HYBRID ECOLOGIES: BRIDGING THE PRODUCTIVE, URBAN AND NATURAL LANDSCAPE
Title of the project: Hybrid Ecologies: Bridging the Natural, Urban and Productive Landscapes
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Written statement, short description of the project in English, no more than 250 words
Ecuador is one of the most bio-diverse countries in the world. As mono-crop industry has taken hold of the economy, many of the native ecosystems are now at risk, none more so than the coastal mangrove ecosystem. Over 70% of Ecuador’s mangrove forests have been lost since 1990 when industrial shrimp farming was introduced. Additionally, much of the Ecuadorian population still rely on artisanal fishing, shellfish & shrimp collecting, whose stocks have depleted due to habitat loss, jeopardizing entire region’s economies & well being of communities. Currently, the landscape is intentionally segregated for production or urban development and is often in conflict with natural systems. Hybrid Ecologies is a design & planning process by which conflicting ecosystems & unsustainable practices are manipulated to work in tandem between the natural, urban and productive environments. It is unrealistic to believe that ecological restoration can be completed to the original state, & it is most likely that industries that produce large revenues will remain in place. This project focuses on combining shrimp farming & mangrove restoration that work in harmony, still provides revenue, and blends seamlessly with an urban backdrop. Essential to their survival mangroves need cultural & monetary appreciation. We attempt to show that mangroves & their accompanying wetlands can be harnessed for monetary production and designed into natural urban spaces that are beautiful and complement the surrounding urban fabric through parks & food production utilizing silvofishery methods of shrimp farming & chinampas as the foundation of design & mangrove restoration.

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Hybrid Ecologies: Analysis and Concept

Mangroves are often not appreciated as a monetary commodity, but they are necessary. Mangroves are worth:

- Erosion Control: $3,679/ha
- Storm Protection: $8,366-$13,821/ha
- Food & Raw Material: $484-$585/ha
- Offshore Fishery Production: $708-$957/ha

Goals:
- Provide buffers between conflicting land uses
- Rethink unsustainable management by hybridization
- Merging Urban, Natural, and Productive Landscapes

Strategies for Hybrid Ecologies:
- Educate residents in sustainable farming and aqua farming practices
- Design less intensive, but still productive aqua-farming practices
- Develop artificial ecosystems combining productive & artificial natural preserves
- Develop protected area system considering both vulnerable, currently protected and unlikely to be protected areas. Educate about artificial ecosystem & farm symbiotic benefits
- Develop incentives to preserve natural environments. Long term: land use & mitigation plan
- Identify low-cost mitigation to curb risk or curb habitat destruction

Chinampas as Restoration

Chinampas increase restoration success rates by 40%. When placed further apart they provide more habitat and surface area for wildlife and aerobic/anaerobic cleaning cycles.

Chinampas as Urban Fabric

Chinampas as Base for Silvofishery Farms
Hybrid Ecologies: Natural & Productive Landscapes

Ideal Semi-Intensive Pond Design
- **Pump**: Pump with suction head = 1 meter water column needed to move the shrimp from the bottom to the top of the pond.
- **Skimming Feeding**: Skimming feeding system to remove dead shrimp and algae from the pond.
- **Drainage**: Water drainage system to remove excess water and algae from the pond.
- **Harvesting**: Harvesting system to collect mature shrimp from the pond.
- **Discharge Canal**: Discharge canal to carry excess water and algae from the pond.

Proposed resilient shrimp farming model re-incorporating mangroves and additional crops and activities.

Shrimp farms are the main cause for mangrove deforestation in Casuari Cogmes and along the Pedernales river system, however they are also the main source of wealth production. The river travels through different landscapes and socio-economic conditions, therefore the productive landscape must adapt to these different conditions. The coastal region is rich with tourism and we invite tourists to visit the farms. The inland farms are focused on mangrove reforestation and research facilities to further understand a resilient relationship between shrimp farming and the mangrove environment.
After a devastating earthquake, San Jose de Chamanga was struggling with environmental degradation, physical destruction, and government proposals to remove the fishing community from the waterfront and prioritize shrimp farms over artisanal fishermen. The proposal envisions a new type of shrimp farming model and mangrove habitat restoration that encourages habitat recovery, growth in fishing stocks, and a cultural harmony between natural, productive, and urban landscapes. As a result, long-term economic stability will assist in recovery.

Site Analysis:
1. Tidal Water System
2. Existing Mangrove in Estuary
3. Artisanal Fishing
4. Shellfish Collecting
5. Official Relocation
6. Environmental Protection

Productive - Urban-Natural Hybrid II: Entrance to a mangrove silofishery park and shellfish collecting, serving as the gathering/recreation space to the town.

Natural-Urban-Productive Hybrid II: Terraced gardens used for soil retention and food production.

Productive - Natural-Urban Hybrid II: Retrofitted shrimp processing post-artisanal fisherman and mangrove based-crab pens for extra fish.