화성
3만 가지 이유
지속가능하고 현명한 발전 제안서

발표: 2019년 5월 13일

희망을 위한 설계:삶, 생계, 그리고 화성습지 국제 심포지엄

마르시아 맥날리 교수, 랜돌프 헤스터 교수, 완 치인 교수

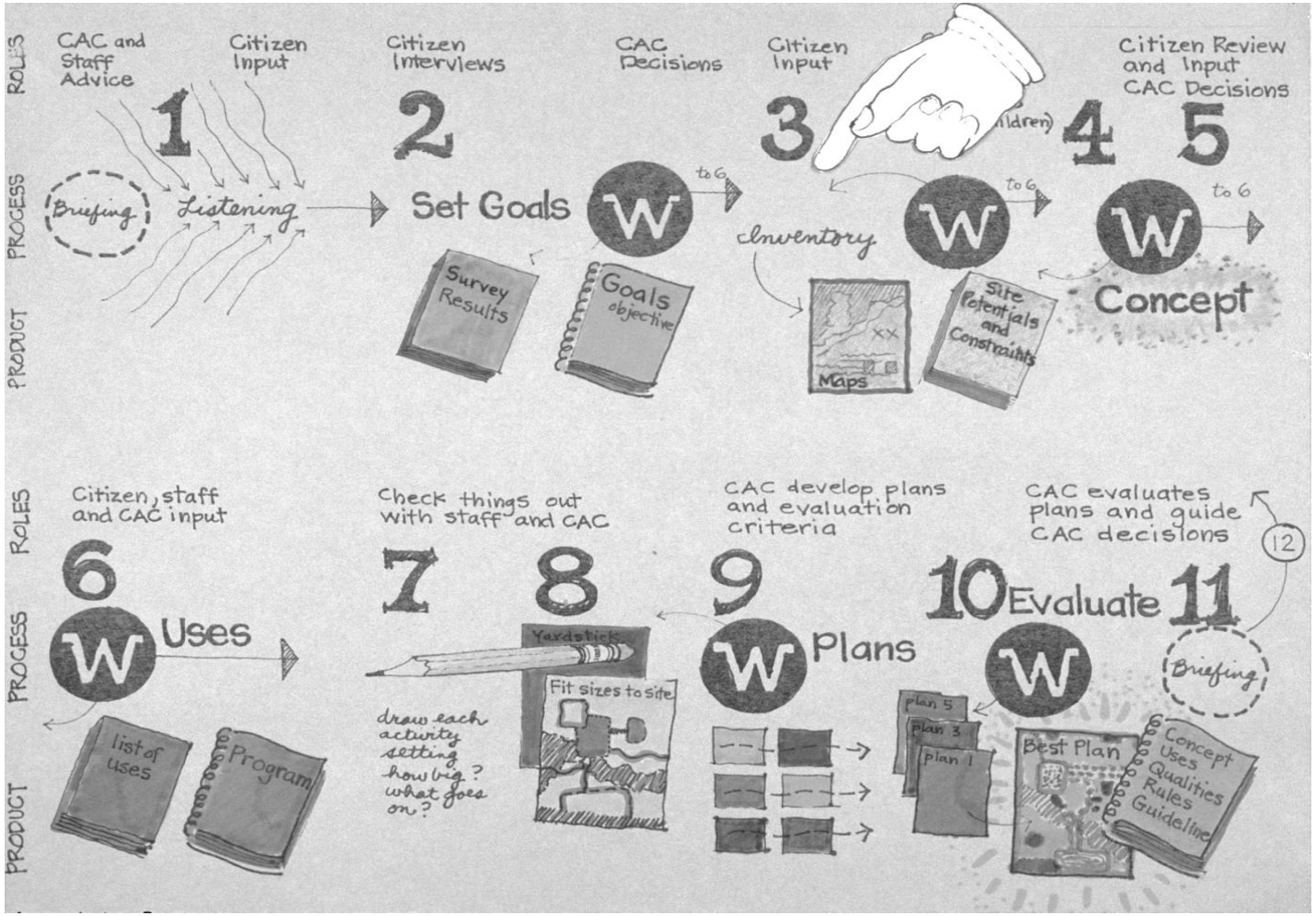
(캘리포니아 버클리 대학/세이브 인터네셔널)

발표내용

- UC 버클리/세이브 인터네셔널의 지역사회 기반 계획과 설계 방식
- 활동 사례
- 화성습지와 화성시를 위한 제안서 입안 과정
- 제안서
- 주요 특색

미국 캘리포니아 대학 버클리/세이브 인터네셔널

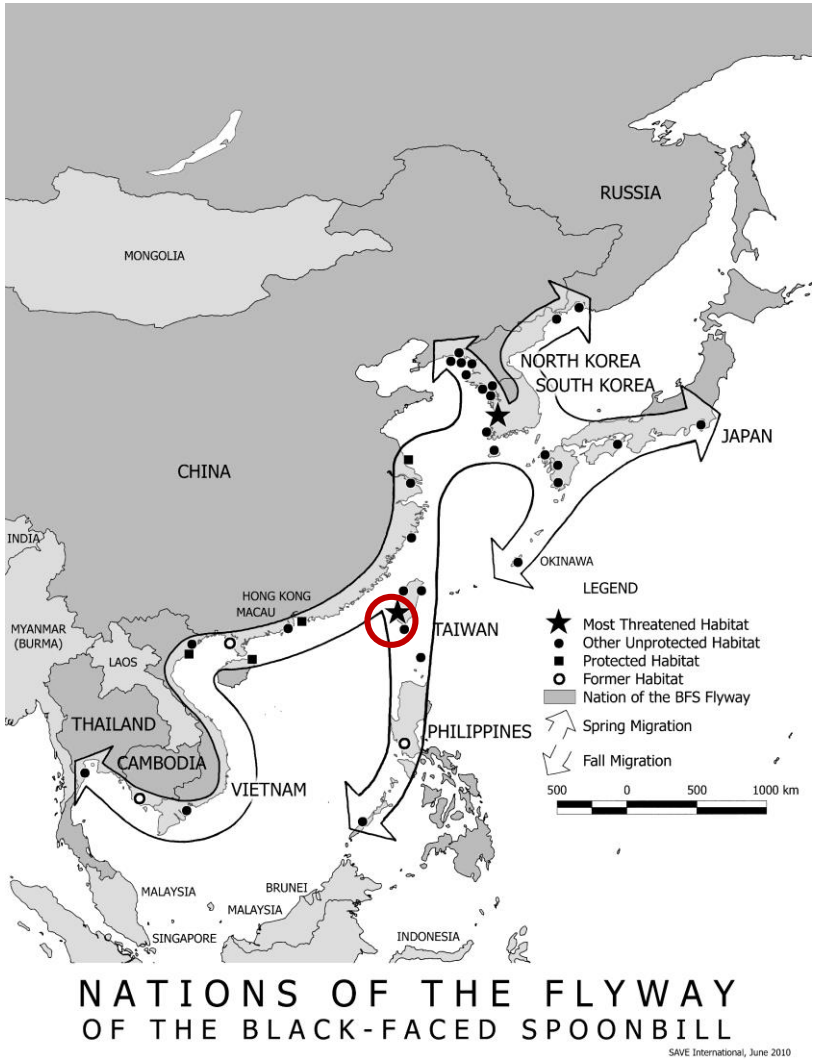
지역사회 기반 계획과 설계 방식

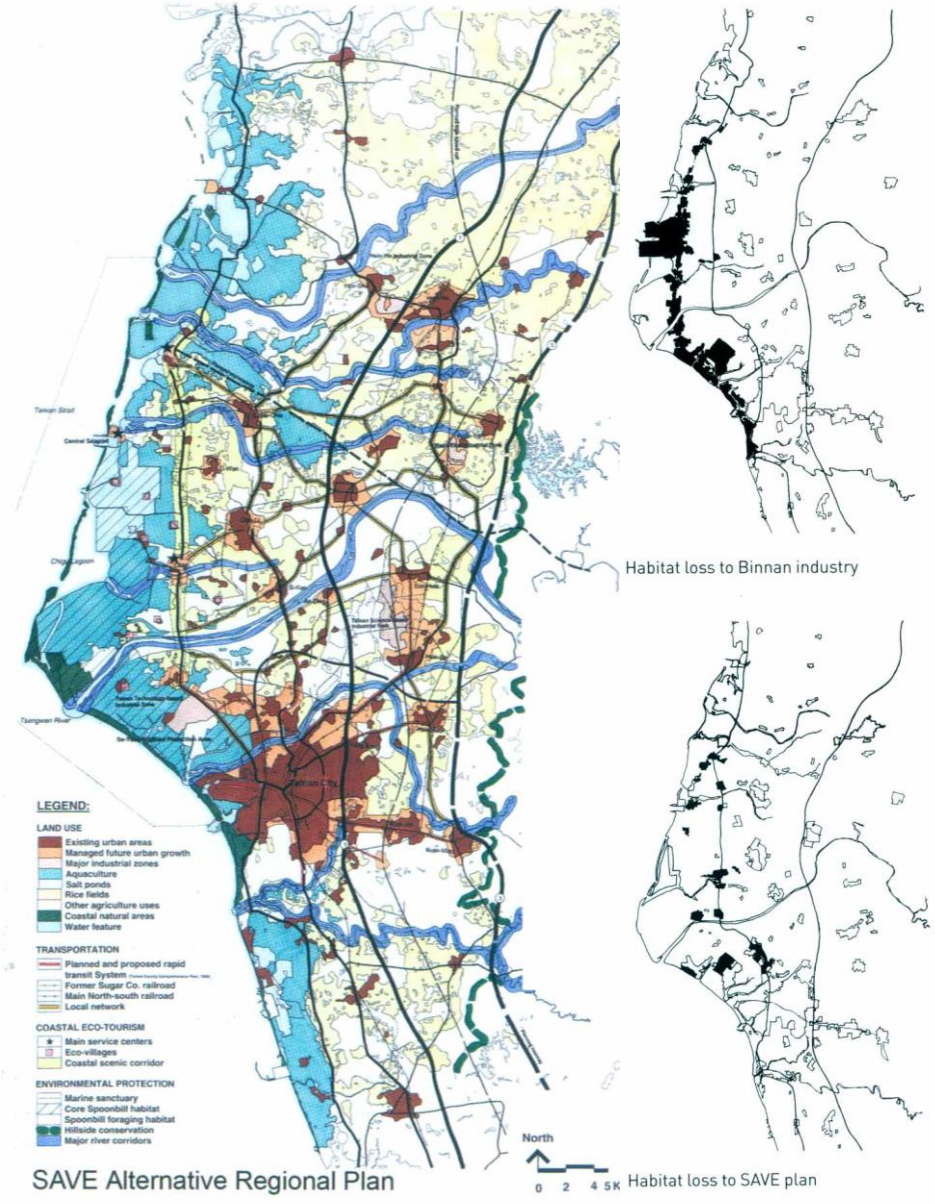



PROPOSED PROJECTS: Tidal Flat Visitor Exhibition
PROPOSED PROJECTS: Yeongnam Beach Promenade
PROPOSED PROJECTS: Ghodiri Gateway Park


Southern Tidal Mudflats

활동 사례: 대만 남서해안

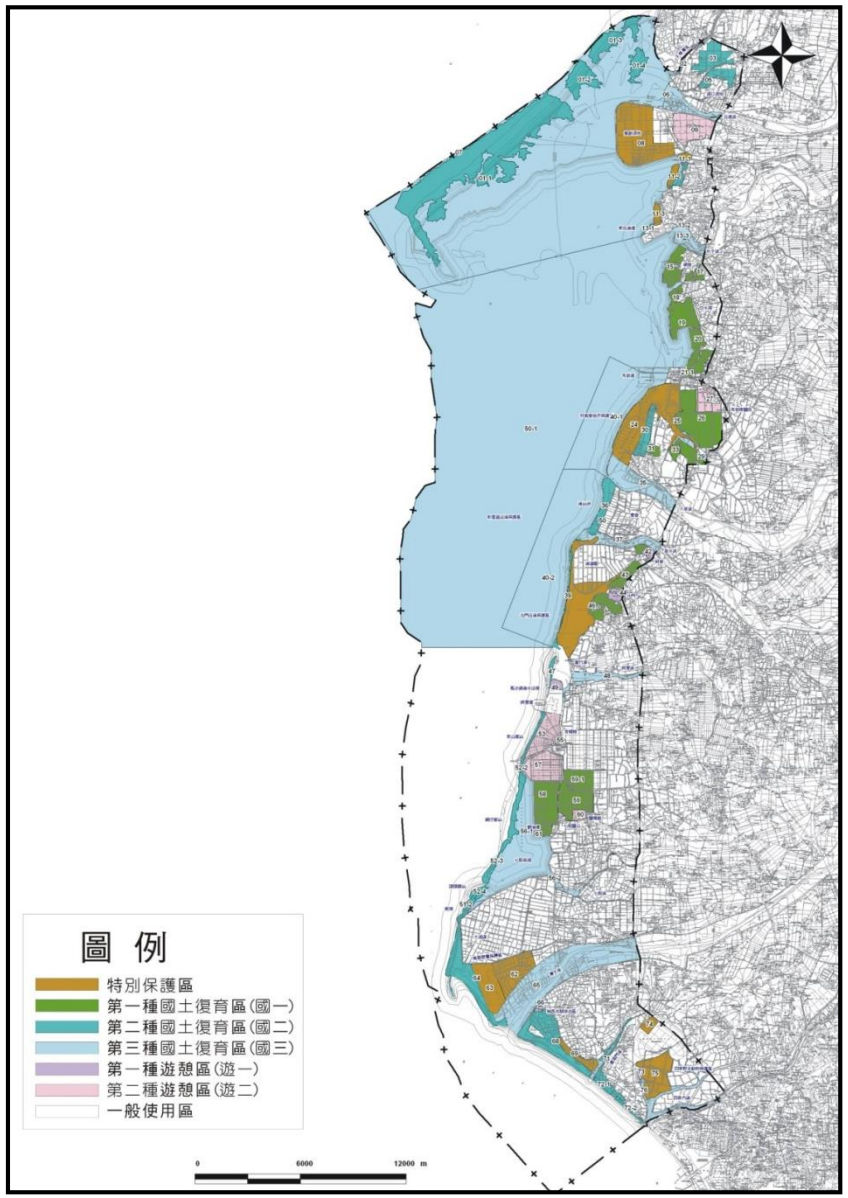

RUSSIA
MONGOLIA
NORTH KOREA
SOUTH KOREA
JAPAN
CHINA
INDIA
OKINAWA
HONG KONG
MACAU
TAIWAN
MYANMAR
(BURMA)
LAOS
THAILAND
CAMBODIA
VIETNAM
PHILIPPINES
MALAYSIA
BRUNEI
MALAYSIA
SINGAPORE
INDONESIA
LEGEND
Most Threatened Habitat
Other Unprotected Habitat
Protected Habitat
Former Habitat
Nation of the BFS Flyway
Spring Migration
Fall Migration
500 0 500 1000 km
NATIONS OF THE FLYWAY
OF THE BLACK-FACED SPOONBILL
SAVE International, June 2010

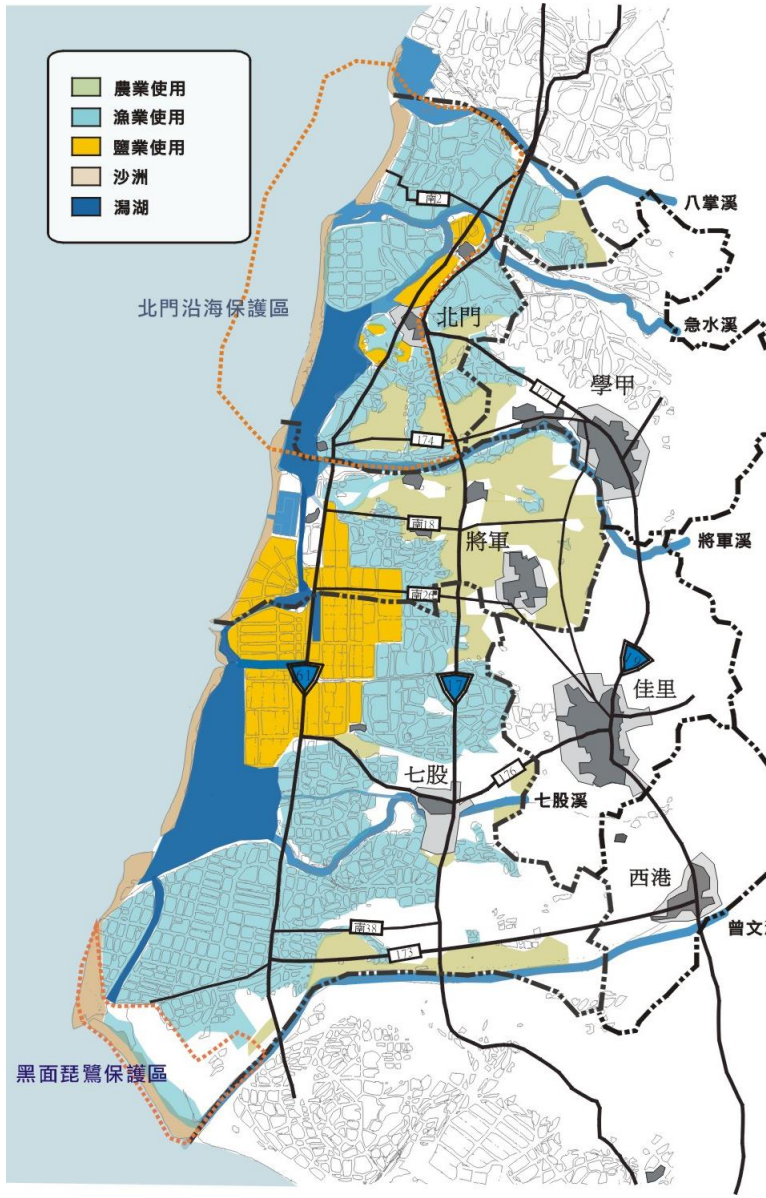


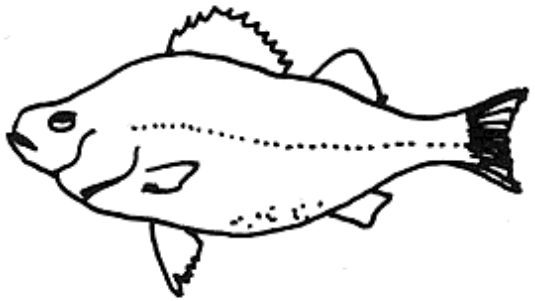
SAVE Alternative Regional Plan

Habitat loss to Binnan industry

Habitat loss to SAVE plan

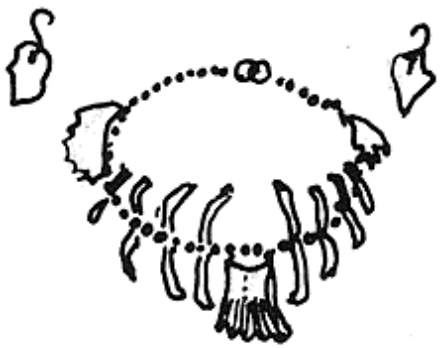






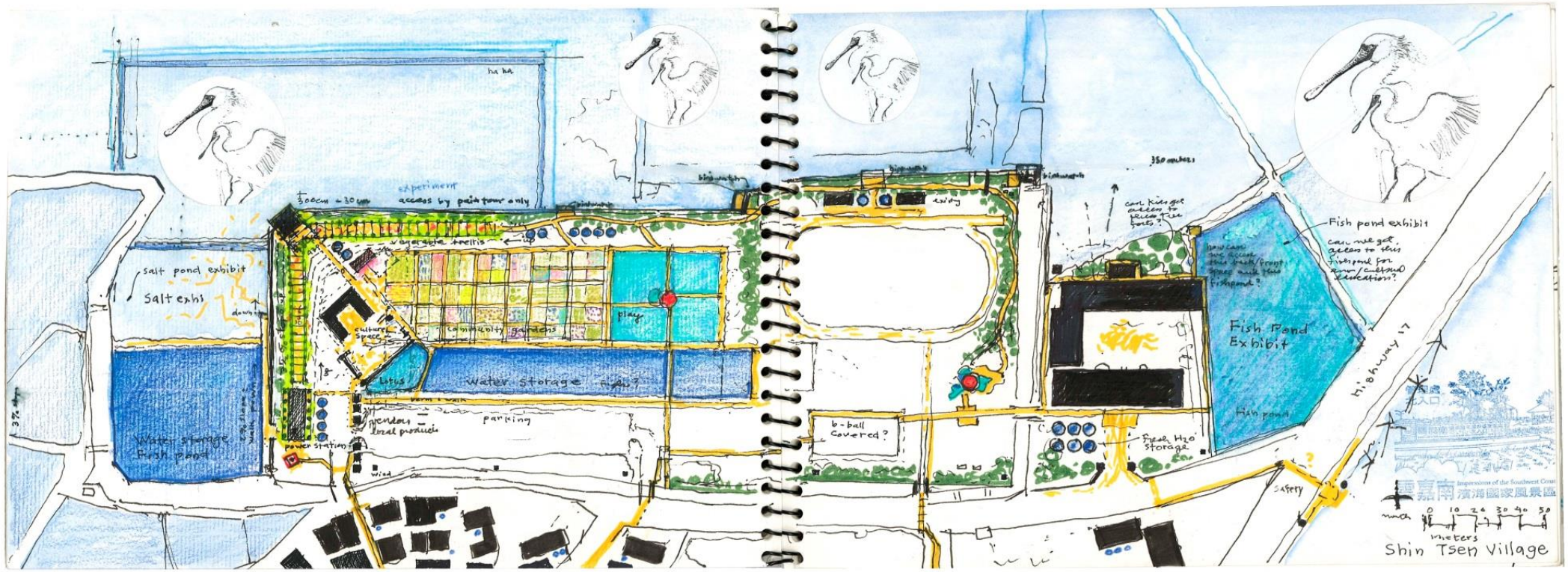
trash

sell



use

sell


salt pond exhibit
Salt exhi
Water storage
Fish pond
experiment
access by paid tour only
vegetable trellis
community gardens
culture space
play
lotus
Water storage
parking
vendors
local products
power station
b-ball
Covered?
Fish Pond
Exhibit
Fish pond exhibit
Fresh H2O
Storage
safety
Hi8hway 17
0 10 24 30 40 50
meters
Shin Tsen Village


SAVE INTERNATIONAL
Membership Certificate
March 21, 2011

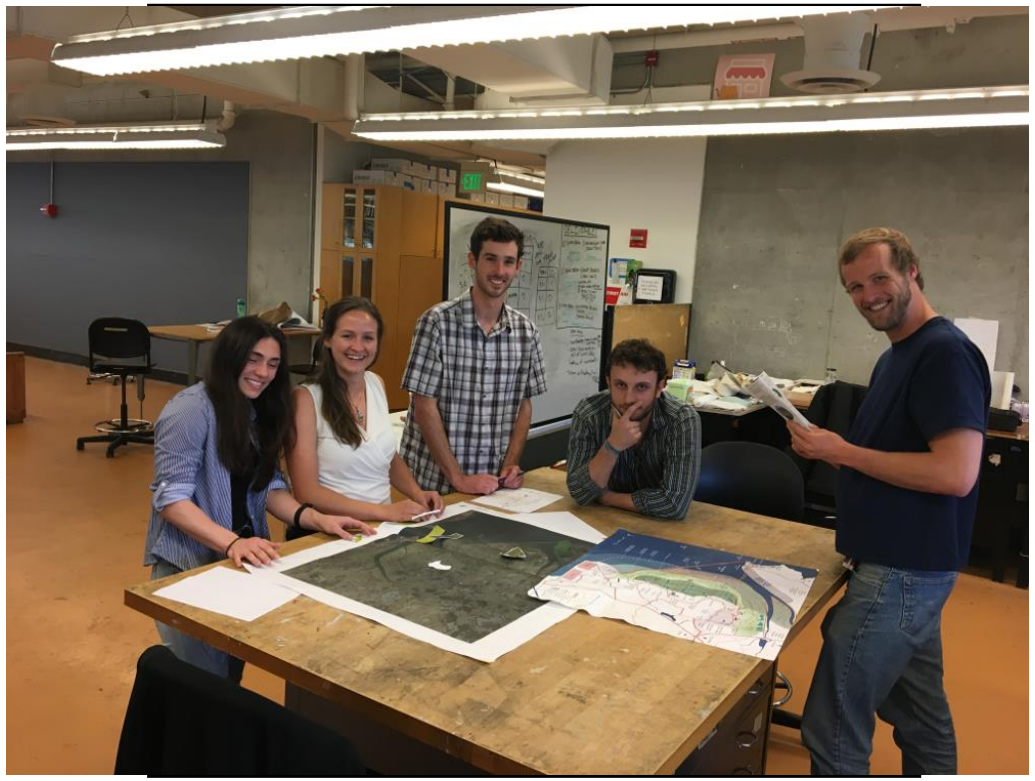
제안서 입안 과정

- 미국 캘리포니아 대학, 버클리 팀(UCB) 조사와 구상
- UCB의 계획에 관한 세이브 인터네셔널의 보강
- 5월 11-12일, 지역민들과의 의견 교환


화성호
국제
심포지엄
International
Symposium

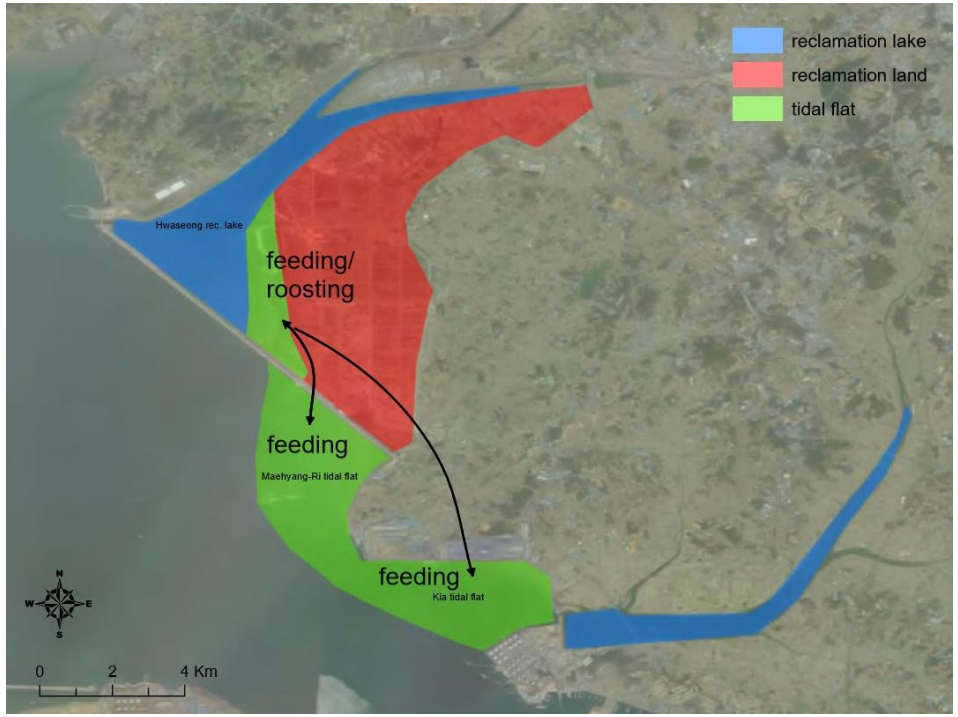
캘리포니아 대학 버클리 팀(UCB) 조사와 구상

스카이프를 통한 UCB 팀과 환경운동연합, 새와생명의터 작업



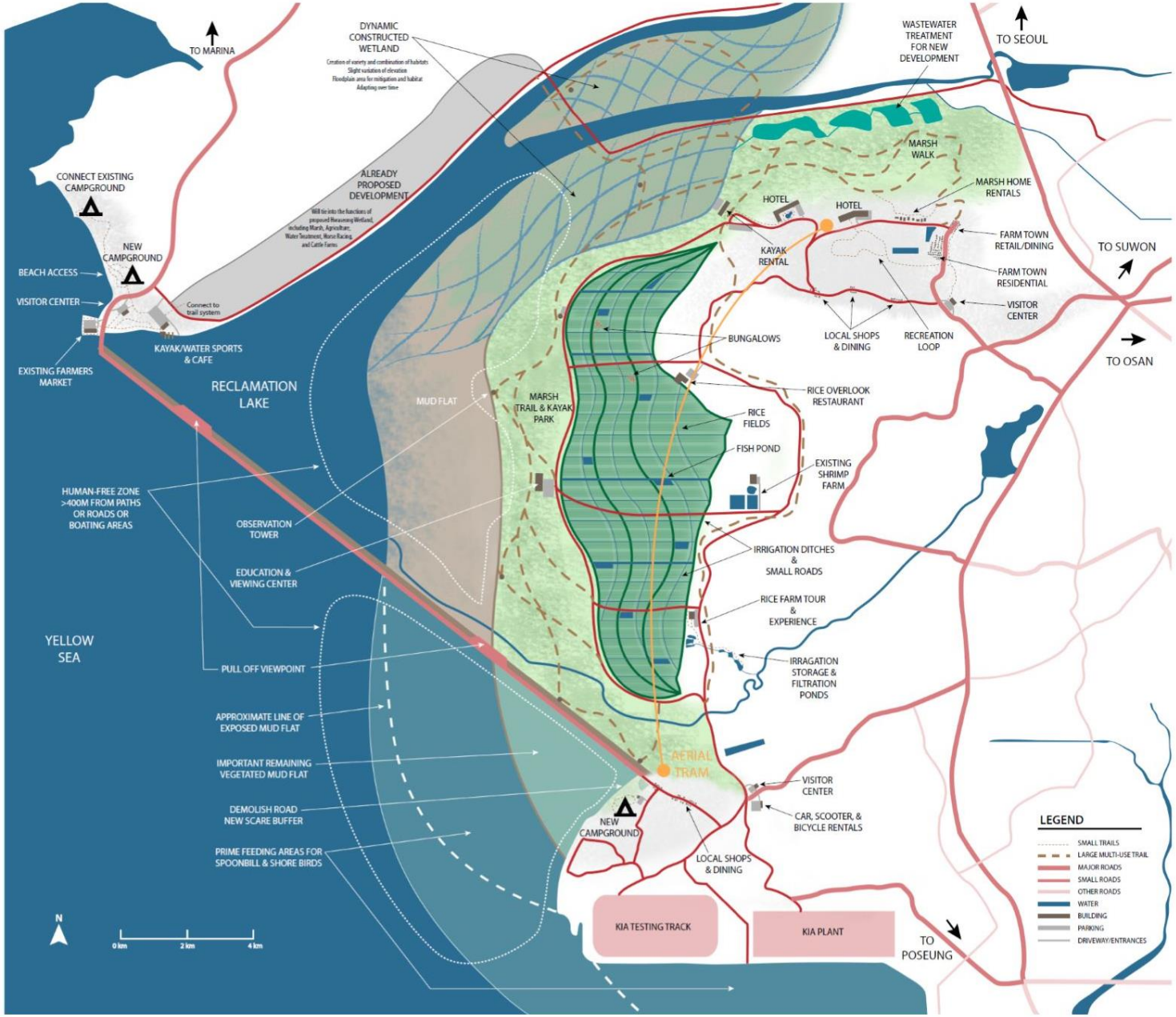
UCB 팀

UCB 조사활동



화성습지 서식지 형태

서식지 위협 요인들

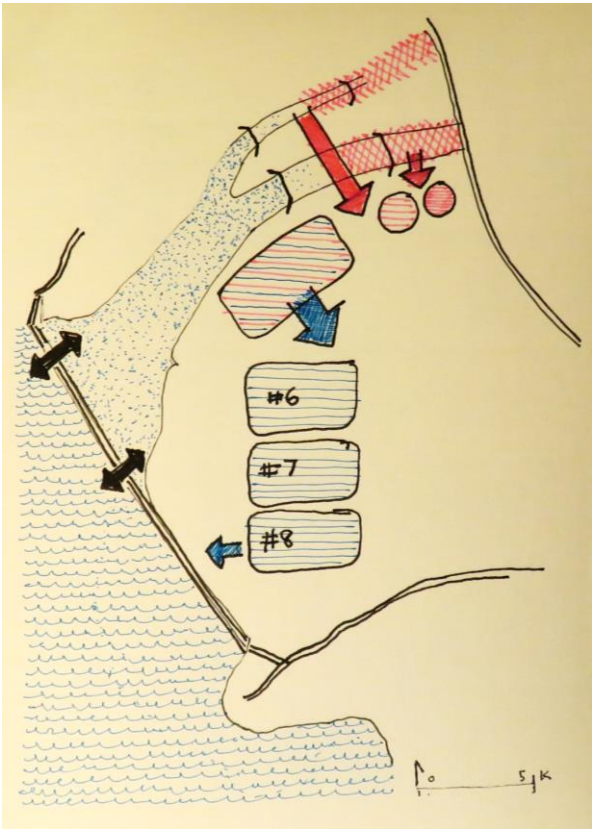


화성습지를 위한 UCB 구상

폐·하수 관리

Waste Water Management

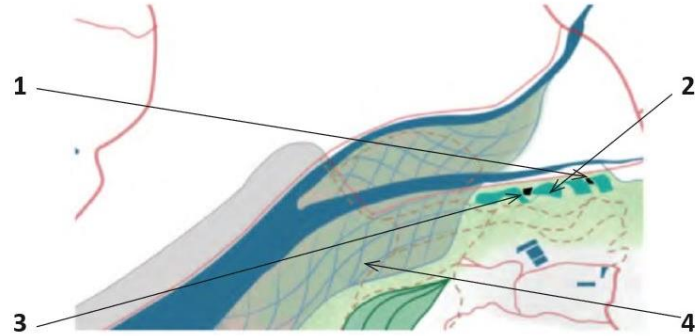
After talking with Bob Gearheart, the mastermind and creator of the Arcata Marsh, one of the most famous natural waste treatment systems in the world, he recommended modeling our waste water management systems on the Columbia, Missouri, treatment center. Columbia, Missouri has a similar climate to Hwaseong, South Korea which includes subfreezing temperatures for over two months of the year. Therefore, the ponds and marsh will be able to filter agricultural pollution coming downstream all year around.



Waste Water Treatment Breakdown

This waste water treatment plan we suggest is heavily modeled on the one from Columbia, Missouri. It is our aim that this treatment plant will be adequate to support all the waste from the new development as well as local runoff. There are several filtration steps which are intensive before the wetland filtration happens. The waste first goes through bar screens, hydrocyclone grit separator before entering the first settling basin. The secondary treatment is all basins, first with aeration basins and then with final settling basins. And lastly, there is a sludge thickener and a two stage digester. With heating from captured methane, the machinery and basins do not freeze even in subzero temperatures.

1. Primary Treatment

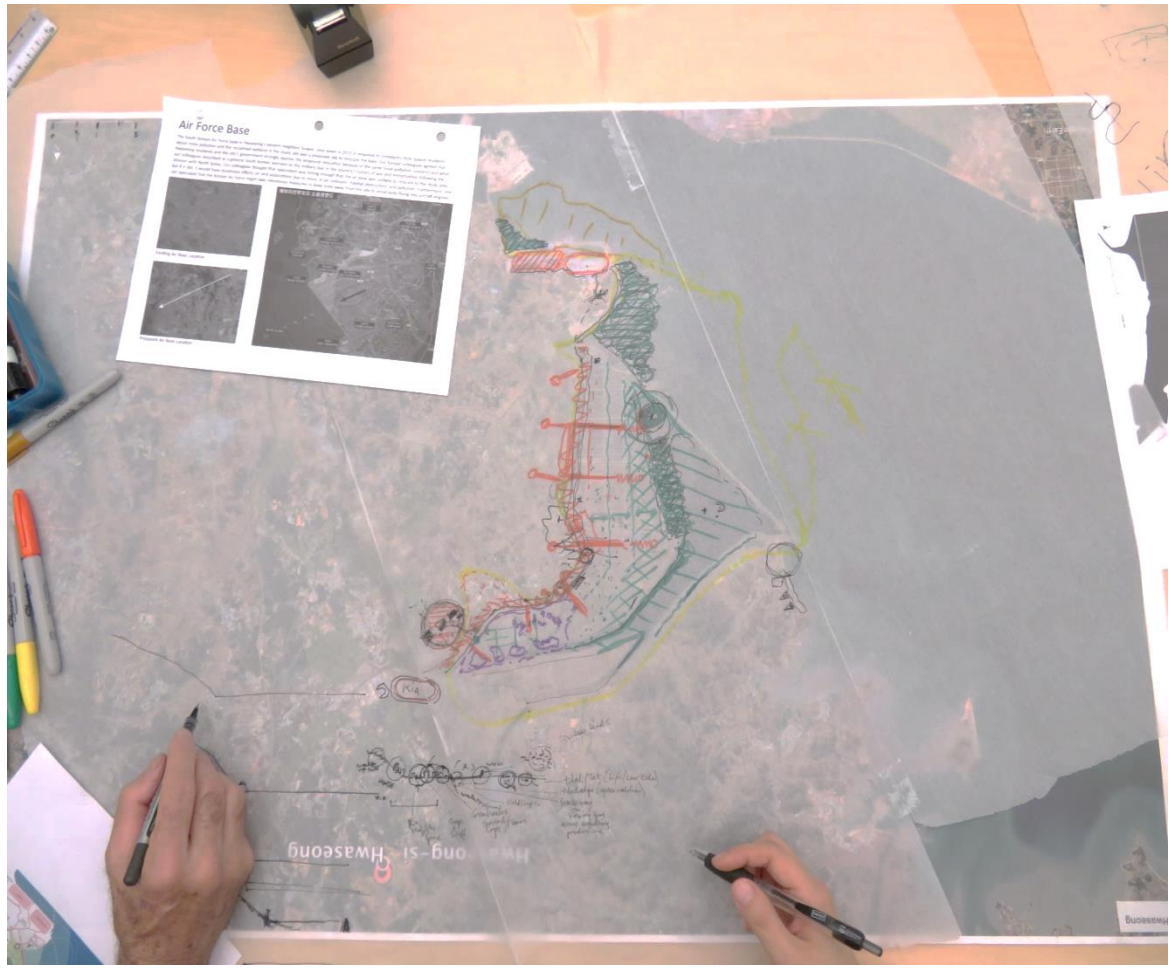


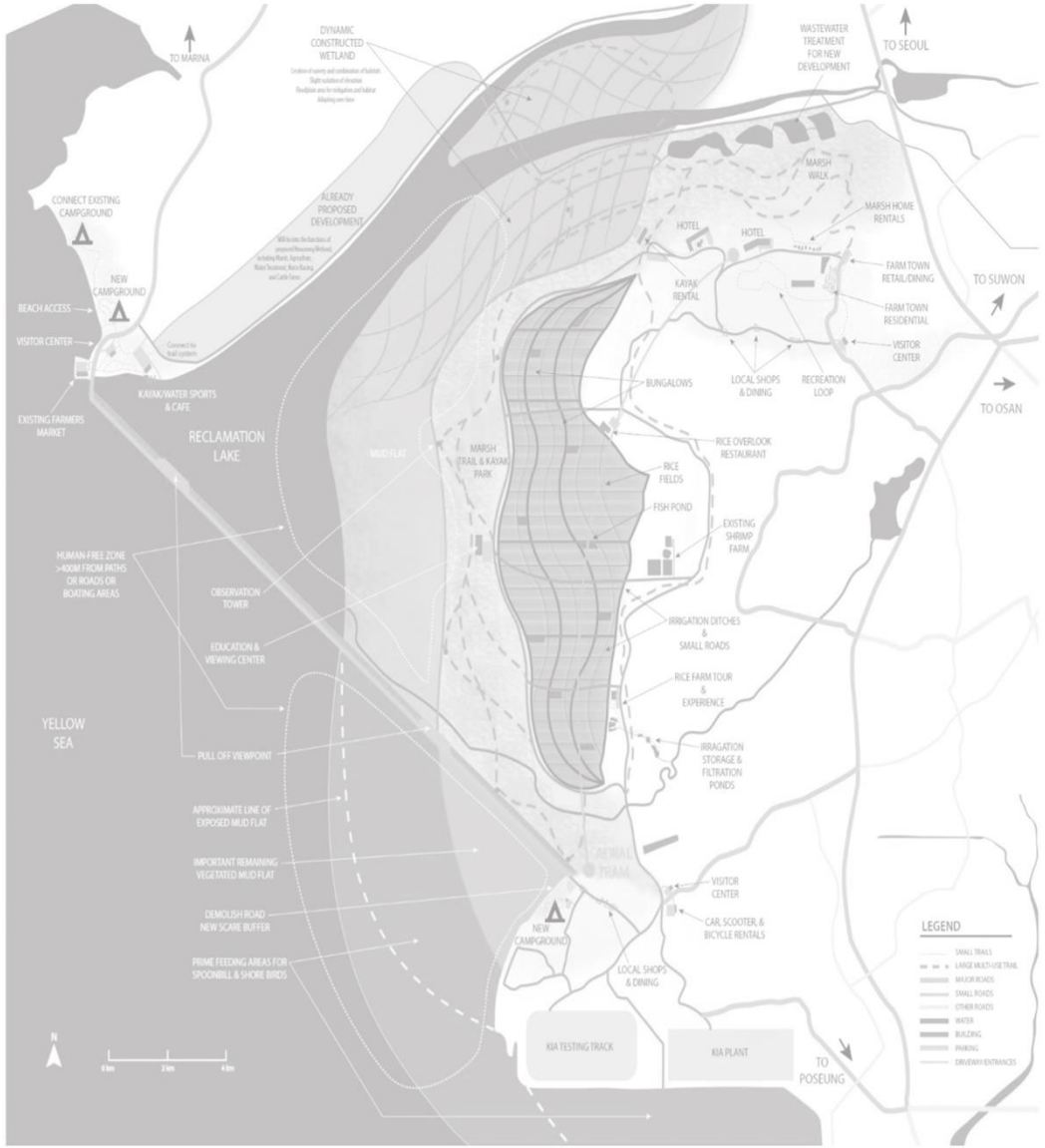
2. Secondary Treatment

3. Tertiary Treatment

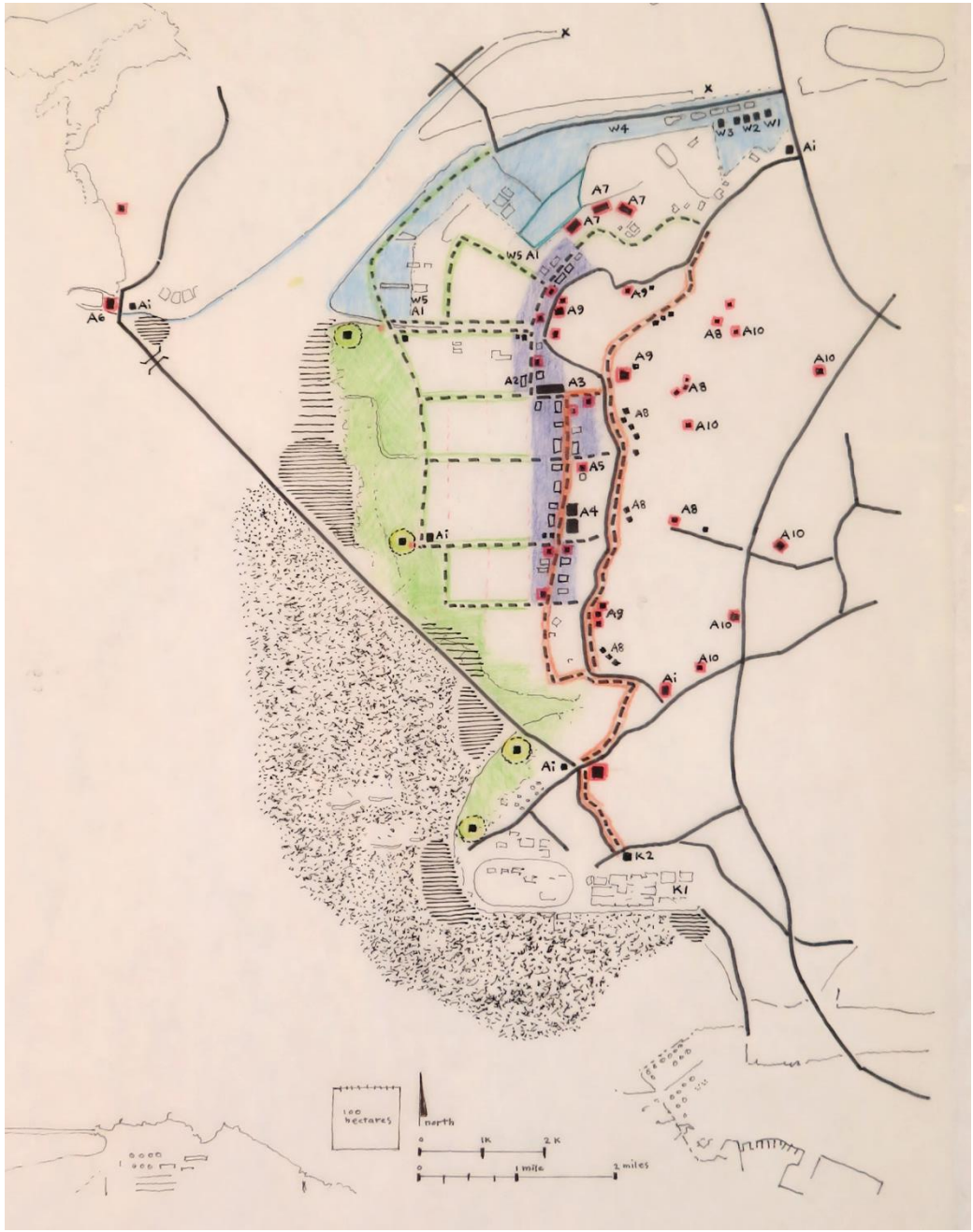
4. Wetland Filtration

UCB 설계를 위한 세이브 인터네셔널의 준비활동





화성 습지에 관한 버클리 대학의 개념



화성 습지를 위한 세이브의 계획

범례

1. **농업 개선**
   - 수질 개선
   - A1 담수의 원천
   - 현재 사용되는 논과 현존하는 연못
   - 연중 계속되는 농업
   - A2 농산물 개발
   - 토양 품질 향상
   - A3 부가가치 생산 및 전시
   - A4 농업사 및 미래 박물관
   - 부가가치 판매
   - A5 새우 양식장

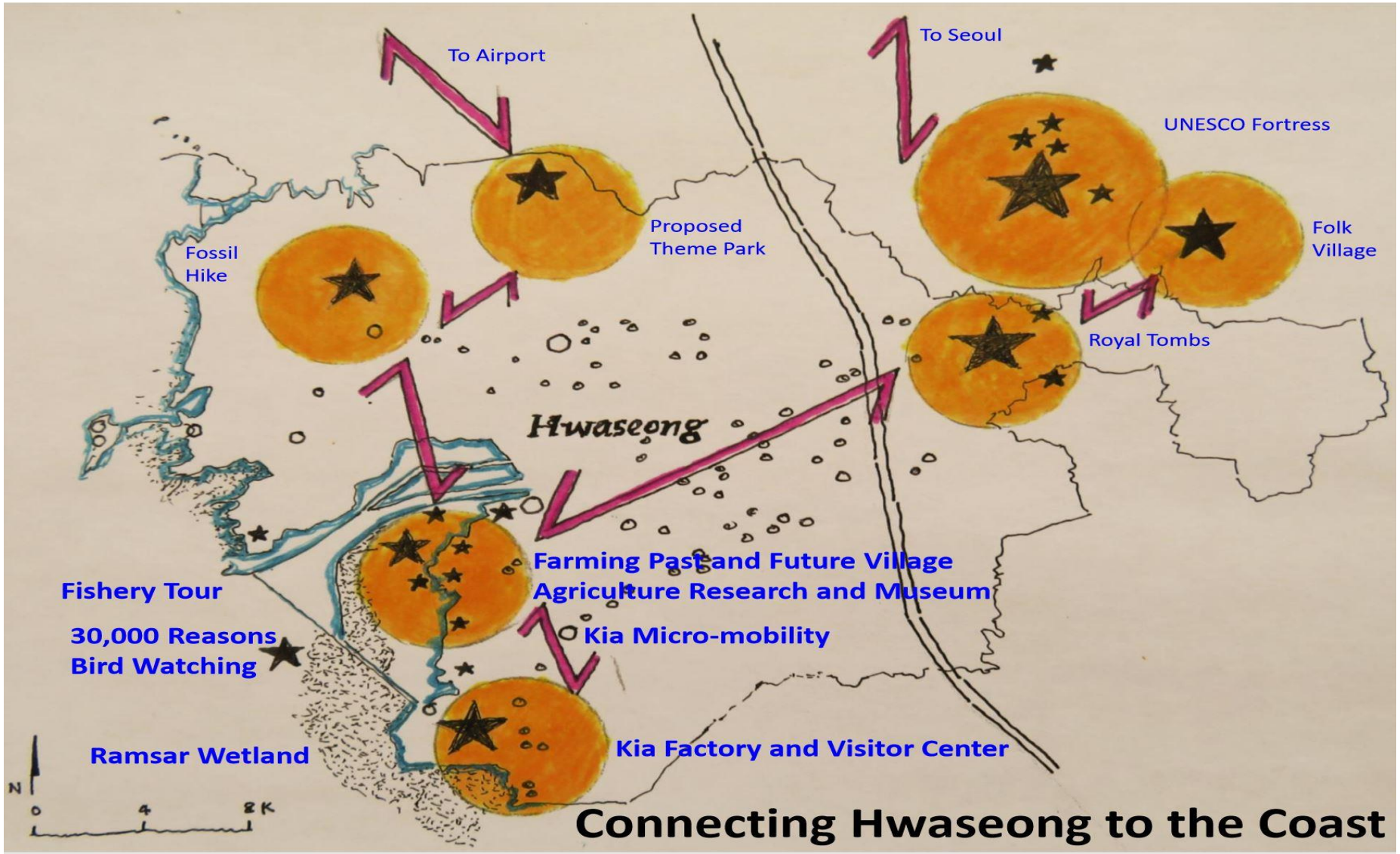
2. **수산 개발**
   - 수질 개선
   - 어업 보호 지역
   - 하수 처리
   - X 오염 통제
   - W1 오염 정화
   - 습지 보강
   - 저수지 수문 개방 실험 및 접근
   - 호수 낚시 실험
   - A3 부가가치 생산 및 판매

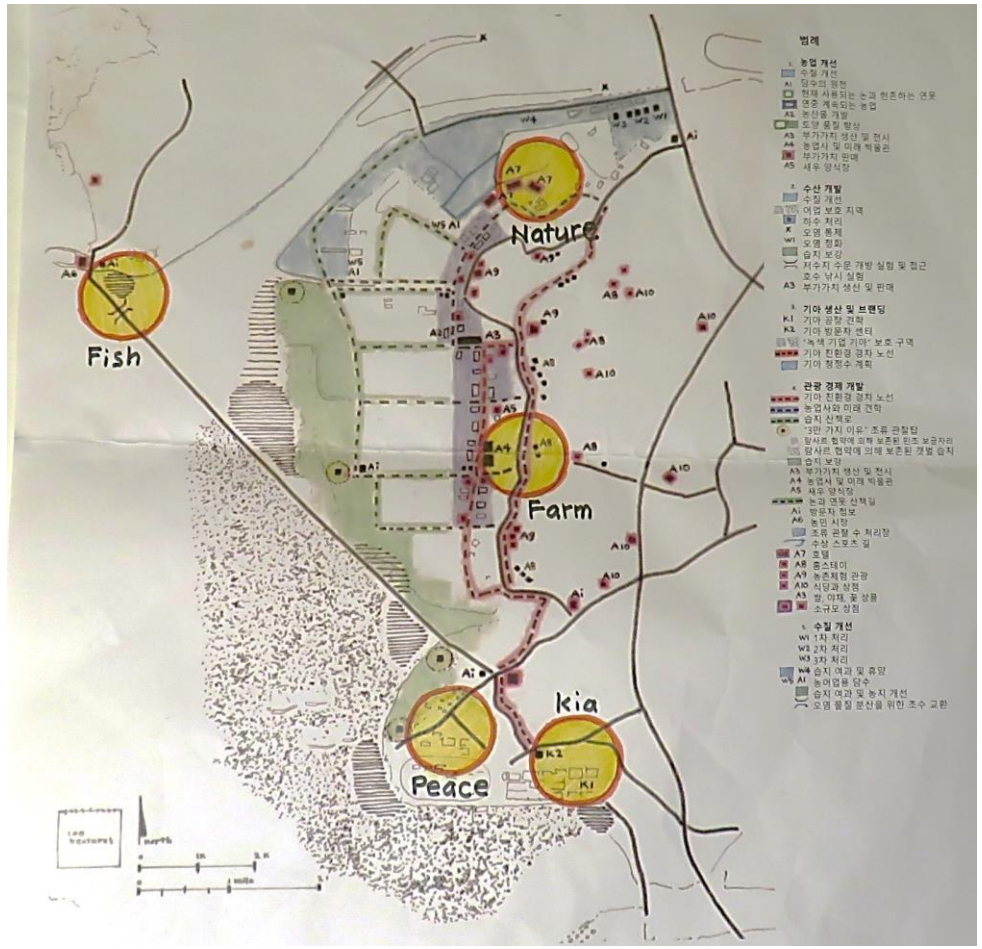
3. **기아 생산 및 브랜딩**
   - K1 기아 공장 견학
   - K2 기아 방문자 센터
   - "녹색 기업 기아" 보호 구역
   - 기아 친환경 경차 노선
   - 기아 청정수 계획

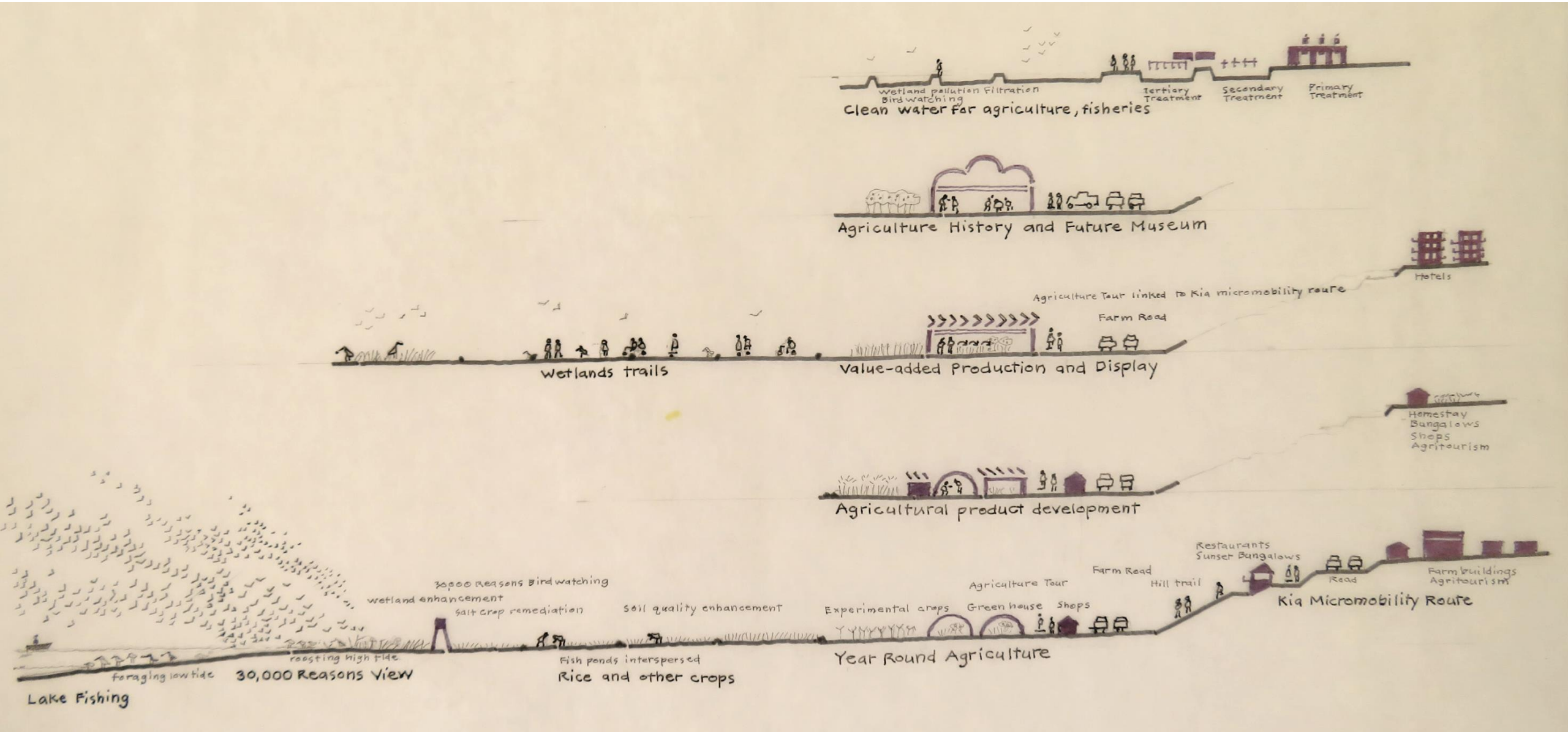
4. **관광 경제 개발**
   - 기아 친환경 경차 노선
   - 농업사와 미래 견학
   - 습지 산책로
   - "3만 가지 이유" 조류 관찰탑
   - 람사르 협약에 의해 보존된 만조 보금자리
   - 람사르 협약에 의해 보존된 갯벌 습지
   - 습지 보강
   - A3 부가가치 생산 및 전시
   - A4 농업사 및 미래 박물관
   - A5 새우 양식장
   - 논과 연못 산책길
   - Ai 방문자 정보
   - A6 농민 시장
   - 조류 관찰 수 처리장
   - 수상 스포츠 길
   - A7 호텔
   - A8 홈스테이
   - A9 농촌체험 관광
   - A10 식당과 상점
   - A3 쌀, 야채, 꽃 상품
   - 소규모 상점

5. **수질 개선**
   - W1 1차 처리
   - W2 2차 처리
   - W3 3차 처리
   - W4 습지 여과 및 휴양
   - W5 A1 농어업용 담수
   - 습지 여과 및 농지 개선
   - 오염 물질 분산을 위한 조수 교환

화성과 연안 잇기

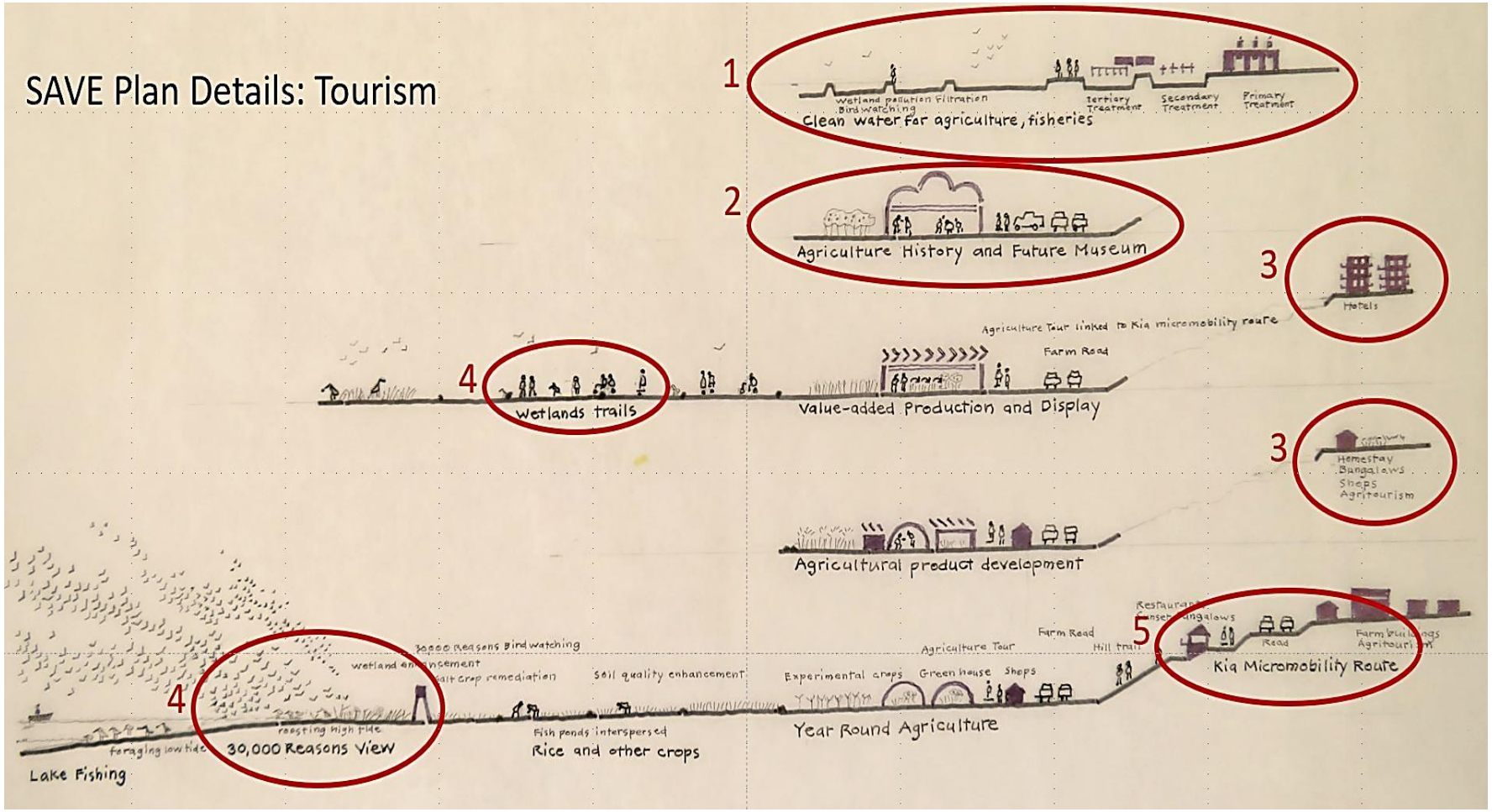

To Airport
To Seoul
UNESCO Fortress
Proposed
Theme Park
Fossil
Hike
Folk
Village
Royal Tombs
Hwaseong
Farming Past and Future Village
Agriculture Research and Museum
Fishery Tour
30,000 Reasons
Bird Watching
Kia Micro-mobility
Ramsar Wetland
Kia Factory and Visitor Center
N
0
4
8K
Connecting Hwaseong to the Coast


Nature
Fish
Farm
Kia
Peace



화성습지를 위한 SAVE 계획: 확장된 영농 방법, 개선된 어장, 깨끗한 물과 관광

관광



1

2

3

4

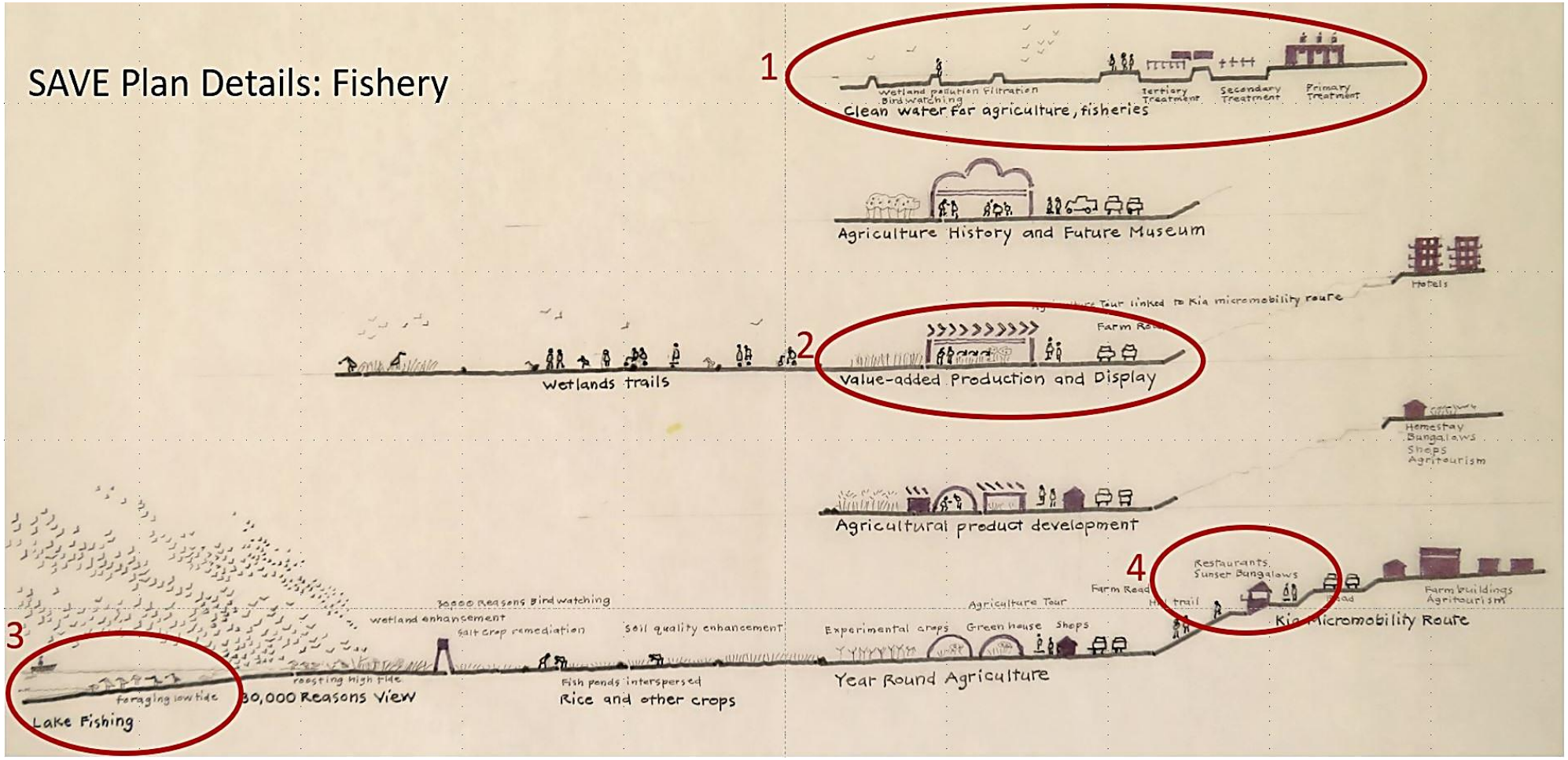
Great Knot. Photo © Clive Minton.

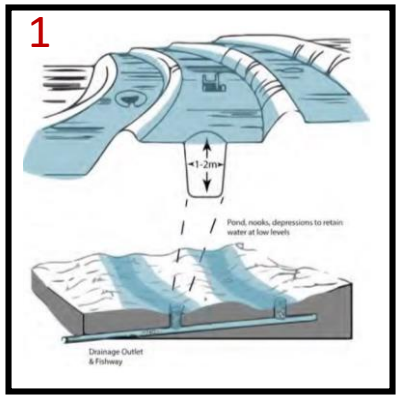
5

5


매향리 평화기념관, 환경조형물
MARIO BOTTA
HnSa

수산업


SAVE Plan Details: Fishery
1
Wetland pollution Filtration
Bird watching
Tertiary Treatment
Secondary Treatment
Primary Treatment
Clean water for agriculture, fisheries
Agriculture History and Future Museum
Hotels
Tour linked to Kia micromobility route
Farm Road
2
Wetlands trails
Value-added Production and Display
Homestay
Bungalows
Shops
Agritourism
Agricultural product development
4
Restaurants
Sunset Bungalows
Farm Road
trail
Farm buildings
Agritourism
Kia Micromobility Route
Agriculture Tour
Experimental crops
Green house
Shops
Year Round Agriculture
3
30000 Reasons Bird watching
wetland enhancement
salt crop remediation
soil quality enhancement
roosting high tide
foraging low tide
30,000 Reasons View
Lake Fishing
Fish ponds interspersed
Rice and other crops


1
1-2m
Pond, nooks, depressions to retain water at low levels
Drainage Outlet & Fishway


2


3

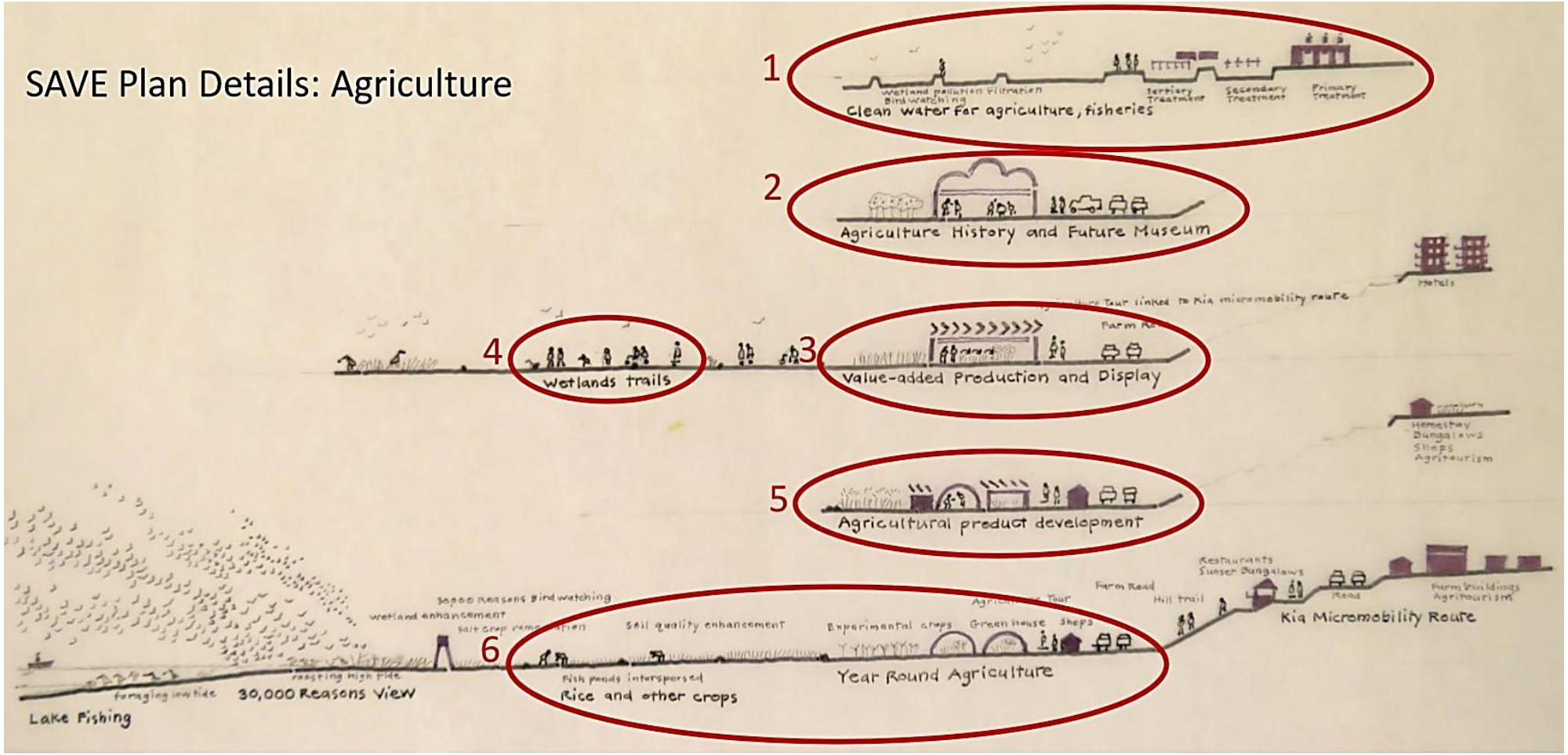

4


5


5


화성습지, 희망을 그리다
"Designing for Hope; Lives,
Livelihoods and the Hwaseong Wetlands"
2019. 5.11.~5.12. 화성호, 매향리 일대

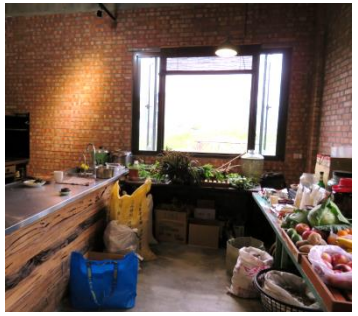
농업


SAVE Plan Details: Agriculture
1
Clean water for agriculture, fisheries
2
Agriculture History and Future Museum
3
Value-added Production and Display
4
Wetlands trails
5
Agricultural product development
6
Year Round Agriculture
Rice and other crops
Fish ponds interspersed
Soil quality enhancement
Experimental crops
Green House
Shops
Wetland enhancement
30,000 Reasons Bird watching
30,000 Reasons View
Lake Fishing
Kia Micromobility Route
Restaurants
Sunset Bungalows
Hill trail
Farm Road
Hotels
Homestay
Bungalows
Shops
Agritourism

1

2

3



4

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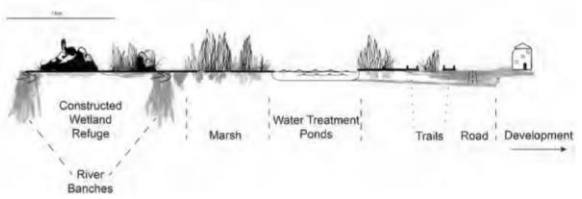
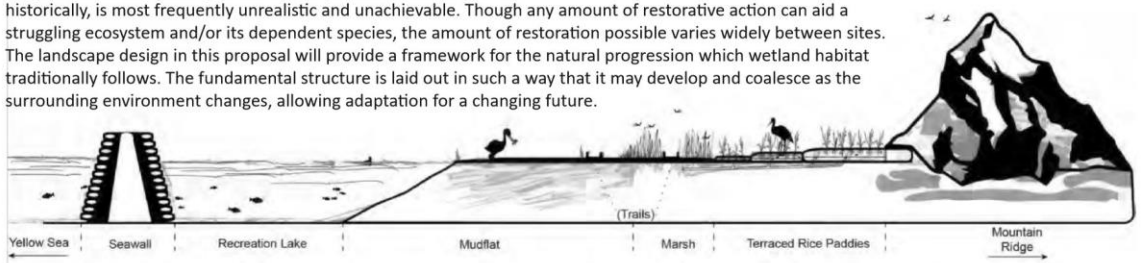
6

습지 복원 & 벼농사

RESILIENT RESTORATION: A MOSAIC OF EVOLVING HABITATS

Hwaseong's historic marsh and mudflats are a unique environment that support numerous threatened and near-threatened species - a type of environment that is increasingly limited across the globe due to human reclamation and degradation. A compilation of diverse habitats provide ample foraging and rest areas for flora and fauna, which is particularly relevant to the threatened migratory bird species that congregate in globally significant proportions in this region. Outright restoration, while the most positive outcome ecologically, is often difficult to achieve politically, financially, or even practically; human degradation is both ubiquitous and severe. A "pristine nature", which functions as it did historically, is most frequently unrealistic and unachievable. Though any amount of restorative action can aid a struggling ecosystem and/or its dependent species, the amount of restoration possible varies widely between sites. The landscape design in this proposal will provide a framework for the natural progression which wetland habitat traditionally follows. The fundamental structure is laid out in such a way that it may develop and coalesce as the surrounding environment changes, allowing adaptation for a changing future.





The gradual succession of intertidal mudflats to marsh increases the available habitat to local species compared to the status quo, both spatially (amount of physical habitat) and in diversity (variety of habitat types). A variety of habitat encourages more robust populations, as well as greater species richness in an area, which poses numerous benefits ecologically. The preservation of several iconic bird species of this region also creates an opportunity to reinforce and revitalize the local identity of Hwaseong - a vital underlying component of the proposal's success.

The first component of intermingled habitat reaches into the traditional roots of Korea; the integration of terraced rice paddies as a multifunctional habitat provides a means for both community engagement and habitat expansion to be achieved simultaneously. The spatial redesign of the fields, paired with new management strategies, creates a unique opportunity synthesize our project goals, serving as a cultural anchor in identity, suitable habitat for vulnerable migratory shorebird species, as well as a means for sustainable eco-tourism to develop. To compensate for the potential pollution related to the adjacent new development, upstream water treatment pools would be distributed along the river channel to improve water quality site-wide. This water treatment is only augmented by the constructed wetlands just downstream of the pools. While the proposal has these wetlands as manifesting in a braided-island formation, we provide only the framework for these wetlands to develop in a more natural manner.

The constructed wetlands slow the rate of water flow in the river to allow for more effective filtration, conducive for both water quality and stream conditions favorable for mudflat and marsh development. While initially labor intensive, these formations gain efficiency in filtration over time, as well as resilience which permits less stringent management.

RICE FARMING AND HABITAT

Terraced rice paddies are an iconic landscape formation which easily relates back to historical cultivation of the staple; rice has been a leading agricultural product for the entirety of modern human existence, archaeological remnants of rice cultivation have dated as far back as 5000 BC. Rice, as historically and currently the most consumed food item throughout Asia, holds deeply rooted meaning in history, culture, food specialties, lore, and recreation. Rice production has mechanized through modernization, which has caused the prevalence of terraced rice paddies to steadily declined over recent decades. This phenomenon is exacerbated further through demographic changes in the community, as family-led farming begins to dissipate. The traditional customs tend to fall on aging and/or senior members of family units as the younger members seek alternative lifestyles away from home.

ENDANGERED SPECIES HABITAT

Regarding species habitat, the rice paddies provide a serendipitous opportunity to observe an alternative-stable state in action. The Oriental White Stork (OWS) is an iconic migratory bird which once occupied habitat across all of Asia. The OWS was nearly driven to extinction through the excess of human-driven wetland destruction, overfishing, deforestation, and general disturbance of habitat, despite its cultural significance. The global OWS population declined to nearly irreparable levels; captive breeding programs began to work in supplementing the wild population but was met with limited success. Eventually, through a combination of regional habitat conservation and improved breeding success, a slow stabilization of the population was achieved (currently resting at under 2000 wild individuals worldwide). An opportune relationship between the OWS and rice paddies would be discovered, as the threatened species began utilizing rice paddy fields as alternative habitat to the wetlands which had been overtaken.

INDICATOR SPECIES

The OWS only adopt the most productive and uncontaminated rice fields due to their and their prey's sensitivity to pollution and selective habitat conditions (i.e. water depth, quality, etc.) Thus a specific requirement of the rice paddy design must be integrated in order to achieve the intended balance of goals: organic agriculture. The agricultural production, specifically geared toward stork-friendly practice, systematically ensures the rice fields will provide suitable and safe habitat to the OWS as well as the many other migratory shorebirds. Initiatives throughout China, Japan, and Korea to assist in the rehabilitation of the OWS have encountered significant stork population improvement following conversion to organic farming; rice field owners were encouraged to reduce agrochemical use (minimally by 75%) through monetary incentives. Management, beyond organic policy, is also vital in creating OWS suitable habitat. The inundation associated with rice cultivation provides suitable foraging, as their prey depend on aquatic conditions. This becomes particularly vital in the winter; rice fields are often left dry after harvesting, killing off food sources for the stork as well as encouraging weed growth in the bed. Sustained inundation of the fields is often sufficient to create fish refuge, but having ~5-6% of the field dedicated to deeper fish ponds allows for adequate wintering habitat for prey while maximizing agricultural yield vs habitat conditions. The proximity of these refuge ponds are imperative to account for in construction: the adjacency of fish ponds to the nearest drainage channel is proportional to the level of functional habitat it provides. The continued inundation of the fields (~20cm), as well as locating fish ponds or throughways for fish refuge adjacent to drainage (~5-6% of total field area), are vital components to integrate into the field construction and management to best serve the vulnerable bird species which increasingly rely on these alternative habitats as their primary food source.

The OWS act as a key indicator species of wetland health, which signifies the process of ecological improvement as well as a defining characteristic of the quality of rice produced (a positive outcome for sale and export price point).

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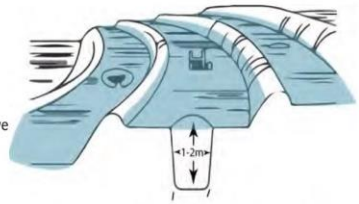
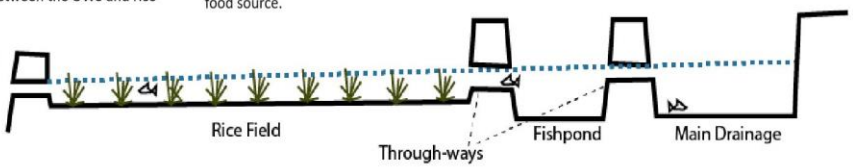
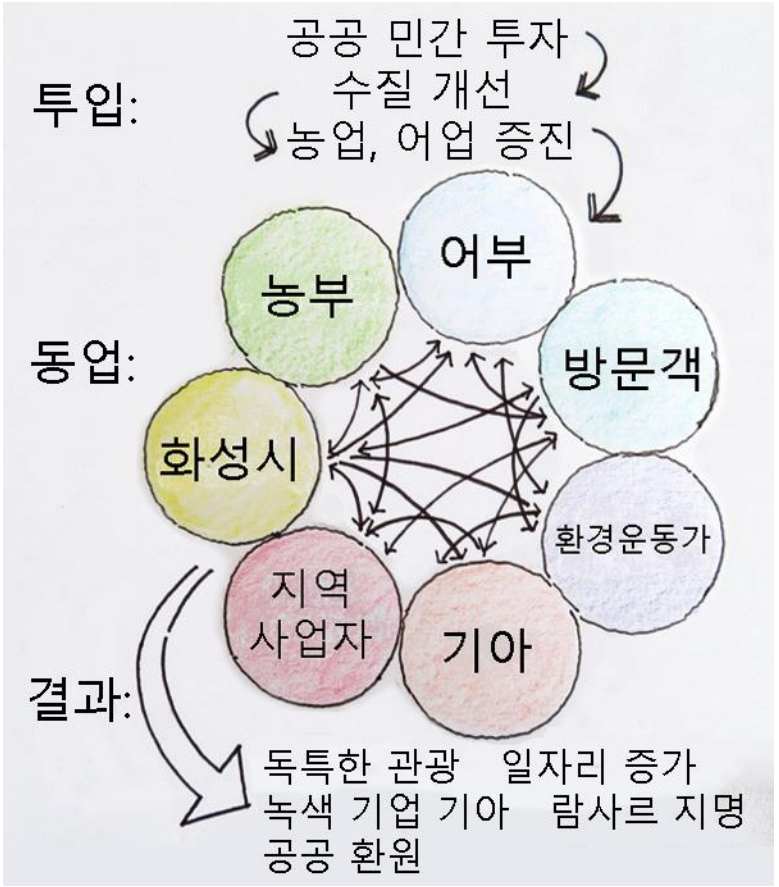




SAVE 계획안 파트너십

지속 가능한 경제를 위한
화성 해안 협력체



화성연안
투입, 동업, 결과

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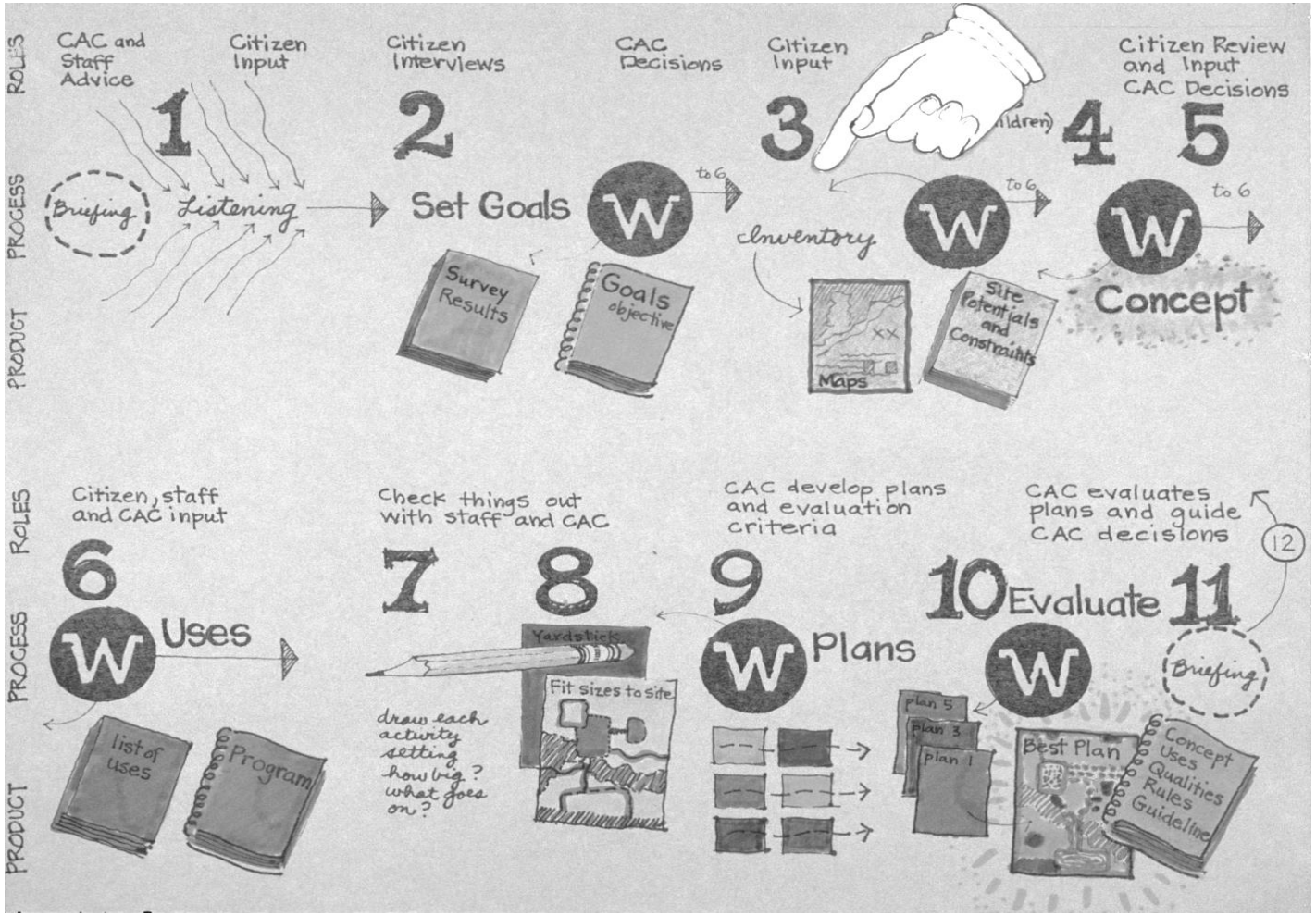
지역사회 기반 계획과 설계 방식



감사합니다!

이제 의논을 해볼까요?