Bring Nature to Cities Deep Forms: Nature Based Solutions

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How can we survive?



Over 80% of the Chinese cities suffer air pollution, kills 1.2 million people each year









Flood: annual flood damage cost 100 billion US \$ Draught: 400 of 662 cities in shortage of water Pollution: 75% of the nation's surface water is polluted, 64% of cities' underground water is polluted

Habitat loss: 50% wetland disappeared in the past 50 years

Conventional solutions of single-minded engineering are not sustainable





Alternative----

Nature based solutions: by planning and designing landscape as ecological infrastructures (Green Infrastructure) to provide multiple ecoservices:

Provision Regulation Life supporting Cultural and spiritual services



Two strategies to create the ecological infrastructure, thus deep forms

- **1. Planning to create configurative deep forms**
- 2. Design and engineering to create transformative deep forms

For about 20 years, my team have being testing such solutions in over 200 cities and showcased numerous replicable models for transforming our environment at various scales



1. Planning to create configurative deep forms Ecological Infrastructure across scales









National water security pattern

- 1- year flood, 0.8% of the national land;
- 10 -year flood, 2.2% of the national land;
- 50-year-flood, 6.2% of the national land;



the national Ecological Infrastructure



以为生态安全为核心的 中国国土生态安全格局



Krasovsky_1940_Alber



The Foothills Strategy: where to build another 500 cities for 0.5 billion new immigrants (Kongjian Yu, Capitalizing on foothills: restoring the relationship between people and land. Harvard International Review; Summer 2012, Vol. 34 (1); 40-45)



Regional Ecological Infrastructure



7729

11508

13902

47.

70.

85

Landscape leads the way: Urban growth based on El



Scenario-1 Sprawl as usual



Scenario-3

Scenario-4

Scenario-5

Urban design based on El



The subtle elevation change on the rolling terrain gives character to the existing water system,





Conventional way of city building









El based circulation El based land City deign based on El



City based on EI

Landscape as infrastructure leading urban development





The stormwater collecting and filtrating system is the core for the ecological infrastructure of the new town. Three levels of green corridors were developed based that make up an

















2. Design and engineering to create Ecological infrastructure



Inspired by the ancient farming wisdom, based on sciences of ecology, replicable terrace module is developed to solve the problem in an inexpensive way



• #1 Make Friends with Floods

- Annual flood damage cost 100 billion US \$, 10 million people live in flood plain.
- All Rivers in China are dammed and channelized with concrete flood walls, What can you do?

Number of dames (height>15m) World total: 49,697 China: 25,800 USA: 8,724

#1 Make Friends with Floods

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by the landscape architect as an alternative to the commonly used concrete embankment and channelization. This proposal was finally been accepted. As a result, the former engineering approach was stopped, and the concrete lined river was to be ecologically recovered. The Yongning River Park was, therefore, set up an example for ecological recovering of the whole river.

Flood Analysis

The Floating Gardens: Yongning River Park

'Floating tree matrix

he Master Pla







Jinhua YAnweizhou:浙江金华,燕尾洲公园







100年一遇的洪水淹没的实景

Tol.






#2 Creating Water Resilient City by Restoring Native Habitats The Mangrove park and wetland Park in the city of Sanya

三亚的系列生态修复工程,由住建部召开现场会,向全国推广(之一) 海南三亚红树林公园

通过弹性适应、界面增强和仿生修复等技术,快速修复红树林栖息地



修复之前,2016

修复之后,2018

39











To induct ocean tides and avoid destructive fresh water storm



To avoid tropical destructive storm from the sea



01 Site plan: form follow processes. The designed ecotones of inter-locked fingers help to induct ocean tides, avoid the fresh water flush and destructive tropical storm

















东岸湿地East bank wetland













₩ 城市道路	1停车场
NC ROUN	2 主入口广场
田地	3 育业建筑
■ 智慧林	4 景现水面
〇〇〇 伊车场	5 特色呈观构筑
28 景观塔	6 榕树岛
管业律 统	7 陂塘
▶ 主入口广场	8 景观塔
	9 田地
中央水面	10 卫生间
罗 入口广场	11 中央水面
副 量加均衡	12 省景林
N 卫生间	13 自行车路
🛃 量现路	14 景观主路
	15 次入口广场









#4 Minimize Intervention and Maximize Return

Billions of dollars have been spent to turn nature into expensive urban landscapes. What could be the alternatives?



Under the name of safety and "beauty," we created shallow form or fake forms



The Red Ribbon park, Qinghuangdoa City, Hebei Province

Google earth


































#5 Sponge City: Green Infrastructure for A Water Resilient City

Almost all Chinese cities suffered the storm water inundation due to the monsoon climate, hundreds of people dies on street annually.

How to solve the problem in a wise way?



群力新区启动区控制性详细规划











Inspired by the pond-and-dyke system



Qunli Stormwater Park Ha'erbin, 33 ha







After: 2013, 3 years after the stormwater park was built









10% green sponge can solve the urban inundation problem







#6 黑臭河流治理 Landscape as living system to cleanse polluted water

75% of the nation's surface water is polluted, 64 % of cities' underground water is polluted, 1/3 of the national population are under the threat of drinking water pollution, what can we do?





Shanghai Houtan Park, 上海后滩 10 hectares., 1700 m long, producing 2400 cubic meter of water per day





Aeriation and filtration processes













Created a life supporting system for biodiversity and low maintenance



