Natural Environment Survey and Biodiversity Conservation by Gap Analysis in Hokkaido, Japan

Masami Kaneko

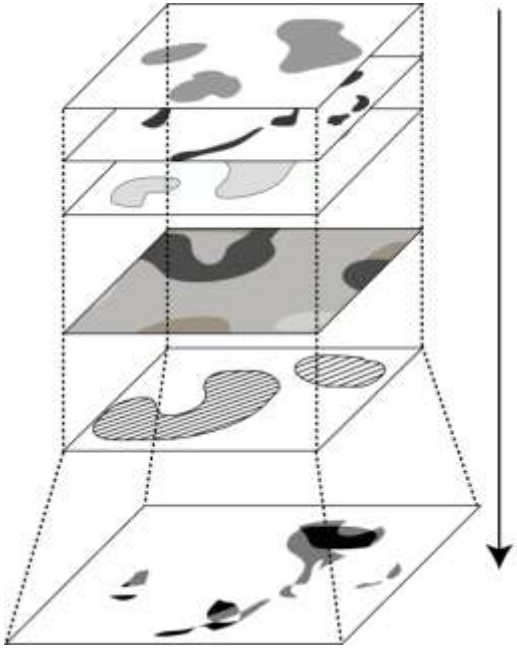
Rakuno Gakuen University

Gap Analysis?

Identify differences, or gaps,

between habitats and existing protection networks

by superimposing various geographical information using GIS.



Species distribution or (potential) habitat information
Distribution – Species A
Distribution – Species B
Distribution – Species X

Landcover (vegetation, soil map)

Land ownership and stewardship (Nature reserves, land ownership map)

Overlaid – gap analysis
Association map of biodiversity and protection status

Characteristics of Gap Analysis

Proposal of proactive conservation policies

- Can reduce economical and biological costs compared with traditional reactive approach

***"Coarse-filter"* approach**

- Complements "fine-filter" approach for protecting particular species.

Utilize ***remote sensing and GIS***
to their maximum potential

Natural Environment Survey in JAPAN

Ministry of the Environment

National Surveys on the Natural Environment

- Vegetation map (Land cover map)
- Animal Distribution (Mammal, Bird, Fish, etc.)

Natural Environmental Information GIS

http://www.biodic.go.jp

Natural Environment Survey in JAPAN

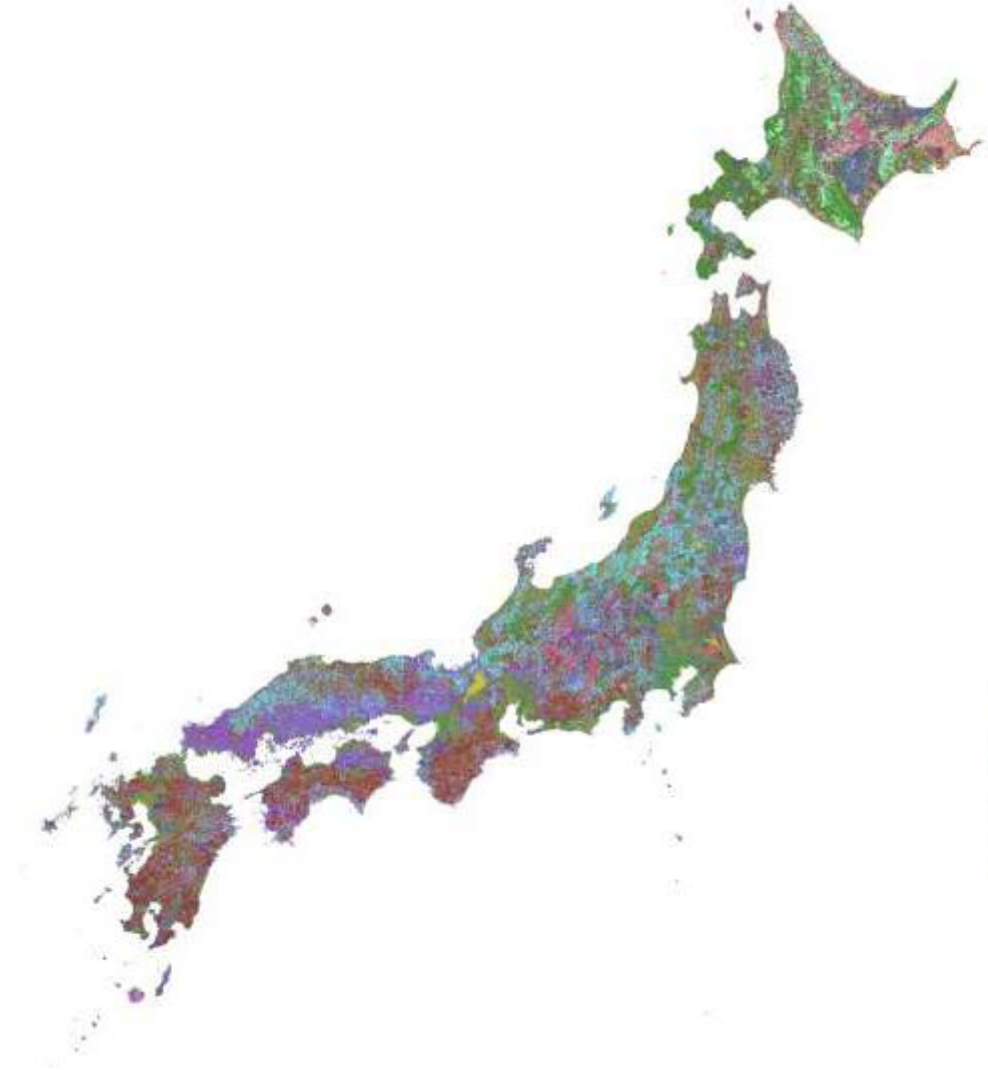
Animal Distribution Map

the distribution of mammals, birds, amphibians & reptiles, freshwater fish and insects.

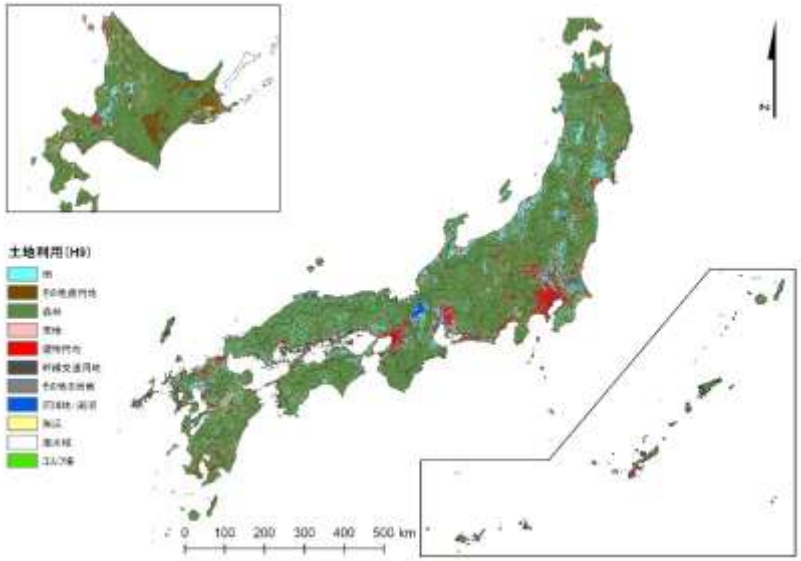
2nd Survey (1978), 3rd Survey(1983)
4th Survey(1988-92), 5th Survey(1993,94)
6th Survey(1999-2002)

Natural Environment Survey in JAPAN

Vegetation map (Land cover map)



plant community units classified according to plant sociology
2nd Survey (1978-79)
5th Survey(1993-98)
6th-7th Survey(1999-)



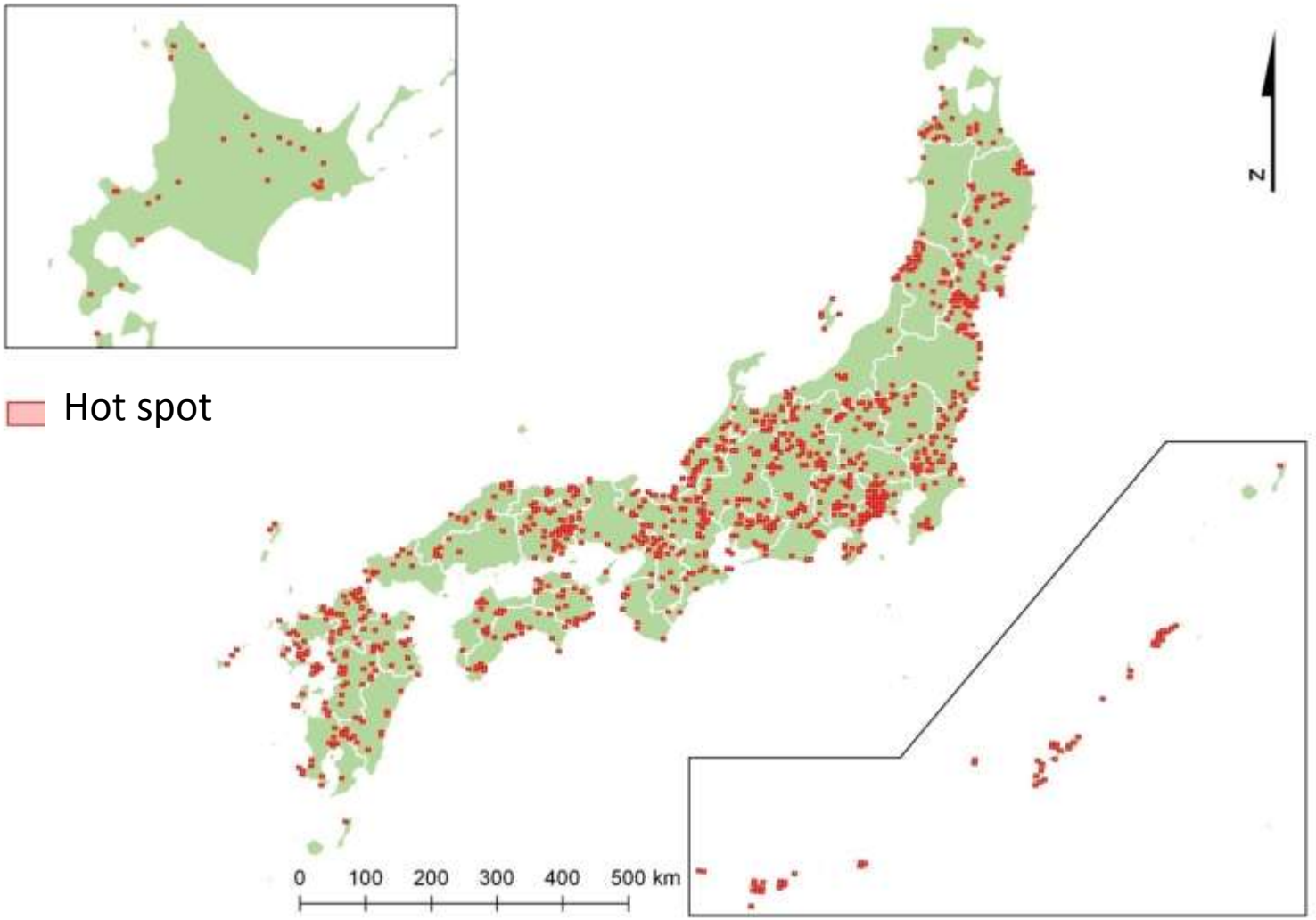
Land use map (National Land Numerical Information)

Natural Environment Survey in JAPAN

Parks (30 National Parks, 56 quasi-national park)

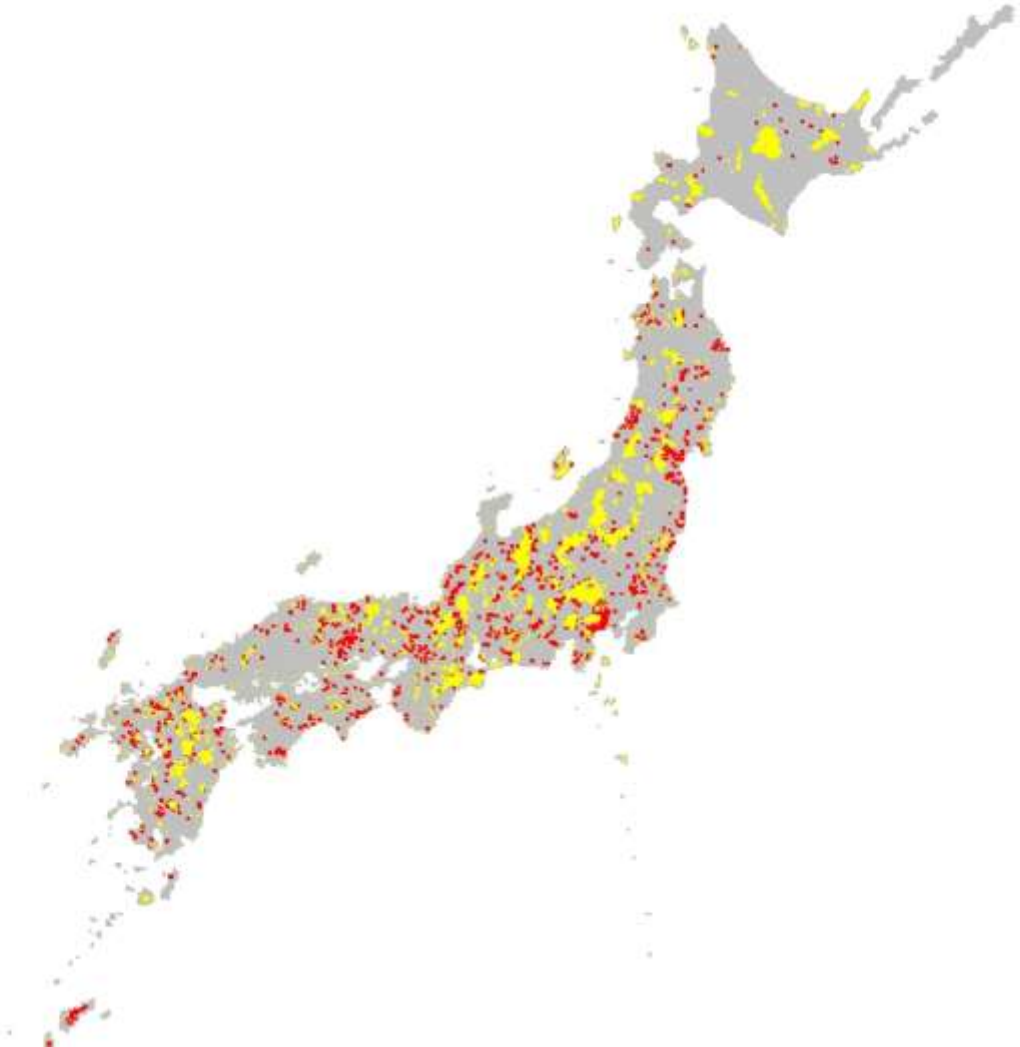
Gap Analysis in JAPAN

Hotspot Estimated from Species Richness



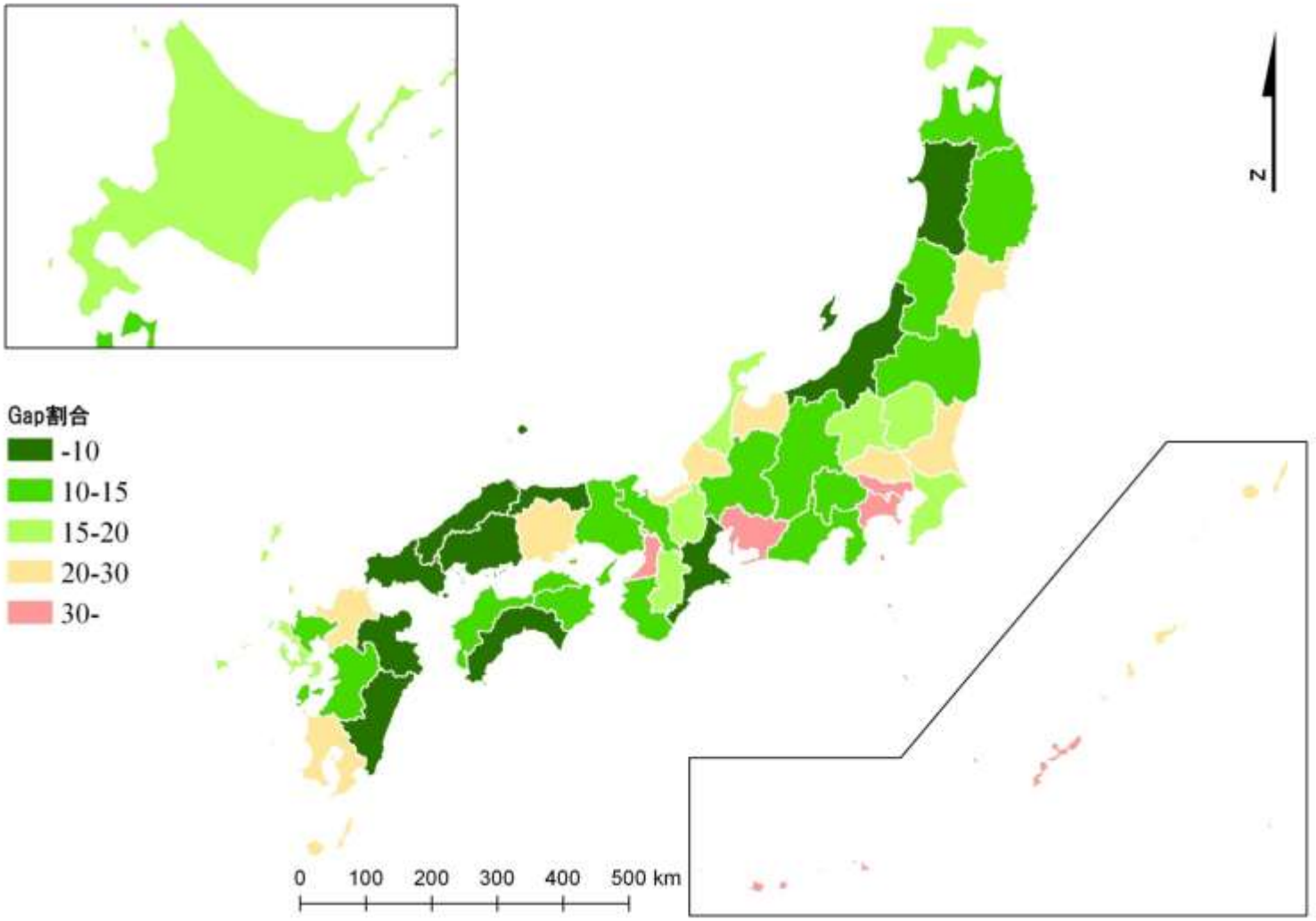
Gap Analysis in JAPAN

Hotspot of Species Richness and Parks



Gap Analysis in JAPAN

Percentage Gap Calculated for each Prefecture



Gap Analysis in JAPAN

Percentage gap calculated for each prefecture

Hokkaido had a relatively low gap percentage despite its large gap area, because its protected area is relatively large.

Rank	Prefecture	Gap %	Rank	Prefecture	Gap %
1	Kanagawa	50.55	11	Toyama	21.38
2	Okinawa	48.72	12	Fukuoka	20.77
3	Osaka	42.65	13	Okayama	20.52
4	Tokyo	37.35	14	Chiba	18.18
5	Aichi	31.66	15	Nara	17.99
6	Saitama	27.59	**16**	**Hokkaido**	**16.70**
7	Ibaraki	24.26	17	Shiga	15.69
8	Fukui	22.64	18	Ishikawa	15.57
9	Miyagi	21.68	19	Gunma	15.45
10	Kagoshima	21.49	20	Tochigi	15.38

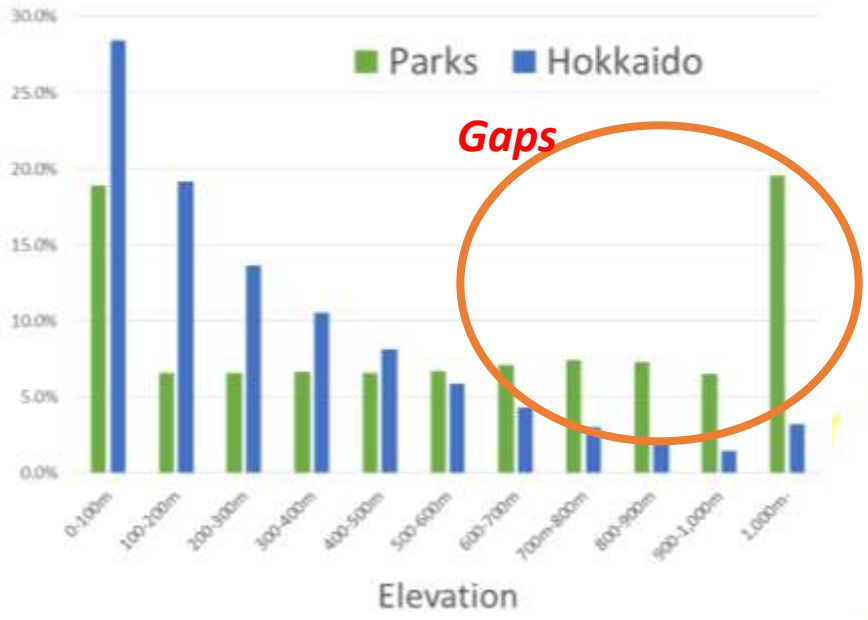
Parks in Hokkaido, JAPAN

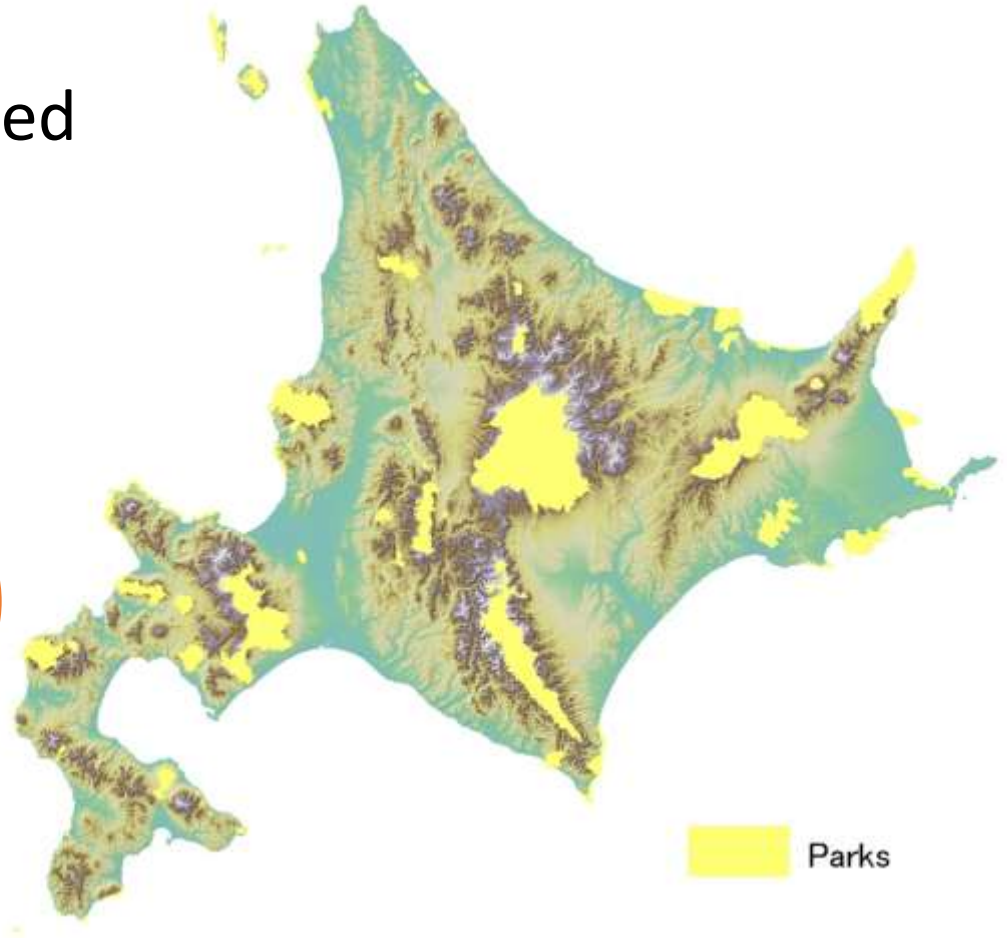
23 Parks in Hokkaido

(6 National Parks, 5 quasi-national park, 12 Prefectural Natural Park)

Many parks were designated

in high altitude.





Gap Analysis for Rare Species

Mountain Hawk Eagle (*Spizaetus nipalensis*)

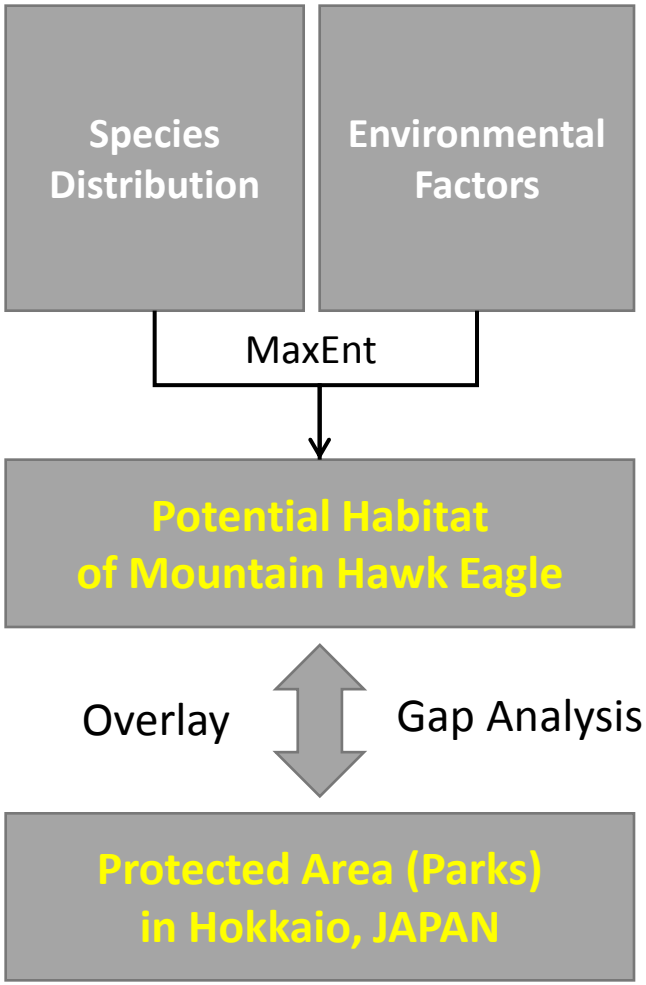
a Large-sized Raptor

a Endangered Species

Little Information in Hokkaido, JAPAN

Identify Conservation Gaps

between Potential Habitat and Parks



Potential Habitat of Mountain Hawk Eagle

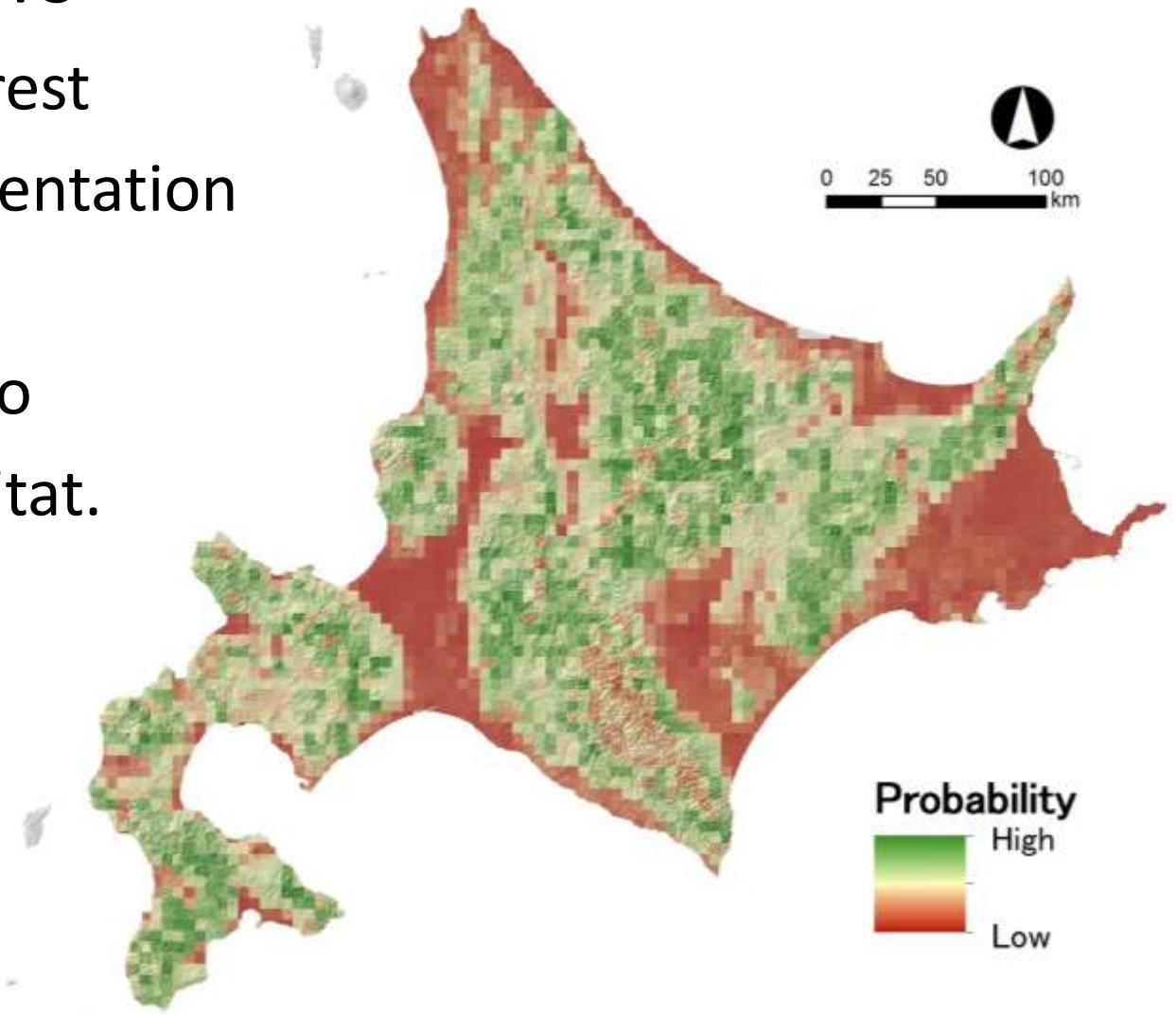
Limiting Factors

the amount of forest

the habitat fragmentation

18.2% of Hokkaido

is a potential habitat.

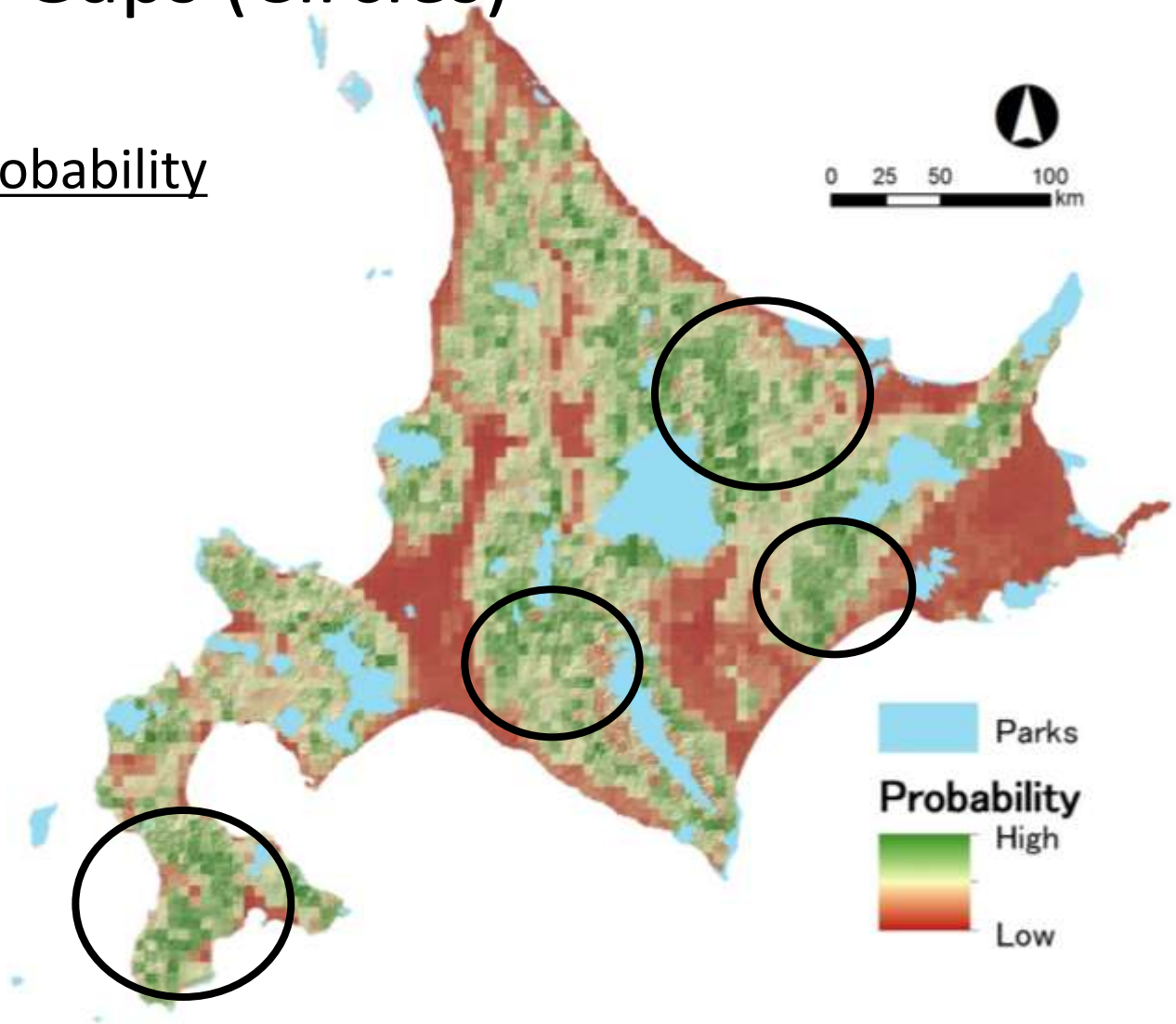


Conservation Gaps of Mountain Hawk Eagle

Conservation Gaps (Circles)

Unprotected area

with high habitat probability

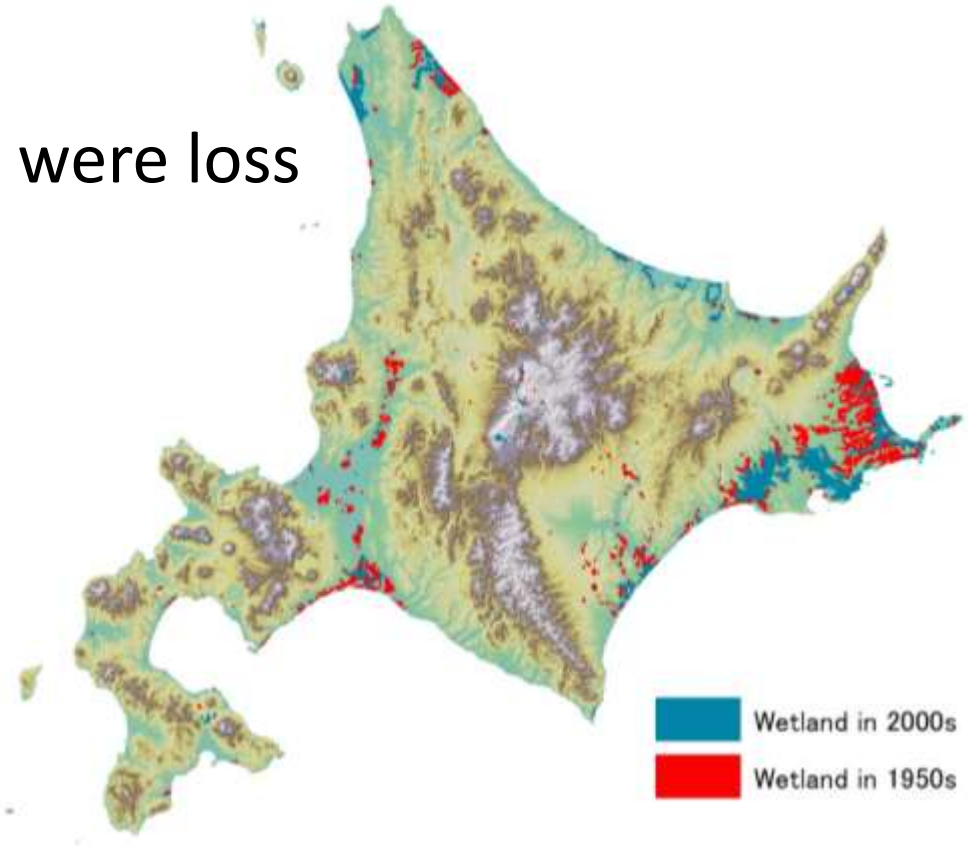


Application of Gap Analysis for Wetland Biodiversity Conservation

86% of wetlands in Japan are located in Hokkaido.

Wetlands are one of the most diverse ecosystems.

46% of wetlands were loss in about 50 years.



Complementary Analysis for Effective Reserve Network Design

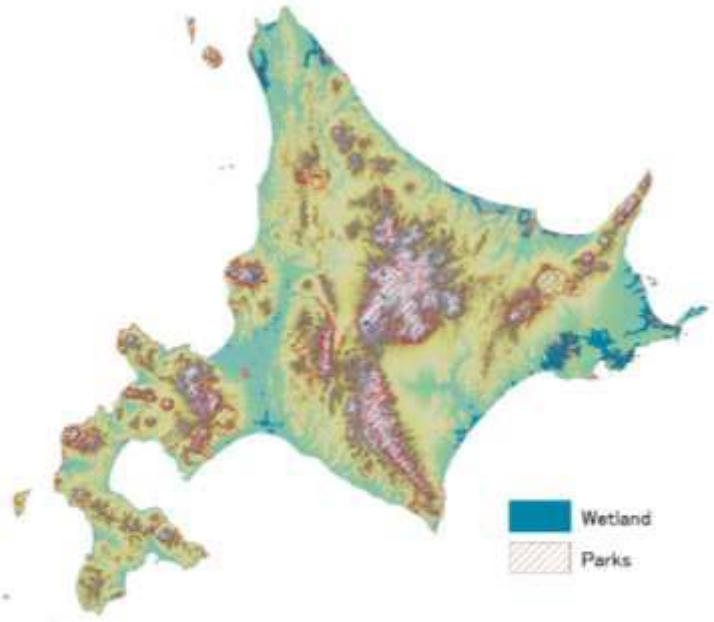
Place Prioritization for Reserve Network Design

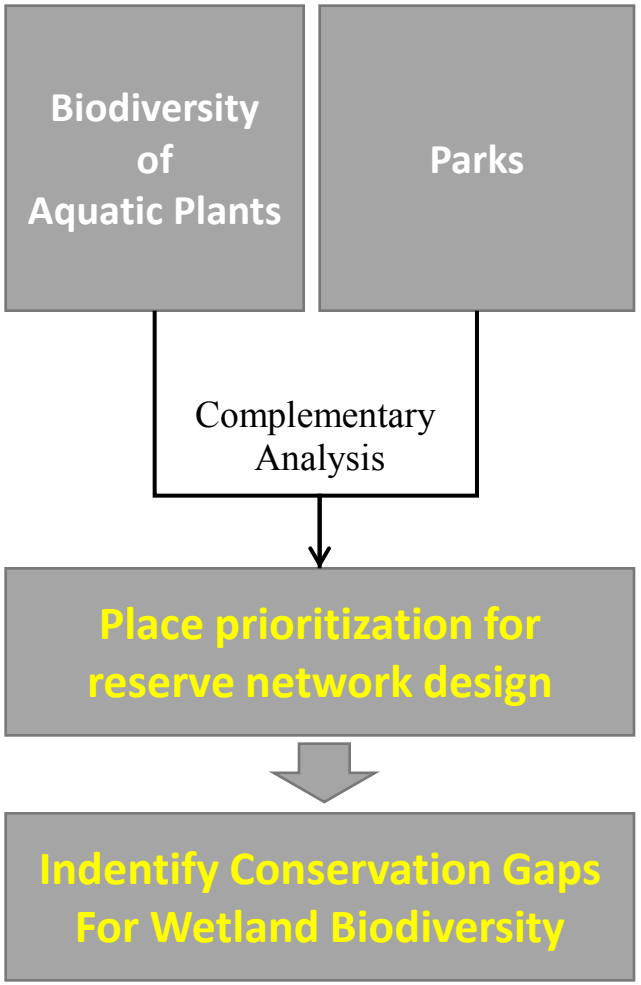
Complementary Analysis

Native Aquatic Plants Database

Identify Conservation Gaps

For Wetland Biodiversity

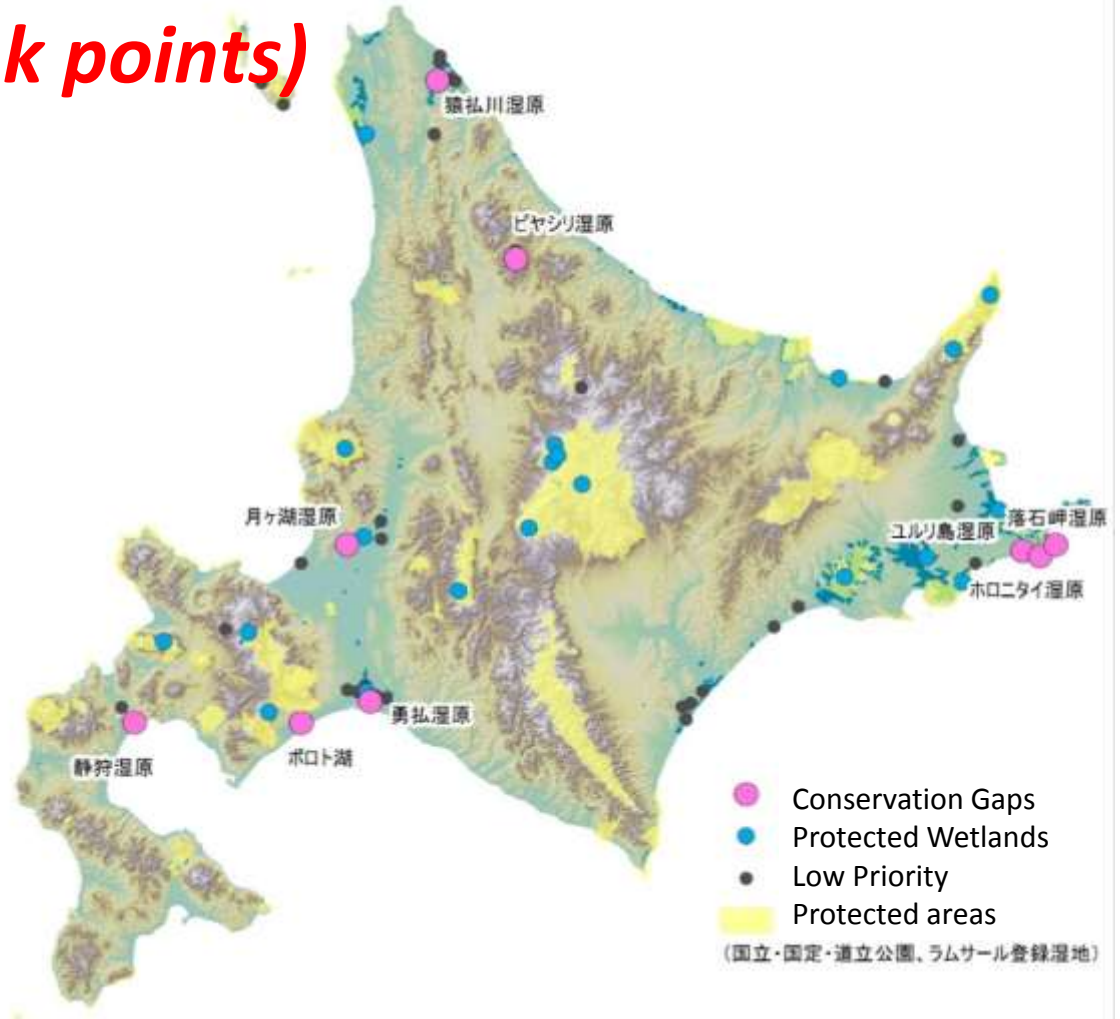




Conservation Gaps for Effective Reserve Network Design

Conservation Gaps for Effective Reserve Network Design

9 Wetlands (pink points)



Cooperation for Biodiversity Conservation

comprehensive partnership and cooperation focusing on the establishment of a Conservation GIS Consortium

- *Rakuno Gakuen University*
- *Conservation International Japan*
- *EnVision Conservaiton Office*
- *ESRI Japan*

http://cgisj.jp/