
Conservation and Rehabilitation of Habitats for Key Migratory Birds in North-East Asia

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Korean Society of Environmental Ecology

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Presenter: Kyung-won KIM

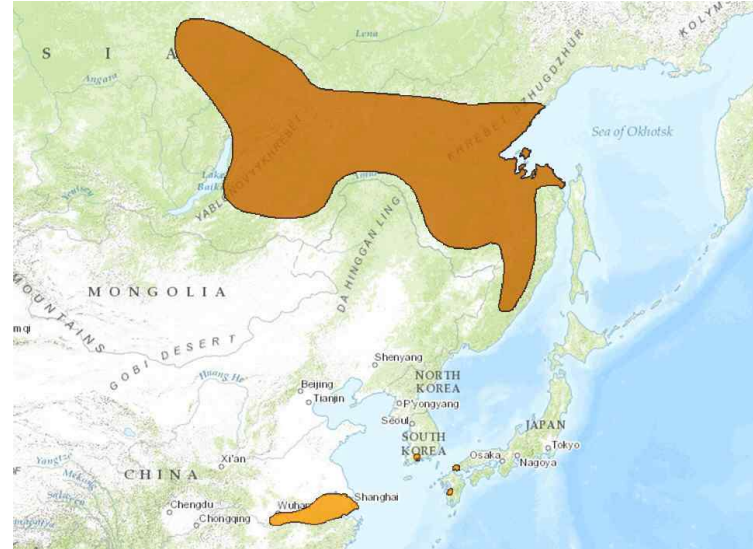


I. Background



<http://www.neaspec.org/envir-impera.asp>

Hooded Crane



<http://maps.iucnredlist.org/index.html>

Black-faced Spoonbill



<http://maps.iucnredlist.org/index.html>

White naped Crane



<http://maps.iucnredlist.org/index.html>

Project Strategies

In order to implement its proposed strategies of the Nature Conservation Strategy for White-naped Cranes, Hooded Cranes, and Black-faced Spoonbills.



Key wetland habitats in Korea

Rice paddies, River, Estuary and Tidal-flats are key wetlands in Korea for White-naped Cranes, Hooded Cranes, and Black-faced Spoonbills



Ganghwa Island , breeding site of BFS



Cholwon Basin, wintering site of White-naped Cranes



Imjin River wintering site of White-naped Cranes



Southern tidal flat of Ganghwa Island , habitat of BFS and Cranes



Suncheon Bay, wintering sites of Hooded Crane



Han River Estuary , wintering site of White-naped Cranes

II. Scoping survey

1. Objectives

Selecting key habitats for conservation and rehabilitation of target species in North-East Asian subregion	(related to the Strategy for the BFS no. 2-d, and for the Cranes no. 1-d)
Undertaking a precise and comprehensive survey on the key habitats for the development of the North-East Asian Habitats Conservation Plan	(related to the Strategy for the BFS no.5 and for the Cranes no. 6)
Establishment of a subregional monitoring scheme and information sharing network among the key habitats	(related to the Strategy for the BFS no. 3 and for the Cranes no. 1-a)

2. Criteria for selection of key habitats

Sites that are officially enlisted under EAAFP FSN(Flyway Site Network), IBA of Birdlife International, Ramsar Site etc.	(related to the Strategy for the BFS no. 1-a, and for the Cranes no. 8-a)
Sites that are breeding, staging or wintering grounds of target species and require urgent rehabilitation and management of habitats through international support	(related to the Strategy for the BFS no.5 and for the Cranes no. 1)
Sites that require improved local community involvement as a key condition for rehabilitation and management	(related to the Strategy for the BFS no. 5 and for the Cranes no. 2)

3. Provisional Research Format of Survey I

(*Revision of RIS)

Country	
Name of the Site	
Overview of the site	
Geographical location	latitude/longitude
	General location
Physical Feature	Area (in hectares)
	Elevation
	General physical features (including catchment area)
	Hydrological values
Habitat Types	Presence
	dominance
Ecological features	General features
	Noteworthy flora
	Noteworthy fauna
Socioeconomic and cultural features	Social and cultural values
	Land tenure/ownership
	Current land (including water) use
Threaten factors (past, present or potential)	affecting the site's ecological character
Conservation measures taken	
Stakeholder Participation	Major stakeholders of the site
	Potential target groups for conservation of the site
	Need of local and/or national development
	Ecotourism value

4. Provisional Research Format of Survey II

(*Revision of species account from *Cranes, 1996*)

Summary of the site related to target species

(Breeding/staging/wintering)

Population numbers and trends of species in the site

Historic and present distribution of species in the site

Characteristics of habitat and ecology

Principal threats

Current conservation measures

Legal and cultural protection

International agreements and cooperation

Habitat protection and management

Surveys/Monitoring/Censuses

Research

Non-governmental Organizations(NGOs)

Education and Training

Captive propagation and reintroduction

Major stakeholders of the site

Potential target groups for conservation of the site

Need of local and/or national development

Ecotourism value

1. Objectives

Conducting joint study on the target sites in particular in transboundary areas	(related to the Strategy for the BFS no. 2-c and for the Cranes no. 6-b)
Conducting a comprehensive study with participation of ornithologists, landscape planners , community development experts, local authorities, local inhabitants, local media and NGOs	(related to the Strategy for the BFS no. 2-b, and for the Cranes no. 2-b and 5-d)
Producing Environmental-Ecology Planning (EEP) on the target sites, including zoning of core zone, buffer zone and cooperation zone with management and sustainable development plan of the site	(related to the Strategy for the BFS no. 5 and for the Cranes no. 6)
Preparing the North East Asian Habitats Conservation Plan	(related to the Strategy for the BFS no. 5 and for the Cranes no. 6)

process

Goal-setting of the joint study

Composition of the joint study team Preparation

Habitat Mapping I (*Habitat structure mapping*)

Habitat Mapping II (*Threatened factors mapping*)

Suggestion of future direction

2. Provisional methodology and process of the study

1) Goal-setting of the joint study

Item	Content	Detail
Goal-setting of the joint study	Joint study on two key habitats in the sub-region	Establishment of conservation and rehabilitation plan through habitat mapping

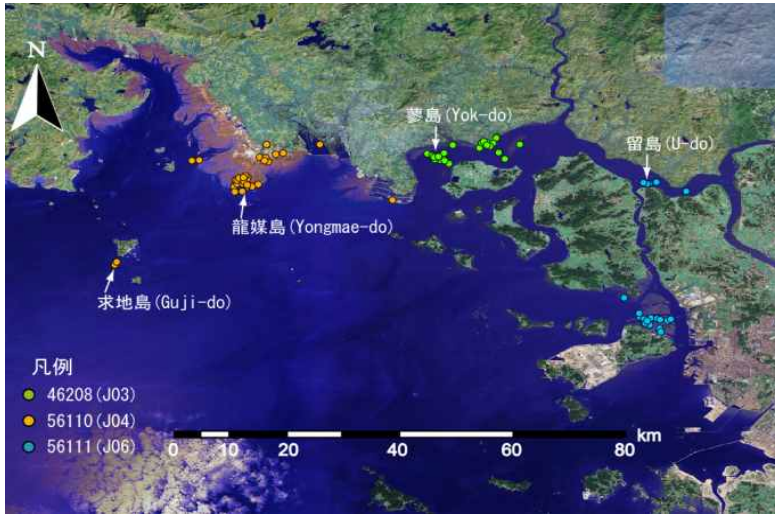
2) Composition of the joint study team

Item	Content	Detail
Composition of the joint study team	NEASPEC Secretariat	Support to administrative work
	KSEE	Facilitating organization of the team
	National experts and resource persons	Providing expertise of species, habitat mapping, land use, local community development etc.

Item	Content	Detail
Preparation	Desk-study for gathering relative data and producing a basic plan for joint study	Selection of mapping area Posing mapping unit and basic habitat type Producing preliminary plan using GIS

(1) Selection of mapping area

Movement in breeding site of BFS between North and South Korea

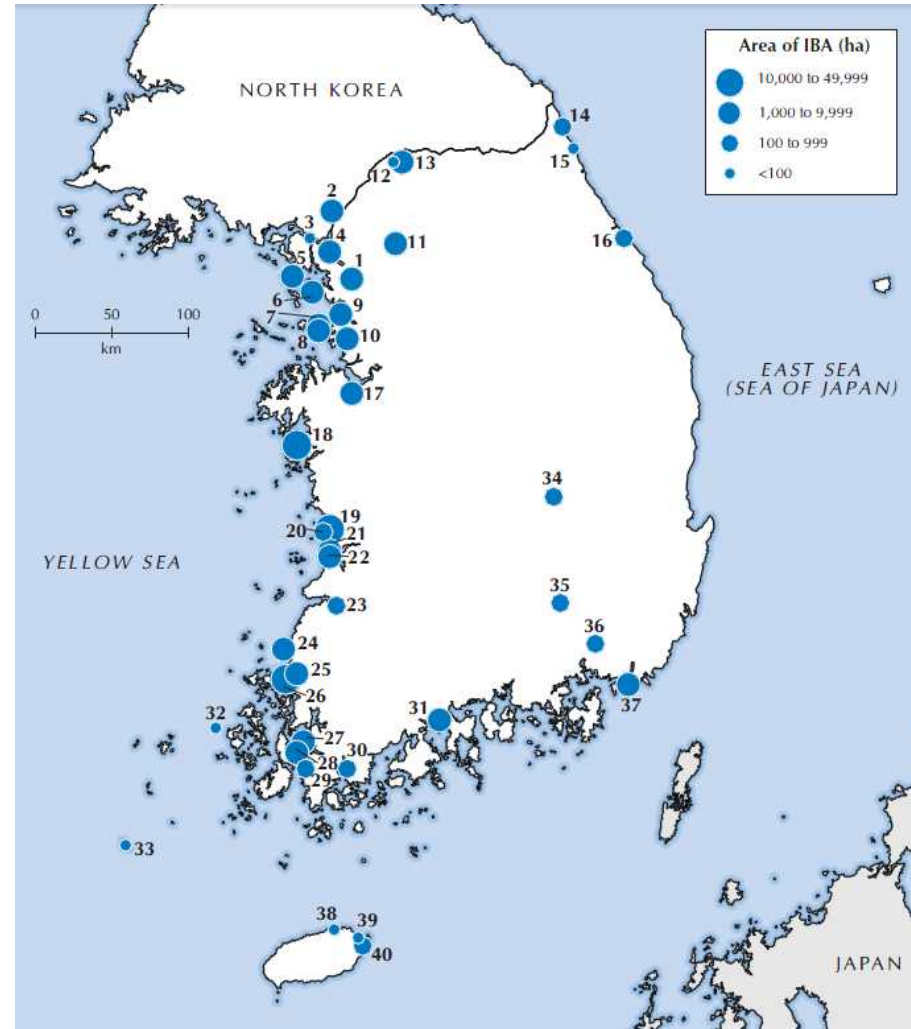


○ Breeding site ○ Feeding site 2005 Google

Source from WBSJ, 2005

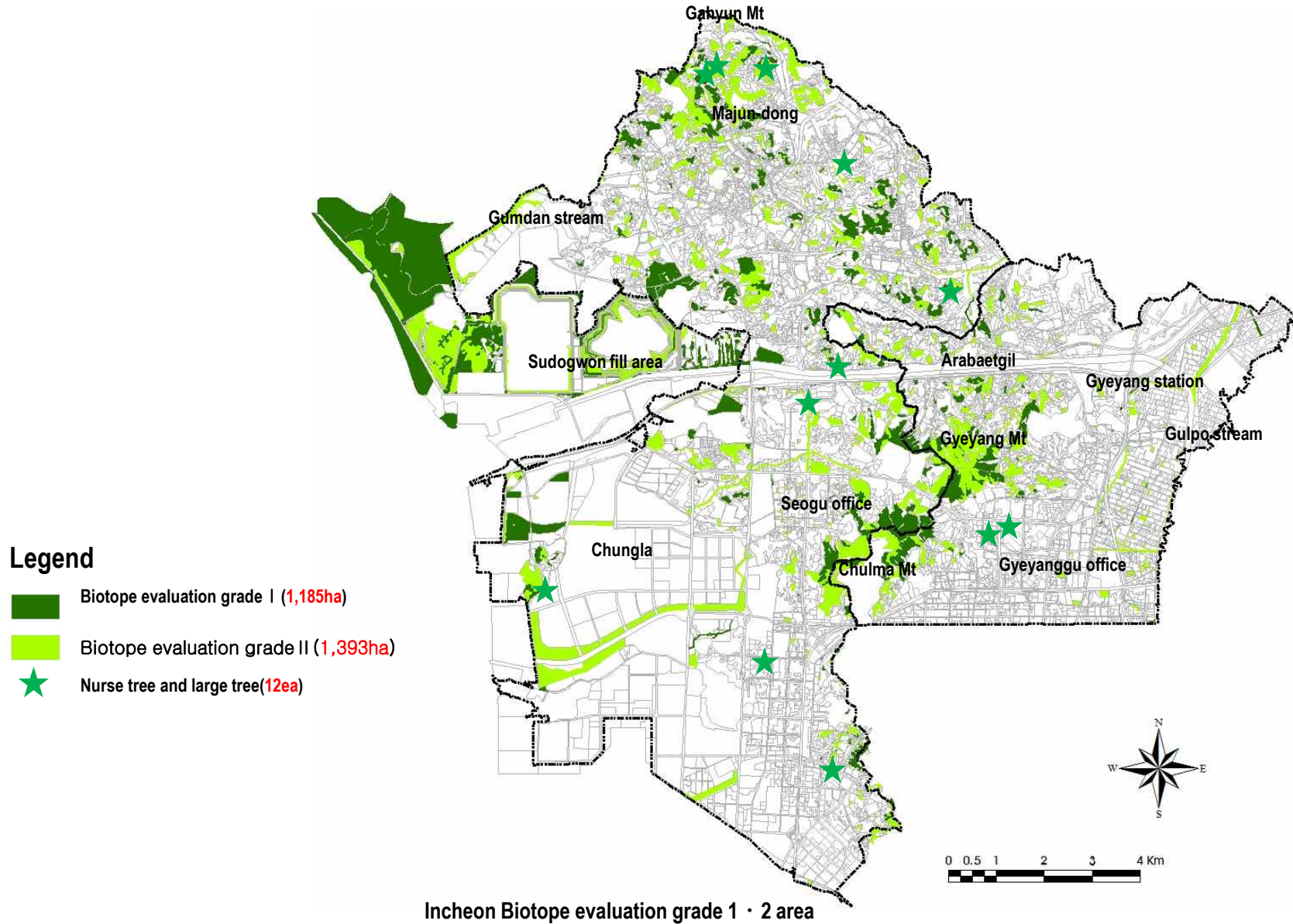


The area of IBA in Korea

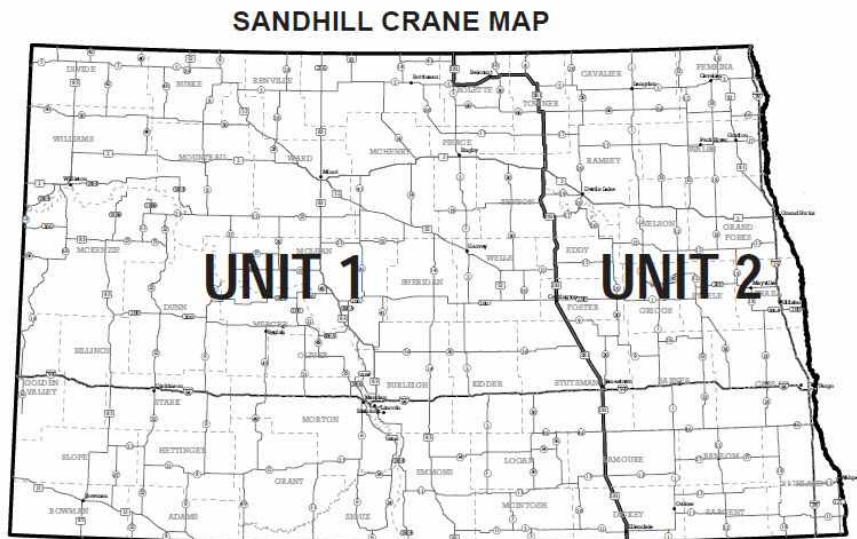


Source from Birdlife International

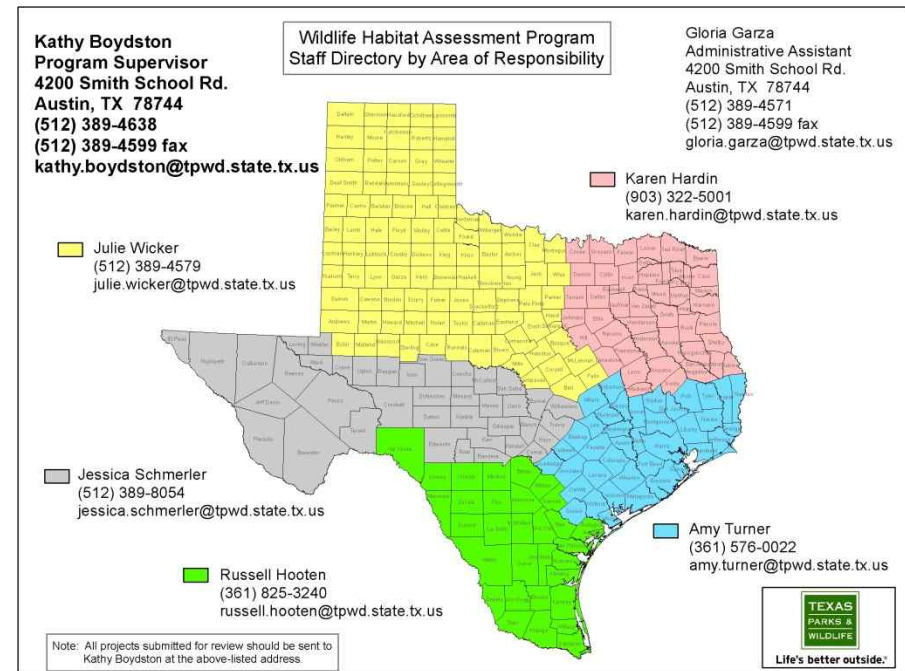
Example: selection of mapping area of Incheon city



Posing mapping unit

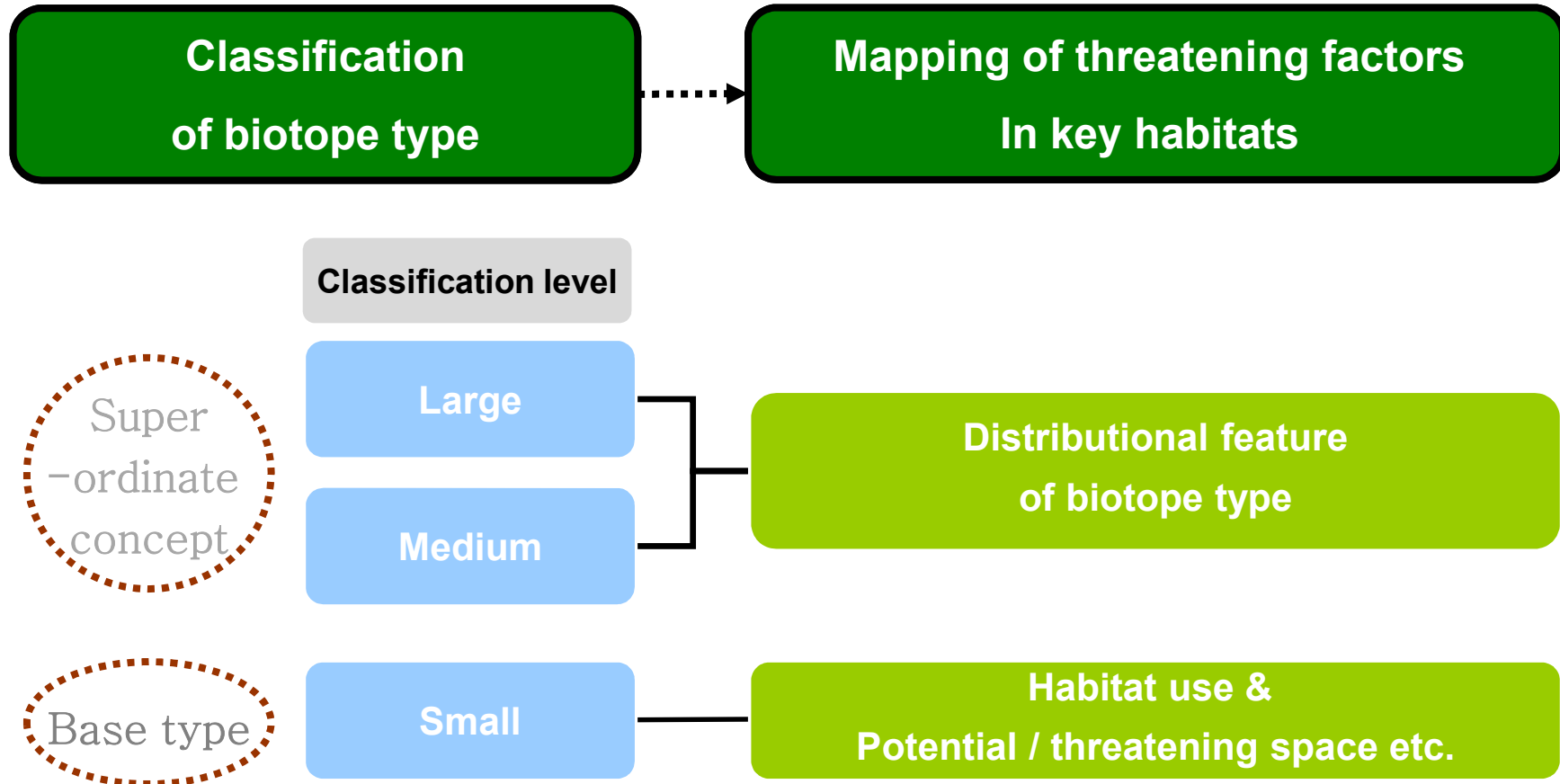


Project Map of migratory routes for Siberian Crane & project sites
 ((Map: www.thegef.org).

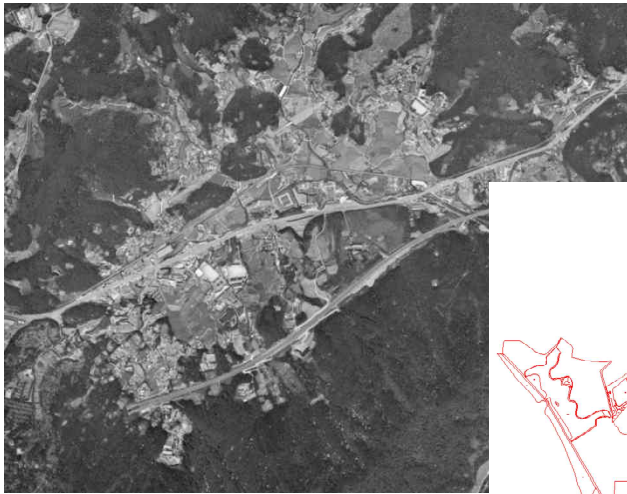


Wildlife Habitat Assessment Program Staff Directory by Area of Responsibility

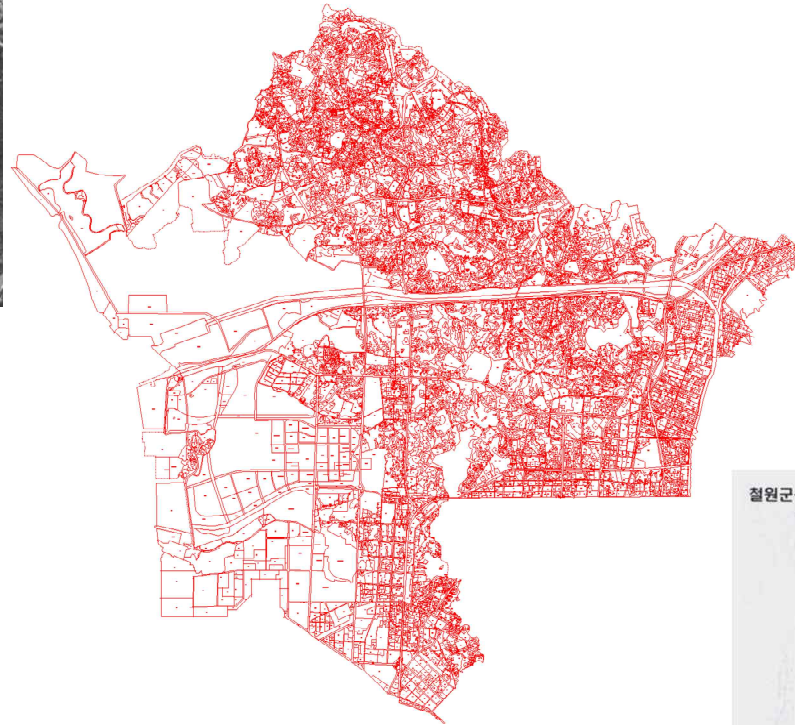
Posing basic habitat(Biotope) type



(3) Producing preliminary plan using GIS



Aviation image

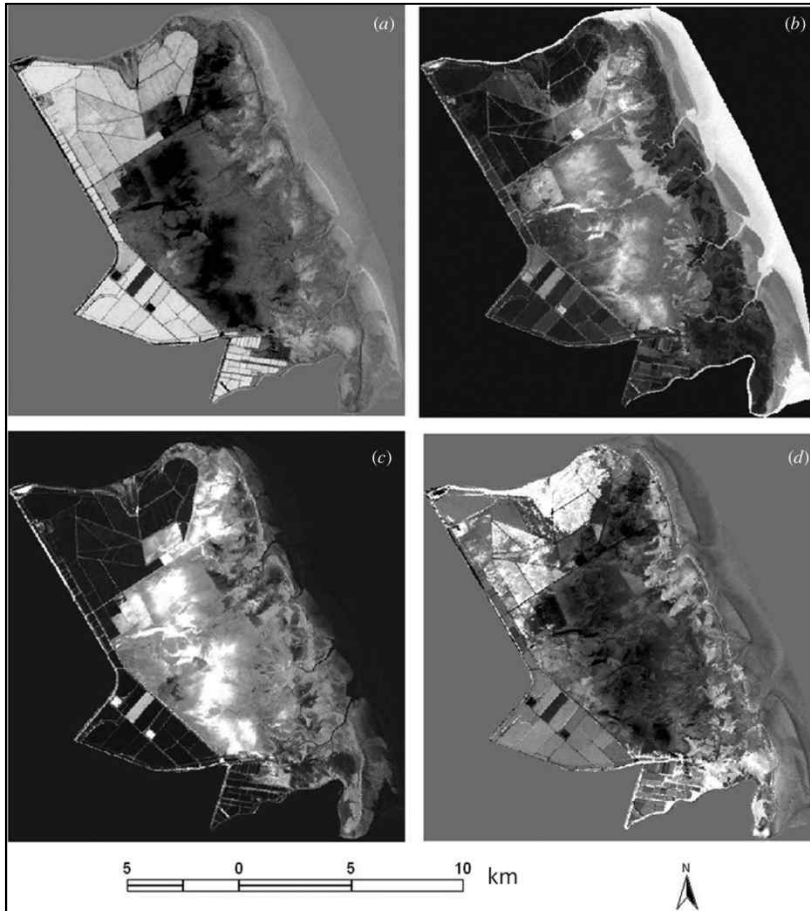


Map by using aviation & satellite image



Map of habitat mapping by field survey

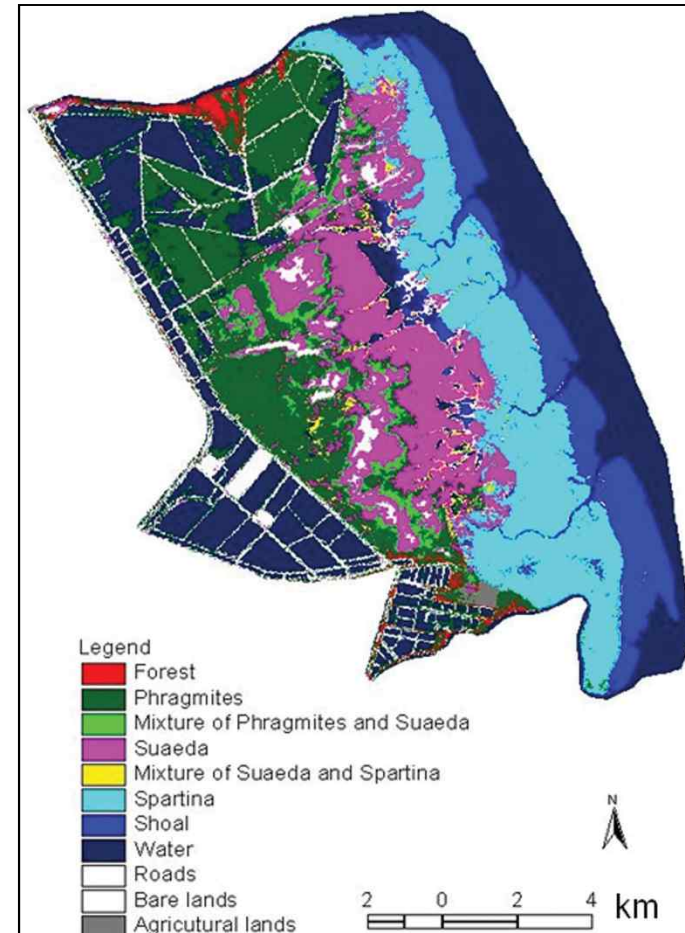
Yancheng National Nature Reserve



The four fraction images (a – fresh water, b – salty water, c – soil, and d – vegetation) derived from the spectral mixture analysis of the Landsat 5 TM image.

Source from, Y. Zhang et al.(2009) Coastal wetland vegetation classification with a Landsat Thematic Mapper image

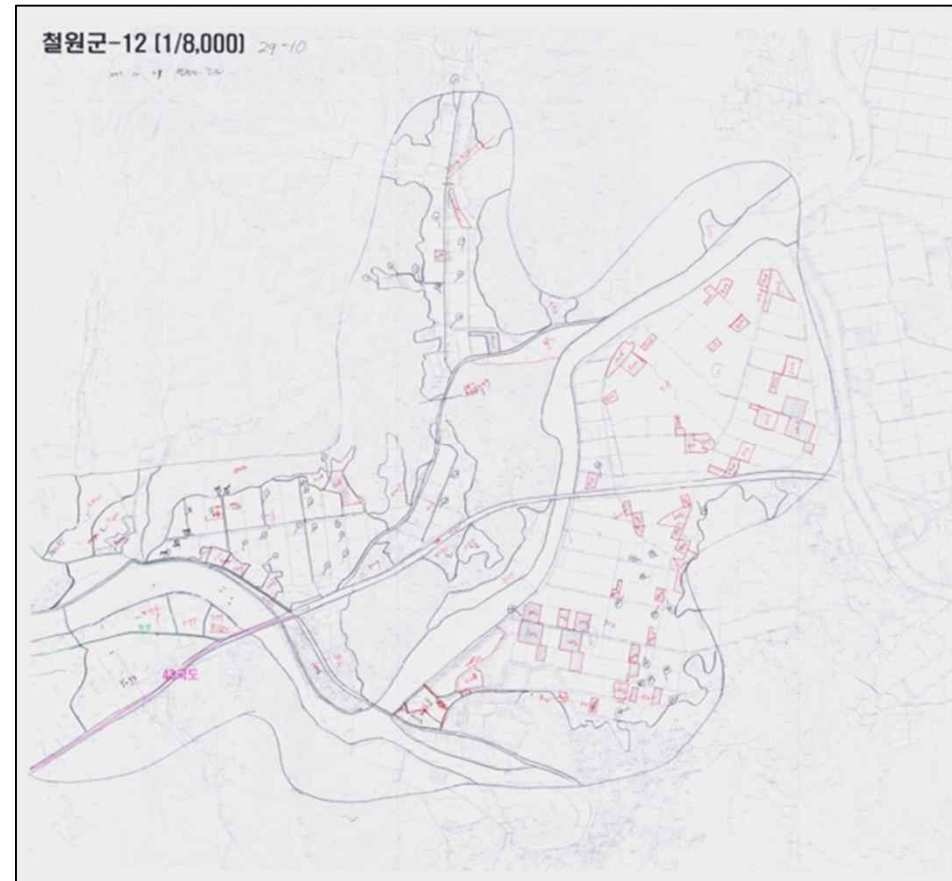
Coastal wetland vegetation distribution developed with the hybrid approach from the Landsat TM image.



Source from, Y. Zhang et al.(2009) Coastal wetland vegetation classification with a Landsat Thematic Mapper image

Item	Content	Detail
Field Study	Joint study to the key habitats	Field workshop with local community Synthesis of targeted species' inhabit condition, complement by field survey Appearance mapping of species Mapping of threatening factors and socio-economic status

(1) Field workshop with local community



Habitat map ping in the field

(2) Synthesis of targeted species' inhabit condition complementing by field survey

범례

현존_위해join

세분류_범

- A1. 자갈톱
- A2. 모래톱
- A3. 하천둔치
- A4. 하천제방
- A5. 하천옹벽
- A6. 수면
- B1. 자연형 하천

- B2. 인공형 하천
- C1. 자연형 농수로
- C2. 인공형 농수로
- D1. 하천보
- E1. 버드나무 수림대
- E2. 아까시나무 수림대
- F1. 들범
- F2. 자연형 소류지
- F3. 저수지

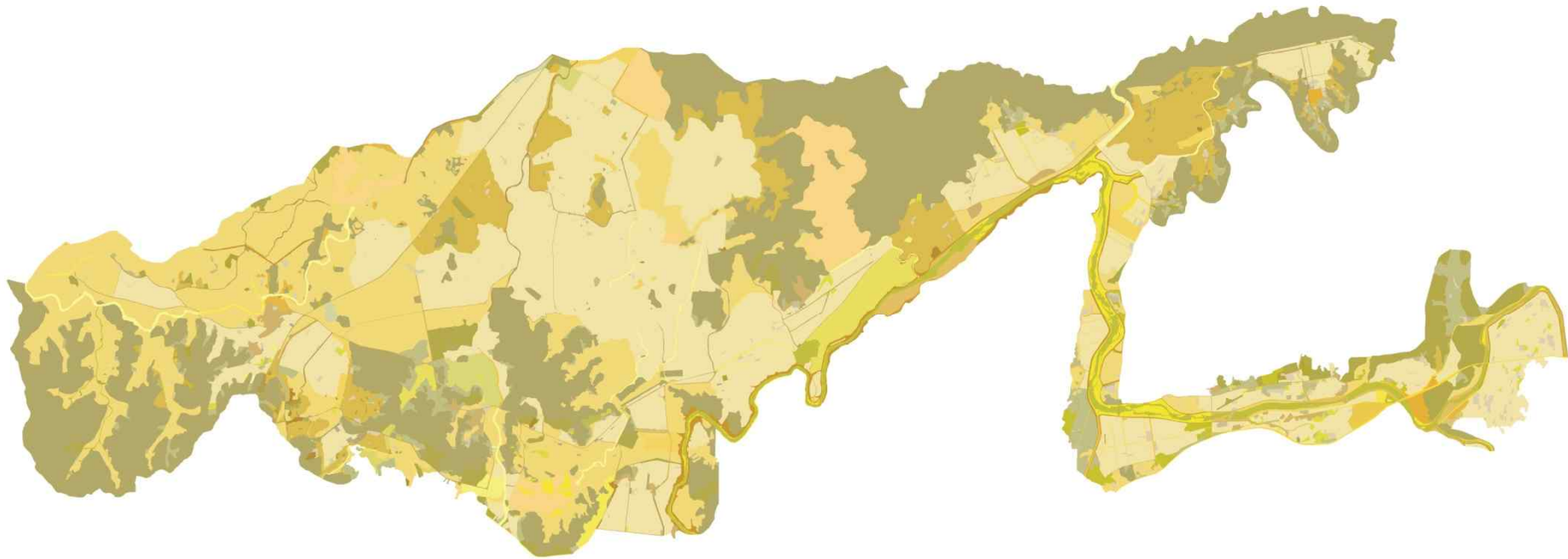
- G1. 산림
- G2. 관목식생지
- G3. 산림훼손지
- H1. 묘지
- H2. 목논
- H3. 목밭
- H4. 건조초지
- H5. 습지초지
- I1. 나지

- J1. 구릉형 경지정리 논경작지
- J2. 구릉형 자연형 논경작지
- J3. 경지정리 논경작지
- J4. 자연형 논경작지
- K1. 과수원
- K2. 밭경작지
- K3. 묘포장
- K4. 시설경작지
- K5. 인상밭

- L1. 조경수식재지
- M1. 농촌주택지
- M2. 단독주택지
- N1. 농공단지
- N2. 상업시설지
- N3. 전망대
- N4. 전시관
- O1. 주상혼합지
- P1. 교육시설

- P2. 공공시설
- P3. 대규모체육시설지
- P4. 수련원
- P5. 체육시설지
- Q1. 축사
- Q2. 견사
- R1. 공업지
- R2. 액체비료저장소
- R3. 창고

- S1. 하수처리장
- S2. 펌프장
- S3. 배수장
- T1. 도로
- T2. 농로
- T3. 주차장
- U1. 문화재
- V1. 군사지역
- V2. 건설현장
- V3. 야적장



(3) Appearance mapping of species

Legend

Grus japonensis

- Family 533
- Individual 6
- △ Drove 131

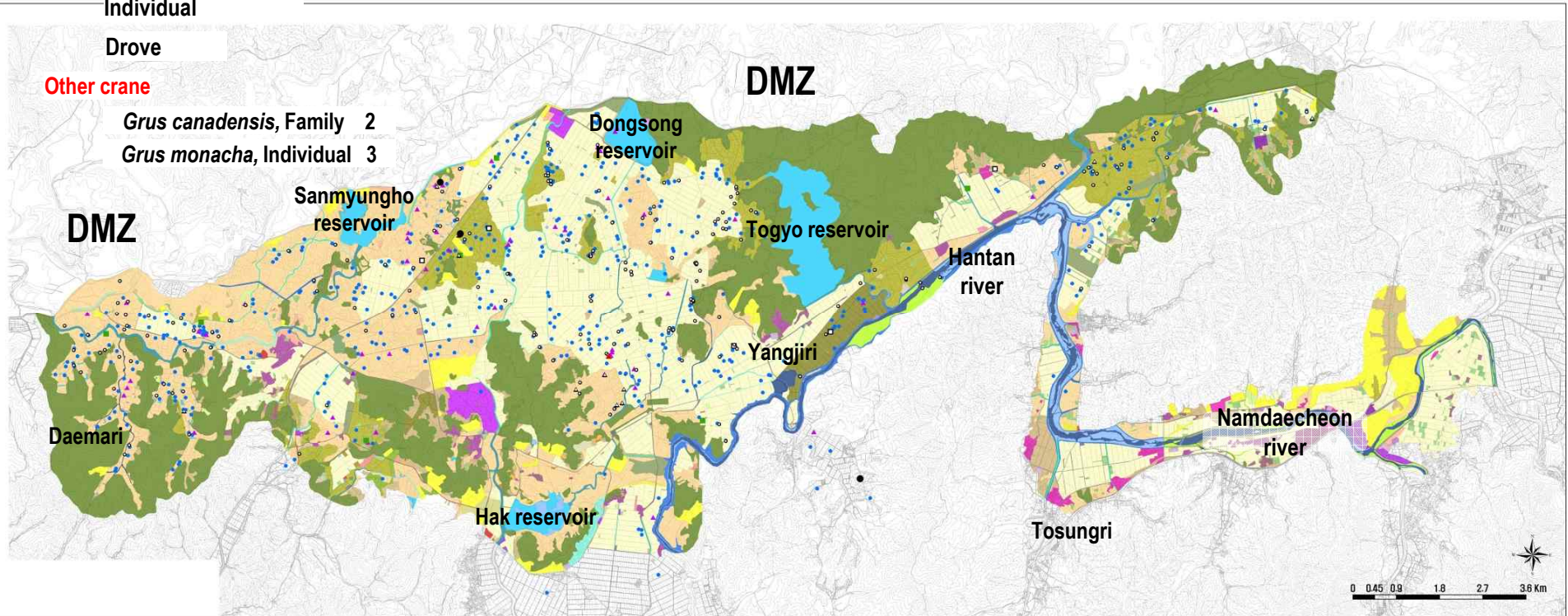
Grus vipio

- Family 1,676
- Individual -
- △ Drove -

Other crane

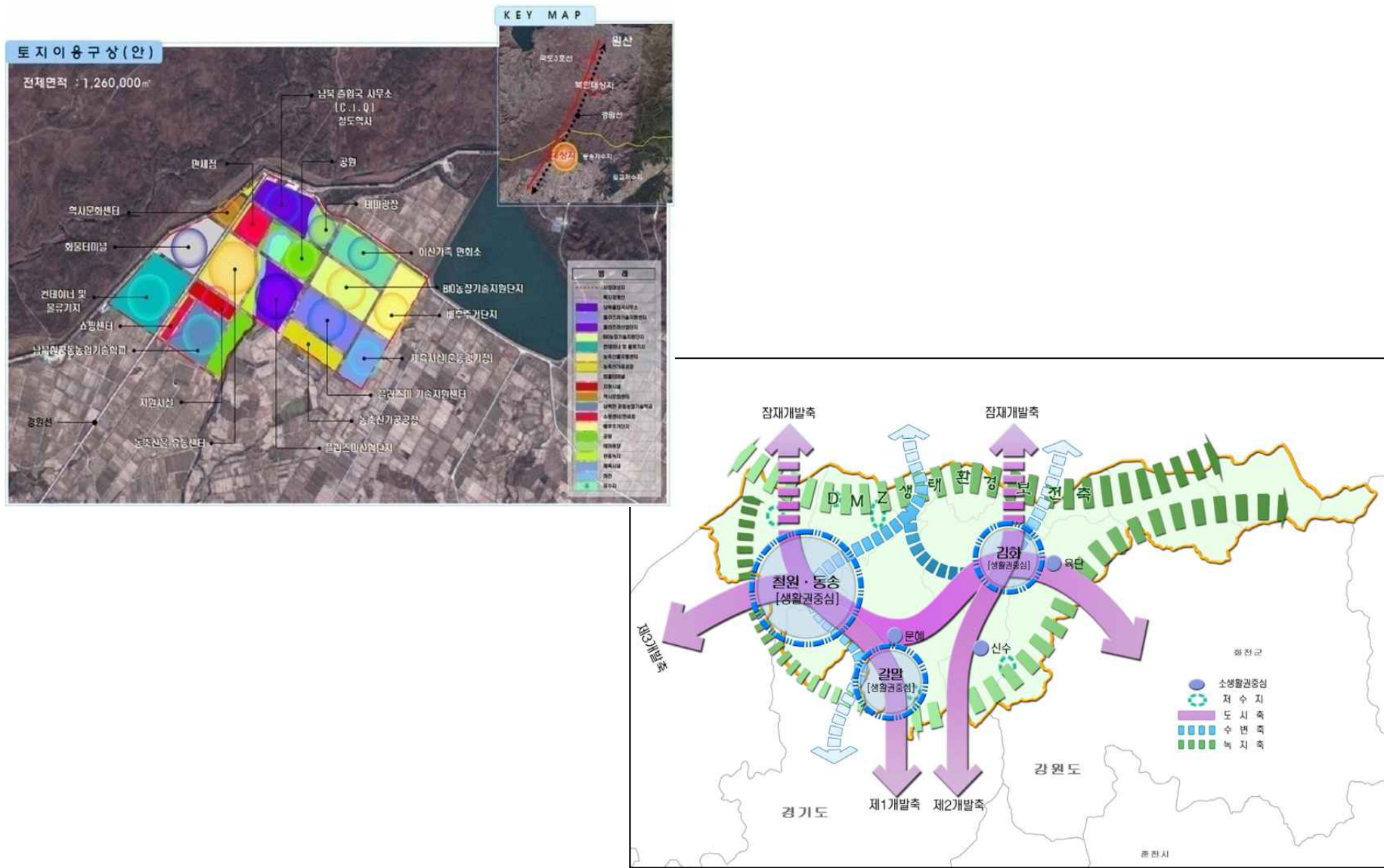
- Grus canadensis, Family 2
- Grus monacha, Individual 3

Grus japonensis 670 individuals, *Grus vipio* 2,716 individuals
 The population of migratory season increases due to an influx of *Grus Vipio* and spread to Internal and external area of CCZ



Habitat map of cranes' distribution (FEB. 26-27, 2012)

(4) Mapping of threatening factors and socio-economic status



*Source: 철원군 중장기 발전계획 (철원군, 2010)

5) Habitat Mapping

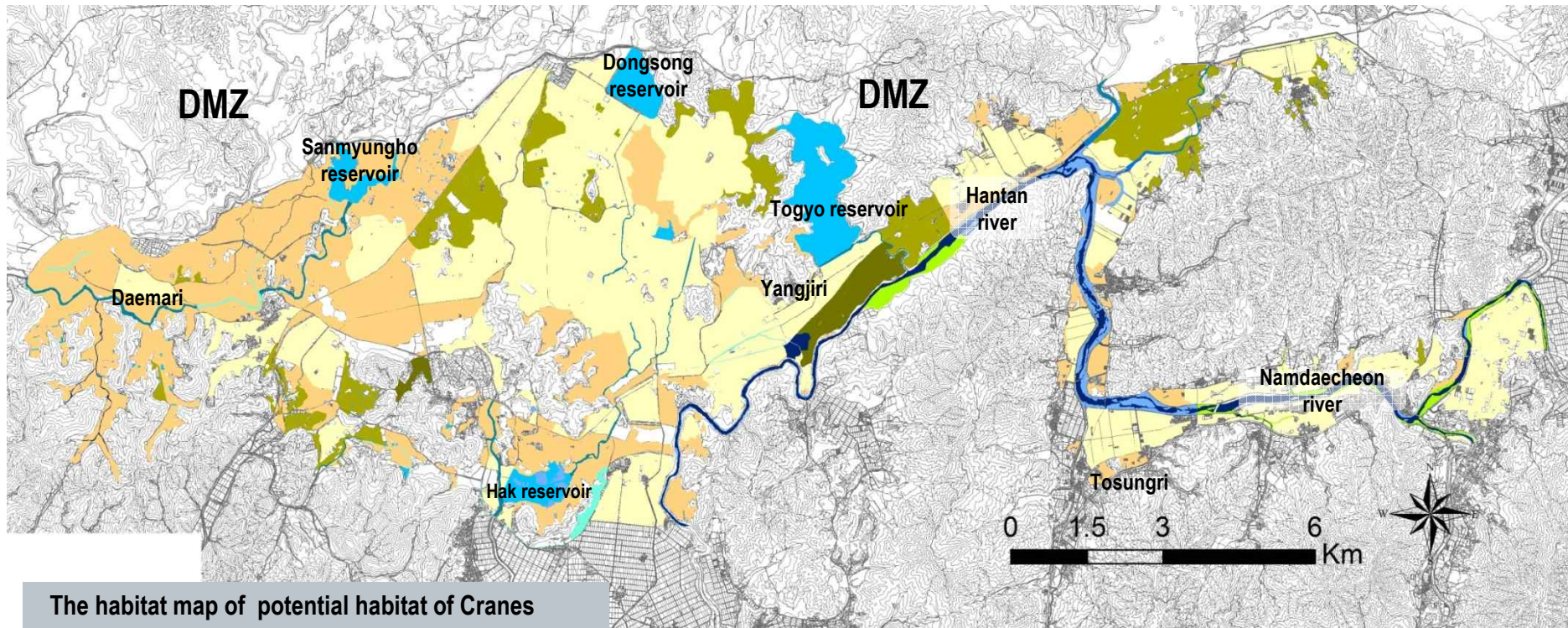
Digitizing of data, habitat typology of roosting and feeding site, revision of habitat typology by discussion, and Habitat structure mapping through GIS

Total area of potential habitat : 92.0km²
 ; 45 % of re-adjustment rice field, 30.6% of natural Rice field

Legend

- | | | | | | |
|----------|-------------|-------------------|------|---------------------|-------|
| A1. 자갈톱 | B1. 자연형 하천 | Reservoir | 5.2% | Hilly natural paddy | 9.7% |
| A2. 모래톱 | C1. 자연형 농수로 | H2. 묵논 | | Readjustment paddy | 45.0% |
| A3. 하천둔치 | F1. 돌병 | H5. 습지초지 | | Natural paddy | 30.6% |
| A6. 수면 | F2. 자연형 소류지 | J1. 구릉형 경지정리 논경작지 | | | |

Total area: 92.0km²

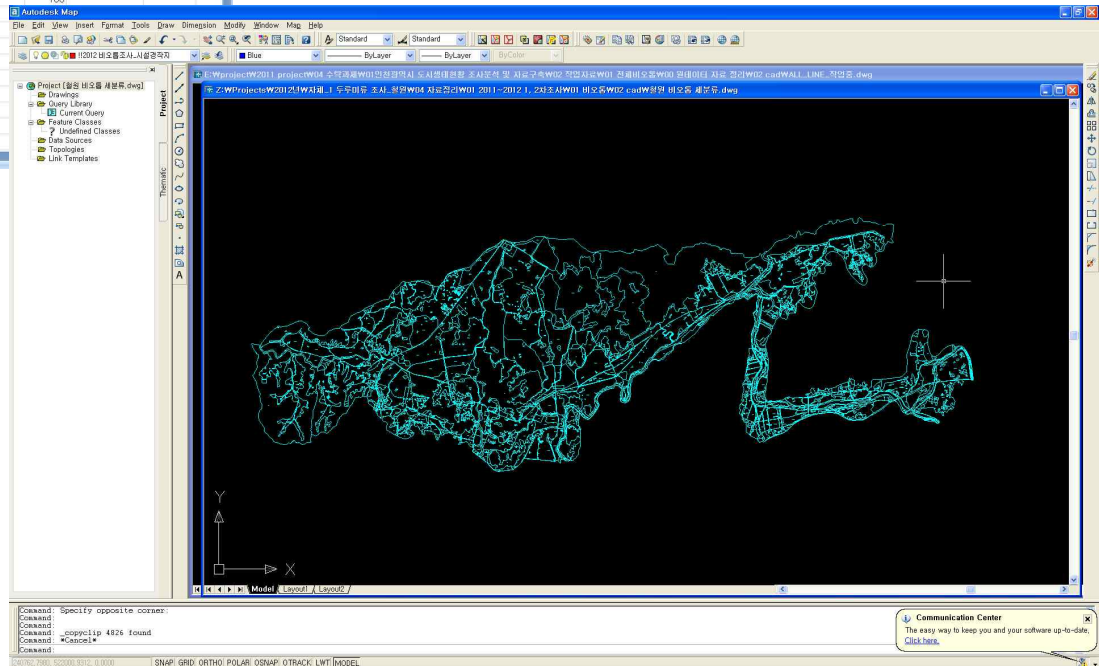


The habitat map of potential habitat of Cranes

(1) Digitizing of data

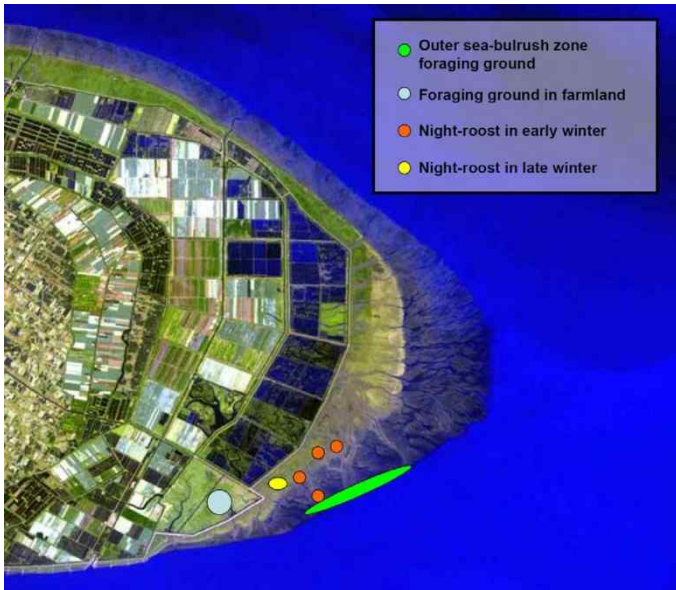
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	STRING	유형분류	토지이용	규격	유형분류	건폐지	분투수요정	투수요정	반투수요정	총세투수요정	녹지	수공간	합계	인공지반예부	유형분류	녹지
2	29-01-건폐지	건폐지		A13(T)		80							100			
3	29-01-건폐지	건폐지		A13(T)		80		20					100			
4	29-01-건폐지	건폐지		A13(T)		80							100			
5	29-01-건폐지	건폐지		A13(T)		80		20					100			
6	29-01-건폐지	건폐지		A13(T)		80							100			
7	29-01-건폐지	건폐지		A13(T)		80		20					100			
8	29-01-건사	건사		A13(T)		80		20					100			
9	29-01-공장	공장		A13(T)		60		20	20				100			
10	29-01-과수원	과수원											100			
11	29-01-군부대	군부대		A13(T)		40		40					20			
12	29-01-군부대	군부대		A13(T)		40		40					100			
13	29-01-군부대	군부대		A13(T)		40		40					20			
14	29-01-군부대	군부대		A13(T)		40		40					100			
15	29-01-군부대	군부대		A13(T)		40		40					20			
16	29-01-단독주거지	단독주거지		A13(T)		60		20					100			
17	29-01-단독주거지	단독주거지		A13(T)		60		20					100			
18	29-01-묘지	묘지											100			
19	29-01-묘지	묘지											100			
20	29-01-묘포장	묘포장											100			
21	29-01-목밭	목밭											100			
22	29-01-목밭	목밭											100			
23	29-01-목밭	목밭											100			
24	29-01-목밭	목밭											100			
25	29-01-밭	밭											100			
26	29-01-밭	밭											100			
27	29-01-밭	밭											100			
28	29-01-밭	밭											100			
29	29-01-밭	밭											100			
30	29-01-밭	밭											100			
31	29-01-밭	밭											100			
32	29-01-밭	밭											100			

Data digitizing using Excel

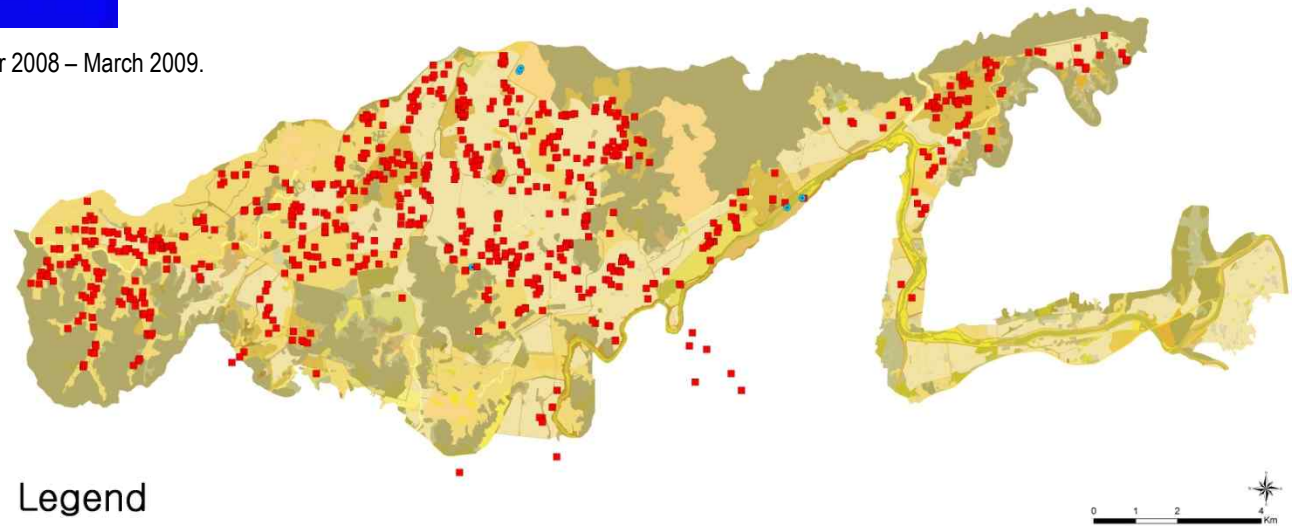


Data digitizing using Autocad

(2) Habitat typology of roosting and feeding site



The main areas used by the Hooded Cranes from October 2008 – March 2009.



The main areas used by the Cranes in Cheorwon

(3) Habitat structure mapping through GIS

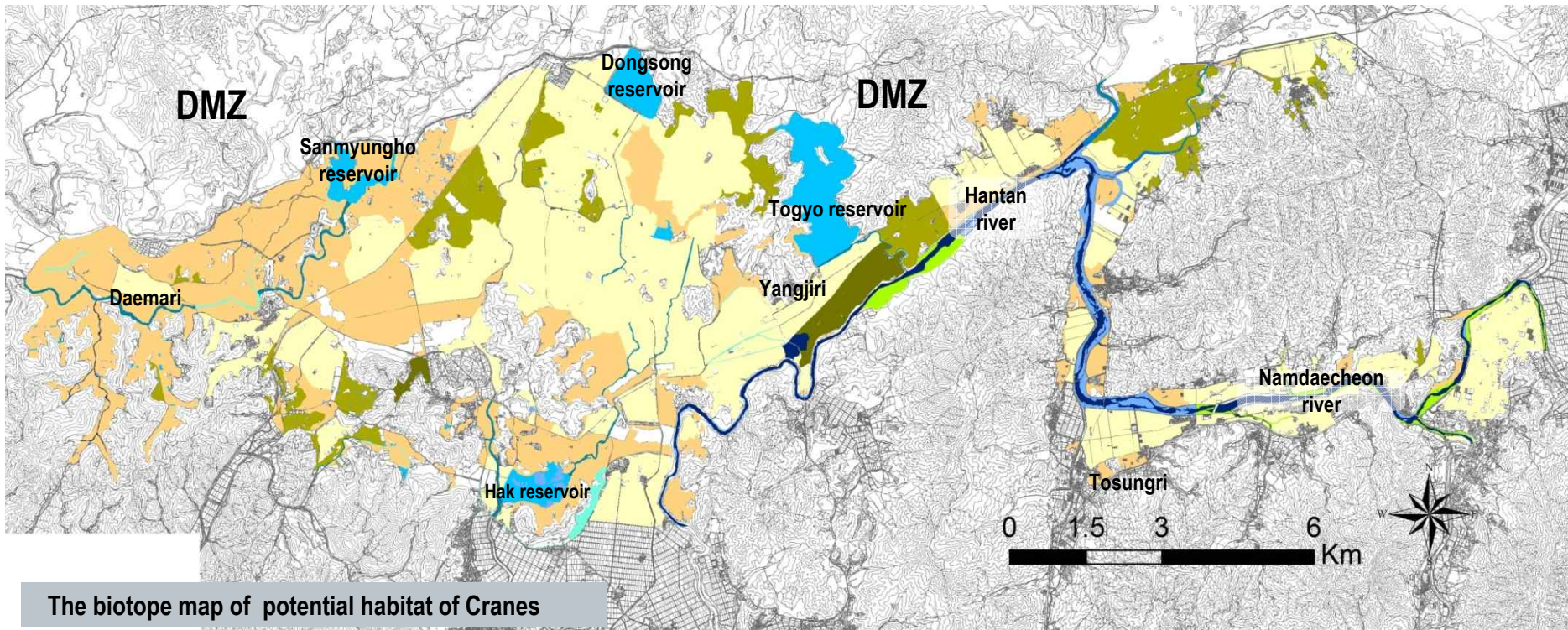
Total area of potential habitat : 92.0km²

; 45 % of re-adjustment rice field, 30.6% of natural Rice field

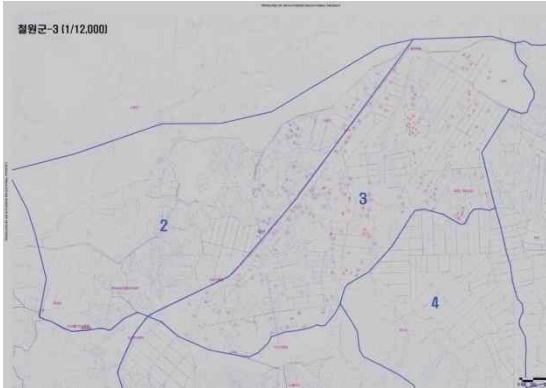
Legend

A1. 자갈톱	B1. 자연형 하천	Reservoir	5.2%	Hilly natural paddy	9.7%
A2. 모래톱	C1. 자연형 농수로	H2. 목논	45.0%	Readjustment paddy	30.6%
A3. 하천둔치	F1. 둠벙	H5. 습지초지		Natural paddy	
A6. 수면	F2. 자연형 소류지	J1. 구릉형 경지정리 논경작지			

Total area: 92.0km²



The biotope map of potential habitat of Cranes



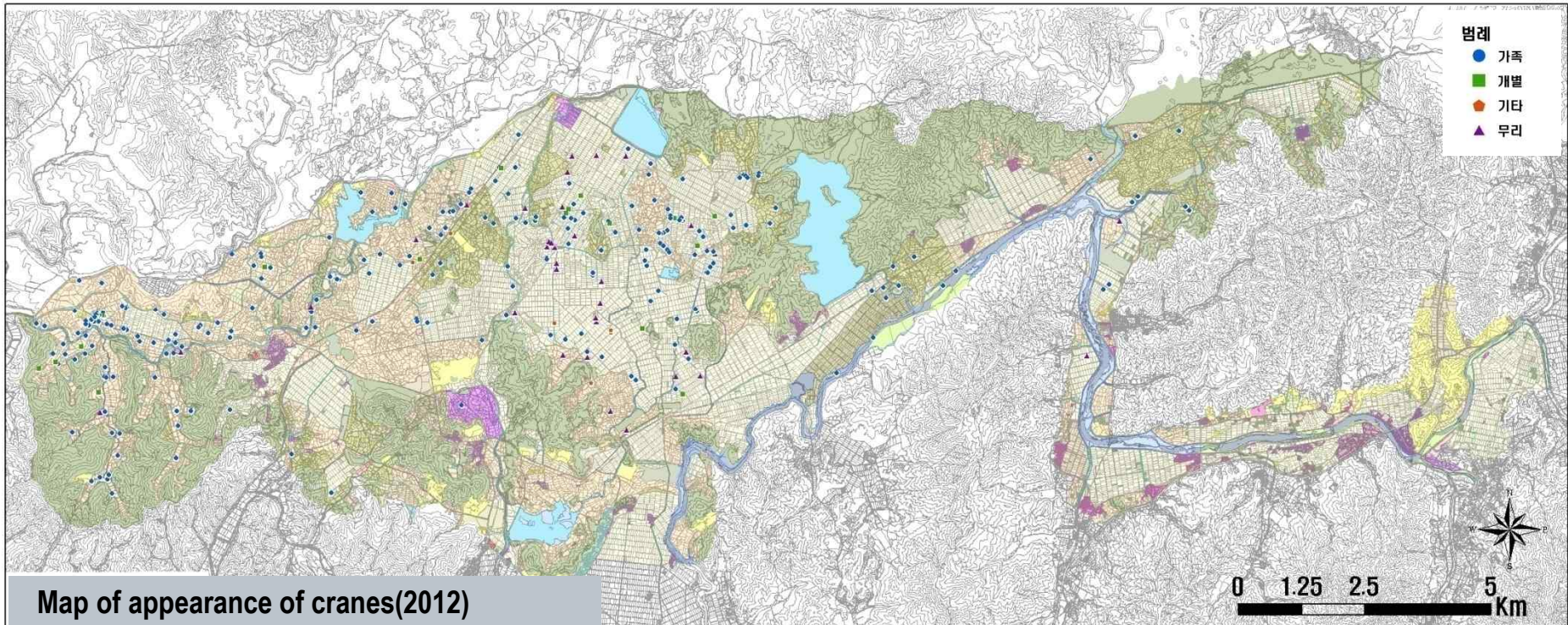
Map of field survey



Crane family



Crane group



Map of appearance of cranes(2012)

6) Mapping of threatened factors

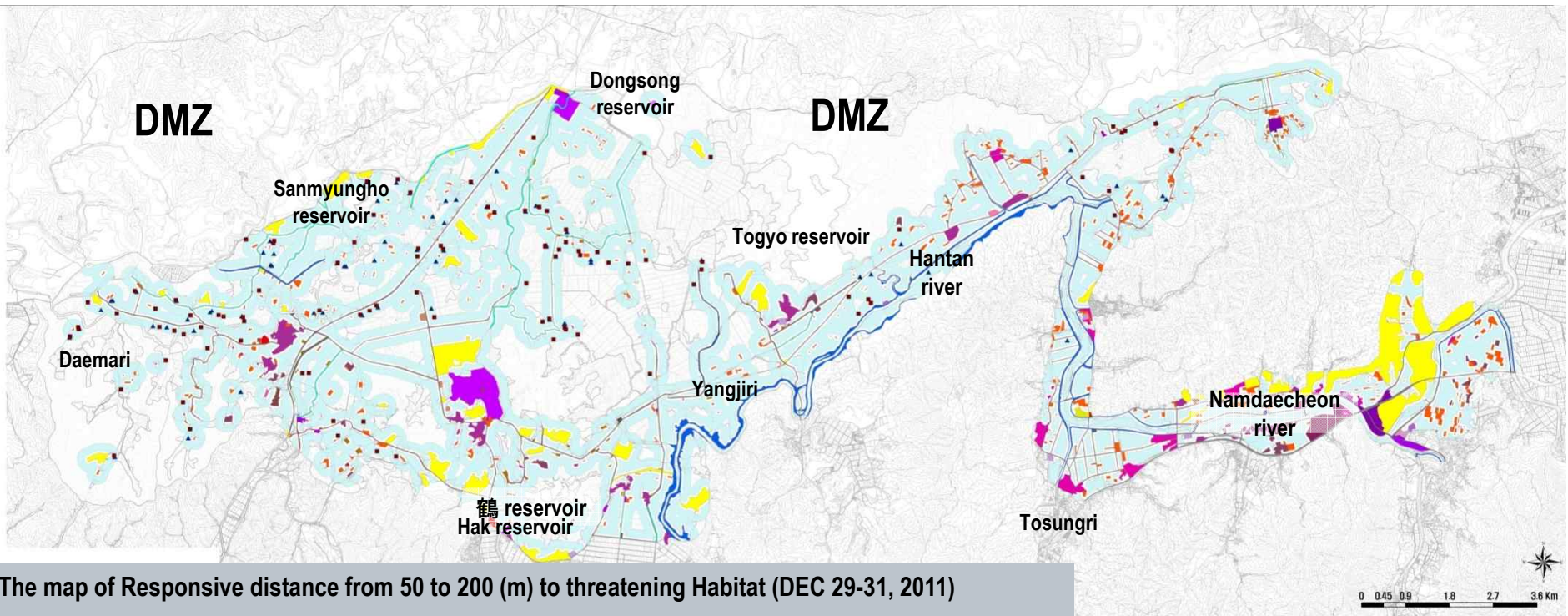
Synthesis of threatening factors in habitat, Typology of threatening factors, Creating mapping unit (polygon, line, point) , and Mapping of threatened factors through GIS

Legend

- ▲ *Grus japonensis* 216 Individuals
- *Grus vipio* 449 Individuals

범례		범례		범례		범례		범례	
A4. 아천제방	비율 11.2	K4. 시설경작지	비율 9.8	N2. 상업시설지	비율 5.9	P1. 교육시설	비율 2.8	R2. 액체비료저장소	비율 7.6
A5. 아천옹벽		M1. 농촌주택지	비율 6.6	N3. 전망대	비율 1.9	P2. 관광시설		R3. 창고	비율 3.8
C2. 인공형 농수로	비율 3.8	M2. 단독주택지	비율 4.6	N4. 전시장		P3. 대규모체육시설지		S1. 하수처리장	비율 34.3
D1. 아천보		N1. 농경단지		O1. 주상콘크리트		P4. 수련원		S2. 펌프장	비율 3.8
						P5. 체육시설지		T1. 도로	
						Q1. 축사		T2. 농로	
						Q2. 견사		T3. 주차장	
						R1. 공업지		U1. 문화재	
								V1. 군사지역	
								V2. 건설현장	
								V3. 아적장	

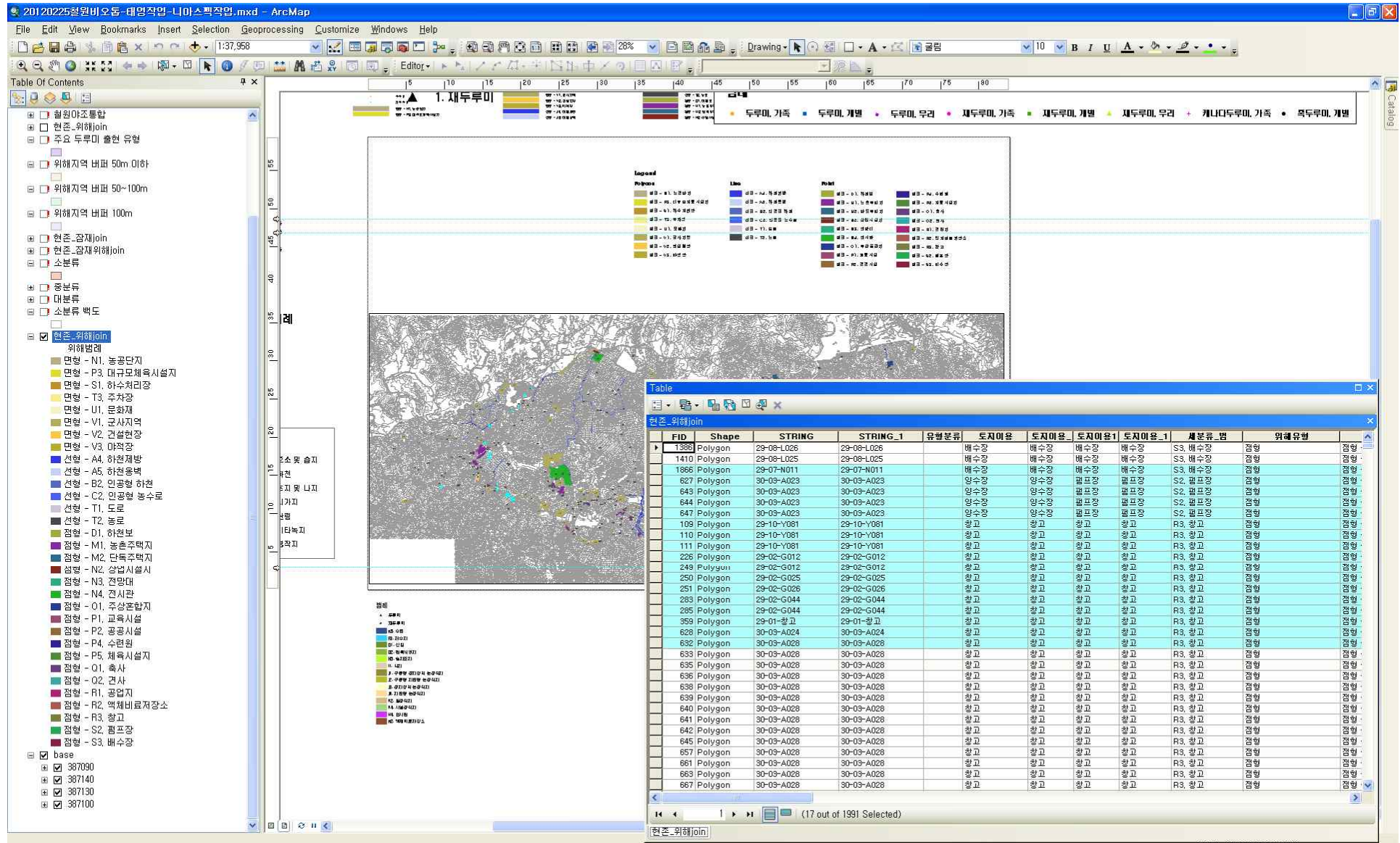
위협요인 면적: 13.62^{km²}, 전체 조사면적 152.55^{km²} 대비 8.9% 위험지역 범위 50m ~ 200m



The map of Responsive distance from 50 to 200 (m) to threatening Habitat (DEC 29-31, 2011)

Habitat Type	Threatening factors in habitat Content
Point	Residential area, Commercial area, industrial area, Observatory, Public facilities, cattle shed , Storage etc.
Line	Road, Artificial river, Revetment etc.
Polygon	Agricultural industrial complex, Sports facilities, Construction sites, Open-storage area etc.

(2) Typology of threatening factors



Typology of threatening factors

(3) Creating mapping unit (polygon, line, point)



Point unit - Residential area



Point unit - Storage etc

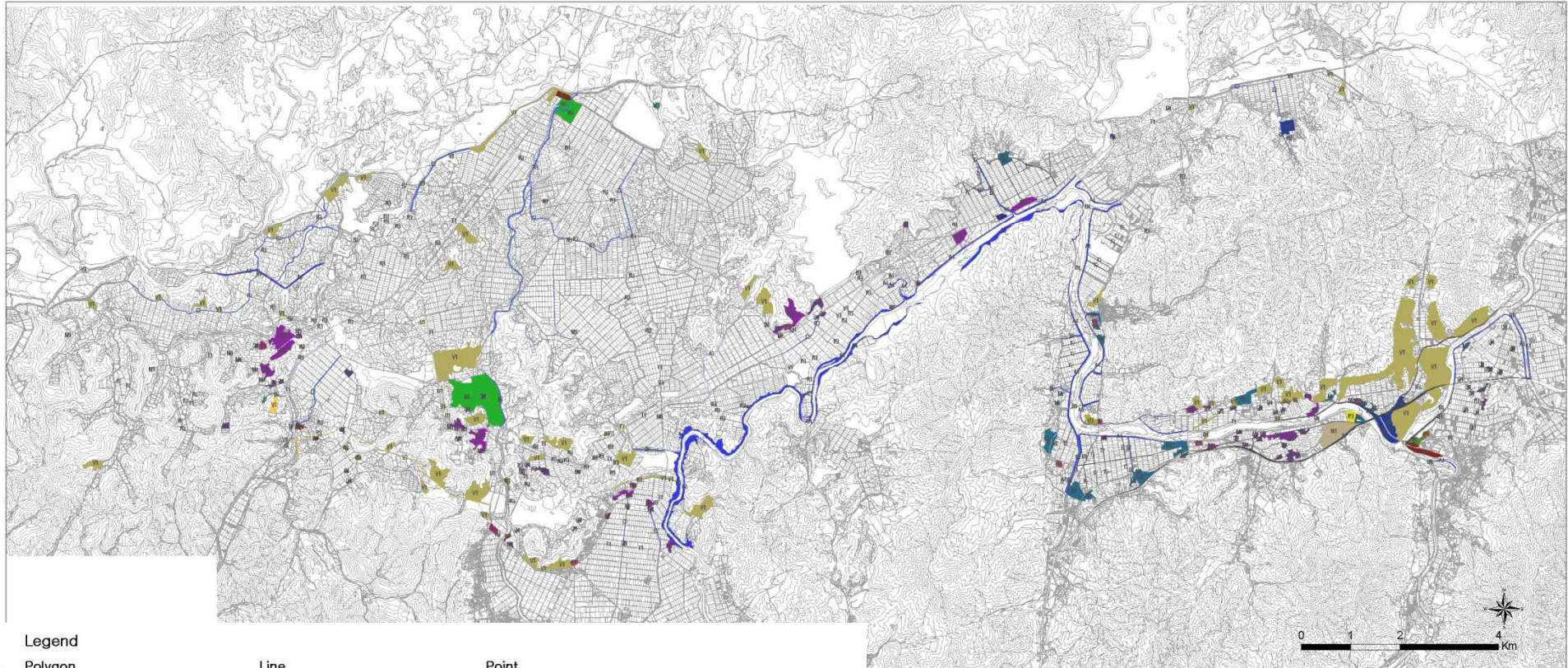


Line unit - Road



Point unit - Construction sites

(4) Mapping of threatened factors through GIS



Legend

Polygon

- 면형 - N1. 농공단지
- 면형 - P8. 대규모체육시설지
- 면형 - S1. 하수처리장
- 면형 - T3. 주차장
- 면형 - U1. 문화재
- 면형 - V1. 군사지역
- 면형 - V2. 건설현장
- 면형 - V8. 야적장

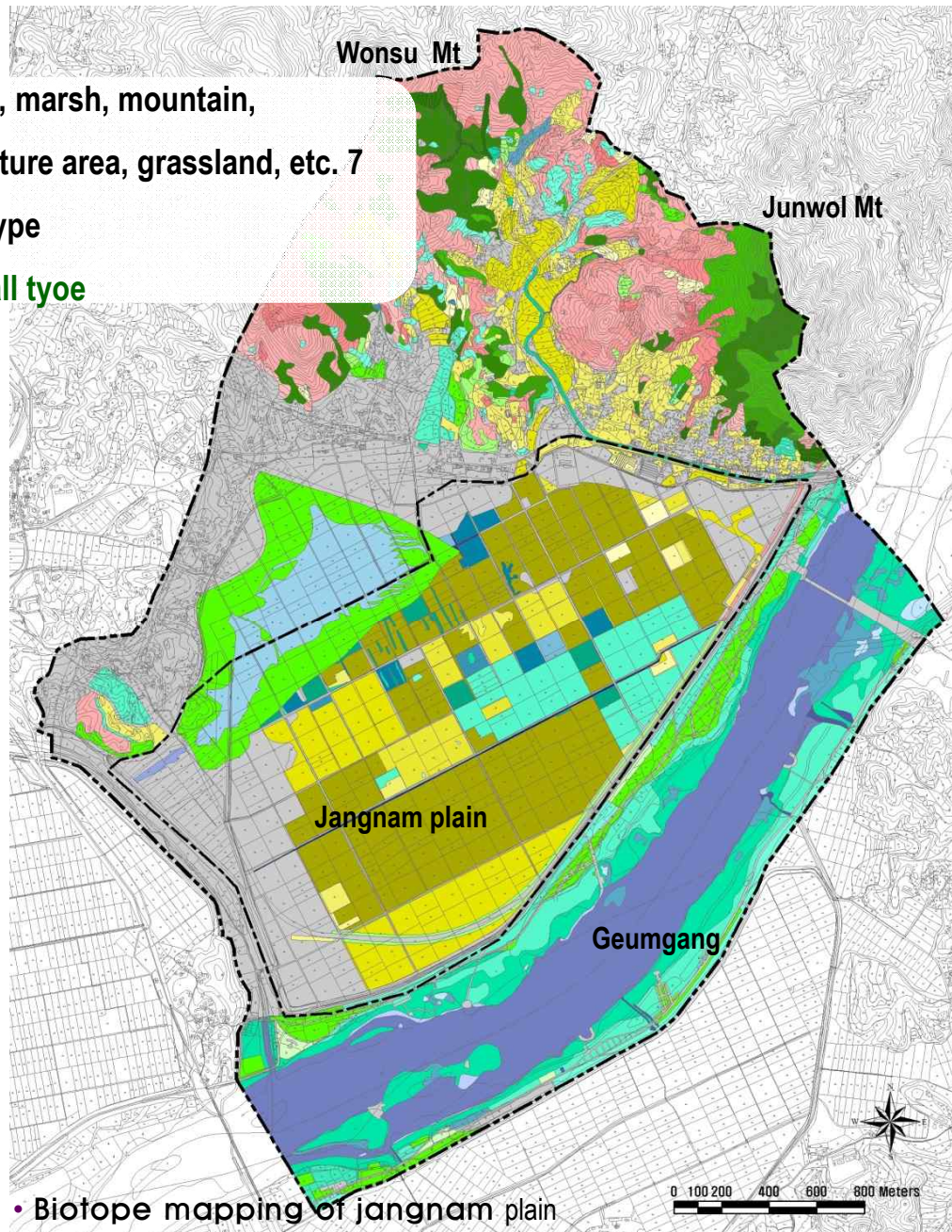
Line

- 선형 - A4. 하천제방
- 선형 - A5. 하천옹벽
- 선형 - B2. 인공형 하천
- 선형 - C2. 인공형 농수로
- 선형 - T1. 도로
- 선형 - T2. 농로

Point

- 점형 - D1. 하천보
- 점형 - M1. 농촌주막지
- 점형 - M2. 단목주막지
- 점형 - N2. 상입시설지
- 점형 - N3. 전망대
- 점형 - N4. 전시관
- 점형 - O1. 주상훈합지
- 점형 - P1. 교육시설
- 점형 - P2. 공공시설
- 점형 - P4. 수련원
- 점형 - P5. 체육시설지
- 점형 - Q1. 축사
- 점형 - Q2. 견사
- 점형 - R1. 공업지
- 점형 - R2. 액체비료저장소
- 점형 - R3. 창고
- 점형 - S2. 썩뜨장
- 점형 - S3. 배수장

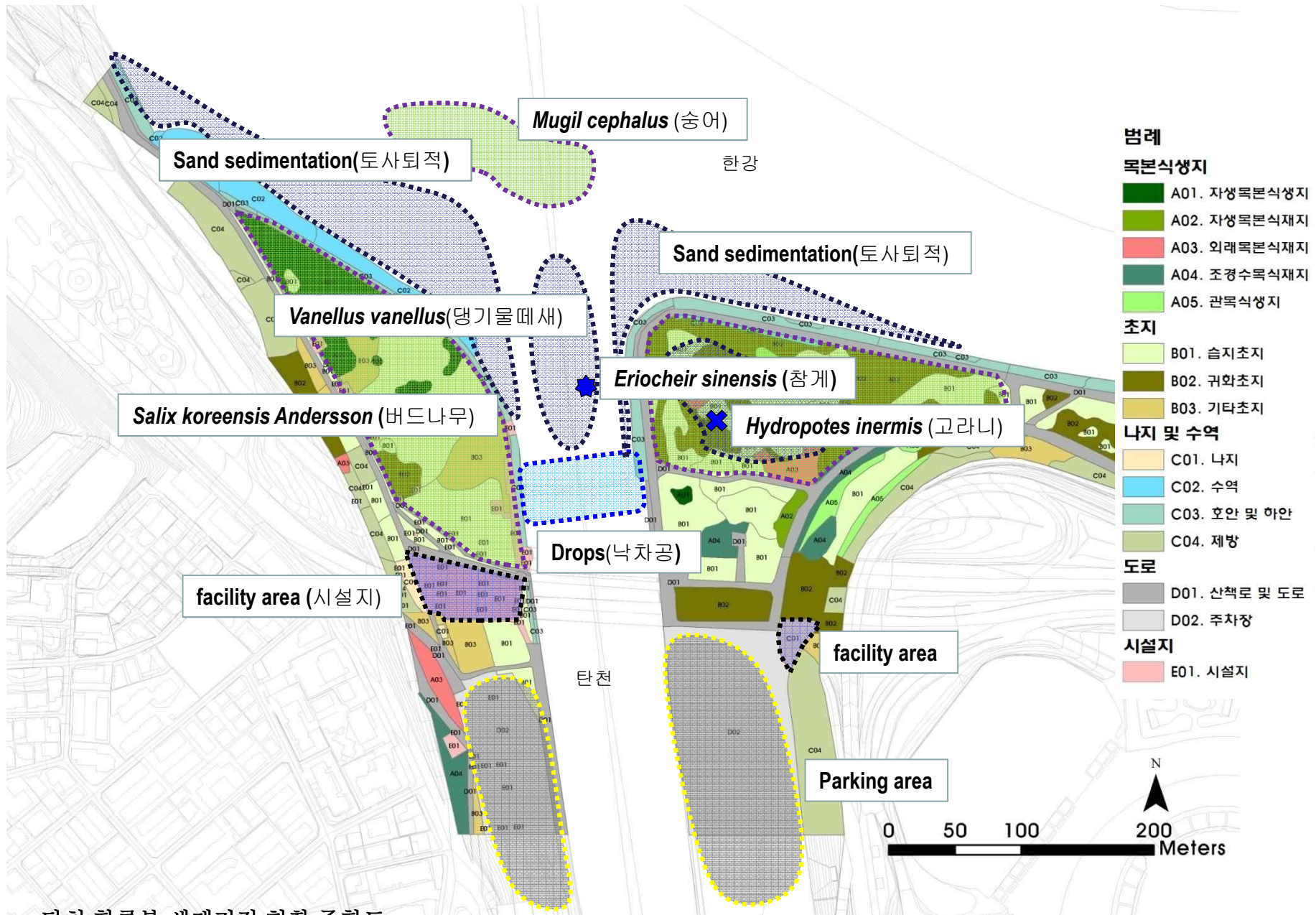
- stream, marsh, mountain, agriculture area, grassland, etc. 7 large type
- 42 small tyoe



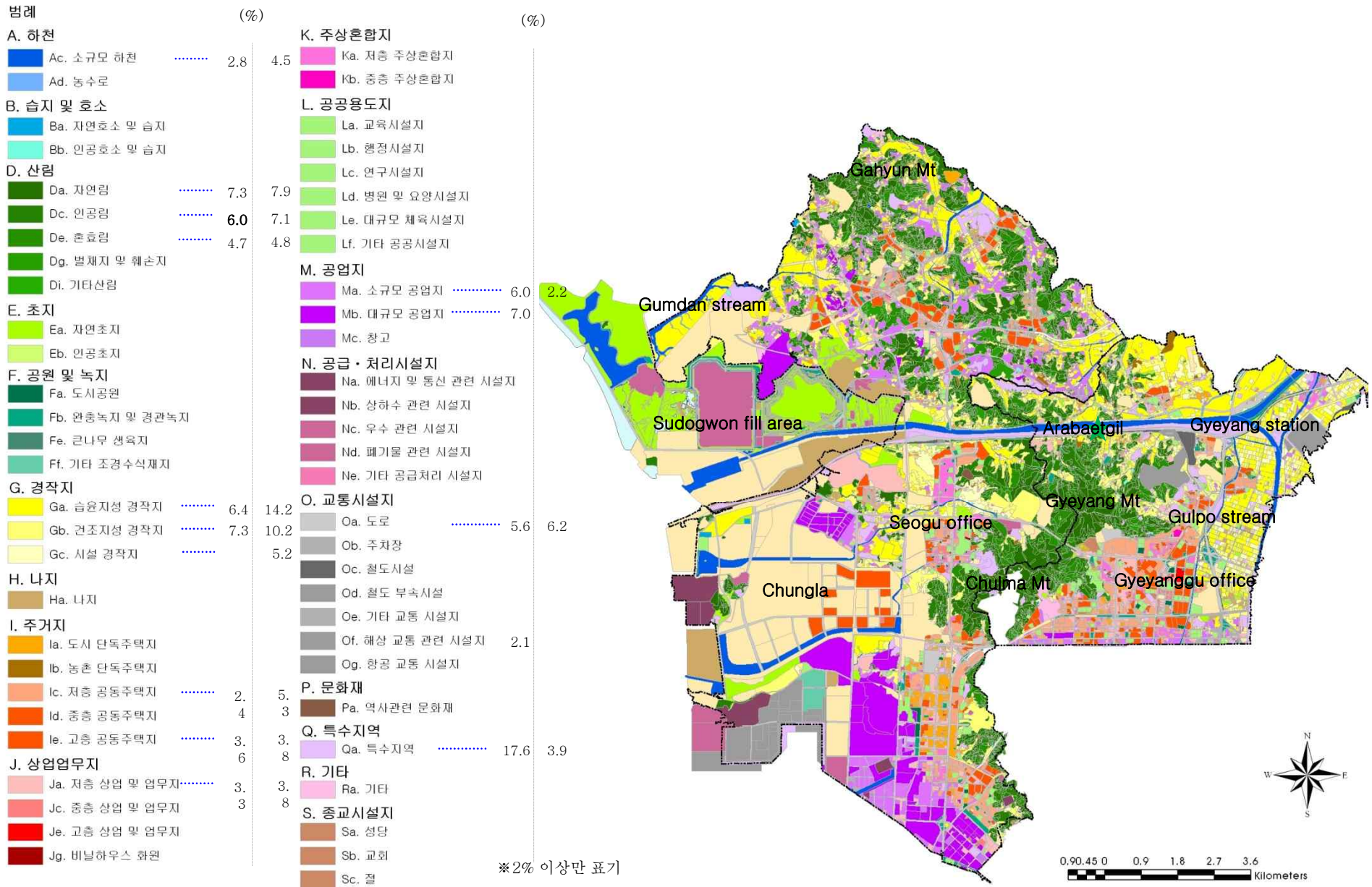
• Biotope mapping of jangnam plain

범례

하천(W)	<ul style="list-style-type: none"> Waa. 금개구리가 서식하는 자연형 농수로 Wab. 금개구리가 서식하는 인공형 농수로 Wac. 인공형 농수로 Wbb. 자연형호안 하천 Wcc. 인공형호안 하천 We. 모래퇴적지
습지(S)	<ul style="list-style-type: none"> Saa. 금개구리가 서식하는 습지 Sab. 목논습지 Sac. 습윤지성 목본 식생이 우점하는 습지 Sad. 초본 식생이 우점하는 습지 Sba. 인공형 호소 Sbb. 물웅덩이
산림(F)	<ul style="list-style-type: none"> Faa. 다중구조 건조지성 낙엽활엽수 자연림 Fab. 단중구조 건조지성 낙엽활엽수 자연림 Fba. 다중구조 건조지성 침엽수 자연림 Fbb. 단중구조 건조지성 침엽수 자연림 Fca. 단중구조 습윤지성 낙엽활엽수 자연림 Fda. 천이 가능성이 높은 낙엽활엽수 인공림 Fdb. 천이 가능성이 높은 침엽수 인공림 Fea. 천이 가능성이 낮은 낙엽활엽수 인공림 Feb. 천이 가능성이 낮은 침엽수 인공림 Ffa. 천이가 진행중인 침엽수 인공림 Fga. 벌채지 및 나지 Fgb. 관목식생지
경작지(A)	<ul style="list-style-type: none"> Aaa. 금개구리가 서식하는 습윤지성 경작지 Aab. 금개구리가 서식하는 습윤지성 논경지 Aba. 습윤지성 경작지 Abb. 습윤지성 논경지 Abc. 물이 있는 습윤지성 논경지 Aca. 건조지성 경작지 Acb. 건조지성 과수원 Acc. 건조지성 시설경작지 Acd. 건조지성 밭경지
초지(G)	<ul style="list-style-type: none"> Gaa. 금개구리가 서식하는 습윤지성 자생초지 Gab. 금개구리가 서식하는 습윤지성 귀화종 초지 Gba. 습윤지성 자생초지 Gca. 건조지성 자생초지 Gda. 건조지성 귀화종 초지 Gea. 잔디식재지
조경수 식재지(S)	<ul style="list-style-type: none"> Ta. 향토종 조경수식재지 Tb. 외래종 조경수식재지
시가지(U)	<ul style="list-style-type: none"> U. 시가화지역



▪ 탄천 합류부 생태거점 현황 종합도



7) Suggestion of future direction

Landscape planning for better management on target habitats

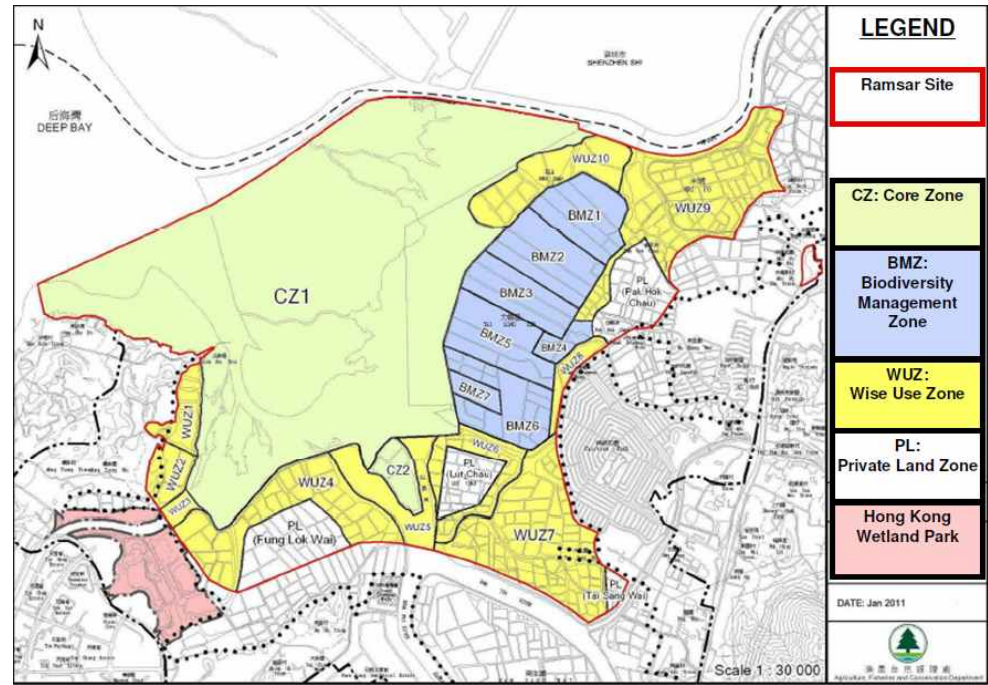
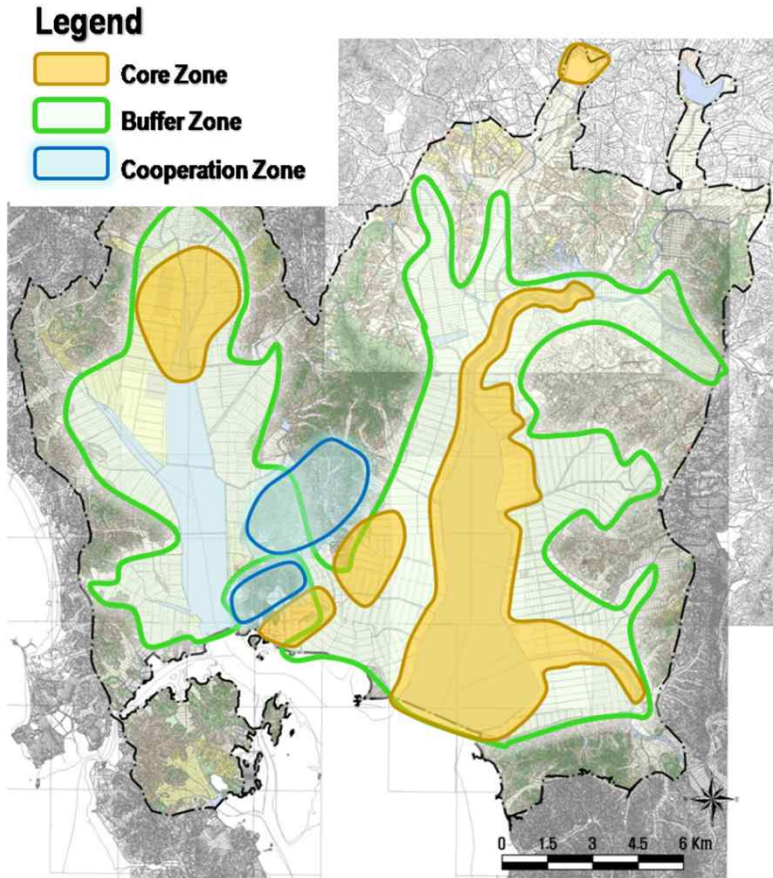
Zoning of the sites (core zone, buffer zone, and cooperation zone), producing a strategy for conservation and better management of the sites, and Establishment of land use and landscape management plan

DMZ Eco corridor
Eco-network of crane's wintering sites
MAB, Ramsar sites etc.



(1) Zoning of the sites

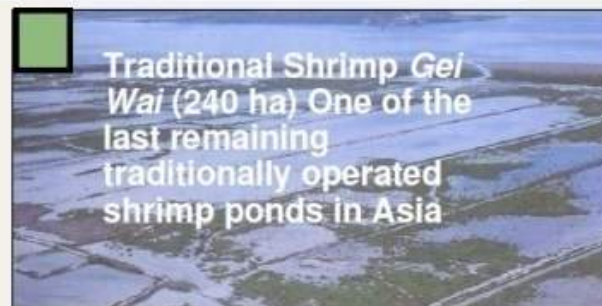
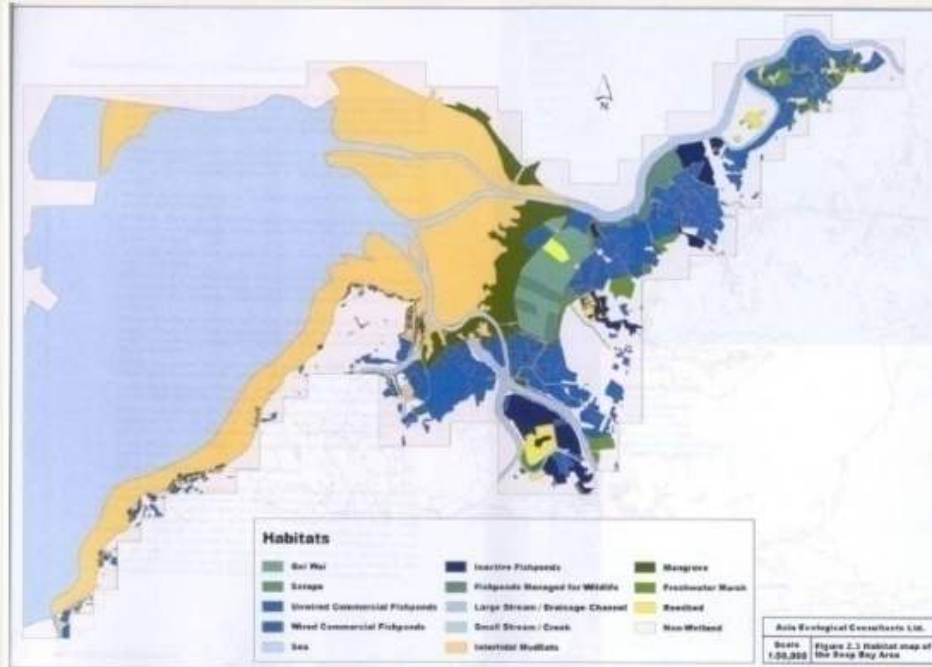
Core zone, Buffer zone, and Cooperation zone





Mai Po & Inner Deep Bay

Compose of various type of wetlands



(3) Establishment of land use and landscape management plan

Legend

Grus japonensis

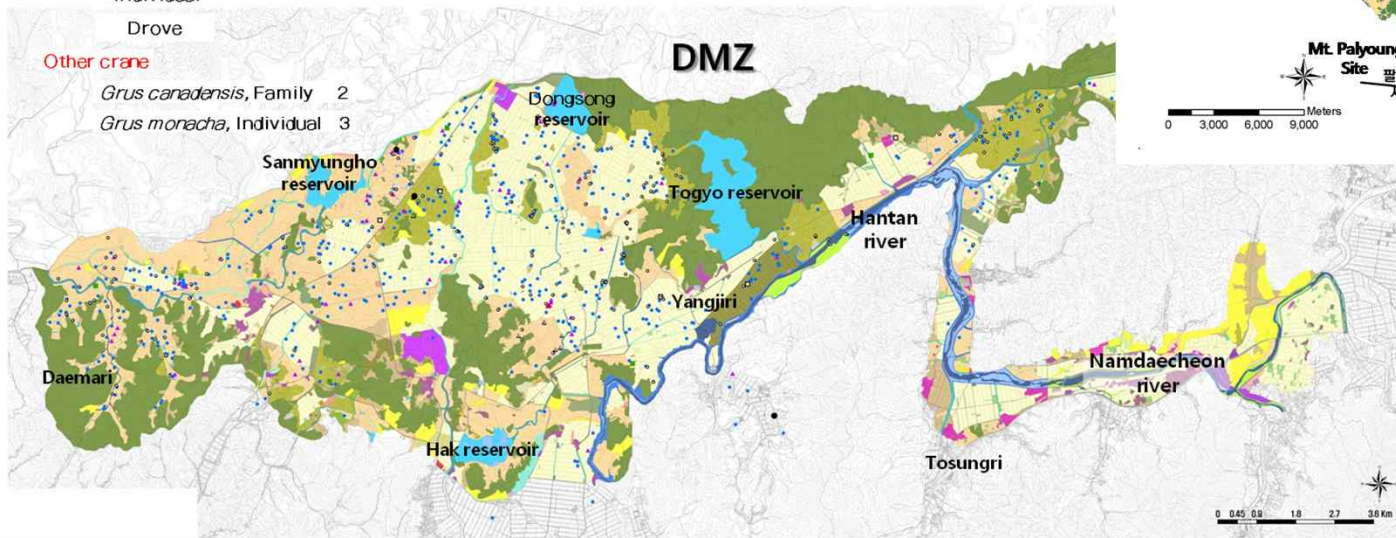
- Family 533
- Individual 6
- △ Drove 131

Grus vipio

- Family 1,676
- Individual -
- △ Drove -

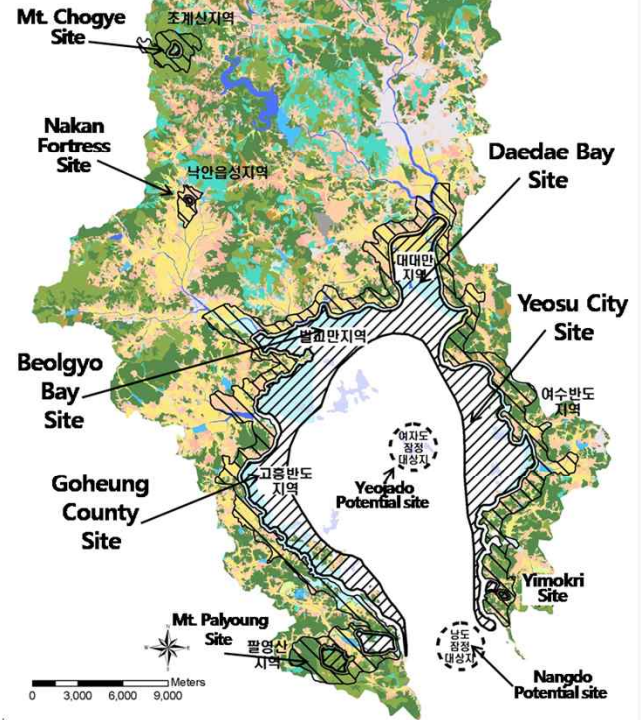
Other crane

- Grus canadensis*, Family 2
- Grus monacha*, Individual 3



Legend

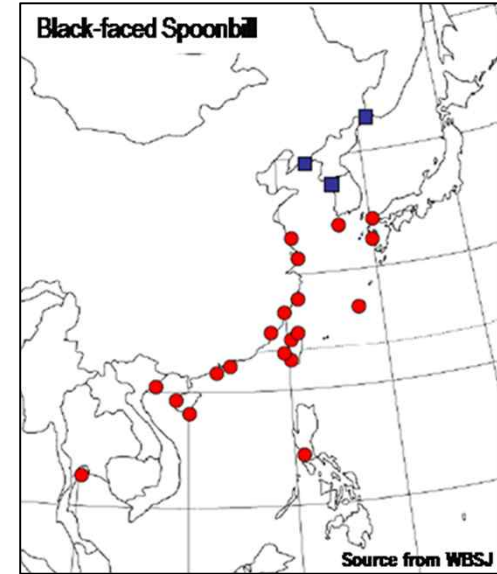
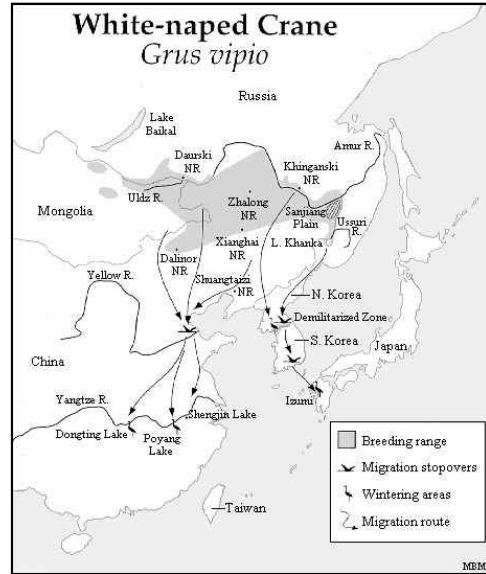
- ▨ Core Zone
- ▨ Buffer Zone
- Potential Site



IV. Vision and future

Conservation of endangered species & habitat through the environmental ecological planning

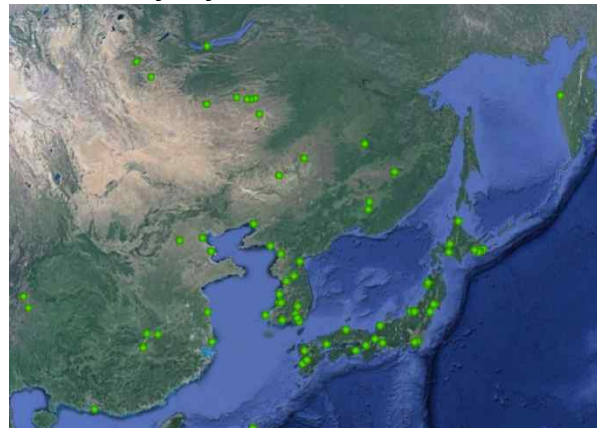




Ramsar Site in NEA



EAAFP Flyway Site in NEA



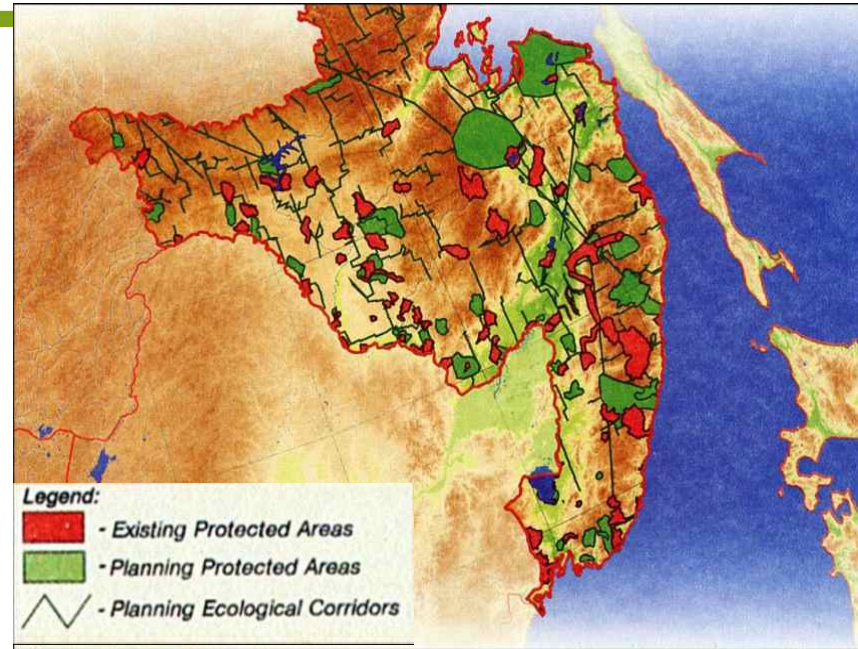
Important Birds Area in NEA





Source from The World Database on Protected Areas

Ecological Network of the Russian Far East

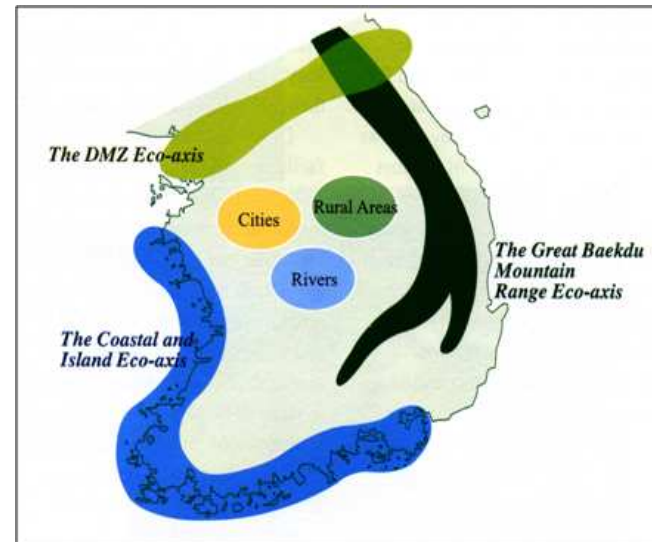


Potential Priority Areas of the Yellow Sea



Source from The Yellow Sea Ecoregion Planning Programme, 2006

Three Core Eco-Axes of Korean Peninsula



Source from MOE, Korea (2010)

NEASPEC Nature Conservation Site for Sub-regional cooperation

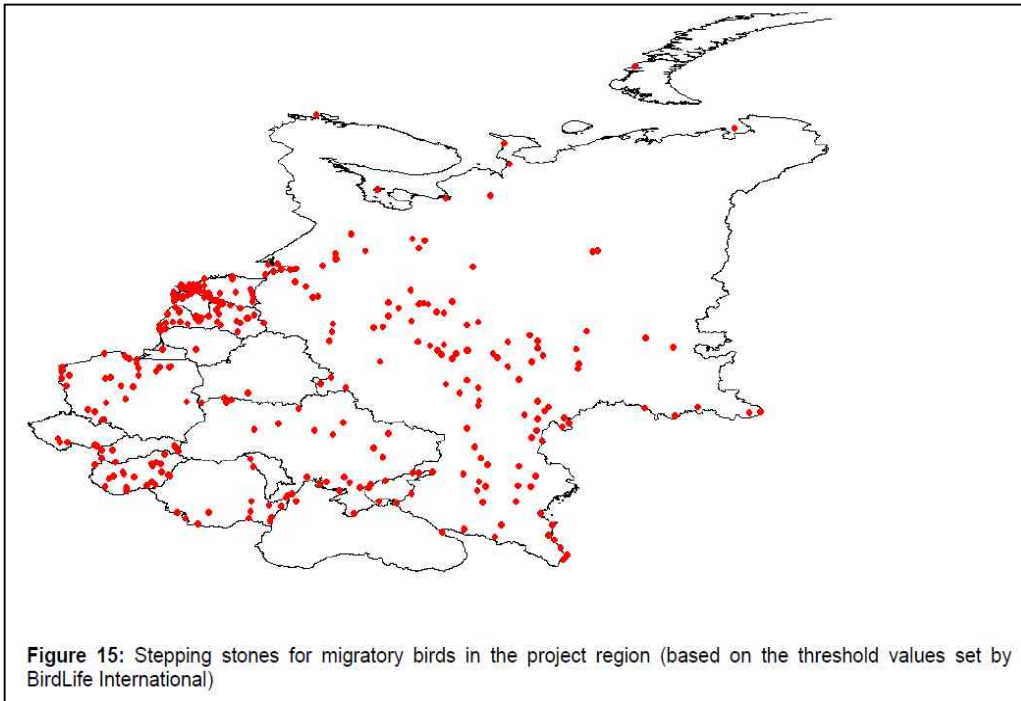
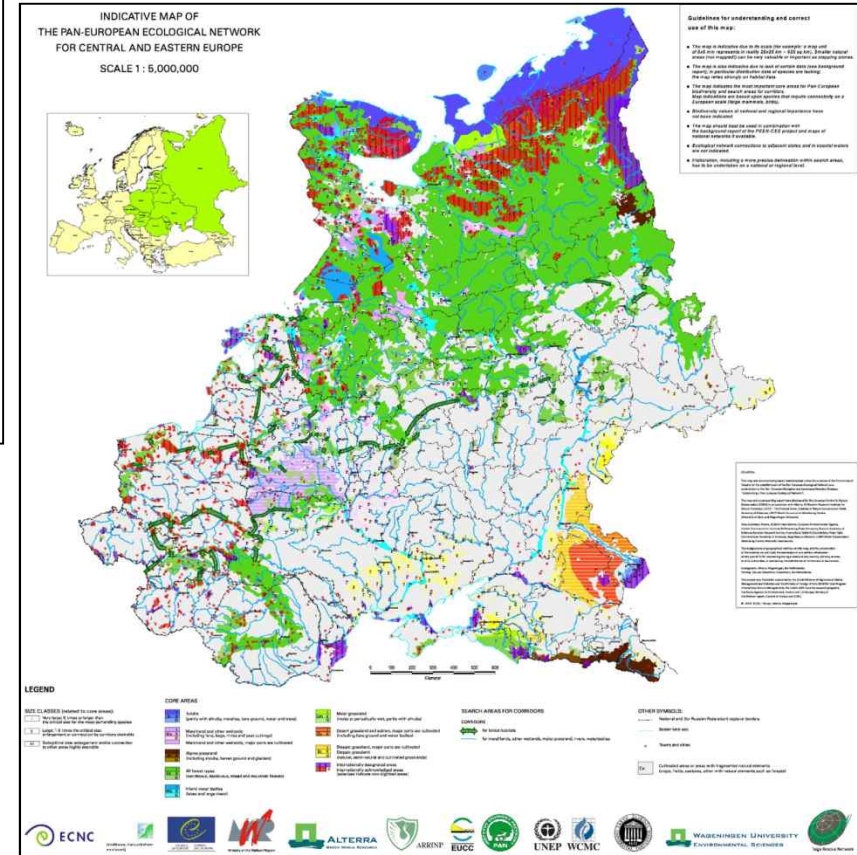


Figure 15: Stepping stones for migratory birds in the project region (based on the threshold values set by BirdLife International)



Thank you for your attention!

