

Zoo Master Planning:

Definitions and Process

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Biographies

Jon Coe is a Fellow of the American Society of Landscape Architects presently living and practicing in Australia. Mr. Coe has been a leading innovator of zoo planning and design for over forty years and has contributed to planning for 57 zoos, botanic gardens and nature parks in North America, Africa, Middle East, Asia and Australia.

Brij Kishor Gupta, a post graduate in Environmental Zoology, has submitted his doctoral thesis on behavioural and environmental enrichment of sloth bears in Agra, India. He has specialized training and fifteen years of experience working with zoos and a rescue centre in wildlife conservation, ex situ breeding, zoo planning, design and management. He received training from and was later a Grantee and Fellow of the Durrell Wildlife Preservation Trust. Mr. Gupta has contributed fifty-nine scientific papers to various national and international journals. Mr. Gupta is presently with the Central Zoo Authority (Ministry of Environment and Forests, Government of India) and is fully involved in the implementation of their programs to improve zoos throughout India.

Abstract

Master planning zoological parks and other multi-functional campuses and working with multi-disciplinary client and consultant teams can be difficult and confusing. This paper

explains and defines important, but frequently misused planning terms, presents a step-by-step comprehensive planning process and identifies common causes of master planning problems. An extensive template for preparing zoo master plans is also included.

Introduction

This article provides an introduction to master planning for zoological parks. While some material applies specifically to zoos, much of the information is broadly applicable to planning other complex multidisciplinary facilities and campuses.

Definitions

There are many important terms used interchangeably and indiscriminately in planning which has led to considerable confusion among students, planners and their clients. We hope the following definitions will encourage better communication in this field.

A **master plan** foresees the coordinated physical and management development of the many separate facilities and functions of a zoo in order to guide growth and control the final outcome. The term **master plan** simply means the plan which governs all other plans within an organization. However this term is commonly used to describe planning work ranging from very brief vision statements and conceptual plans taking a few days or weeks to prepare (we refer to these as **concept plans**) to lengthy and detailed comprehensive plans requiring many months to complete.

The term master planning also is used in relation to several different planning subjects or focuses. These include **physical planning** of tangible assets like exhibits, pathways, support buildings, infrastructure and plantings; and **business planning** which guides human resource, financial and operational management. Unfortunately, most zoo master plans are only physical development plans. However, it is in the owner's interest to coordinate physical, operational and business planning, since all are needed for successful development. The term **comprehensive planning** is sometimes used to describe such integrated programs. This integrated, comprehensive model is followed in this article, although we will continue to use the more popular term "**master plan**". Zoos may also have

“collection plans”, “educational plans” and “conservation plans”, for example. However, all these should be integrated under the master plan.

The terms **long-range planning** and **strategic planning** are sometimes used to mean master planning although the term “strategic” is associated with business planning. The “long-range plan” describes a desired future and the means to achieve it¹, encouraging long-term thinking. The term “strategic” implies the organization “...will creatively attempt to conceive its role in a different, more effective way.”¹ This strategic approach applies to both long-term and short-term activities. For the purpose of this paper, the terms “master plan” and “long-range plan” will be considered synonymous.

There is often confusion of the terms “vision”, “mission”, “purpose”, “goal”, and “objective”. Simply stated, there are two general ways to use these terms to establish a hierarchy of intentions and actions. The first is a “results-based hierarchy” (Cook 1987). **Purpose**, the senior item, means: “the ultimate result your organization hopes to achieve” (Cook 1987). This is followed by **goal**: “a broadly stated subsidiary result”(Cook 1987), which may or may not be fully obtainable and **objective**: “a precise, measurable, time-phased result”(Cook 1987).

The second method to establish a hierarchy of intentions is to use a methods-based approach¹. This approach seems to be more in vogue today. The term **mission** identifies: “the main focus of the organization (what business are we in?)” (Cook 1987). This is followed by **strategy**, the primary method of advancing the mission. Below strategy comes **program**: “a set of activities designed to achieve or contribute to” (Cook 1987)... strategies and mission. Programs in turn are supported by defined **activities**.

Either the result-based or the method-based terms may be used, but these terms should not be confused or used interchangeably. We will use the mission/strategy/program method for this paper.

Another term much used today is **vision**. We define **vision** as how an organization wishes to see itself or be seen by the public after the implementation of the master plan. A

related term that deserves more use is **message** (Coe in press) which describes the emotions, memories, attitudes and facts the zoo wishes visitors to retain from their visit.

Zoos are educational institutions and zoo master plans usually organize the zoo campus into didactic **themed** (Coe in press) areas, such as taxonomic, geographic, or bioclimatic zones as well as other public and off-exhibit precincts. The design of each themed area and each exhibit or exhibit complex within each zone is guided by specific scenarios and storylines. A **scenario** (Coe in press) is an outline of the proposed natural or cultural scene or setting of the display. A **storyline** (Coe in press) is the narrative or pictorial sequence of events or visitor experiences envisioned in the themed exhibit area.

The Planning Process

As typically presented, the master planning process is a sequential investigation that proceeds in well defined steps.

Pre-Planning

Before planning begins it is often useful to hold an informal, interactive vision workshop with a small influential group of organization leaders. The purpose is to define the zoo's "mission," "vision" and "message". This can be a prelude to both physical planning and business planning.

Planning

The first step is **inventory**: the systematic gathering of background information about such subjects as natural systems (climate, geology, hydrology, soils, vegetation); infrastructure (utilities, roads, structures); cultural systems (historic features and surrounding uses, cultural values), market studies, operation audits, and precedence and trends (development models and trends in zoos and related industries such as theme parks, museums, aquariums, botanic gardens and wildlife sanctuaries).

Second: **Analyse** the data inventoried in the preceding step. This is then presented, both graphically and verbally. Often the analysis data is discussed in terms of opportunities, constraints, risks and rewards.

Third: Draft a **development brief**. This confirms the organization's mission, vision and message. The development brief also identifies and prioritizes the needs of the organization which the master plan is intended to address. It may list "project imperatives": actions or facilities essential to success. The owner usually prepares the development brief before the planning consultant team is selected. However inexperienced zoos should obtain the help of professional planners to assist them in preparing this important document. In this way the brief can be prepared concurrently with the inventory and analysis work and respond to opportunities and needs identified during the analysis phase.

Fourth: The previous steps are then synthesized into a **concept plan** by individuals or small groups with strong interdisciplinary, planning and design skills. The concept plan includes concept-level cost and schedule projections as well as a prioritized development or action plan. The concept plan represents the optimal relationship among all major master plan components, a happy marriage between needs, opportunities, constraints, risks and rewards supporting an exciting vision for the future. Often several alternative concepts are developed, compared and evaluated before a final concept is selected.

Preparation of the concept plan may represent only 30-40% of the effort needed to produce a full master plan, but it includes most of the important decisions and commitments needed to proceed.

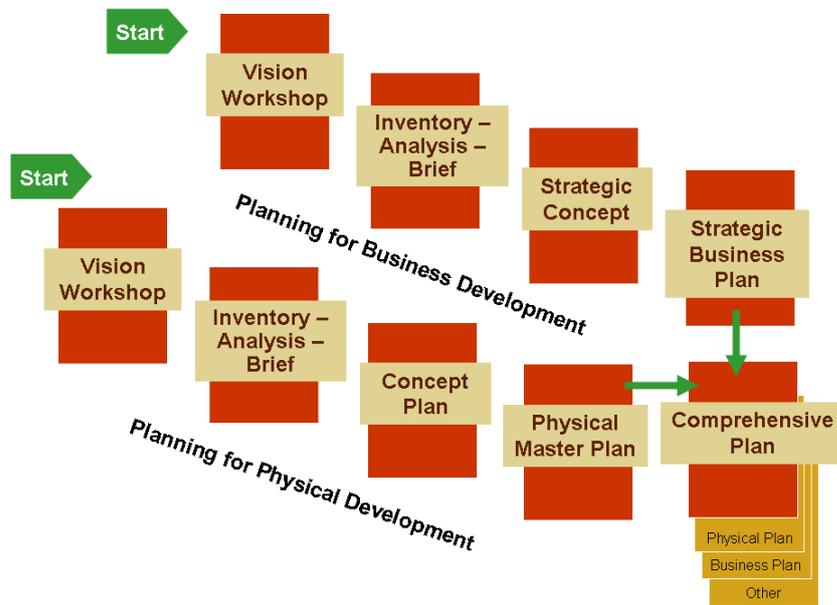
It is recommended the concept plan together with summaries of other studies listed above be submitted to internal and external governing authorities for interim approval before proceeding to develop the master plan.

Lastly, after a concept plan has been approved, it is further elaborated with additional levels of detail appropriate to institutional needs and developed as the **master plan** or **comprehensive plan**. This is then given final approval and published.

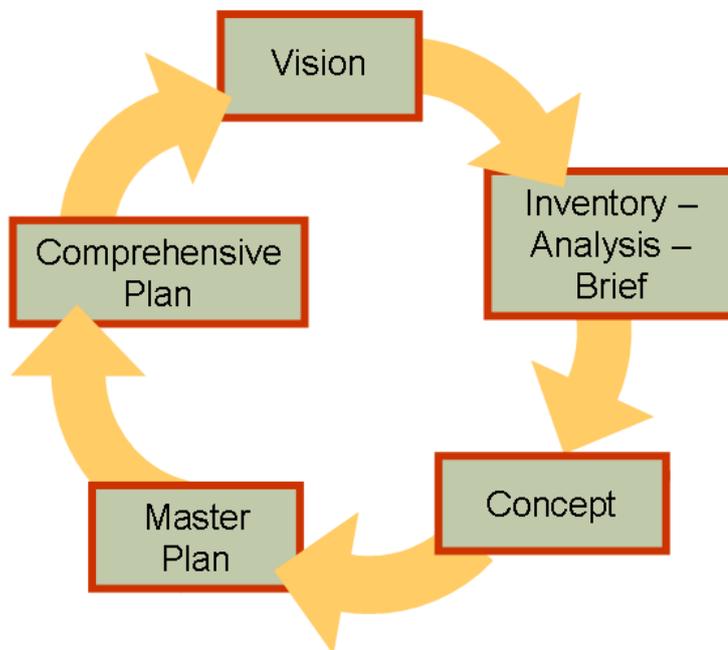
Planning as an Iterative Process

While the main steps in master planning are thought of as linear and taken sequentially, experience has shown it is beneficial to cycle through the steps of inventory,

analysis, development brief, and concept plan several times with increasing depth being investigated each time.



(Fig. 1) Linear Planning Process



(Fig. 2) Iterative Planning Process

For example, if one were to fully analyse all site or business data without any means of evaluating the data's relevance, one would soon be overwhelmed with data and expend unnecessary amounts of time. It would be better to begin with an extensive (but not intensive) search for relevant data. That is, do a broad search of all categories (such as natural and cultural systems, etc.) but don't go too deeply into each category until you establish its relevance. Analyse these preliminary data and use them to formulate your first planning concept alternatives. These preliminary concepts may raise questions which suggest the need to inventory and analyse additional material or look in greater depth at previously generated data. Thus an iterative approach to master planning encourages a more efficient use of time and other resources.

What Level and Frequency of Planning is Needed?

Owners developing new zoos or upgrading institutions without master plans should consider preparing complete comprehensive plans. However, preparation of such thorough studies requires considerable time and effort to develop recommendations, some of which will not be needed for many years and may become obsolete during the interim. Some owners prefer to carry planning only to the approved concept plan stage, delaying more detailed plans to be completed during development phase. For example, the concept plan may include development guidelines scheduling projects for short, medium and long term development. Detailed planning work is prioritized accordingly. Following this model some owners are able to accelerate design and implementation of high priority projects and programs while planning studies continue in areas of less urgency.

(Fig. 3)

Some highly successful zoos choose to review and update their master plans on an annual or five-year schedule. This allows them to adapt to changing design, market and business trends and evolving mission priorities while adhering to the main frame of their original plan.

The Planning Team

The master plan is often developed through the collaboration of two teams. A **consultant team** of experienced professionals, landscape architects, architects, engineers and business advisors prepare the plan. There is no substitute for the special training and experience of consultants specializing in zoo planning and design. The owner's **in-house planning team** participates in, reviews and approves the work. It is essential that members of both the consultant team and the owner's planning team be multidisciplinary.

The owner's planning team should represent a balance of stakeholders representing all major areas of the zoo's operation including executive, veterinary, animal care, and education. More advanced zoos also include representatives of fields such as horticulture, research/conservation, marketing, guest services and even volunteers.

(Fig. 4)

In order to keep the in-house team a manageable size, representatives are often divided into two groups, a **planning team** or core group and an **advisory team**. Each team member is expected both to contribute directly to the planning effort and also to communicate the ongoing planning work to constituents in their field within the organization.

A few large zoos do all planning and design in-house, sometimes providing positions for staff trained in this field.

Planning as an Interactive Process

The planning process should be interactive. Team members not only contribute good ideas and valuable experience, they also help insure the developing plan achieves an overall balance. And they will be largely responsible for delivering the final outcome. For these reasons it is vitally important planning meetings encourage free thinking, open exchange of ideas and shared sense of ownership and responsibility for the final plan. Planning meetings are best managed as interactive "workshops", run by experienced facilitators, rather than as simple "take-it-or-leave-it" presentations.

Planning Problems

It is important to keep the purpose of the planning effort in view and not get lost in details. Remember the master plan is a means to an end (sustained self-improvement) and not

an end in itself. Sometimes “planning paralysis” occurs when leaders are unable to make timely decisions or teams focus excessively on details.

Lack of vision is another common problem. A plan may be very complete yet totally uninspired or unoriginal, suggesting the future will be simply a continuation of the present. However, an overly impractical or unsustainable plan may also fail.

A fourth common cause of ineffective master plans is failure by leadership to build a constituency among staff at all levels to support the plan. This is often the result when leaders develop the plan themselves without broad and open staff involvement and support. When a strong leader imposes a plan and then leaves the institution it is usually time for a new plan.

Planning as Advocacy

From an academic perspective planners are seen as impartial advisors. In practical terms we are advocates for improvement and innovation. Master plans must not only function as road maps for institutional advancement, they often are used as promotional documents. Descriptions of proposed changes or new facilities are expected to be both truthful and compelling. Report graphics and organization are designed to appeal to a predefined reader, be it a governing board, government agency or corporate underwriter.

Conclusions

Planning complex multidisciplinary, multifaceted institutions such as zoological parks can be a daunting task. While we hope this presentation will become a useful guide, following it too slavishly could result in an uninspired “fill-in-the-blank” master plan. Thoughtful planners must frequently step back and seek to reorient themselves to the “big picture”, asking, for example: “Is this the best way to achieve the owner’s desired ends? Are we using the planning process to solve problems, or is the process becoming a problem in itself?” Responsible planning consultants insure their zoo clients understand both what they are doing and why they are doing it. Responsible owners use the planning process to develop a constituency which will advocate for the master plan’s implementation and the realization of their shared vision and dreams.

Appendix: Zoo Master Plan or Comprehensive Plan Format

The following format is suggested both to help guide the planning process and to serve as a report outline for a relatively complete zoo master plan. It could be abbreviated for less complete concept plans.

Each client and site is unique and the outline must be tailored to fit the owner's needs. For example, many business-oriented institutions prefer a more streamlined approach for the master plan document itself, beginning with a brief executive summary followed with a presentation of the plan and key recommendations. Support material such as inventory, analysis, and concept plans are placed as appendices or even bound as separate documents.

Suggested Master Plan Outline

1) Introduction

- a) Summary of recommendations (executive summary)
- b) Brief history of the institution and previous master plans
- c) Justification of present planning; purpose and uses of the new master plan

2) Inventory

- a) Natural factors
 - Topography and hydrology
 - Geology and soil
 - Flora
 - Fauna
 - Climate: rainfall, temperature and season, prevailing winds
 - Sources of pollution
- b) Social factors
 - Attendance data: annual, seasonal, peak day, design day (ideal) and historic trends
 - Visitor surveys: characteristics of visitors' age, income and education
 - Demography of the market area
 - Cultural factors affecting design, operation and attendance
- c) Legal status of the land and expansion opportunities

- d) Arrangement of existing zoo
- e) Business and market study
 - Market potential (latent demand)
 - Market penetration
 - Regional competition
 - External factors: economic climate, demography
 - Internal factors: attractions, current business practices, income, expenses, profitability, marketing effort
- f) Visitor experience
 - Arrival, transit, car park
 - Wayfinding
 - Circulation
 - Amenities
 - Toilets
 - Shade, shelter and rest areas
 - Drinking fountains
 - Accessibility
 - Views and vistas
 - Visitor services: food, beverage, gift sales
- g) Service circulation
 - Convenience and efficiency
 - Accessibility
- h) Buildings and infrastructure
 - Buildings and exhibits
 - Water
 - Electric power
 - Gas
 - Telecommunications

- Sewerage
- Solid waste
- Recycling
- Record drawings available
- Approvals
- Opportunities
- i) Administration and operations department
 - Organization chart
 - Janitorial
 - Repair and craft
 - Security
 - Marketing, development and public relations
 - Volunteer organization
 - Food, beverage and gift
 - Opportunities
- j) Animal care department
 - Collection plan
 - Present collection
 - General health and status
 - Collection philosophy and goals
 - Opportunities
 - Conservation/breeding
 - Animal care staff
 - Staff
 - Education
 - Training
 - Animal exhibit and support facilities (may be covered under building evaluations)
 - Conditions

- Adequacy

- k) Veterinary department

- Staff
- Facilities
- Programs
- Opportunities

- l) Horticulture department

- Plant collection plan and inventory
- Staff
- Facilities
- Programs
- Opportunities

- m) Education department

- Staff
- Facilities
- Programs
- Opportunities

- n) Research department

- Staff
- Facilities
- Programs
- Opportunities

- o) Zoo safety audit

- Public safety
- Animal safety
- Workplace safety

3) Analysis

- a) All areas of inventory study are evaluated and prioritized according to

- Opportunities
- Constraints
- Risks
- Rewards
- National and international standards, best practice and trends

b) Integrate findings of physical, operation and business studies

4) Development Brief

a) Identify institutional

- Mission
- Vision
- Message

b) Identify strategies, programs and activities necessary to fulfil the mission and achieve the vision within a stated time frame

c) Identify key action areas and key outcomes as mile posts along the way

d) List and prioritize institutional needs according to development schedule

- Develop a short list of “project imperatives”
- List of desired animal species and their requirements
- Detailed program of projects and their requirements
- Prioritized list of early action and “clean-up, paint-up, fix-up” projects

e) Development Schedule, a multi-year calendar of actions and development

- Early action projects (first year)
- Short-term projects (1-5 years)
- Mid-term projects (5-10 years)
- Long-term projects (10+ years)

5) Concept Plan

a) Develop alternative concept plans based upon the opportunities, constraints and risks study and meeting requirements of the development brief, then select most promising plan or combination of plans

b) The concept plan

- Should cover all areas of the master plan at a general level to insure integration of the zoo's assets and needs
- A balance should be sought so no area receives too much attention while others are ignored

c) Illustrative concept map (usually at a scale of 1:500 or 1:1000 with contour interval between 0.5 metre to 1.0 metre, depending on the topography)

- Existing natural features: topography, water bodies, significant trees, etc.
- Arrival, car park, and entry
- Visitor circulation
- Exhibit, demonstration and show areas
- Amenities: toilets, shade, shelter and rest areas, drinking fountains
- Visitor service areas: food, beverage, gifts
- General zoo service areas and circulation
- Administrative facilities
- Education facilities
- Support, off-exhibit and quarantine facilities

d) Descriptive text

e) Concept development guidelines: prioritizes actions into phases such as early action, short-term, mid-term and long term with proposed development costs and schedule

f) Depending on local conditions, other items may also be added or deleted.

6) Master Plan

a) Illustrative map (usually at a scale of 1:500 or 1:1000 with contour interval between 0.5 metre to 1.0 metre, depending on the topography)

- Existing natural features: topography, water bodies, significant trees, etc.
- Arrival, car park, and entry
- Visitor circulation
- Exhibit, demonstration and show areas

- Amenities: toilets, shade, shelter and rest areas, drinking fountains
 - Visitor service areas: food, beverage, gifts
 - General zoo service areas and circulation
 - Administrative facilities
 - Education facilities
 - Support, off-exhibit and quarantine facilities
- b) Descriptive maps (often overlays to illustrative map) with descriptive text
- Overall concept diagram showing key features: theme areas, visitor circulation and experience, service access, principle attractions, unique features, etc.
 - Thematic concept: zoo organization concept (taxonomic or bio-regional, etc.), theme areas, storyline concept, landscape concept
 - Circulation concept: public circulation, service and emergency vehicle circulation
 - Infrastructure concept: water, power, gas, sewerage, surface drainage and storage, storm water harvesting and management concept
- c) Animal collection guidelines summary including population size and justification of keeping all endangered species
- d) Guidelines for animal exhibition and management
- Humane philosophy
 - Display philosophy: naturalistic, immersive, functional, etc.
 - Activity-based concepts such as “rotation”
 - Reward-based animal training
 - Environmental enrichment
- e) Guidelines for architecture and landscape architecture
- Theme areas
 - Public precincts
 - Off-exhibit and service areas
 - Buffer areas
 - Natural areas

- f) Exhibit storylines or scenarios
 - Description of theme, storyline, setting, animal and plant species and key features, at least for short to mid-term exhibit development areas
- g) Guidelines for signage
 - Entry
 - Wayfinding
 - Visitor services
 - Interpretation
- h) Education plan summary and recommendations
- i) Administrative and support area recommendations
- j) Development guidelines
 - Details of the phased sequence of activities for master plan implementation (work usually is prioritized in phases of five to ten years with more detail presented for early projects than for works in the more distant future)
 - Plan should include projected costs (construction and operation) compared of projected income for the same period.
 - Revenue sources (this may be covered in a separate business plan)
 - Construction phasing schedule: a graph organized by month or quarter year showing date and duration of major projects including phases for design, tendering, construction, commissioning and opening. A parallel graph would show cash flow and project attendance in relation to construction.
- k) Sustainability guidelines
 - Solid waste, composting, etc.
 - Energy conservation, methane production, etc.
 - Potable water
 - Irrigation
 - Storm water harvesting and management
 - Grey water system

- l) Disaster management and contingency guidelines
 - Animal rescued from wild
 - Escape of animals from enclosures
 - Monkey, dog, other feral or native animal menace
 - Arrangement for animal feed in case of strike (non supply by contractor) or natural disaster
 - Snake bite
 - Visitor injuries: visitors falling into water features or inside enclosures
 - Natural calamities and fire
 - Law and order breakdown or terrorist threat
- m) Staff development guidelines
 - Manpower projections related to development guidelines
 - Guidelines for upgrading animal training and other professional skills
 - Guidelines for upgrading staff interaction with other zoos and regional cooperation
- n) Business guidelines related to development schedule
 - Projected operating income: operating grants from government or other sources, admission, food and gift sales, sponsorships, compost sales, etc.
 - Projected operating costs: pay roll, animal food, other supplies, utilities, rentals, insurance, etc.
 - Projected development income: capital projects, development grants from government or private sources, sponsorships, fund raising, loans, etc.
 - Projected development costs: planning, design and other consultant fees, additional staff or support for in-house planning team, planning-related travel, construction costs, commissioning costs, marketing, costs, debt service for loans, etc.
- o) Depending on local conditions, other items may also be added or deleted.

7) **Annexure to the Master Plan:** Detailed studies undertaken in the Inventory, Analysis and Concept Phases (items 2-5 in this outline) and other supporting data may be included in an appendix to make the main body of the master plan more readable.

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