Note: All source materials of the fieldwork test were presented in A4-size in the tests. They were re-sized and copied into this file for your convenience. Some maps/images are not provided due to the copyright reason and Google Earth images are in use to replace those presented in the fieldwork test.

iGeo 2010 Taipei – Fieldwork Test

List of source materials

Fieldwork Test – I

Source 1	Index map and list of source materials
Source 2	Guandu Wetland - base map (taken in 2009)
Source 3A	Guandu Wetland (site A)
Source 3B	Guandu Wetland (site B & C)
Source 4	River system of Taipei Basin
Source 5	Topographical map of the Guandu Lowland
Source 6	Main area, Guandu Nature Park
Source 7	Guandu Nature Park under construction (photo)
Source 8A	Seeding of *Kandelia obovata* (photo)
Source 8B	Shorebirds on mudflat (photo)
Source 9	Introduction of water birds and land birds
Source 10	Field Guide of selected Plants in Guandu Area

Fieldwork Test – II

Source 11 A/B	Image of the Guandu lowland/wetland in late 1950s
Source 12A/B	Image of the Guandu lowland/wetland in mid 1960s
Source 13 A/B	Image of the Guandu lowland/wetland in early 1980s
Source 14 A/B	Image of the Guandu lowland/wetland in early 1990s
Source 15 A/B	Image of the Guandu lowland/wetland in early 2000s
Source 16	Bird migration routes in East Asia
Source 17	Tidal information of Danshui River
Source 18	WCPA Categories System for Protected Areas Task Force
Source 19	Chronicle of events
Source 20	The discovery of mangroves in Northern Taiwan
Source 21	Siltation and the sustainability of reeds in Guandu
Source 22	Function of flood-gates
Source 23	Crisis caused by over-growth of mangrove
Source 24	Guandu Landuse/Landcover, 2009

*** Fieldwork Test Introduction was held on 30 August, and Source 4, 5, 8, 9 and 10 were also presented to the students.**

Source 1. Index map and list of source materials

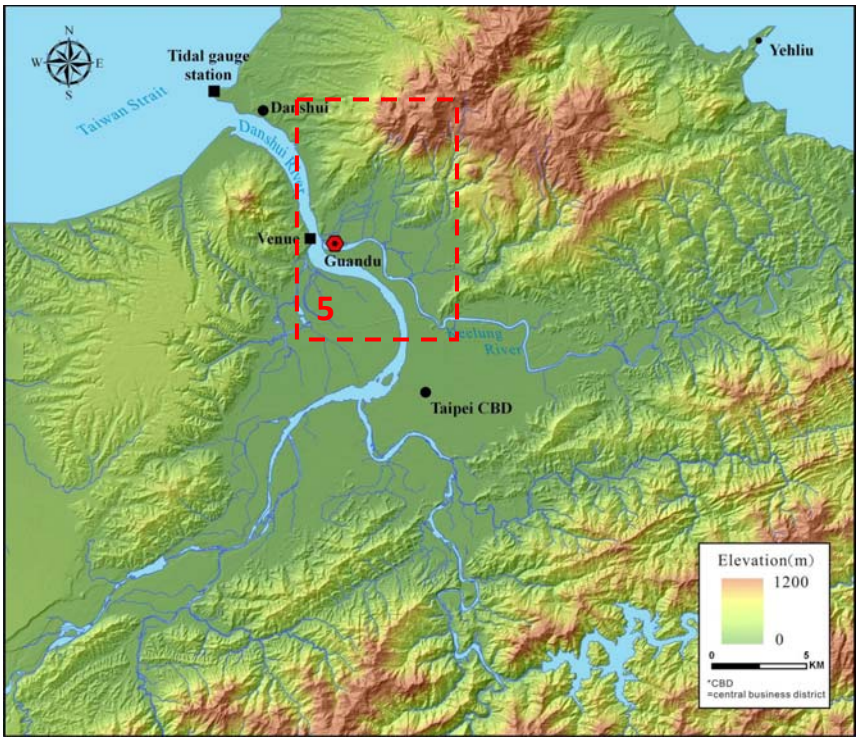
Source 2. Guandu Wetland - base map (taken in 2009) *(see above for location)*

Source 3A. Guandu Wetland (site A) *(see above for location)*

Source 3B. Guandu Wetland (site B & C) *(see above for location)*

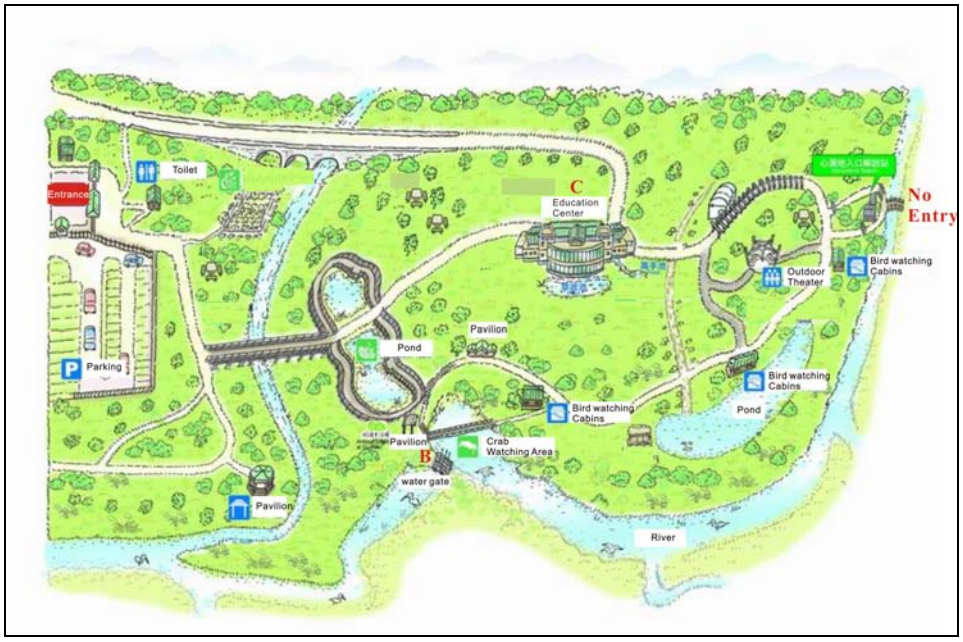
Note: Original images of Source 1-3 are not provided due to the copyright reason and Google Earth images are used instead.

Source 4. River system of Taipei Basin



Source 5. Topographical map of the Guandu Lowland *(see above for location)*

Source 6. Main area, Guandu Nature Park



Source 7. Guandu Nature Park under construction (photo)

Source 8A. Seeding of Kandelia obovata (photo)

Source 8B. Shorebirds on mudflat (photo)

Source 8A. Seeding of *Kandelia obovata*

Source 8B. Shorebirds on mudflat

Source 9. Introduction of water birds and land birds

Water birds		Land birds
Shorebirds (Wader)	Waterfowls	
		
Shorebirds, like sandpipers and plovers, use mud flat as their foraging habitats.	Waterfowls, like mallards and ducks, use open water for foraging habitats and mud flat for rest.	Land birds, like sparrows and warblers, perch in grass and tree, grassland, farmland and woodland are their habitats.

Source 10. Field Guide of selected Plants in Guandu Area

Paper Mulberry, *Broussonetia papyrifera* (L.) L'Herit. (Family Moraceae)	
	
Height 2-6 m, grow in dry land	

India-charcoal Trema, *Trema orientalis* (L.) Blume (Family Ulmaceae)	
	
Height 2-10 m, grow in dry land.	

Mangrove, *Kandelia obovata* Sheue, Liu & Yong (Family Rhizophoraceae)	
	
Height 1-5 m, grow in salt marsh.	

Reed, *Phragmites australis* (Cav.) Trin ex Steud. (Family Poaceae)	
	
Height 1-2 m, grow in both freshwater wetland, brackish water wetland and salt marsh.	

Blush Macaranga, *Macaranga tanarius* (L.) Muell-Arg. (Family Euphorbiaceae)	
	
Height 2-4 m, grow in dry land.	

Coastal Cottonwood, *Hibiscus tiliaceus* L. (Family Malvaceae)	
	
Height 2-4 m, grow in dry land.	

Source 10. Field Guide of Selected Plants in Guandu Area

Source 11 A: Image of the Guandu lowland in late 1950s

Source 11B: Image of the Guandu wetland in late 1950s

Source 12A: Image of the Guandu lowland in mid 1960s

Source 12B: Image of the Guandu wetland in mid 1960s

Source 13 A: Image of the Guandu lowland in early 1980s

Source 13B: Image of the Guandu wetland in early 1980s

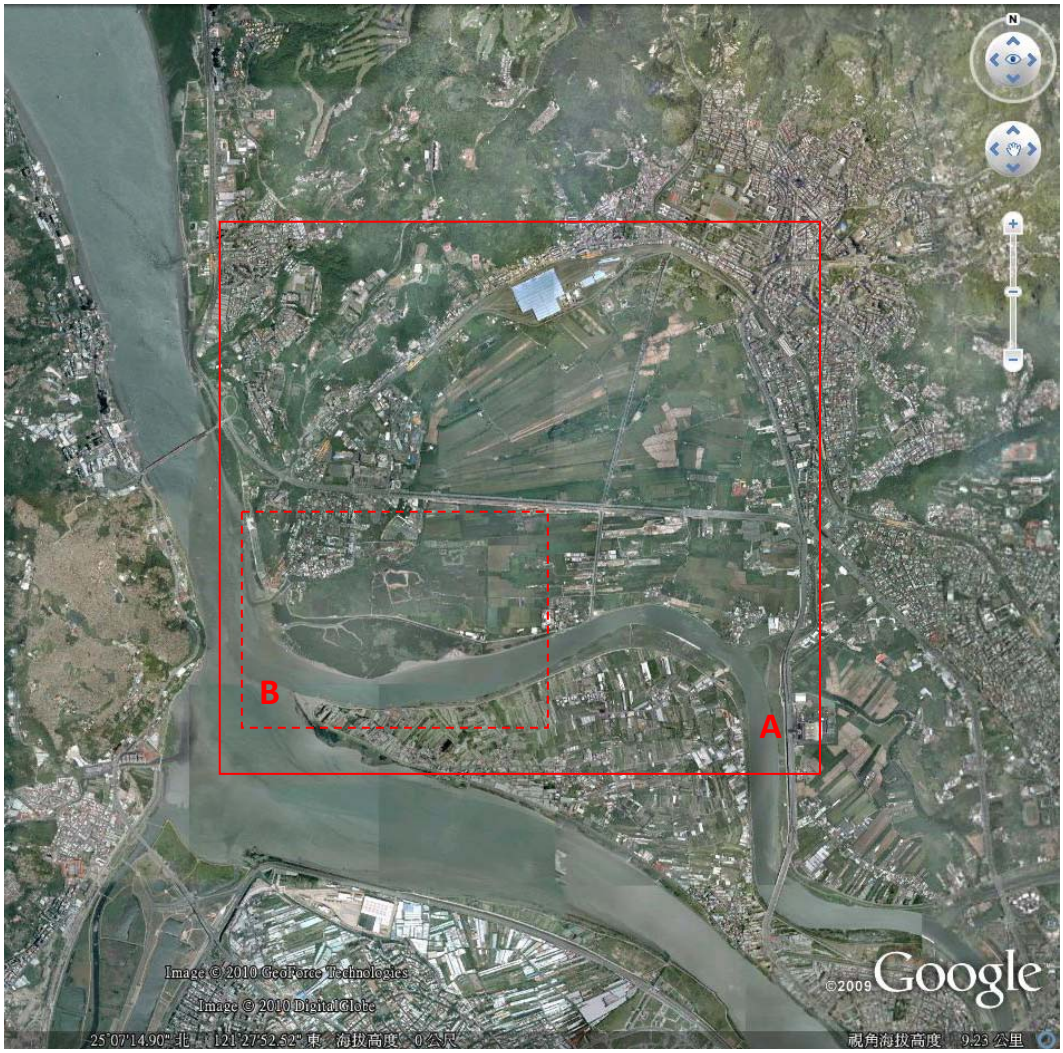
Source 14 A: Image of the Guandu lowland in early 1990s

Source 14B: Image of the Guandu wetland in early 1990s

Source 15 A: Image of the Guandu lowland in early 2000s

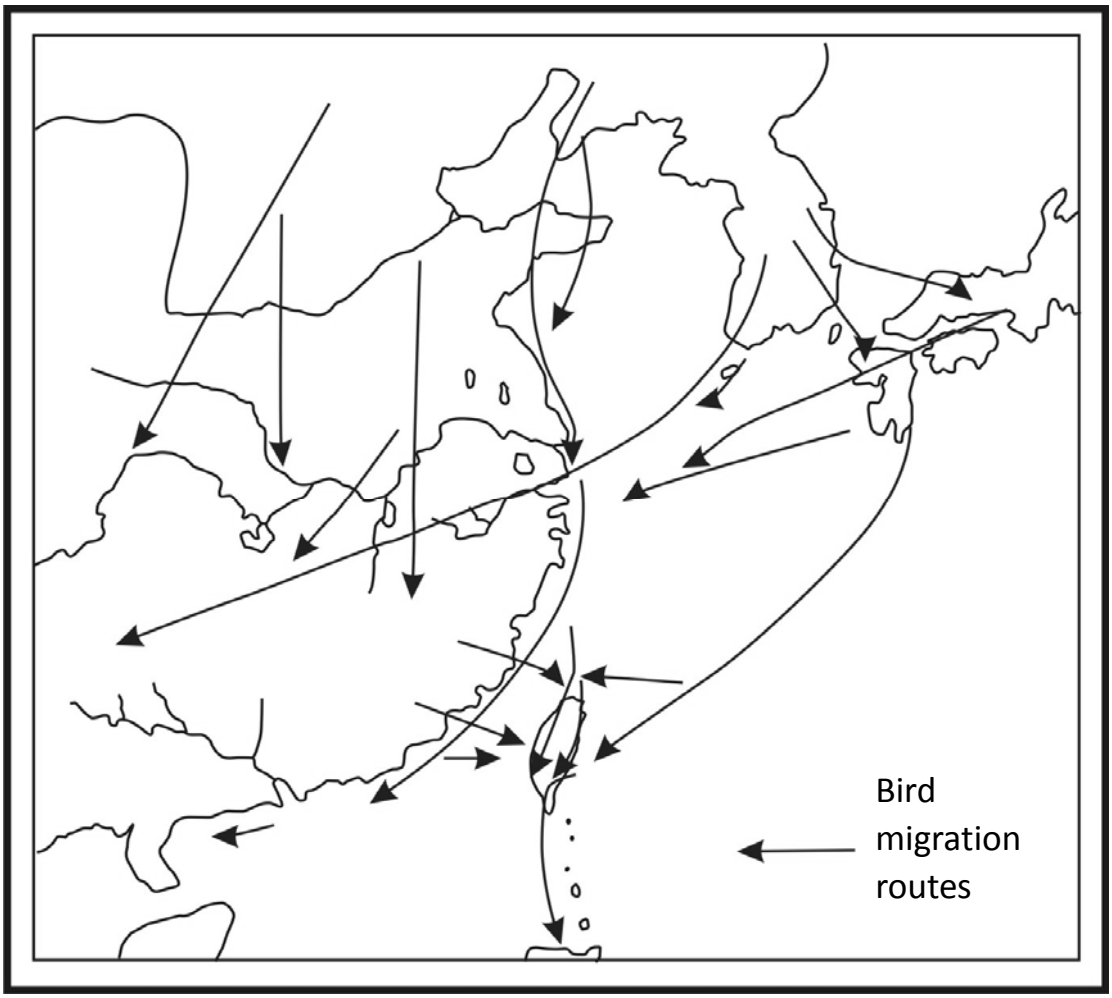
Source 15B: Image of the Guandu wetland in early 2000s

Area of map A and map B



Note: Images of Source 11-15 are not provided due to the copyright reason and Google Earth images here to show the location.

Source 16. Bird migration routes in East Asia

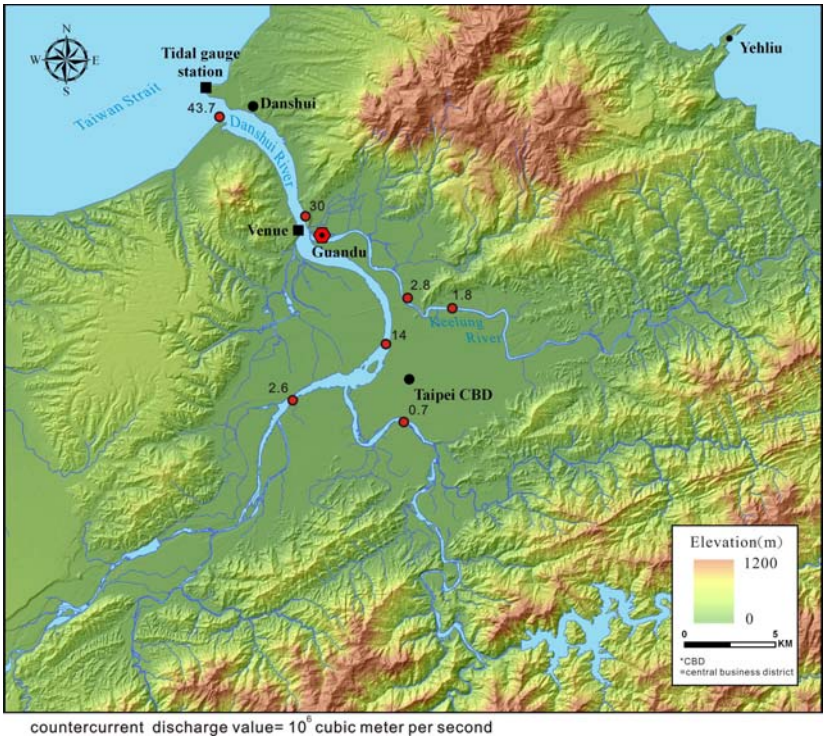


Source 17. Tidal information of Danshui River

2010/07/30	06/19 (lunar calendar) Friday	
High tide	01:07	144.5
Low tide	07:19	-82.5
High tide	13:10	129.5
Low tide	19:23	-105.5

2010/07/31	06/20 (lunar calendar) Saturday	
High tide	01:37	140.5
Low tide	07:51	-86.5
High tide	13:48	125.5
Low tide	19:58	-91.5

2010/08/01	06/21 (lunar calendar) Sunday	
High tide	02:09	133.5
Low tide	08:28	-88.5
High tide	14:30	118.5
Low tide	20:38	-74.5



countercurrent discharge value= 10^6 cubic meter per second

Source 18. WCPA Categories System for Protected Areas Task Force

IUCN protected area management categories classify protected areas according to their management objectives. The categories are recognised by international bodies such as the United Nations and by many national governments as the global standard for defining and recording protected areas and as such are increasingly being incorporated into government legislation.

IUCN Protected Areas Categories System

Ia Strict Nature Reserve

- Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring

Ib Wilderness Area

- Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence within permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

II National Park

- Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

III Natural Monument or Feature

- Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.

IV Habitat/Species Management Area

- Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

V Protected Landscape/ Seascape

- A protected area where the interaction of people and nature over time has produced an area of distinct charcter with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI Protected area with sustainable use of natural resources

- Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area

For more information Guidelines for Applying Protected Area Management Categories

Source 19. Chronicle of events

In 1968, Guandu stop bank was built for preventing flooding tide.
In 1986, Guandu Nature Reserve was established by Central Government to conserve shore birds and their habitats.
In 1996, under the pressure of public opinion, Taipei City Government approved the establishment of Guandu Nature Park.
In 2001, Wildbird Society of Taipei, a nonprofit organization, was chosen by Taipei City Government to run Guandu Nature Park.

Source 20. The discovery of mangroves in Northern Taiwan

Robert Swinhoe, a naturalist and the first British consul in Taiwan (1856-1866), found and collected specimens of mangroves near Danshui. His work is recognize as the first record of mangroves in Northern Taiwan.

Source 21. Siltation and the sustainability of reeds in Guandu

Siltation of the reedbeds is caused by the stop bank preventing "flushing" of the areas in which reeds grows. The consequences are the invasion of terrestrial plants, more land bird species in the place of shore birds, and the gradual extension of the land surface with greater flood risk.

Source 22. Function of flood-gates

Flood-gates are built to drain the freshwater areas and prevent the brackish water invading the farm lands.

Source 23. Crisis caused by over-growth of mangrove

The Guandu Nature Reserve is a high status conservation area for the protection of shore birds. Mud flats are the preferred habitat of shore birds, but mangroves now dominate these areas, and this has created a problem.

Source 24. Guandu Landuse/Landcover, 2009

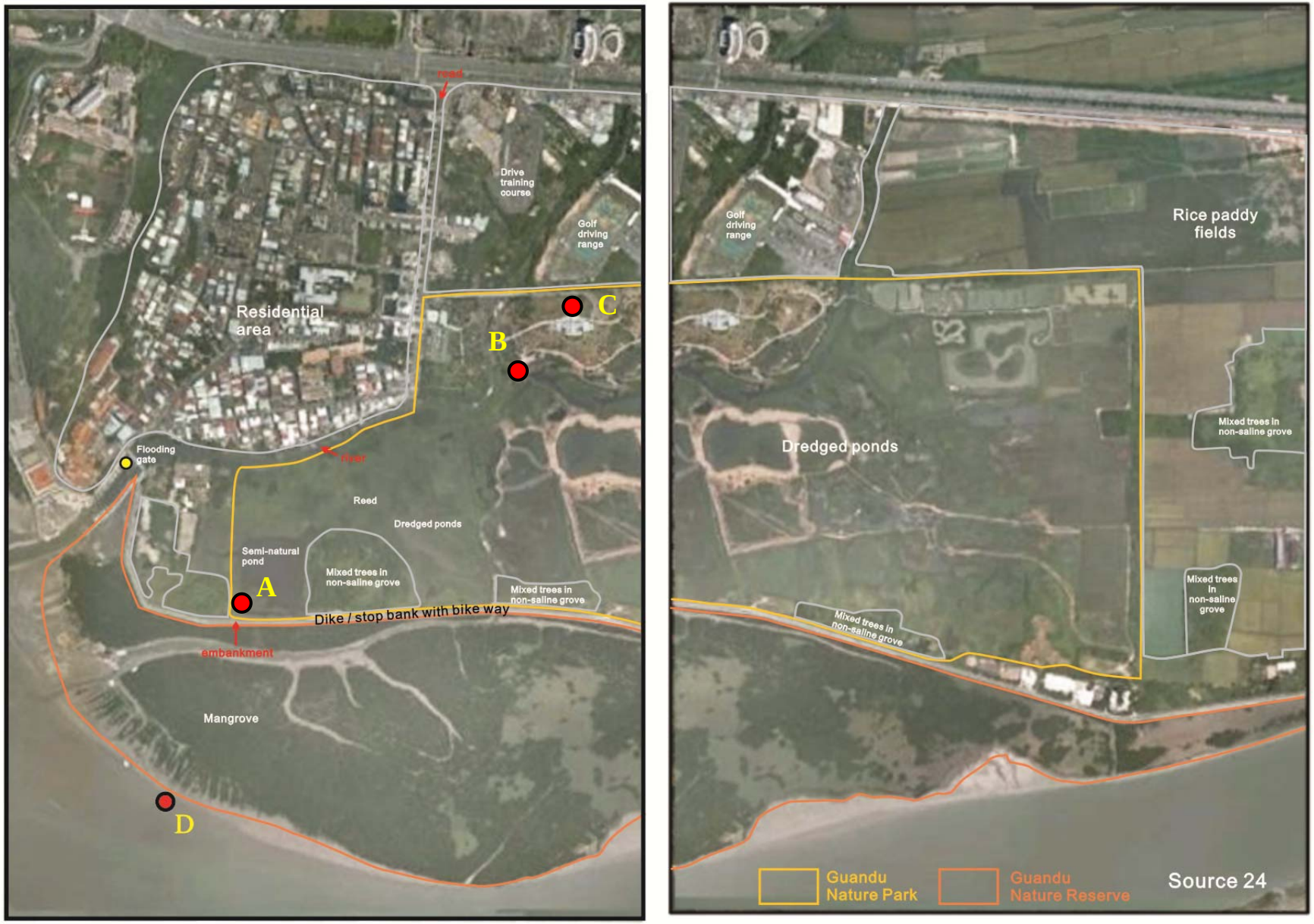


Figure 24. Guandu Landuse/Landcover, 2009

Original image of Source 24 is not provided due to the copyright reason and the Google Earth images are used instead.