

Introduction to the biodiversity of Taiwan

臺灣生物多樣性



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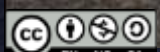
Institute of Ecology and Evolutionary Biology,
NTU

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Wk	Date	Content	Lecturer
1	2/23	Introduction to biodiversity	Jer-Ming Hu (胡哲明)
2	3/1	Natural history and exploration in Taiwan	Jer-Ming Hu (胡哲明)
3	3/8	Campus tour and TAI herbarium	Jer-Ming Hu (胡哲明)
4	3/15	NTU Zoological museums	Yu-Teh Lin (林雨德)
5	3/22	Lowland biota of Taiwan	Jer-Ming Hu (胡哲明)
6	3/29	Mid to high altitude biota of Taiwan	Jer-Ming Hu (胡哲明)
7	4/5	Holiday	
8	4/12	Life on intertidal regions	Benny Chen (陳國勤)
9	4/19	Fauna of Taiwan	Yu-Teh Lin (林雨德)
10	4/26	Dolphins and whales in Taiwan's water	Lien-Shiang Chou (周蓮香)
11	5/5*	Visit Taipei Zoo (Saturday)	HS Tsao (曹先紹)
12	5/10	Visit TFRI Insect Museum	Jung-Tai Chao (趙榮台)
13	5/17	Plants and people	Jer-Ming Hu (胡哲明)
14	5/24	Status of biological conservation in Taiwan	Jer-Ming Hu (胡哲明)
15	5/31	Special topic: Yin and yang of plants	Jer-Ming Hu (胡哲明)
16	6/7	Group presentation	Jer-Ming Hu (胡哲明) , Yu-Teh Lin (林雨德)
17	6/14	Group presentation	Jer-Ming Hu (胡哲明) , Yu-Teh Lin (林雨德)



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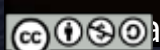
Jer-Ming Hu (胡哲明)

Inst. Ecology & Evolutionary Biology

Research interests

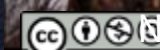
- Plant systematics
- Evolution of flowers
- Molecular evolution



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Trochodendron aralioides (昆欄樹)



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Balanophora yakushimensis (屋久島蛇菰)



 National Taiwan University Yu-The Lin

Yu-Teh Lin (林雨德)

Inst. Ecology & Evolutionary Biology

Lecture topics this semester

- Fauna of Taiwan



 National Taiwan University Yu-The Lin

Research interests

- Population and community ecology of small mammals
- Effects of habitat fragmentation
- Social organization of small mammals

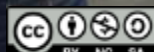
Lien-Siang Chou (周蓮香)

Inst. Ecology & Evolutionary Biology

Lecture topics this semester

- Dolphins and whales

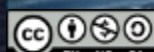


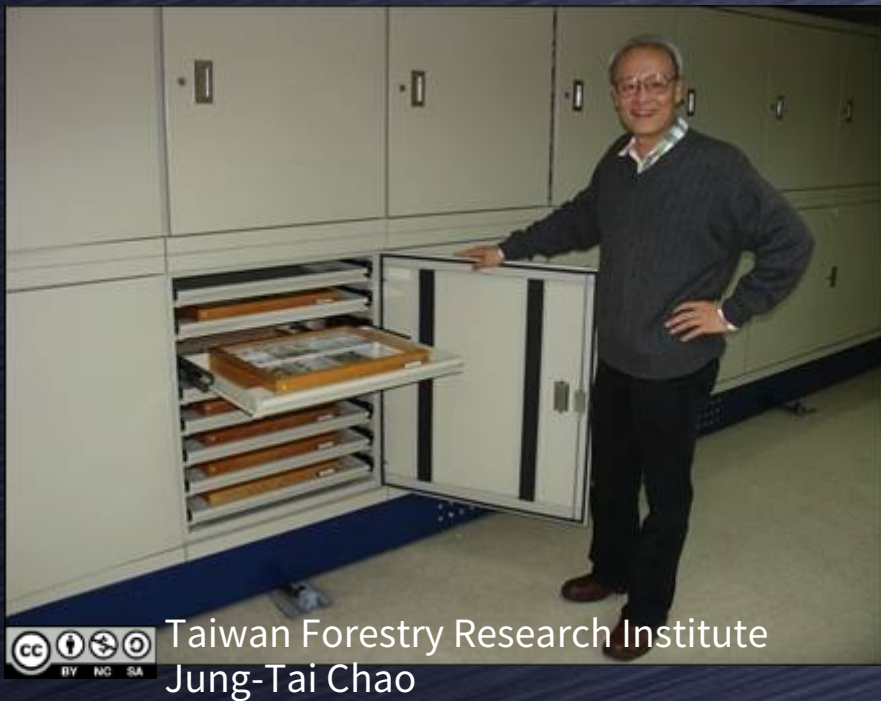
 National Taiwan University Lien-Siang Chou

Research interests

- Ecology & conservation of whales and dolphins
- Ecology of stray dogs, birds, fairy shrimps, & fig wasps



 National Taiwan University Lien-Siang Chou Laboratory



Jung-Tai Chao (趙榮台)

Taiwan Forestry Research Institute

Lecture topics this semester

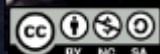
- Insect Collection of TFRI

Research interests

- Behavior, ecology and conservation of wildlife.
- Ecology and management of forest insects.
- Sociality and ecology of hornets.





 Academia Sinica Benny K. K. Chan

Benny K.K. Chan (陳國勤)

Biodiversity Research Center, Academia Sinica

Lecture topics this semester

- Life on intertidal regions



 Academia Sinica Benny K. K. Chan

Research interests

- Intertidal & supply-side ecology
- Barnacle ecology
- Larval ecology

Grading

- Essays (30%)
- Term papers (20%)
- Group report and presentation (30%)
 - Give an introduction to a native species in Taiwan
 - Either a plant, animal, insect, or fungi, of student's own choice
- Class involvement (20%)

Photo by J.-M. Hu



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Crab spider on Cephalanthus naucleoides



Flickr CharlesLam

Black-faced spoonbill



Shark fin soup



臺 港 通 識 網

Biodiversity

- The term biodiversity is a summary of biological diversity, including the variability at the level of:
 - within species (genetic diversity)
 - between species
 - ecosystems
- How to measure biodiversity?
 - Alpha diversity - The diversity of *species* within an ecological community
 - But, how to define a 'species'?

Categorizing species in local biota

- **Native** (indigenous) species
 - The presence is resulted from natural processes, with no human intervention
- **Endemic** species
 - A species restricted to a particular area or region
- **Exotic** (alien) species
 - Introduced species
 - Naturalized species
 - Invasive species

Mountain Kudzu (*Pueraria montana*)

- Native to Asia
- Introduced from Japan to the US in 1876 Centennial Exposition in Philadelphia



Mountain Kudzu
in Lushan, Taiwan



Kudzu on trees in
Atlanta, Georgia, USA

Endemism (特有性)

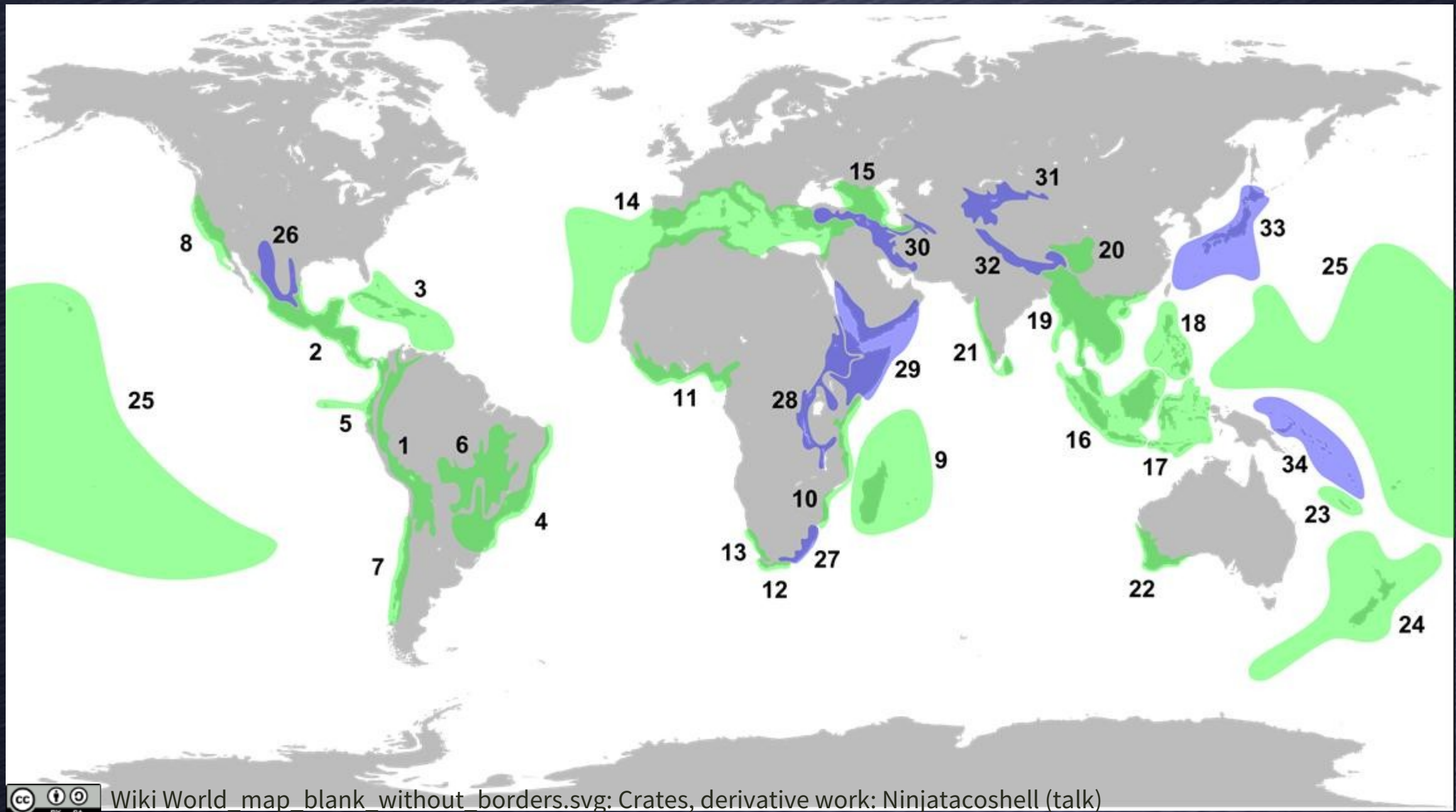
- Richness and endemism are somehow correlated, particularly among different taxa
- Application on conservation biology: protecting threatened species in one group would protect threatened species in other groups at the same area

The biodiversity

	Global species	Taiwan species	Endemic% in Taiwan
Fungi	75,000	5,921	2.0%
Plants	295,880	6,362	25.0%
Animals	1,750,000	53,253	
Insects	950,000	20,877	62.5%
Mammals	7,200	123	64.0%



Biodiversity hotspots



>50% of plant species and >42% terrestrial vertebrate species are endemic to the 34 biodiversity hotspots (~2.3% earth surface)

Conservation
International

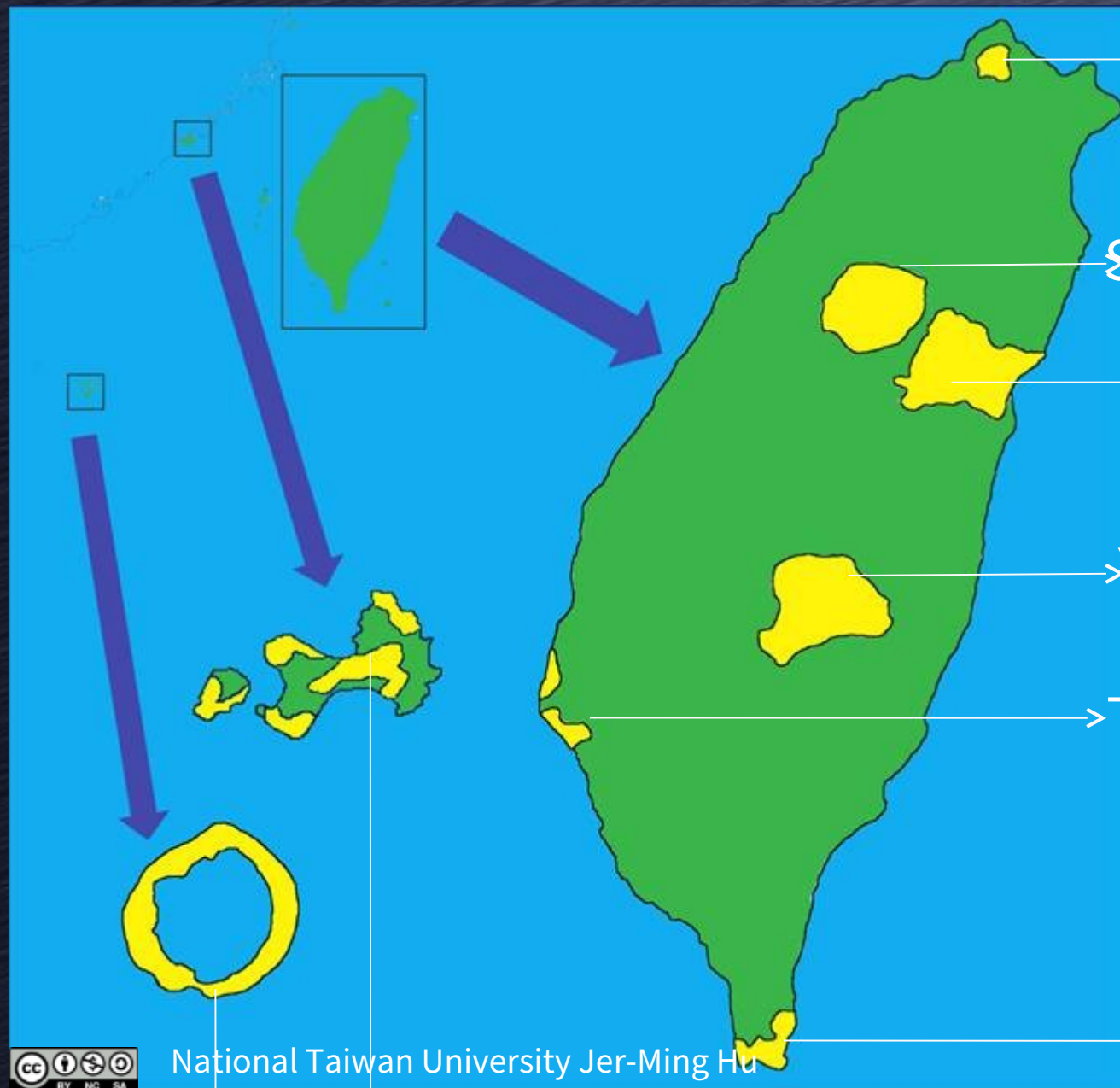
Protected areas in Taiwan

Category	No.	Area
National parks 國家公園	8	715781 ha
Natural reserves 自然保留區	20	64654 ha
Wildlife refuges 野生動物保護區	17	25827 ha
Major wildlife habitats 野生動物重要棲息環境	34	324669 ha
Forest Reserves 國有林自然保護區	6	21771 ha
Coastal Protection area 沿海保護區	12	



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Data from Forestry Bureau



→Yangmingshan National Park
陽明山國家公園 (1985)

→Sheipa National Park 雪霸國家公園 (1991)

→Taroko National Park
太魯閣國家公園 (1986)

→Yushan National Park 玉山國家公園 (1985)

→Taijiang National Park 台江國家公園 (2009)

→Kenting National Park 墾丁國家公園
(1984)

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↓
Kinmen National
Park 金門國家公園
(1995)

↓
Dongsha Atoll National Park
東沙國家公園 (2007)

National parks in plan:

- Maqaw National Park 馬告國家公園
- Nengdan National Park 能丹國家公園
- Lanyu National Park 蘭嶼國家公園

Nanhutaishan (南湖大山)





Pyrola morrisonensis (玉山鹿蹄草)



Nature Reserves (自然保留區): 20

Danshuei River Mangrove
Nature Reserve

淡水河紅樹林自然保留區

Wazihwei Nature Reserve

挖子尾自然保留區

Guandu Nature Reserve

關渡自然保留區

Chatianshan Nature Reserve

插天山自然保留區

Miaoli Sanyi Huoyanshan
Nature Reserve

苗栗三義火炎山自然保留區

Penghu Columnar Basalt
Nature Reserve

澎湖玄武岩自然保留區

Penghu Nanhai Columnar Basalt
Nature Reserve

澎湖南海玄武岩自然保留區

Mt. Chiu-chiu Nature Reserve

九九峰自然保留區

Wushanding Mud Volcano
Nature Reserve

烏山頂泥火山自然保留區

Kenting Barrier Reefs Mountain
Nature Reserve

墾丁高位珊瑚礁自然保留區

Pinglin Keteleeria Nature
Reserve

坪林台灣油杉自然保留區

Hapen Nature Reserve

哈盆自然保留區

Yuanyang Lake Nature Reserve

鴛鴦湖自然保留區

Wushihbi Coastal Nature Reserve

烏石鼻海岸自然保留區

Nanao Broad-leaved Forest
Nature Reserve

南澳闊葉樹自然保留區

Alishan Taiwan Pleione
Nature Reserve

阿里山台灣一葉蘭自然保留區

Chuyunshan Nature Reserve

出雲山自然保留區

Taitung Hongye Village

Taitung Cycas Nature Reserve

台東紅葉村台東蘇鐵自然保留區

Dawushan Nature Reserve

大武山自然保留區

Dawu Tawan Amentotaxus
Nature Reserve

大武事業區台灣穗花杉自然保留區



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Jinshueiying National Trail, Tawu Amentotaxus National Reserve

Amentotaxus formosana
台灣穗花杉



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Keteleeria davidiana var. *formosana* (台灣油杉)



Wildlife Protection area 野生動物保護區：17

Matsu Islands Tern Refuge
馬祖列島燕鷗保護區

Taipei City Waterbird
Refuge
台北市野雁保護區
Hsinchu City Costal
Wildlife Refuge
新竹市濱海野生動物保護區

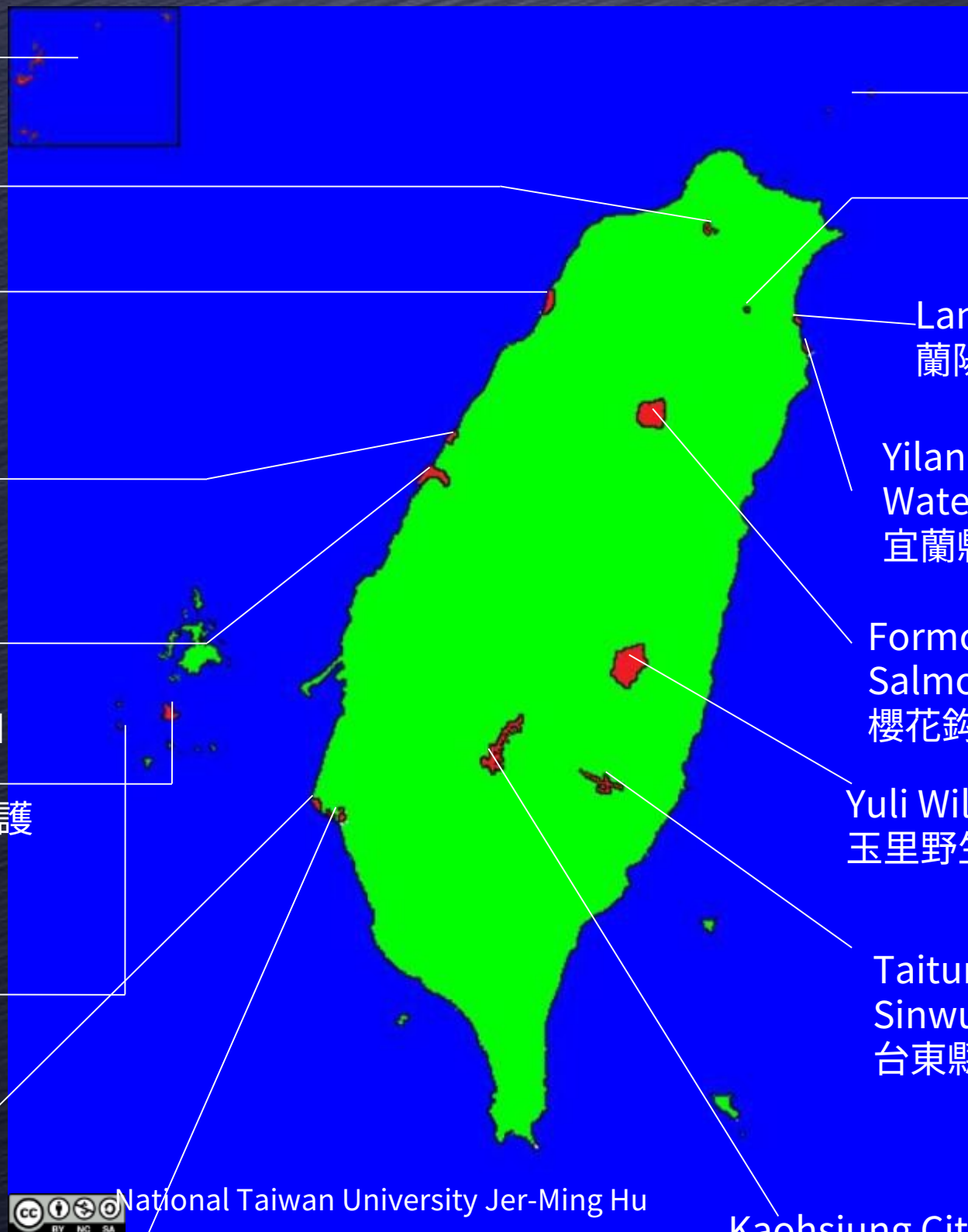
Gaomei Wildlife Refuge
高美濕地野生動物保護區

Dadu Estuary Wildlife Refuge
大肚溪口野生動物保護區

Penghu County Wangan Island
Green Turtle Breeding Refuge
澎湖縣望安島綠蠵龜產卵棲地保護區

Penghu County Cat Islets
Seabird Refuge
澎湖縣貓嶼海鳥保護區

Tainan City Zengwun
Estuary North Bank Black-
faced Spoonbill Refuge
台南曾文溪口北岸黑面琵鷺動物保護區



Mianhua and Huaping Islets
Wildlife Refuge
棉花嶼、花瓶嶼野生動物保護區

Shuanglianpi Wildlife Refuge
雙連埤野生動物保護區

Lanyang Estuary Waterbird Refuge
蘭陽溪口水鳥保護區

Yilan County Wuweigang
Waterbird Refuge
宜蘭縣無尾港水鳥保護區

Formosan Landlocked
Salmon Refuge
櫻花鉤吻鮭野生動物保護區

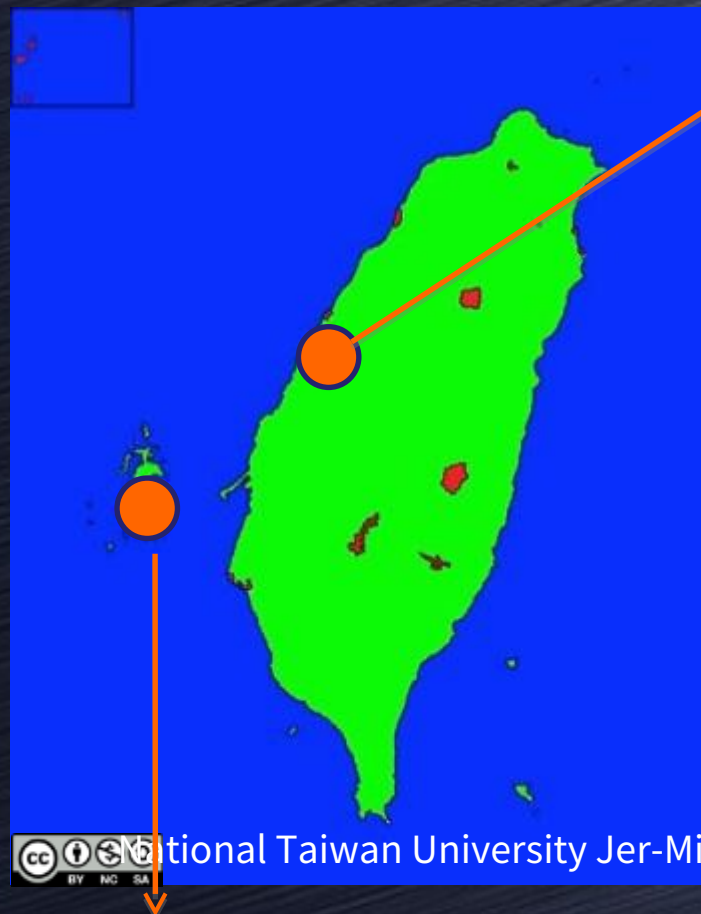
Yuli Wildlife Refuge
玉里野生動物保護區

Taitung County Haiduan Township
Sinwulyu River Fish Refuge
台東縣海端鄉新武呂溪魚類保護區

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Tainan City Sihcao Wildlife Refuge
台南四草野生動物保護區

Kaohsiung City Nanzihshan
River Wildlife Refuge
高雄楠梓仙溪野生動物保護區



Dadu Estuary Wildlife Refuge 大肚溪口野生動物保護區



Grey-tailed tattler 黃足鷸

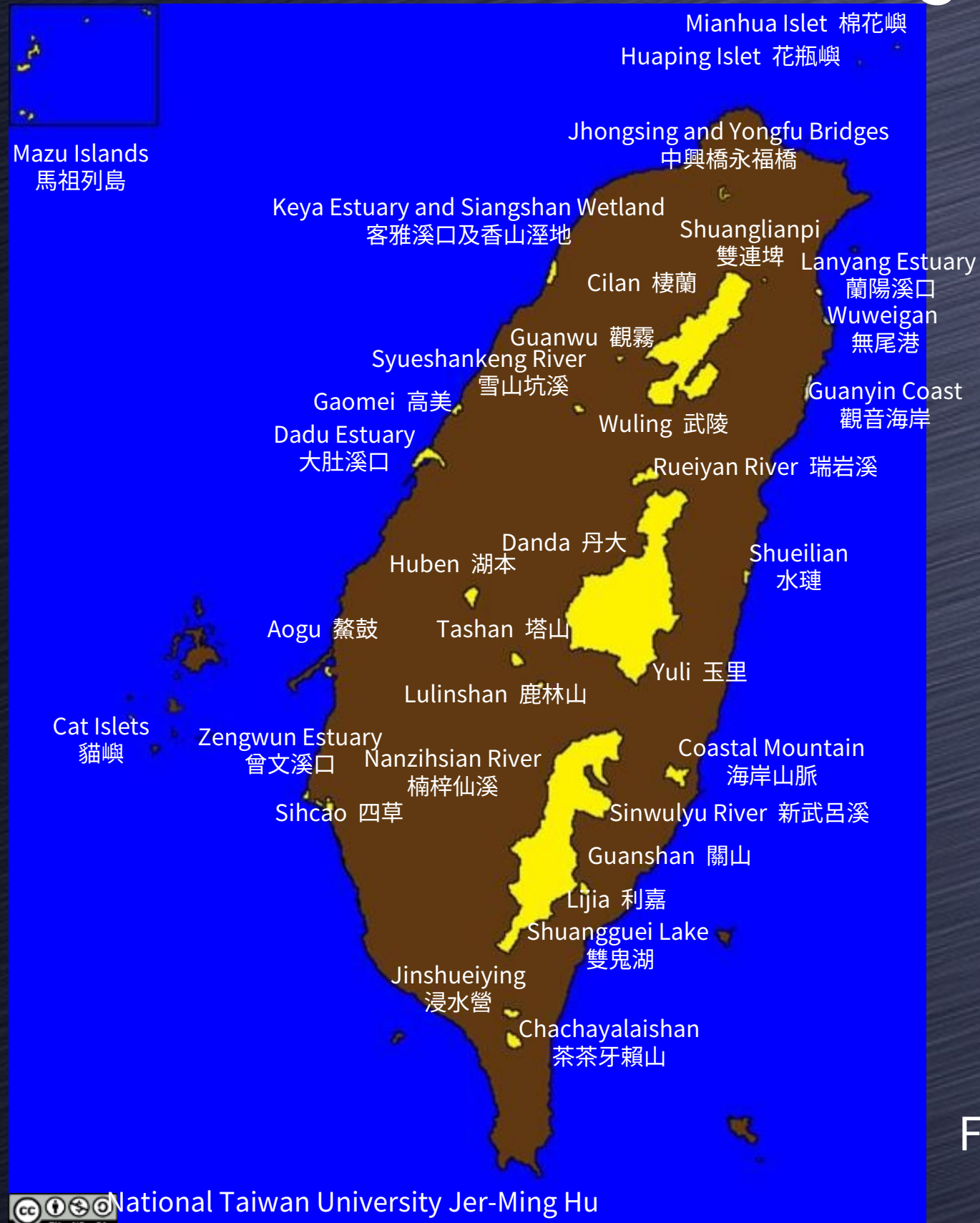
Penghu County Wangan Island Green Turtle Breeding Refuge 澎湖縣望安島綠蠵龜產卵棲地保護區



Green turtle 綠蠵龜

Major wildlife habitats 野生動物重要棲息環境：

34



Mianhua Islet 棉花嶼

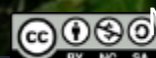


Oncorhynchus formosanus
Formosan landlocked salmon
櫻花鉤吻鮭

Coastal Protection Area 沿海保護區：12





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Chingsui, Hualien

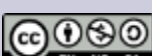
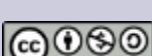
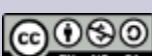
Yeiliu (野柳): the typical scene showing the problem of human impact



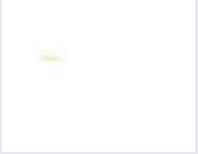
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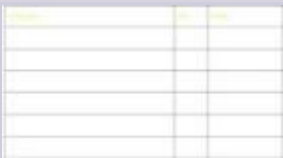
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