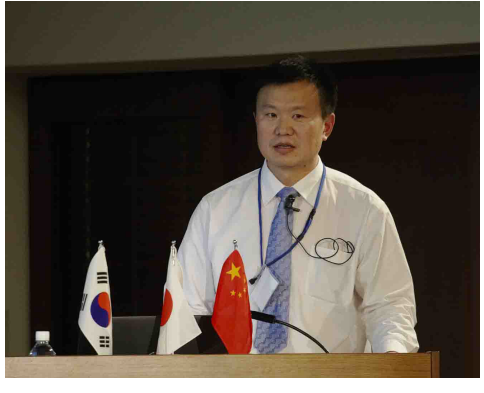
Session 2

Biodiversity Conservation



Biodiversity Conservation Strategy and Action Plan of China (2010-2030)

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Report Contents:

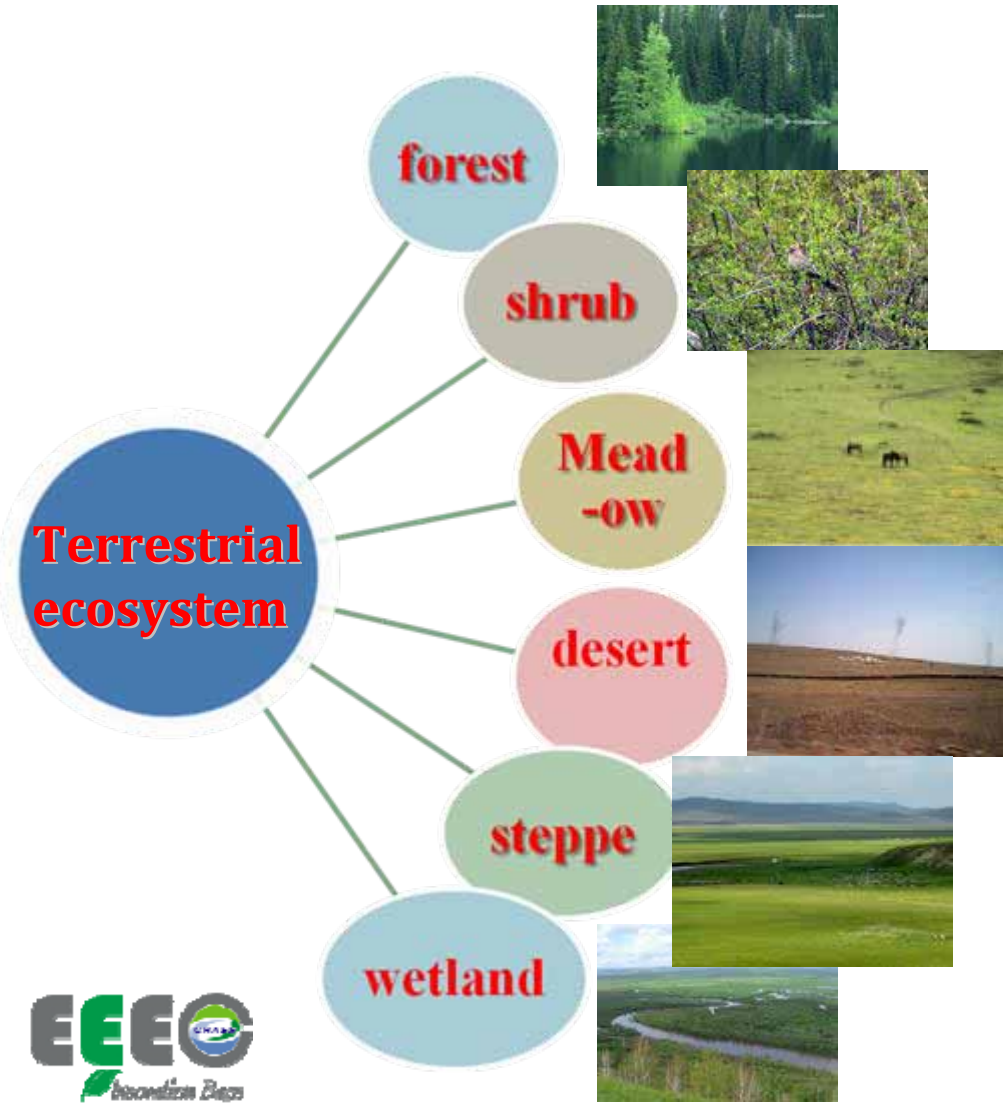
- Current Status of Biodiversity
- achievements, Problems and Challenges
- methods
- Priority domains and actions

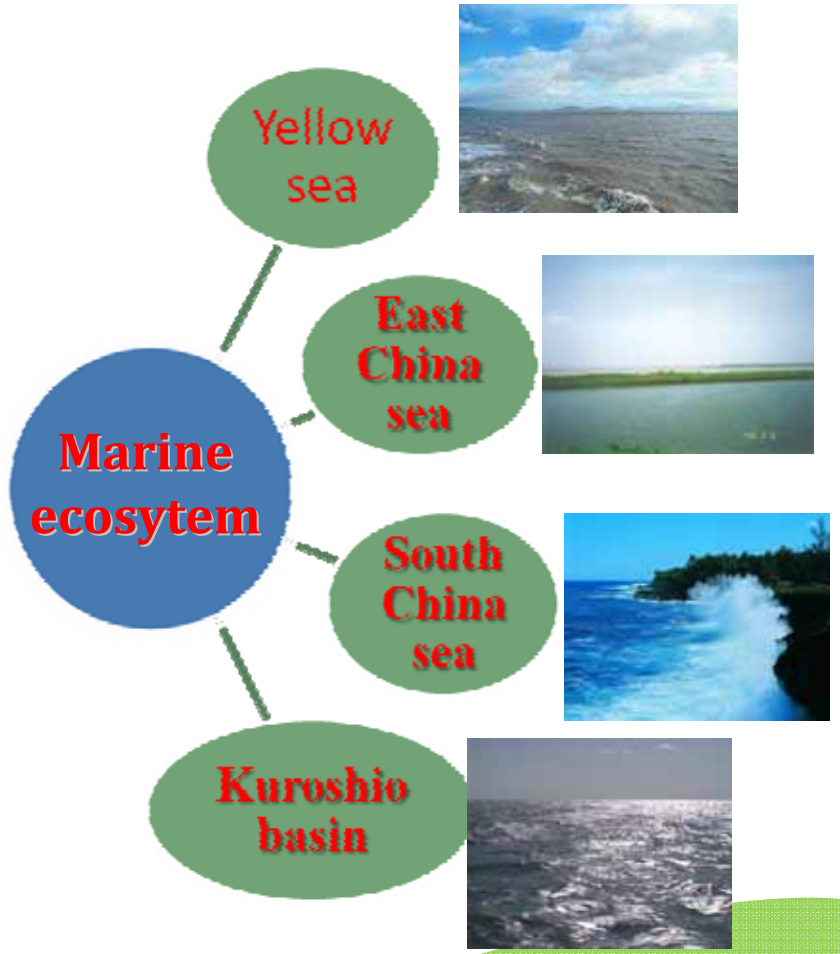
Background

- The CBD provides that each Party should develop and update in a timely manner its national strategy, plan or program.
- The Ministry of Environmental Protection (MEP) together with relevant departments have issued the first Biodiversity Conservation Action Plan (“the Action Plan”) in June 1994. By now, the main goals have been mostly achieved and most of twenty-six priority actions identified therein have been implemented.
- At present, the overall trend of biodiversity decline in the global has not been effectively controlled (GBO 3, CBD 10). This is same in China.
- To implement related provision of the CBD, further strengthen biodiversity conservation in China and effectively cope with new problems and challenges facing biodiversity conservation in China, the MEP jointed with more than 20 agencies and departments has compiled China National Biodiversity Conservation Strategy and Action Plan (2010--2030).

1. Current Status of Biodiversity in China

- **China is one of the 12 mega-biodiversity countries in the world.**





1. Current Status of Biodiversity in China

- **China has rich species diversity in animals, plants and microbes and has rich genetic resources.**

Animals Plants Microbes

- **Verteb-rates**
  - 6445 species
  - 13.7% of world
- **Higher plants**
  - 34984 species
  - Ranking the third In the world
- **fungis**
  - ＞10,000 species
  - 14% of the world

Genetic Resources

- **Origin of many crop**
  - rice, soybean etc.
  - Wild and cultivated fruit trees
- **Cultiv-ated crops**
  - 1339 species
  - Top in the world
- **Domest-icated animals**
  - 576 species
  - One of richest countries in the world






1. Current Status of Biodiversity in China

- **Functions of some ecosystems are being constantly degraded in China**

- **90% of grasslands have been degraded by varying degrees.**
- **The monopoly of forest plantations have led to low pest resistance.**
- **Inland fresh water ecosystems are threatened and some important wetlands have been degraded.**
- **Marine and coastal species and their habitats are being constantly lost.**

Degraded grassland

Degraded wetland

1. Current Status of Biodiversity in China

The status of endangered species is being exacerbated

- It is estimated that 15% to 20% of wild higher plants in china are endangerd.
- With 233 vertebrate animal species facing extinction.
- The number of about 44% of wild animals declining, as well as the populations of non-protected wild animals decreasing significantly.

Davidia Involucrate

Metasequoia glyptostroboides

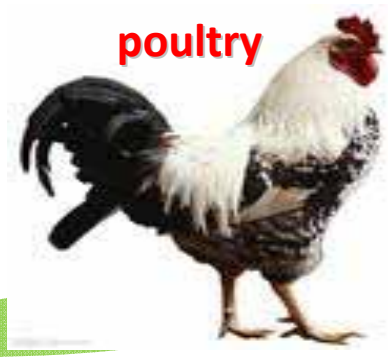
Nipponia nippon

Ailuropoda melanoleuca

1. Current Status of Biodiversity in China

Erosion and loss of genetic resources are continuing

- The habitats of some wild crop relatives have been destroyed and lost. 60% to 70% of the original distribution sites of wild rice have disappeared or shrunk.
- Some rare and endemic germplasm resources of crops, trees, flowers, livestock, poultry and fish suffer serious loss.
- Some local traditional and rare varieties have been also lost.



2. achievements, Problems and Challenges

(1) Achievements:

- **The legal system of biodiversity conservation has been initially established**
- **A series of plans and programes on biodiversity conservation have been implemented**
- **The mechanisms for biodiversity conservation have been gradually improved**
- **Notable achievements have been made in *in-situ* conservation. *i.e.* 2546 nature reserves had been established at various levels in China, accounting for 14.7% of China's total land area which is higher than the global average 12% (2009s).**
- ***Ex-situ* conservation has been further strengthened. *i. e.* China has established over 240 zoos, 234 botanical gardens, and 83 long- and medium-term banks for agricultural crop germplasm resources.**

2. achievements, Problems and Challenges

(2) Major problems:

- **The legal and policy system on biodiversity conservation is yet to be completed.**
- **Baseline data on biological resources is far from adequate.**
- **The monitoring and warning system on biodiversity has not been set up.**
- **China also has such problems as**
  - **Insufficient investment in biodiversity**
  - **Inadequate capacities of management**
  - **Inadequate Protection and fundamental scientific research**
  - **And insufficient capacities to cope with new problems facing biodiversity conservation**
- **Moreover, the awareness of biodiversity conservation of the whole country or society is yet to be raised**

2. achievements, Problems and Challenges

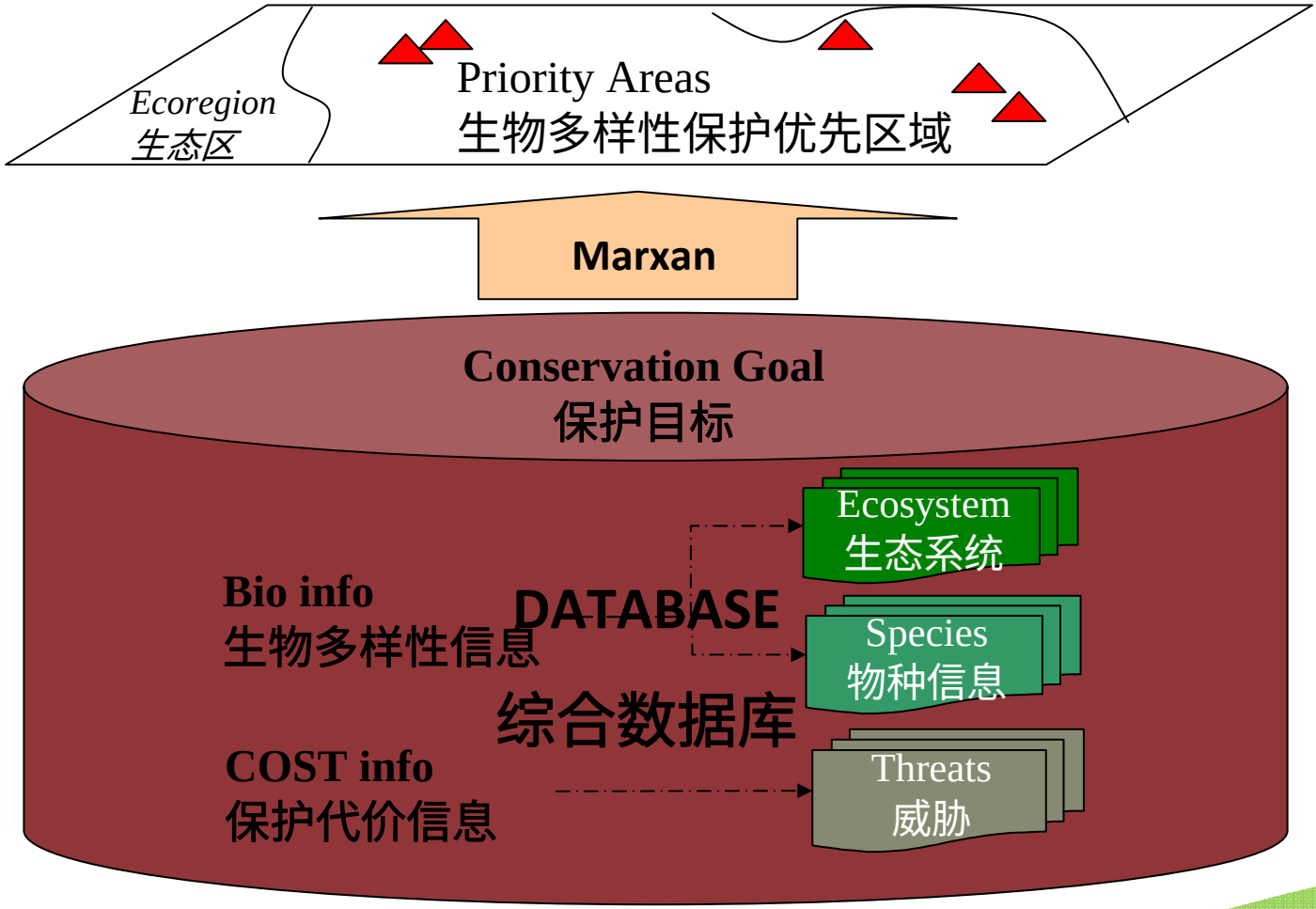
(3) Pressures and challenges:

- **The accelerated urbanization and industrialization bring threats to and increases pressures on the habitats of species and ecosystem.**
- **Overexploitation and disorderly development of biological resources aggravate the negative impacts on biodiversity.**
- **Environmental pollution has great impacts on aquatic biodiversity and habitats.**
- **The release of invasive alien species and genetically modified organisms to the environment has increased pressures on bio-safe.**
- **The production of bio-fuels has created new threats to biodiversity.**
- **The impacts of climate change on biodiversity are yet to be evaluated.**

3. methods

- Use the approach of "Conservation by Design" to assess the China biodiversity status, identify the priority areas, and provide the science-based support for Chinese Government to make the conservation strategy and action plan.

Eco-regional Assessment (ERA)



Ecoregional Assessment

- Select Conservation **Targets** — Ecosystems & Species
- Set Conservation **Goals** — Amount & Distribution
- Assess **Viability** of Target Occurrences — Size, Condition, Landscape Context

Selecting Conservation Targets

- Multiple realms: terrestrial, freshwater, marine
- Multiple scales of organization:

COARSE FILTER / FINE FILTER Strategy

representative ecosystems

viable populations of *common* species

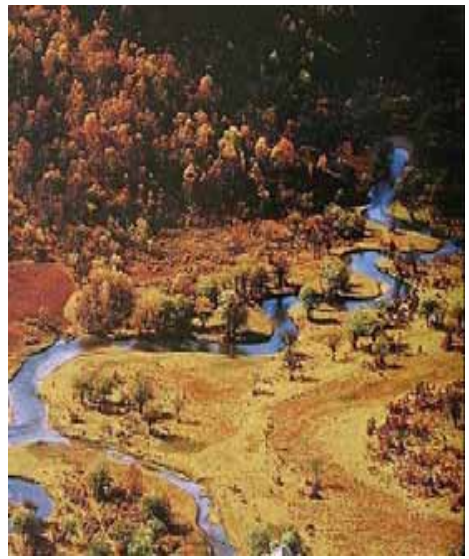
species distributions

- rare species
- declining species
- special elements

COARSE FILTER / FINE FILTER Strategy

COARSE FILTER: Representative ecosystems

- capture broad, regional patterns of biodiversity
- biotic + physical components
- data: vegetation, landforms, geology, climate
- coarse but regionally consistent



COARSE FILTER / FINE FILTER Strategy

FINE FILTER: Species populations

- rare & threatened species, special habitats

- data: surveys, specimens, expert knowledge

- locally accurate, sampling bias

COARSE FILTER / FINE FILTER Strategy

Ecological Advantages:

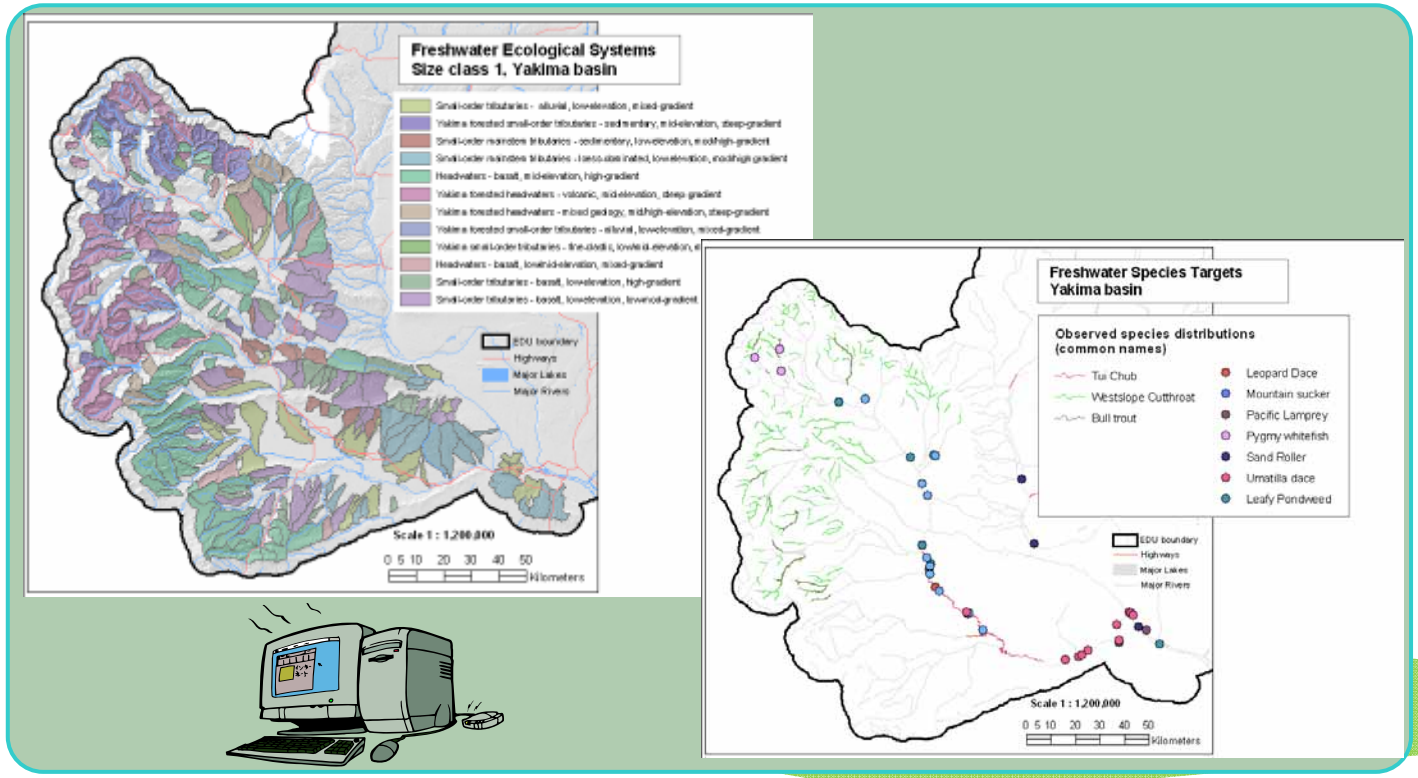
- multiple scales of organization

- ecological processes

COARSE FILTER / FINE FILTER Strategy

Practical Advantages:

- best use of available data
- practical number of targets

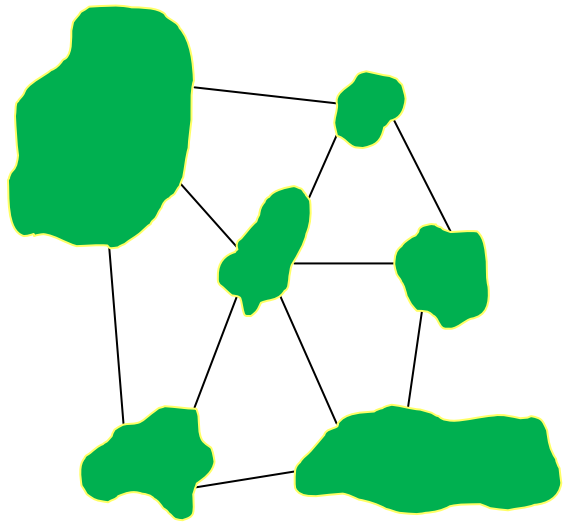


Ecoregional Assessment

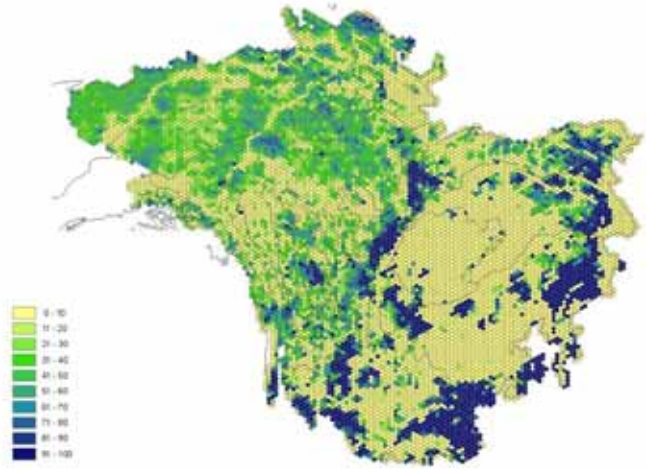
- **Targets**
- **Goals**
- **Viability**

Design Portfolio of Sites

- To meet Goals
- Connectivity, Networks



MARXAN of modern



(Possingham, Ball & Andelman 2001)

$$\underbrace{\sum_{PUs} Cost}_{1} + \underbrace{BLM \sum_{PUs} Boundary}_{3} + \underbrace{\sum_{ConValue} SPF \times Penalty}_{2} + \underbrace{CostThresholdPenalty(t)}_{4}$$

- 基于模拟退火的优化算法
- 满足生物多样性保护目标
- 保护代价最低
- 面积最小、考虑边界效应的最优组合
- 易于得到多个情景结果，进行比较分析

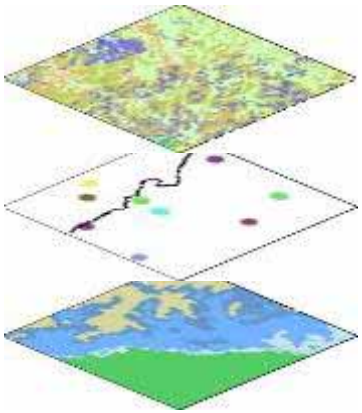
- 应用**粗筛(生态系统)**和**细筛(物种)**信息，综合生态系统的**状态因素**，计算满足保护目标的最经济的优先保护区的空间组合。

Route of Marxan

Designing potential conservation area networks with MARXAN

BIODVIVERSITY TARGETS

GOALS



COARSE FILTER
Vegetation Types

X **30% area - stratified by ecoregion 30%**

FINE FILTER
T/E Species

X **80% known occurrences - stratified by ecoregion 80%**

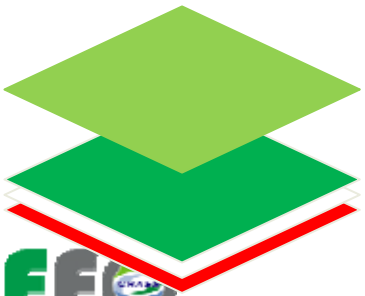
COARSE FILTER
Climate Zones

X **30% area**

COST / SUITABILITY

Cost / Suitability Index

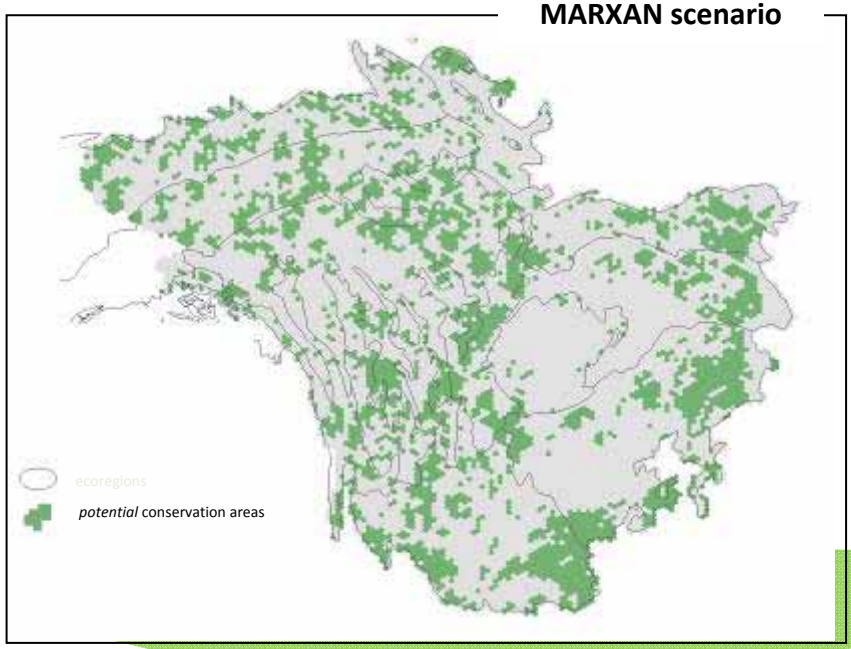
- population density
- land use
- infrastructure
- irrigated agriculture
- protected area status



Connectivity

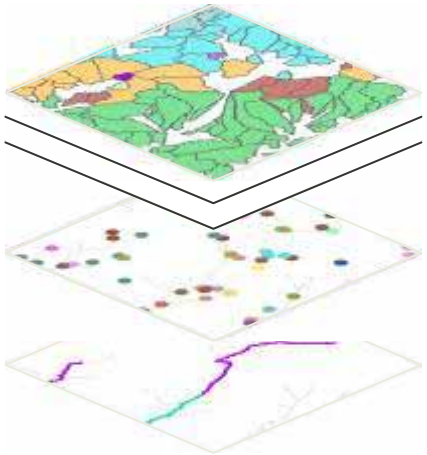
other priority areas

MARXAN scenario



UYRB Freshwater ERA

BIODIVERSITY TARGETS



Ecosystems

Species surveys
Rare, endemic, T/E

Endemic Fish
Historic Ranges

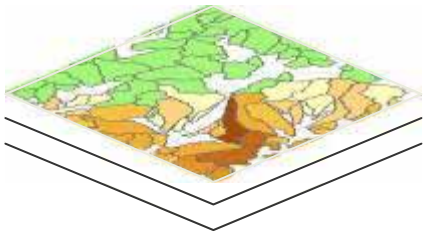
GOALS

X (x) existing - stratified by major basin

X (y) occurrences - stratified by basin size class

X (z) river length - stratified by basin size class

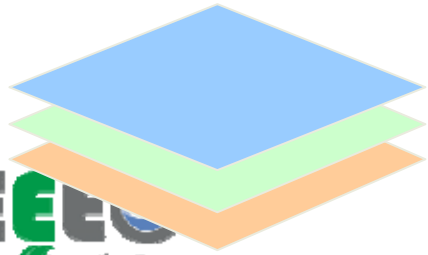
STATUS



Cost / Suitability Index

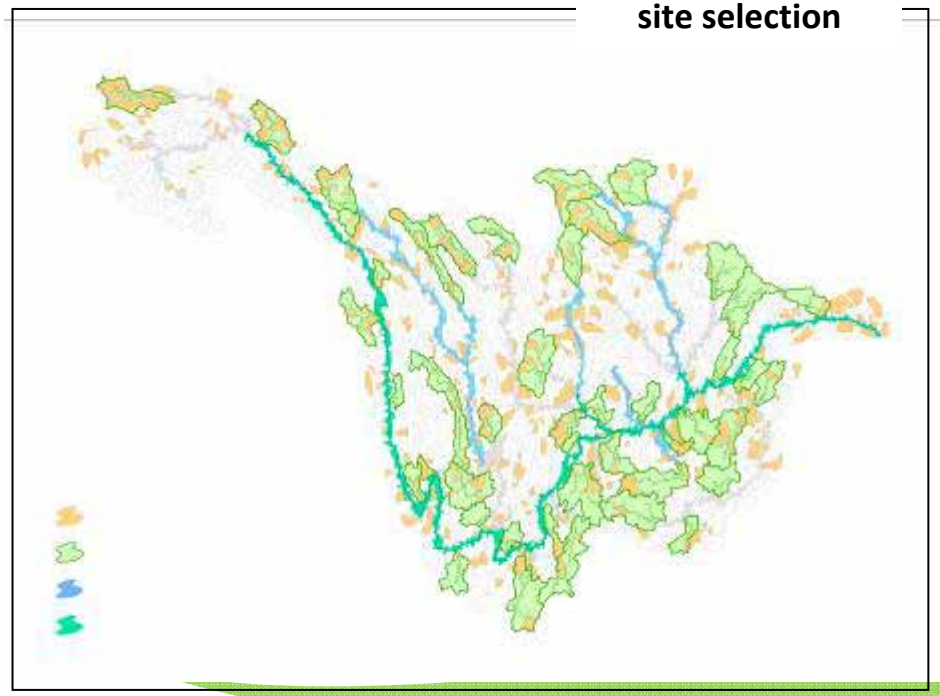
- infrastructure
- population density
- land use
- irrigated agriculture
- protected area status

ECOSYSTEM FUNCTIONS



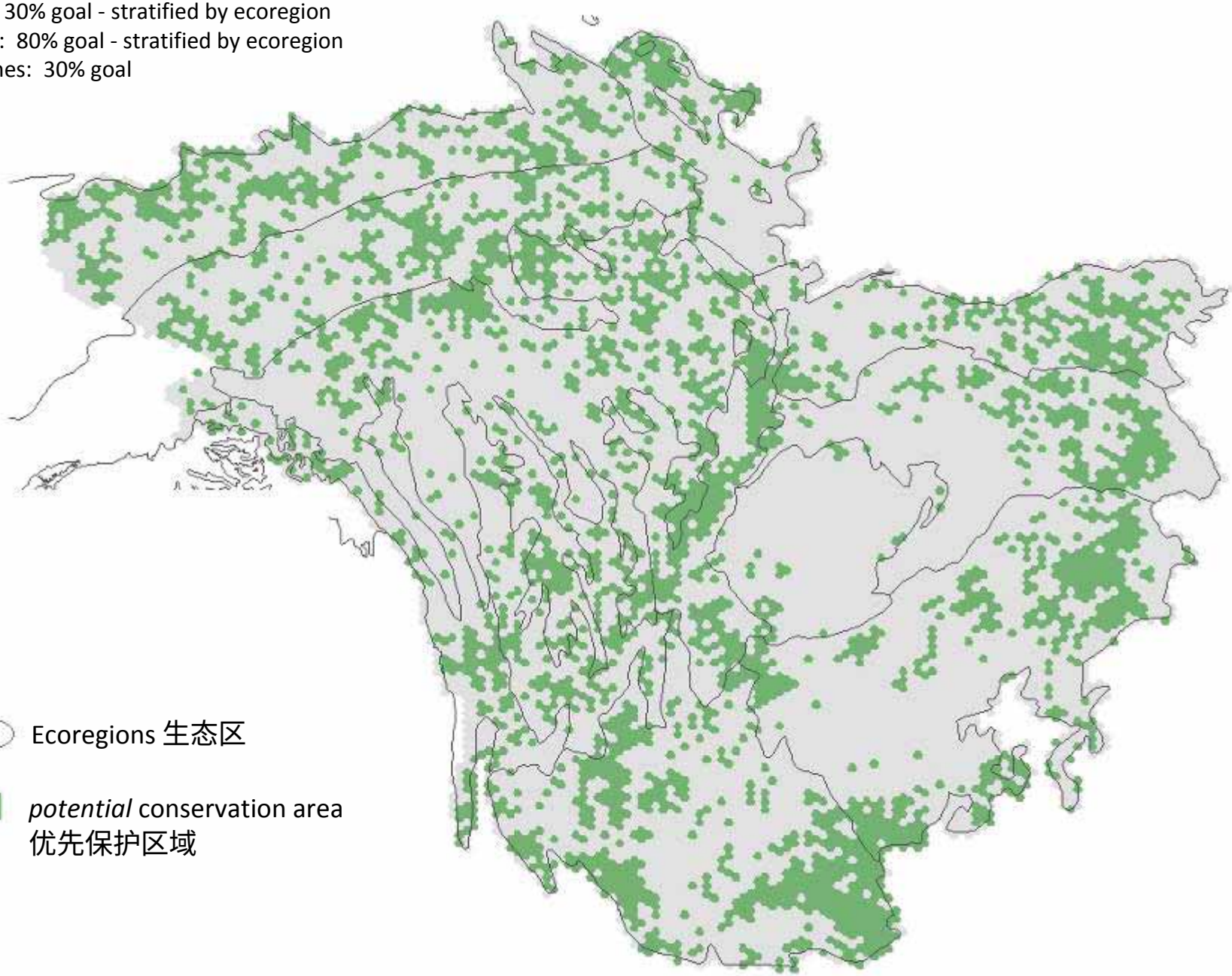
Water Quality
Flood Mitigation
Carbon Storage

site selection



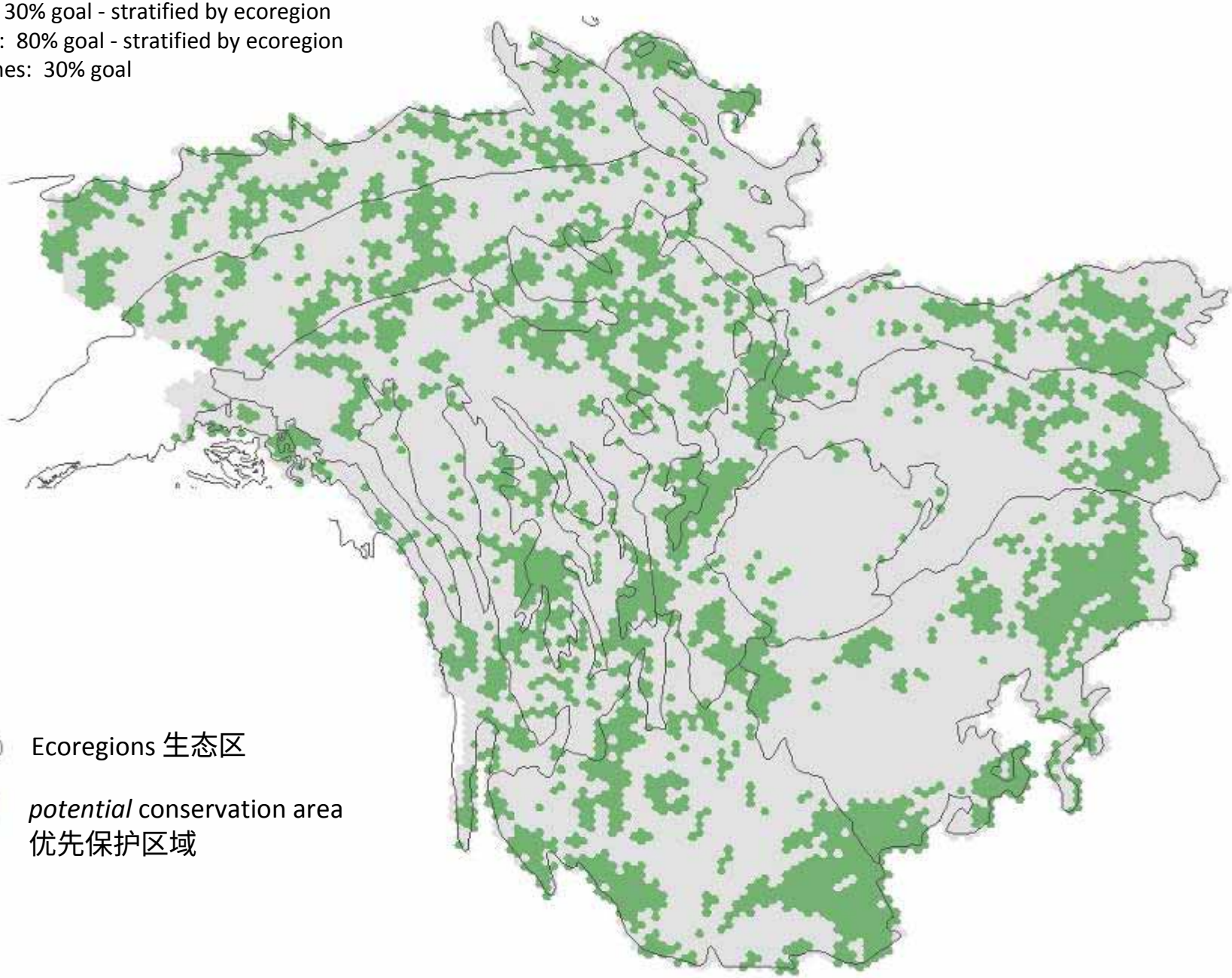
MARXAN Scenario A 结果A

Veg Types: 30% goal - stratified by ecoregion
T/E Species: 80% goal - stratified by ecoregion
Climate Zones: 30% goal



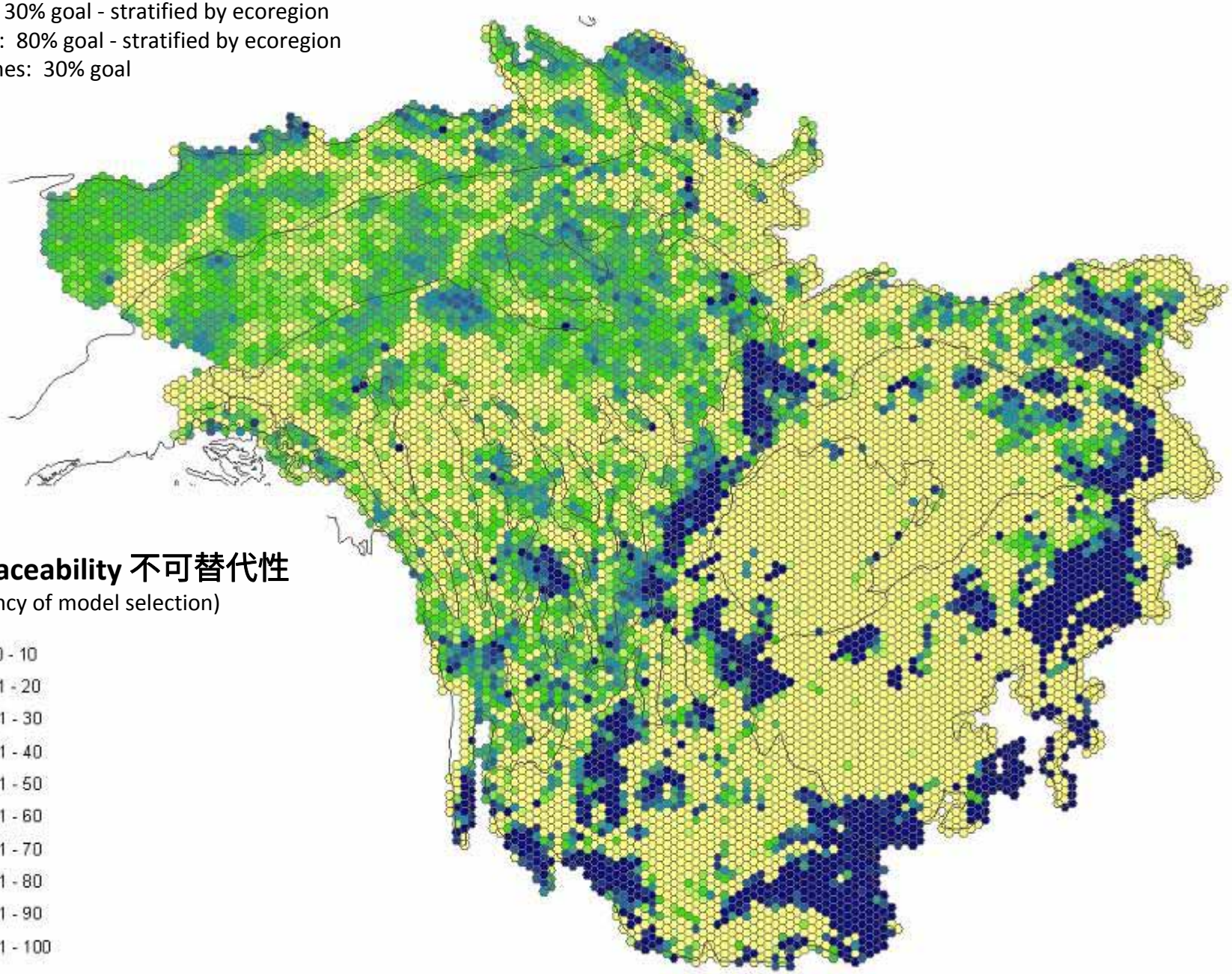
MARXAN Scenario B: 结果B high weight for boundary length (fewer & larger sites) 强调边界效应

Veg Types: 30% goal - stratified by ecoregion
T/E Species: 80% goal - stratified by ecoregion
Climate Zones: 30% goal



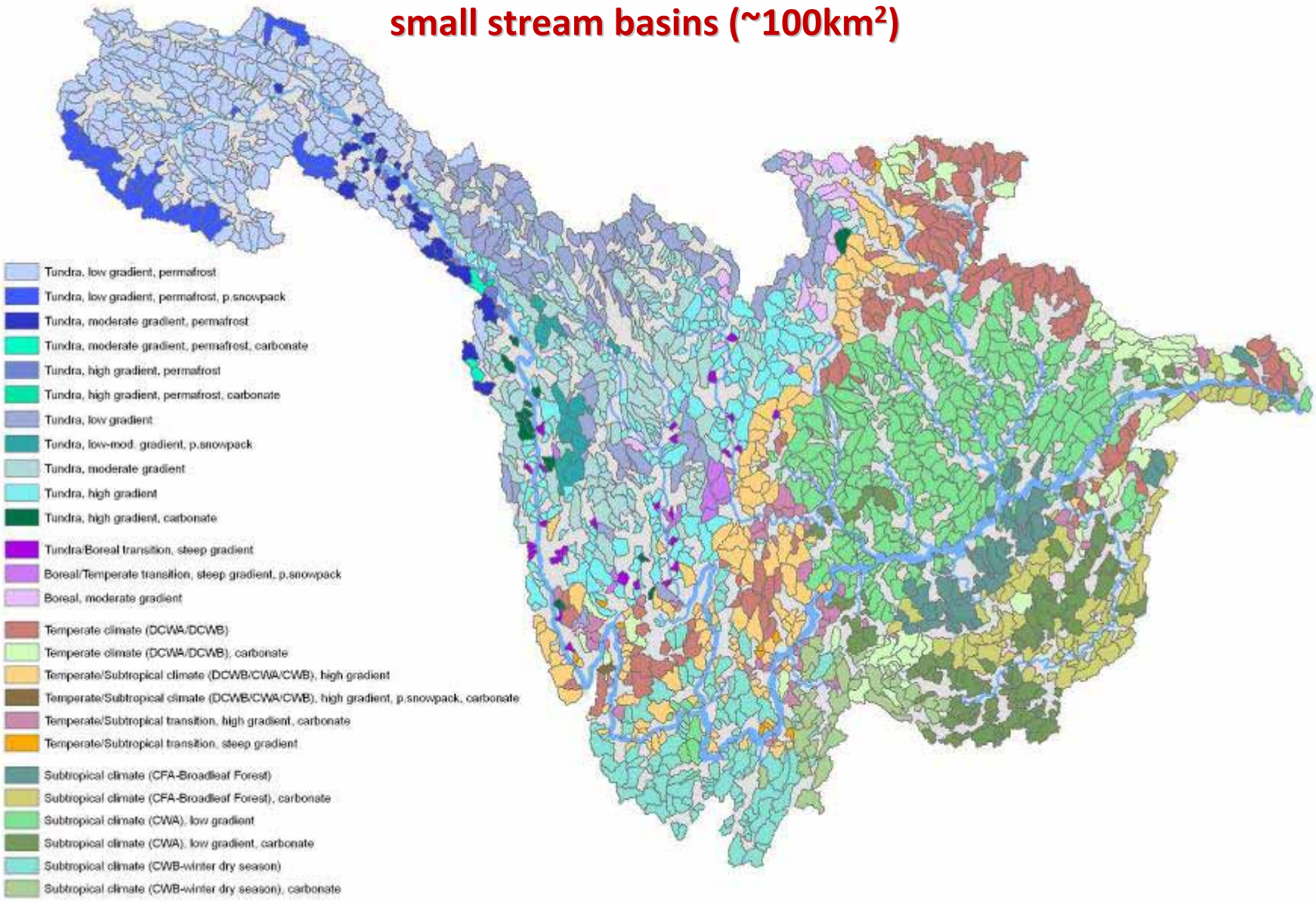
MARXAN Scenario B: high weight for boundary length (fewer, larger sites)强调边界效应

Veg Types: 30% goal - stratified by ecoregion
T/E Species: 80% goal - stratified by ecoregion
Climate Zones: 30% goal

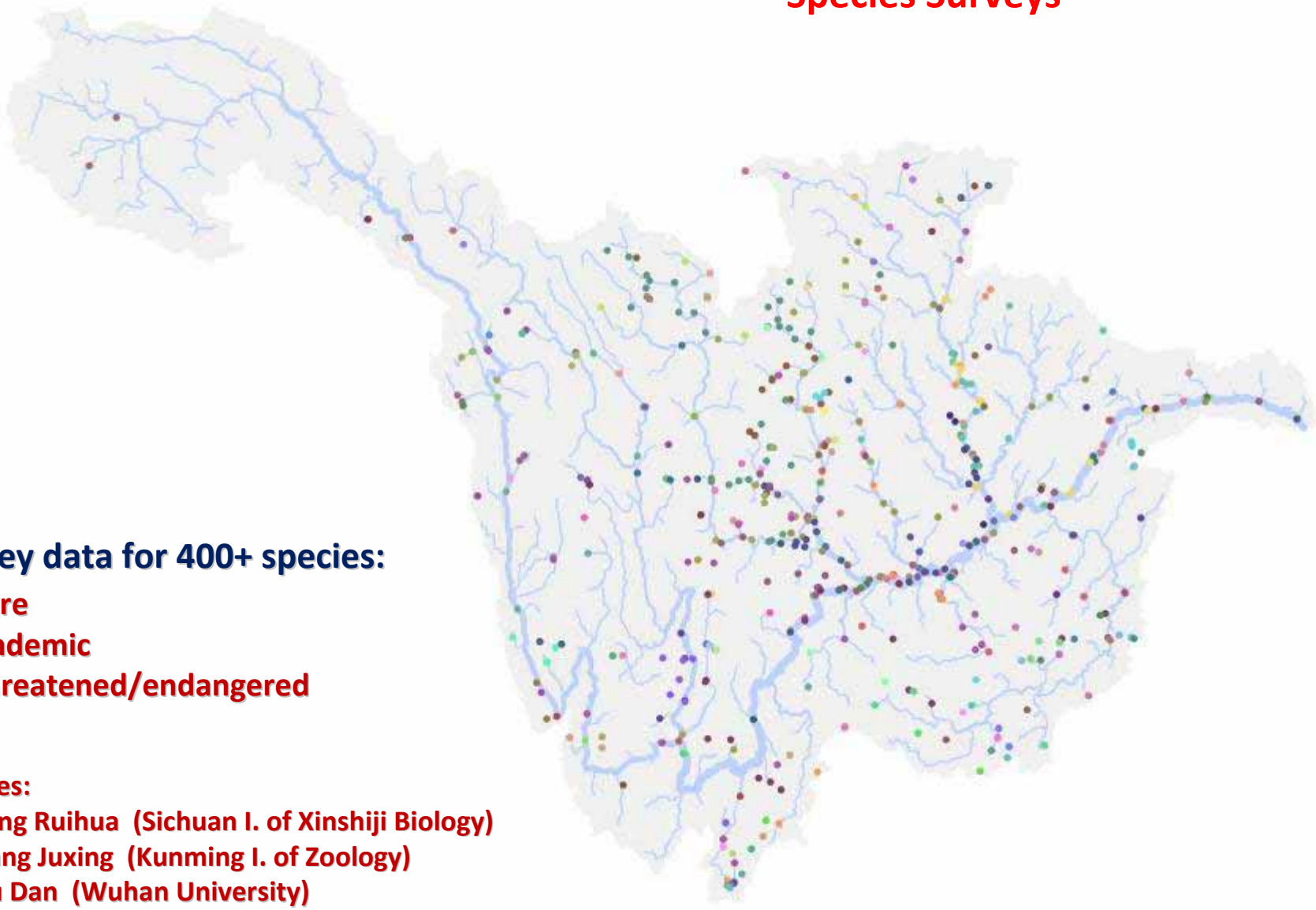


stream & watershed network
-Planning Unit

freshwater ecosystem classification: small stream basins (~100km^2)



Species Surveys



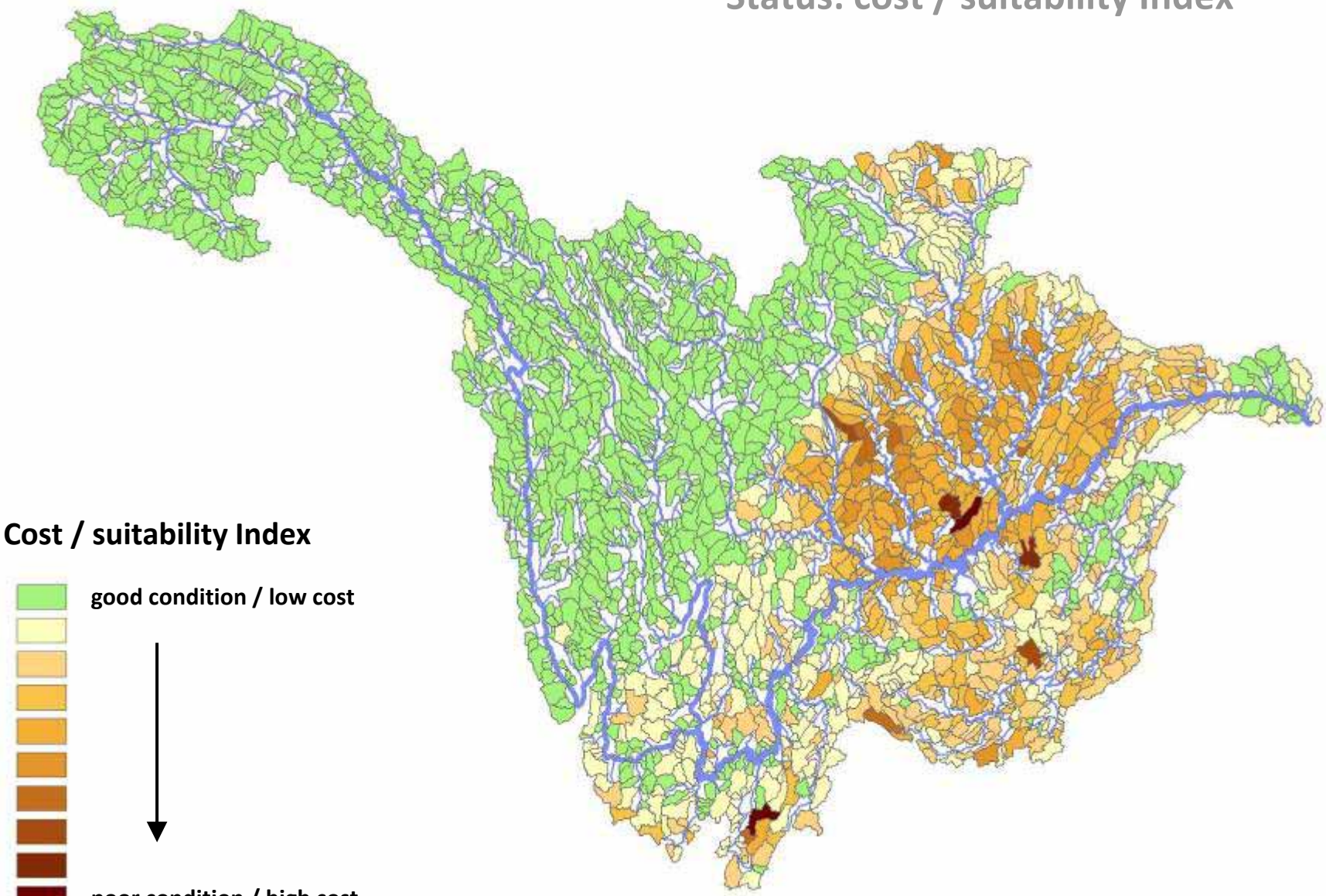
Survey data for 400+ species:

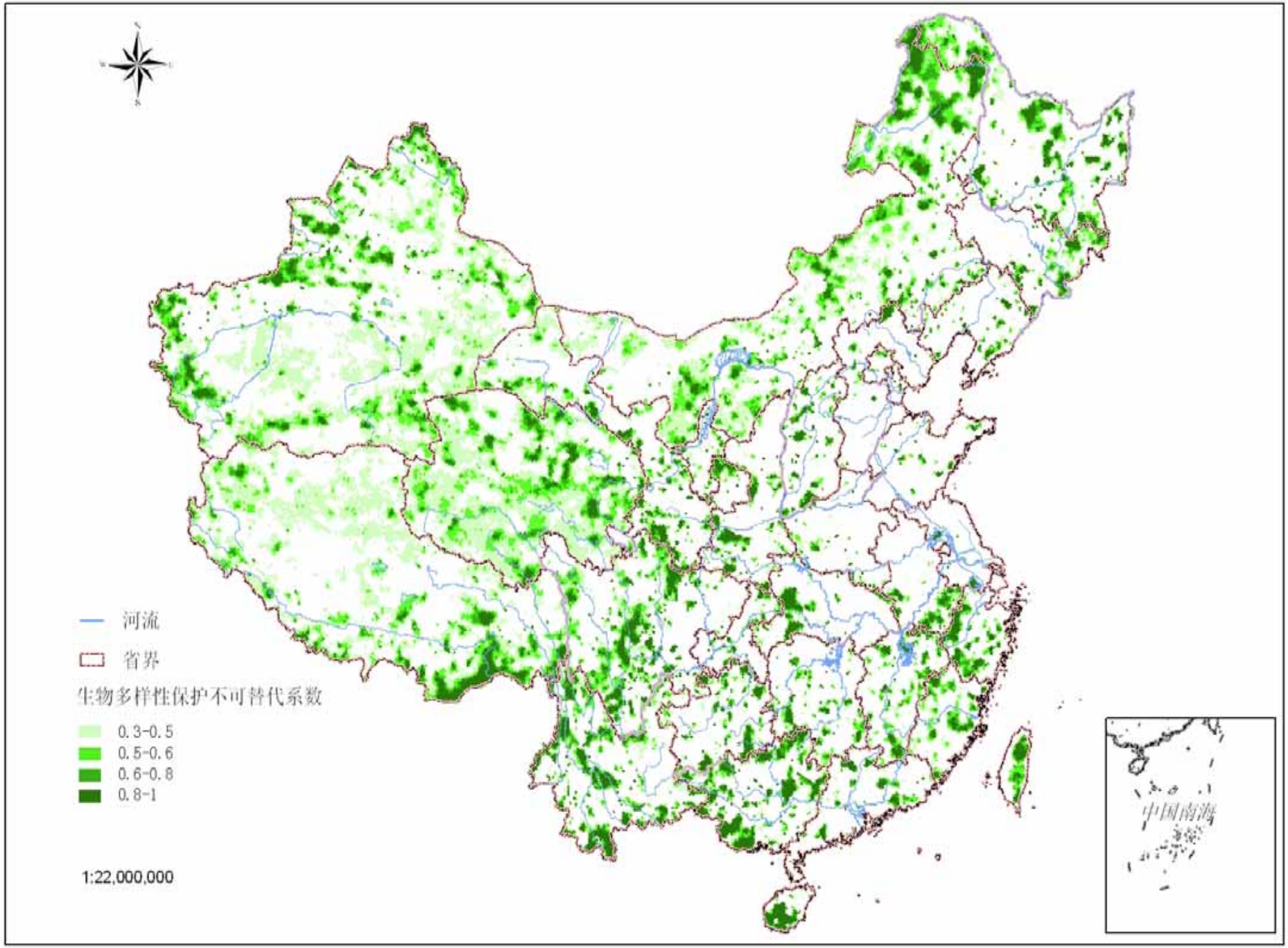
- **rare**
- **endemic**
- **threatened/endangered**

Sources:

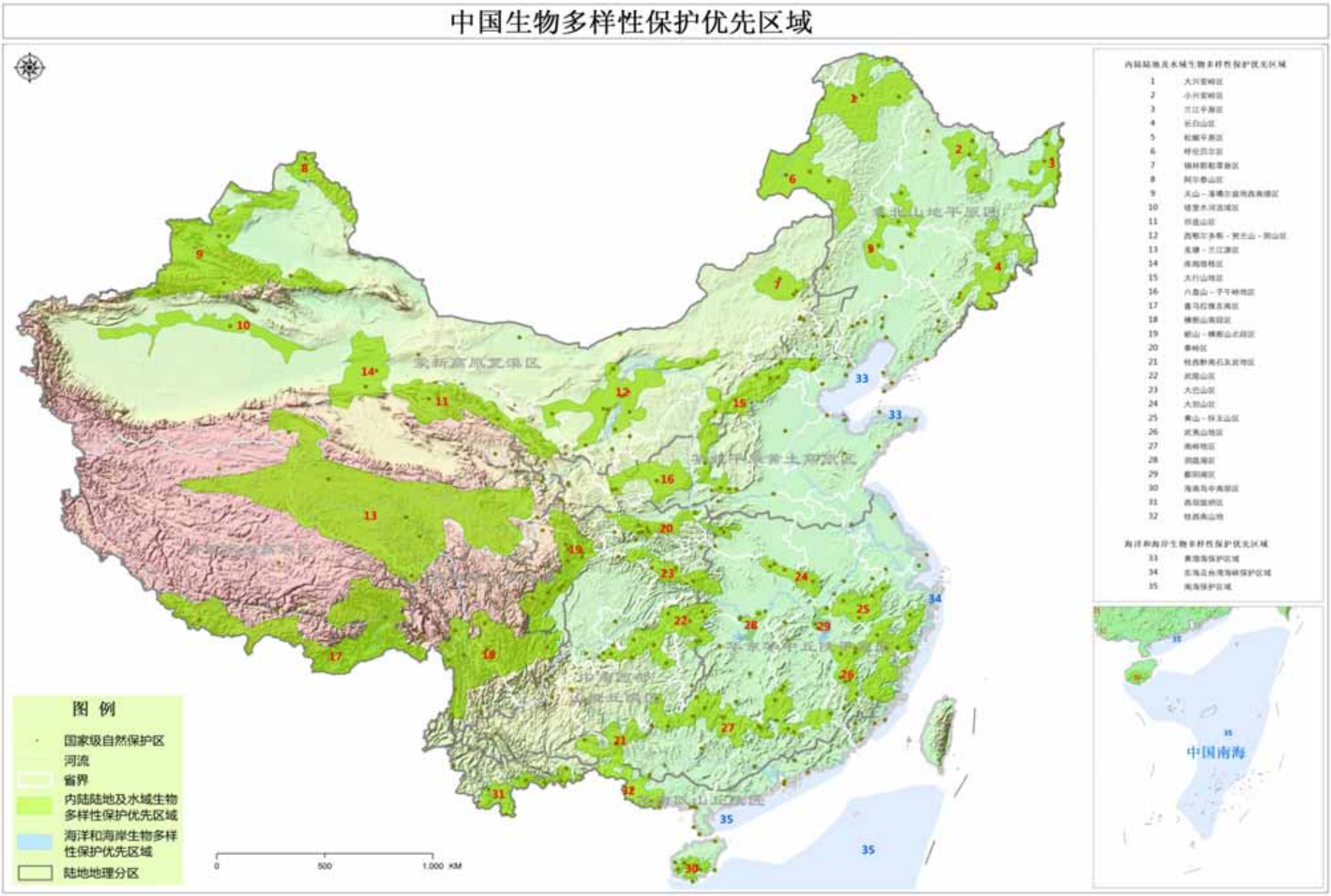
Dr. Ding Ruihua (Sichuan I. of Xinshiji Biology)
Dr. Yang Juxing (Kunming I. of Zoology)
Dr. Yu Dan (Wuhan University)
Dr. Zhao Yahui (CAS I. of Zoology)

Status: cost / suitability Index




河流
省界
生物多样性保护不可替代系数
0.3-0.5
0.5-0.6
0.6-0.8
0.8-1
1:22,000,000
中国南海

Priority Area of Biodiversity Conservation



4. Priority domains and actions

Base on the 35 priority areas of biodiversity conservation, ten priority domains and thirty priority actions have been identified in accordance with the strategic goals and strategic tasks.

- **To improve the policy and legal system of biodiversity conservation and sustainable use**
- **To incorporate biodiversity conservation into sectoral and regional planning to promote sustainable use**
- **To carry out identification, evaluation and monitoring of biodiversity**

4. Priority domains and actions

- To strenthen in-situ biodiversity conservation
- To carry out ex-situ conservation based on sciences
- To promote rational use and benefit sharing of biodiversity genetic resources and associated traditional knowledge
- To strengthen biosafety management of invasive alien species and genetically modified organisms
- To improve capacities to cope with climate change
- To strengthen scientific research and human resources development in the field of biodiversity
- To establish public participatory mechanisms and partnerships for biodiversity conservation

生物多样性是生命
生物多样性就是我们的生命

BIODIVERSITY IS LIFE BIODIVERSITY IS OUR LIFE

■ 2010国际生物多样性年中国国家委员会
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Thanks for your attention!