HOKKAIDO UNIVERSITY

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Biodiversity and conservation of mire ecosystems in Hokkaido, Japan

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Biodiversity of wetland ecosystem

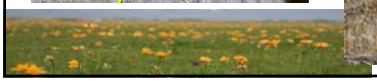
Cardamine pratensis

Iris ensata var. spontanea

Bean goose オオヒシクイ
Anser fabalis middendorffii

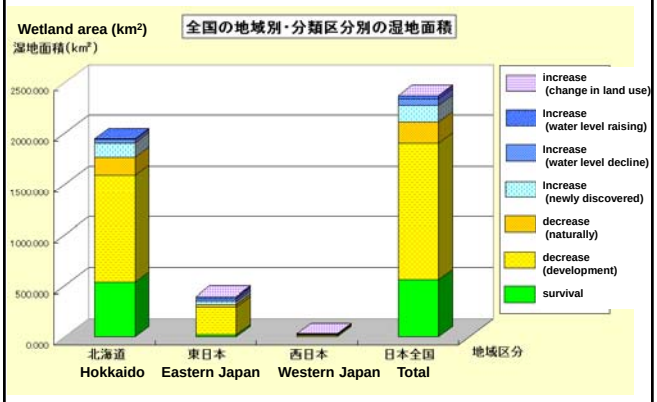
Yellow-breasted bunting
シマアオジ*Emberiza aureola ornata*

Viviparous lizard コモチカナヘビ
Zootoca vivipara



Japanese crane タンチョウ
Grus japonensis

Change in wetland area at different regions in Japan



after **Geospatial information Authority of Japan (GSI)**
http://www1.gsi.go.jp/geoweww/lake/shicchimenseki2.html

Today's Topics

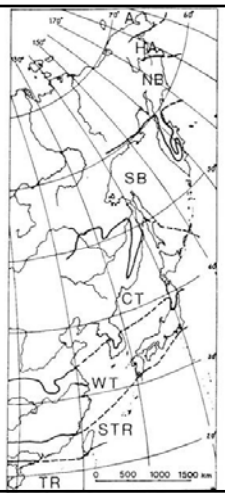
I. **Introduction of mires in Hokkaido**

II. **Decline and the present condition of mires in Hokkaido**

III. **Biodiversity and conservation of remaining mire ecosystem in Hokkaido**

I . Introduction of mires in Hokkaido

Makunbetsu mire

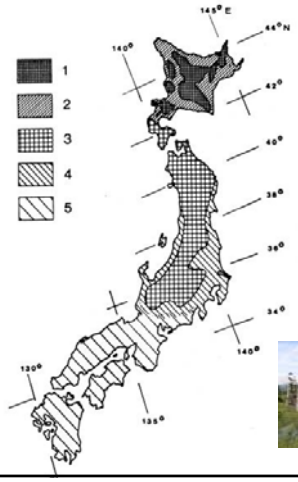


Climatic vegetational zones in East Asia, After Hamet-Ahti et al. (1974)

Explanetion of symbols:

- **A - arctic**
- **HA - hemiarctic**
- **NB - northern boreal**
- **SB - southern boreal**
- **CT - cool temperate**
- **WT - warm temperate**
- **STR - subtropical**
- **TR - tropical**

Climatic mire zones in Japan After Wolejko and Ito (1986)



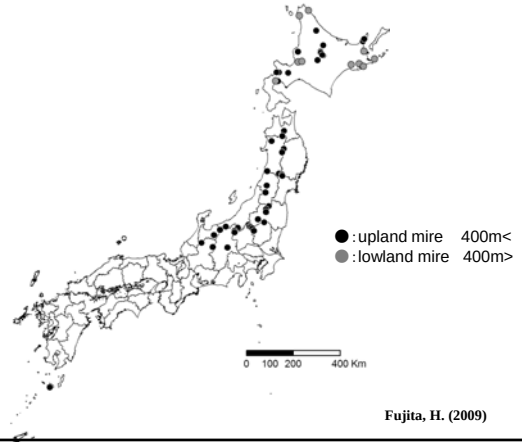
Explanetion of symbols:

1. mountain mire zone of Hokkaido
2. lowland mire zone of Hokkaido
3. mountain mire and upland bog zone of northern Honshu
4. transitional zone
5. peatless zone of southern Japan

Numanohara mire (Daisetsu mountain)

Shizukari mire

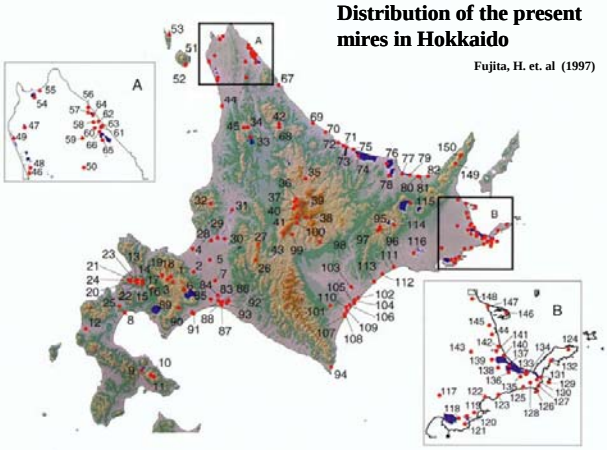
Major mires in the upland and lowland



Fujita, H. (2009)

Distribution of the present mires in Hokkaido

Fujita, H. et. al (1997)



Typical mires in Hokkaido

Lowland (alluvial plain, river side)

Kushiro

Sarobetsu

Sarobetsu

Asajino

Shizukari

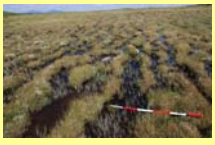
Utasai

Typical mires in Hokkaido

Upland (mountainous region)

Daisetsu moutain

Numanohara



Hiragadake-nanpou

Daisetu Kumoigahara

Ukishima

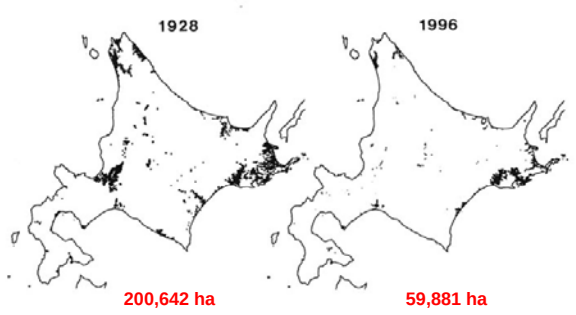
Uryunuma

II. Decline and the present condition of mires in Hokkaido

Kushiro mire (Yasuhara Riverside)

Sarobetsu mire

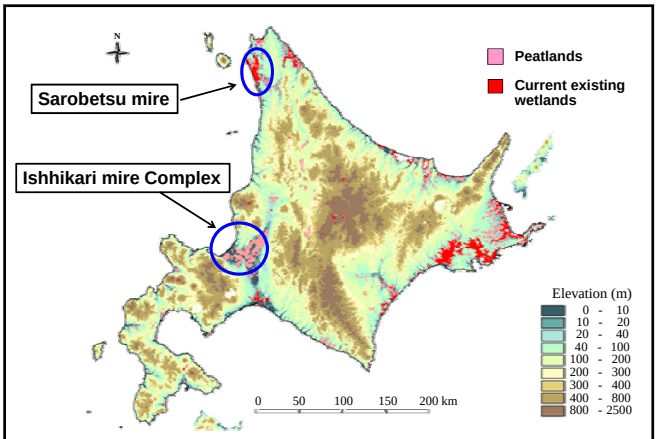
Change of mire area in Hokkaido



200,642 ha　　59,881 ha

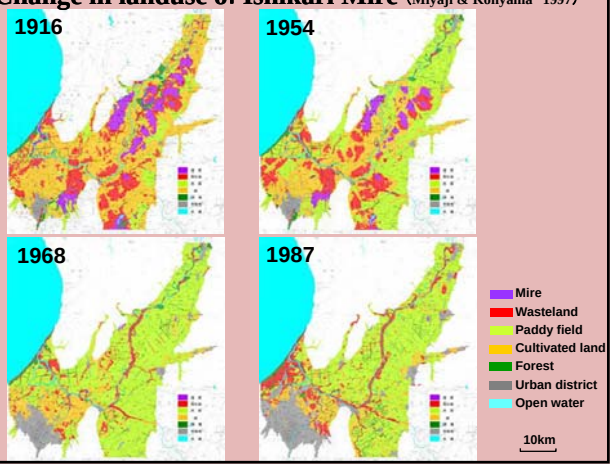
Survival percentage 29.8 %

Fujita, H. (1997)



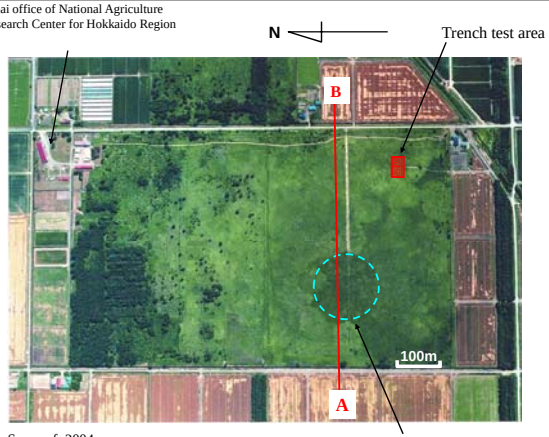
Distribution of peatlands and current existing wetlands in Hokkaido

Change in landuse of Ishikari Mire (Miyaji & Kohyama 1997)



Present condition of Bibai Mire

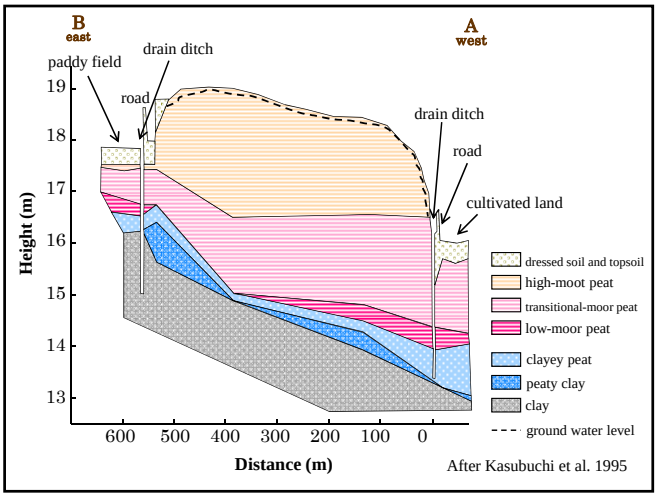
Bibai office of National Agriculture Research Center for Hokkaido Region



Scene of 2004

Bibai Mire

Bog vegetaion



After Kasubuchi et al. 1995

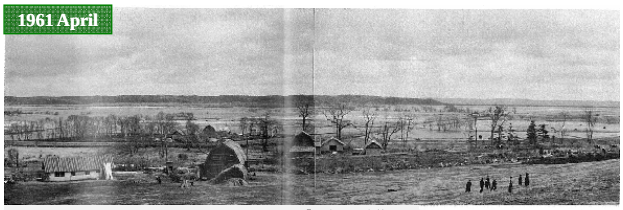
Present condition of Shinsinotsu mire

Change of the river network around Sarobestu mire

Original river network (before1920s)

Present river network

1961 April

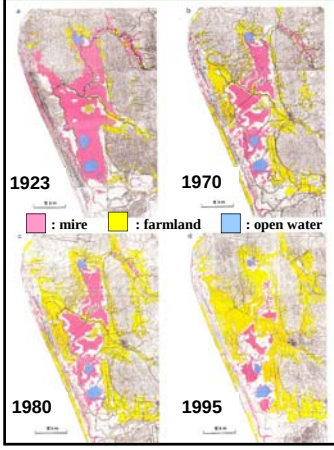


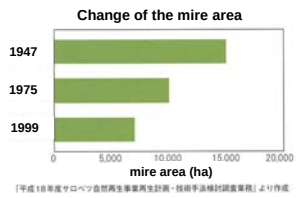
After Hokkaido Regional Development Bureau (1972)「泥炭地の生態」

2010 October

Photo by Takashi Inoue

Reduction of Sarobestu mire

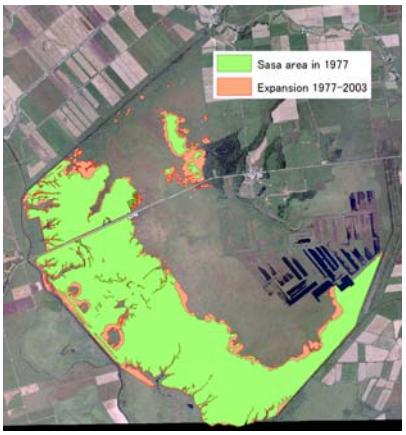




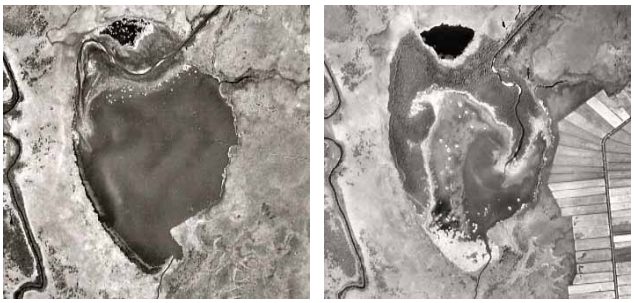
Fujita, H. (1997)

Expansion of *Sasa* growing area in Sarobestu mire

Expansion of *Sasa* growing area in Sarobestu mire

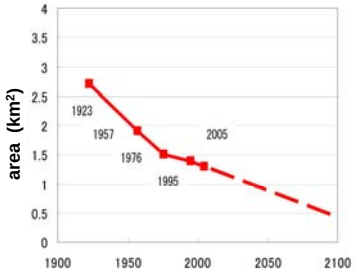


Reduction of Penke-pond in Sarobetsu mire



1947　　1999

Reduction of Penke-pond in Sarobetsu mire



Change of the open water area of Penke-pond
A dashed line is simulated Panke-pond area in the future.

国土地理院　サロベツ地区湖沼湿原調査報告書(2007)より引用

After Geospatial information Authority of Japan (GSI) (2007)
'The report of lake and wetland survey of Sarobetsu area, Hokkaido, northern Japan'

Ⅲ. Biodiversity and conservation of remaining mire ecosystem

Ownership of mires in Hokkaido

Fujita et.al (2009)

	Ownership condition	Number	% in site	ha	% in area
Uplands	Federal land	29	67.4	654.8	70.9
	Prefectural, town, and municipal land	10	23.3	255.2	27.7
	Private land	3	7.0	13.0	1.4
	Federal land & Prefectural, town, and municipal land mixed	1	2.3	-	-
	Subtotal	43	100.0	923.0	100.0
Lowlands	Federal land	15	14.0	12,802.9	21.7
	Prefectural, town, and municipal land	3	2.8	3,766.1	6.4
	Private land	45	42.1	42,388.8	71.9
	Federall land & Prefectural, town, and municipal land mixed	2	1.9	-	-
	Federall, Prefectural, town, and land & Private land mixed	42	39.2	-	-
	Subtotal	107	100.0	58,957.8	100.0
Total		150		59,880.8	

The extent of designated mires protection in Hokkaido.

Fujita et. al (2009)

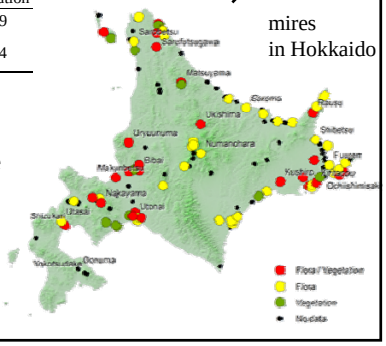
	Conservation system	Number	% in site	ha	% in area
Uplands N=43	National park	20	46.5	635.0	68.8
	Quasi-national park	9	20.9	193.2	20.9
	Prefectural national park	2	4.7	4.4	0.5
	Other protected areas	3	7.0	57.9	6.3
	No protection	9	20.9	32.5	3.5
	Subtotal	43	100.0	923	100.0
Lowlands N=107	National park	6	5.6	18080.7	30.7
	Quasi-national park	8	7.5	2406.9	4.1
	Prefectural national park	26	24.3	7899.0	13.4
	Other protected areas	25	23.4	2231.5	3.8
	No protection	42	39.3	28339.7	48.1
	Subtotal	107	100.0	58957.8	100.0
Total		150		59880.8	

Database for wetland biodiversity analysis

Literature used for the database

	Flora	Vegetation
No. of literature	91	139
Used for this analysis	57	104

83/151 mires in Hokkaido

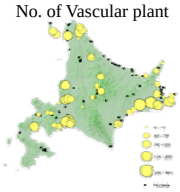


The number of vascular plant species in the database

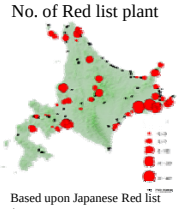
No. of vascular plant	1,442
No. of Red data plant	173
No. of Invasive plant	151

Example of the analysis using the database

No. of Vascular plant

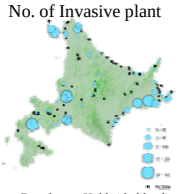


No. of Red list plant



Based upon Japanese Red list (Ministry of Environment, Japan 2010)

No. of Invasive plant

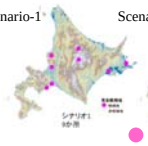


Based upon Hokkaido blue list (Hokkaido, Japan 2012)
Blue list = invasive alian speacies list

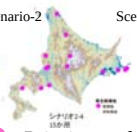
Now in progress

Identify priority wetlands for conservation

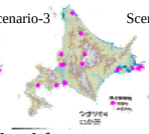
Scenario-1



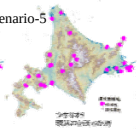
Scenario-2



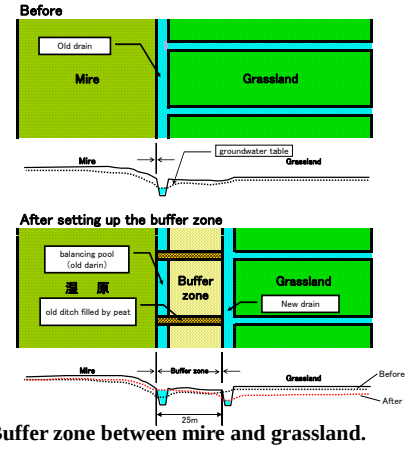
Scenario-3



Scenario-5

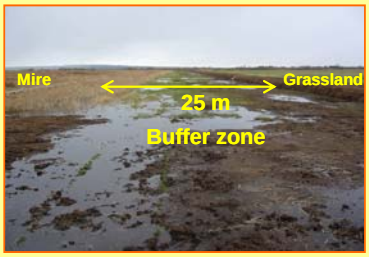


● : Priority wetland for conservation



Buffer zone between mire and grassland.
(after Wakkanai Development and Construction Department)

Buffer zone between mire and grassland



The water level in the farmland decreased after the construction of the new farm drain.

Buffer zone is flooded due to the over flooding of the old drain.

Conclusion

- **In Hokkaido, more than 70 % of mire area has been lost during the past 100 years.**
- **It is urgent for human society to protect and restore the remaining mires.**
- **The mires in the rural area and the urban area have serious problems due to drainage, land subsididence, mire vegetation change etc.**
- **For further progress;**
  - **Accumulation of scientific knowledge and commitment of researches,**
  - **Long term monitoring project,**
  - **Organization of new method to evaluate biodiversity**