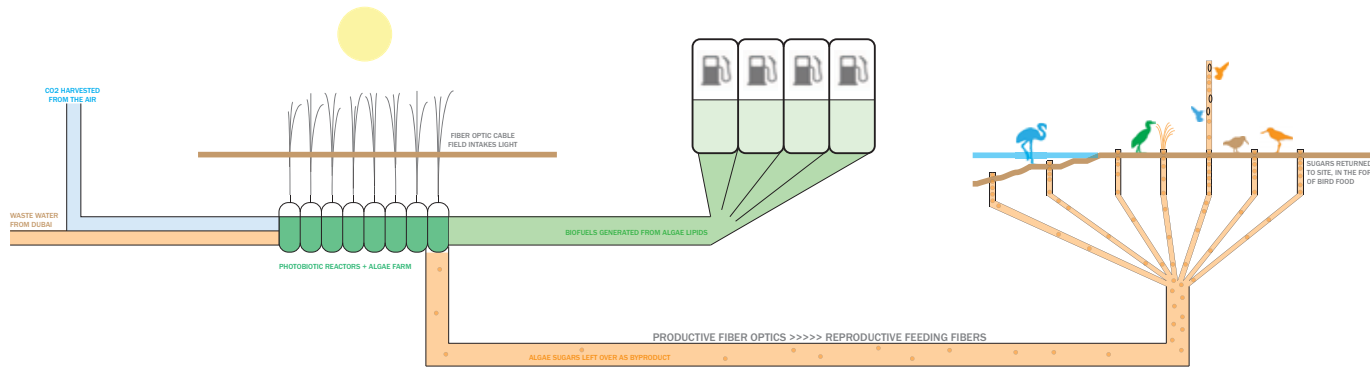


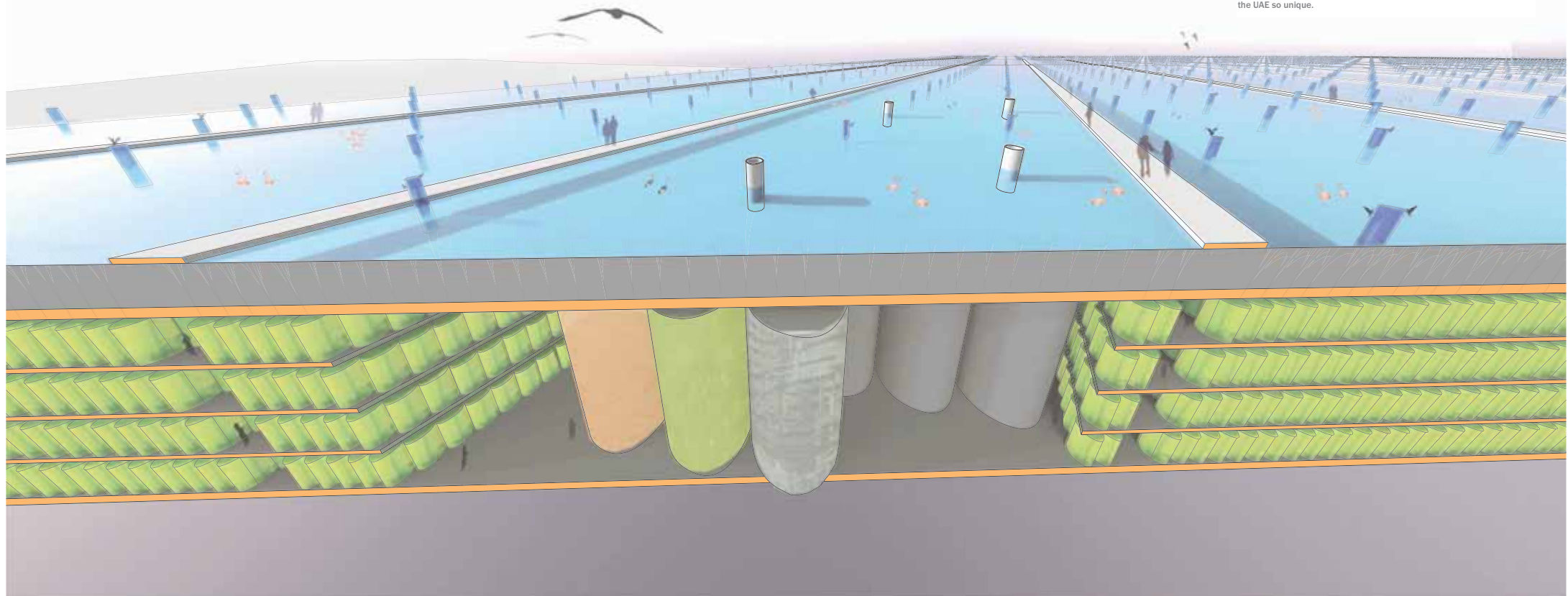
FERTILE CRESCENT

SYMBIOTIC ECOLOGIES

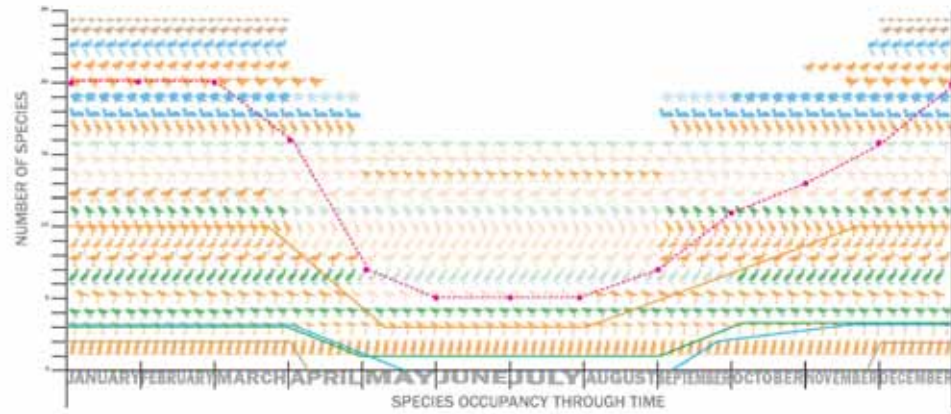


Symbiotic Ecologies are a juxtaposition of man-made and natural ecologies that will create energy beneficial to both. Visitors move into the site along boardwalks; first, over fields of fiber optic cables and then into bird filled meadows. An underground algae farm utilizes the light captured in fields of fiber optic cables to grow. When processed, its lipids are converted into biofuels that cleanly power Dubai's built environment and its sugars are returned to the site in the form of bird feed. In addition, natural shallow water, marsh, seacoast, and grassland habitats provide an extended home to the 7,000,000 birds that annually pass through the Ras Al Khor Wildlife Sanctuary. By enhancing the existing wildlife sanctuary with a new energy-generating art installation, this project seeks to become not only a global tourist destination but a model system of local energy creation and feedback, environmentally and culturally specific to the UAE.

The project's energy generating capacity relies on an underground system of algae farms. Sheltered underground, no excess environmental controls or conditioning are needed on the site to make it suitable for crop growth. Photobiotic reactors are used to grow the algae, which would be processed into biofuel and electricity. Fields of fiber optic cables on the surface of the site will collect sunlight during the day and pass it underground to the reactors. Combined with CO2 harvested from the air and waste water from Dubai, a harvest of algae can be completed in one to ten days, with a 100% yield capacity. Algae can grow with saline water in desert conditions, produces 300x more oil than conventional crops, and grows 20-30x faster than traditional food crops. To be harvested, the algae is starved of its nutrients, separated into its constituent lipids and sugars by soaking in a solvent bath, the solvent is evaporated, and the lipids are converted into biofuels and their sugars are used as bird feed. The biofuels can be used to cleanly power Dubai and the feed is then redistributed across the site, attracting and nourishing the local and migrant bird populations of Ras Al Khor. Once its initial construction is complete, this project will coexist and symbiotically support the neighboring bird sanctuary. Truly clean energy should support Dubai's built environment and preserve the natural environment and diversity that makes the UAE so unique.



THE BIRDS OF RAS AL KHOR



Symbiotic Ecologies presents a seasonally changing temporal habitat, providing varying means of human and animal occupation. The northern portion of the site will be flooded by the nearby Dubai Creek, providing a year round bird sanctuary and feeding grounds. To the south, other areas of the site contain integrated fiber optic light harvesting fields and bird feeding systems. These areas will be gradually flooded in the spring and fall, with peak flooding occurring in the winter, to provide increased shallow water, marsh, seacoast, and grassland habitats for the large influx of migratory birds at this time.

As more birds migrate, a larger area of the site is devoted to providing a habitat and feeding grounds. As they go, the site may revert back to generating energy for human consumption. When the habitable space for the birds increases, the area occupiable by man decreases, with certain paths only accessible during the summer, spring or autumn. People and birds co-exist in a proportional and symbiotic relationship, in occupation and energy production and consumption.

- Red-billed Tropicbird
- Blue-faced Booby
- Orange-billed Tropicbird
- Yellow-billed Tropicbird
- Green-billed Tropicbird
- Purple-billed Tropicbird
- Pink-billed Tropicbird
- Brown-billed Tropicbird
- Black-billed Tropicbird
- Grey-billed Tropicbird
- White-billed Tropicbird
- Light blue-billed Tropicbird
- Light green-billed Tropicbird
- Light orange-billed Tropicbird
- Light yellow-billed Tropicbird
- Light purple-billed Tropicbird
- Light pink-billed Tropicbird
- Light brown-billed Tropicbird
- Light black-billed Tropicbird
- Light grey-billed Tropicbird
- Light white-billed Tropicbird

RAS AL KHOR HABITATS



SHALLOW WATER



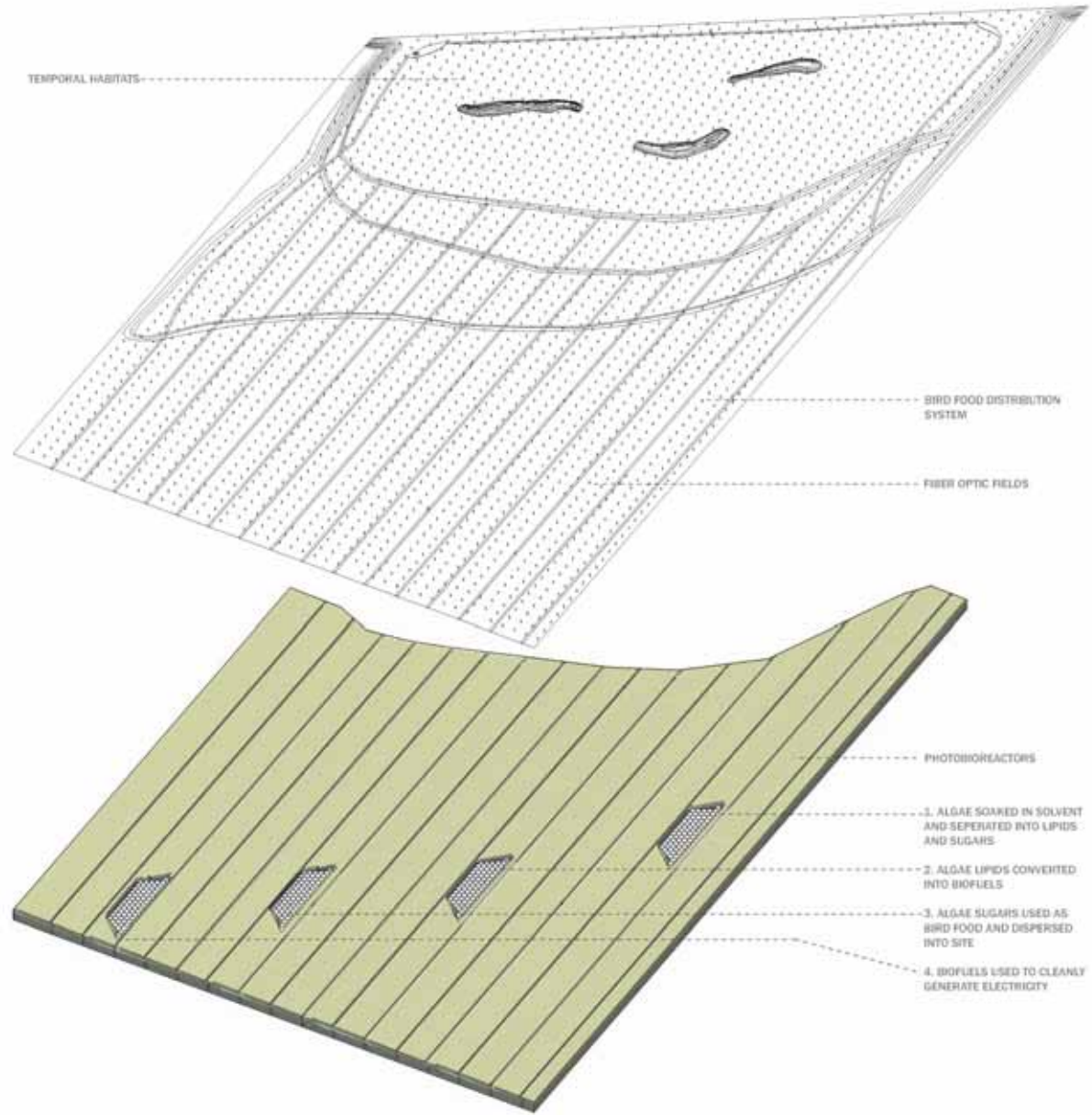
MARSHES/MUDFLATS



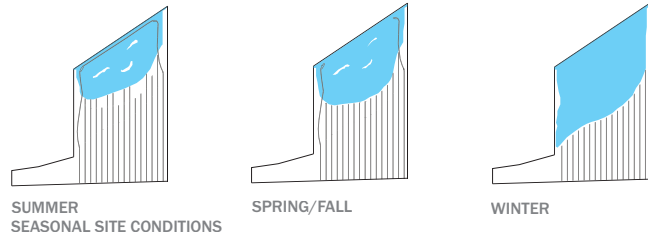
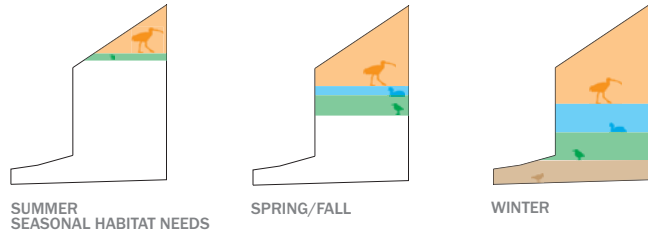
SANDY SEACOASTS



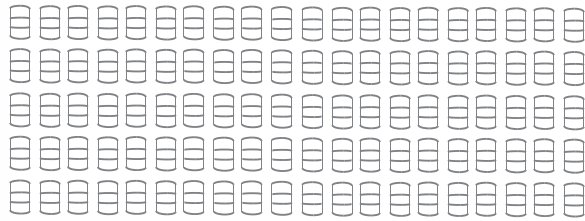
FIELDS/GRASSLANDS



SITE PLAN : SCALE 1/200' = 1'-0"



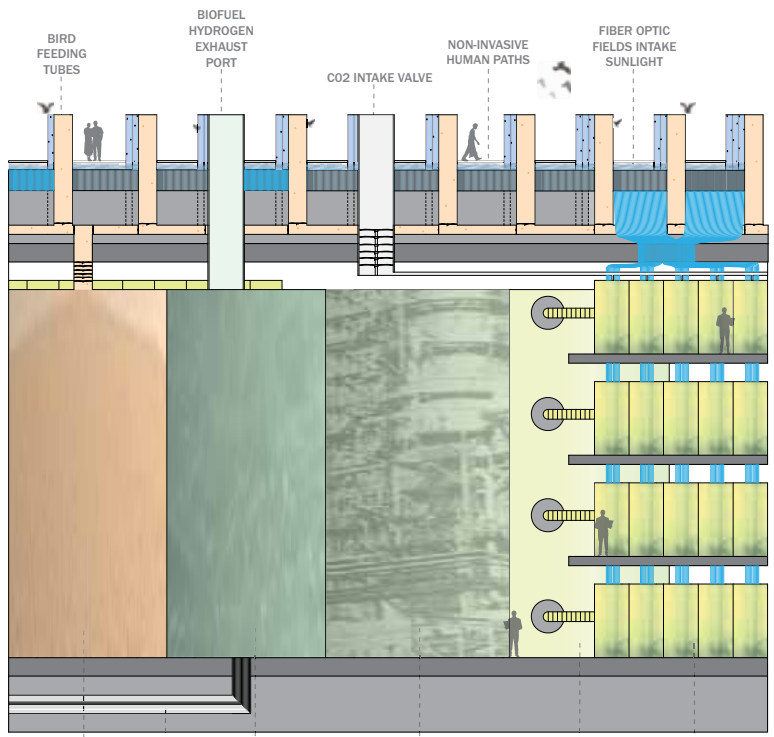
CLEAN ENERGY GENERATION



1 icon = 1,000 barrels of oil

Biofuels generated in this project would:
Create the equivalent of 100,000 barrels of oil per day*
Generate 170,000 megaWatt hours per day**
Meet 83.2% of Dubai's daily energy needs***

* Based on high yield algae crops (50 g/m²/day) with an oil yield of 10,000 gallons per acre
 ** One barrel of oil generates the equivalent of 1.7 megawatt hours of energy
 *** Statistics from Dubai Electric and Water Authority (DEWA), who estimates Dubai will require 8,513 MW per day (or 204,312 mWhr) by 2015.



- 5. ALGAE SUGARS CONVERTED INTO BIRD FEED AND REDISTRIBUTED INTO SITE
 - 4. BIOFUELS USED TO CLEANLY GENERATE ELECTRICITY
 - 3. ALGAE LIPIDS CONVERTED INTO BIOFUELS
 - 1. ALGAE GROWN IN PHOTOBIOREACTORS
 - 2. ALGAE SOAKED IN SOLVENT AND SEPERATED INTO LIPIDS AND SUGARS
- ELECTRICITY/BIOFUEL PIPELINED INTO DUBAI FOR CLEAN ENERGY USE

DETAIL SECTION

ENVIRONMENTAL IMPACT STATEMENT
 Although this project seeks a fairly dramatic intervention into the site, once constructed it would become a self sustaining energy generator and would fully support the native and migratory bird species of the adjacent Ras Al Khor Wildlife Sanctuary. An artificial man made energy generating ecological system coexists with created natural habitats. A new, sustainable symbiotic ecology is created.

