**MISTY(CAL)**

**FOG CATCHERS**

**INSPIRATION**

Sometimes, answers to the most complex problems can be found by piecing simple things together, and when it comes to green design, nature is a good place to turn to. Additionally, as the developed world faces challenges that used to be primarily faced by the developing world—such as water shortages—there is a chance for developed countries to emulate successes from developing countries. Based on these premises, we used biomimicry to evaluate low-tech solutions to California’s water crisis, examining the way a spider webs catches dewdrop or the Namib Desert beetle captures moisture through alternate hydrophilic bumps and hydrophobic furrows. We also looked at existing water collection technology used in Chile’s Atamaca Desert, where the average rainfall is less than 0.1mm (0.004 in) per year. Despite the lack of rain, coastal fog forms on Chile’s shore and moves inland in the form of cloud banks that carry humidity. By stretching fine nets vertically between poles, and placing a gutter at the bottom, communities in Chile have successfully installed fog-catching arrays that capture the minuscule drops of water that make up fog, and are able to supply homes or irrigation systems.

**CONCEPT**

Misty(Cal) is both a functional design structure and a public space that draws on existing fog catching technology, adapted to the local context of the City of Santa Monica. The fog catchers placed in the inner part of the structure produce water for a drip irrigation system connected to the gardens on the lower platform, creating a self-sustainable ecosystem. The nets that are stretched on the outer part of the structure collect water that feeds back to the City through a piping system that connects to the Santa Monica Urban Runoff Recycling Facility (SMURFF).

Santa Monica enjoys 310 days of sunshine a year; however coastal fog is a prevalent phenomenon throughout the year peaking in May and June, also known as “May Gray” and “June Gloom.” On certain years, the fog extends to July and August, occasionally referred to as “No Sky July” and “Fogust.” This coastal fog, scientifically called the Marine Layer, results from a combination of cold Pacific Ocean Water, an ocean current known as the California Current, and a high pressure formation known as the Pacific High. The Misty(Cal) design structure is oriented to take advantage of the prevailing South West wind direction, as wind is a fundamental component to the fog collection process.

The fog catchers work year round, seven days a week, and twenty-four hours a day. However, most of the fog collection happens in the morning, as condensation mainly takes place at sunrise. During the “gloomy” months in Santa Monica, which can stretch from May to August, the fog catchers will reach their maximum yield. The translucent colorful mesh creates playful light effects on sunny days, and brings color in the horizon during “grey days.” Extending from the Santa Monica Pier to the water breaker, the design structure is a destination for locals and tourists alike, giving the community something to look forward to during the dreaded “May Gray” and “June Gloom.” The irrigation system linked to the gardens and orchards inside the structure reaches its full capacity during the month of June. The design concept has an educational component as members of the community can learn about and enjoy the benefits of fog collection. As the orchards bear fruits and colorful flowers blossom through the irrigation system, “June Gloom” becomes “June Bloom”!

**ENVIRONMENTAL IMPACT STATEMENT**

Fog collection is a low-tech, low-cost solution to supply fresh water in areas with minimal rainfall. The fog catchers require minimal maintenance. They nets are inexpensive and do not rely on power. The process of fog collection is passive; the energy is supplied by the wind, and the water moves by gravity, so no pumps or electricity are needed to generate or move the water.

Fog collection is a sustainable water supply for as long as the community maintains the system. According to FogQuest, a Canadian nonprofit that deploys fog collectors around the world, the durability of a project depends on the human component. Typically, the meteorological conditions that produce the fog are determined by large scale circulations in the atmosphere that change little over long periods of time.

The design is highly adaptable to the site. As a built form it is meant to blend into the sky and fog.

The dimensions of the design structure are based on the size of the site but the concept can be replicated in any type of location as long as foggy conditions exist. The low-tech water collection process and the modularity of the structure, makes the design concept easily scalable and adaptable.

**MATERIALS & COMPONENTS**

Fog catching nets:

* The meshes are made of polyethylene, chosen to be very efficient capturing windblown fog droplets. It is important that nets are made of plastic as metal can rust.
* The meshes are made of a 1mm-wide fiber and a 35% Raschel weave to maximize the fog collection efficiency.
* Our fog catchers are rectangular in shape as the nets are most efficient when stretched between poles, rather than in 3D form.
* For this project the mesh is translucent and comes in different colors.

Structure:

* Steel support columns
* Wooden platforms
* Plastic piping system

**DATA**

Estimated amount of fresh water collected:

* One large fog catcher, with an approximate 400 m2 collecting surface (15.5m x 26m), will produce an average of 2,000 Liters (528.3 Gallons) per day throughout the year.
* On some days no water will be produced. On other days as much as 10,000 Liters will be generated.
* With a total of 50 fog catchers, the design structure could average a total of 100,000 Liters (26,400 Gallons) per day, reaching 36.5 Million Liters (9.6 Million Gallons) per year.
* A portion of the water collected by the fog catchers will be used to irrigate the public gardens and orchards, while the rest of the water supply will be redirected to the Santa Monica Urban Runoff Recycling Facility (SMURFF), which treats up to 500,000 gallons of runoff water per day (approx. 4% of the Santa Monica’s daily water usage).

**REFERENCES**

Fog Catching Technology Organizations:

* FogQuest (Canada)
* Massachusetts Institute of Technology (USA)
* The ‘Green Desert’ Project by Alimon e.V. (Germany/Peru)

Research Materials:

* *World Changing: A User’s Guide for the 21st Century*, edited by Alex Steffen, 2006
* *L’Avenir de l’Eau: Petit précis de mondialisation II,* Erik Orsenna,2008