A satellite-style map of Hokkaido, Japan, showing the island's topography and coastline. The map is semi-transparent and serves as a background for the text.

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

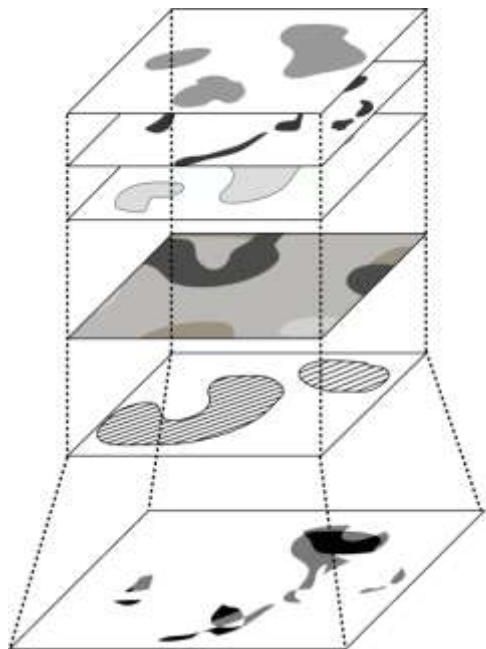
Masami Kaneko

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

環境省 自然環境局  
生物多様性センター  
Biodiversity Center of Japan

Biodiversity Center of Japan, Nature Conservation Bureau, Ministry of the Environment, has been conducting basic researches on vegetation, flora and fauna in Japan. The Center has also been monitoring various ecosystems, including forests, grasslands, alpiners, rivers, lakes, marshes, tidal flats and coral reefs.

This is a part of the artwork illustrated by Nobuyuki Nagata. The entire illustration is displayed in the exhibition hall of the Center.  
Illustration/Nobuyuki Nagata

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National Survey on the Natural Environment

The National Biodiversity Strategy of Japan 2012-2020

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News

Watch List

Announce 16th meeting of the Network of Organization for Research on Nature Conservation (NORNAC16) to be held. (2013.10.28) **NEW!!**

Monitoring Sites 1000

Japan Integrated Biodiversity Information System (J-IBIS)

# Natural Environment Survey in JAPAN

## Animal Distribution Map



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

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

# Natural Environment Survey in JAPAN

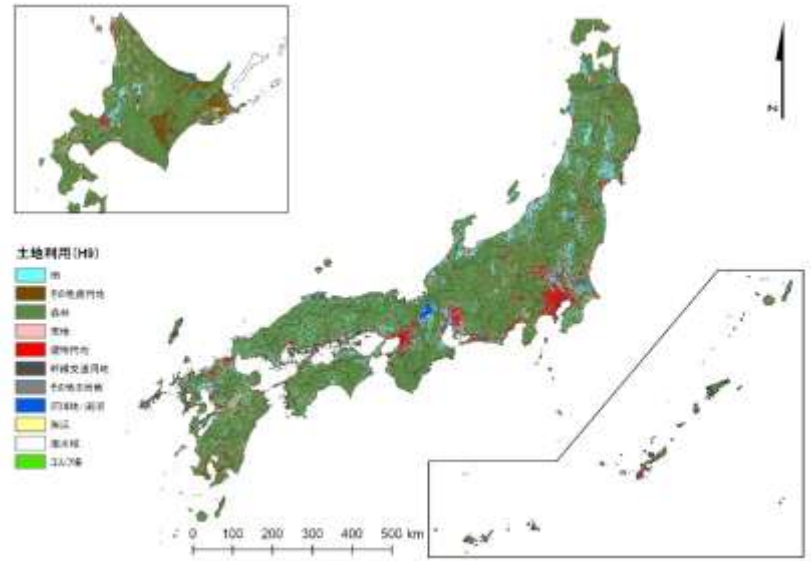
## Vegetation map (Land cover map)

plant community units classified  
according to plant sociology

2<sup>nd</sup> Survey (1978-79)

5<sup>th</sup> Survey (1993-98)

6<sup>th</sup>-7<sup>th</sup> Survey (1999-)



Land use map (National Land Numerical Information)

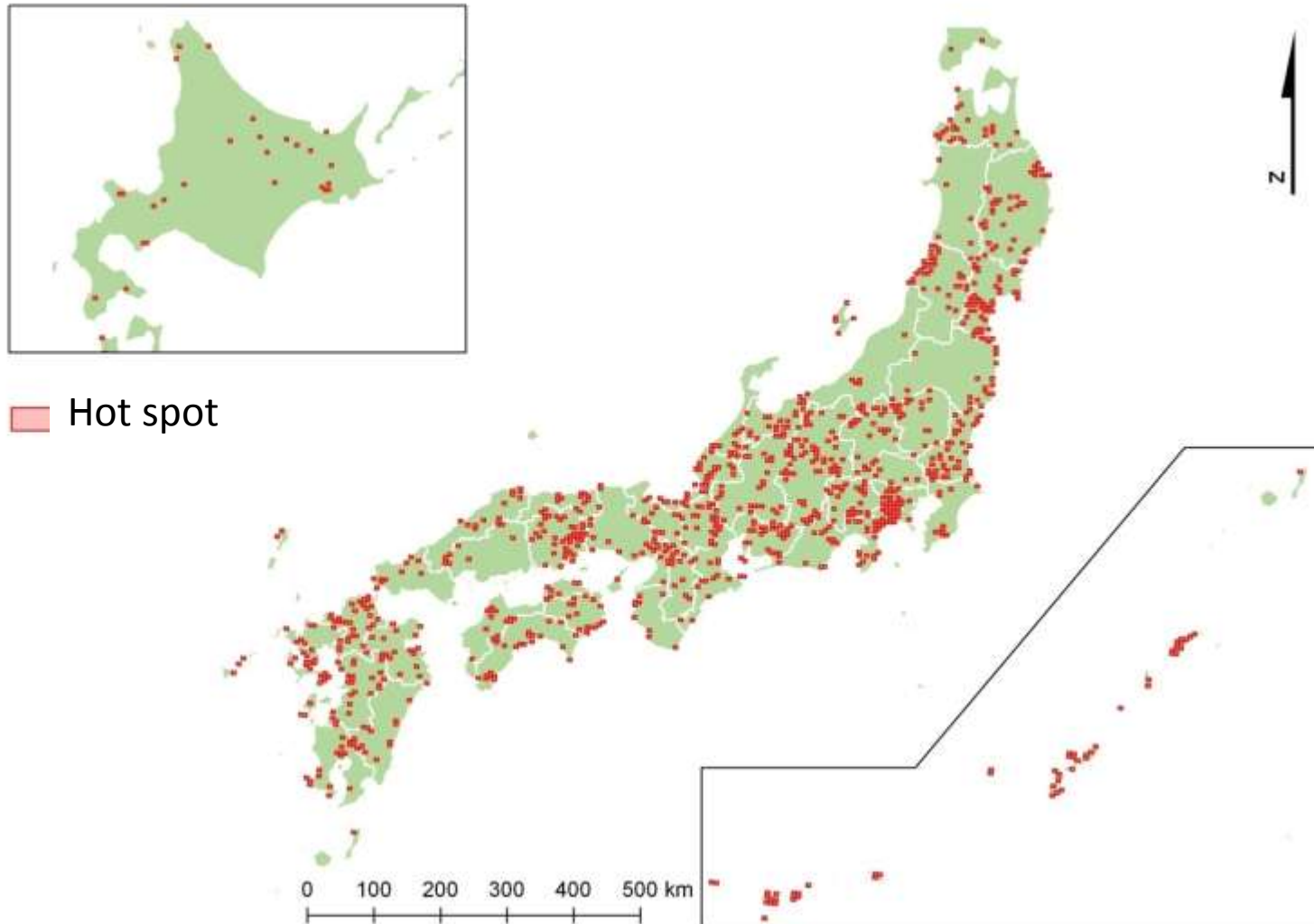
# Natural Environment Survey in JAPAN

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



# Gap Analysis in JAPAN

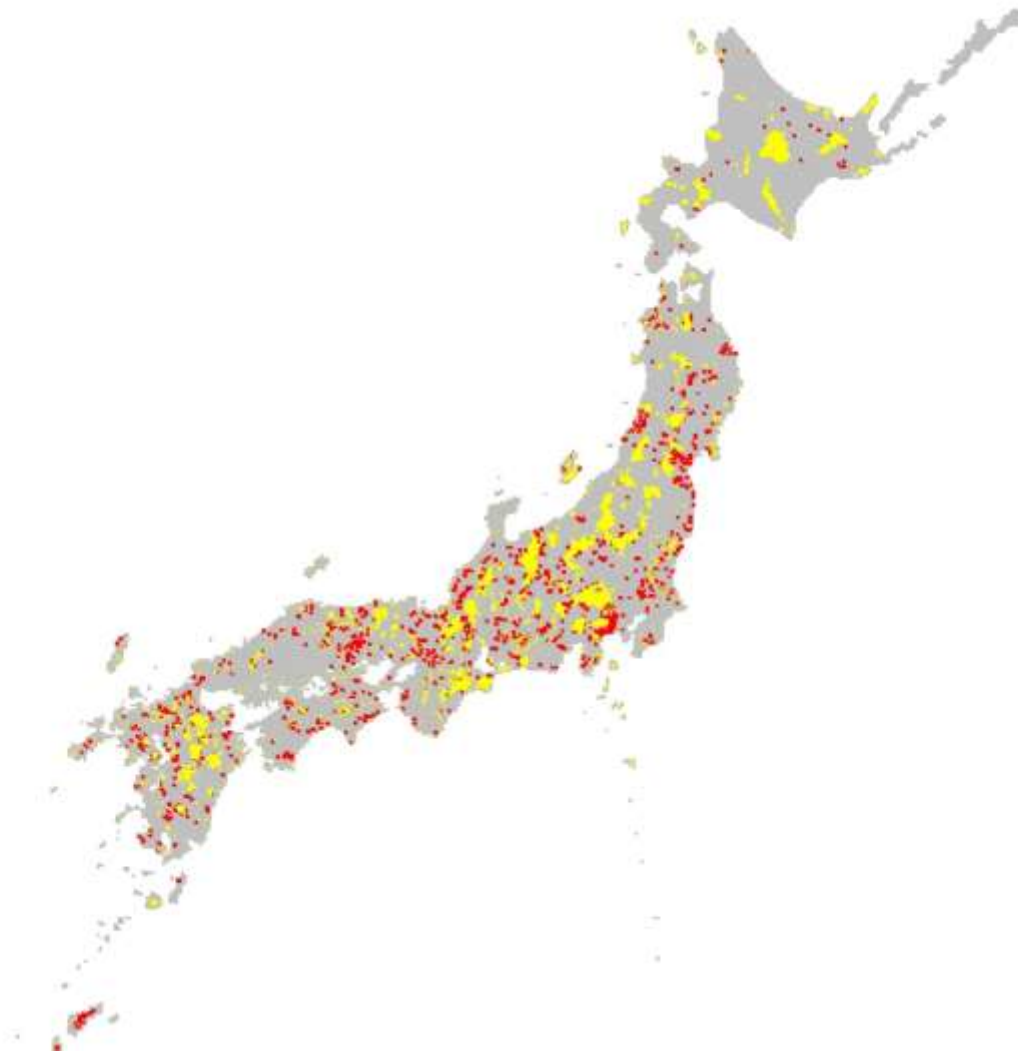
## Hotspot Estimated from Species Richness





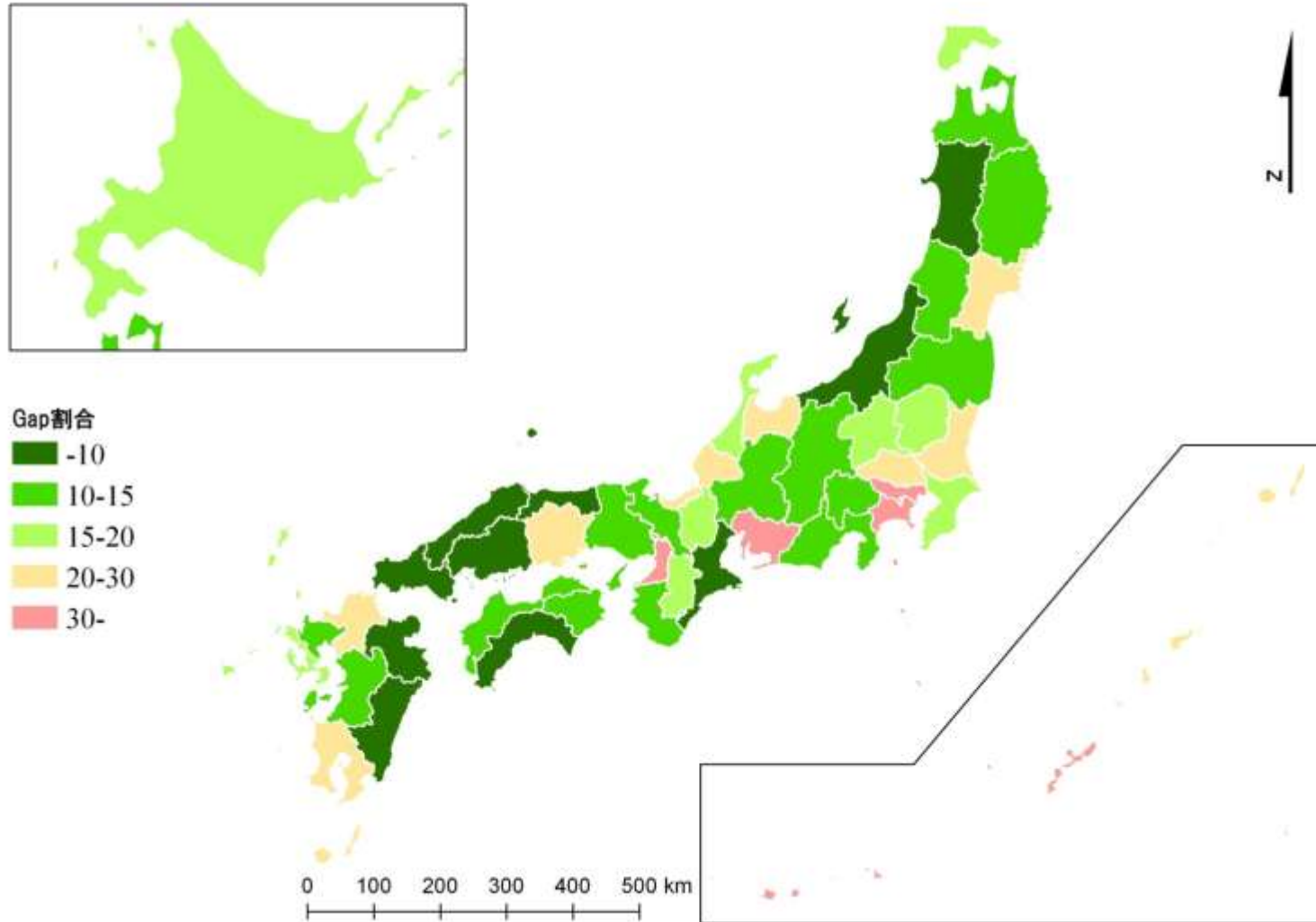
# Gap Analysis in JAPAN

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.

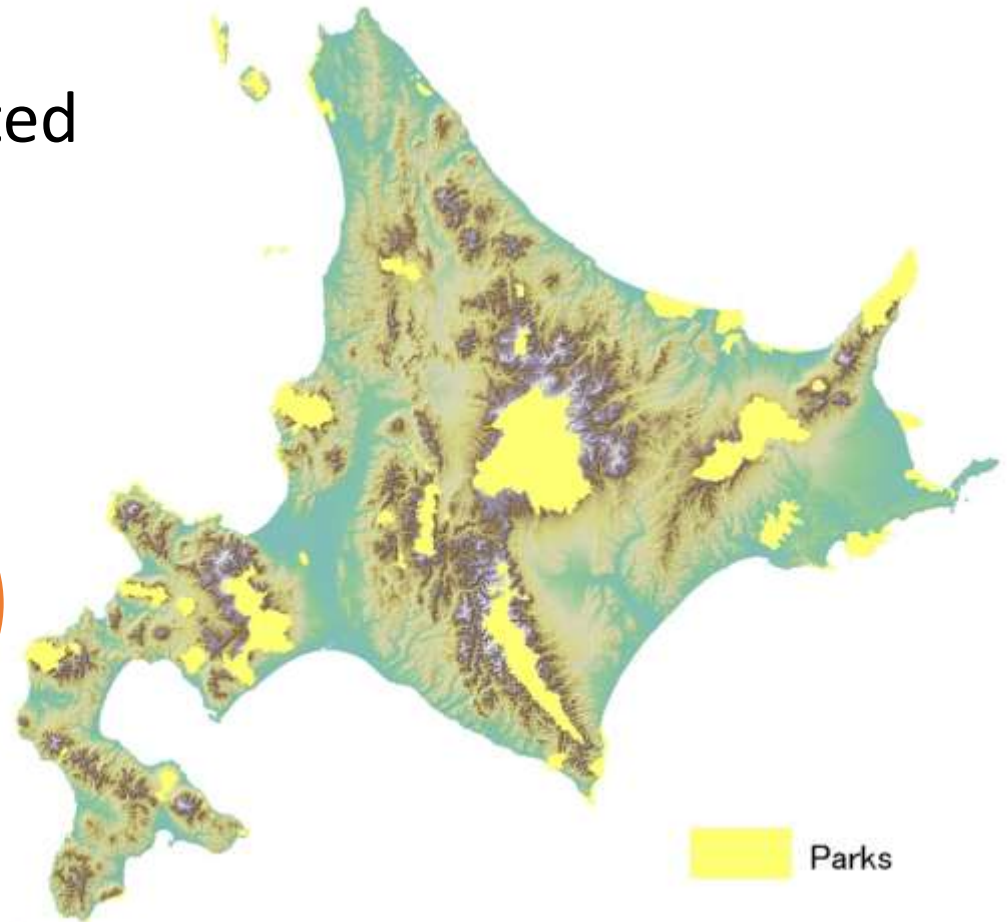
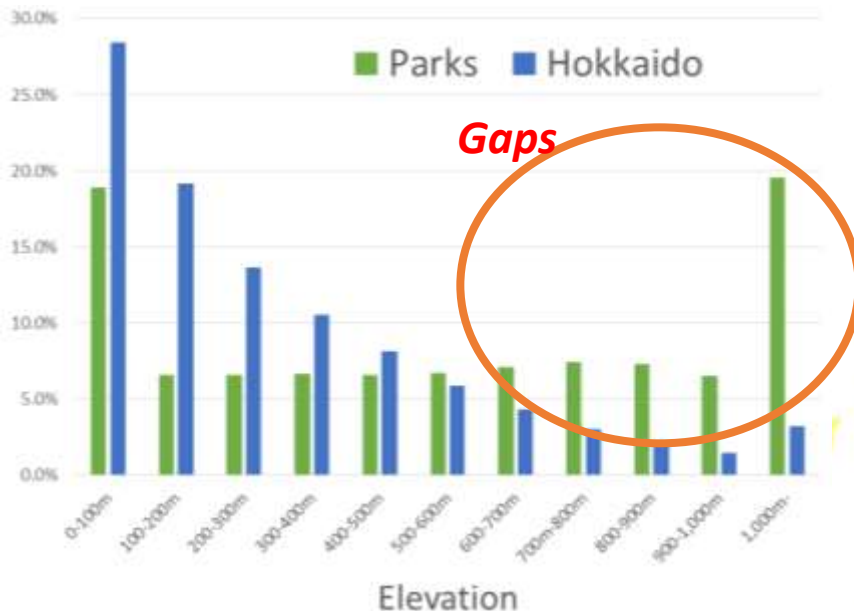
Rank	Prefecture	Gap %	Rank	Prefecture	Gap %
1	Kanagawa	50.55	11	Toyama	21.38
2	Okinawa	48.72	12	Fukuoka	20.77
3	Osaka	42.65	13	Okayama	20.52
4	Tokyo	37.35	14	Chiba	18.18
5	Aichi	31.66	15	Nara	17.99
6	Saitama	27.59	<b>16</b>	<b>Hokkaido</b>	<b>16.70</b>
7	Ibaraki	24.26	17	Shiga	15.69
8	Fukui	22.64	18	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*)

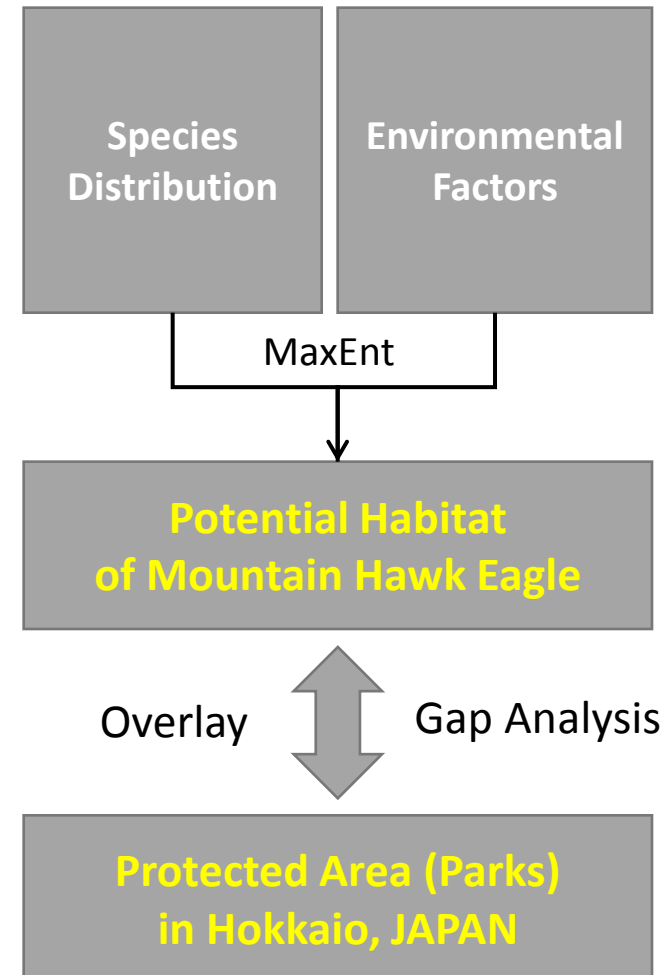
a Large-sized Raptor

a Endangered Species

Little Information in Hokkaido, JAPAN

**Identify Conservation Gaps**

between Potential Habitat and Parks

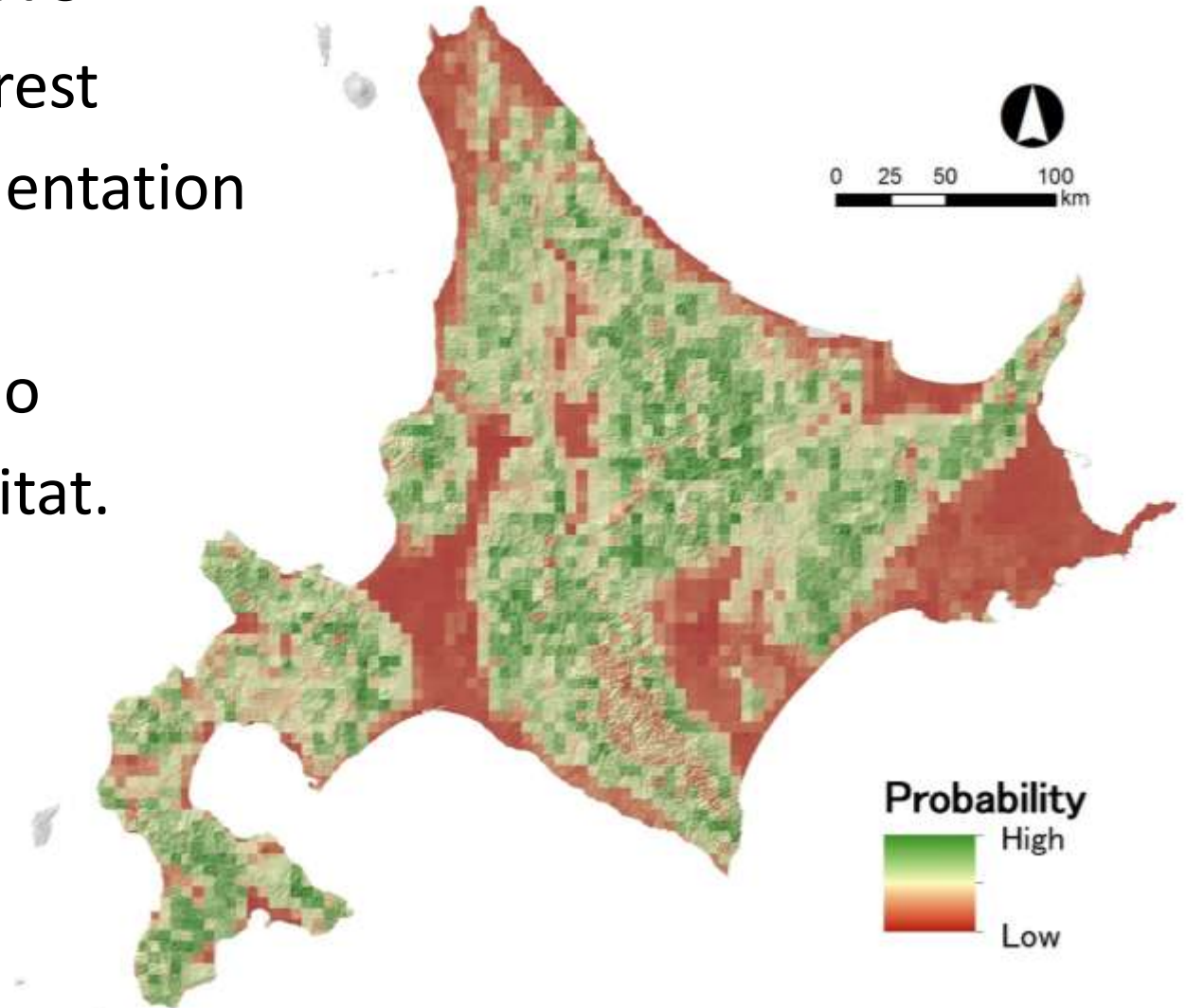


# Potential Habitat of Mountain Hawk Eagle

## Limiting Factors

the amount of forest  
the habitat fragmentation

18.2% of Hokkaido  
is a potential habitat.

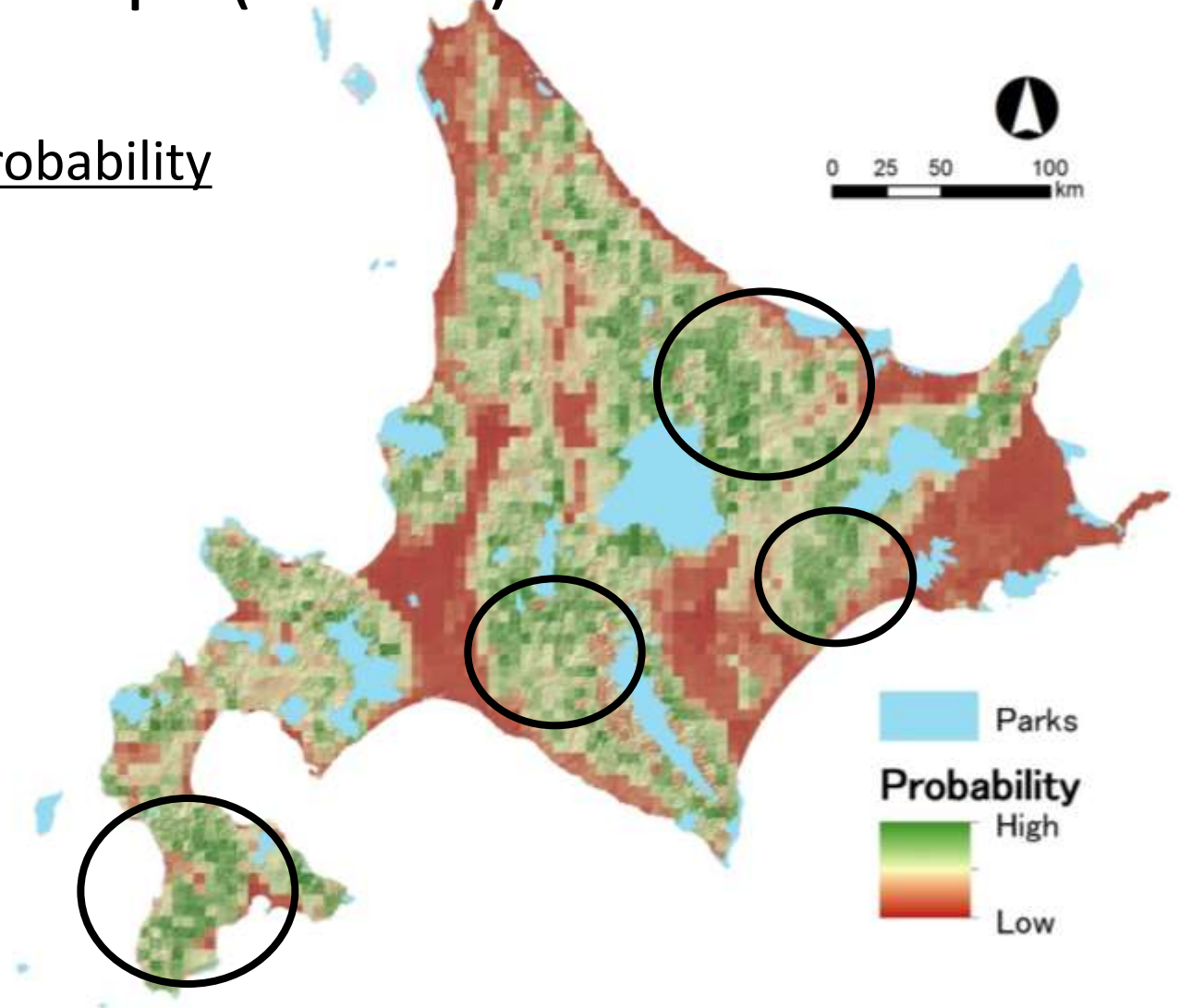


# Conservation Gaps of Mountain Hawk Eagle

## Conservation Gaps (Circles)

Unprotected area

with high habitat probability

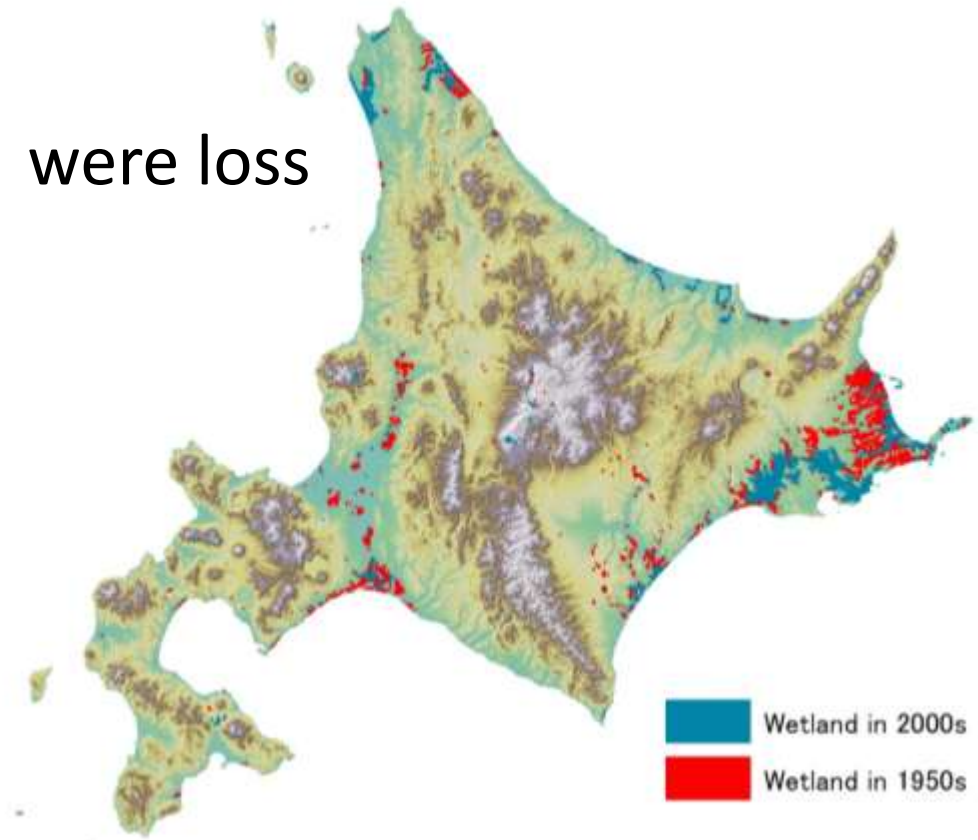


# Application of Gap Analysis for Wetland Biodiversity Conservation

**86%** of wetlands in Japan are located in Hokkaido.

Wetlands are one of the most diverse ecosystems.

***46% of wetlands*** were lost  
in about 50 years.





# Complementary Analysis for Effective Reserve Network Design

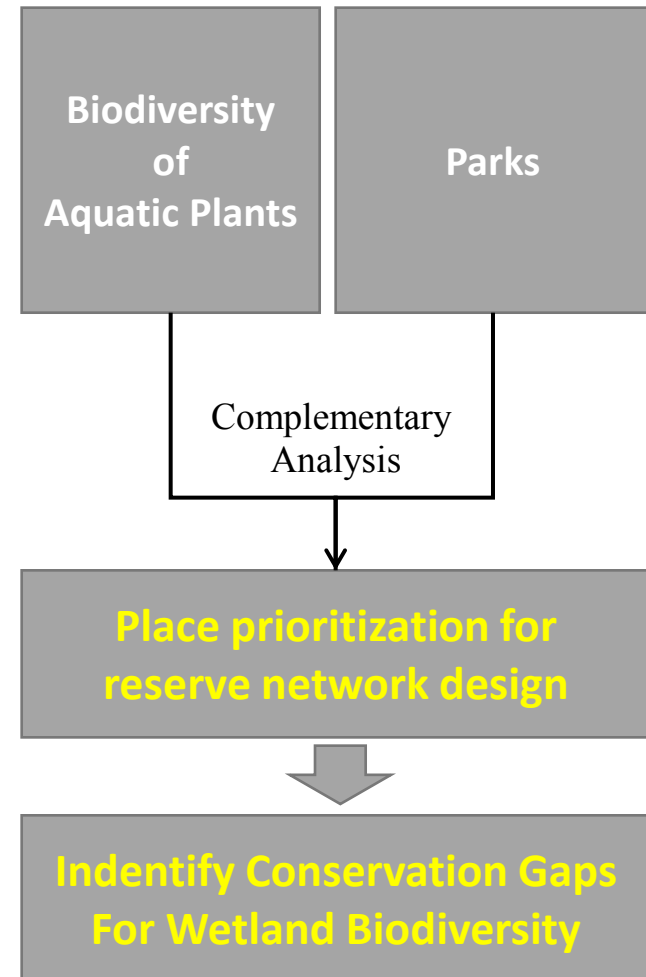
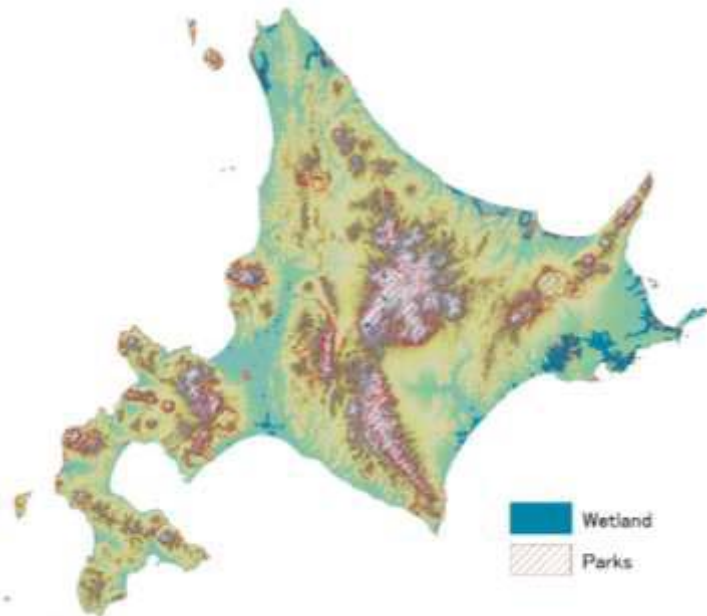
## ***Place Prioritization for Reserve Network Design***

### Complementary Analysis

Native Aquatic Plants Database

## ***Identify Conservation Gaps***

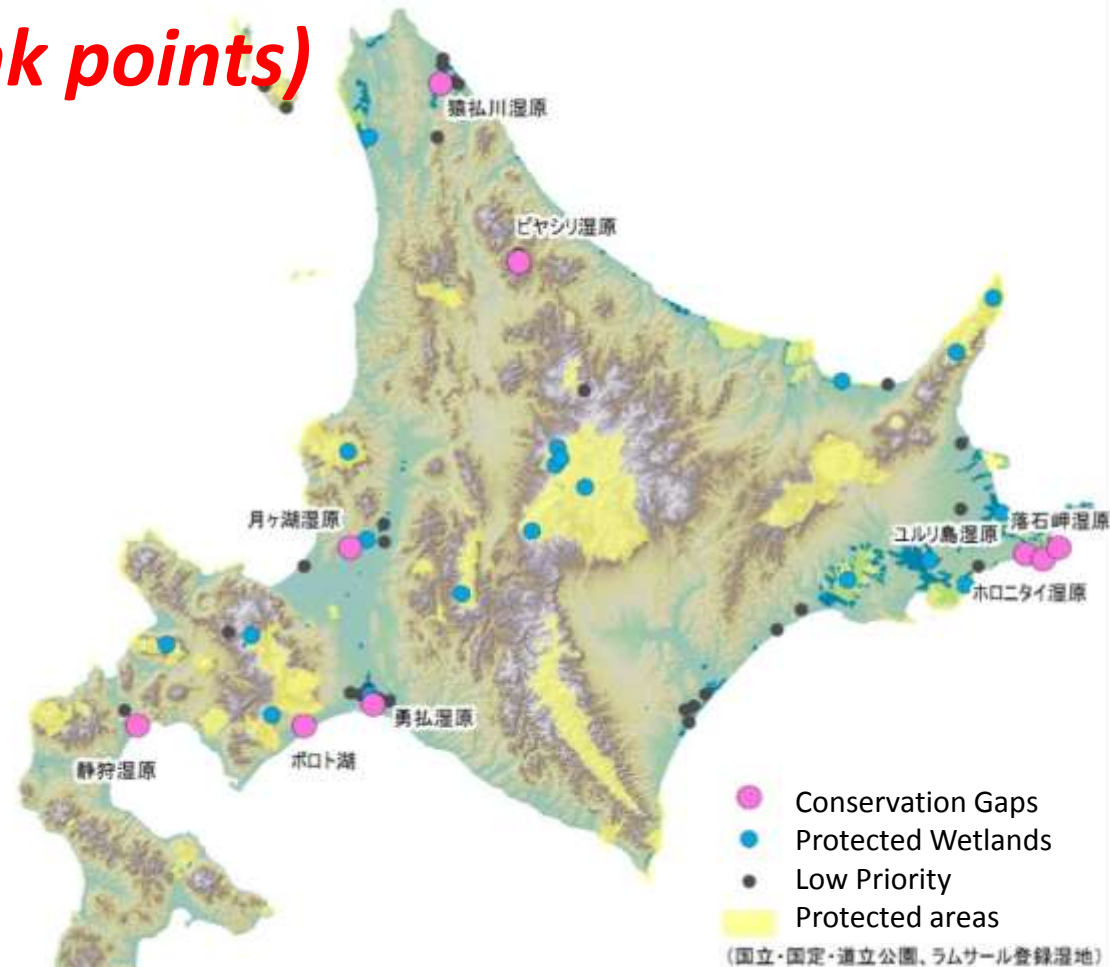
For Wetland Biodiversity



# 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 Conservation Office*
- *ESRI Japan*

<http://cgisj.jp/>

