

分解保护：

格兰德河三角洲的生态流动与生态基础设施设计

Conservation Disassembled:

Choreographing Infrastructural and Ecological Flows in the Rio Grande Delta

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摘要 ……

本项目位于社会、经济及环境条件都不断变化的景观之中，体现了废料经济与泻湖生态两大系统的重要性，同时通过精心重组区域尺度的基础设施和生态物质流动，为该地区塑造了具有自我恢复能力和生产力的新景观。

关键词 ……

分解；保护；废船拆卸；废料；三角洲

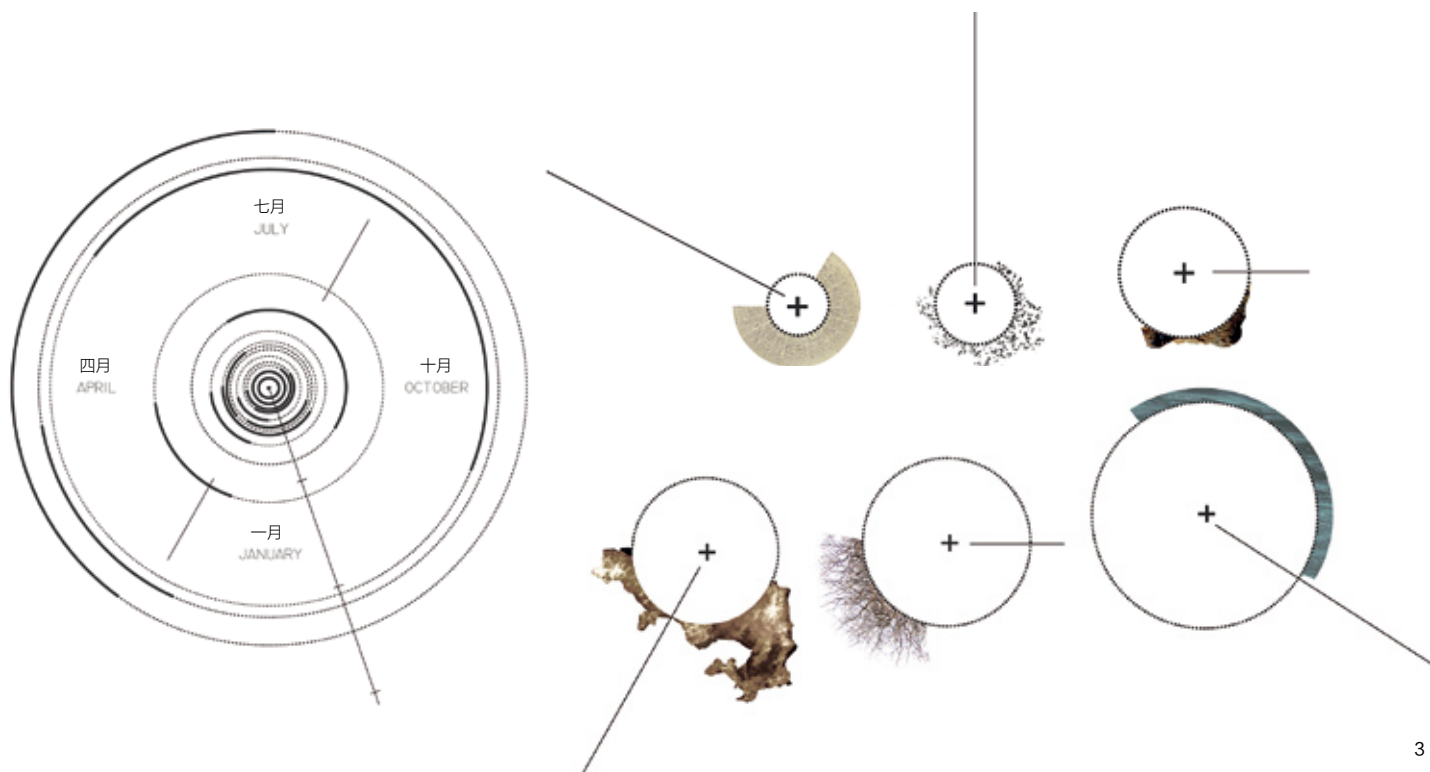
Abstract ...

This project investigates the current tension between waste economies and lagoonal ecologies in the Rio Grande Delta. It questions the notions of growth through production and conservation through preservation by offering a new model for the region that couples marine disassembly practices with the conservation of ecologically sensitive areas. Situated in a shifting landscape — socially, economically, and environmentally — the project acknowledges the importance of both systems and attempts to choreograph infrastructural and ecological flows to enhance regional resiliency and productivity.

Key words ...

Disassembly; Conservation; Shipbreaking; Waste; Delta





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背景

该项目始于距格兰德河口15 000km处。在耗费将近3个月时间追踪美国军用船舶处理废弃物的历史后，因为研究需要笔者曾前往孟加拉国的一处海滩，在这片海滩上每年将会完成数百艘退役船舶的回收和分解工作。该地区是全球“船舶分解”市场的枢纽，这一行业在其带来的经济增长和环境与社会影响的夹缝中艰难发展。^{[1][2]}

该海滩位于孟加拉国工业城市吉大港北部，绵延近20km，这里活像一座座钢铁骷髅——处于不同分解阶段的船只——的墓地。在这里，利用孟加拉湾的潮汐能量作为动力，船舶随着潮水涌动，被潮水冲刷到岸边，打成碎片。一艘巨大的船只会在几个月的时间里缓慢消失，船上几乎所有的零部件都在此过程中得到了回收及再利用。^[3]

挑战

目前，美国国内仅有少数拆船厂具有将国有船舶进行分解处理的能力——其中最为活跃的工厂之一坐落于德克萨斯州的布朗斯维尔市城外。^[4]为了获得富有竞争

力的劳动力市场、关键的交通运输通道以及可供未来扩张的土地，这一产业将在未来成为德克萨斯州南部的支柱性产业。此外，鉴于国有船只存量，以及在国际“方便旗”（Flags of Convenience）政策的影响下，毋庸置疑，即将报废的船只将会在未来源源不断地涌入这一区域。

虽然因船只拆卸景观带来的经济增长将会最终造福于布朗斯维尔市，然而这一场地的所在地是该地区中最富有生态性生产力的地方——格兰德河三角洲。河口两侧的地带被恰如其分地命名为“马德雷泻湖”（Laguna Madre，西班牙语“母亲湖”之意），这片具有超高盐度海水的海湾作为该地区的育苗场地，为墨西哥湾的海洋生物生长发挥了极为重要的作用，同时在当地渔业发展中扮演了十分重要的角色。这里极高的生物多样性水平每年都吸引了大量的捕猎者、以休闲为目的的捕鱼人和自然观光客前来。

经济增长和环境保护之间的压力最终促使笔者提出了一系列对格兰德河三角洲地区进行干预的设计策略和方案。这里的挑战十分明确：废料经济与泻湖生态能否共存？

改造方案

设计方案的焦点在于创建马德雷泻湖跨国保护区。格兰德河两岸有超过700km²的受保护土地，希望通过将现有的船舶分解厂融入德克萨斯州布朗斯维尔市外围地区，并纳入受到联邦法律保护的区域内，使这些共存的系统能够得到有效的监督和管理。

这一保护区包括多种不断变化的沿海栖息地——受保护的泻湖、移动沙丘以及低地冲刷地区——这些地区已受到明

1. 2011年8月实地考察孟加拉国期间，位于吉大港北部海滩上的船舶拆解设备。
2. 两种船舶拆卸景观的鸟瞰对比图：孟加拉国吉大港和德克萨斯州布朗斯维尔（截图自谷歌地球专业版，2010年和2011年）。
3. 图中显示了界定格兰德河三角洲的不同周期循环，包括飓风、疏浚维护、鸟类的迁徙、洪水、灌木修剪和野生动物管理。
1. Shipbreaking facilities on a beach north of Chittagong, Bangladesh during a site visit in August 2011.
2. Aerials comparing two landscapes of marine disassembly: Chittagong, Bangladesh and Brownsville, Texas (Google Earth Pro, 2010 and 2011).
3. A diagram showing the various cycles that define the Rio Grande Delta including: hurricanes, dredge maintenance, bird migrations, flooding, brush sculpting and wildlife management.

显的人为和自然的影响而发生了变化。从某种角度上来说,这一地区可因其景观每天、每月、每年不断进行的拆解和组装的过程被划分为季节性和年际性的不同循环周期。在为保护区进行发展策略规划的同时,笔者的首要目标是将这些现存的循环和能量流动在两个系统中实现经济效益和生态性的共存。

策略

在对现场场地条件以及同海洋基础设施分解相关的各种过程进行深入调查后,笔者为这一地区提出了4项土地管理的策略,可作为潜在的驱动方式。

第一个加强潮汐活力的策略源自于多年以来为近岸内航道进行的疏浚工作,这条近岸内航道是一条由墨西哥湾延伸到佛罗里达的海上高速公路,主要被用于贸易资源运输。正因如此,一些泻湖多年以来已经中断了洪水补给,目前已完全干涸。布朗斯维尔航道是该区域水道的最终端,目前作为船只拆解活动的聚集地,导致附近的一些泻湖被完全同潮汐流隔离开来。为了增强潮汐活力,笔者的策略包括切削通往泻湖的进水口,使其最终成为船舶拆解的盆地。洪水通过一系列船闸得到了控制,该盆地将会得到周期性的冲刷,以重新连接起各个泻湖。除此之外,根据拆解的需要,这一盆地可以被开放或关闭,或者转作他用。

目前,德克萨斯海岸作为营建离岸礁的一个试验场地,已经开始进行海洋生物栖息地恢复的尝试。第二个策略的目的是同现有的实践进行联系,通过引入两个新的区域,进行船舶的水下组装,并对已退役的船只进行沉没处理。一旦这些船只抵达格兰德河三角洲来走完它们“最后的旅程”,将会被进行潜力评估,看其能否成为海洋栖息地,以及是否具备吸引人们进行潜水的条件。如果被选中,它们将会在修建好的盆地内得到彻底的清洗,以便将污染降到最低。然后,当大气条件合适凿沉时,船只将会从海平面上消失,最终被多种海洋物种所环绕栖居。当水面平静

时,前往保护区的游客可以通过一个从水中升起的基座对水下环境进行观赏,并探索水下的礁群。

多年以来,格兰德河三角洲的很多地区遍布着浓密的灌木丛,包括豆科灌木和仙人掌等植被。为了恢复这片热带疏林草原栖息地,笔者的第三个策略是对这一地区进行重塑,使用机械器具移除部分灌木、在裸露的土壤上进行栽种,以及对景观进行空中补种。随着时间的推移,这些新种植的植物斑块将成为沿海的热带疏林草原群落,并最终成为野生动物观察者和打猎者的天堂。多余的灌木也将被重新运回到河道中去,以助于航道清理疏浚。

最后一个土地管理策略是使用改良过的疏浚材料,在建造好的盆地内创造合适的条件,营建出一个稳定的高地栖息地。格兰德河三角洲是一个大型沙丘系统的发源地,对这一地区的生态而言至关重要,然而最近正遭受到严重的侵蚀。为了有效缓解这一趋势,可以从航道处转移并存放一些改良的疏通材料。然后,通过架设大规模的滞蓄系统,以堆积海砂,创建出沙丘,并通过芦苇和草的网格种植模式对其加以固定。

除此之外,还将在整个保护区内设置一系列独特的设计元素,在游客和计划采取的各项干预措施之间创造出一个交流的平台,从而在景观中创造出一条线性的解说脉络,指引游客们从一个场地前往另一个。

结论

需要承认的是,格兰德河三角洲的未来同这些船舶废料的未来密不可分。这一项目对保护进行了更为广泛的定义:保护并不等同于保存。在对船只拆解及与地区生态学相关的各项活动进行重新设计时,项目意在创造出一种能够产生生态、经济等多方面效益的系统,为该地区的多种航道和机遇提供相互依存的干预措施,而不是仅仅为这一地区提供一种单一的未来选择,从而使这里具有能重塑不断变化的景观的潜力。LAF



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Background

The origins of this project began 15,000 kilometers from the mouth of the Rio Grande River. After spending nearly three months tracking the history of disposal operations for United States military vessels, my research led me to a beach in Bangladesh, a beach that is responsible for dismantling and recycling hundreds of decommissioned ships every year. The region serves as one hub in the global market of "shipbreaking", which is an industry that is continuously caught between the economic growth that it spawns and the environmental and social repercussions that result.^{[1][2]}

Stretching for nearly 20 kilometers just north of the industrial city of Chittagong, the beach resembles a living graveyard of steel skeletons, each at a different stage of disassembly. Here, ships ride in with the tide, using the energy of the Bay of Bengal as a

means of propulsion before being broken down piece by piece on the shore. Over the course of a few months, a massive ship will slowly disappear, with nearly all of its parts being reused or recycled in the process.^[3]

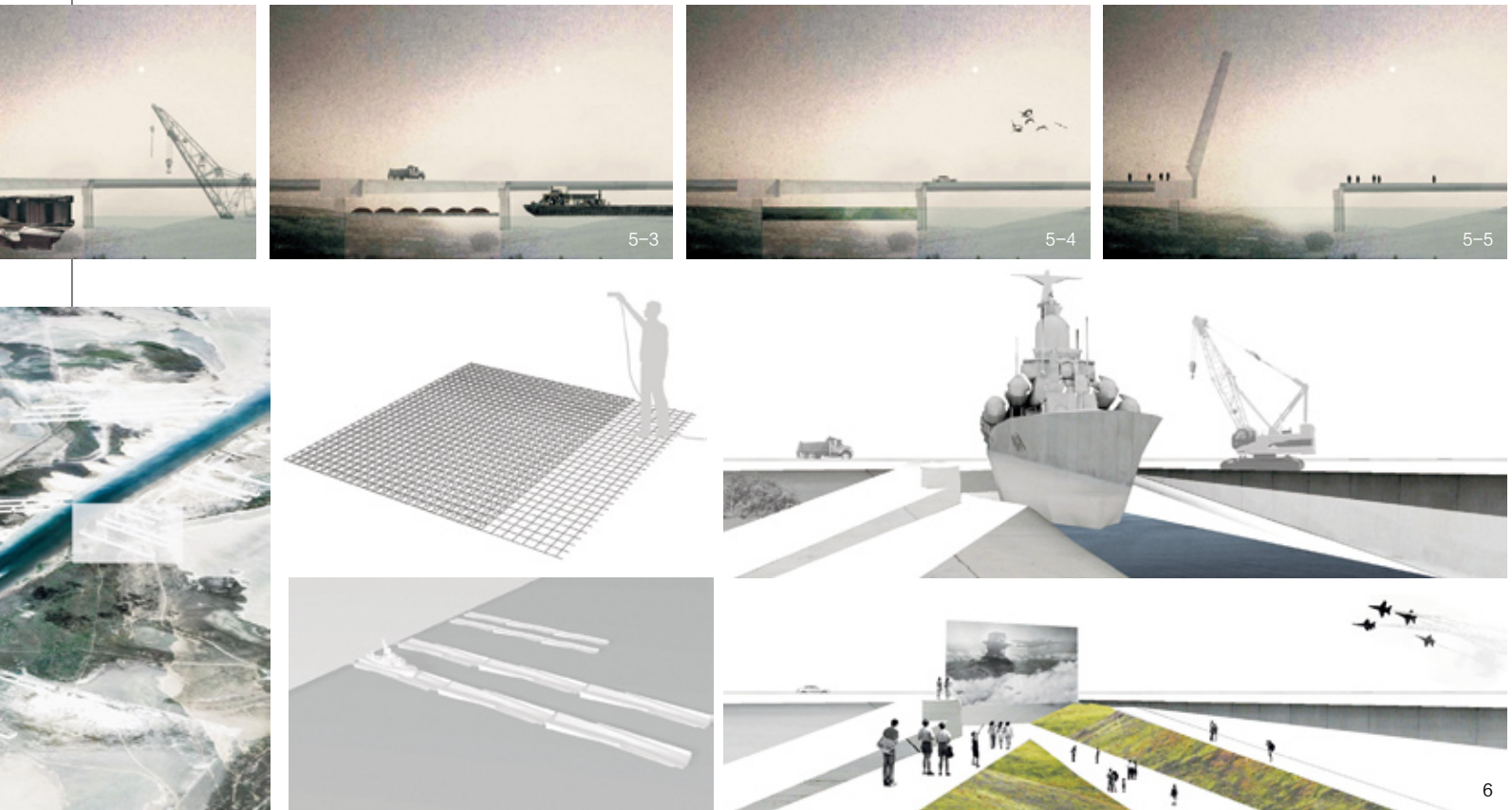
Challenge

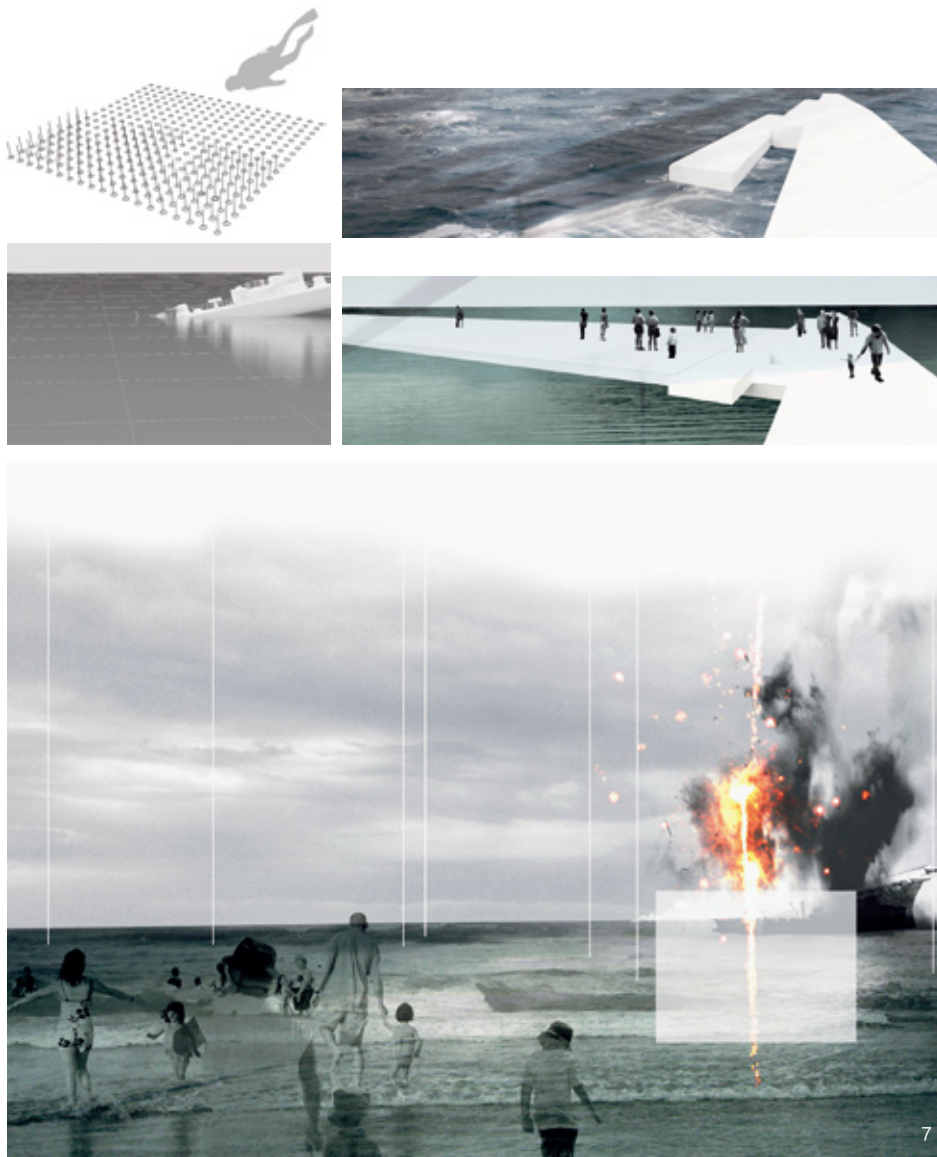
Currently, there are few domestic shipbreaking facilities that are capable of handling the disposal operations of government-owned vessels — the most active site being located just outside of Brownsville, Texas.^[4] With access to a competitive labor market, key transportation corridors, and land for future expansion, it is anticipated that the industry will be a mainstay for southern Texas. Furthermore, with the current backlog of federal ships and the potential for the tightening of international regulations regarding flags of convenience, there will undoubtedly be a steady flow of end-of-life

ships to the region.

While the economic growth stemming from this landscape of disassembly will ultimately benefit the city of Brownsville and its surrounding communities, it is located in one of the most ecologically productive regions — the Rio Grande Delta. Flanking both sides of the river mouth is the aptly named Laguna Madre, a hyper-saline bay that serves as nursery ground for a significant percentage of

4. 本方案提出的“马德雷泻湖跨国保护区”，位于重新规划的近岸内航道和墨西哥湾绕行航道廊道之内。
5. “船舶拆卸”盆地可转作他用，如疏浚管理和供海底生物产卵。
6. 第一个策略是通过联结拆解盆地与潮汐水港，重新引入潮汐动力系统。经切割后，该盆地在被用于冲刷相邻泻湖之前能够转作其他用途。
4. The proposed "Laguna Madre Transnational Conservation Area" as situated within the re-aligned corridors of the Intracoastal Waterway and the Gulf Coast Byway.
5. The transitioning of a "shipbreaking" basin to other uses such as dredge conditioning and benthic spawning.
6. The first strategy is reintroducing tidal dynamics to the system by coupling dismantling basins with tidal inlets. After dissection, the basin is able to transition to other uses before being used to flush adjacent lagoons.





marine life in the Gulf of Mexico and plays a very important role in local fisheries. Its high levels of biodiversity draws a large number of hunters, recreational fisherman and nature-watchers to the region every year.

The tension between economic growth and conservation is ultimately what compelled me to propose a series of design strategies and interventions for the Rio Grande Delta. The challenge was clear: is it possible to couple waste economies with lagoonal ecologies?

Proposal

The focal point of my design proposal

is the creation of the "Laguna Madre Transnational Conservation Area" which includes over 700 square kilometers of protected land on both sides of the Rio Grande River. By embedding the existing shipbreaking facilities outside of Brownsville, Texas within this federally-protected area, the co-existence of these systems could be supervised and managed.

The proposed conservation area includes a variety of shifting coastal habitats — protected lagoons, migrating dunes, and low-land scrub areas — that have been subjected to significant anthropogenic and

natural change. In a way, the region can be defined by seasonal and yearly cycles as parts of its landscape go through processes of disassembly and re-assembly daily, monthly, and yearly. In developing strategies for the conservation area, my primary goal was to tap into these existing cycles and flows in an effort to find economic and ecological overlaps between the two systems.

Strategies

After a thorough survey of existing site conditions and the various processes associated with the disassembly of marine infrastructure, four land management strategies surfaced as potential drivers for the region.

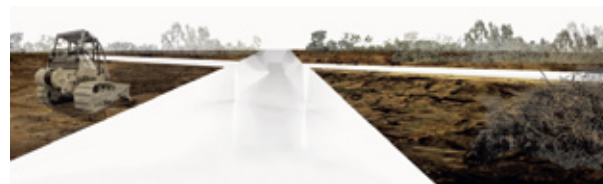
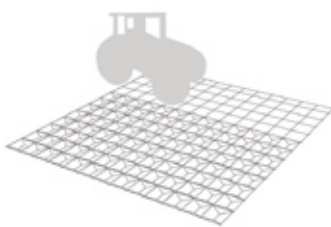
The first strategy of reintroducing tidal dynamics to the system stems from years of dredging to construct navigable channels for the Intracoastal Waterway, a marine highway that extends up the Gulf of Mexico to Florida and is extensively used for the transport of commercial resources. As a result of these modifications, many lagoons have been cut off from inundation and over the years, have become fully desiccated. The Brownsville Ship Channel, where current shipbreaking activities are clustered, serves as the final terminus of the waterway and has a number of adjacent lagoons that have been nearly cut off from all tidal dynamics. To allow for reintroduction, my strategy involves cutting inlets into the lagoons that can also serve as ship dismantling basins. With inundation being controlled through a series of locks, the basins would be periodically flushed, re-connecting the lagoons. Furthermore, depending on the need for dismantling, the basins could be turned on and off or transitioned to other uses.

Currently, the coast of Texas serves as a testing ground for the construction of offshore reefs in an effort to restore marine habitat. My

second strategy aims to tie into this existing practice by introducing two new zones for underwater assemblages and by sinking decommissioned vessels. Once ships make their final journey to the Rio Grande Delta, they would be evaluated for their potential in providing sufficient marine habitat as well as their ability to become a diving attraction. If selected, they would undergo extensive cleaning in the constructed basins to ensure minimal contamination. Then, once atmospheric conditions are appropriate for scuttling, the ship would disappear below the surface of the water where it would eventually become encrusted with a number of marine species. Visitors to the Conservation Area would be encouraged to watch these events from a designed plinth that emerges from the water when conditions are calm and to explore these reefs underwater.

Over the years, many areas in the Rio Grande Delta have become overrun with dense brush including mesquite and prickly pear. In an effort to restore savannah habitat, my third strategy sculpts these areas by mechanically removing portions of the brush, imprinting the exposed soil, and reseeded the landscape aerially. Over time, these newly seeded patches would become coastal savannah communities and would transition into a destination for wildlife watchers and hunters. Excess brush could be transported back to the channel and used as an additive for dredge conditioning.

The last land management strategy involves using amended dredge material, conditioned in the constructed basins, to create and stabilize upland habitat. The Rio Grande Delta is home to a large dune system that is extremely important to the ecology of the region but has recently experienced significant erosion. To counteract this trend, amended dredge could be transported from the channel and deposited. Then, with the



erection of large-scale retention systems, sand would accumulate, creating dunes that could then be stabilized through a gridded planting pattern using reeds and grasses.

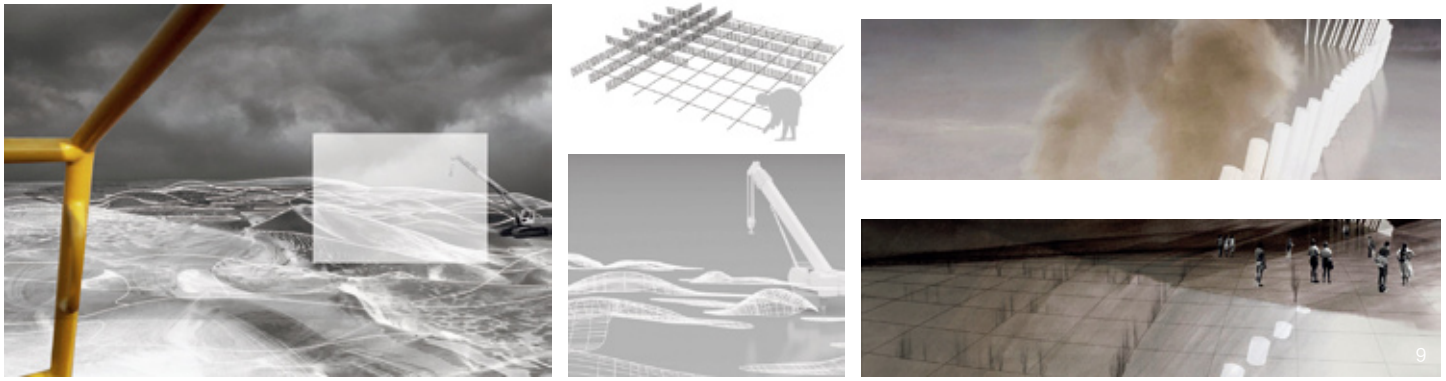
Furthermore, a number of distinctive design elements would be deployed throughout the conservation area to create an interface between the visitors and the proposed interventions and to allow for an interpretive thread to emerge throughout the landscape, guiding visitors from site to site.

Conclusion

Acknowledging that the future of the Rio

Grande Delta is inseparable from the future of waste, this project argues for a broader definition of conservation, one that is not wholly dependent on notions of preservation. In choreographing flows associated with

7. 第二个策略是通过只对船只进行凿沉处理以形成水下礁，并促进公园扩建地区附近的海洋生物栖息地的建造。
8. 第三个策略是通过修剪密集的、不规则的植被使沿海草原栖息地得到再生。通过网格状形式移除灌木丛，从而土壤可以被标记和用于重新种植。
7. The second strategy is sinking ships to create subsurface reefs and promote the create of marine habitat near and around these park extensions.
8. The third strategy is sculpting dense and unruly vegetation to regenerate coastal savannah habitat. Using a grid-like pattern, brush is removed so the soil can be imprinted and reseeded.



shipbreaking and regional ecologies, the project aims to create a system that is mutually beneficial, ecologically and economically. Rather than offering a single future for the region, it seeks to provide multiple channels and opportunities with interdependent interventions that have the potential to regenerate a shifting landscape. **LAF**

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9. 第四个策略是通过疏浚管理、滞蓄系统和种植来减少侵蚀，从而扩大并加固高地沙丘栖息地。
10. 整个保护区的干预措施将采用钢材料进行标记，建立一个解说脉络，呼吁拆解和生态恢复之间的整合。
9. The fourth strategy is augmenting and stabilizing upland dune habitat using conditioned dredge, retention systems and planting to reduce erosion.
10. Throughout the conservation area interventions will be marked with steel, creating an interpretative thread that calls upon the integration of disassembly and ecological regeneration.



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10-3