Developing a Zoo Master Plan : Why is master planning particularly important for zoos?

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Purposes

Why is master planning particularly important for zoological parks? The purposes and audiences of zoos are very diverse, the period of a zoo's development is open-ended, funding and public support are changing and unpredictable, and the goals of zoos are long-term. These inherent complications require that zoos make and carry out appropriate decisions today to ensure success in the future.

A master plan creates a vision that is supported by policies, guidelines, and priorities. It guides the development and evolution of the zoo. The planning team that creates the master plan should involve representatives from all aspects of the zoo's operation, and may or may not be supplemented with outside consultants. The benefits of an entirely in-house team may be stronger local control of the project and lower recognized costs. However, there will be an increased amount of time and work required from already-busy staff, leading to a long period of development. Outside professionals, who are trained in design, planning, and facilitating, can bring experience and specialized knowledge of new trends and technology, as well as help avoid costly mistakes.

Having a master plan in place supports the *coordinated growth* of the zoo's separate facilities and functions and helps avoid "ad-hoc" development of the zoo. If future decisions about the design and development of the zoo are all made with respect to the precedent and direction of the master plan, the future zoo will likely be a coherent, site-specific, unique institution that fulfills identified goals. The master plan should, however, be reviewed and updated at least every five years, to keep up with the on-going changes in the zoo.

Process

Master planning differs from design in terms of scale, scope, and timeline. Institution development generally occurs through a three-tiered process, comprised of *strategic planning*, *master planning*, and *project design*.

The *strategic plan* is the first step to distinguishing the fundamental goals and overall visions of the institution. It is most commonly expressed in textual form, with supporting statistics and figures. The scope of a strategic plan includes intangibles such as the history of the institution, future goals, mission statements, breeding plan intentions, marketing strategies, financial strategies, possible partnerships, organizational plans, and interpretive program goals. The timeline of a strategic plan is as long as the plan is valid well into the future.

A *master plan* looks at the zoo for the next 5 to 25 years. Here, the scope is the physical boundaries of the zoo site. Concept plans, diagrams, and estimates of costs and schedules demonstrate how the strategic plan will be realized *physically* on the site. The master plan looks at the site in its entirety, laying a framework of how individual exhibits and facilities relate to one another and what consistent story is being told by the zoo as a whole, and a phasing schedule of how this will be realized on the site. An *interpretive plan* should develop alongside the master plan, each one informing the other to ensure consistency between message and physical development.

Project design is the physical design of one exhibit, a group of exhibits, or a facility. It turns estimations and visions from the master plan into realizable solutions. The timeline of a project design is generally 6 months to 3 years. Here, specifics such as barrier types, materials, built-in enrichment programs, sizes and shapes of facilities, and configurations of pathways are determined and detailed.

Each step of development builds on the previous. A master plan is derived from the objectives laid out in the strategic plan. Then, each project design will build off of the master plan. During project design, new information may suggest a re-thinking in the master plan. The planning team may look alternately at the master plan and the project designs a number of times, each one informing the other, until the plan that best captures the potential of the site is found.

The scale of a master plan is more specific than a strategic plan, looking only at those aspects of the institution that are to be realized physically within the boundaries of the zoo. However, the scale is still broader than the design and construction of specific exhibits, facilities, or portions of the site. Only prevailing principles for future design will be laid out. The master plan looks at the large-scale, physical make-up of the site and the conceptual organization of the site. This includes establishment of entrance and orientation, movement through the site, a story or theme that flows through the site, and ordering and placement of specific exhibits, facilities, and infrastructure. These plans are determined through an analysis of the site - determining which natural or inherent features of the site are appropriate for which uses - and subsequently arranging facilities on the site to best serve the future goals of the zoo.

Because master planning is building the framework on which future project planning will take place, and uses the strategic plan as a foundation, every

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concept in a master plan should fulfill the goals stated in the strategic plan. It should likewise be developed so that it can direct future project planning and design. It should offer specific directives for the future development of the site, but should be flexible enough to allow for unforeseeable changes in the zoo's situation (funding, attendance, etc.).
The final publication of a master plan will have many uses, in addition to providing an obtainable plan for future development. A master plan document can be used to market the zoo and to gain public support and funding. Attractively-done plans and models are especially helpful for "selling" the future zoo to the public and sponsors. Because of a wide readership, master plans are generally succinct (rarely exceeding 30,000 words) and contain up to 75% drawings, tables, maps, and other visual illustrations of the plan. In other words, a quick glimpse of the future of the zoo is made accessible to governing boards, businesses, government agencies, and the community, in addition to the future designers of the zoo.
The process of master planning encompasses a variety of activities, including:

Gaining an understanding of the zoo's strategic plan, as well as the current and intended audience, and the needs of the visitor,
• analysis and inventory of the existing site, including natural features (landform, vegetation), cultural aspects, (history, relation to the broader region, partnerships or competition with other facilities), environmental traits (climate, relation to greater landscape), and existing infrastructure,
• establishing a dominant organizational theme, which will provide a sense of order and continuity throughout the site,
• prioritizing goals, audiences, species, and exhibits,
• shaping circulation patterns for visitors and service staff,
• determining the numbers, sizes, and uses of facilities for visitors, animals, and staff to be included on the site, based on needs and budget availability,
• developing an implementation schedule (phasing).

Understanding the Zoo's Present and Future
Before a master plan can begin to take shape, the design team, be zoo employees or outside consultants, must determine a common vision for the future of the zoo. If a strategic plan has been developed, this will offer important input to the master plan. The strategic plan states the mission of the zoo and describes how this mission will be achieved through marketing, visitor services, collection development, interpretation, and partnerships. All parties involved in developing the master plan must be aware of the current status of the zoo in order to look ahead to the potential future of the zoo.

Site Analysis
A primary step towards developing a master plan for the future is inventorying what resources and limitations the site possesses today. Then, a site analysis of these inherent characteristics of the site is carried out. Through site analysis, existing site characteristics are placed into one of four categories: strengths, weaknesses, opportunities, and constraints (S.W.O.C.). Findings of the site analysis will help direct the plan of the zoo. For example, if one corner of the zoo is found to be noisy due to an adjacent street, or shady due to large trees blocking the sun, only animal exhibits or visitor facilities that can tolerate the noise or benefit from the shade should be placed there. Strengths of the site are traits that are well-appreciated, desirable to maintain, and parallel to the goals and visions laid out in the zoo's strategic plan. Strengths of the zoo site may be a large site with room to expand, a visible location in the city, many large shade trees, an agreeable climate, a unique historic character, or a large water body that serves as a focal point. The master plan should aim to retain these recognized strengths, given that they fit into the future vision of the zoo, and use them to realize the full potential of the site.

Weaknesses are aspects of the site that are currently sub-standard or lacking, but could be improved. These could be deteriorating buildings, a poor visitor entrance and orientation, a deficiency of green space, seating areas, or drinking fountains, inconsistent signage, or insufficient shade or indoor activities.

Opportunities are features on the site that have not previously been recognized as valuable or are not yet being used to their full potential. Examples might be an adjacent wilderness area that could serve as a splendid backdrop for animal exhibits, an area with a high water-table that could easily support wetland species, or the possibility to connect the zoo to the city's downtown via a bike path. The purpose of site analysis is to look beyond the functions of the site as it is today or always has been. For example, perhaps that northwest corner where the service yard has always been offers the ideal space for an African savanna exhibit. Searching for opportunities on the site causes the planner to re-think previous decisions made about the layout of the zoo. Often, "problem areas" (for example, a wet area that is always flooding) can be turned into areas of great success (a wetland exhibit).

Constraints are traits of the site that cannot easily be changed and must be recognized as challenges to work around. Buildings that must be preserved due to historic significance, strict boundaries to the site, noise or visual distractions produced by adjacent facilities, and government regulations are all examples of constraints. A challenge in developing the master plan will be to deal with constraints in an effective manner.

Whether a trait inherent on your site is a strength, an opportunity, or a constraint, depends greatly on the goals and visions set out in your strategic plan. For example, a protected historic building on the site can be considered a strength if it speaks to the historic character of your zoo, an opportunity if it could be re-furbished for a new use, or a constraint if the idea of the plan is to decrease the existence of large buildings on the site.

Examples of S.W.O.C. from Woodland Park Zoo master plan, 1976:
Strength = mild climate of Seattle area allows most animal species to remain outdoors year-round and a broad palette of plants to grow.
Weakness (changeable) = many activities on the site (rides, active recreation) compete with animal exhibitry.
Opportunity = the varying topography of the zoo site could be taken advantage of to develop microclimates and vary viewing opportunities.
Constraint (unchangeable) = boundaries of major roads on all four sides of site

Prioritizing
Not all goals can be realized this year, next year, or perhaps at all, if there are conflicting outcomes. In order to ensure coherency in future development of the zoo, it must be decided which species, exhibits, visitor experiences, programs, and facilities will be emphasized on the site. Many of these priorities may have been recognized in the strategic plan, but in the master plan, they must be given their specific place in space and time. Priority features are often given prime real-estate within the site, a high allotment of space and funding, and may be scheduled to be developed first.

An example of space-allotment by priority comes from Zoo Leipzig. “Pongoland” covers over 1/4 of the zoo’s total area, yet houses only 40 of the zoo’s 1,800 animals and just 6 of the zoo’s 950 species. This was determined to be a priority area because landscape immersion would play an important role (requiring a lot of space), great apes are interesting and complex, visitors will spend a good deal of time observing them, and the facility would also serve as a major research institution. The Oklahoma Zoo master plan divides future development projects into “priority projects” and “secondary projects”. The “priority projects” make up the central core of the zoo, while the “secondary projects” are located on the zoo outskirts. This allows the zoo to exist in a complete form before all of the “secondary projects” are complete.

Prioritizing may set the stage for a zoo’s identity in the future. The planning team should seek ways to take advantage of unique characteristics of their particular site and institution, to prevent their facility from being identical in purpose and appearance to other nearby facilities. Ways to achieve a unique identity include focusing on a certain category of species, decreasing the number of species and individuals to allow for large groups of select species, or choosing species that are relevant to a specific theme or message.

Establishing an Organizational Theme
Consistency is generally desirable (in materials, signage, and message) in creating a coherent site and visitor experience. Having a dominant theme in place, each exhibit referring back to a key message, will help ensure consistency throughout the zoo.

The central message or theme of the zoo should be meaningful, concrete, and communicatable. The site, as a whole, should say something fundamental and important, but not try to say more than can be clearly conveyed.

Many historic zoos have developed over the years to resemble pastoral city parks with “islands” of distinct animal exhibits floating within them. This arrangement provides minimal context for, or relationship between, the individual exhibits. In master planning, the idea is to look at individual exhibits and facilities as the pieces that make up a complete story in the zoo experience. Each exhibit should relate to those adjacent to it as well as to the overriding message of the zoo.

Zoo Hannover’s master plan set the goal of creating “scenarios instead of menageries” in its development. The zoo’s overriding theme is to exhibit animals within the cultures of their countries of origin. Other themes could be emphasizing animal behavior, evolutionary relationships, taxonomy, human relationships with animals, or ecosystems. The planning team may want to ask itself how their zoo can provide a unique experience, different from other zoos in the region. The overall layout of the park may also be determined by the story the zoo is trying to tell. If the zoo’s story is one of interconnected ecosystems, in addition to exhibiting animals that co-exist in the wild adjacent to one-another, the entire park may be laid out in a zoogeographic configuration (placing species from Asia in one area, Africa in another, and the Americas in another) or in a bio-climatic configuration (desert species in one area, rainforest species in another area, and tundra species in still another area). The overall layout of exhibits can thus enhance the educational experience for the visitor. In order for this to be effective, however, it must be consistent throughout the zoo, expressed through inter-pretive signage, and main visitor paths must run through different zones, not between them. Another approach is to sequence exhibits so that they capture attention interest. It has been proven that visitors spend less time at exhibits that are placed far away from the entrance, due to “museum fatigue”. You may choose to put less-charismatic species near the beginning of the visitor’s experience, when their level of interest is high.

Conversely, human psychology also tells us that educational messages will only be absorbed by visitors when they are emotionally-engaged. The Apenheul Primate Park is arranged so that visitors encounter free-ranging small monkeys that they can personally interact with at the beginning of their visit. This emotionally-engaging experience heightens their receptivity to learning when they move on to highly-educational great ape exhibits.

Configuring a Circulation System

Laying out exhibits and facilities happens simultaneously with determining how people will move from location to location, or through your zoo experience from start to finish.

A one-way traffic flow allows more control over visitor experience, story-telling, and interpretive programs. However, visitors also enjoy having choices and planning their own adventures. Recognizing facilities that compete with, or complement, one another, will help concentrate complementary facilities (restrooms, meeting spots, orientation maps, and food service, for example) around high-activity nodes, thus creating a rhythm throughout the site of dense architecture and activity versus open, casual-use space.

Thinking as a visitor moving through the site, what arrangement of pathways, facilities, and exhibits would offer an experience that is pleasant, safe, educational, and entertaining? Straight paths or serpentine paths? Exhibits placed in a row along the path (experiencing them as you pass by)? Exhibits alternating on both sides of the path? Paths cutting through exhibits (experiencing them while moving through them)? Placing exhibits at the ends of secondary paths that shoot off of the main path (experiencing them as a destination point)?

Many zoos employ a loop, or a series of loops, as the basic framework for pathways. A hierarchy of pathways is usually placed on top of this, with primary, secondary, eventually tertiary paths differing in width, material, and use. A primary pathway may be 10 meters wide to accommodate many people moving in all directions with strollers, wagons, and wheelchairs. Here, a more durable, urban surface material may be used and more benches and signage be offered. On secondary and tertiary paths, the width would decrease to 4 or 2 meters, designed to accommodate less people at a time and provide a more personal experience. Direction signage may be reduced, and the path may be made of wood, gravel, cobbles, or another material that conveys the character of the exhibit area. It is often desirable to have most exhibit viewing locations located on secondary and tertiary paths, while primary paths serve to move people from one area to another and to accommodate visitor services.

In addition to the visitor experience, circulation and building layout must take other users into consideration, such as service and maintenance staff. Some service roads will be used daily, like those for delivering food or hauling trash. Others, such as access points for cranes when adding a new log or boulder to an exhibit, will only be used occasionally, but must be planned for. There must also be consideration given to handicap accessibility of the entire site as well as to fire or emergency routes (this includes how to get people and animals out as well as allowing emergency vehicles in).

Clearly identifying the main entrance or entrances is of prime importance. Also, if special events are to be held in the zoo (now or in the future) they may require special entry or circulation consideration. Zoo Hannover chose to place its Meyer's Farm area near the parking structure for the zoo with its own entrance, allowing the themed restaurant to remain open later than the rest of the zoo.

If there is any chance for zoo expansion in the future, it may be desirable to create a pathway system that can be easily extended without disrupting flow and organization.

Determining Amounts of Space to be Allotted to Visitors, Staff, and Animals

How big should the African savanna be to accommodate all the species desired? How many restrooms per visitor should the zoo have? What facilities will the great ape keepers need? Will most veterinary procedures be performed at individual exhibits, or will animals be taken to a specific clinic? Would adding another gift shop increase revenue, or be redundant? Does the current administrative building supply enough office space?

One of the biggest challenges of developing and managing a zoo is striking a balance between fulfilling the needs of animals, visitors, and staff. In the strategic planning phase, we look at current visitation patterns and predict future increases, as well as add to or subtract from the animal collection so that the best possible conditions can be provided to the animals the zoo chooses to keep. The master plan should use these data to compute the number and sizes of exhibits and facilities that will be required in the future zoo.

Looking at other zoos that have similar-sized groups of animals may help determine how much space a species requires, as will reading reports from field studies on that animal.

Developing a Phasing Plan

A master plan is intended to be realized over the next 5 to 20 years. Naturally, the obtainment of funding will drive how quickly or slowly projects can be begun and completed. The master plan will estimate how much the zoo can afford to carry-out each year, but the situation very well may change. Construction costs vary considerably from project to project, depending upon amount of demolition necessary, materials to be used, and complexity of structures.

There are many factors besides funding that will determine the how and when of project construction. It may be necessary to build certain areas before others, so that animals can move into them before demolition of their current enclosures, so that the vegetation can quickly begin maturing, or so that other sections above, beneath, or adjacent can be built. For example, the underground level of Woodland Park Zoo's planned aviary would house the holding areas for primates. Either, the primate exhibits, as well as the foundation for the aviary had to be built first, with the intention of adding the aviary on top later, or the aviary itself had to be built before the outdoor primate enclosures.

Another consideration is how visitors, animals, and staff can continue to use the site during construction. It is important that a continuous portion of the zoo remains open, so that visitors can safely and pleasantly enjoy some exhibits, while others are under construction or renovation. Animal holding must be coordinated, so that animals can shift to temporary or new enclosures when needed. Access for maintenance and emergency vehicles must always be available.

A final consideration of phasing will be scheduling openings of new exhibits and facilities. New exhibits are often major crowd-drawers and bring extra visitors, including a high number of return visitors, to the zoo. If scheduled at the beginning of the peak visitation season, the number of visitors can be even further increased. If the zoo announces new openings periodically, every year or two years, visitors have an increased incentive to return to the zoo again and again.

Presentation

The results of the previous steps toward a masterplan will be compiled and presented in a format accessible to many audiences. When recording a site analysis, when communicating your ideas to other staff members or designers, and when trying to read and understand another person's ideas, a simple vocabulary of symbols is helpful. The idea of a master plan is to communicate *spaces* and *connections*. The large scale of a master plan means that graphics tend to be comprised of many "bubbles" and arrows. Different colors can represent phases and different patterns can represent different uses.

The final publication of a master plan should be simple and understandable enough so that future staff members and designers can follow it. It should make strong arguments for the decisions outlined and express the plan in a manner specific enough to keep the visions. While the situation of the zoo is likely to change in many aspects over the years, a well-thought-out, flexible master plan, will enable the zoo to develop continuously towards consistent goals.

Sources:

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Woodland Park Zoo Long Range Plan, prepared by Jones and Jones, 1976.

Zoo Hannover. "Exhibition Hanover Zoo: On the Way to the Zoo of the Future". Brochure, 1996.

Our readers may like to know about Gibbon Pocket Books. Their logo, depicted above, includes a Hoolock Gibbon and was drawn and designed by Anwarddun Choudhery, a well-known field researcher in NE India. Anwarddun is a bit of an anomaly as he is a senior bureaucrat with the government as well as researcher and writer. The history of Gibbon Pocket Guides dates back to 1993 when the publishing company was initiated by Anwarddun with support from his family and friends. Their motto was to publish some good quality books on wildlife. This was a necessity then as most of the Indian publishers then brought out books of poor quality paper and binding. Foreign publishers, however, edited the books in their own way, making significant changes in names which were not popular in India. Gibbon Books does not have its own publication fund and is usualy supported by reputed organisations (The birds of Arunchal and nagaland were supported by Oriental Bird club, UK), Mammals of Assam by ASTEC and so on. Listed below are books published by Gibbon Books.

Books published by Gibbon Books (many in collaboration)

1993 : 1. *A Naturalist in Karbi Anglong.* Gibbon Books, Guwahati. 88pp+maps, illustrations.

1994 : 2. *Checklist of the Mammals of Assam.* Gibbon Books, Guwahati. 59pp+maps, illustrations.

1997 : 3. *Checklist of the Mammals of Assam.* Revised 2nd edn. Gibbon Books and Assam Science Technology & Environment Council, Guwahati. 103pp, maps, illustrations.

2000 : 4. *The Birds of Assam.* Gibbon Books & WWF-India NE Reg.Office, Guwahati. 240pp, plates.

2003 : 5. *A pocketguide to the birds of Nagaland.* Gibbon Books & The Rhino Foundation, Guwahati [part funded by OBC, UK under Wildwings Conservation Awareness Award].

2006 : 6. *A pocketguide to the birds of Arunachal Pradesh.* Gibbon Books & The Rhino Foundation, Guwahati. [part funded by OBC, UK].

7. *Birds of Manas national park.* Gibbon Books & The Rhino Foundation, Guwahati. [part funded by Bodoland Territorial Council].

2007 (in press): 8. *Birds of Dibru-Saikhowa national park.* Gibbon Books & The Rhino Foundation, Guwahati.

9. *A pocket guide to the birds of Mizoram.* Gibbon Books & Rhino Foundation, Guwahati, part funded by OBC, UK.

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