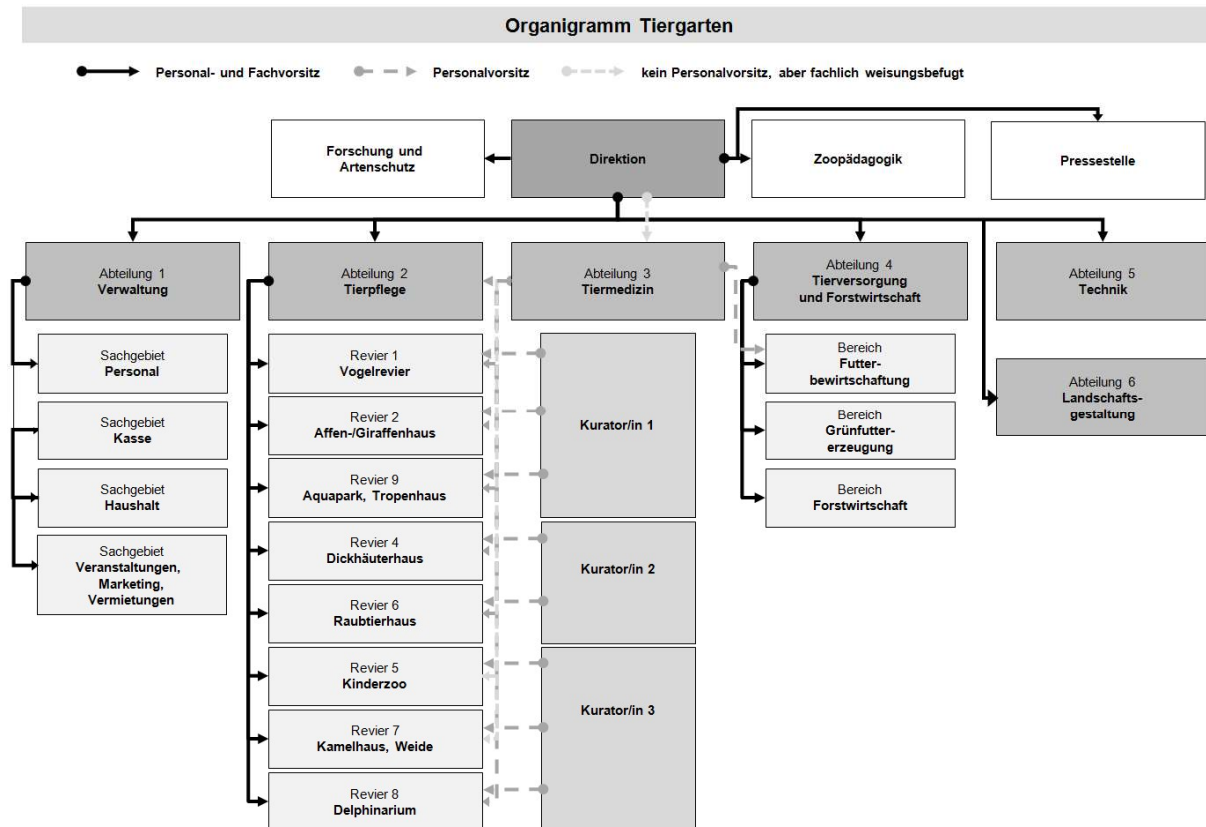
One aim of the association's work is to provide the legislator with the technical basis for its legislative procedures and to make itself heard as a registered lobbyist in Brussels. The zoo is also a registered lobbyist in the Transparency Register of the EU and thus has official access to Parliament and the Commission.

The political dimension of the zoo's work was unimaginable just a few years ago and has therefore not yet been reflected in the corporate structure. However, this must change as long as the zoo and therefore the City of Nuremberg have influence over the European and federal policy in the area of biodiversity management and biodiversity conservation.

The newly developed structure of the EEPs mentioned in Chapter III was also discussed by the zoo and will allow for much stricter implementation of Article 9 of the CBD. But this will require all members of the EAZA and the EEPs enormous personnel requirements, which are outlined in the zoos proposed organisational chart.

XIII. Proposed zoo organisational chart

The zoo currently has 109 FTE (full-time equivalent) positions, which are filled by 123 employees.



The organisational chart of the zoo no longer reflects the tasks of a modern zoo in a contemporary way. The indispensable functions of research, education and species protection are only formally covered by staff offices. The area of communication is no longer able to cope with the challenges of digital media with its 0.6 FTE position.

Although staffing at the zoo has grown in recent decades, little has changed in the basic structure of the organization. The Zoo School (1.0 FTE), which was founded in 1986, the Office of the Curator for Research and Species Protection (1.0 FTE), created in 2006, the Office for Communication (0.6 FTE), created in 2008 and the Office for the Organization of Zoo Tours (1.0 FTE) are the only structural changes made during this period.

A real review and adjustment of the organizational structure to the current needs of a modern zoo has yet to take place.

It is difficult to make a comparison with other zoos in Germany or the German-speaking countries, because there is no information with which comparison parameters or key figures would be used for classical zoo benchmarking.

In the following table, therefore, only a few zoos are listed as examples, which are assumed to play in the same league as the zoo, even though the individual figures show that they do not really yield plausible correlations.

	Nürnberg	München	Leipzig	Köln	Basel	Hannover	Gelsen- kirchen	Wien
Fläche	65 ha	40 ha	27 ha	20 ha	13 ha	22 ha	31 ha	17 ha
Einwohner	500.000	1.500.000	570.000	1.000.000	175.000	550.000	260.000	1.800.000
Besucher/a	1.000.000	2.000.000	1.800.000	1.700.000	2.000.000	1.200.000	970.000	2.200.000
Preis/Erw.	13,50 €	15,00 €	21,00 €	19,50 €	19,30 €	25,00 €	21,50 €	18,50 €
Anzahl Tierarten	250	750*	865*	842*	628*	177	100	746*
Anzahl Tiere	2.500	19.000*	9.500*	10.500*	7.000*	1.800	900	8.800*
VZ- Äquivalente	109 (2017)	149 (2015)	215 (2015)	138 (2015)	154 (2015)	195 (2015)	129 (2015)	196 (2015)

** In zoos with aquariums/vivariums, invertebrates & fish make up about 2/3 of the animal population*

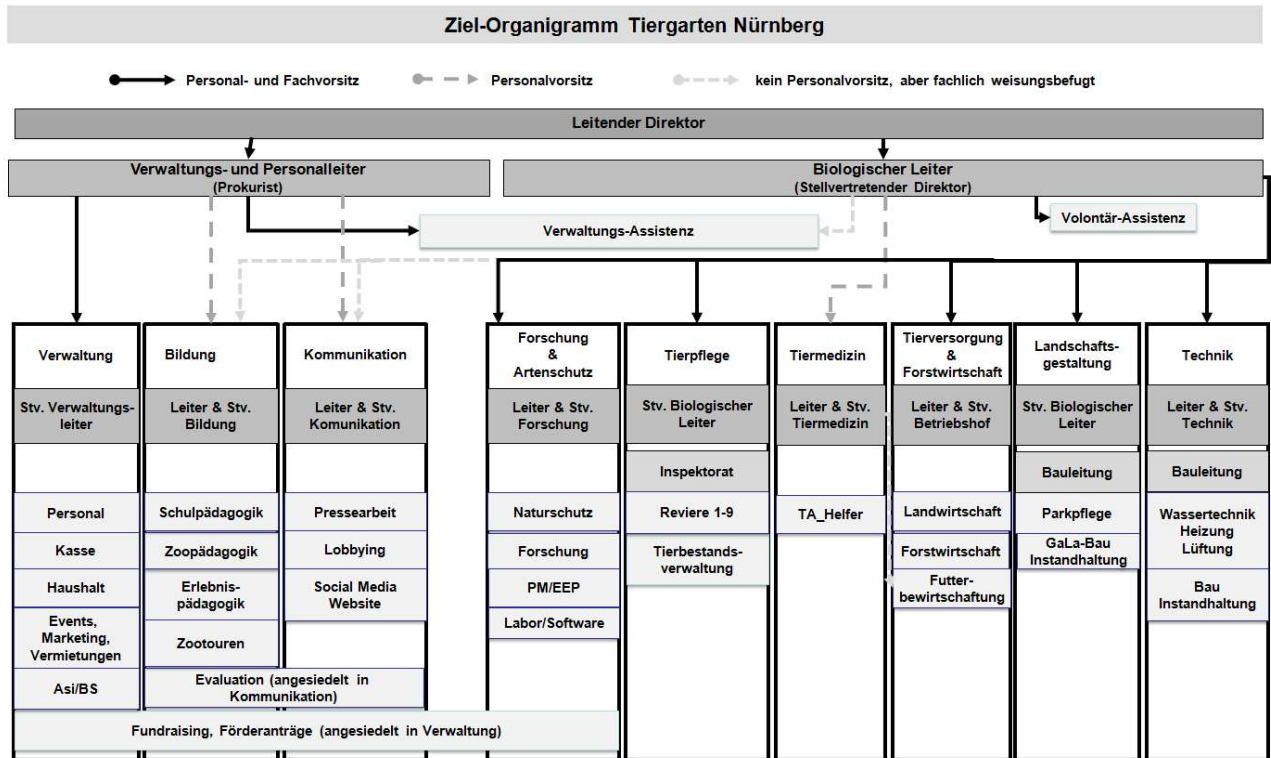
The very limited staffing at the zoo inhibits further development of the zoo and increasingly overstrains staff. The priorities are primarily to increase the necessary adjustments to the functionality and attractiveness of the business in the commercial sector. The secondary priority involves the expansion of the staffing units into functional operating units in order to adequately meet the legal requirements and societal expectations. The third priority is the restructuring of the management functions.

Some of the jobs are designed to generate additional revenue that overcompensates staffing costs in the long term. This applies to the fundraising, research laboratory and zoo education positions, i.e. 5.5 positions.

Increasing the number of technical staff should result in lower maintenance costs and, possibly, a reduction in outsourcing. However, this is also offset by the expected higher construction output, so ultimately no cost savings are expected in this area.

The additional needs in animal care will ensure quality in animal husbandry, the most sensitive area of the zoo in the public eye. At the same time, the planned investments in new animal facilities naturally leads to an increase in staffing requirements.

All in all, the zoo will need to create at least 26 FTE positions over the long term to meet the needs identified in this report. With assumed average costs per job and year of 60,000 euros, this results in a future additional budgetary burden of 1.5 million euros per year.



The proposed organisational chart for the zoo illustrates how the operational structures will be adapted to the requirements of a contemporary zoological garden in the future. The speed and order of these personnel adjustments will depend on the needs and business opportunities of the zoo. The step-by-step implementation allows for adjustments, elaboration and amendments to this proposed organisational chart after every completed step.

It would be misleading to consider staffing costs alone. All non-commercial employees will have to implement projects, plans and programs. They will be allocated budgets and will raise orders and bookings. As the amount of additional budgetary requirements cannot be quantified in advance for each individual position, it is generally assumed that each position will on average spend the same amount of money as the position itself costs. This includes diverse requirements such as advertising, lobbying, research funding, business trips, signposting, structural and design improvements, etc. As the size of the business grows, consumptive expenditure is estimated to increase, in line with staffing costs.

This results in an incalculable increase in operating costs by a further 1.5 million euros.

XIV. Investment Plans of the Tiergarten

Nuremberg Zoo is lucky to have one of the most committed and member-strongest support associations in Nuremberg at its side. The association of the zoo friends has become a guarantor of the zoo development. Meanwhile the association provides the zoo with an average of 400,000 euros per year for its structural development.

Thus, the zoo is able to plan investment projects for up to 1.0 million euro with association funds and at the same time to pursue its strategy of 200,000-euro steps with association funds. The Association of Friends of the Zoo has contributed 2.5 million euros for the Manatee House alone and fully financed the Desert House with 1.0 million euros, even though only 800,000 euros of this will be drawn down due to federal funding.

Despite the large investments totalling 3.5 million euros, the zoo was able to realize seven additional larger projects in the period 2005-17 and spend additional association funds on research, veterinary medicine and species protection.



The Association of Friends of the Zoo (Verein der Tiergartenfreunde Nürnberg e.V.) reflects the considerable civic commitment to the zoo in Nuremberg. Its over 8.000 members finance both animal facilities and in situ kind-protection projects of the zoo.

For the investment, planning of the zoological garden this has large effects. For many years now, the budget has not included any animal facilities that do not exceed a sum of 300,000 euros, as the association with third-party funds finances them.

The zoo budget therefore mainly includes technically necessary measures in the maintenance budget and infrastructural projects in the conversion and extension lump sum.

The maintenance budget needs to be increased by around EUR 0.5 million/year to maintain the substance. This necessary increase, however, requires the additional staffing levels described above, as otherwise, it will still not be possible to implement the necessary maintenance.

In the foreseeable future, only major investments (> EUR 1.0 million) will otherwise require recourse to the city's overall budget. These are listed in the overall plan of the Tiergarten: Forest path in the north of the Tiergarten (in 2-4 construction phases) and "One World Facility" and gorilla house in the south of the Tiergarten. To what extent a new giraffe house and the extension of the rhinoceros house, that the zoo can finance itself together with the Association of Friends of the Zoo is not yet foreseeable.

The enclosed plans show the structural changes to and in the zoo planned so far. They represent a continuum of the planned and already implemented projects since 2001 (Appendices 2-4: Already implemented and planned projects in the zoo)

XV. Conclusion

The concept presented here represents a minimal variant with which the zoo can be developed in small steps in a cost-saving, efficient and effective way, making it competitive and socially acceptable. The concept does not rely on major investments as a recipe for success for increasing visitor numbers, but rather on continuity in quality and credibility with the aim of maintaining an annual visitor number of around 1.0 million in the long term, while at the same time ensuring that visitors are willing to pay for their visit.

The personnel and management proposal is based on the following assumptions:

- Admission fees are too low in comparison with other national zoos in Nuremberg.
- The number of visitors will always remain at an average of one million per year, even with increased admission fees.

- Without a successive increase in staff by 26 FTEs and a related increase in the budget, the zoo will be unable to develop and will quickly lose its acceptance and, ultimately, its visitors.
- The zoo can cover all the consumption costs proposed in the concept itself if gradual fee increases are accepted.



Small house - big change: The old hippo house during its metamorphosis into a desert house in February 2017 and January 2018. Verein der Tiergartenfreunde Nürnberg e.V. supported the project with 1,000,000 euros. Federal funding was about 200,000 euros.

Attachments:

- (1) Extract from the 2008 development concept
- (2) Zoo plan for conversions and new buildings 2001-2017
- (3) Zoo planning until 2032
- (4) The forest path - a lighthouse project for the future

Attachment 1

Extract from the development concept from 2008

Extract from the development concept from 2008

Nature is the teacher, not as if we wanted to copy natural sceneries as our final goal, but in such a way that we recognize the beautiful in the creations of nature and study its causes in order to compose beautiful landscapes ourselves. (Fritz Encke, 1901)

Basics:

The landscape characterizes the Nuremberg Zoo (Tiergarten Nürnberg). It consists of areas with dense tree population, old quarries, ponds and open meadows. What we casually refer to as countryside is in reality a manufactured natural space:

The forest is a forest, the quarries are synthetic, the ponds are built and the meadows are typical cultivated areas. Shaped by people, cultivated by people and developed by people.

This means that any long-term development concept for the Tiergarten will methodically be a landscape architectural plan - the design and development of a natural space.

The unique selling point of the zoo in the past and for the future was, is and must remain its incomparable landscape character. Every structural intervention in this space changes its character and the way people perceive it as they pass through it. It is like in an art exhibition: a given exhibition space influences the effect, power and intensity of the exhibited art, just as the works of art change the space in its effect on the visitor. Ideally, the architecture of the room and the exhibited art reinforce each other.

This principle also applies to the landscape architecture of a zoo. Buildings, paths and enclosures must represent an aesthetic enrichment of the given (natural) space and not contradict the existing (cultural) landscape. For the planning of such spaces, therefore, both sides must be equally involved in the planning process. The modification of the natural space through human intervention can become functionally and aesthetically necessary. We have to harmonize the aesthetics of functional building measures with their surroundings.

....

Objective:

The Nuremberg Zoo is to use its enormous potential in terms of space, animal population and qualified personnel to become one of the leading and most modern zoos in Europe with all the facilities that the zoo is going to build. The old facilities have to reach a condition that at least meets today's basic standards.

The zoological garden is committed to innovative new planning, which in the long term can serve as a model even ten years after opening. This presupposes that none of our plans may refer to copies of existing facilities. Every planning must incorporate new aspects based on experience with existing facilities. It let think ahead and set new standards for the future:

- Every new plant must meet the highest aesthetic standards.
- Every new animal husbandry must introduce new aspects to the animal nursery in terms of quality and standard.
- Every facility we will design for animal and plant communities, as far as a socialization is possible.
- Each facility we have to build under the aspect of educational employability.
- Each facility must be subject to the principle of sustainability.
- Every facility we will plan holistically: Animal communities, plant communities, didactic statement, and harmony of landscape, functional perfection must fit together without contradiction.
- Every facility must be equipped with the same meticulousness for the needs of the animals and the visitors.
- Each facility should be unique.

The zoo must maintain and consolidate its reputation as the most beautiful landscape zoo in Germany.

...

Zoo and environmental education

Zoos are among the potentially strongest multipliers for nature and species conservation issues. The potential offered by over one million visitors to Nuremberg Zoo and hundreds of guided tours booked at the zoo every year must be exploited.

All plans have to incorporate the ability to communicate the content. Which animals, plants, facilities, and designs can convey which topics? How can we support the work of educators through design, signage, planting and animal selection? Which aids can be included from the outset? How can central concerns of environmental education be "materialized" in the zoo through targeted planning?

Soberly considered, this is one of the most essential and at the same time most difficult tasks of zoos. After all, our visitors do not come primarily for further education. They want to enjoy the day. If we want to give them a lasting message to take home with them, we must not spoil their enjoyment of their visit.

However, how can we package an urgent warning about the consequences of environmental destruction or the loss of biodiversity as an enrichment of a visit to the zoo? If this is possible at all, then certainly only by conveying solutions and positive perspectives instead of disaster scenarios. In general, our visitors should be able to leave the zoo with some basic ideas:

- The topic of biodiversity is complicated but boundlessly fascinating,
- there are solutions for most and even the biggest problems,
- technically, man is already able to keep the planet livable,
- every single person can make a contribution without loss of quality of life,
- to deal with topics of nature and biology is fun.

Importance of the immediacy of the animal experience:

The Nuremberg Zoo fulfils an innate need of people to be able to get as close as possible to other alien creatures. The closeness or distance from the animal has a decisive influence on the emotional accessibility of people to an animal or species. The innate affection for other living beings (biophilia) loses its effect with the removal of the living being.

For example, a Chilean Dolphin on the Chilean coast will never be able to develop even remotely the emotional reaction that the bottlenose dolphin Moby in Nuremberg exerts on humans. The killing of thousands of African elephants in so-called culling actions will never be able to stir up a citizen of Nuremberg as much as the death of the elephant Kiri in Nuremberg Zoo.

Scientifically, so-called biophilia has been recognized as the decisive key to restoring the largely lost relationship between an urban person and animals or plants by means of encounters as close as possible. The directness of keeping zoo animals fulfils this approach far more effectively than media mediation.

In terms of implementation, this means above all reducing the distances between humans and animals to an acceptable extent.

Attachment 2

Zoo plan for conversions and new buildings 2001-2017

Umbauten und Neubauten von 2001 bis 2017

Städtische Finanzierung
 Drittmittelfinanzierung
 Tg-Budget
 Rücklagen
 Um- und Ausbaupauschale



Attachment 3

Zoo planning until 2032

Planung neuer Anlagen bis 2032

- Drittmittelfinanzierung/Tg-Budget**
- Kategorie I < 500.000 € =
 - Kategorie II 500.000 € bis 1.000.000 €
 - Kategorie III 1.000.000 € bis 5.000.000 €
 - Kategorie IV > 10.000.000 €
- Städtische Finanzierung**



Explanation of the development and planned major projects of the zoo

- The zoo will base the decisions on issues of species protection and environmental education.
- The animal population will reflect these issues.
- In its area-wide over-planning of the site, the zoo does not intend to change the character of the landscape, but to strengthen it.
- The vegetation will take on a more central role.
- For the greatest possible proximity of humans and animals, the zoo create barrier-free enclosures - in a double sense.
- The enclosures will offer the animals more choices and challenges.
- The zoo will translate important topics for the preservation of biodiversity into coherent images with attractive animals and plants.
- The zoo aims to become the most important extracurricular learning space for sustainable development in the metropolitan region.

The Forest Trail: The ecology of the forest from the ground to the treetops will be the subject of adventurous tours through a forest of wolves and monkeys, from the ground up to a height of 24 meters, where school classes and groups will find a classroom for lessons and overnight accommodation.

The One World Site: What do we have to do with Africa? The migratory birds tell the stories of the ecological interrelations of migration routes that lead from Europe to Africa. In the summer, people experience the life of bee-eaters, storks, European rollers, kingfishers and hoopoes in a huge, walk-in aviary. In the summer, they share the rear pond of the zoo with African antelopes and in the winter, they live in a warm house with the antelopes.

Gorilla House: How can sustainable forestry in tropical rainforests be managed for the benefit of humans and for the survival of the gorillas? The Tropical House for Gorillas will take visitors into an African rainforest. In summer, visitors will experience how these animals inhabit and use our forest and share it with other animals.

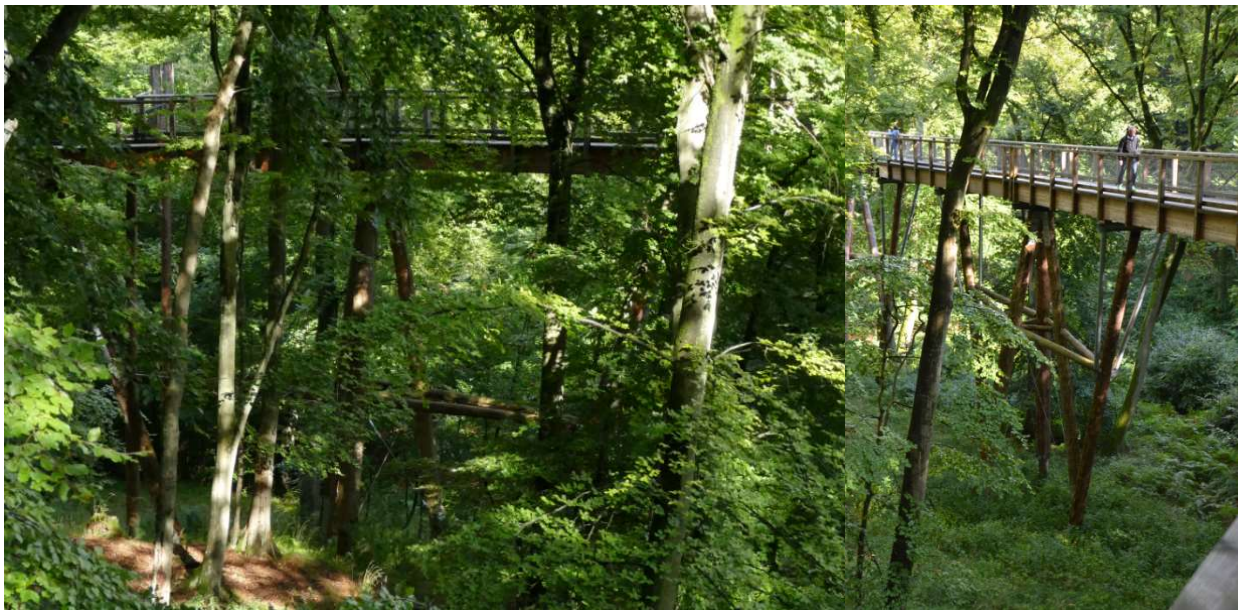
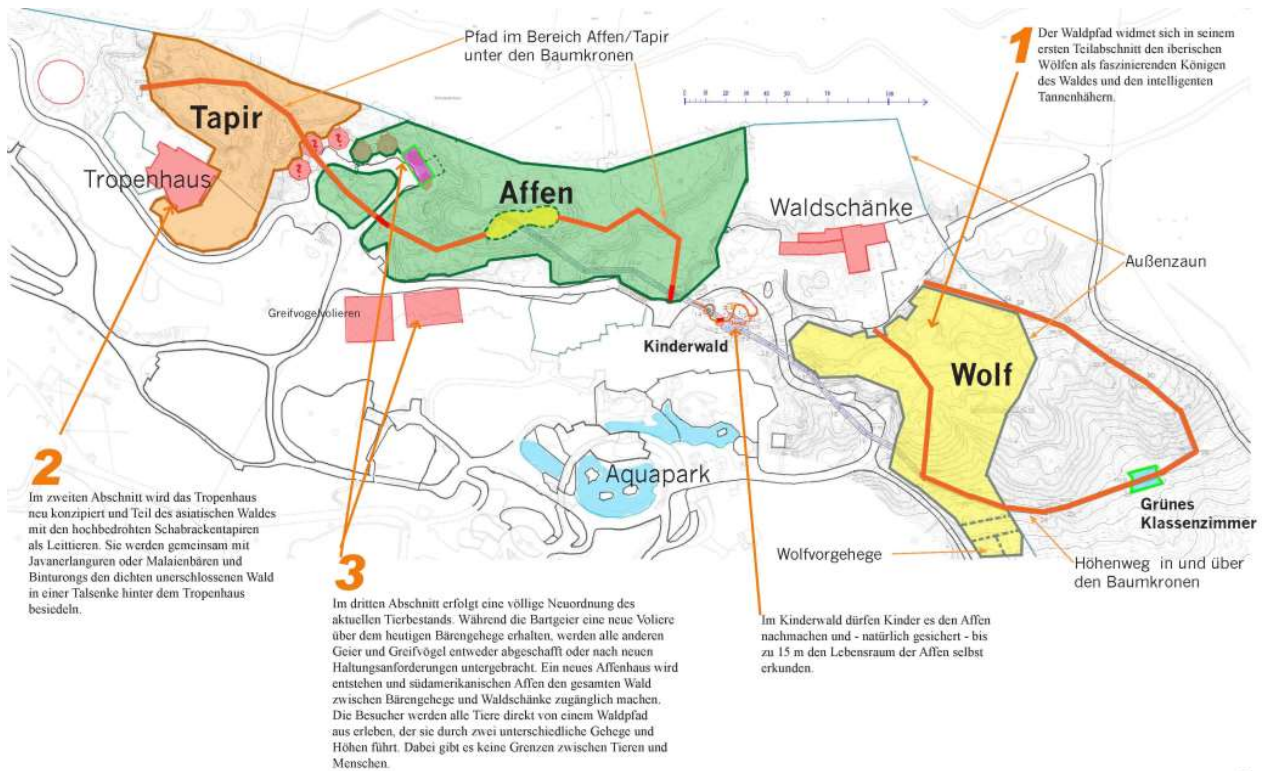
Aviary for Barbary sheep, vultures and Barbary apes: Is it inevitable that the animals of the Atlas Mountains will become extinct? On the other hand, will we find concepts for a new harmony of human needs and animal demands in a common habitat? This question will be answered with the help of the above-mentioned species in another walk-in aviary.



The zoo has to preserve its landscape character permanently. All planning is adapted to the terrain and its tree population. The picture shows an excess planning over a period of about 30 years (2001-2032).

Attachment 4

The forest path - a lighthouse project for the future



The planned forest path is divided into three construction phases. It leads through a wolf enclosure for the endangered Asian Red Dogs, a forest for monkeys and an area for the endangered Malayan tapirs. It leaves the zoo and presents the native beech forest in the Reichswald at a height of 24 meters. A green classroom is located at a height of 24 meters with a logistic connection to the Waldschänke. Here, lessons can be taught and overnight stays can be organized for rural school homes and other interested groups. The walk at altitude will offer many opportunities to experience life in the treetops, the height of the forest and the behavior of the animals up close. The tree population will hardly be affected by the construction of the path. Despite the height, the path is barrier-free and equipped with many possibilities to settle down and look up. The planners will not neglect the adventure for children, too.

The forest path will be a unique selling point for the city of Nuremberg and the zoo world.