Proposals for Island City: Livability and Nature

Fukuoka, Japan

SAVE International

November 2011

Credits

Report produced by SAVE (Spoonbill Action Voluntary Echo) International. SAVE's mission is to save the endangered Black-faced Spoonbill (*Platalea minor*) from extinction by protecting important habitat and cultures while promoting sustainable development throughout the bird's migratory flyway. Founded in 1997, SAVE International is a volunteer group of professors, students, and staff from the University of California, Berkeley (UC Berkeley); Fukuoka University; and National Taiwan University. SAVE campaigns against threats to spoonbill habitat, conducts research on spoonbill habitat requirements, raises international awareness to stop threats to habitat, promotes alternative sustainable development, and collaborates with local groups to develop comprehensive plans where there is Black-faced Spoonbill habitat.

Contents of this report include maps, design plans, and calculations by students in LA 205, the environmental planning studio in Landscape Architecture and Environmental Planning at UC Berkeley: Molly Franson, Kelly Janes, Darryl Jones, Mike Cook, Tammy Church, Jessie Olson, Pedro Pinto, and Rachael Marzion. Scientific review provided by: Matsumoto Satoru, Shibata Hisashi, Takata Ayano, and Alex Horne. Financial support provided by the Student Community Design Fund, UC Berkeley. November 2011.

Background

The Black-faced Spoonbill (*Platalea minor*) is a well-known bird in Japan and around the world. Its ecological requirements have been well-researched in several countries, and it is at the heart of a major eco-tourism initiative in Taiwan. Although the spoonbill's population has increased throughout its range over the past 20 years due to conservation measures, the bird remains globally endangered with a population of little over 2,000. The spoonbill depends on wetland sites: shallow brackish lagoons and tidal-flats for feeding, and small undisturbed islands for resting. In winters past, Hakata Bay in Fukuoka was one of the most important wetlands in East Asia. It regularly supported more than 100,000 waterbirds, including the spoonbill, which has been studied in the bay since at least the late 1980s.

In recent years the number of birds in Fukuoka has declined precipitously which has been attributed to changes in Wajiro Tidal Flat caused by the Island City Project. This project, begun in 1994, involved construction of an artificial island in the frontal waters of the tidal flat to develop port and harbor facilities and a new urban area. In planning the project Fukuoka City maintained that "Man" and "Nature" could coexist and claimed that the reclamation project would attract more waterbirds to Hakata Bay. Seventeen years later, the scientific data does not support this claim.

In its 2008 Land Use Plan for Island City, Fukuoka City designated 12 hectares at the northeast corner for a wildbird park. But this is not enough for the migratory birds passing through the Hakata Bay area nor is it necessarily where the birds now go. To evaluate the proposed site against the needs and alternatives for bird habitat on Island City, the Landscape Architecture and Community Design laboratory at Fukuoka University, directed by Dr. Hisashi Shibata, formed a partnership with SAVE International and the Wetland Forum in Fukuoka.

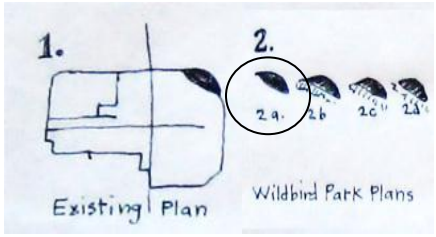
The partnership held a symposium in Fukuoka on September 17, 2010. In the winter of 2011 Fukuoka University and UC Berkeley students, assisted by environmental planners and researchers, developed proposals for wildbird habitat on the island. Over the summer of 2011 SAVE evaluated the proposals and the City's plan for the wildbird park using the latest known science on the Black-faced Spoonbill, habitat creation, water management, the health benefits of nature, and sustainable development considerations. This report presents the analysis and proposes three new Island City alternatives for Fukuoka citizens to consider.

September 17, 2010 Black-faced Spoonbill Symposium in Fukuoka

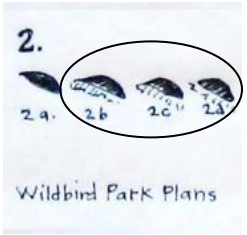
Fukuoka University, SAVE International, and Wetland Forum Partnership

SAVE Evaluated Plans for Island City

To start the process SAVE International conducted an initial cost-benefit analysis of each plan in terms of the goal of maximizing economic success, bird habitat on the island, the experience of nature, realizing Fukuoka's healthy city agenda, and political will.



1. 2008 Land Use Plan (1) with Wetland Forum Plan for Wild Bird Park (2a)
   + Wild birds used this area after it was dyked and before filled in 2009
   + Within view of Wajiro Tidal Flat, effective location for environmental education
   – Wild Bird Park a token add on to land use plan and too small
   – Currently birds don't use the space because endangered species' scare distance not satisfied

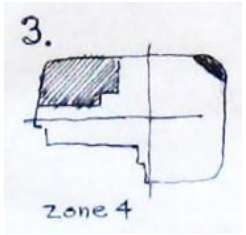


2. Fukuoka University Student Proposals

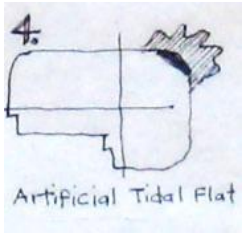
   Proposal 1: (2b)
   + Gradient for human access at bird park with mixed land use nodes
   + Recognizes need for larger wildbird park
   – Scare distance not satisfied

   Proposal 2: (2c)
   + Similar idea to Proposal 1 but less well developed
   – Does not address the rest of the island and scare distance not satisfied

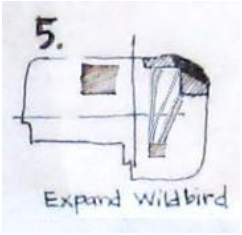
   Proposal 3: (2d)
   + Looks closely at organization of micro habitat types based on: plant type, elevation, and scare distance.
   – Does not address the rest of the island and scare distance not satisfied

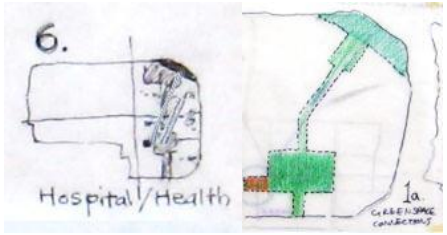


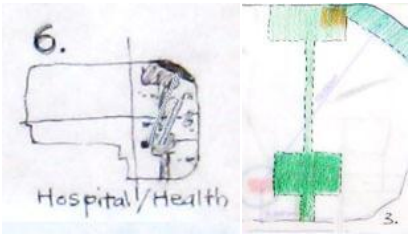
3. Expand Designated Area for Habitat (12 ha + 64.9 ha)
   + Easy to do, possible, just leave as a hole
   + Doesn't cost money for construction
   + Lots of habitat that is already in use by birds
   +/– View to Hakata Bay, Fukuoka Dome, and Fukuoka Tower (city view, not just natural scenery)
   – Opportunity cost likely excessive due to loss of port land
   – Political resistance to changing land use plan

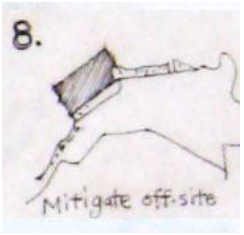


4. Add Fill Into Wajiro Bay to Expand Habitat Area
   – Potentially could change tidal prism further
   – Likely to further degrade Wajiro Tidal Flat
   – Likely negative impact on inner bay ecosystem and organisms
   – Citizens groups and environmental groups worry about artificial tidal flat
   – Birds need high tide refuge
   – Requires a lot of fill
   – Requires armoring and could be difficult to manage









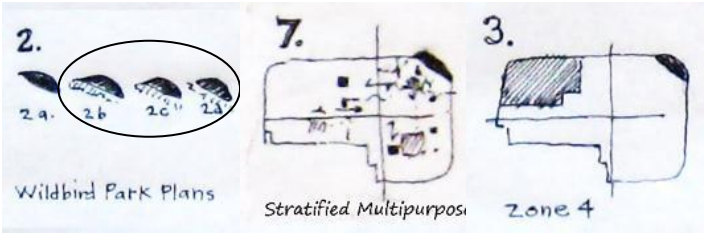
5. Expand the 12 ha, Reduce the 64.9 ha, and Create Green Connections
   + 2 habitat types, 1 tidal, 1 damp ground with zones managing human access bird protection
   + Larger contiguous habitat with opportunities for high tide refuge
   + Doesn't add fill
   + Doesn't remove the dyke, which is expensive
   – Difficult to manage

6.1a. Keep Hospital in Planned Location
   + No political resistance
   + Adjacent to Center Park
   + Close to planned medical R/D, elderly center
   + Physical manifestation of land use health agenda
   – No view of natural landscape
   – At this point, road system is a barrier

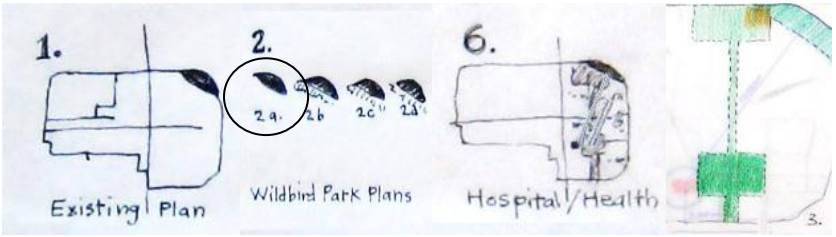
6.3. Move Hospital Close to Natural Area and Wildbird Park
   + Benefits of proximity to nature and big landscape view
   + Physical manifestation of land use health agenda
   + Close to planned medical R/D and invites more R/D to create another economic node
   ? Better for wetland habitat/fish habitat location
   – Political and cultural resistance
   – Would have to demonstrate how visual access does not increase bird flu risk

7. Co-mingled Land Use
   + Gives distinctive character to development strategy and makes it more competitive
   + Breaks down bigness and creates "comfortable urban space"
   + Bolsters 2008 plan, integrating bird park and keeping more land for bird park
   + Mimics organic city growth
   + Gives more space for niche habitat throughout the city
   + Solves multiple problems in same space – maximizes space use
   – Have to rework land use plan
   – Difficult to manage habitat
   – No place large enough for birds to be safe
   – Takes longer, more diverse campaign to move things in

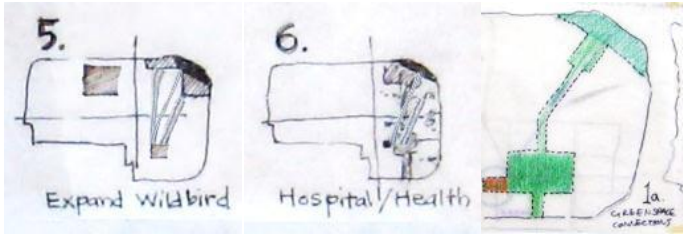
8. Buy Land in Imazu for Habitat Mitigation
   + Near national park and could become a major tourist destination
   + Would get a significant amount of habitat next to existing habitat that is being used
   + Construction will be "inexpensive"
   – Land acquisition or purchase of development rights required
   – Takes agricultural land out of production
   – Removes opportunity to see birds in the city and for Fukuoka to do habitat conservation
   – Removes claim that Fukuoka would gain from habitat conservation in the city



Integrated Habitat with Dynamic Port



Corridor Habitat and Nature Healing Hospital



Concentrated Nature and Vital City

Results of Initial Cost-Benefit Analysis

To conduct the cost-benefit analysis of the eight alternative plans experts in city design, environmental planning, and economic development convened at UC Berkeley. The experts sought to improve the 2008 Land Use Plan because the wildbird habitat it allocated was too small to attract the birds in most danger of extinction. Some among the experts also worried about the viability of the port and if Island City would be successful economically.

The group concluded that most of the alternatives performed better than the 2008 plan. However the experts concluded that even the best alternatives could be improved if aspects of other alternatives were incorporated. The team recommended that the three resulting aggregate plan proposals retain the same land coverage as the land use coverages in the 2008 plan but that each proposal would improve what was on the existing plan. The three aggregate plans that SAVE International decided to improve upon are shown to the left.

Integrated Habitat with Dynamic Port

The first plan added new functions to stimulate port development, creating leading-edge mixed uses and stratified multi-purpose areas. It combined this concept with the 2008 plan to maintain a small bird park for active public use and a larger wildbird habitat area in Zone 4 of the port where birds presently congregate for foraging, retreat from high tides, and to escape human intrusion.

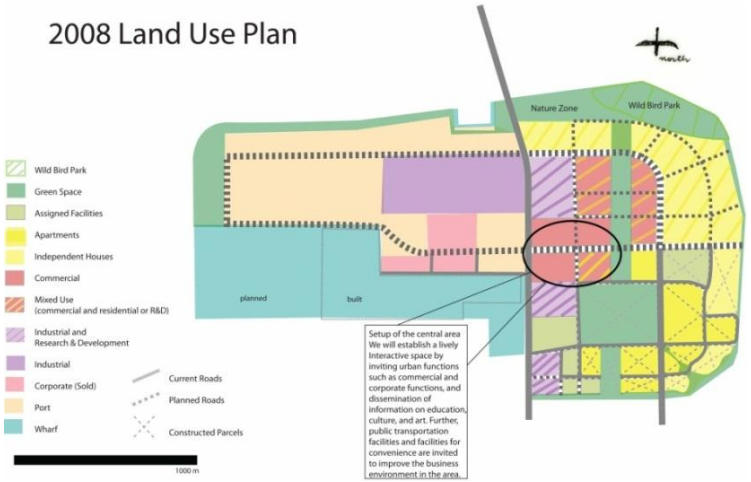
Corridor Habitat and Nature Healing Hospital

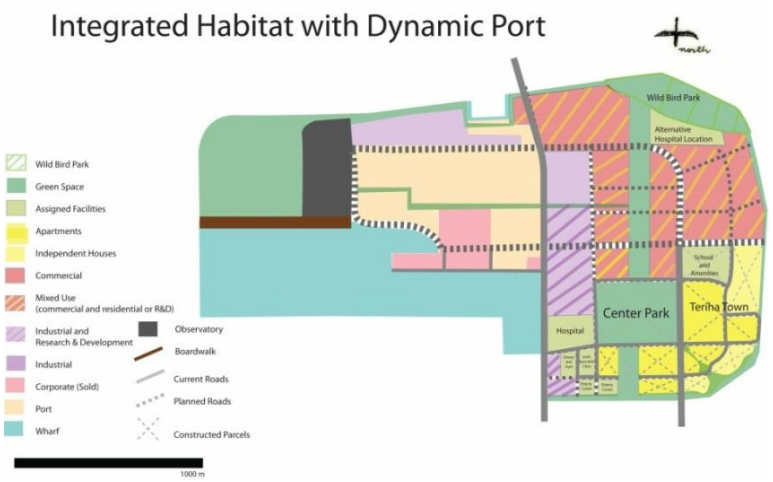
The second plan created a hospital and medical R/D complex overlooking the nature area and wildbird park. It expanded the wildbird park called for in the 2008 plan.

Concentrated Nature and Vital City

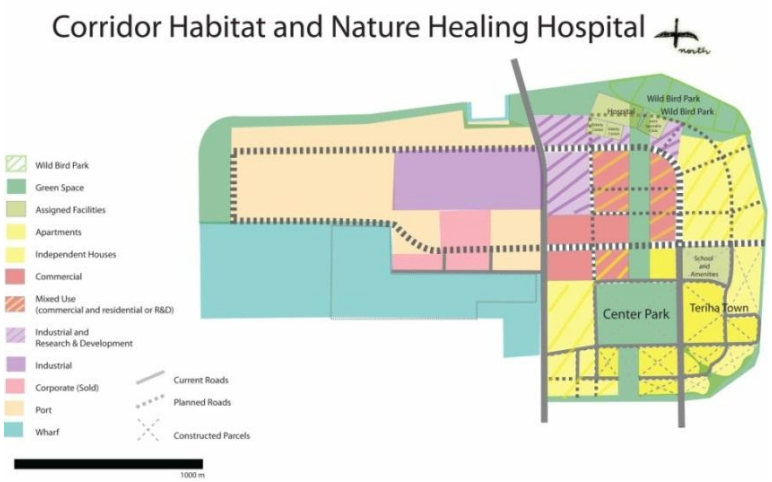
The third plan expanded the proposed wildbird park to create a large enough area to accommodate the most endangered birds, combined it with the green spaces designated in the 2008 plan, and together made them have multiple functions. The plan also locates the hospital at Center Park.

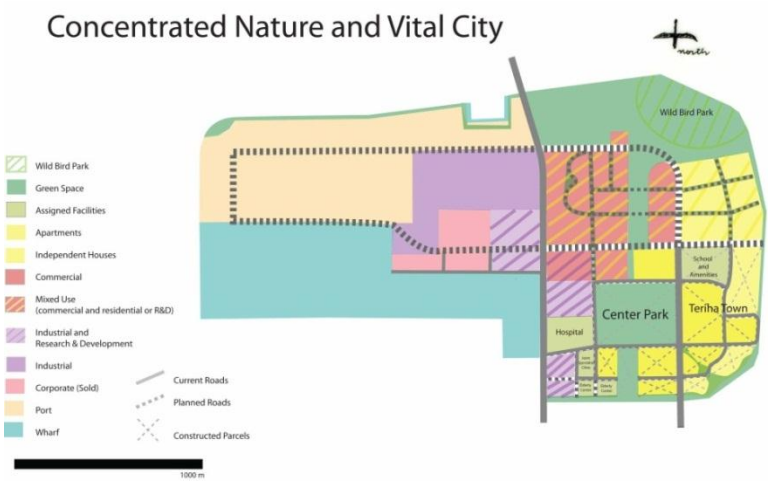
Plans Performing Best by Economic, Livability, and Ecological Criteria





Each of the three plans could improve the 2008 Land Use Plan shown above. The experts conducting the cost-benefit analysis suggested that the three new plan proposals should retain the same amount of land use coverages as the 2008 plan and demonstrate the advantages without loss of the best aspects of the 2008 plan.



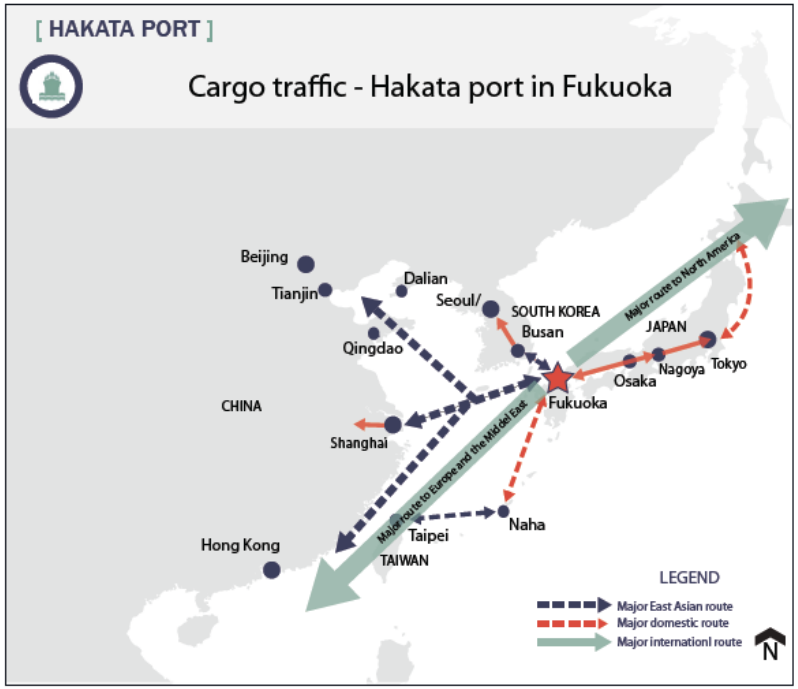


Technical Considerations

To further evaluate the 2008 Land Use Plan and develop the three plan proposals additional research on certain technical aspects of Island City was required including the following:

1. Competitive advantages in economic development
2. Fukuoka's role in the East Asian Flyway
3. Tidal flats in high velocity water
4. Spatial requirements of wild birds
5. Natural process for healthy cities

A brief summary of the research on each of these considerations follows.



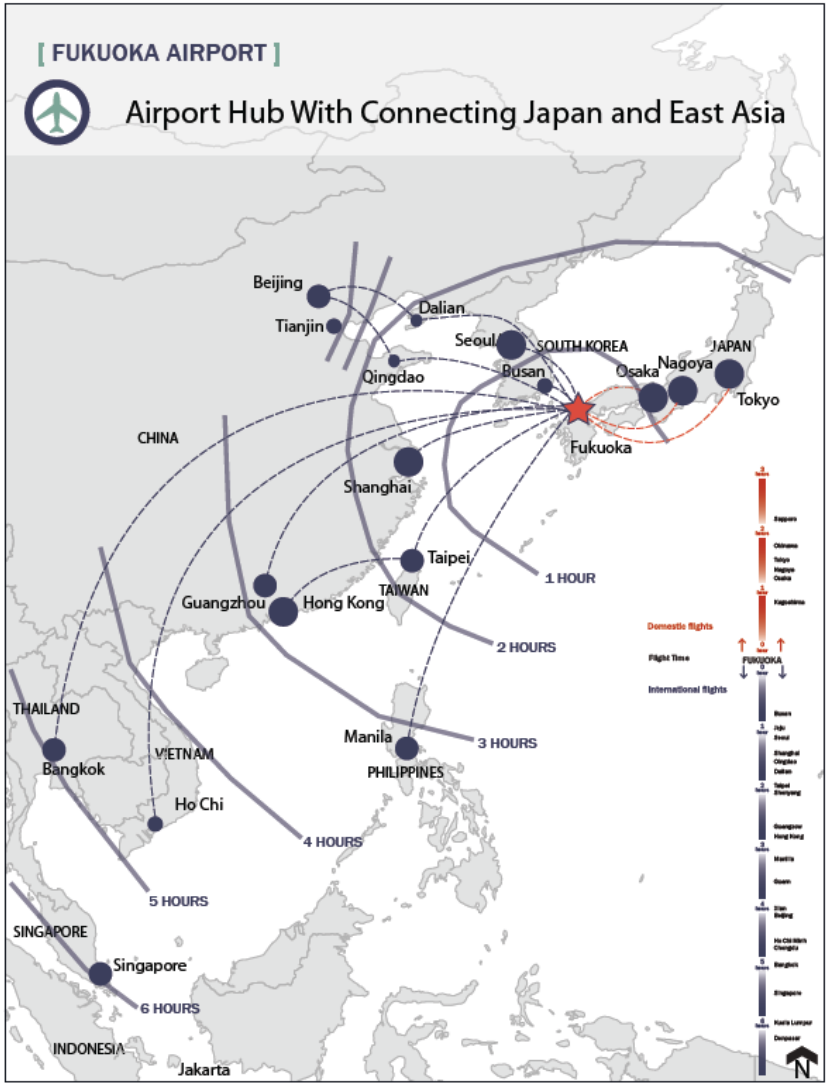
Competitive Advantages in Economic Development

During the last 50 years most East Asian port cities filled parts of their bays to expand port, industrial, and airport land uses. Every city planned their expansion similarly, expecting to become a major center because of proximity to large markets and rising consumer economies. The result was that far more port capacity was created than there is likely to be demand for. This resulted in many half-complete ports and failed industrial parks, and many cities have been left with the financial burden of these projects.

Fukuoka's location relative to South Korea and China remains an advantage for air and ocean economies, but to fulfill its potential will require innovation. These strategies seem most important:

- Develop a distinctive identity for the port that makes it unique relative to its competition
- Offer facilities that other ports do not
- Create uses inside the port that were not considered initially but that today attract local users and tourists for activities special to the port such as shows and sales of imports, restaurants, manufacturing of local arts and crafts, port parks and boardwalks to view port activity, and corporate centers
- Pay special attention to attracting ecotourists, the most rapidly expanding segment of tourism worldwide
- Consider utilizing unfinished parts of the port for tourism and niche manufacturing and expansion

Parts of Zone 4 on Island City that attract birds presently might be used to accomplish all of the above strategies for an economically competitive port.


[FUKUOKA AIRPORT]
Airport Hub With Connecting Japan and East Asia
Beijing
Tianjin
Dalian
Seoul
SOUTH KOREA
Busan
Qingdao
Osaka
Nagoya
JAPAN
Tokyo
Fukuoka
CHINA
Shanghai
Taipei
TAIWAN
Guangzhou
Hong Kong
1 HOUR
2 HOURS
3 HOURS
4 HOURS
5 HOURS
6 HOURS
THAILAND
Bangkok
VIETNAM
Ho Chi
Manila
PHILIPPINES
SINGAPORE
Singapore
INDONESIA
Jakarta
Domestic flights
Flight Time
International flights
FUKUOKA
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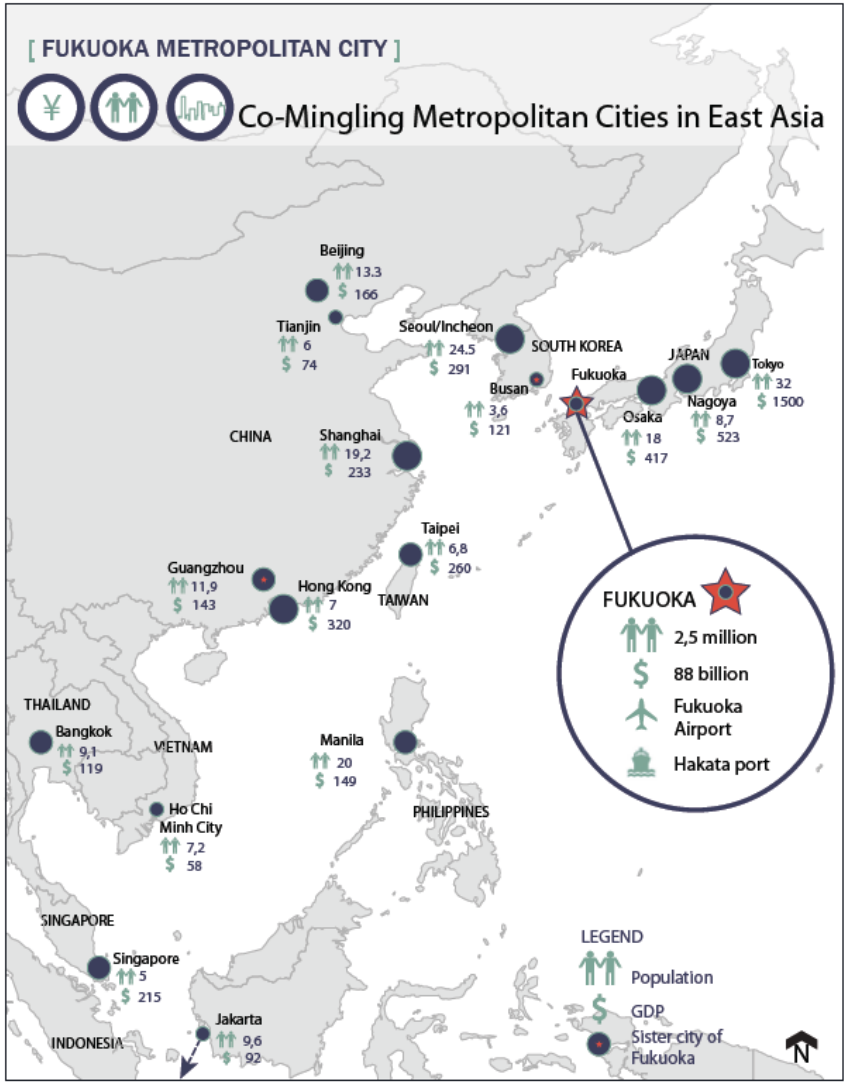

[FUKUOKA METROPOLITAN CITY]
Co-Mingling Metropolitan Cities in East Asia
Beijing
13.3
$ 166
Tianjin
6
$ 74
Seoul/Incheon
24.5
$ 291
SOUTH KOREA
Busan
3,6
$ 121
Fukuoka
JAPAN
Tokyo
32
$ 1500
Nagoya
8,7
$ 523
Osaka
18
$ 417
CHINA
Shanghai
19,2
$ 233
Taipei
6,8
$ 260
Guangzhou
11,9
$ 143
Hong Kong
7
$ 320
TAIWAN
FUKUOKA
2,5 million
88 billion
Fukuoka Airport
Hakata port
THAILAND
Bangkok
9,1
$ 119
VIETNAM
Manila
20
$ 149
PHILIPPINES
Ho Chi Minh City
7,2
$ 58
SINGAPORE
Singapore
5
$ 215
INDONESIA
Jakarta
9,6
$ 92
LEGEND
Population
GDP
Sister city of Fukuoka
N

Checklist on Tourism Potential of Protected Areas

(1) Is the protected area
- close to an international airport or major tourist center?
- moderately close?
- remote?

(2) Is the journey to the area
- easy (short) and comfortable?
- a bit of an effort?
- arduous or dangerous?

(3) Does the area offer the following
- "star" species attractions?
- other interesting wildlife?
- representative wildlife?
- distinctive wildlife viewing (on foot, by boat, from hides)?

(4) Is successful wildlife viewing
- guaranteed?
- usual?
- with luck or highly seasonal?

(5) Does the area offer
- several distinct features of interest?
- more than one feature of interest?
- one main feature of interest?

(6) What standards of food and accommodation are offered?
- high standards
- adequate standards
- rough standards

(7) Does the area have additional
- high cultural interest?
- some cultural attractions?
- few cultural attractions?

(8) Is the area:
- unique in its appeal?
- a little bit different?
- similar to other visitor reserves?

(9) Does the area have
- a beach or lakeside recreation facilities?
- river, falls, or swimming pools?
- any other recreation possibilities?

(10) Is the area close enough to other sites of tourist interest to be part of a tourist circuit?
- yes, other attractive sites
- moderate potential
- low or no such potential

(11) Is the surrounding area
- of high scenic beauty or intrinsic interest?
- quite attractive?
- rather ordinary?

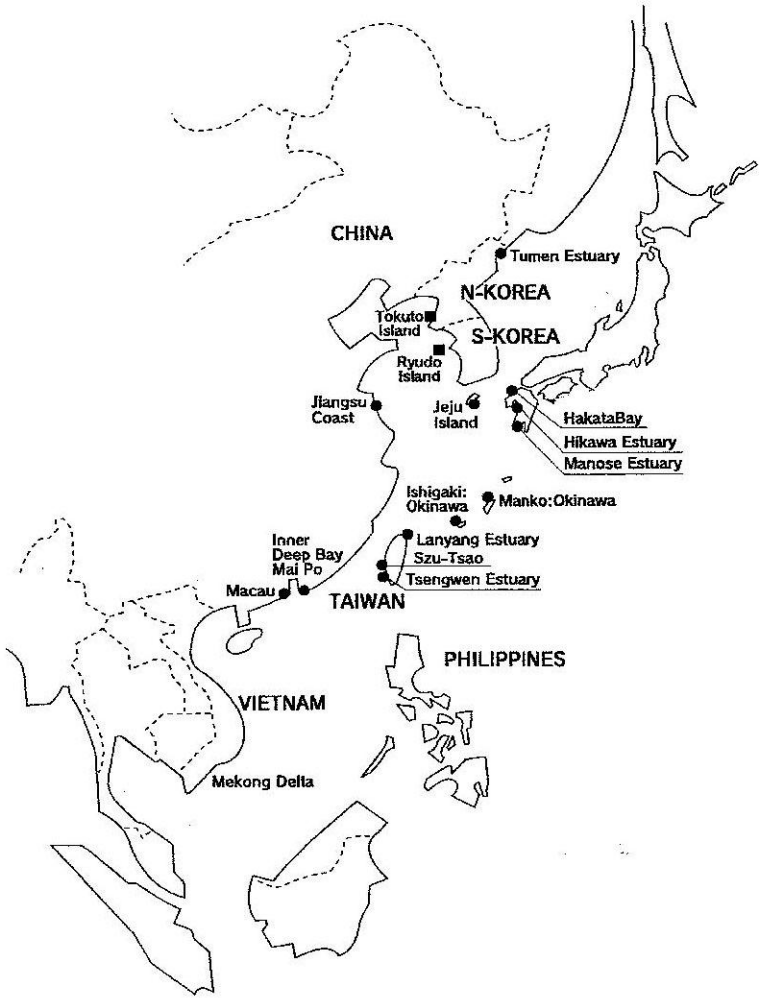
(12) Is the cost of the visit
- high?
- moderate?
- low?

Source: Adapted from McNeely, Thorsell, and Ceballos-Lascurain 1992, p. 17.

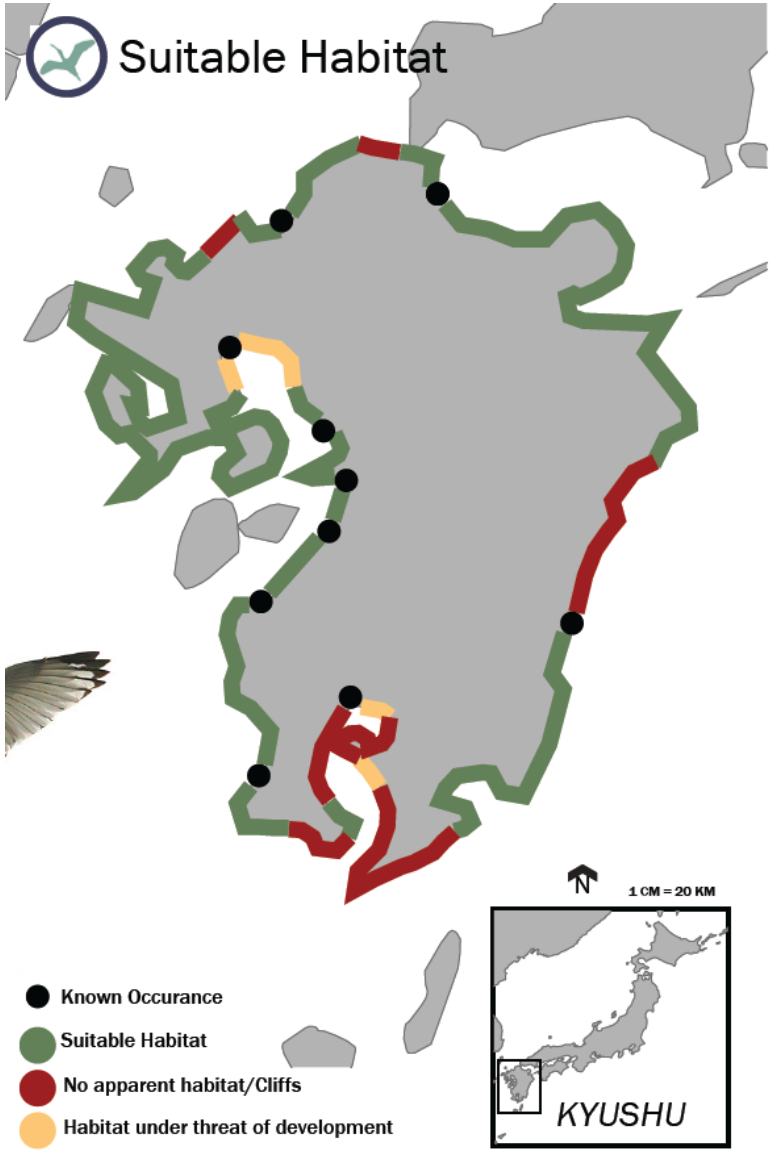
Fukuoka's Role in the East Asian Flyway

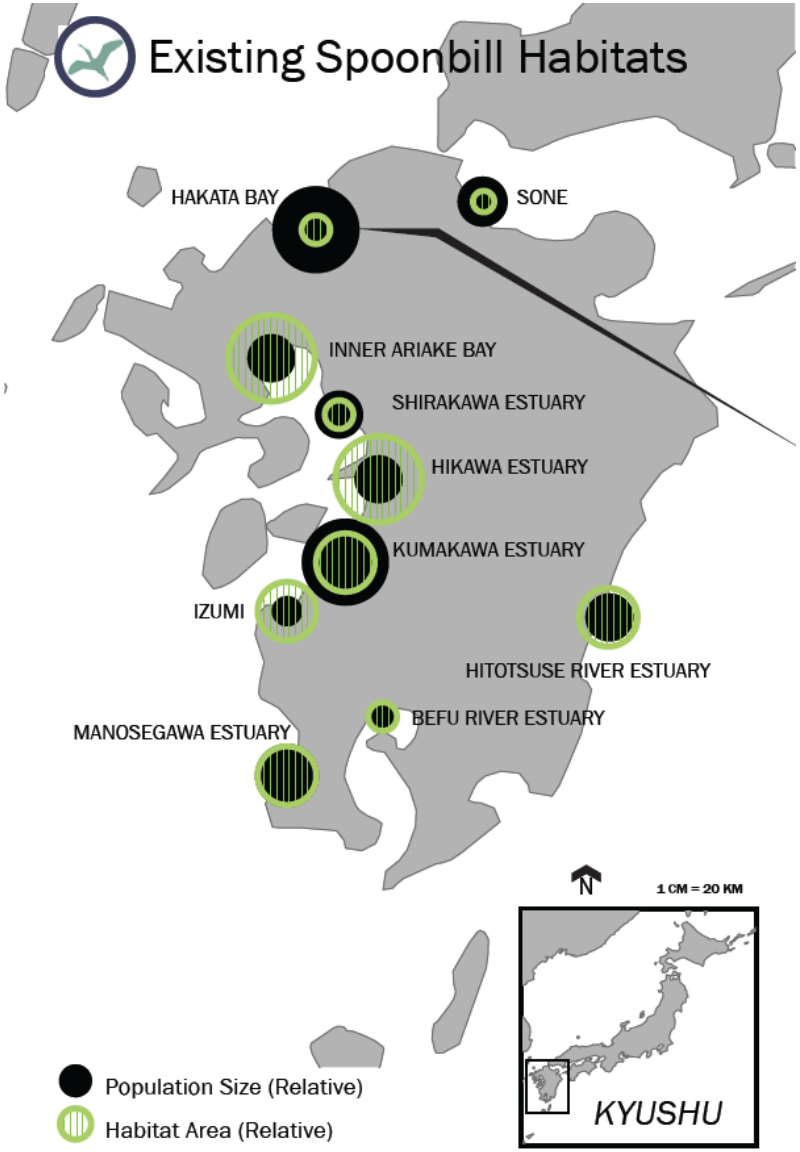
For many of the same reasons that Fukuoka enjoys a special location relative to rising Asian economies and expanding tourism markets it is also a key location for wild birds, both endemic and migratory. Due to its southwest location, Fukuoka and Hakata Bay are home to birds that other parts of Japan do not have. Of all of Japan the Kyushu region provides the most direct stopover for migrating water and shorebirds along the East Asian and East Asian Australasian Flyways. These birds depend on tidal flats, wetlands, bays, the mouths of rivers, and undeveloped beaches, as well as fallow agricultural lands and underdeveloped or abandoned fill areas, all of which Kyushu provides.

Among the most important habitats is Hakata Bay. For example Hakata Bay has the largest population of Black-faced Spoonbills relative to available habitat area of any location in Kyushu. To prevent the extinction of this species, it is particularly important to protect habitat throughout the Hakata Bay area. The site at Imazu, among others, provides critical roosting and foraging that could be protected by purchasing development rights to maintain agricultural lands and reestablish tidal lands adjacent to the bay. This area could readily become a significant ecotourism destination in association with the existing Genki Quasi-National Park, schools in the area for collaborative research, and visitor accommodations developed privately. Applying the Checklist of Tourism Potential (see page 10) Imazu, the Tatara River, and Island City all have unusually high potential for ecological and cultural tourism.



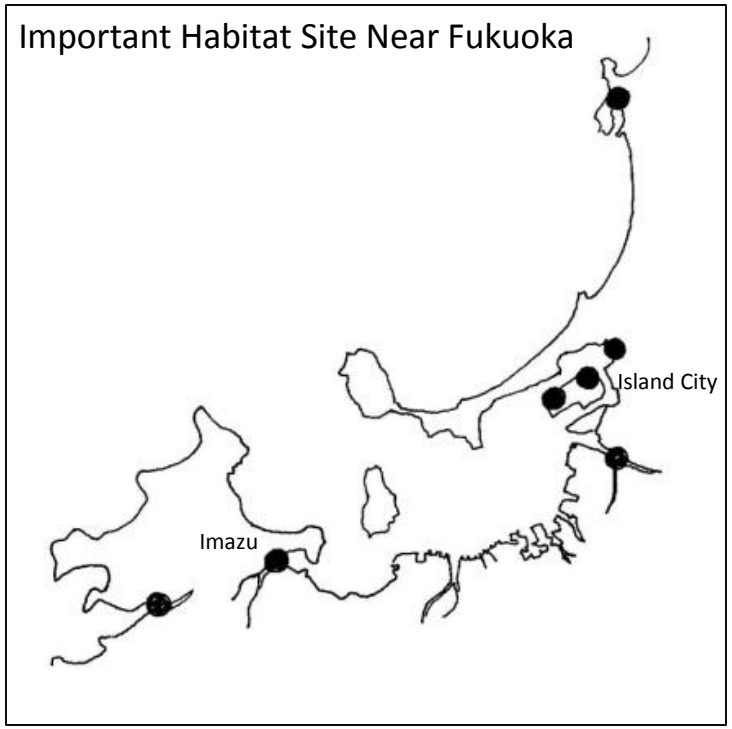
Map by Matsumoto Satoru

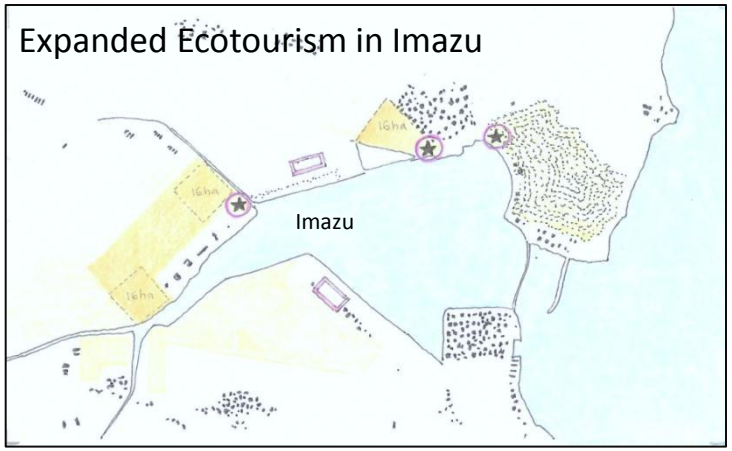

Suitable Habitat
Known Occurance
Suitable Habitat
No apparent habitat/Cliffs
Habitat under threat of development
N
1 CM = 20 KM
KYUSHU


Existing Spoonbill Habitats
HAKATA BAY
SONE
INNER ARIAKE BAY
SHIRAKAWA ESTUARY
HIKAWA ESTUARY
KUMAKAWA ESTUARY
IZUMI
HITOTSUSE RIVER ESTUARY
BEFU RIVER ESTUARY
MANOSEGAWA ESTUARY
Population Size (Relative)
Habitat Area (Relative)
N
1 CM = 20 KM
KYUSHU

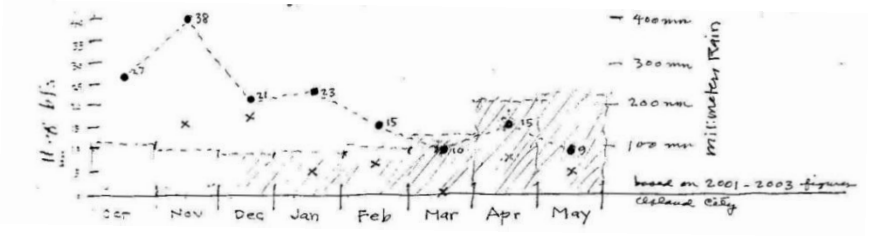
Birding Economics

According to the U.S. Fish and Wildlife Service, in 2006 48 million people went bird watching in the U.S. spending $12 billion on trip expenditures and $24 billion on equipment. Bosque del Apache National Wildlife Refuge in New Mexico (below) is one of the top birding destinations in the U.S. The government and farmers work together to maintain a flooding schedule that creates seasonal habitat for the Sandhill Crane and the tens of thousands of birds migrating along the Central Flyway. Birding sites in and around Fukuoka such as Island City and Imazu have the same potential.

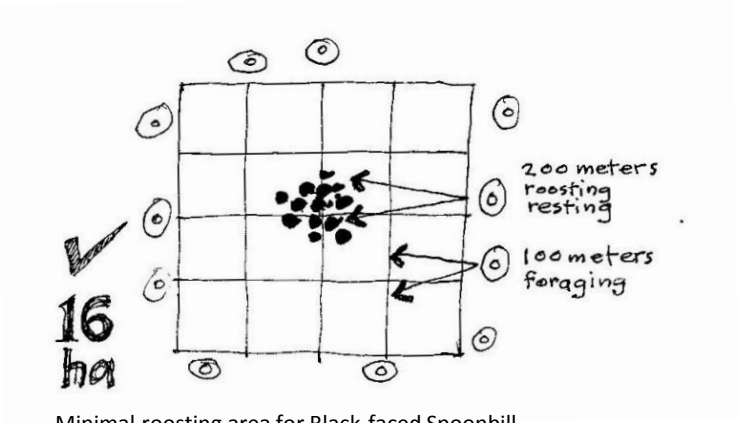




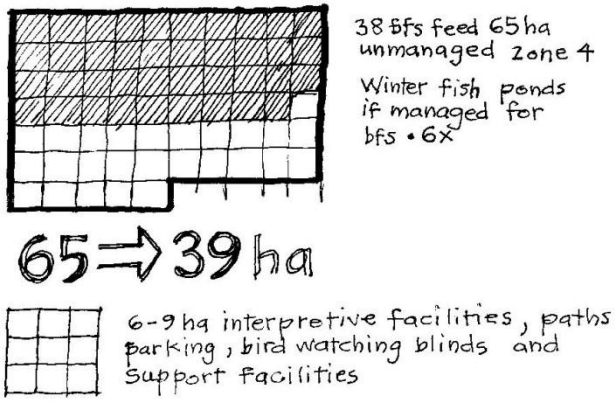
Spatial Requirements of Wild Birds



Seasonal change of numbers of Black-faced Spoonbill in Fukuoka



Minimal roosting area for Black-faced Spoonbill



Minimum roosting and foraging area for Black-faced Spoonbill

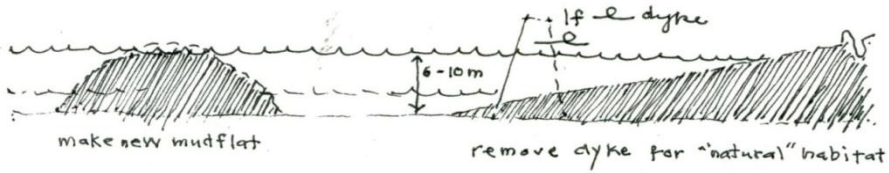
There has been debate about how big a wildbird park on Island City must be to provide habitat for the species that frequent Hakata Bay. To determine the optimal park size, Fukuoka University researchers conducted field studies at sites in Hakata Bay. SAVE reviewed literatures for breeding, migrating, and wintering studies of the Black-faced Spoonbill and other species and convened wetland restoration scientists at UC Berkeley to determine the requirements. The following conclusions were reached:

1. The single most important action is to provide an undisturbed area for birds. To do this choose an umbrella species which satisfies the spatial needs of other species and calculate the area that species requires. The Black-faced Spoonbill is such a species throughout its range. During migration it has a scare distance of 100 meters prime foraging area and 200 meters when roosting and resting. This is bracketed by its winter roosting scare distance of 500 meters and a summer scare distance of 100 meters when foraging in rice fields for neonates. Resting and foraging requires water depth between 4 cm and 20 cm, salinity between 0 and 48 ppt with 200 meters of open water without visual obstruction from the nearest human disturbance. Therefore a shallow tidal area of 400 meters by 400 meters (i.e. 16 ha) is necessary to provide adequate, undisturbed safety.
2. Aggregate the allocations of natural areas and wildbird parks into one large area to provide adequate habitat. Do not make lots of small habitat pieces.
3. Provide deep water and anti-predator trenches 2 to 3 meters deep and 6 to 7 meters wide near outer edges.
4. Provide total foraging and roosting of 39 ha with intensively managed production of prey or 65 ha of unmanaged area. 65 ha presently support 38 spoonbills in Zone 4 (note: in wintering habitat intensively managed prey production requires 60% as much foraging area as unmanaged). Schedule prey production for peak consumption in October through January and non-peak consumption from February through May. In Hakata Bay there is inadequate natural prey production in tidal flats due to filling. On Island City final stage stormwater treatment wetlands can remove toxics and provide nursery for prey species.
5. Provide deep water and shallow water with emergent vegetation at edges of the 16 ha open water for diving and dabbling ducks and waders.
6. Provide a refuge for shorebirds at high tide.
7. Maximize the aquatic vegetation outside the 16 ha open water to increase foraging productivity. Do not plant trees near the open water.
8. Provide 6 to 9 ha for research and interpretive facilities, paths, bird watching blinds, and support facilities.
9. Consider creating multi-use foraging areas. Since the 39 ha foraging area is the threshold that must be met to provide adequate habitat, create each aspect of the system so it maximizes prey production i.e. 16 ha of open water, 12 ha of stormwater treatment, 5 ha of other natural open space in parks and schools, and 6 ha of Wajiro Tidal Flat.

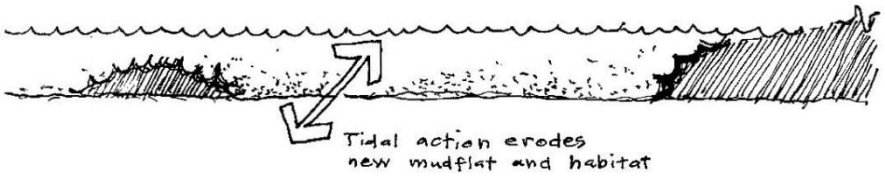
Constructed Tidal Flats in High Velocity Water Exchange

One of the most important technical issues in coastal wildbird parks is the feasibility or lack thereof of constructing tidal flats where the historic flow from low to high to low tide has been interrupted by filling parts of the surrounding bay. This is the case of Hakata Bay where Island City has altered the historic tidal exchange, concentrating the flow into high velocity funnels north and south of the island while diminishing the natural circulation and biological diversity.

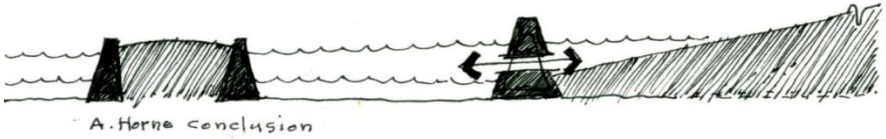
Although most citizens prefer wildbird parks with natural wetlands and tidal flats, SAVE experts predict that removal of the armored dyke to create a natural tidal flat would lead to serious erosion of any 'natural' edge. The tidal flat would be washed away by the funneled tide. Experts recommend adding tidal gates to the existing dyke and creating the tidal flat inside the dyke. While it seems 'unnatural', sustainable habitat is created at a much reduced cost.



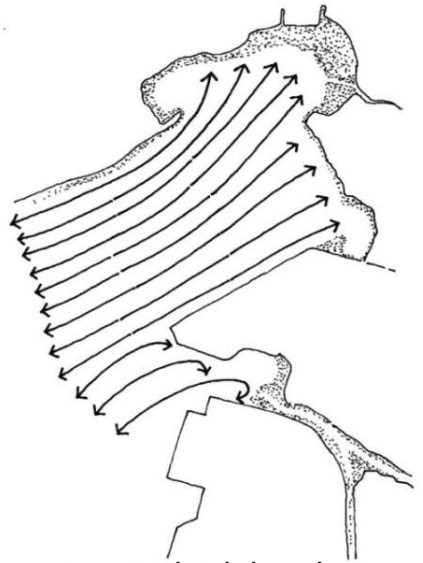
Public desire for natural tidal flat



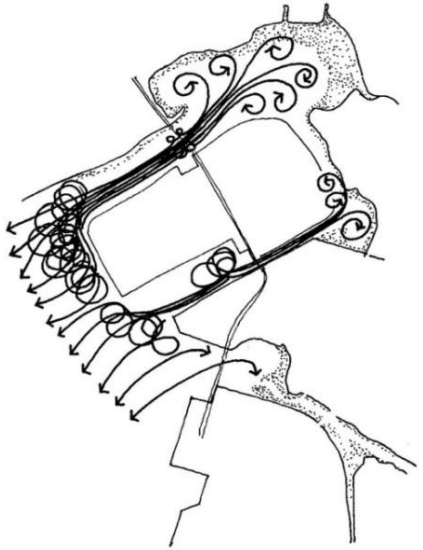
Funneled flow destroys tidal flats



Tidal flats created behind dike



Historical tidal exchange



Island City funneled tides

Natural Processes for Healthy Cities

Recent research informs the location and design of cities to make them healthy. Island City has employed some of these principles and can create healthier human habitat by extending the principles beyond reducing air and water pollution and segregating toxic land uses.

Key city design actions include the following:

1. Provide walking and jogging paths and parks for vigorous exercise for citizens to maintain a healthy cardiovascular system.
2. Provide safe walking routes, free of automobile traffic, for children to have pedestrian access to schools, parks, and public facilities.
3. Reduce the use of the automobile. Traffic discourages neighboring, fuels asthma and other diseases, and adds to global warming.
4. Provide access to nature in daily life. Pay particular attention to guaranteed access to:
   - views of nature from home, work, and school rooms
   - places to walk in natural surroundings
   - places to garden, grow food, and flowers
   - places to be in, explore, play, and relax in nature

   All of these combined provide not only aesthetic pleasure but also health benefits, ranging from decreasing anxiety and violence, increasing the power of concentration, ecoliteracy, and maintaining good physical and psychological health.
5. Make natural processes transparent.
6. Clean stormwater runoff before it enters natural waterways. Island City has a particular opportunity to achieve this and help clean the water of Hakata Bay. SAVE experts calculated the stormwater runoff of parts of Island City to determine the feasibility of achieving zero runoff. The preliminary calculations indicate that cleaning stormwater in constructed wetlands before it reaches Hakata Bay is feasible. The wetlands can also serve as wildlife habitat, parks, and open spaces to reinforce the health benefits listed above.

Stormwater and Habitat Management

In order to treat all the stormwater produced by the parcels in the new industrial and R/D zone surrounding the Island City Center Park, it is recommended that between 1.2 and 1.6 ha be dedicated to a stormwater treatment wetland train. This sum was calculated using the guideline of the Texas Coastal Stormwater Treatment Wetland Design Manual. The Gulf Coast of the United States has a similar average annual precipitation to Fukuoka and so it is assumed that the design rainfall used will be appropriate for the climate on Island City. The permeability coefficient used is based on the assumption that the parcels will primarily be built of impermeable surfaces.

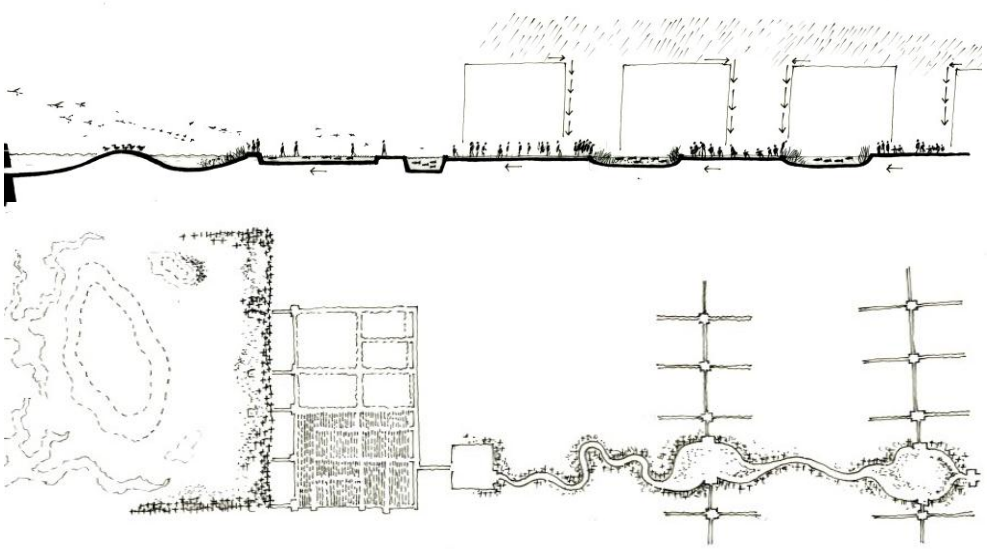
Background Calculations of Stormwater Used to Create Habitat on Island City

C	**0.9**	**coefficient for impermeable surfaces**
Rd	0.1 feet	1.5 inch rain = 0.125 foot rain = design rain fall event
Rd	0.2 feet	2 inch rain = 0.166666 foot rain = design rain fall event
WD	2.0 feet	

Total ha required to support the current spoonbill population	**39 ha**	**Based on SAVE's analysis - this includes the amount of area needed to produce enough food to support the current population of spoonbills found on Island City if the food is managed**
Total ha required to maintain scare distance for spoonbill	8 ha	Based on Fukuoka University research on the assumption that people can only access one edge of the refuge
Total ha required to maintain scare distance for spoonbill	16 ha	Based on Fukuoka University research on the assumption that people can access the area fully around refuge
Area needed for amenities(paths, viewpoints, education, research centers)	6-9 ha	Based on Fukuoka University student proposals

Background Calculations for Stormwater Runoff on Island City

Stormwater Wetland Treatment Calculations	Atot - ha	Atot - sqft	V (1.5in storm)	V (2 in storm)	WE - sqft (1.5 in storm)	WE - sqft (2 in storm)	WE - ha (1.5 in storm)	WE - ha (2in storm)
Parcels by land use								
Commercial Facility	3.9	419,792.5	47226.7	62,968.9	23,613.3	31,484.4	0.2	0.3
Commercial Facility and Apartments	3.1	333,681.2	37539.1	50,052.2	18,769.6	25,026.1	0.2	0.2
Hospital	4.1	441,320.3	49648.5	66,198.0	24,824.3	33,099.0	0.2	0.3
R&D/industry	4.1	441,320.3	49648.5	66,198.0	24,824.3	33,099.0	0.2	0.3
R&D/industry	1.8	193,750.4	21796.9	29,062.6	10,898.5	14,531.3	0.1	0.1
R&D/industry	1.6	172,222.6	19375.0	25,833.4	9,687.5	12,916.7	0.1	0.1



Using best practices of stormwater management can reduce pollution in Hakata Bay, produce habitat and prey for wild birds, and create more natural areas in Island City

Integrated Habitat with Dynamic Port

The goal of this plan is to create an economically successful port though creative combinations of port, industrial, and commercial land uses that distinguish Fukuoka from the many other underused ports in East Asia.

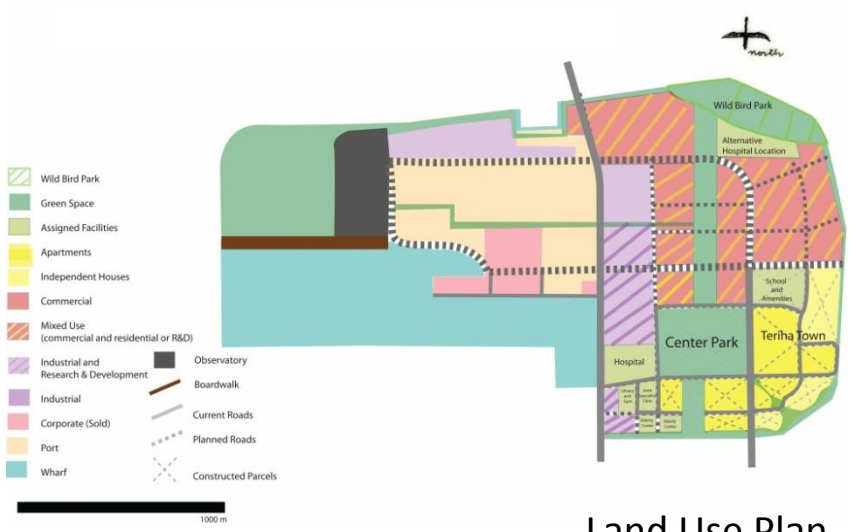
The plan inserts a multi-use, signature building that houses port and corporate offices, a wildlife observatory, restaurants, retail space, interactive exhibits about the port, and tourist accommodations. This building provides something for everyone and should become a destination retail center.

The building is flanked to the east by a live-work industrial arts district where artisans manufacture and display their work next to the bay. The entry boulevard leading to the observatory separates the industrial arts district from more traditional port activity. The unique identity of the port enables Fukuoka to attract additional shipping companies to locate here, adding to the vitality of Island City.

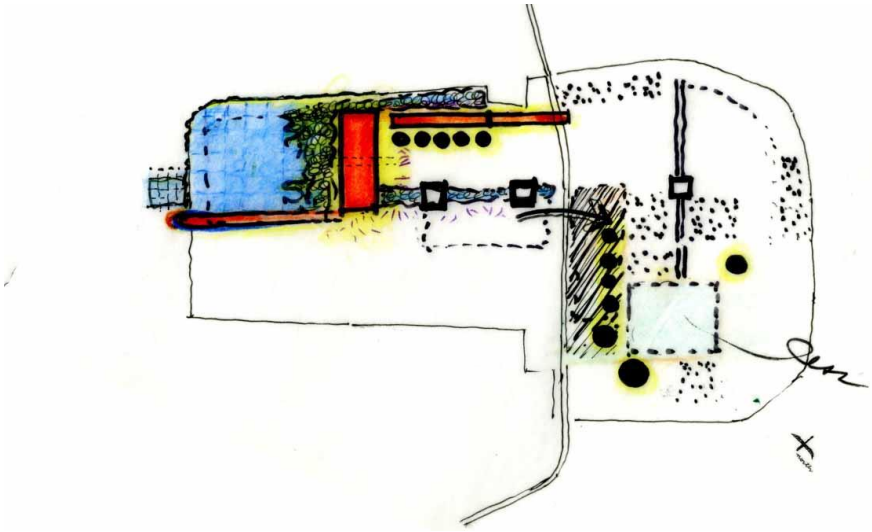
The 10 ha of open space called for in the 2008 Land Use Plan at the northwest end of Island City where spoonbills presently forage is expanded to 25 ha by relocating the nature zone to this area, creating an open water wildbird park of 16 ha and a natural wetland and tidal flat of 10 ha to mitigate loss from Island City construction. A green street brings stormwater from the hard surfaces of the port to the wetland for treatment and reuse in the wildbird park. The runoff from the entire port are can be treated in the natural area.

This natural area provides majestic borrowed scenery for the port's signature building and appropriate habitat for spoonbills and shorebirds. With a diversity of habitat and a unique boardwalk with views over natural habitat and port operations, the area should attract ecotourists as well as other visitors.

This plan requires rethinking the 2008 Land Use Plan to accommodate the new uses and green infrastructure as well as capital investment in the signature building. The hospital and health services would be located around Center Park. Additional mixed use buildings would be needed around and north of Center Park.

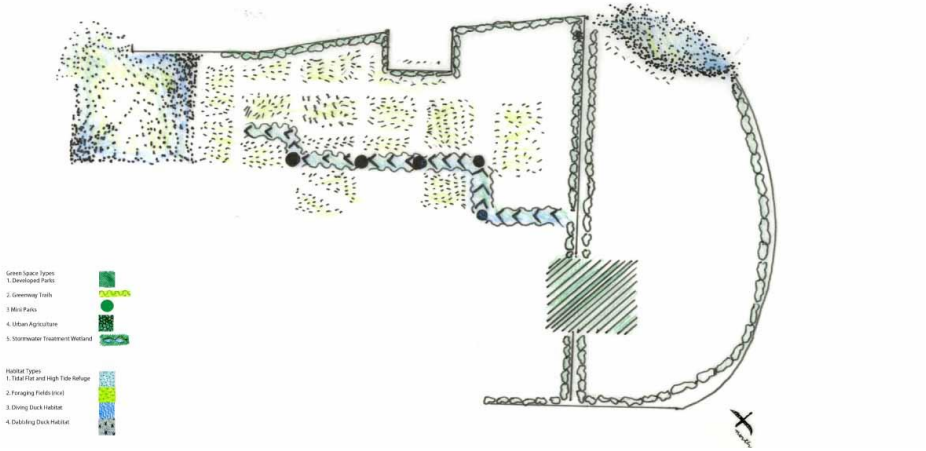


Land Use Plan

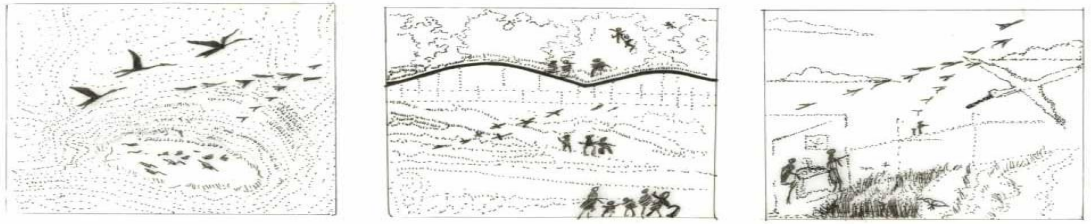


Concept Plan

Integrated Habitat with Dynamic Port



Greenspace Overlay



Section: Port Building and Wildbird Habitat

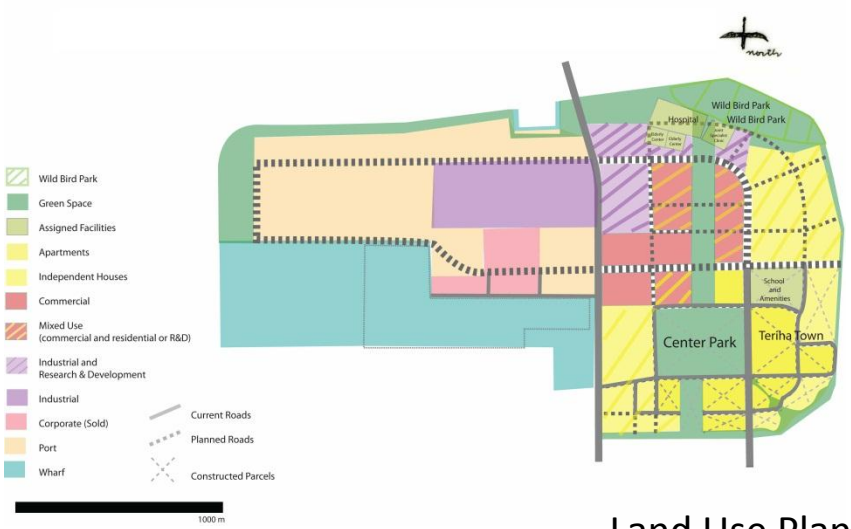
Corridor Habitat and Nature Healing Hospital

The goal of this plan is to realize Island City's vision of becoming a health-oriented community by employing the latest research on health and healing, preventative medicine, exercise, and diet. The centerpiece of the plan is a hospital campus with medical research facilities located adjacent to the natural area and wildbird park. This provides visual access to the natural landscape which recent research shows speeds recovery, reduces stress, and reduces risk of some diseases. Within the hospital rooms have views to the wetland tidal flat, bay, and mountains. There are small gardens for staff, patients, and families. There are wheelchair-accessible strolling gardens in natural areas. To address the '4 tenets of healthy landscapes' namely places to view it, walk through it, garden in it, and simply be in it, the vision is extended throughout Island City with small parks and greenways to encourage these activities.

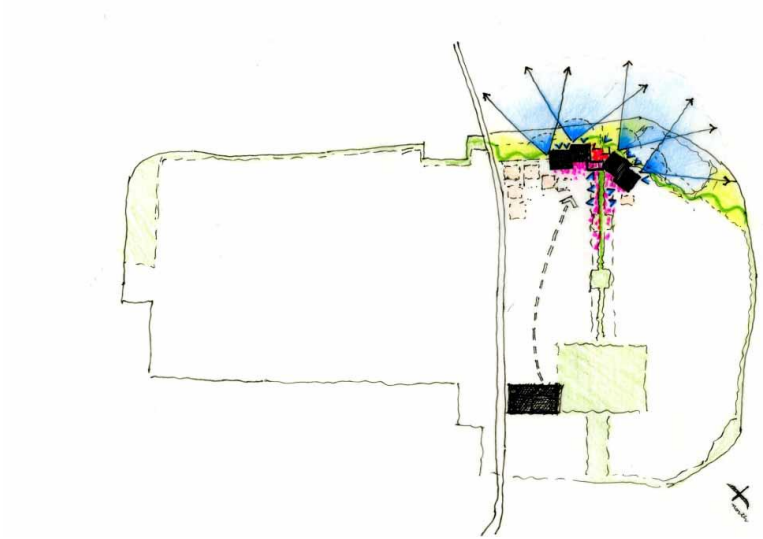
By combining the open space of the natural area, the wildbird park, and the greenway from Center Park and exchanging land uses with the presently proposed hospital site, a habitat corridor is created on the northern shore of Island City. This provides enough space to make a sheltered tidal pond of 12 ha providing refuge for shorebirds at high tide. Gates would be built in the existing dike to allow modified natural flow of tidal water.

Residential land uses would be expanded around Center Park, research and office shifted north to the hospital campus, and commercial development would be concentrated along the green corridor connecting Center Park and the hospital campus.

This plan requires moving the hospital from the Center Park location presently proposed and modifying the 2008 Land Use Plan to shift research facilities toward the medical complex. Because the natural and wildbird park is a linear corridor it does not provide adequate space to accommodate some important species of wild birds (for example it does not satisfy the 200 meter scare distance required for the Black-faced Spoonbill).



Land Use Plan

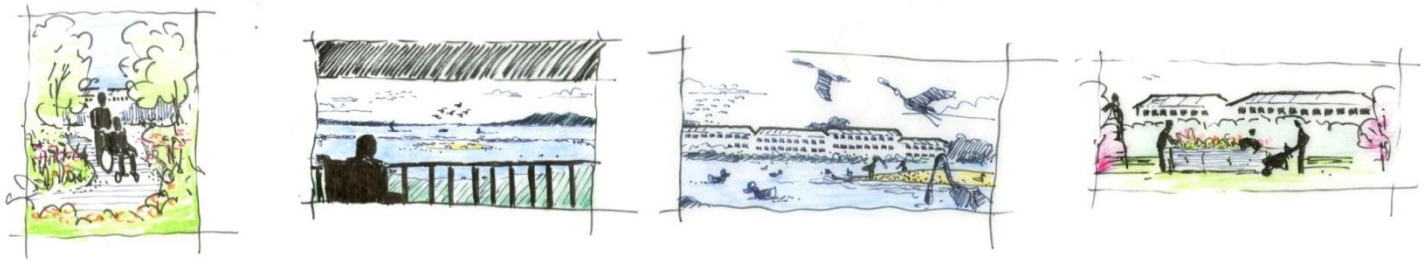


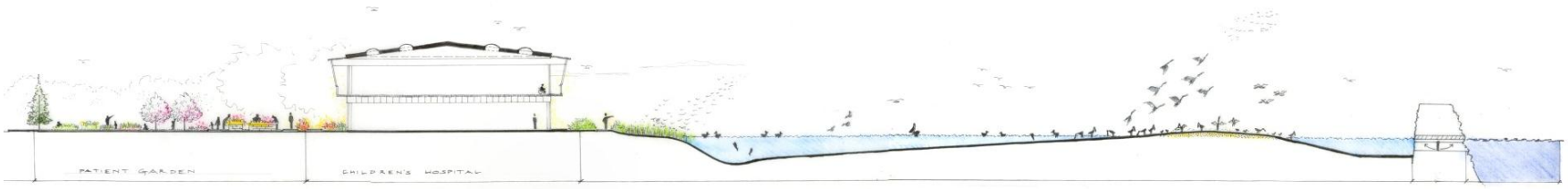
Concept Plan

Corridor Habitat and Nature Healing Hospital

Detail

Greenspace Overlay





Section: Hospital and Wildbird Park

Concentrated Nature and Vital City

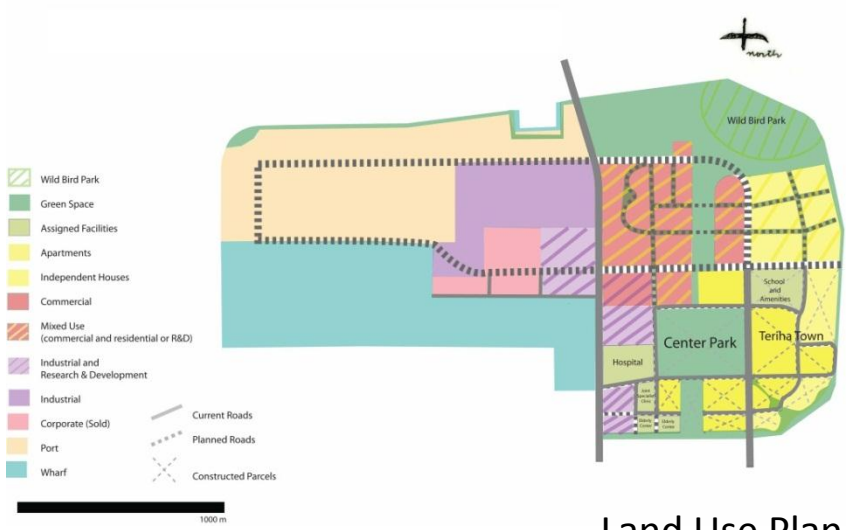
The primary goal of this plan is to increase the life quality of residents and marketability of housing, wildbird habitat, associated ecotourism economy, and stormwater quality. By concentrating the green open space, the proposed wildbird park can be expanded to 16 ha of shallow tidal water, adequate to attract Black-faced Spoonbills and a dozen other bird species that ecotourists travel to view. Surrounding the 16 ha of protected habitat is an interpretive center with mixed uses, a wetland park, stormwater retention, rice fields, and fish ponds, habitat for fireflies and dragonflies, places to view wildlife at a close distance, and natural places for children to play and adults to stroll. The interpretation of the wildbird park is supplemented with an outdoor educational facility at Wajiro Tidal Flat immediately across the bay.

The wildbird park connects to Center Park along a grand boulevard with water gardens that retain and clean stormwater. 21.7 ha of stormwater from surrounding buildings and streets can be treated in this system. Along this boulevard intensive mixed use development of business, research, and housing creates a distinctive and lively urban neighborhood. The combination of these changes will place Island City at the leading edge of combined stormwater and wildbird habitat technology created on reclaimed baylands.

The hospital and other medical services and R/D facilities are located around Center Park. As needed the port and industrial uses expand on the west side of Island City.

The density of development is increased around the expanded wildbird park so real estate can take advantage of the views over the park, inner bay to Wajiro Tidal Flat, and outer bay to the west. A nature center, offices, commercial research and development, and housing all with viewing gardens and balconies surround the wildbird and tidal flat park. The existing dike is retained and water gates provide a controlled tidal fluctuation in the protected core habitat. By varying the elevation inside the created tidal flat habitat will be provided for shorebirds seeking safe refuge at high tides, diving and dabbling ducks, as well as wading birds. The stormwater gardens provide habitat to wading birds, as well as wetland and riparian species.

This plan accommodates recent thinking to locate a hospital and other health services at Center Park. To implement this plan the 2008 Land Use Plan would need updating to concentrate the natural areas, open space, and wildlbird park in order to create an area large enough to provide adequate habitat for spoonbills and other wildlife.



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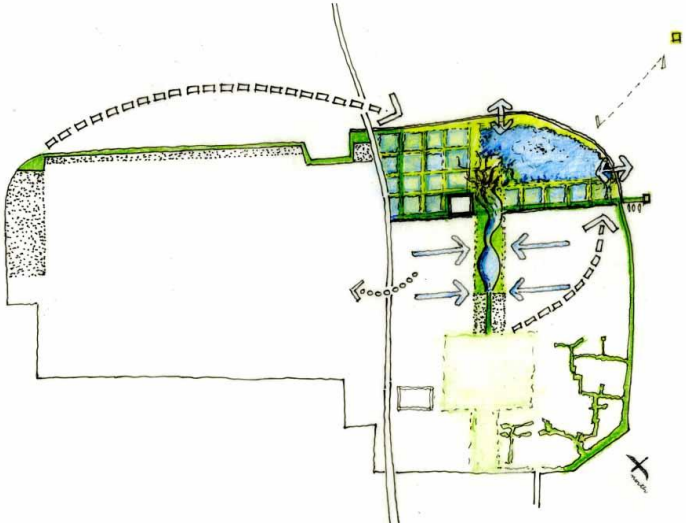
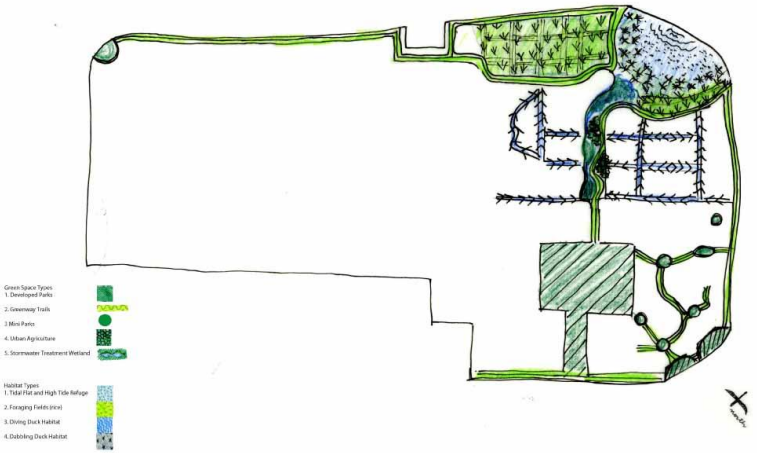


Concept Plan

Concentrated Nature and Vital City



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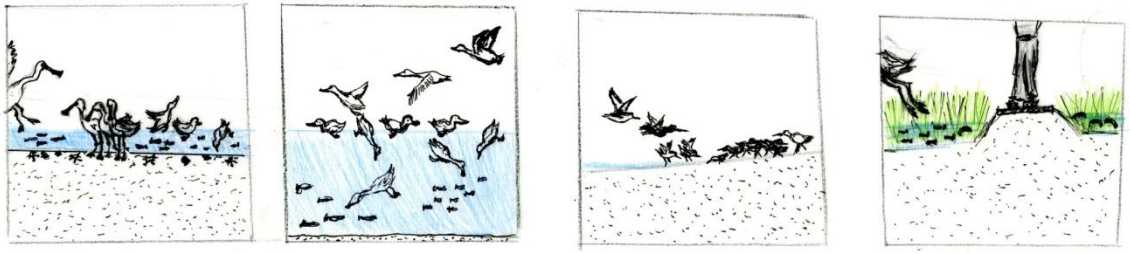


Section: Mixed Use Visitor Center, Rice Fields, and Expanded Wildbird Park

Help Us Evaluate

SAVE International believes that the time is right to reconsider the wildbird park designated in the 2008 Land Use Plan for Island City so as to achieve greater conservation of the Black-faced Spoonbill and other migratory waterbirds now using Hakata Bay. The 2008 plan is based on conditions and research that are more than a decade old. The 2008 plan provides a wildbird park too small to be able to maintain internationally important concentrations of the spoonbill over the long-term.

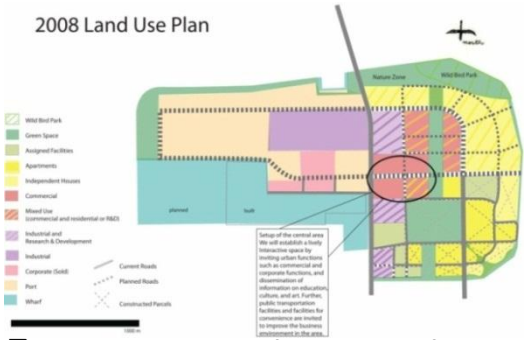
The wildbird park design needs to be revised based on improved knowledge of the ecological requirements of target species, most especially the spoonbill and migrant shorebirds, as well as advanced thinking on habitat creation, water management, sustainable development, and healthy cities.

SAVE asks the citizens of Fukuoka to reconsider the 2008 plan for the wildbird park by joining us in evaluating it along with the three new plan proposals in this report. If the wildbird park is improved Fukuoka City will be able to become even prouder of its progress, and claim the title of a modern and sustainable Gateway to Asia.

Evaluation Criteria

Below are criteria SAVE would like you to use to evaluate the 4 plans (the existing 2008 plan as well as the 3 proposals discussed in this report). Please review the criteria and add any you think are missing. Then on the next two pages, evaluate the 4 plans.

- ❑ 1. Increases livability for residents of Island City with greater access to nature and community facilities and increases the future marketability of housing real estate.
- ❑ 2. Provides a central location for hospital and medical facilities with access to natural healing environments.
- ❑ 3. Stimulates additional port development with uses that create symbiotic centers of employment and attractions for visitors.
- ❑ 4. Maintains the land uses described in the 2008 Land Use Plan.
- ❑ 5. Makes land use and infrastructure changes only in undeveloped areas.
- ❑ 6. Contributes to cleaning the water of Hakata Bay with a green LID (low impact development) stormwater retention and treatment system.
- ❑ 7. Does no additional harm to Wajiro Tidal Flat or the inner bay ecology.
- ❑ 8. Provides adequate habitat to satisfy the needs of the umbrella species the Black-faced Spoonbill, as well as other water and shorebirds.
- ❑ 9. Creates wildbird habitat in a cost-effective manner.
- ❑ 10. Makes a bird park that supports an ecotourism industry and creates places for children to learn about birds and the ecosystem where they live.
- ❑ 11. Other (you write) _____
- ❑ 12. Other _____



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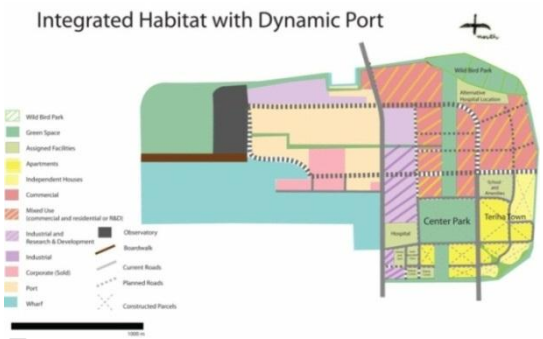

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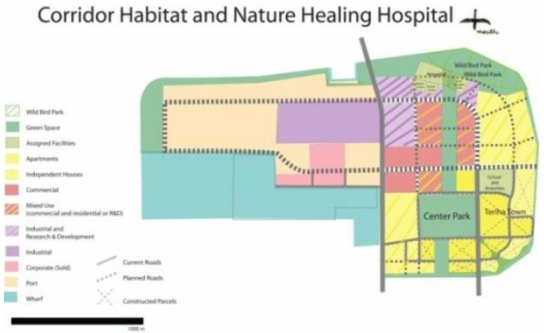
Corridor Habitat and Nature Healing Hospital



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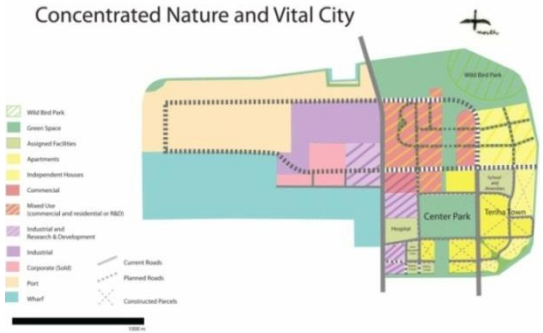
Concentrated Nature and Vital City



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- ❑ 7. Does no additional harm to Wajiro Tidal Flat or the inner bay ecology.
- ❑ 8. Provides adequate habitat to satisfy the needs of the umbrella species the Black-faced Spoonbill, as well as other water and shorebirds.
- ❑ 9. Creates wildbird habitat in a cost-effective manner.
- ❑ 10. Makes a bird park that supports an ecotourism industry and creates places for children to learn about birds and the ecosystem where they live.
- ❑ 11. Other (you write) _____
- ❑ 12. Other _____

Notes