

## **HIGHLIGHTING CONSERVATION NUTRITION: THE SAINT LOUIS ZOO'S ORTHWEIN ANIMAL NUTRITION CENTER**

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### **Introduction**

The Saint Louis Zoo's high standard for animal care is evidenced by the opening of its Orthwein Animal Nutrition Center (OANC) in 2007, a world class facility that highlights critical functions of the Nutrition Department in meeting the nutritional needs of wildlife. Not only will the collection animals be served, but also the science and research programs supporting the institution's global conservation efforts are on public display, targeting the food resources of both captive and free-ranging species.

The building is sited on the periphery of the zoo for easy service access, but also immediately adjacent to a major exhibit area, The River's Edge, hence accessible and highly visible. Through the building's glass expanse, Zoo visitors are invited to observe various facets of nutritional and food sciences involved in this operation, displaying activities normally housed behind the scenes. While most Zoo visitors are intrigued by the variety and amounts required to feed our diverse collections, few can appreciate the underlying information contributing to optimal diets and health, nor the truly vast quantities delivered daily by diet prep and animal keeper staff. The St. Louis Zoo strives to change that view. The OANC allows visitors to see 'science in the making' and the practical application of advances in nutrition and feeding sciences.

### **Support Services & Infrastructure**

The total building encompasses approximately 17,500 ft<sup>2</sup>; the upper level (approximately 10,000 ft<sup>2</sup>) is dedicated exclusively to Nutrition, while the lower floor houses education classroom space, biomaterials storage for the Animal Health and Research departments, and facility mechanicals. The public view along the path and glass front highlights the science activities involved in Wildlife and Comparative Nutrition, as well as the people that advance that knowledge. This area (Figure 1) contains a reference library with reprints, compact discs, and books on topics from Anatomy to Zoology, as well as *Zootrition*, the Saint Louis Zoo's diet-analyzing software program that is used throughout the world. Open intern carrels, private glass-fronted offices for staff as well as graduate students and visiting scientists, and a small meeting area provide the space and opportunity for expanding training and consulting programs, collaborative research efforts, and future growth. Interpretive signs on the building's exterior highlight the myriad disciplines that must be considered in comparative animal nutrition, such as digestive anatomy, behavior, feeding ecology, food chemistry, physiology, etc. in support of the feeding programs, laboratory analytical methods, research projects and product development.

This section of the building also houses a private conference room, office and staff support areas (break room/kitchen, lockers, showers) that are not publicly visible.

Further along the path on the glass front of the OANC is an Analytical Laboratory - the inner workings of the building's Center for Comparative Wildlife Nutrition. Using state-of-the-art equipment, the various Nutrition Center staff, graduate students, interns, and volunteers monitor nutritional quality of diet ingredients and develop independent research projects in support of the institution's species and habitat conservation efforts. With numerous studies occurring simultaneously year-round, a speaker on the exterior signage updates visitors about current ongoing investigations. Analytical services will be available to other animal facilities, helping to ensure the nutritional quality of their feeds, and assisting institutions who are investigating the many aspects of wildlife nutrition.

The heart of the Center is the Mary Ann Lee Diet Kitchen. Although last on the visitor path, this area represents the primary function of the building – supporting the feeding program. Four stainless steel work stations allow efficient and safe diet preparation in a spacious 1300 ft<sup>2</sup>, with computer screens displaying diet recipes and notebooks for ease in records updating. In addition to the restaurant-grade equipment and active Nutrition staff, annual quantities of foods delivered, and specific diet examples are visible as public displays through the window. Deliveries are completed daily before the zoo opens, hence the visitor will be able to observe food preparations for the following day(s) in real time, but a video monitor on the external signage highlights full activities that occur while much of the world sleeps.

### **Feedstuff Storage**

Immediately adjacent to the food preparation area and opening directly onto the kitchen and loading dock, are cold storage and dry storage modules. Cold storage comprises a walk-in cooler (~650 ft<sup>2</sup>, 3500 ft<sup>3</sup>) for refrigerated fish/meat thawing as well as produce and prepared diet storage. Opening off the cooler area is a 1500 ft<sup>2</sup>, ~25,000 ft<sup>3</sup> (about 15,000 ft<sup>3</sup> usable space) freezer, designed to hold approximately 6 months of frozen foods for the collection. This additional freezer space also provides the ability to harvest, freeze and store leafy browse for the year-round feeding of our herbivores. Redundant condenser units, and external generator hookups were designed as backup features in cold storage.

The dry storage module, covering ~2200ft<sup>2</sup>, (~22,000 ft<sup>3</sup>) was designed for efficient and safe storage of bagged, canned, and boxed foodstuffs, with pallet racking to hold 50 tons. The temperature and humidity controlled environment will ensure optimal nutritional quality, and ability to purchase in bulk units supports feeding economies. Three 4.5-ton bulk grain bins are also sited within the dry storage area, with external filling access, allowing more than 12 tons of pellets to be maintained in proper conditions to maintain nutritional value.

### **Landscaping**

Even the landscaping surrounding the building encompasses the multiple impacts of nutrition on animals. Five medicinal plant gardens, designed with help from the St. Louis Herb Society, integrate themes of plant chemical interactions on reproduction, digestion, skin care, parasite control, and overall well being, further linking Nutrition as a foundation Health Science. The Plant Science Research Garden by the Monsanto Fund features areas of planting used for

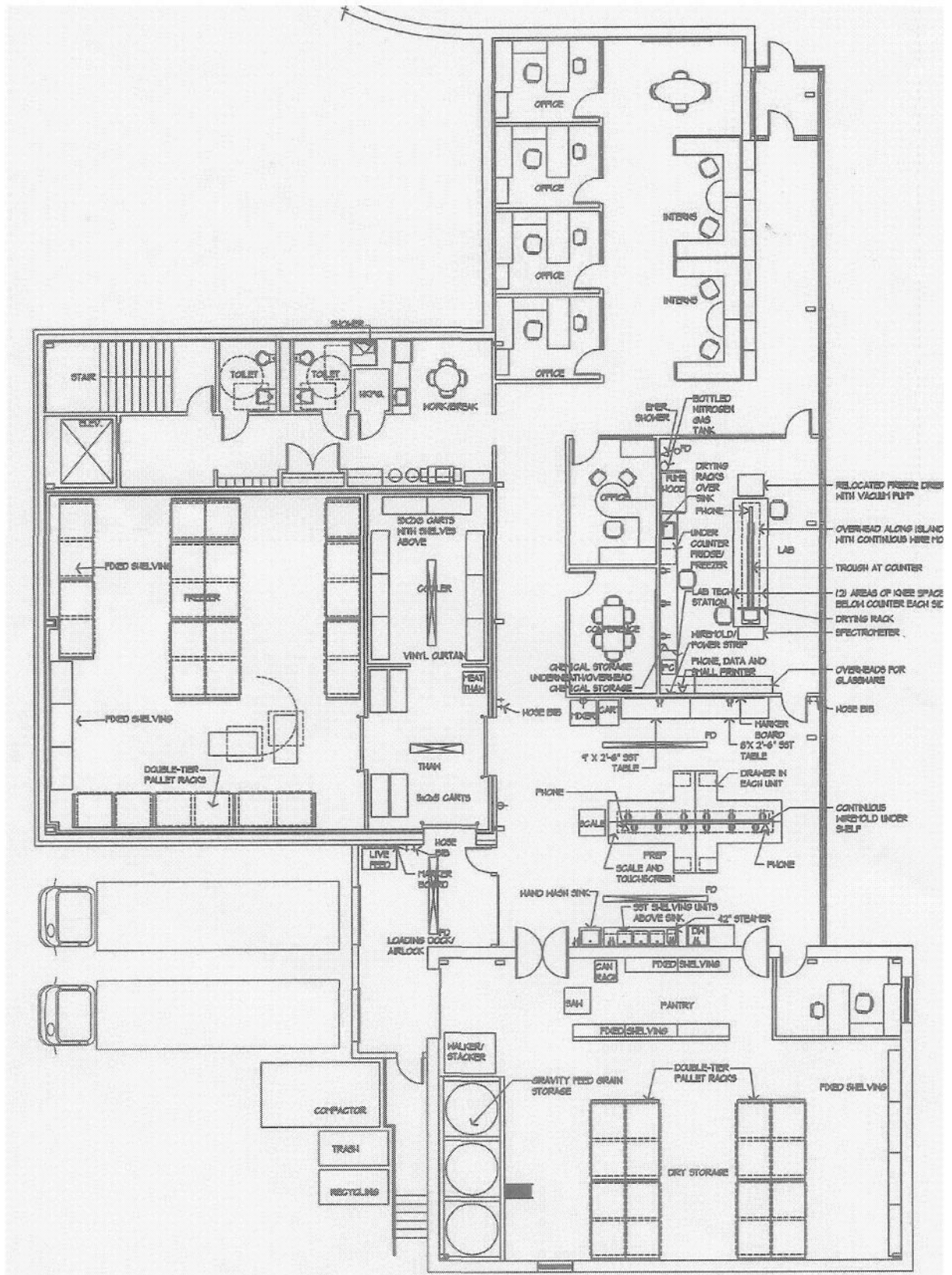
investigating environmental, genetic, and species diversity effects on plant nutrient composition. A whimsical animal topiary, visible from the train, completes the landscaping.

### **Green Architecture**

Lastly, and probably most importantly, the Orthwein Animal Nutrition Center is designed with “green” architectural features. The city of St. Louis is currently rated within the top 10 cities in the country for LEED-certified (Leadership in Energy and Environmental Design) buildings, and the OANC will be a highly visible star while working for a silver rating. As the Zoo’s first full scale green building, the Center is setting an example for energy efficiency and low environmental impact. Energy conservation measures include the building being partially-constructed underground to provide high insulation capacity and its location taking advantage of natural daytime lighting. HVAC systems incorporate high-efficiency and heat-recovery heating and cooling systems, temperatures are regulated externally and maintained at energy-conserving values. All lighting is high efficiency and motion-sensored. All landscaping is designed with plants requiring no irrigation, low-flow water fixtures and native, drought-resistant plants to minimize water use; the roof is a planted, green meadow. Materials used in construction have high recycled content and are locally-sourced, including the steel beams, concrete, floor and ceiling tiles, carpeting, and furniture, with wastage minimized and diverted away from landfills. Wood products derive from certified sustainable forest, and equipment from our current nutrition facility center is being re-used when possible.

### **Conclusion**

Providing appropriate, high quality and nutritionally balanced diets are paramount for maintaining the institution’s vast collection of animals. The completion of the Orthwein Animal Nutrition Center provides a world class facility for ensuring efficient success. It also allows the Saint Louis Zoo to remain at the forefront of research, conservation, and education in the fields of animal nutrition, health, and care while minimizing our impact on the environment. The St. Louis Zoo is excited to share its enthusiasm with colleagues for the future of wildlife nutrition at the Saint Louis Zoo. This is facilitated by providing the best care for the collection animals, contributing to the understanding of wildlife nutrition in captivity and the wild and influencing conservation efforts world wide.



**Figure 1.** Floor plan of Saint Louis Zoo's Orthwein Animal Nutrition Center, opened in June 2007.