Since severe damage was caused to once prevalent rain forests in the Hawaiian Islands by the early emphasis on ranching, the Hawaiian Sugar Planters' Association (HSPA) in 1918 organized a Department of Botany and Forestry to assist in the restoration of these forests as watersheds to meet the demand for water for the agricultural industries. HSPA purchased 124 acres for a master arboretum where the department planted exotic trees. With the introduction of thousands of species of plants, the Manoa Arboretum became a vast reservoir of valuable plant material for botanists, foresters, horticulturists and other researchers. Once the need for introduction of plants for reforestation was completed, the Manoa Arboretum had served the purpose for which it was created. Therefore, on July 1, 1953, title to the 124 acres of land was conveyed by HSPA to the University of Hawaii "solely for the use and benefit of the University of Hawaii to use, maintain and preserve the granted premises as an arboretum and botanical garden only".

Since its establishment in 1965 as one of the organized research units of the University of Hawaii at Manoa, the Harold L. Lyon Arboretum has served to coordinate, facilitate and execute onsite and university system-wide research, instruction and services as related to its resources. Although its initial principal responsibility has been to University of Hawaii system-wide students, instructors and researchers, in recent years, it has been expanded to include elementary and secondary schools, other colleges and universities and the community as a whole within the State of Hawaii. Most recently, it has included a national and international clientele.

Currently, the Harold L. Lyon Arboretum is responsible for:

- Development of a major resource center of tropical plants with Hawaii/Pacific Basin/Asian focus by field explorations, exchanges and collation of research results and publications.
- Performing research and collating of accessions to make collections and information available to a broad clientele including students, researchers, industry and general public.
- Identification, improvement through breeding and introduction of plants useful for research, instruction or industry.
- Preservation and propagation of germplasm of endangered plant species, especially those native to Hawaii and other tropical areas. Promotion and dissemination of information, focusing on the importance of plant germplasm conservation in general, and native Hawaiian plants in particular.
- Development of an active program of plant and seed exchanges with local, domestic and international clientele.
- Enrichment of experiences of students in the university system by introduction of living plants into classroom and laboratory; by onsite field experience; and offering part-time employment or technical and practical training.
- Research and collating ethnobotanical data and development of collections related to the ethnic diversity of Hawaii.
- Development through guided educational tours, classes, workshops and other events of an educational program capitalizing on Arboretum resources, for a broad clientele, including students and teachers at K-12, college and university, and post-graduate levels, and for the community at large.
- Development of a research and training program in restoration of Hawaiian ecosystems.