Sustainability in Puerto Rican Landscape Architecture

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Environmental + LA Overview

Triple Planetary Crisis

Like the entire globe, Puerto Rico's environment is currently feeling the impact of the triple planetary crisis...

Climate Change

- Long-term changes in Earth's average weather and temperature patterns

Pollution

- Energy/substance added to an environment faster than it can be removed

Biodiversity Loss

- Decline in species abundance and genetic diversity in ecosystems

Accelerated coastal erosion post Hurricane Maria

Widespread water pollution from manufacturing industry hubs

Mangroves threatened by biodiversity and habitat loss along coastlines

Combatting Problems

Researchers, scientists, and biologists are taking great strides in this climate fight. Labs, studies, programs are all pushing us forward, but more can be done in such an ecological complex place like Puerto Rico. Landscape architecture can help.

The Role of Landscape Architecture

Landscape architecture exists at the **intersection of natural/ecological** systems and **cultural** systems…

- It is the analysis, planning, design, management, and stewardship of the natural and built environment, **combining the human and the organic**

- Landscape architects combine art and science in the construction of **ecological infrastructure** and spaces, proposing and implementing **solutions** to problems affecting the **health, safety, and welfare** of people

Laws & Regulations

Energy Public Policy Act

- Introduced in 2018, passed in 2019
- Move to 100% renewable energy by 2050
- Eliminating coal-based energy in 2028
- Limits the approval time for commercial and industrial projects using solar energy, removes taxes on solar equipment

Protestors rally support for the Energy Public Policy Act, implementing a “more resilient, reliable and cleaner energy grid”

Carbon Tax

- Approved in 2019
- Fee is charged to polluters for emissions
- Revenue goes to renewable energy projects
- Tax breaks for using renewable energy sources

Stormwater Management Regulations

- Prevents water pollution from industrial/construction activities
- Controls water pollution

EPA ordered construction companies to stop pollution of runoff, also requiring introduction of stormwater management measures and monitoring of compliance

Green Building Codes

- Government mandated environmental protection building codes
- Enforcement through building permits, inspections, fines and penalties, education and outreach, third party certification, and potential legal action and public complaints

Climate Change Mitigation Plan

- Rooted in Law 33 of 2019
- Established a greenhouse gas emission inventory
- Promotes energy efficiency and renewable energy sources
- Enhance emergency response strategies in extreme weather
- Prioritize community engagement and climate change education

Global Suzuki

Puerto Rico's team, Suzuki del Caribe Inc., of 7 participants on a beach Clean Up Campaign

Fox News - 2019

El Yunque researches conducting controlled climate change and extreme weather studies

Clean Air Act Implementation Plan

- Adoption and implementation of the Clean Air Act
- Sets limits on power plant, industrial facility, and transportation source emissions
- Requirements to reduce ozone and fine particulate matter from the atmosphere
- Monitoring/enforcement mechanisms and regulatory measures according to SIP to meet National Ambient Air Quality standards

Emission control and monitoring technology at Steri-Tech industrial facility in Salinas

Sustainability in Action: LA Firms

NECA Design Studio

Overview:

- Focused on fostering nature, ecology, culture, and art
- Designs manage 190,000 gallons of water per year through the use of bioswales, infiltration gardens, and permeable systems
- Support biodiversity and lower maintenance by using native plants to Puerto Rico
- Woman-founded

Key Projects:

- Manati Dog Park – native ecology and resilience
- Parque Gandara — carbon sequestration and stormwater management
- Washington 61 – stormwater management and urban heat island reduction

Manatí Dog Park

- Manatí, Puerto Rico in 2022
- **Ecologically** inspired and **influenced** berm structures
- **Native** species and **resilient** ornamental plantings
- Located in “an ecological landscape shaped by limestone mogotes and rugged topography”

Parque Gandara

- Hato Rey, San Juan, Puerto Rico in 2023
- Design took existing 112 trees in poor health and increased that to 162 **native or climate-adapted trees**
- Native tree plantings improve **soil health** and **biodiversity**
- Stormwater management and **water buildup prevention** through accessible paths and gathering spaces
- Introduced vegetated swales, rain gardens, and permeable paving to **slow and filter water flow**
- **Reduction of flooding risks** in redesign

Washington 61

- Condado, Santurce, Puerto Rico in 2019
- Transformed L-shaped hardscape lot into a **resilient green refuge**
- Rain gardens catch/filter precipitation sustainably, reducing **runoff and flood risk**
- Native, resilient climbing plants and fruit trees **support local ecology** and communities
- **Reduced urban heat island impact** on residents through added plantings

Vaccarino Associates

Overview:

- Established in 2003
- Promote adaptation strategies to strengthen communities and ecosystems
- Focus on small to medium scale sites
- Worked on habitat recovery after Hurricanes Irma and Maria

Key Projects:

- Science City – Research Hub
- Dunes Reconstruction – Dunes in Puerto Rico
- The Wings of Culebrita – National Wildlife Refuge

Science City

- On the site of a former prison
- Received the XIII Bienal de Arquitectura y Arquitectura Paisajista Honor Award in 2010
- **Stormwater management** implemented
- Soil compaction on site was the biggest problem when trying to establish **permeable pavement**
- Samanea saman, a **drought-tolerant** tree commonly found in Puerto Rico, provides an **urban forest**

Dunes Reconstruction

- In response to Hurricanes Irma and Maria
- Dune vegetation shapes the sand and keeps it from **eroding**
- Vegetation also reduces **wind velocity** and anchors sand
- **Sand fences** work as **filters** for sand and wind, and **protect vegetation**





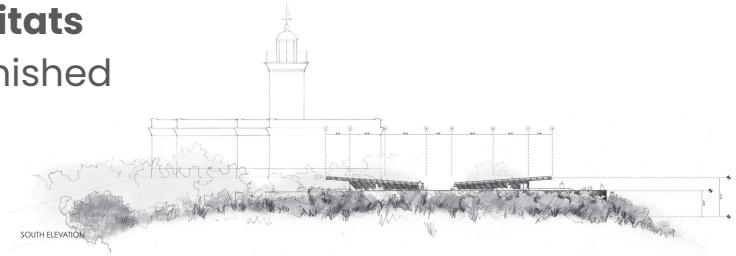


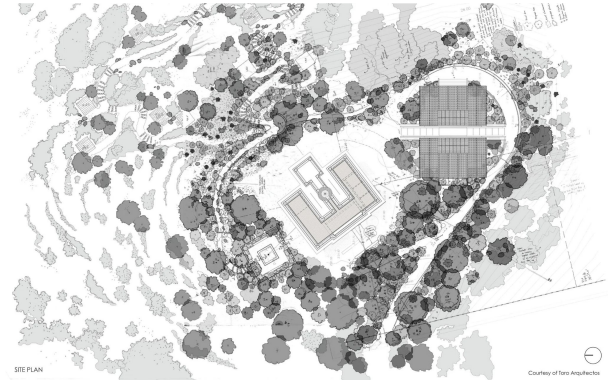


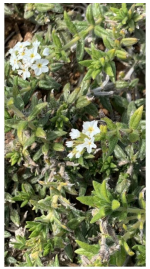


The Wings of Culebrita

- Relies solely on **native and endemic species**
- Restores lost **habitats**
- **Diversity** is replenished







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Green Building Standards in Puerto Rico – State Regs Today

Landscape Architecture Services in Puerto Rico

Landscape Architecture Studio | Puerto Rico & All Virgin Islands

Landscape Architecture Services in Puerto Rico

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*Photo and caption information sources linked in source text on photographs