



NOAA
FISHERIES

Southwest Fisheries
Science Center

The La Jolla Laboratory Green Roofs: Living Architecture

The green (living) roofs of the Southwest Fisheries Science Center are designed to blend the architecture of the new laboratory into the existing hillside, to manage stormwater and to save energy. The roofs provide insulation, create habitat for coastal birds and insects, help lower urban air temperatures and mitigate the heat island effect. Aesthetically, the green roofs enhance the views for resident researchers and visitors. Visible from the street as it curves down the hill, the vegetated roofs minimize the appearance of a tall building and preserve public view corridors out to the Pacific Ocean. Taking full advantage of the mild coastal climate, the green roof atrium courtyards and patios provide a physical environment conducive to promoting interaction among researchers from different disciplines.

Native San Diego county and coastal chaparral plants were chosen for the green roofs, arranged in mosaic patterns to showcase their shape, color and diversity, and planted to enhance the corresponding viewing angles. Plants on Level 3 include velvet cactus (*Bergerocactus emoryi*), coast prickly pear (*Opuntia littoralis*) and Shaw agave (*Agave shawii*). On Level 4, plants include wooley blue curls (*Trichostema lanatum*), rock rose (*Helianthemum scoparium*) and deer grass (*Muhlenbergia rugen*).



- Shaw agave (*Agave shawii*)



- Wooley blue curl (*Trichostema lanatum*)



- Green roof plaza (Gould Evans)

Landscape Engineering



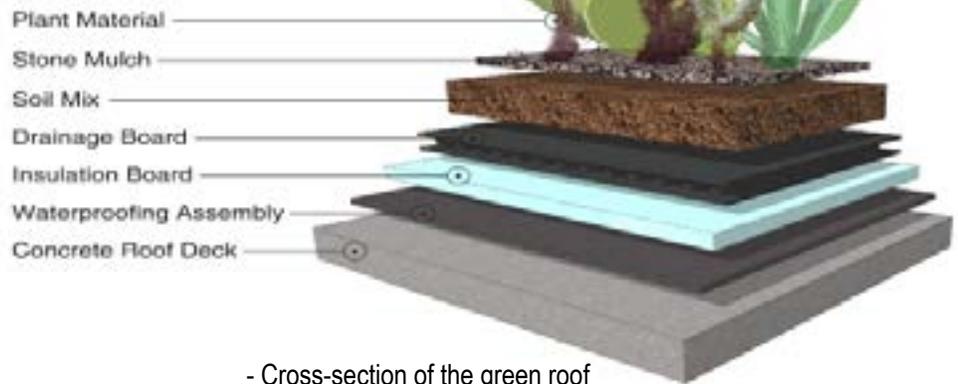
- Coast prickly pear (*Opuntia littoralis*)



- Rock rose (*Helianthemum scoparium*)



- Deer grass (*Muhlenbergia rugen*)



- Cross-section of the green roof

The growing media for the green roof is an engineered soil comprised of a mixture of locally available components designed to benefit from the moderate temperatures and semi-arid climate of La Jolla. With an average depth of 23 cm (9”), the primary component of the growing media is locally procured sand which ensures proper drainage. Organic material is also a key component, allowing for the absorption of water. The growing media provides water to the plants, and in rare rainy conditions, will retain the majority of the rainwater, holding it through capillary action for the plants to use later.

To supplement a potential deficiency of water during long periods without rainfall, the green roofs have an automatic irrigation system. This system is especially important during the initial period of plant establishment (1 – 2 years). Due to differences between the engineered growing media used for the green roof and the surrounding soil used for the landscaping on the grounds around the building, the green roof irrigation system is separated from the landscape irrigation system in order to maximize water efficiency. Any excess rainwater is captured by drains found in each of the green roof areas. These drains are protected by a stainless steel inspection chamber for easy access by the maintenance staff.

The vegetation and growing media are layered over a waterproof membrane on the roof deck. By covering the membrane, the green roofs provide another benefit to the laboratory: they protect the waterproofing assembly from the sun’s ultraviolet rays, lengthening its lifespan and reducing maintenance. With vegetation covering about 30% of the total roof surface, the green roofs also help prevent temperatures inside the building from fluctuating with exterior weather conditions, improving the efficiency of the building’s heating and cooling systems.

Within days of the green roofs being planted, another benefit has already been realized - the vegetation is providing new habitat for bees and hummingbirds - which are now frequently seen foraging among the vegetation.