



JAPAN BIODIVERSITY OUTLOOK

Assessment and indicator on biodiversity

Ministry of the Environment, Japan

Background

Global level

2001-2005 Millennium Ecosystem Assessment

2002 Adopted 2010 target

2006 GBO2

National level

2007 3rd NBSAP

2008 The Basic Law for Biological
Diversity

2010 NBSAP2010

2010 GBO3

2010 Japan Biodiversity
Outlook



Purpose of the JBO

To raise public awareness of
“Biodiversity”

To promote national and
regional conservation activities
of various stake holders

Target and Period of JBO

Target of JBO

Biodiversity throughout Japan

1. Drivers of biodiversity loss
2. State of biodiversity

Assessment Period of JBO

from the latter half of the 1950's to the present

From the latter half of the 1950's
Rapid economic growth

From the latter half of the 1970's
Stable economic growth

From 1990's
population decrease, Low economic growth

Framework of JBO

Indicators were set to assess biodiversity from the aspect of Driver/Pressure, State/Impact and Response.

Indirect Driver

Driver/Pressure

Factors behind loss (degree of impact) and current trends



e.g. Land use

Response

e.g. Protected areas
Monitoring

State/Impact

Degree of loss and current trends of biodiversity



e.g. Reduction of distribution
Decreasing habitat quality

Drivers of biodiversity loss

Four biodiversity crises

(by NBSAP2010)



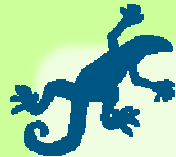
First Crisis

Overexploitation,
development and
water pollution



Second Crisis

Underutilization
[*Satoyama* issue]



Third Crisis

Artificially introduced factors
(Alien Species, chemicals)



Climate Change Crisis

Global warming



State of Biodiversity in six ecosystems



Forest system



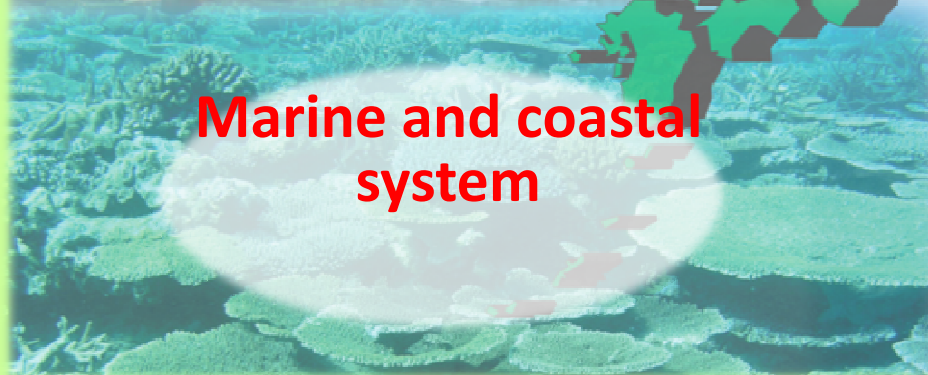
Agricultural system



Urban system



Inland water system



Marine and coastal system



Island system




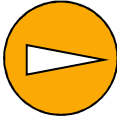
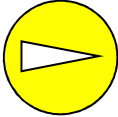


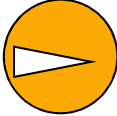



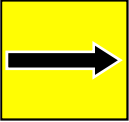
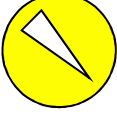


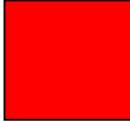










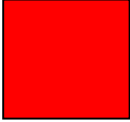

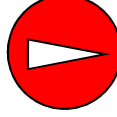






Assessment Results

- Four biodiversity crises
- Six ecosystems

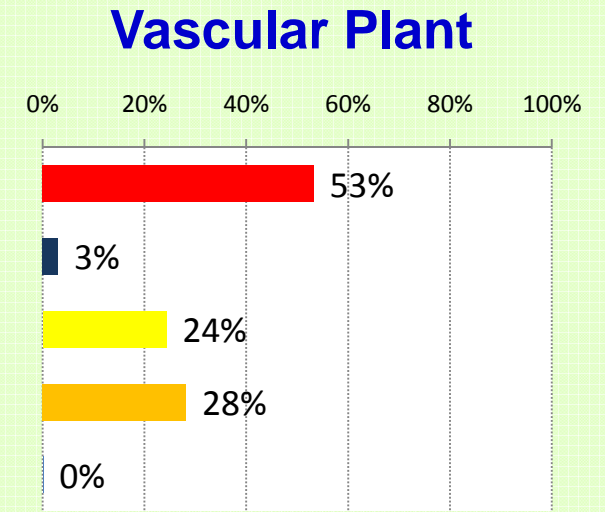
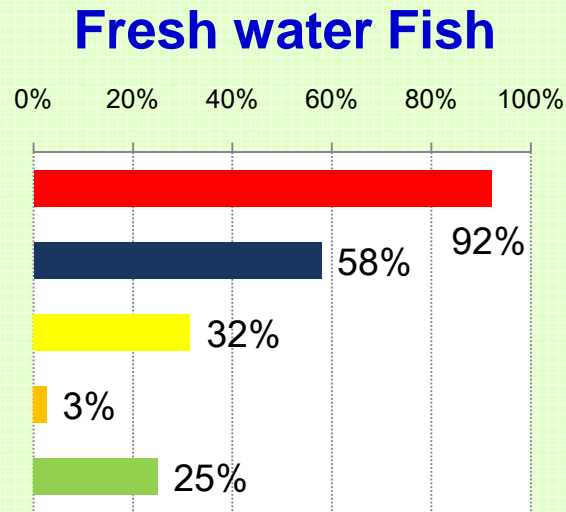
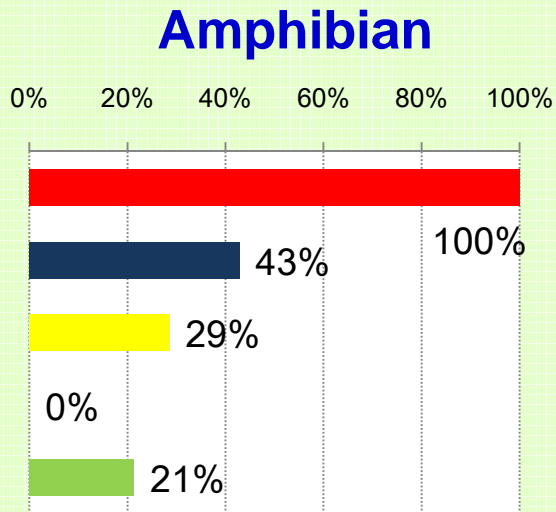
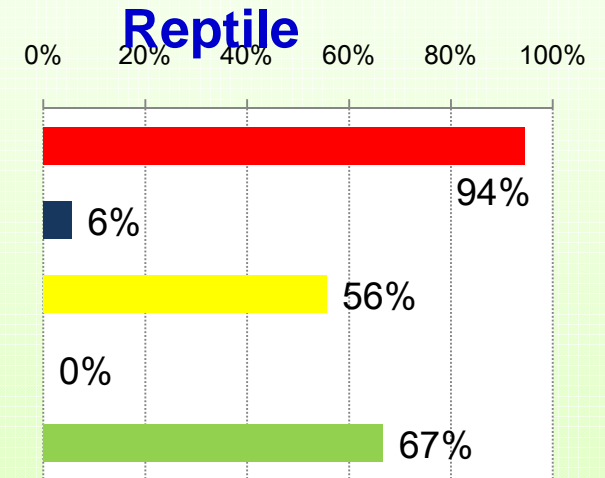
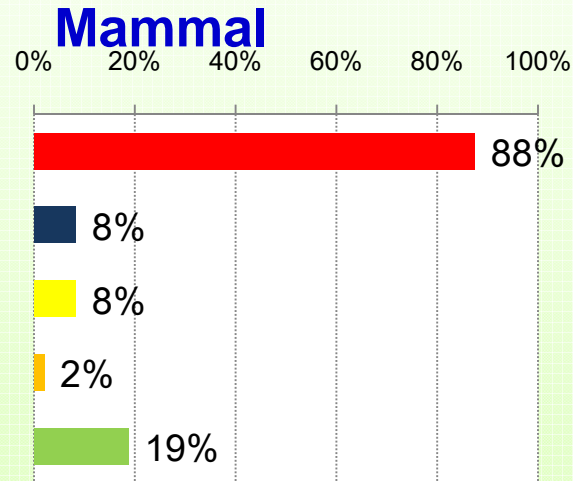
Assessment Results: 1st Crisis

	State and trends		Drivers and trends				
	From original	Since late 1950s	Over Use	Under use	Alien Species	Climate change	Others
Forest							
Agriculture	-						<ul style="list-style-type: none"> • Decrease of crops and domestic animals genetic diversity
Urban	-			-			
Inland water							
Marine and Coastal				-			<ul style="list-style-type: none"> • Deforestation of seaweed bed • Plague of coral-eating animals
Island				-			

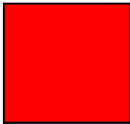



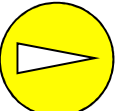






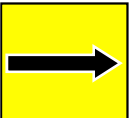
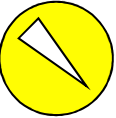


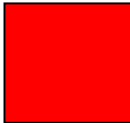

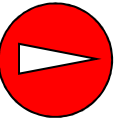



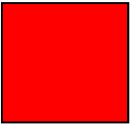

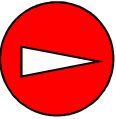




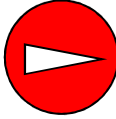


Drivers of biodiversity loss – 1st Crisis

Factors threatening RL species

Development
Pollution
Exploitation
Succession
Invasive spp.

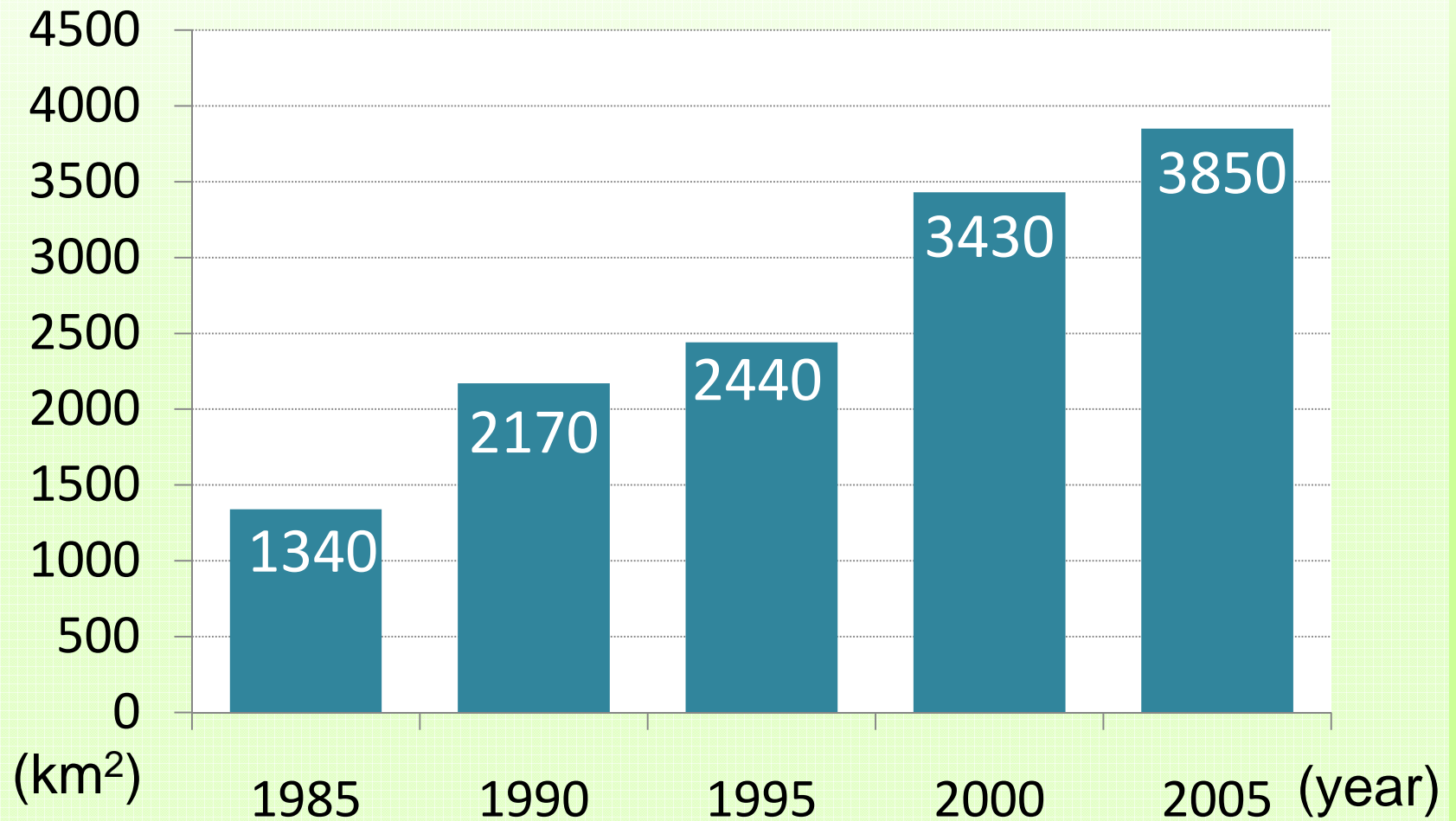


Assessment Results: 2nd Crisis





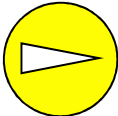






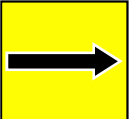
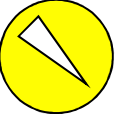




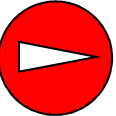








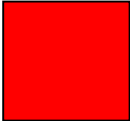

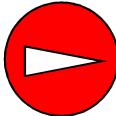


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Agriculture	-						<ul style="list-style-type: none"> • Decrease of crops and domestic animals genetic diversity
Urban	-			-			
Inland water							
Marine and Coastal				-			<ul style="list-style-type: none"> • Deforestation of seaweed bed • Plague of coral-eating animals
Island				-			

Drivers of biodiversity loss – 2nd Crisis

Area of abandoned farmland

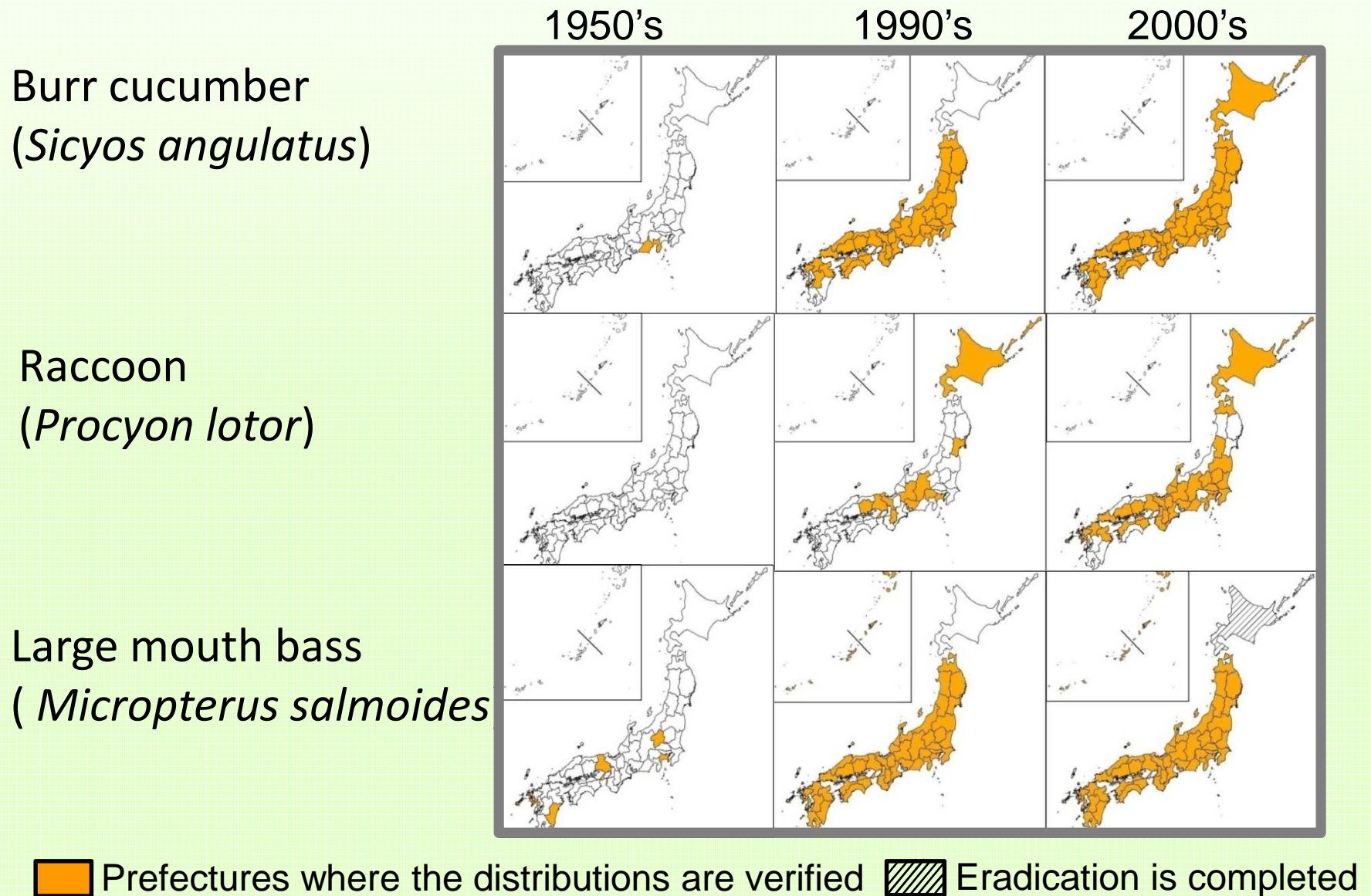


Assessment Results: 3rd Crisis





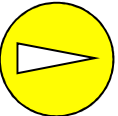






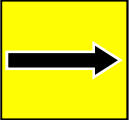
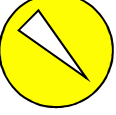


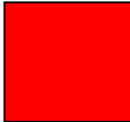




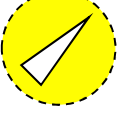





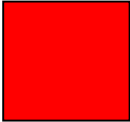




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Urban	-			-			
Inland water							
Marine and Coastal				-			<ul style="list-style-type: none"> • Deforestation of seaweed bed • Plague of coral-eating animals
Island				-			

Drivers of biodiversity loss – 3rd Crisis

Expansion of Invasive alien species



Assessment Results: Climate change

	State and trends		Drivers and trends					Others
	From original	Since late 1950s	Over Use	Under use	Alien Species	Climate change		
Forest								
Agriculture	-						Decrease of crops and domestic animals genetic diversity	
Urban	-			-				
Inland water								
Marine and Coastal				-			Deforestation of seaweed bed Plague of coral-eating animals	
Island				-				

Drivers of biodiversity loss – Climate change crisis

Decrease and loss of ecosystems

Decreasing alpine plants in Mt. Apo

Changes in abundance and distribution

Distribution change of Great Mormon, Common Flangetai and Southern green stink bug

Phenology

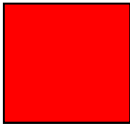



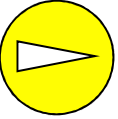


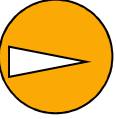



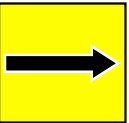
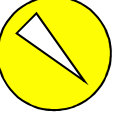


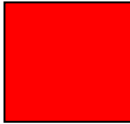





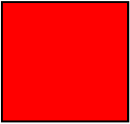

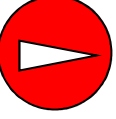







Changes in the egg-laying season and clutch size of Red-cheeked Starlings

Changes in population number

Changes in population size of Bewick's Swan during winter Season in Japan

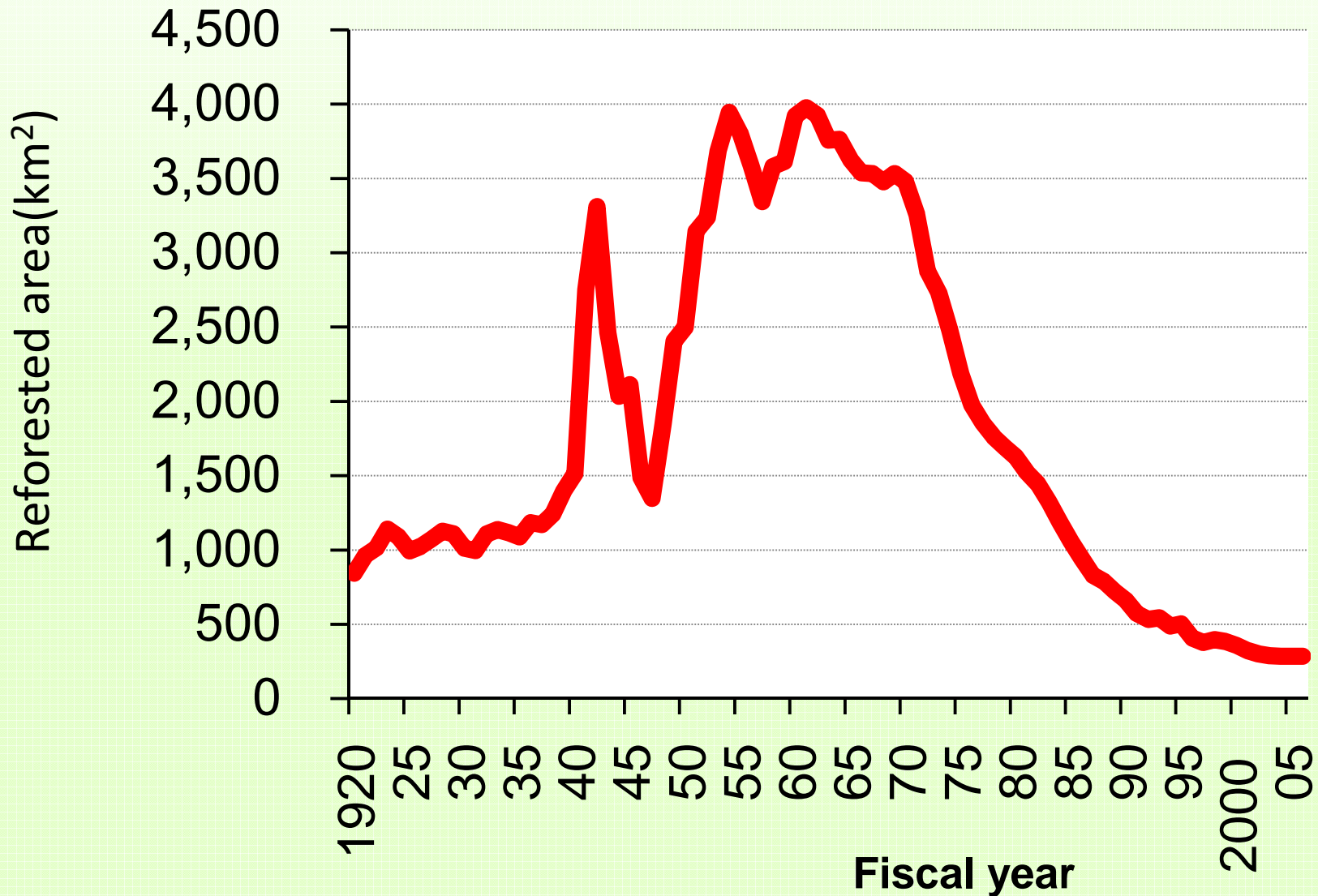


Assessment Results: Forests Systems

	State and trends		Drivers and trends				
	From original	Since late 1950s	Over Use	Under use	Alien Species	Climate change	Others
Forest							
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Island				-			

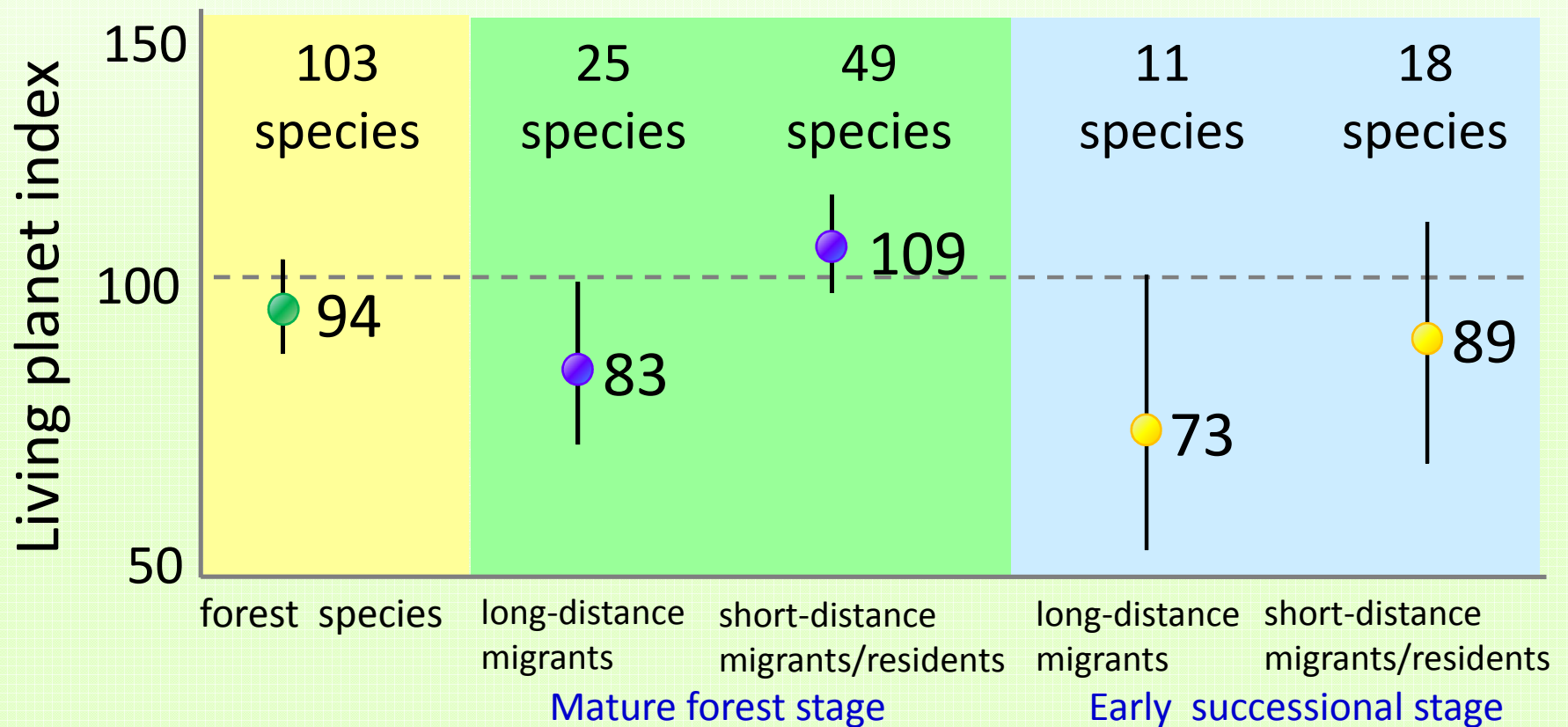
State of Biodiversity - Forests Systems

Trend in reforested area

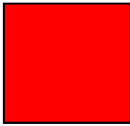



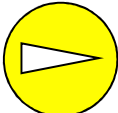


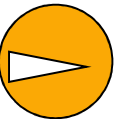



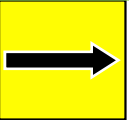
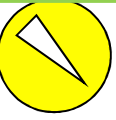




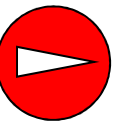








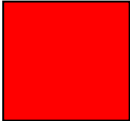






State of Biodiversity -Forests Systems

Distribution change of birds at 1997-2002(1978 as base year)
(Living Planet Index)

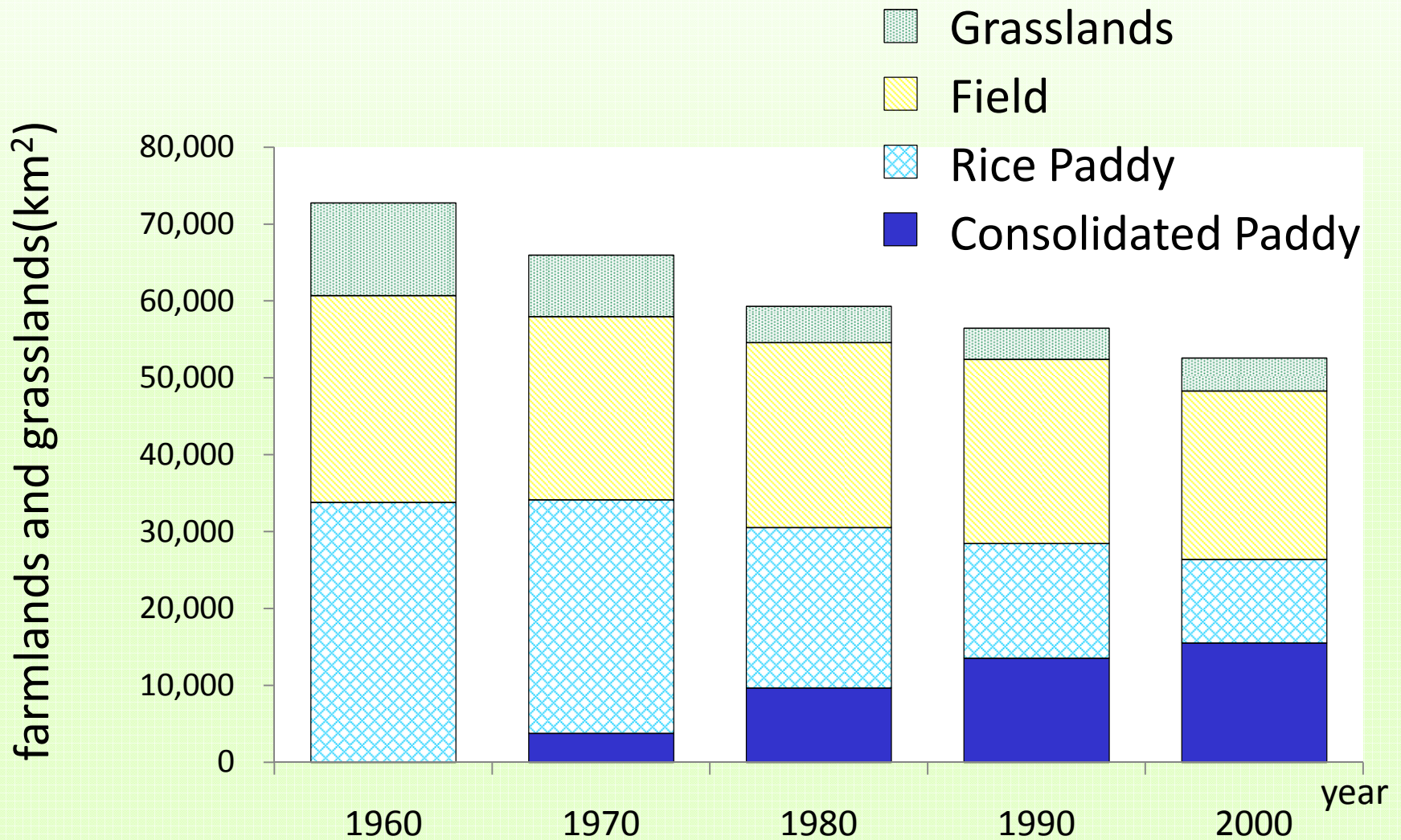


Assessment Results: Agricultural Systems

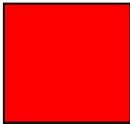



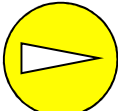






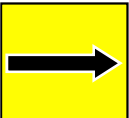
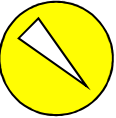


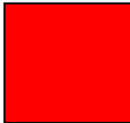

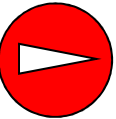



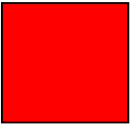

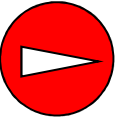




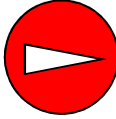


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Island				-			

State of Biodiversity-Agricultural Systems

Trend in farmlands and grasslands in area

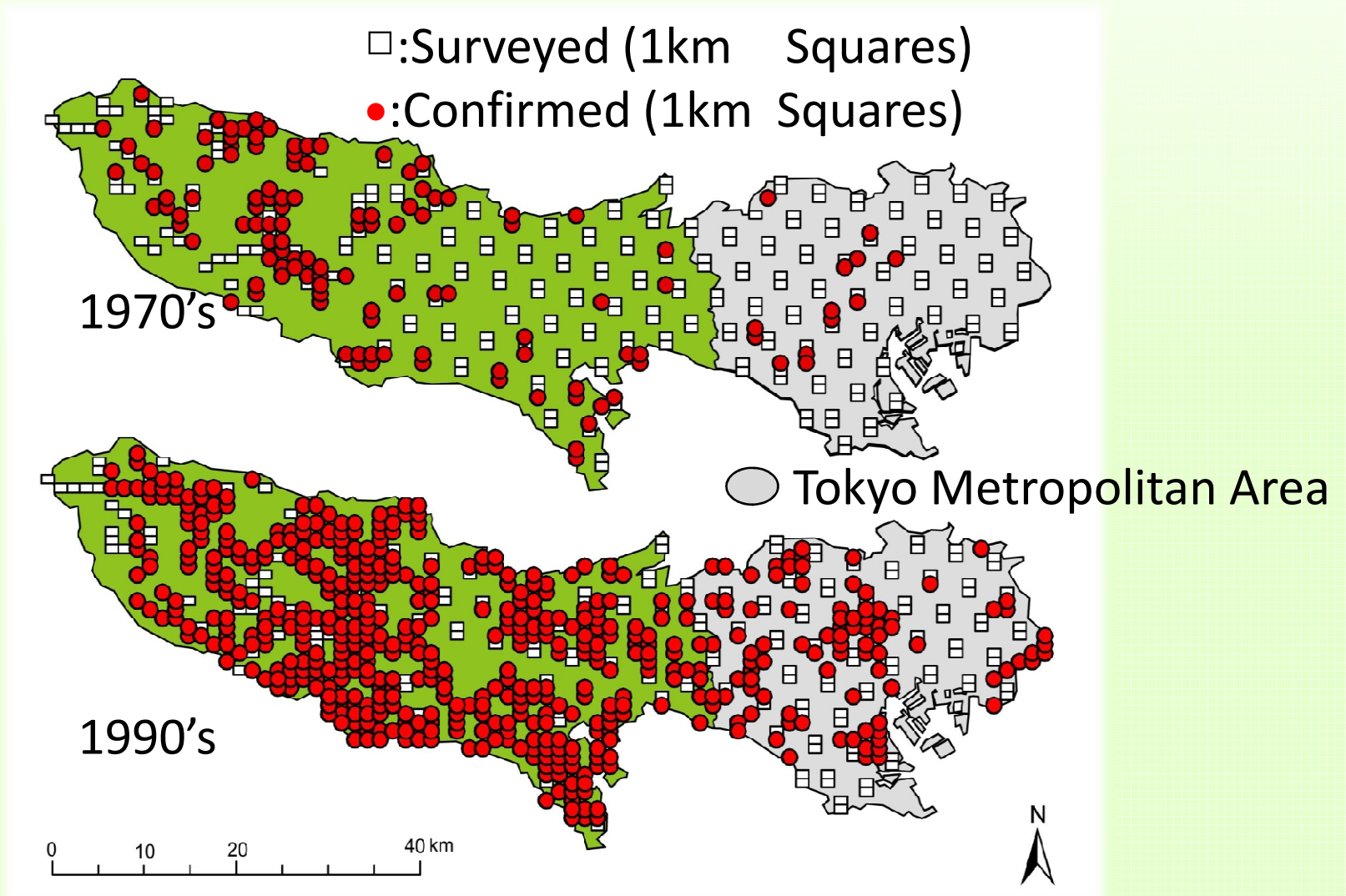


Assessment Results: Urban Systems

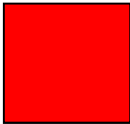



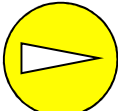






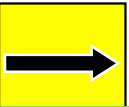



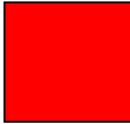

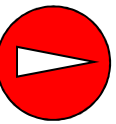





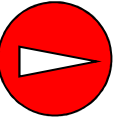




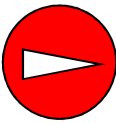


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Island				-			

State of Biodiversity-Urban Systems

Distribution change of Japanese White-eye *Zosterops japonicus* in Tokyo



Assessment Results: : Inland water Systems

	State and trends		Drivers and trends				
	From original	Since late 1950s	Over Use	Under use	Alien Species	Climate change	Others
Forest							
Agriculture	-						<ul style="list-style-type: none"> • Decrease of crops and domestic animals genetic diversity
Urban	-			-			
Inland water							
Marine and Coastal				-			<ul style="list-style-type: none"> • Deforestation of seaweed bed • Plague of coral-eating animals
Island				-			

State of Biodiversity-Inland water Systems

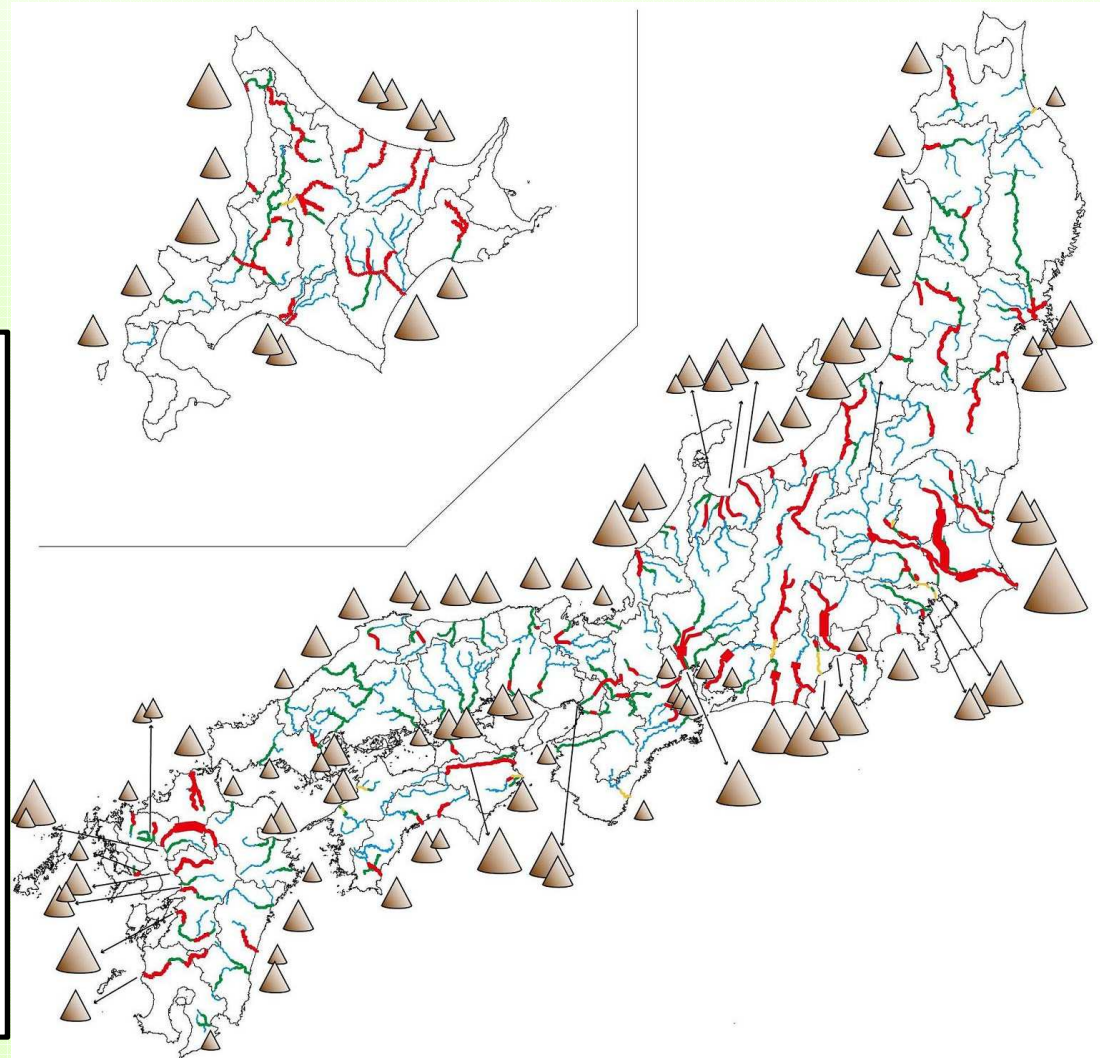
River beds degradation, sands and gravels taken from river channel

River beds degradation since 1945

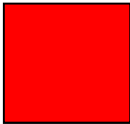



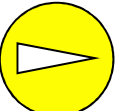






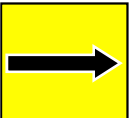
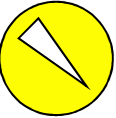













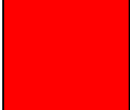




- Decreased
- No trend
- Increase

Sands and gravels taken from river channel past 30 years

- 100 million tons
- 10 million tons
- 1 million tons



Assessment Results: Marine and Coastal Systems

	State and trends		Drivers and trends				
	From original	Since late 1950s	Over Use	Under use	Alien Species	Climate change	Others
Forest							
Agriculture	-						<ul style="list-style-type: none"> • Decrease of crops and domestic animals genetic diversity
Urban	-			-			
Inland water							
Marine and Coastal				-			<ul style="list-style-type: none"> • Deforestation of seaweed bed • Plague of coral-eating animals
Island				-			

State of Biodiversity-Marine Systems

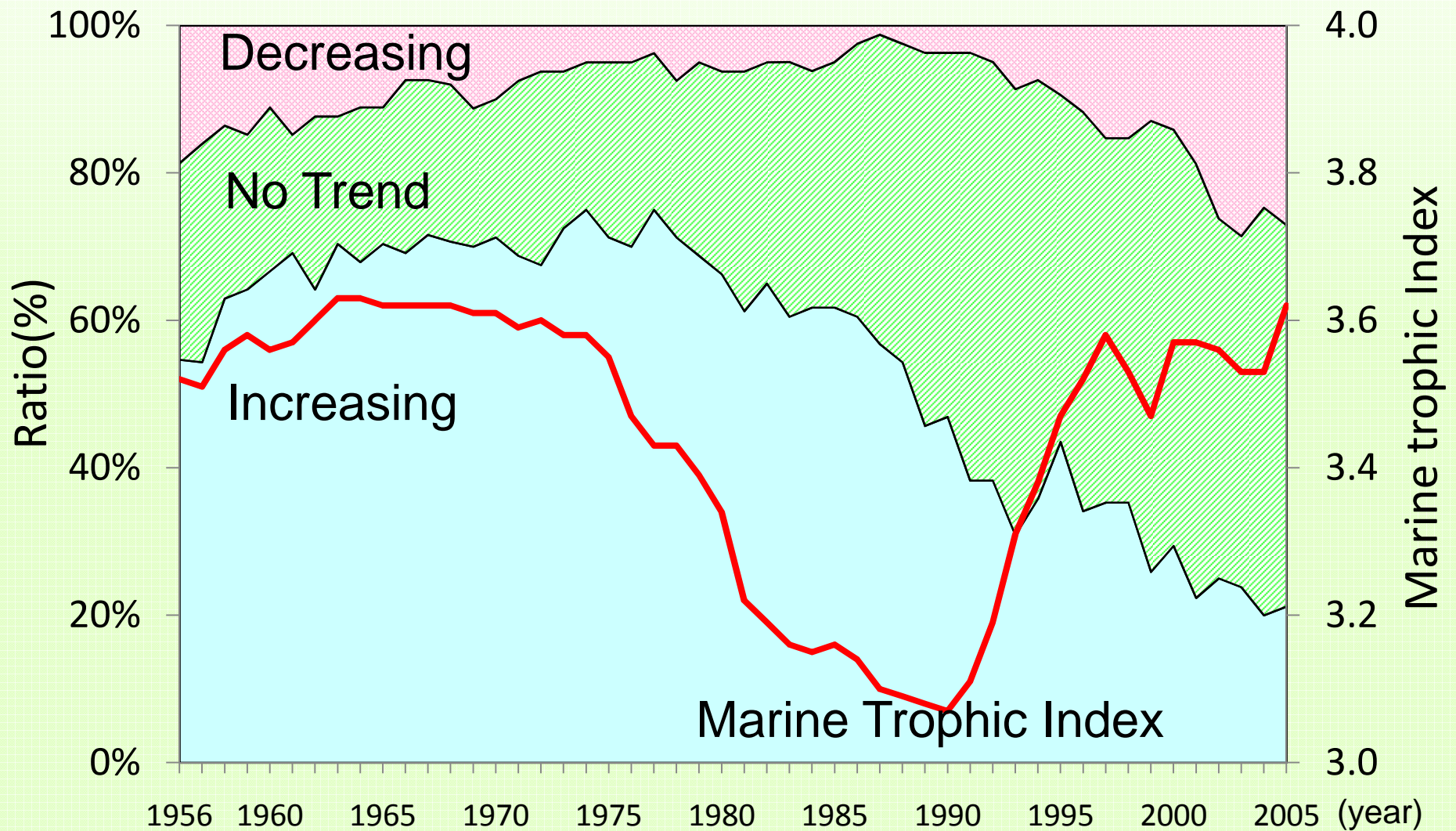
changes in scale of coastal system

Ecosystems \ year	1945	1973	1978	1984	1990	1995
Tidal flat (km ²)	841 (100)		553		514 (61)	496
Seagrass and Seaweed bed(km ²)		2,097 (100)	2,076		2,012 (96)	1,455
Coral communities in Back Reef moat (km ²)			357 (100)		342 (96)	
Natural coast(km)			18,717 (100)	18,155	17,859 (96)	17,414

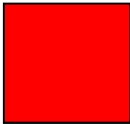



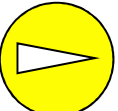






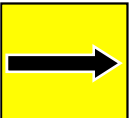
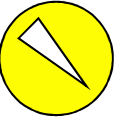


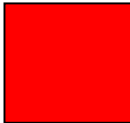

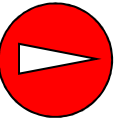



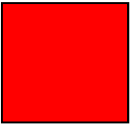

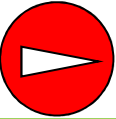




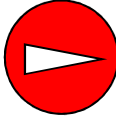


Figures in parentheses show the decrease ratio from the base year.

State of Biodiversity-Marine Systems

Trends in fish catches and Marine Trophic Index



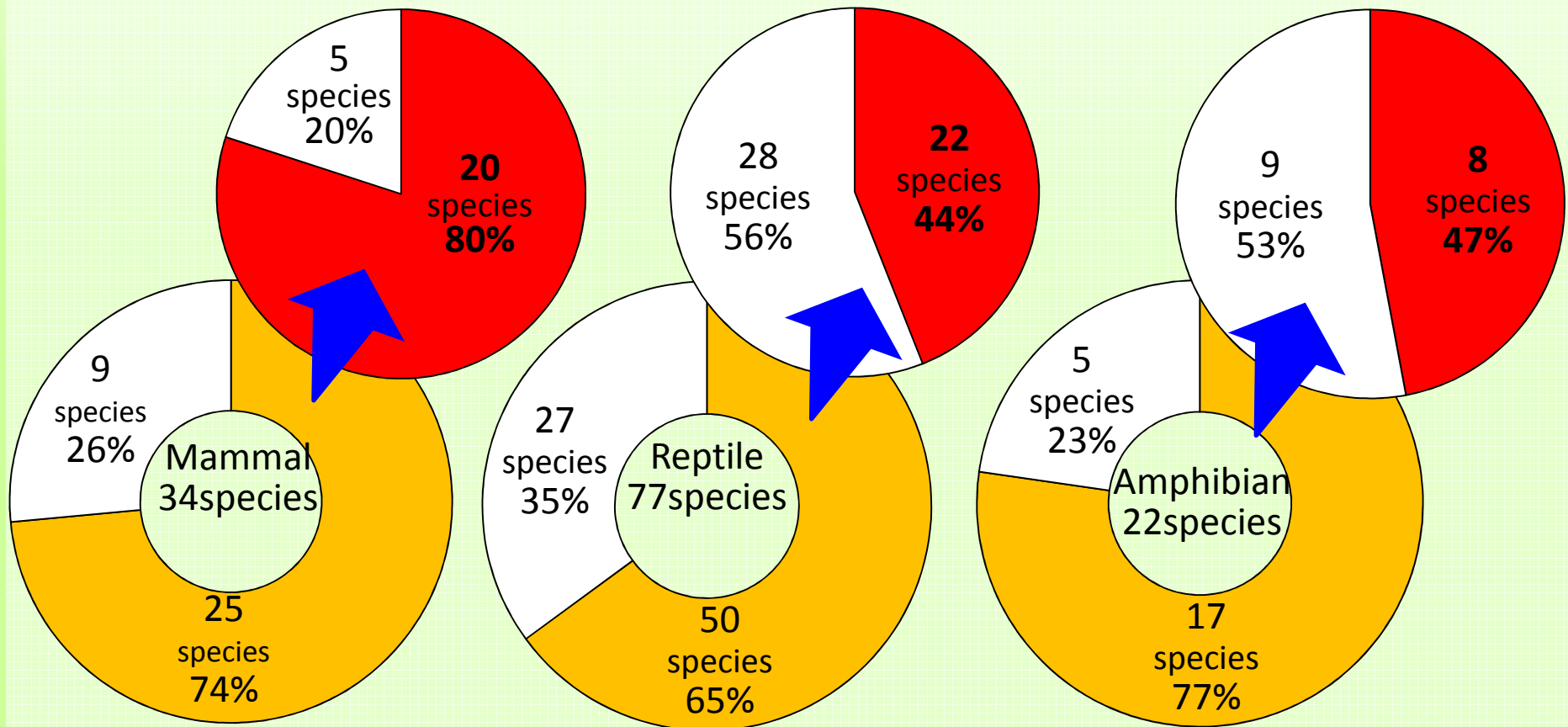
Assessment Results: Island Systems

	State and trends		Drivers and trends				
	From original	Since late 1950s	Over Use	Under use	Alien Species	Climate change	Others
Forest							
Agriculture	-						<ul style="list-style-type: none"> • Decrease of crops and domestic animals genetic diversity
Urban	-			-			
Inland water							
Marine and Coastal				-			<ul style="list-style-type: none"> • Deforestation of seaweed bed • Plague of coral-eating animals
Island				-			

State of Biodiversity – Island Systems

Proportion of endemic species in Nansei Islands and Proportion of endangered species among those endemic species

- : Endangered species among endemic species
- : Others among endemic species



■ : Endemic species □ : Others

Assessment Summary



Biodiversity loss as of 2010



Evaluation of the achievement of
“2010 Targets”



Responses of Biodiversity loss
beyond 2010

Biodiversity loss as of 2010

State of biodiversity

Biodiversity has been lost in every ecosystem and is still being lost in general.

Freshwater, marine, coastal and island ecosystems are still under severe threat.



Biodiversity loss as of 2010

Drivers of biodiversity loss

Development pressure has the most serious impacts, though the rate of additional biodiversity loss is slightly reduced.



Indirect driver: social demands during the period of rapid economic growth

2nd Crisis is still increasing at a slow rate.



Indirect driver: Social changes after the period of rapid economic growth

Biodiversity loss as of 2010

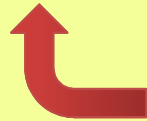
Drivers of biodiversity loss

Invasive species pose a great threat.



Indirect driver: Increase of the international trade

Global warming is a serious threat particular to some vulnerable ecosystems.



Indirect driver: Emission of greenhouse gas

Biodiversity loss as of 2010

Responses

Despite enhanced responses, efforts are challenged by indirect drivers that are difficult to control.

To set priority on responses, proper understanding of biodiversity loss is important.

Biodiversity loss and Ecosystem service to date

Trade-offs between Ecosystem services and biodiversity

Provide large quantity of provisioning service

- Forest system(Timber)
- Agricultural system(Food)



Loss of biodiversity

- Forest Conversions
- Extensive use of agricultural chemicals



Social demands during the period of rapid economic growth

Biodiversity loss and Ecosystem services to date

Dependence on ecosystem services abroad

Mass imports of biological resources from foreign countries

- Timber, Food, Energy

Decline in utilization of domestic ecosystem service





- 2nd Crisis
- Impact on biodiversity abroad



Social changes during the period of rapid economic growth (such as industrialization and urbanization.)



Evaluation of the achievement of “2010 Targets”

 <p>Achieved</p> <p>or</p>  <p>positive trend</p>	<p>Reduce pollution and its impacts on biodiversity (Goal7-2)</p> <p>Pathways for major potential alien invasive species controlled(Goal6-1)</p>
 <p>Not Achieved</p> <p>or</p>  <p>Negative trend</p>	<p>Adaptation to climate change(Goal7-1)</p> <p>Promote sustainable use and consumption (Goal4-1,4-2)</p>

Evaluation of the achievement of “2010 Targets”



Although some progress has been made, the state of biodiversity continues to decline

Responses to loss beyond 2010

1st crisis



Changes currently expected to occur in the future

Population decrease, Low economic growth,
Dependence on foreign resources, Improvement
of infrastructure



Concerns over biodiversity loss

The rate of development will continue to reduce

The effects of past development will persist



Long-term responses

- Recovery from past losses
- Development of methods and techniques to avoid and restore impacts on biodiversity
- Conservation of marine and coastal systems

Responses to loss beyond 2010 2nd Crisis

Changes currently expected to occur in the future

Further depopulation/aging in agricultural/rural areas

Decreased hunting pressures



Concerns over biodiversity loss

Serious concerns over the impact of further decline of utilization/use of Satochi-Satoyama area

Populations and distributions of mid-to-large -size mammals expanding more rapidly



Long-term responses

- Promotion of sustainable use of local resources
- Conversion of secondary forests to natural forests
- Large scale wildlife management

Responses to loss beyond 2010 3rd Crisis



Changes currently expected to occur in the future

International movement of people and goods



Concerns over biodiversity loss

Continuation of the introduction and distribution expansion of invasive alien species



Long-term responses

- Enhancement of monitoring and management of invasive alien species
- Prioritization and technological development for settled alien species control



Changes currently expected to occur in the future

Continued warming trend



Concerns over biodiversity loss

Threat of irreversible changes to vulnerable ecosystems



Changes currently expected to occur in the future

Continued warming trend



Concerns over biodiversity loss

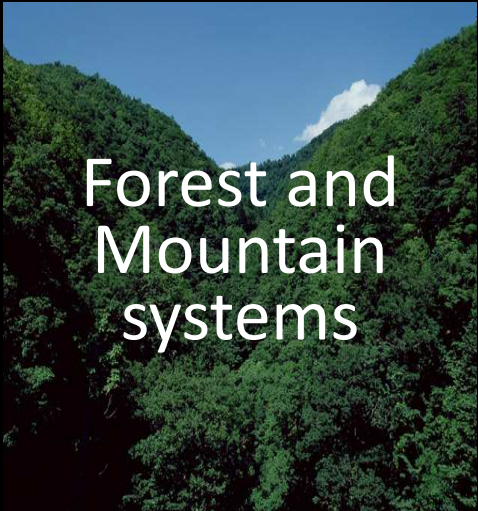

Threat of irreversible changes to vulnerable ecosystems



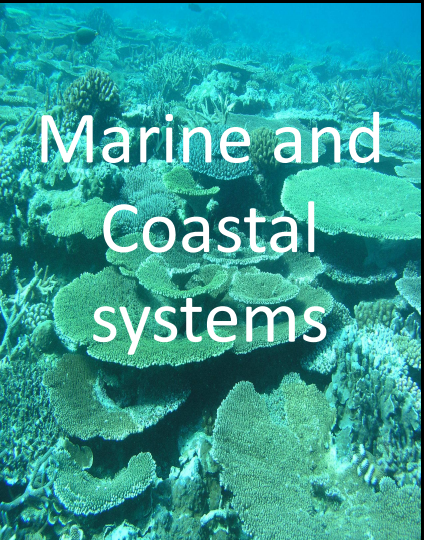

Long-term responses

- Enhancement of monitoring
- Development of adaptation methods to climate change

Responses to loss beyond 2010 Irreversible changes

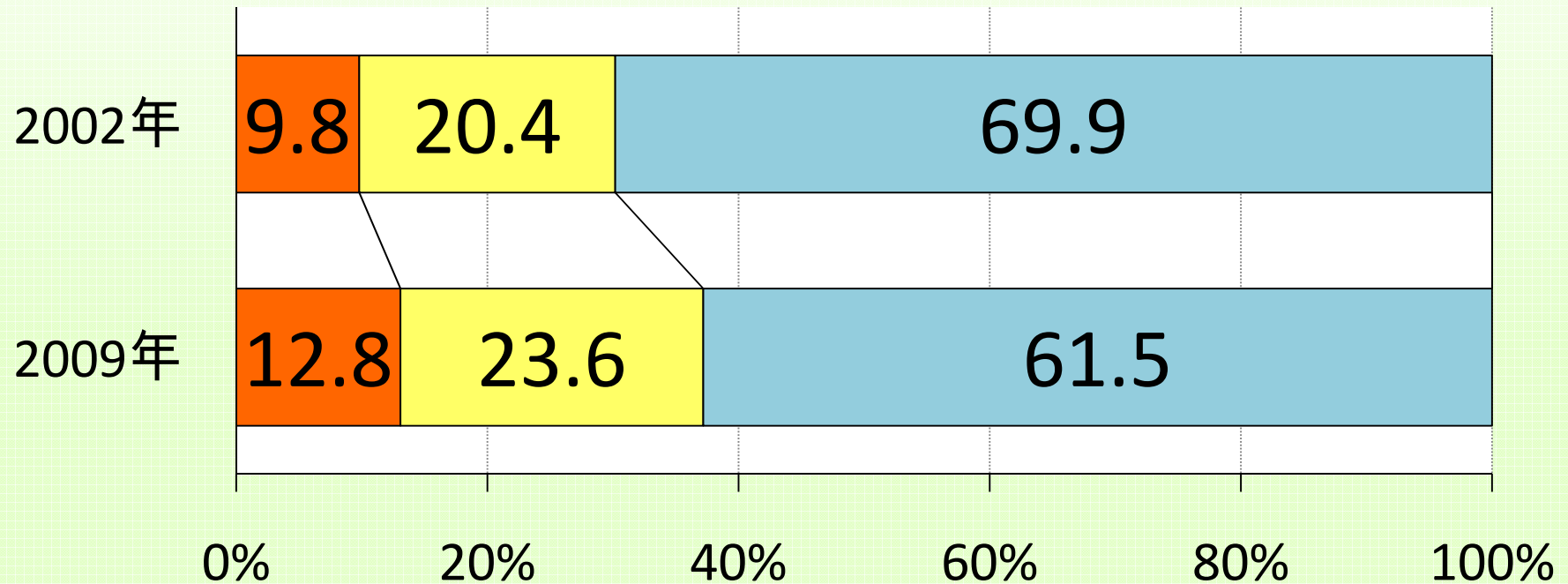
Ecosystems	Possible examples of irreversible changes
 <p data-bbox="210 641 525 836">Forest and Mountain systems</p>	<p data-bbox="619 503 1669 657">Impact of climate change on alpine vegetation</p> <p data-bbox="619 738 1942 982">Effects of destruction of forest vegetation due to increasing population and expanding distributions of deer</p>
 <p data-bbox="178 1112 556 1242">Inland water systems</p>	<p data-bbox="619 1047 1858 1177">Impact of river bed degradation and river basin fragmentations</p> <p data-bbox="619 1242 1858 1372">Impact of invasive alien species on rivers, lakes, ponds and marshes</p>

Responses to loss beyond 2010 Irreversible changes

Ecosystems	Possible examples of irreversible changes
 <p>Marine and Coastal systems</p>	<p>Combined impact on coastal systems caused by development (Including gravel extractions from sea)</p> <p>Impact of climate change on coral reef</p>
 <p>Island systems</p>	<p>Impact of invasive alien species on islands</p>

Responses of loss beyond 2010 Mainstreaming

Awareness of Biodiversity



Do you know what “Biodiversity” means?

■ I know the meaning of it.

■ I don't know the meaning of it but I've heard of it.

■ I've never heard of it.

Responses of loss beyond 2010 Mainstreaming

Economic evaluation of biodiversity

Local or regional consensus building
over biodiversity



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