



**China Council for International Cooperation on Environment and
Development (CCICED)**

Institutional Innovation of Eco-Environmental Redlining

CCICED Special Policy Study Report

**CCICED 2014 Annual General Meeting
2014.12.1 – 3**

Special Policy Study Members

Co-chairs:*

- **OUYANG Zhiyun**, Professor/Deputy Director, Research Center for Eco-Environmental Sciences (RCEES), Chinese Academy of Sciences (CAS)
- **Derek THOMPSON**, former Deputy Minister of Environment, Lands & Park, British Columbia, Canada

Special Policy Study Members:*

- **GAO Jixi**, Professor, Director, Nanjing Institute of Environmental Sciences, Ministry of Environmental Protection (MEP)
- **LIN Jian**, Professor, Peking University
- **ZHANG Lijun**, Professor, Information Center of Ministry of Land and Resources
- **Scott PERKIN**, Head, Natural Resources Group, IUCN Asia Regional Office, Bangkok
- **John MacKINNON**, Professor, University of Kent, U.K.
- **Tundi AGARDY**, Ecosystem Services Program, Forest Trends, USA

Support Team:

- **ZHANG Huiyuan**, Professor, Chinese Research Academy of Environmental Sciences, MEP
- **ZOU Changxin**, Professor, Nanjing Institute of Environmental Sciences, MEP
- **SONG Feng**, Professor, Peking University
- **FU Rong**, Associate Professor, Information Center of Ministry of Land and Resources
- **LIN Xiyi**, Peking University
- **LUO Yilin**, Peking University

Coordinators:

- **ZHENG Hua**, Professor, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences; Program Coordinator
- **ZHU Chunquan**, Country Representative, China Office, IUCN; Program Coordinator

** Co-chairs and Special Policy Study Members serve in their personal capacities.*

Background and Summary of the Study

China's rich and varied ecosystems deliver a wealth of benefits in the form of ecosystem services and should form a sound pillar for the creation of an ecological civilization. However, the pace and nature of physical and economic growth are having alarming impacts on the health of those ecosystems and will limit national aspirations to achieve an ecological civilization unless addressed.

Admirable government efforts to protect and restore environmental health by establishing Protected Areas, restoring forests, controlling the use of grasslands, farmlands, wetlands, and strengthening the administrative and legal framework are proving inadequate to the task, especially in the context of an ecological civilization approach and in optimizing ecological goods and services.

In recognition of these problems the Government of China has issued the following direction. To strengthen ecological protection and establish ecological security pattern, in 2011, "State Council's Opinions on Priorities of Strengthening Environmental Protection" (GF [2011] No. 35) made it clear that in important ecological function areas, terrestrial and marine ecology sensitive areas, fragile areas, and other areas, ecological redlining shall be drawn. "Decisions on Several Major Issues of Comprehensively Deepening Reform" adopted on Third Plenary Session of 18th CPC Central Committee set the ecological protection redlining as key content to speed up the ecological civilization institutional construction. It explicitly requested "to delineate ecological protection redlining. Establish national spatial development and protection system", "establish spatial planning system, delineate production, life and ecology space development control limits, and implement use controls."

The Special Policy Study officially commenced in March 2014. Over the succeeding six months the SPS has met with a wide range of experts and studied the rationale for and current practice of redlining in China by examining many practical cases in Jiangsu, Shenzhen, Beijing, and the Bohai Sea. The SPS team has identified several reasons why current efforts have failed to reverse the trend of ecological degradation, including: (1) the lack of a coordinating institution with the primary role and responsibility for ecological well-being; (2) insufficient recognition of ecological conservation in spatial planning; (3) the reality that the Protected Area system was not specifically designed to protect ecosystem services; (4) problems with accountability and enforcement for all types of environmental protection; (5) lack of an integrated approach to managing land, water, and marine uses and insufficient coordination among different agencies; (6) the inadequacy of eco-compensation systems to pay for protection of ecological services, and to provide adequate incentive to ensure local agencies pay attention to these issues.

Summary of Recommendations and Implementation Plan

The SPS study team recommends several institutional reforms to address the pressing need for safeguarding and improving ecological and environmental goods and services. These suggested reforms are based on using the mechanism proposed by the central government of establishing ecological protection red lines (EPRL) in order to delineate additional lands and water areas for strict protection and restoration of ecological functions. The SPS team views this effort as essential for China's national and local ecological security and sustainable development. The specific recommendations are to:

1. Institute a major redlining effort starting immediately to identify adequate ecological lands and water areas to ensure sustained delivery of ecosystem services, at a level sufficient to guarantee protection of China's national needs; and strengthen the legal framework for ecological protection with introduction of a comprehensive law and regulations covering existing and new Protected Areas, their use and management in relation to Ecological Civilization, and the new designations of ecological protection red lines.
2. Integrate these EPRLs into a reformed land-use planning process by introduction of a new land-use category for ecological protection and to pay specific attention to situations involving areas surrounding China's urban areas, coastal, marine and watershed areas, which otherwise will face environmental and ecosystem degradation.
3. Establish a new coordination agency to plan, supervise and monitor ecological conservation in China since redlining is just one tool in the battle to preserve a healthy and safe living environment; additional institutional changes and market reforms also need to be made.
4. Reform the mechanism of payment for ecological services, including a performance-based approach to improve the environmental benefits and cost-effectiveness of eco-compensation and environmentally based transfer payments for ecological construction and other ecosystem protection mechanisms.
5. Reform the existing Protected Areas system in China to allow more management categories and include protection of areas for primarily ecological function. Similarly, introduce into ocean and coastal zoning initiatives a category of zone important to protect sustainability of ecosystem services delivery and ecological functioning, and for the protection of sea life, migratory birds, fish and mammals, and other biodiversity components.

The recommended changes need to be institutionalised within recognized national plans and strategies by:

- 1) Approval of the SPS recommendations by the central Government Economic and Eco-civilization Reform Group;
- 2) Mainstream the Recommendations into the National and Provincial Five-Year Plan to be approved at the March 2016 National Peoples' Congress;
- 3) Refer all law and regulatory changes to the National Peoples' Congress for approval in 2016.

These steps will take some years and a number of tasks are required to be implemented in parallel. Immediate actions are required to:

- 1) Establish the national coordination function to oversee all implementation;
- 2) Set the EPRL definition and characteristics and targets;
- 3) Establish management rules and regulations by State Council;
- 4) Freeze all incompatible development in nationally significant approved Ecological Function Zones and existing nature reserves.

Within one year actions required to:

- 1) Commence full implementation of planning, management and enforcement of the ERPL system throughout China
- 2) Change the spatial and land use planning systems
- 3) Undertake the necessary steps to rationalise and improve the Protected Areas system.
- 4) Develop the payments for performance approach

National implementation at all levels will take five years. By that time the complete institutional system will be in place and technical functions will have become routine. At the end of a ten year period China will have in place a fully functional comprehensive and systematic approach to the conservation and restoration of ecologically important lands, services and environments that will be the underpinning of an Ecological Civilisation and will also lead the world in practice.

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1. THE NEED TO STRENGTHEN ECOLOGICAL PROTECTION IN CHINA

1.1 The Importance of Healthy Ecosystems

Human welfare and development depend to a large extent upon the ecosystem services provided by our natural environment. For centuries we have taken the fertility of soils, the patterns of annual climate, rainfall, river flow of clean water, the bounty of the lakes and oceans for granted and treated the growth of timber and the pollination of our crops by insects as free gifts from nature. These services are not free and we can no longer take them for granted. They can and are being irreversibly damaged by the pace and scale of modern development and need careful protection^{1,2}.

Ecosystem services can be classed into four main categories:

- Provisioning – drinking water, timber, fuels, fish, game, medicinal plants, fibres, etc.
- Regulating – pollination, decomposition, water purification, erosion and flood control, carbon storage, and climate regulation
- Cultural – contributions to local practices, beliefs, inspiration, and recreation
- Supporting – photosynthesis, nutrient cycling, the creation of soils, and the water cycle

The total value of such ecosystem services is immense. Globally, these have been calculated to be in the order of \$125 trillion per annum³. With 6% of global land area and 20% of the human population, China is a primary beneficiary of this total but also a country with a high demand for such services. Further, due to its overall geographic setting, China contains a wide range of extremely rich and valuable ecosystems. National efforts to determine the value of ecosystem services in China suggest they must be at least worth several times national GDP⁴.

While few would doubt these values exist, many are somewhat intangible and difficult to fully capture or audit in national accounting. However, the scale of economic losses faced if ecosystem services start to fail becomes painfully evident when China faces floods, landslides, typhoons, droughts, or when valuable soils, coastline, houses and loved ones are being washed away⁵.

The continued flow of these benefits is vital for human health, security and a foundation for sustained economic development, but is dependent on the health of functioning ecosystems such as forests, grasslands, farmlands, wetlands and oceans. However, the Government of China is alert to growing evidence that ecosystem health is degrading at an alarming pace. In large part this change is the undesirable consequence of the remarkable pace of economic and physical development over the

¹ TEEB Reports

² CCICED 2010a

³ Costanza 2014

⁴ Ouyang Z Y, Zhu C Q, Yang G B, Xu W H, Zheng H, Zhang Y, Xiao Y. Gross ecosystem product: concept, accounting framework and case study. *Acta Ecologica Sinica*,2013,33(21):6747-6761

⁵ Wang *et al.* 2010

past few decades. Human-induced changes to climate are placing an additional and accelerating stress on already degrading ecosystems in China.

1.2 Growing Threats to China's Ecological Health

Deteriorating ecosystem functions in China slow the attainment of 'ecological civilization'. Recent reviews of the status of China's ecological environment are cause for alarm and urgent attention⁶. Certainly economic development since the 1970s has raised hundreds of millions out of poverty, but these 'miracles' have not been without environmental costs. Land reclamation, deforestation, overgrazing, uncontrolled mining, unsustainable fishing, pollution and improper use of water resources have resulted in ecological degradation on almost all fronts.

- *Water resources* – The Ministry of Water Resources reported in 2012 that two thirds of Chinese cities were “water-needy”, nearly 300 million rural residents lacked access to safe drinking water, and 40% of rivers were seriously polluted.⁷
- *Forests* – China's original forest cover was reduced in area and quality by unsustainable logging, fuel collection, agriculture encroachment and forest fires. New forest plantings are now restoring forest area from a low of 8% cover to 22% cover, but new forests lack sufficient biomass and biodiversity levels and deliver reduced hydrological functions.
- *Grasslands* – These have been severely degraded as a result of over-grazing and losing biodiversity as a result of fencing and misguided pest control policies. The situation has worsened through reduced water tables, changing climate and desertification⁸.
- *Wetlands* – Over 1.3 million ha of lake surface have been lost to reclamation and more than 1,000 lakes have disappeared forever⁹. Large lakes have been reduced, e.g., Dongting was 430,000 ha in the 1940s but is only 240,000 ha today. Marshes have been drained. For instance, Sanjiang Plain had 2.44 million ha of marshland in 1975 but was reduced to only 1.13 by 1990. River flow has been altered by thousands of dams, and wetlands face increasing pollution, water diversions and reduced water tables. Wetland biodiversity is under severe pressure – 40% of all amphibians and 88% of all fish evaluated are categorized as 'threatened' in the China Red List¹⁰.
- *Coasts* – 50% of the intertidal zones of Bohai and Yellow Sea have been lost to reclamation¹¹ and 80% of China's mangroves have been lost^{11,12}. Reduction in silt deposition rates caused by major dam projects plus rising sea levels are causing fast erosion of precious coastal lands¹³ along with nursery habitats

⁶ Ouyang Z Y et al. 2014 MEP & CAS Special Project: “National Wide Remote Sensing Survey and Assessment of the Ten Years Changes of Ecological Environment of China (2000-2010)

⁷ http://news.xinhuanet.com/english/china/2012-02/16/c_131414176.htm

⁸ Piao et al. 2010

⁹ An et al. 2007

¹⁰ China Red List of Endangered Species, 2002, IUCN 2011

¹¹ IUCN 2012 Situation Analysis

¹² Murray et al. 2014

¹³ Chen 1997

needed by commercial fish populations. Sediment starvation and subsequent erosion also puts coastal lands, infrastructure, and cities at hazard risk.

- *Ocean and islands* – Onshore habitat destruction has increased sediment flow and pollution into marine waters, land reclamations¹⁴, destruction of sea-grass, mangroves and coral reefs, and destructive fishing methods all reduce fish catch and negatively impact coastal communities¹⁵.
- *Fragile soils* – Loose dusty sands and fragile soils of the Loess Plateau continue to be lost and create spreading deserts and dust storms that reach Beijing and beyond.
- *Deserts* – Desert cover of China has increased throughout history and now covers 2.6 million ha or 27% of the entire country.
- *Air* – High-rise urban developments combined with increases in factory, household and car emissions have resulted in dangerous levels of air pollutants and subsequent acid rain.
- *Agro-biodiversity* – A shift from traditional crop varieties adapted to local conditions towards more mechanical cultivation of high-yield varieties is well underway. Much greater use of chemicals and water leads to the loss of soil fertility and hundreds of traditional varieties¹⁶. Soils are becoming toxic; natural pest control and pollinating bees are endangered. High diversity provides resilience and adaptability to change and this capacity is being lost, at a time when China is facing climate changes.
- *Urban environments* are choked with pollution, and are affected by introduced alien species¹⁷ and water-hungry grasses. Industrial brownfield zones are in need of environmental restoration and greening. Paving of vast areas for roads and parking lots leads to flooding and loss of plant and animal habitat. Interurban transportation and utility construction damages wildlife corridors and fragments key ecosystems.

1.3 Government Efforts to Strengthen Ecological Protection

China's government has given increasing policy attention to the state of the living environment, undertaken a wide range of related actions, and expended very large investments in programs to strengthen protection of the natural environment. The government has adopted a green development path to achieve harmony between man and environment and has recently clarified this policy in the goal of attaining an ecological civilization. Major elements of the government's actions pertinent to ecosystems and ecology include:

- *Protected Area (PA) system* – Built up gradually since 1956 originally of nature reserves for species or representative ecosystems, with accelerating increase in spatial cover following the logging ban of 1997. Recent additions to the PA system include a wide range of land-type titles such as national and provincial parks, scenic areas, forest parks, geoparks, wetland parks, marine

¹⁴ Barter 2006

¹⁵ CCICED 2010b

¹⁶ NEPA 1998

¹⁷ Yu & Yan 2002

reserves and agro-genetic resource reserves. Different PA types are administered by several agencies at different levels of government from national to local. The total PA system covers more than 15% of China's land area, much less of the marine and coastal area. According to China's National Main Ecological Function Zoning Plan issued by State Council in 2010, Development-prohibited Zones include all types and all levels of protected areas of nature, culture and resources and any other areas of key ecological functional zones, which are the first category of the Key Ecological Functional Zones, and not allowed to carry out industrialization and urbanization, and require special protection.

- Reforestation programs – Designed to restore diminished forest cover by protection of remaining natural forests, post-logging replanting, green shelter belts establishment, logging ban over most of the country, returning steep farmlands to tree and grass cover, and ecological restoration of mangroves and wetlands.
- Ministry of Environmental Protection (MEP) – Serves as focal point for Convention on Biological Diversity and administers Environmental Impact Assessments and Strategic Environmental Assessments. MEP has played a key role nationally and within the regions of China concerning pollution control and many important matters such as public participation.
- National Biodiversity Conservation Strategy and Action Plan^{18,19} issued by State Council and developed by MEP in collaboration with other relevant agencies outlining policy and strategy for biodiversity conservation and identification of key programmes and a system of key biodiversity priority areas, including marine areas.
- The Key Ecological Function Zones identify Development-restricted Zones which are defined as the areas where large scale and high intensity industrialization and urbanization is not allowed, which include water sources protection areas, soil and water erosion control areas, wind break and desertification control areas and biodiversity maintaining areas. Twenty-five areas of Development-restricted Zones had been identified based on integrated national wide assessment, with total areas of 3.86 million km², takes 40.2% of the total land territory of China.
- Revised Environmental Protection Law – Taking effect from January 2015, this major revision will be the overarching law to cover the use and protection of both physical and biotic environments. It provides much more severe penalties for infractions. However many new regulations will need to be put into place and other sectoral laws also will need to be made consistent, especially with respect to ecological civilization needs.

1.4 Why are these efforts failing?

The current approach to ecological health can be summarized still as 'develop first and clean up after', and sometimes responding *post facto* rather than taking a

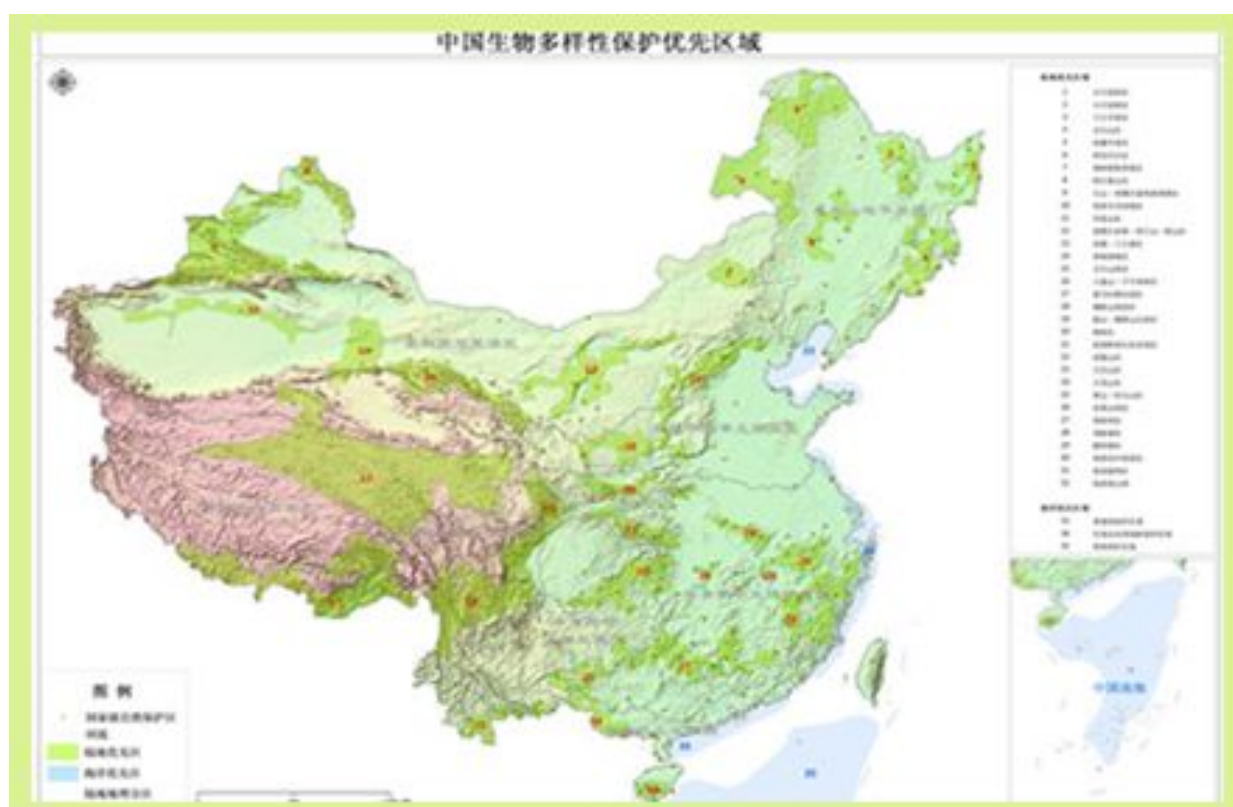
¹⁸ NEPA 1994

¹⁹ China National Biodiversity Conservation Strategy and Action Plan (CNBSAP), 2011, China Environmental Sciences Press

precautionary approach. There is a tendency to solve environmental problems with yet more development (dams, reservoirs, water diversions, plantations), rather than tackle root causes, or to take heed of early warnings of emerging environmental and ecological problems. Other specific reasons for failing efforts are noted in the following sections.

1.4.1 Inadequacy of the Existing PA System

The existing PA system protects some superb and important sites for biodiversity conservation and natural heritage (scenic, geological and cultural values). Although these sites also deliver other important ecosystem services, such as clean water supply, this was not the function for which most PAs were originally selected or established. Also, huge areas with important ecological functions exist outside of the PA system. The Protected Area system itself faces many problems, including patchy management effectiveness, designation overlap and poor coordination with uses in surrounding areas, and the lack of specific legislation or an overall strategic framework.



Map 1-1. Priority Biodiversity Areas

Source: “NBSAP Strategies and action plan for biodiversity conservation in China” (2011-2030)

The core of the PA system consists of some 2,669 nature reserves, covering 14.9% of China’s total land area. Reserves are registered at the national level (363), provincial level (876) or city and county level (1,430). These nature reserves are established and managed by several different agencies, with the majority under the State Forestry Administration (SFA), the Ministry of Environmental Protection (MEP), the Ministry

of Agriculture (MoA), the Ministry of Lands and Resources and the State Oceanography Administration (SOA).

The Nature Reserve system is augmented by scenic areas. The Temporary Regulation of Scenic Spots was issued by the State Council in 1985 and revised in 2006 and 2013. The State Council has approved eight batches of 225 national scenic spots, with an area of about 103,600 km². Provincial governments have approved 737 Scenic Spots, with an area of about 90,100 km². The total area accounts for 2% percent of China's land area. Additional designations of protected areas include forest parks, wetland parks and geoparks.

International designations cut across the national system including World Heritage Sites, Man and Biosphere Reserves, Global Geoparks, and wetland sites of global significance (Ramsar Sites). There is a great deal of overlap in designation. For



Map 1-2. Distribution of China Nature Reserve System

Source: TNC

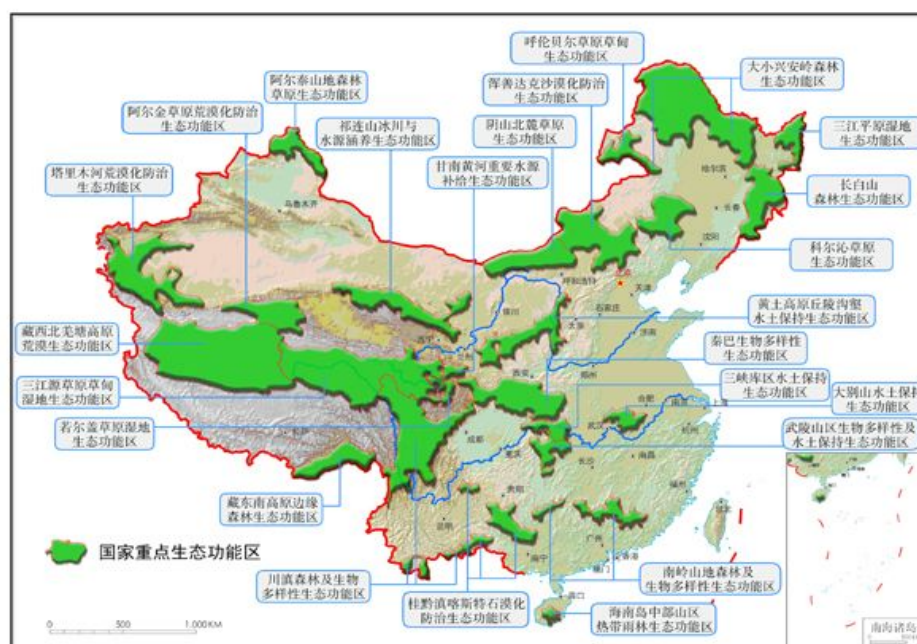
instance Jiuzhaigou is listed as a national nature reserve, national level scenic spot, National Forest Park Global Geopark and World Natural Heritage Site. The following major issues have been highlighted by earlier studies and CCICED working groups and task forces^{20,21,22}:

²⁰ Wang Sung & MacKinnon 1997

²¹ Yan *et al.* 2004

²² CCICED 2010c

(1) Apart from a few super-sized reserves in western China, which help boost the area of terrestrial PAs almost up to the Aichi target²³, most of the country's nature reserves and other PAs are too small, suffer from encroachment, and lack sufficient connectivity to sustain high biodiversity. The system evolved on an ad hoc basis without systematic planning. Many PAs were established out of timber production areas following the logging ban of 1997. There are identified gaps in terms of representational coverage of species and habitat types. Thirty-two terrestrial biological diversity conservation priority areas have been proposed in the "China National Biodiversity Conservation Strategy and Action Plan" with an area of 2.32



Map 1-3. Key Ecological Function Zones

Source: http://www.gov.cn/zw/gk/2011-06/08/content_1879180.htm

million km², accounting for 24.2% of total land area (see Map 1-1)²⁴. There is at the same time a paucity of well-managed marine Protected Areas. There is a need to do the systematic analysis of the ecological representativeness of PAs system in China.

(2) Management standards remain low for a variety of reasons. Staff lack specific training in Protected Area management (many are ex-loggers); there is no legal requirement to develop or follow management plans; management lacks supervision; Protected Area staff lack police status and have a weak law enforcement mandate; and the lack of operational funding drives many sites down a commercial-orientated path of chasing economic ventures (including excessive eco-tourism), which is in conflict with their protection mandate.

(3) Although many national level Protected Areas enjoy high levels of financial support, most provincial level sites are severely under-funded and most county level

²³ The Aichi Biodiversity targets (5 goals and 20 targets) are part of the Strategic Plan of the Convention on Biological Diversity. They were adopted in an October 2010 decision at the Conference of the Parties in Nagoya, Aichi Prefecture, Japan

²⁴ China National Biodiversity Conservation Strategy and Action Plan (CNBSAP), 2011, China Environmental Sciences Press

sites have no operational funds at all. There is no specific law to define different types or categories of Protected Areas. Nature reserves are regulated through an outdated regulation issued by the State Council. It was drafted by the Ministry of Forestry (now SFA) and National Environmental Protection Agency (now MEP) in 1986. The regulation is weak, fails to protect nature reserves from mining and other impacting developments, uses confusing terms for zones, offers no opportunities for wildlife or habitat management or rehabilitation, and gives no consideration to new threats such as Alien Invasive Species (AIS) and climate change. The regulation also fails to provide for any forms of public participation or co-management. The legal status of all other types of PAs remains undefined and vague. Many sites enjoy multiple overlapping status and titles. One reason for the proliferation of many types of legally undefined ‘parks’ is a deliberate effort to avoid the strictures of the Nature Reserve regulation.

(4) The weakness of PA status is revealed by GIS analysis of the rate of conversion of one key biodiversity habitat—intertidal estuarine in the Yellow Sea²⁵. This study reveals the frightening rate of habitat loss, matched by documentation of the rates of species losses. Both South Korea and China have been reclaiming coastal lands at a similar pace, but there is an alarming difference between the two countries: in those areas in which South Korea has declared nature reserves, the rate of habitat loss has been significantly reduced, whereas in China, the status of nature reserve has had no impact on the rate of coastal development and land reclamation.

1.4.2 Inadequacy of the Key Ecological Function Zones

National Ecological Function Zones have been identified and published at the national scale by the Ministry of Environment and the Chinese Academy of Sciences (CAS) in 2008 and the National Main Ecological Functional Zones Plan was issued by State Council in 2010. These maps (see Map 1-3 above) are useful as a strategic planning tool but the identified areas lack protective legal status and have little meaning for ground level management. The Ecological Function Zones are not approved by all ministries. The 50 Important Ecological Function Zones proposed in the “National Ecological Function Zoning” have a total area of 4,360,000 – accounting for 45.4% of total land km², and the 25 Key Ecological Function Zones²⁶ proposed in the “Nationwide Main Functional Zones Plan” have a total area of 3.86 million km², accounting for 40.2% of total land.²⁷

1.4.3 Weak Incentives for Ecological Protection

There are insufficient legislative mechanisms for the identification, management and protection of critical ecosystem services across the landscape outside the PA system. Ecosystem services are being assessed across the landscapes of China, but very little assessment or valuation has been done on marine and coastal ecosystem services, which are some of the most valuable and most threatened services. Where ecosystem services have been identified and attempts have been made to alleviate pressures that

²⁵ Murray *et al.* 2014

²⁶ The Nationwide Main Functional Zones Plan is a strategic level plan released by the State Council and identifies the Four categories of i) Optimal Development ii) Key Development iii) Limited Development iv) Prohibited Development. It is intended as guidance to provincial and local governments.

²⁷ Ouyang ZY and Zheng H, 2014, Ecological Security Strategy.

cause declines in services, fines and penalties for ecological damage are weak and poorly enforced, providing little disincentive for many destructive activities and developments.

Considerable financial support has been expended for ecological work in China through reforestation programs, ecological construction projects, protection of fragile soils and water catchment sources and post-disaster restoration projects. However, some of these activities are misdirected and payments for ecosystem services are inefficient and fail to reach the most critical targets.

1.4.4 Lack of Institutional Coordination Enforcement and Accountability

Responsibilities for ecological protection are scattered among many organizations including nine major governmental agencies. This in itself is not unworkable, but there is no agency for which ecological well-being forms the major mandate, and there is little coordination among the activities and programs of these nine agencies. Indeed, there are overlaps of responsibilities, jealous protection of mandates and land management allocations, gaps in attention, no overall plan or legal basis and no transparent reporting or effective enforcement. There is no agency with overall coordination or supervisory role and no comprehensive plan for ecological protection, or mainstreaming of ecological protection and biodiversity conservation into holistic government plans at different levels.

1.4.5 Poor Awareness

Senior government leaders clearly understand the value of ecosystem services, recognize the threat of degrading ecological health of the country, and have made ecological protection redlining a high priority for the government development program. Yet this level of awareness is not shared fully by many other government officials, especially at a local level. Nor is it shared by some members of the public and perhaps not by the majority of enterprises.

Such lack of awareness leads to half-hearted support of the program and regular ignoring or deliberate disregard for the government policies and regulations. These attitudes, combined with a lack of laws and weak penalties, explain why ecologically damaging developments and activities remain so widespread across the landscape.

1.5 New Approach to Be Followed

New approaches are clearly needed. Chinese leaders have identified the red line concept as a key mechanism. To strengthen ecological protection, the “State Council’s Opinions on Priorities of Strengthening Environmental Protection” (GF [2011] No. 35) made it clear that for important ecological function areas, terrestrial and marine ecology sensitive areas, fragile areas, and other areas, red lines for ecological protection shall be drawn. “Decisions on Several Major Issues of Comprehensively Deepening Reform” adopted by the Third Plenary Session of 18th CPC Central Committee set ecological protection redlining as a key action to speed up the ecological civilization institutional construction. It explicitly requested “to delineate ecological redlining. Establish national spatial development and protection system”, “establish spatial planning system, delineate production, life and ecology space development control limits, and implement use controls.”

2. ECOLOGICAL PROTECTION REDLINING (EPRL) NEEDS AND OPTIONS

Despite a relatively clear introduction of the term ‘ecological red line’ in national policy documents, it is apparent that there is a lack of clarity and uncertainty in the understanding of this term, how it relates to red lines for environment, and what it entails. Different agencies of the government have initiated quite separate efforts to describe and apply their own ideas. There is a great need for a clear, commonly accepted definition of the term, better understanding of what China expects from such red lines for ecological protection, and improved harmonization among the different approaches being launched.

2.1 Definition and Characteristics of EPRL

2.1.1 Definition

The term EPRL is proposed to best convey the primary focus and intent with regard to ecology and it is defined as the aggregate minimum space or area within which strict development controls can ensure the sustainable provision of ecosystem services that underpin regional and national development and support the attainment of China’s vision of an ‘ecological civilization’. EPRL includes natural and constructed ecosystems (terrestrial, freshwater and marine), and degraded areas with potential for ecological restoration to high ecosystem services value.

2.1.2 Characteristics of the Ecological Protection Red Line (EPRL)

2.1.2.1 What is contained within the EPRL?

There is already a plethora of red lines emerging in China for different purposes. As one senior official noted “there are enough red lines to knit a sweater”. We have agreed that there should be a single EPRL rather than several “ecological” red lines or lines of yet more colours. The line is simply the tool to delineate spatial land units that require various measures of special protection or strict limits on activities and developments. Moreover, it is not the only regulatory designation that may apply to a specific unit of land since these lands may be used for various purposes. Within the EPRL, different land units will be labelled as to what ecological functions need protection or enhancement. The responsible agencies and managers will be accountable to ensure that the correct designation and regulations are applied.

It should also be pointed out that the EPRL is only the final line that should not be breached. Lands falling outside of the EPRL also serve important ecological functions and require various levels of protective management and controlled use. And the viability of continued ecological function within redlined areas is also influenced by the context – islands of protection in a sea of degradation will have little ability to provide services or meet the needs of the China ecological civilization into the future. This is especially true in marine and coastal areas, where degradation from afar is often the driver of ecosystem services loss. So in many cases, the redlined lands will require establishment of an external buffer that allows some appropriate level of development that is compatible with the adjacent EPRL and provisions to protect functional connectivity to ensure, for example, migration routes for wildlife.

The EPRL can thus be seen as a category division in a land-use classification system that contains a review of the ecological protection needs of all land units, freshwater and marine areas of China, dividing those lands for which ecological protection is the primary function from lands where other uses – farming, forestry, mineral development, etc. – may be the primary function. However, attention will also be needed to protect some ecological functionality in these lands.

Some areas within the EPRL may be primarily for water catchment protection and require strict protection of vegetation cover but not necessarily native vegetation. Other areas may be important for biodiversity and the emphasis would be more on natural conditions or even conditions managed to favour a specific target species or species community. And even other areas may be primarily concerned with binding loose soils or creating wind or storm barriers to protect crops and property. Many land units will serve multiple ecological functions and may need attention from several different agencies to ensure their proper management. Marine redlining could underpin the country’s marine spatial planning and ocean zoning, in such a way that it improves the prospect for food security and assures that ecosystem services flow into the future, even as global change stresses ecosystems everywhere²⁸.

2.1.2.2 Relationship with other red lines

There are currently many “red lines” (or other coloured lines) being utilised by the various departments of government. Some, but not all, may apply to ecological protection in some way and will need to be rationalised during implementation.

Table 2-1. Various red lines under different ministries/agencies

	Name	Ministry	Feature
1	Red line of land	Ministry of Housing, Urban and Rural Development (MoHURD)	space bound area proportion
2	Red line of farmland	Ministry of Land and Resources (MLR) and Ministry of Agriculture (MoA)	quantity / total
3	Red line of water control	Ministry of Water Resources (MWR)	total \ limiting value
4	Law of water and soil conservation	Ministry of Water Resources (MWR)	spatial constraint

²⁸ Sale *et al.*, 2014

5	Red line of forest and wetland	State Forestry Administration (SFA)	quantity/quality
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These different red lines vary according to their nature and purpose; some are spatially fixed, while others are quantile rather than spatial. For instance, the agricultural red line simply demands that an adequate extent of arable lands be protected from conversion so as to guarantee long-term food security (assuming *per capita* food consumption levels remain constant with growing wealth, China's population levels off, and soil fertility is maintained). Such lands can be identified and marked on a map.

Clearly, there will be overlaps among these red lines. For example, some of the lands reserved under the agricultural red line may serve important ecological functions, notably in steep terrain, important water catchment areas, and on fragile soils. Some agricultural lands may be important for biodiversity conservation – feeding areas for geese and cranes, breeding sites for endangered Crested Ibis, etc. Thus, the EPRL is likely to overlap the agricultural red line and identify some farmlands that require special protection measures or controlled use.

There will be more overlap with lands redlined to protect forest lands, wetlands and lands redlined to protect water sources. During implementation these overlaps can become harmonized through the land-use planning process, where overlay of all classifications are considered during the allocation of appropriate land or marine-use category.

2.1.2.3 Basic characteristics of the EPRL

Once an EPRL has been delineated it should satisfy the following properties and characteristics:

Nature remains unchanged. The main goals of EPRLs include ecosystem services protection, protection of ecologically sensitive areas and fragile areas, and biodiversity conservation. EPRL blocks shall be clearly fixed, and the natural environment and ecosystem types inside the red line area shall remain unchanged. These conditions may be difficult to guarantee, especially when climate change and other drivers come into full play.

Functions are not reduced. For important ecological function areas with good ecological conditions, ecosystem services delivered by the EPRL cannot be reduced. For ecologically sensitive areas, vulnerable areas, and areas within ecological protection red lines, measures of ecological restoration and management shall be taken to continuously improve the ecological function.

Area is not diminished. After the EPRL is delineated, it is not permanently unchanged. When the borders and thresholds of ecological protection redlining change due to external environment changes, the EPRL be adjusted so as to ensure timely supply of basic ecological functions. However, the EPRL area cannot be

reduced, and shall be appropriately increased with the enhancement of ecological protection ability and optimization of land spaces.

2.1.2.4 Objectives of the EPRL

As implicit in the definition of the ecological protection red line, the objective is to safeguard or restore a minimum of ecological functions that underpin the safety and sustainability of human development.

The EPRL delivers three main categories of function. First, it protects the most critical lands for delivery of regulatory and supporting functions with protection of water resources, soil formation/protection and climate mitigation as the main objectives. Secondly, the EPRL protects and conserves areas vital for protection of high conservation values of biodiversity, important species, wild crop relatives, representative ecosystem types and genetic resources. These are valuable as provisioning services, and provide ecological resilience and adaptability as well as forming an important part of national natural heritage. Thirdly, the EPRL includes areas of sensitive/fragile ecological conditions that can be easily threatened or destroyed by erosion, flooding, landslides, flooding, coastal typhoons, etc. Again, there is considerable overlap between these functional types and many areas deliver services of all three.

2.1.2.5 What can establishing EPR deliver?

EPR alone cannot cure all that ails China’s degrading ecosystem functionality. It is one important set of tools in an arsenal of measures needed. Table 2-2 lists the main ecological problems and failings being experienced in China and annotates the relevance of EPR in the remedial prescription.

Table 2-2. Ecological problems and relevance of EPR

Ecological problems faced	Causes and drivers	Remedial actions required	Contribution of EPR
Drying up of dry season river flows	Loss of forest, grassland and wetland sponges in upper catchments; excessive and wasteful upstream water use	Strengthen protection of natural vegetation in catchments; improve reforestation techniques and farm practices	Helps identify and protect critical water catchment areas
Drying up and reduced volume of freshwater lakes	Diversion of water supplies; excessive and wasteful upstream water use; reduced water tables from tapping underground sources; climate change	Better regulate diversion and extraction of water; improve efficiency of irrigation, strengthen water conservation	Minor and indirect
Loss of species connectivity through aquatic habitats	Construction of dams and weirs; disconnection and reduction of lakes; alien introductions	Create fish ‘ladders’ around dams; restore important lakes and reopen connections to major rivers	Used to protect or restore aquatic ecosystems
Excessive siltation of waterways	Poor soil conservation practices; cultivation of steep slopes; loss of	Improve forestry and agricultural practices; apply strict Environmental	Identifies areas most prone to soil losses, but these are mostly

	forest cover; poor engineering	Impact Assessments (EIA) on all engineering projects; better siting of roads and other constructions	in forest and farmlands outside of the EPRLs
Pollution of waterways and soils	Weak control of industrial and domestic waste; excessive use of fertilizers and pesticides	Apply better standards and enforcement; improve agricultural practices; promote use of green manures and integrated pest management	Significant – can help zone location of pollution sources to minimize effect on natural ecosystems
Air pollution and acid rain	Excessive use of coal as fuel	Reduce dependence on coal; raise energy use efficiency; apply carbon cap	Minor – as air pollution can travel long distances and impact ecosystems
Desertification	Destruction of original vegetation; climate change; overgrazing and reduced water tables	Protect and reestablish vegetation; reduce grazing and use of wood fuel; control water boring	Significant – can help prioritize areas for strengthened conservation and ecological restoration
Degradation of grasslands	Overgrazing; fencing of grasslands, climate change; and reduced water tables	Reduce grazing levels; halt misguided pest control (pika) program; protect key functional grasslands	Significant – can help prioritize which grassland areas most need protection from overgrazing
Dust storms	Poor vegetation cover in regions of loose soils and fine sand	Improve natural vegetation cover and strictly control farming practices	Indirectly through identifying sensitive areas where vegetation must be protected or restored
Extreme weather events	Consequence of man-induced climate change	Maintain shelter belts to limit desertification and protect coastline and river banks	Slight mitigation of impacts and identification of important shelter belts
Climate change	Excessive carbon emissions from fuels, land clearance and reduced carbon capture due to loss of green vegetation and biomass	Improve carbon fixation by intensifying vegetation cover and carbon storage of forests and wetlands	By helping protect vegetation, can improve carbon sequestration of degraded lands and mitigate some climate effects
Declining terrestrial biodiversity	Loss and fragmentation of original habitats; fencing of grasslands; over-hunting and collecting; pollution	Extend and strengthen protective management of PA system; control excessive eco-tourism; limit hunting and wildlife trade; promote connectivity and habitat cover	Major contribution through better protection of natural habitats and important reforms to and extension of PA system
Declining aquatic biodiversity	Loss of habitat; pollution, loss of connectivity and over-harvesting	Strengthen wetland protection; control harvest levels and restore waterway connectivity; halt pollution	Indirect through better protection of some wetlands and catchments
Declining agro-biodiversity	Shifting agricultural practices and economic changes	Provide incentives for promotion of traditional varieties; protect wild crop relatives	PA buffers offer opportunities to maintain traditional varieties; PAs can

			also help to conserve crop wild relatives
Declining marine biodiversity	Sedimentation; loss of habitat, pollution; overfishing and destructive fishing methods	Protect spawning source areas; control mariculture and fishing methods and catch; reduce land sourced pollution	Can help zone harvesting and better protect vital spawning areas
Collapse of migratory shorebird populations	Estuarine and intertidal land reclamation and pollution; bird nets	Restore and protect a flyway of adequate intertidal feeding sites and high tide roosting areas; halt pollution; ban bird netting	Can help identify critical habitats that should be spared from coastal reclamation
Forest fires	Conversion of mixed forests to fire-prone conifer or bamboo plantations; climate change; careless land clearance	Promote reforestation with wider mix of native species especially broad-leaf trees; ban shifting cultivation	Adds little to already sophisticated fire proneness models and early warning system
Alien Invasive Species (AIS)	Dynamic changes to landscape combined with uncontrolled imports and deliberate introductions	Strictly control release of exotic species; strengthen IAS monitoring and control measures and regulations	Minor and indirect

2.1.2.6 Beyond EPR – additional needs

However well-chosen, well-protected and well-managed, China's EPR system will fail to guarantee long-term ecosystem service and biodiversity conservation needs unless various other measures are also taken. These should include:

- *Environmental Hazard Line* – To designate additional areas unsuitable or unsafe for living or certain uses due to proximity to toxic wastes, radioactivity, seismic activity, dams, national security installations, etc.
- *Environmental buffering* – EPRL lands need buffering from various extraneous environmental impacts such as upstream water pollution sources, acid rain sources, noisy airports and roads, and other incompatible neighbouring land uses that could undermine the objectives of their protection. This is a two-way relationship as ecosystems serve also to mitigate and cure some environmental problems, e.g., cleansing functions.
- *Population red line* – All red lines will be inadequate if the Chinese population does not reach a stable zero growth.
- *Red line for carbon emissions* – If China and/or the rest of world continue to increase carbon emissions the pressures on ecosystems will prove too great.
- *Agriculture red line* – Even if enough land is reserved to meet long-term food production needs, this depends on stabilizing human population and maintaining fertility of those agricultural lands. Almost all soils are created under natural forest or grasslands. It is a technological battle for farmers to maintain soil fertility after that original formation vegetation has gone. This is a battle China is still losing. Failure to preserve soil fertility would ultimately demand clearing more forests and grasslands.

- China needs red lines in territories beyond its boundaries to protect its long-term dependence on resources from those territories and to ensure that other countries do not suffer loss of ecological services.

2.2 Components, Procedures and Responsibilities for Identifying EPRLs

2.2.1 Components and Procedures for Identifying EPRLs

Terrestrial lands can be classed into EPRL areas by overlaying maps defining three component science-based lines: ecosystem service line, biodiversity conservation line and living security line. All constitute vital ecosystem services. All lines are based on sound scientifically gathered data but involve some choices based on socio-economic situations and choice preferences. Decisions should be open to public enquiry and challenge. Establishing marine EPRLs is similar but more specialized. There is a problem when inter-coastal lands are reclaimed and effectively shift from State Ocean Administration (SOA) administration to urban uses under the Ministry of Housing, Urban and Rural Development (MOHURD).

Table 2-3. The three component lines of the EPRL

1. Ecosystem Services Protection Line (approximately 30% of land surface with variations to reflect local character)	
Includes	<ul style="list-style-type: none"> • Water catchment and storage functions • Fringe protection (river banks, shoreline forests, etc.) • Climate amelioration (including CO₂ fixation) • Soil protection and formation • Desert control (sandy, stony, limestone, etc.) • Areas needing ecological rehabilitation • Sustainable supplies of wood, NIFP, fish, etc.
Identification	<ul style="list-style-type: none"> • Broad key functional areas already identified by MEP and the Land Survey Department • Finer resolution of identification occurring at local BSAP level based on landform, slope, forest/vegetation cover, hydrology systems, location of important dams and reservoirs, climate, and soil type
2. Living Environment Security Protection Line (approximately 5% land surface with variations to reflect local character)	
Includes	<ul style="list-style-type: none"> • Flood prone lands • Regular earthquake and landslide areas • Eroding coastal areas • Fragile ecosystems/habitats • Fire hazard zones
Identification	<ul style="list-style-type: none"> • GIS analysis of soil fragility, slope, climate, sea level changes, seismic history, inflammable litter • Separate thematic threat maps to be produced
3. Biological Diversity Protection Line (approximately 15% land cover with variations to reflect local character)	
Includes	<ul style="list-style-type: none"> • Best viable representatives of major ecosystems of China • Unique or endangered habitats or ecosystems of China • Minimum survival areas of precious (including wild crop relatives, medicines, etc.) and endangered species of China • Vital habitat corridors needed for survival and climate adaptation • Internationally designated sites – Word Heritage, Ramsar, EEAFP, MAB, etc.
Identification	<ul style="list-style-type: none"> • Core areas and buffer zones of existing nature reserves

	<ul style="list-style-type: none"> • Additional reserves, extensions and corridors as identified by several gap analysis exercises • Broad priority areas already identified in National Biodiversity Strategy and Action Plans (NBSAPs), local Biodiversity Strategy and Action Plans (BSAPs), hotspot reviews, Key Biodiversity Areas, etc.
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A scenario of the steps and components for identification of terrestrial and watershed Ecological Protection Red Lines has been developed to illustrate the approach that might be followed (see Figure 2-1 below).

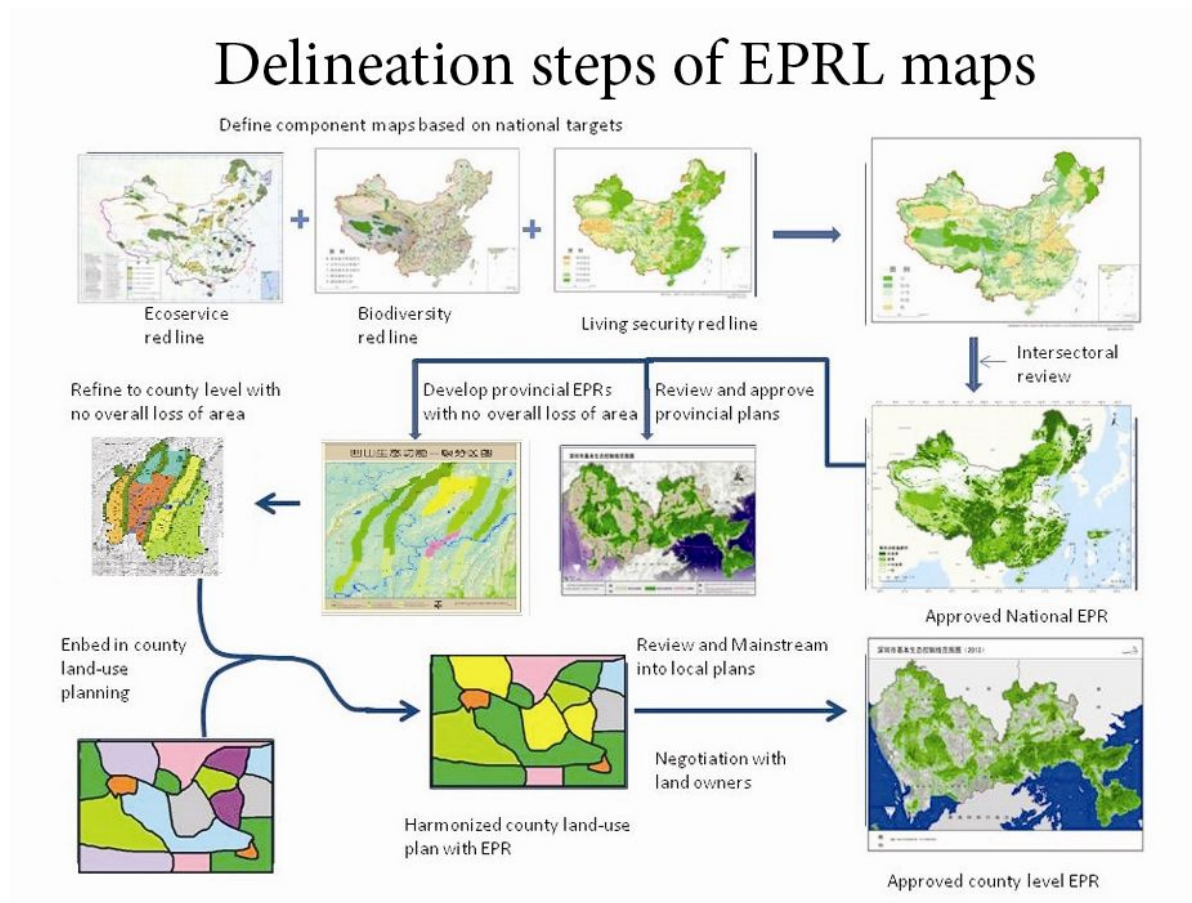


Figure 2-1: Delineation steps of EPRL maps

In practice, separate teams could prepare the three component lines with polygons (land units) shaded in two colours – those “essential” for inclusion and those “recommended” for inclusion.

When the three lines are combined there will be a lot of overlap between biodiversity conservation areas and ecological function areas. Areas identified as “essential” for any of the two categories would automatically qualify for including within the master EPRL system. Any area coloured as “recommended” for two or more categories would also be included within the EPRL system areas.

Regions shaded as “recommended” for only one category would be subjected to a secondary selection process by local planning agencies.

Final EPRL maps would, at each hierarchical level (national, provincial, county etc.), be reviewed by all relevant agencies prior to final ratification

Marine EPRL, a Special Case

In order to define red lines for protection of ecology and environment in marine and coastal areas in a way that maximizes benefits flowing from natural capital and reduces environmental threats and risks, the People's Republic of China has several options. One option is to mirror what is already beginning on land – this is the identification of coastal / marine areas having high ecosystem services value, including provisioning and regulating services, priority areas delivering multiple services, and areas of economic value. Another approach would be to do something more akin to systematic conservation planning, in which the focus is on the identification of coastal and marine areas having high conservation value, using criteria such as: species richness, endemism, and habitat diversity; vulnerable or sensitive species and habitats; and highly migratory or mobile species.

Regardless of which approach is used, China will have to deal with data gaps and inconsistent information, a situation in which heavily studied areas like the Bohai Sea provide a much greater amount of data and higher degree of analysis, while other areas lack this information. It will be important for national agencies to work closely with academic and epistemic communities. Since every effort should be made to apply criteria consistently and to systematically assess all marine areas in concert with coastal and watershed areas, the precautionary approach is likely warranted. International experience has shown that the most efficient way to identify areas in which ecosystem services and conservation are maximized is that which uses a hierarchical approach, beginning with the largest geographical scale.

The People's Republic of China has embarked on an effort to identify priority areas for protection in order to safeguard natural capital, keep the flow of natural goods and ecosystem services flowing, and reduce risks borne from natural catastrophe. While these benefits can also flow from protecting natural capital in the marine environment, there are special challenges inherent in attempting redlining in the marine environment, which include:

- The reality that the oceans are opaque, contain ecosystems with nebulous boundaries, and often have overlapping jurisdictions that make agency responsibilities and opportunities difficult to determine;
- The undeniable fact that much of ocean health and productivity is linked to terrestrial and wetland ecosystem condition, therefore marine redlining should be done systematically with redlining on land;
- The difficulties inherent in defining, mapping, quantifying and valuing marine ecosystem services, despite the fact that marine and coastal ecosystems may provide even more natural capital and services of value than terrestrial; and
- The limited options available for effective management of priority areas, given the need for inter-agency cooperation, surveillance and enforcement, and geographically large scale coordinated and collaborative action.

China also presents a particularly opportune case in marine priority area identification

and protection since many redlining initiatives are already underway. A unique challenge, and opportunity, exists to strategically align all these ecological protection redlining initiatives, and systematically link them to other spatial planning processes underway, such as spatial and land-use planning, regional marine redlining, national ocean zoning, and both terrestrial and marine protected area designations.

In practice there should be three important steps in marine redlining:

Step 1. Identification of areas having high ecosystem services value:

- Provisioning and regulating services
- Priority areas delivering multiple services
- The role of economic valuation

Step 2. Identification of coastal and marine areas having high conservation value:

- Species richness, endemism, and habitat diversity
- Vulnerable or sensitive species and habitats
- Highly migratory or mobile species habitats

Step 3. Drawing boundaries around what is important.

This process is not totally scientific and objective. There is an important social dimension. There are three principles for application.

(1) Delimiting target areas in view of ecosystem complexities:

- Shorelines are dynamic systems
- Boundaries at sea are fluid and shifting
- Size and shape of area depends on scale
- Redlining requires periodic revision as ecosystems, conditions, and needs change (especially in the face of changing sea level, temperature and sea currents)

(2) No redlined area is ‘an island’; marine areas are intimately connected.

- Target areas need to be considered for their linkages to other areas, both marine and terrestrial
- Marine areas are often degraded due to poor land-use practices and poor watershed management, even when the area is strictly protected at sea
- Need to take an integrated approach, recognizing connections

(3) Ecological protection redlining of marine areas must be fitted into existing initiatives:

- Land-use planning
- Regional marine redlining
- National ocean zoning

- Marine protected area designations

2.2.2 Harmonizing the Land-Use Planning Process to Include Recognition of Ecological Functions

All land is useful and much of the currently defined wasteland or unused lands are in fact delivering valuable ecological services. Use of these negative terms should be ceased.

Strict division of marine, urban and rural area planning causes harmonization problems, as different agencies have differing land classification systems and control/planning procedures. The division in reality is not so clear-cut. Coastline changes rapidly, towns grow into country with urban sprawl, and new towns are constantly built. The very valuable intertidal zone is a case in point. Most marine areas are under control of SOA but this zone can also be classed as a forest or wetland, both under nominal control of SFA. However, plans to reclaim such areas as dry land ports or docks fall under MOHURD. Only a harmonized land-use planning system under Ministry of Lands and Resources can effectively control and harmonize such transitions.

Responsibilities

- **National government responsibilities are to:** set targets for the area and quality of lands to be established as EPRLs; identify national major ecological zones, including those which cross provincial boundaries or are critical watersheds; and set acceptable uses and performance standards for red line management. A national target should be put in place to establish 35% of the land and water area and coastline of China within the EPRLs²⁹.
- Define acceptable quality standards and establish the monitoring and enforcement regime. For Oceans a target is still required to be set.
- **Provincial government responsibilities are to:** translate national targets to local government; work in cooperation with surrounding provinces on cross-border EPRLs; and ensure no net loss of areas at a provincial scale resulting from the local land use planning
- **Local government responsibilities are to:** identify ecological lands, resolve conflicting objectives, and ensure achievement of targets for identification of ecological lands through land use planning that involves both local peoples and ministry representatives; and manage and report on Ecological Lands according to national standards.

2.2.3 Negotiation with Local Land Owners and Planners

There will be quite heated negotiations with landowners and local planners to achieve agreement for a mainstreamed and approved version of the draft EPRL map produced by the agencies. Much at this stage will depend on the confidence of local agencies

²⁹ Based on analysis undertaken by the CAS Eco-environmental Laboratory

and communities in the incentive system and methods of payment for ecosystem services that are bought into play.

2.3 Monitoring, Evaluation and Management of EPR

2.3.1 Guiding Principles and Practices for Compliance and Enforcement

Effective compliance and enforcement is vital for ecological protection and successful implementation of the redlining initiatives in China. It is a topic on which there is considerable international experience. This set of principles and practices has been derived from that experience and is intended to provide guidance in the next steps of implementation.

Table 2-4. Principles and practices for effective compliance and enforcement

<i>Defined</i>	clear authorities; separate those who are responsible for decision making from those responsible for compliance and enforcement at the local government levels
<i>Systematic</i>	well-coordinated approach between the various agencies and levels of government
<i>Focused</i>	on compliance as much as on enforcement.
<i>Rules</i>	that are clearly defined and can be enforced effectively
<i>Predictable</i>	transparent, rules and information driven actions
<i>Engaged</i>	citizens and society
<i>Informed</i>	monitoring, accurate and transparent
<i>Trusted</i>	integrity in delivery
<i>Fair</i>	dispute resolution mechanism

2.3.2 Management Responsibilities for EPRL

Identification of a red line will not in itself alter the designation of the land or authority of land managers. It is proposed that direct responsibilities for the day-to-day management of EPRL lands will remain in the hands of the current responsible agencies unless the lands are to become new Protected Areas. The EPR process will add protection to many new areas. These are already mostly under control of SFA if they are forests or wetlands, MOA if they are grasslands (including mountains), or SOA if marine. Newly added areas should be reviewed against available options of new protection status and, depending on specific protection demands, may be suitable for allocation under any of the existing PA categories to be systematically reformed. Many existing PAs are inappropriately allocated and may need to have status revisions to more suitable use categories. In making such selections and reallocations, the needs for protecting identified ecological functions should be given priority over opportunities to maximize economic potential.

Table 2-5. Main Protected Area types and management agencies in China

Types	Agencies							
	SFA	MEP	MOA	SOA	MLR	MHURD	MWR	Other
Nature reserve	X	X	X	X	X	X	X	X
Protected Area for fish germplasm			X					

resources								
Forest park	X							
Wetland park	X							
National Scenic Spot (national park)					X			
World natural and Cultural Heritage					X			
National geopark				X				
National water park						X		
Water resource Protected Area						X		
Traditional cultural protected forest								X

2.3.3 Control of Activities and Developments inside EPRLs

Precise regulations need to be developed for different zones of the EPRL lands and categories of the reformed PA system; however a matrix similar to the one presented will be needed.

Table 2-6. Proposed acceptable uses in different zones

Protection needs/activities	Biodiversity	Scenic/heritage	Ecological services	Forestry red line	Degraded or fragile
Logging	P	P	P	C	P
Hunting	P+buffer	P	C	C	P
Clearing vegetation	P	P	P	C	P
Housing/Urban expansion	P*	P	P	P	P
Rural buildings	P*	P	P	C	C
Industrial construction	P	P	P	P	P
Dams or water diversions	P+buffer	C	C	C	C
Water extraction	P	C	C	C	P
Pollution discharge	P+buffer	P	P	C	C
Road/rail construction	C	C	C	OK	C
Grazing	P	Z	P	Z	P
Plantations	P	C	OK	OK	OK
Farming	P	C	Z	C	Z
Tourism access	Z	Z	C	OK	Z
Habitat restoration	Z	C	C	OK	OK
Mining	P	P	P	Z	P

P = prohibited, P+buffer = prohibited in RL and within appropriate further buffer

C = controlled

Z = only within designated zones

OK = normally allowed

* Protected Areas may contain small zones where construction is allowed.

In the case of areas redlined for biodiversity conservation, there is sometimes a need to define a wider buffer zone in which certain activities will need to be controlled. Quite distant sources of pollution, water flow changes or adjacent hunting activities outside the protected site could completely undermine the objectives of the Protected

Area and have negative impacts on the protected biodiversity. This type of external buffer zone is relatively common in other countries but very different from the currently designated ‘buffer zones’ inside Chinese nature reserves, which are strict protection zones with no exploitative human activities permitted.

2.3.4 Freeze on Major Developments and Approval of Plans in Nationally Identified Candidate EPRL Areas

In order to immediately prevent EPR planning from being undermined by a flood of other plans and claims in anticipation of delineation and introduction of this and other new reforms, regulations and zoning, it is necessary to put in place an immediate freeze on major developments inside the already identified Key Ecological Function Zones. When the final EPRLs are agreed, frozen developments that fall outside the EPRLs can be reactivated while those that fall within the EPRLs can be terminated without need of undue compensation. A freeze such as this will require urgent and decisive action by the State Council.

This freeze would also serve as a massive awareness measure. Everyone would quickly realize that the government means business, and consequently understand the importance of ecological protection in government policy objectives. The freeze would also accelerate the completion of the drawing and agreement of red line boundaries by local agencies if they wish to speed up the thaw on halted developments.

2.3.5 Paying for Redlining

The costs of the identification, legislation, demarcation, education and building awareness of EPRLs and EPRL monitoring, law enforcement and revision are all responsibilities of government and good governance. Their full costs must be borne by government at different levels, but these costs could be covered by new forms of taxation on areas of the economy that most benefit from good ecosystem services.

The costs of managing PAs, establishing protected forests or undertaking ecological restorations are also primarily government responsibilities and should be covered by the relevant establishing agencies. These costs may be offset by earnings from eco-tourism, public or private sector donations, or co-management partners. Costs involved in responsible protection of the environment are a fundamental part of government expenditure and should not be termed eco-compensation.

The term ‘eco-compensation’ should be reserved for payments to individuals, communal or private land-use owners whose loss of development options will be limited through the application of EPRLs. A variety of such eco-compensation mechanisms have been tried in China with varying degrees of success. A CCICED task force on Eco-compensation measures advised on how ecosystem services can be incorporated into Green Development (CCICED 2006). The task force report suggests a variety of payment mechanisms for different types of compensation. One important point of the report is the stress placed on involving local communities in the process. The following table summarizes several such mechanisms.

Table 2-7. Summary of payment mechanisms for eco-compensation

Date	Location	Type of mechanism	Brief description	Comments on suitability
2000 onwards	Western provinces	Grain for Green	Return of steep farmlands to forest or grass cover	Compensation not long enough and farmers usually opt for economic rather than ecological plantation
2008 onwards	Several poorer provinces, mostly western	Horizontal payments between provinces	Beneficiary provinces transfer funds to provinces providing water catchment functions	Only a small fraction of these funds really spent on ecological protection works
2008 onwards	Nationwide	Forest stewardships	Individuals or households paid to protect sectors of forest	SFA lose some control of forest estate, ok for economic forests but less interesting for pure protection work
2010 onwards	Qinghai	Community co-management of NRs	Local communities paid to protect and monitor protection of sections of nature reserve	Communities complain they have no police powers to evict illegal poachers and gold miners
2013 onwards	Hainan	Buy-back of fish ponds	To be converted into mangrove forests	Excessive payment leads to false claims and building fake ponds

2.3.6 Ensuring compliance with EPRLs

Monitoring, Reporting and Compliance Enforcement form critical elements of a program that must be independent and separated from any agency that has direct planning or management accountability for EPRLs. There are two functions:

(1) Monitoring and Reporting

- Monitor and report publicly on local, provincial and national government performance in planning and management according to the prescribed regulations.
- Develop a national information data base and mapping for ecosystem values and areas.

(2) Inspectorate and Enforcement Program

- Establish a national program for compliance and enforcement of ecological regulations.
- Undertake compliance and enforcement review and report publicly.

2.4 Requirements to Make EPRLs Operational

If the EPRL system is to be more than just a strategic planning tool, it requires operationalizing so as to have real meaning on the ground level in terms of protective management and land use. This requires bold and decisive action by the government, but can also form part of the deepening reforms that help guide towards the goal of building a ‘Beautiful China’. Establishing EPRLs requires the following components:

- *Processes* (principles, methodology, procedures, approval, application)
- *Institutional shifts* (clear agency lead and responsibilities for establishing, managing and monitoring red lines)
- *Legal instruments* (better framework for PA system with more categories, protection of other ecological lands, clarification of responsibilities) with real authority and enforcement
- *Capacity* (manpower, training, guidelines, technology, finance)
- *Public engagement monitoring* with open and transparent information, involvement in planning and management, etc.
- *Funding mechanisms* to incent individual and collective actions

The following table summarises the actions to be taken to establish red lines.

Table 2-8. Summary of actions needed to establish EPRLs

Actions	Involvement	Difficulty	Notes
Decide what red lines are needed	Technical experts	Easy	Largely done
Agree on standards	Technical experts	Easy	Largely done
Map red lines spatially on land and at sea	Technical experts	Easy on land, more difficult at sea	Some done
Harmonize zoning plans of different agencies and stakeholders	Experts, government and stakeholders	Very difficult and some compromises	Needs wide participation and consultation
Approval of integrated plans	Government at different levels	Difficult	Senior government must have ownership of plans
Adjust legal and regulatory framework	Experts and legislators	Easy but slow and complex	Priority needed to jump queue
Harmonize scales of planning	Owners of plans at different levels	Difficult	Top down and bottom up issues
Implementation	Inspectors, developers, funders	Very difficult	Big governance challenge
Revision as conditions change	Technical experts	Relatively easy	Constant process

2.4.1 Identification of Underlying Principles

Guiding Principles for EPRL Implementation

(1) Ecological development is as important as social or economic development

- Apply precautionary principle – err on the safe side of projections.

- EPR area shall not be diminished and areas not reduced.
- EPR ecosystem services shall not decline.
- Nature remains unchanged.

(2) Use creative financial, market and regulatory measures

- Employ incentives and market mechanisms to drive action as well as use of punishment systems.
- Polluter pays – apply heavy fines and disincentives to those developments that damage the ecosystem. Such fines to be proportional to damage caused.
- Developers should not benefit from any illegal development.
- Fair play – losers will be compensated (especially rural communities).
- Beneficiaries should be taxed to cover costs of redlining.

(3) The land use system needs to adapt to the ecological imperatives of China

- Environment and ecology are not separate but inextricably bound together.
- All land in China is valuable.
- No such thing as ‘waste’ land.
- “Ecological” land needs to be recognised.
- Both natural and damaged lands are essential components.

(4) The Institutional regime must accommodate EPRL

- Common objectives and standards but differentiated solutions and approaches.
- EPR includes terrestrial, freshwater and marine system.
- Not just about EPRL but the whole landscape.
- Separation of planning, management and monitoring/assessment functions.
- Professional Compliance and Enforcement is necessary.
- Full operational costs to be covered.

2.4.2 Reform of the Protected Area System

There is a strong case for comprehensive reform of the existing PA system to help solve the many problems alluded to in section 1.4.1. Reforms should include the imposition of an overall framework of approved PA categories to allow more appropriate management options for different situations in China. In particular, this should include clarification of standards and management objectives for such categories as national and provincial parks so that they can achieve a sound balance between the objectives of earning income from eco-tourism and protection of ecological, scenic, cultural and biodiversity values contained in such sites. There is also a need to include a managed reserve category to allow various forms of land management for specific biodiversity or ecological restoration, which are currently prohibited in nature reserves. An appropriate category needs to be defined for protection of extensive grasslands, where grazing needs to be integrated with the

presence of valuable wildlife and ecological functions of catchment control. In addition, a new category of Protected Area should be added for designation of lands whose primary function is protection of ecosystem services.

A national PA system plan is required, one that identifies the overall objectives of the PA system and the roles of the individual units in it. The framework needs to clarify and expand the system of zoning on land and at sea and specify how much of each PA category can be zoned into different levels and types of use, ranging from strict protection to visitor zones, management zones, administrative areas, and sustainable use external buffer zones, consistent with international standards.

New regulations should be issued for the proper management procedures for each recognised category and level (national, provincial, county) of Protected Areas. Regulations should clarify objectives, management responsibilities, management procedures, law enforcement procedures, financing mechanisms, public engagement, and permitted co-management arrangements.

These regulations should be enshrined within an overall Law of Protected Areas. While it is anticipated that drafting and approval of such a law might take a matter of years, appropriate regulations could be brought into play very quickly.

Finally, PAs need proper budgets that are dedicated for expenditures on the planning and management of the system and the individual units in it.

2.4.3 Legal Framework for EPRLs

In addition to the need for a revised legal framework for Protected Areas, there is a broader need to review and strengthen the entire process of ecological protection redlining. The process can be launched by decisions of State Council but would require a legal context, approved plans, standards, targets, procedures and budgets^{30 31}.

The core existing framework is the current process of land-use planning and approval of development plans. This is controlled under the “The Law of Land Administration of the People’s Republic of China”, which specifies, “The State is to place a strict control on the usages of land. The people's governments at all levels should manage to make an overall plan for the use of land to strictly administer, protect and develop land resources and stop any illegal occupation of land. Land should be used strictly in line with the purposes of land use defined in the general plan for the utilization of the land whether by units or individuals.”

³⁰ Song 2007

³¹ There are several options for developing the legal instruments:

- i) Develop and pass a completely new piece of legislation. While ultimately desirable, this will take some time to accomplish.
- ii) Add specific rules and regulations into the Sections that have been deliberately designed under the recently amended Environmental Protection Act. While this is both expeditious and quickly achievable, it may well be that the Ministry of Environmental Protection is not deemed to be the most desirable host for this law, in which case,
- iii) State Council can issue a “Regulation for Ecological Protection” in the short term. While this is expeditious and the recommended approach, it ought not to be seen as the best final solution.

The so-called “One proposal and three permits” is the core system for implementation of urban and rural planning, achieving the comprehensive objectives of relevant departments. The proposed development must acquire three different permits before construction can start (construction land-use permit, planning permit for construction project, and planning permit for rural construction). Procedures are similar for each permit and could be adjusted to allow evaluation against agreed red lines, or a fourth permit could be required. The proposal and three permits steps must be transparency and with public participations. (See Appendix 3 for detail on the Steps in Acquiring Development Permits.)

2.4.4 National Capacity Development and Engagement Program

China needs to encourage active participation in planning and managing all aspects of the system of EPRLs and the new PA system. It will be important to establish and implement a program to develop and engage all parts of society (government and non government) in planning and managing ecological values and areas, and in the monitoring and enforcement functions.

2.4.5 Incentives and Penalties “Sticks and Carrots”

Legislation will clarify the regulations relating to controlling developments within the EPRL areas, but judicious use of several other incentives is needed to help in enforcement and compliance.

Table 2-9. Examples of incentives, penalties and principles

Incentives	<ul style="list-style-type: none"> • Civil service performance appraisal to include evaluation of ‘green’ performance
	<ul style="list-style-type: none"> • Local administrators to be held responsible for ecological damages resulting from neglect or wrong decisions
	<ul style="list-style-type: none"> • Tax incentives to encourage appropriate types of development in different EPRL zones
	<ul style="list-style-type: none"> • Payments for ecosystem services (watershed, forest protection, carbon storage, guarding, reporting, fire fighting, reforestation, etc.)
Penalties	<ul style="list-style-type: none"> • Fines/prison for polluters of EPRL ecosystems
	<ul style="list-style-type: none"> • Fines/prison for damage to EPRL ecosystems or species
	<ul style="list-style-type: none"> • Confiscation or demolition of inappropriate developments, structures or equipment within EPRL areas
	<ul style="list-style-type: none"> • Confiscation of illegal traps, fences, structures, harvested materials or domestic animals within respective zones of EPRL
	<ul style="list-style-type: none"> • Taxes on prime beneficiaries of ecosystem services – users of water, lands, minerals, extracted goods; costs of goods and products (including timber, water, coal, etc.) should include all environmental externalities
Compensation offered for	<ul style="list-style-type: none"> • Loss of economic benefits or land/property values caused by establishment of EPRLs to individual households or enterprises
	<ul style="list-style-type: none"> • Compensation for damage caused to private property by wildlife (system already in place)
	<ul style="list-style-type: none"> • Compensation for voluntary abandoning of agriculture/grazing rights within EPRLs
Principles for determining levels of penalties and compensation	<ul style="list-style-type: none"> • Polluter pays – apply heavy fines and disincentives to those developments that damage the ecosystem. Such fines to be proportional to damage caused
	<ul style="list-style-type: none"> • Penalties high enough to ensure that developers should not benefit from any illegal development

	<ul style="list-style-type: none"> • Fair play – losers will be compensated (especially rural communities)
	<ul style="list-style-type: none"> • Beneficiaries should be taxed to cover costs of redlining
	<ul style="list-style-type: none"> • Full operational costs (externalities) to be covered

This chapter has examined the definition, characteristics and the potential approaches to establishment of Ecological Protection Red Lines. It has identified applicable national and international experiences and identified a number of principles on which further progress might be based. By examining the possible technical approaches it is clear that significant work and change is required, but also that this important work can be brought to successful fruition. In the next chapter the conclusions of the team and recommendations for implementation are presented based upon the analysis presented here.

3. LESSONS LEARNED FROM INTERNATIONAL AND NATIONAL CHINESE EXPERIENCES

The term Ecological Red Line does not exist in international practice, however, there is international experience worth learning in the conservation and management of ecological values, the construction and management of natural ecological protected areas including building global natural protection area, and large-scale green corridor protection promoted by International Union of Conservation of Nature (IUCN) and many others.

3.1 Ecosystem Management and Protection

Global assessments of the status of biodiversity and the protection of ecosystem services generally observe that:

- In the developed world though there are very many reasons for concern and continuing vigilance, the situation (for terrestrial systems at least) is relatively stable and there are in fact places where the prospects and conditions are improving.
- In the developing world (where much of the globally critical biodiversity still exists) ecosystem services are under considerable pressure and subject to continuing loss of biodiversity and imminent threat of early collapse in some ecosystem services in particular locations and more extensively in the long term.

Many explanations have been offered:

- The Developed world; has less diversity, fewer pressures and a longer history of resource management and development as a result of which these countries have evolved a complex set of governance institutions and measures that are open, comprehensive, continuously evolving and well adapted to the particular needs of those jurisdictions.
- The Developing world is subject to significant drivers of change (poverty alleviation, agricultural development, settlement expansion, resource extraction and development) in the absence of stable governance regimes or the application of locally adapted and accountable modern management measures.

The counties of Brazil, Colombia and a very few African nations are often mentioned as the best examples of large countries in the developing world that are dealing most effectively with these pressures. Countries such as Australia and Canada are developed world countries that are often identified as most like the developing world with models of resource conservation that are seen as effective. Common characteristics and predictors of effective performance in these jurisdictions are identified as:

- Governance structures that are well grounded continuously evolving and that derive from and are well adapted to local and cultural roots as well as responding to larger national needs.
- A well integrated, open and comprehensive land use planning system that deals effectively with conservation as well as development needs by zoning all lands for those purposes including identification of areas that might be considered Redlines (though this terminology is exclusive to China).
- A history of good resource science and knowledge systems along with training and deployment of highly capable professionals into the field.
- A diversity of modern and traditional market and regulatory “carrots and sticks” that are adapted to local needs and are intended to ensure a mixture of conservation along with development.

3.2 Peri-Urban Conservation

In some ways the challenge of ecosystem service management and protection in urban areas is a very specific, intense and particularly local example of those challenges as encountered in the wider arena of rural resource management.

However, development and in particular the expansion or “sprawl”, of urban areas is the outcome of the complex interaction of many forces. It is reflective of cultural differences, and is driven by the interaction of infrastructure development (in particular but not only transportation) for residential, commercial and service centralization, market and taxation differentiation and variations in governance structures.

The challenge of “urban containment” and the “transition” between urban and rural areas has been one with which many developed and developing world countries have wrestled with varying degrees of success.

Some early examples of structural solutions to the development and containment challenge include the long history of “Green Belt” zonation in the UK and of Agricultural and Nature Reserve establishment in some Canadian jurisdictions. These might be considered as early “red lines” for development control and protection of various values including aesthetics, liveable communities and the quality of environment and ecosystem services.

Experience has demonstrated, however, that a purely structural approach has limited effectiveness. In practice the imperatives of residential and commercial development and service provision both within and around cities have to be considered. An intricate set of policy measures including taxation and market mechanisms along with

zonation and accompanying development “codes” also have to evolve to deal with these and related pressures.

3.3 Nature Conservation Management

3.3.1 Established a system of legal protection for ecological values

Many countries have passed national legislation and set in place coordinated and cohesive policy and practice, that taken together are intended both to establish a “system or systems” of Protected Areas (Parks, Nature reserves, Areas of Outstanding Natural Beauty, Habitat and Wildlife Protection Areas, etc) and a systematic approach to management of those natural values and ecosystem services that are located in areas outside those protected entities.

For instance, basic laws of the United States involving natural protected areas include a number of special laws such as “National Parks Basic Law”, “Law of Natural Reserve”, “National Environmental Policy Act”, “Federal Endangered Species Act”, and “Federal Advisory Committee Act”; “Russian United Specially Protected Natural Areas Law” comprehensively regulates the construction and management of specially protected nature reserves in Russia. In addition, German “Law of Nature and Landscape Protection”, Japanese “Natural Environment Preservation Law”, “Natural Park Law” and “Forest Law”, and Canadian “National Parks Act” and “Canadian Wildlife Act” have all specified the management practices of their countries’ nature reserves, national parks, and other protection parks. EU Natura 2000 Conservation Network, based on “Habitats Directive” and “Birds Directive”, carries out constraints and management on the protection areas of the 27 member states. Management procedures, responsibilities and protection requirements of all countries’ natural protected area are governed by the above-mentioned laws.

3.3.2 Unified regulation achieved scientific planning

In most countries for example in North America, or Europe, Australia, and Asia, the management of their national Parks is placed within the jurisdiction of a single agency. This ensures clear accountability and consistent management according to a single set of legislation and policy.

In many of these nations this single “Parks” entity may also be responsible to manage many other types of Protected Areas. However, there are also many jurisdictions where multiple agencies are responsible for various different areas and laws; however, there are strong coordination or unification processes in such jurisdictions.

The unification or single agency approach is intended to facilitate unified supervision, assessment and unified planning, ensure the integrity of the ecosystems, and improve protective effect. Most countries have made detailed plans on their national nature reserve system, and divide and identify the different types and levels of protections according to the conservation goals, providing guidance reference for the scientific management of protected areas. For instance, the United States carried out national natural protected areas system development planning based on ecological zoning principle, European Union gave detailed development plan on network construction of European natural protected areas based on IUCN protected area classification system (i.e. Natura 2000); New Zealand authorities established two supreme statutory

policies on management, that “Protection General Policies” and “National Parks Overall Policy” to provide guidance for all types of natural protected areas to develop protection management strategies and conservation management plans.

3.4 IUCN Protected Area System

International Union of Conservation of Nature (IUCN) has been committed to promoting global conservation construction, the protected area is defined as: geological space with clear range, recognizable and manageable, to achieve long-term protection of its naturally associated ecosystem services and cultural values through legal or other effective methods. IUCN, on the basis of summarizing the status quo, systematically classified global conservation systems. In 1994, IUCN issued “Protected Area Management Type Guidance”, according to the key management objectives of natural conservation, divided nature reserves into six types. IUCN system of protected areas are accepted and learned by more and more countries, some countries have also included this classification system into the relevant regulations on the construction and management of national nature reserves (e.g., Australia). United Nations List of Natural Ecological Protection Zones (UN List) also regards this system as the standard structural mode for statistical of data of world natural ecological protected areas See Appendix 2.

According to the conservation, management and utilization levels, IUCN protected area classification system can be divided into three categories, namely strict protection class (Ia, Ib, II), habitat/site management class (III, IV) and sustainable use class (V, VI), currently the world's strict protection class accounts for 15.4% of the total natural protected areas, its coverage area accounts for 38.3% of the total area of all natural ecological protections.

With the exacerbated human activities and enhancement of conservation awareness, the number and size of protected areas worldwide have rapid growth rate and the scope of protection also expanded from land to sea. 104,791 protected areas included by World Commission on Protected Areas (WCPA) under IUCN cover an area of more than 200 million square kilometres of earth's surface, most of which is land, and covers more than 12.2% of the land area of the earth's surface, marine protection area is only 0.5% of the earth's oceans.

3.5 Summary of International and Chinese Experiences

Lessons from international (derived from experience in UK, Australia, Canada, USA, Malaysia, Indonesia, Thailand and others) and national (Shenzhen, Beijing, Zhejiang, and Jiangsu) experience. See appendices for more detail.

- No countries reviewed specifically use the ecological protection red line concept, but all have taken measures to protect biodiversity and important ecological lands.
- Most countries have a broad range of PA categories, from strictly protected nature reserves to multiple-use management sites. IUCN categories provide a classification system of the main types.

- Most countries additionally have various designations of lands protected for ecosystem services, such as green belts (UK), protection forests (Indonesia), national forests (USA), Sites of Special Scientific Interest (SSSIs) (UK), etc.
- Most countries have multiple agency involvement and responsibilities. This is not a problem as long as they are harmonized, with clear differentiation of roles and responsibilities and high levels of information exchange and coordination.
- Most countries recognise the need to mainstream conservation of biodiversity and ecosystem services into broader planning processes. The use of municipal-level spatial plans in the Cape Floral Kingdom of South Africa is a good example. The ‘Working for Water’ program in South Africa is another success story, where the removal of invasive plants from wetlands saves water, reduces the need for reservoir capacity and provides employment.
- There is a growing recognition of the need to involve the public and local communities not just in awareness and education, but also in decision-making and co-management.
- There is a proven need for transparency, open decision making, independent oversight and public enquiry.
- There is growing recognition that biodiversity conservation needs a landscape approach with enough connectivity to allow migration, redistribution and adaptation to changing climate.
- Most countries have complex histories of different laws but these need to be compatible. Although laws need periodic updating, much can be done under high-level directives, subsidiary regulations and through development of plans and budgets. Good laws do not guarantee high performance. There needs to be effective compliance and enforcement.
- Most countries have land-cover, land-use and land-ownership database/cadastre systems that form the basis of land-use planning, zoning and approval of developments.
- Models of payments for ecosystem services are emerging, particularly with regard to agriculture and conservation (the EU and US) and tropical forest conservation (Brazil, Guyana and Costa Rica).
- Lessons about ecological protection redlining can be derived from marine protected area (MPA) establishment, marine spatial planning (MSP), and ocean zoning initiatives around the world. The premise here is that spatial planning requires the identification of priority areas, which can then be managed or protected in a spatial plan or MPA. The methods used to identify these priority areas mirror some of the methods used to do ecological protection redlining at sea. Intrinsic to MSP is the concept of ecosystem-based management (EBM), which reiterates the need to think about priority areas in the broader context (and necessitates the linking of marine redlining with terrestrial)
- A recent report³² commissioned by the Global Environment Facility’s

³² Agardy, P. Christie, and E. Nixon. 2012. Marine Spatial Planning in the Context of the Convention

Scientific and Technical Advisory Panel, at the request of the Convention on Biological Diversity, presents lessons learned about MSP at all scales. The findings confirm that the theoretical basis for MSP is well established, but the practical execution of MSP is still in its infancy. The report reviews conventional planning processes, identifies innovative new tools, and discusses the potential MSP has – as yet not fully realized – in aligning conservation and development interests while protecting vital ecosystems, the services they deliver, and the biodiversity they support. A review of MSP at all scales across the world suggests that one of the important keys to success includes using planning approaches appropriate to the particular circumstances of the place (this includes using scientific information as well as traditional ecological knowledge to support management plans and regulations). Another essential element is having a supportive legislative framework in place, with a means to determine priorities (based on the best available science), and a hierarchical system to clearly establish goals, objectives, and strategies for MSP. Governance of management that flows from marine spatial plans is at least as important as effective planning of MSP, so the current undue emphasis on planning as opposed to implementation needs to be overcome (Agardy *et al.*, 2012). China is in a leadership position in this regard, as it already has an ocean zoning initiative underway, and has developed plans for the Bohai Sea, among other areas.

- A number of Chinese municipalities, cities and provinces and the State Oceans Administration have made considerable progress in delineating “ecological” red lines of various types in spite of the previously identified (above) challenges (see Appendix 1) These provide valuable case examples on which to build.

4. KEY CONCLUSIONS

4.1 Imminent Challenge of Eco-Environmental Protection in China

Experts agree that despite significant government initiatives to improve environmental conditions, China’s continued prosperity and social advancement are now threatened by the lack of sufficient attention to protection and management of ecological values. Continuing deterioration of natural ecology now poses a significant risk of natural disaster and constitutes a very real threat to achievement of an Ecological Civilization³³.

At risk annually are trillions of dollars in calculated ecosystem service values³⁴. Coastal areas are particularly at risk, as demographic trends indicate further mass migration of people to coastal cities and suburban areas or into downstream areas of watersheds draining to the coasts. The resulting degradation and loss of services can

on Biological Diversity: A study carried out in response to CBD COP 10 Decision X/29. CBD Tech. Series 68, Montreal

³³ ADB 2012 Toward an Environmentally Sustainable Future

³⁴ Costanza et al 2014

The SPS supports the conclusions of previous CCICED task force studies on the importance of ecosystem services.

be countered by effective protection of natural infrastructure and restoration of key areas providing multiple ecosystem services.

For the marine environment, it is vital to ensure that critical areas (in particular the intertidal zone) and regions providing ecosystem services are identified and protected, whether through existing planning processes such as the marine spatial planning undertaken under China's ocean zoning, or by dedicated initiatives such as those related to the Bohai Sea and other areas. Considerations related to connectivity between land, freshwater, and coastal systems are paramount. Thus redlining protection and future restoration should be designed in a comprehensive and integrated manner—from mountain to sea.

4.2 Opportunity Presented by the Reform Process for the Establishment of Ecological Protection Red Lines

The wide-ranging Reform agenda now underway via the Economic and Ecocivilization Reform sub-group under the direction of the President-led Deepening Reform Central Party leading group³⁵ is timely and highly appropriate in light of the severity of the risks and the interrelated and complex nature of the issues.

Arresting the current decline in ecological conditions will require significant new action to put in place initiatives such as the low carbon economy and solutions that will deal with the fundamental economic, financial, social and institutional drivers that are causing these problems.

Establishment and proper management of Ecological Protection Red Lines (EPRLs) is one key part of the solution. These lines will identify the important functional features and locations of the terrestrial, freshwater and marine ecosystems of China that must not be impaired or must be restored, in order to provide ecological and environmental services essential for social and economic development. However they are not the only part of the necessary solution to maintaining ecological services. In fact, they will only succeed if part of specific reforms to the institutional approach to and the management of these services on *all* lands and resources in China, including those exploited by resource and development sectors of China's economy.

While most attention by government so far has focused on land-based ecological protection, establishing red lines at sea presents a unique opportunity. Critical areas can be demarcated within existing marine spatial planning processes, such as China's ocean zoning initiatives, to maximize and even enhance marine and coastal ecosystem services delivery. Demographic and economic trends in China suggest coastal pressures will only rise in the future, through direct pressure caused by coastal industrialization, and, importantly, indirect pressures caused by land and water use in watersheds, and coastal land reclamation. However, establishing and maintaining redlined areas may be easier at sea than doing so on land, since displacement and eco-compensation needs are more limited. The time is right to insert red line

³⁵ Naughton 2014

considerations into all coastal and marine planning processes in China, to ensure growth of the blue economy will be as sustainable as possible.

4.3 Clarifying Responsibility to Protect Ecosystem Services and Ecological Conditions

Within the current institutions of the government of China there is no fully comprehensive understanding of eco-environmental issues and no vision or systematic, cohesive and well-integrated, strategic and operational approach to confronting the loss of ecosystem services. A responsible authority with the mandate to identify areas of high ecosystem services value is needed to ensure these areas get protected through the planning and management undertaken by all agencies.

Responsibility and accountability to address, identify and manage ecological values is scattered among many government organizations; none is fully responsible for analyzing the issues, developing a fully integrated national policy or implementing and enforcing management solutions, and there is limited coordination and accountability in the governance system.

Responsibility should no longer be seen as only a government task. All of society needs to be welcomed as part of the solution by playing a more significant part in planning, active management, oversight and rules enforcement.

4.4 Critical Components to Successful Implementation of the Ecological Protection Red Lines (EPRL)

The current legislation, policy and institutions available are insufficient to protect terrestrial and especially marine areas that provide high ecosystem service values. Experience within China and internationally indicates that reform of the following components of the governance system is required:

- *Lack of legally enforceable rules that protect ecological services is a problem.* There is need to clearly define, identify and strictly (but flexibly) manage EPRLs by setting and enforcing limits to development and use.
- *There is a lack of a systematic set of designations.* These need to be designed to identify, “zone” and manage ecological values inside and outside the red lines in a manner that is sensitive to the differing ecological situations across the nation.
- *The planning and management tools at the ground level are not effective enough.* Ecological Function Zones are identified at the national level but this is primarily for strategic planning and not for ground-based management.
- *The current Protected Areas System (PAS) should be a key component of the solution.* It is inadequate in terms of its size, types of designation, the lack of systematic planning, the lack of marine and coastal representation, and problems of jurisdictional overlap and conflicts. PAs should be expanded in the coastal and marine areas as well, and designed as networks that allow for true ecosystem-based management.
- *The current spatial and land-use planning systems in China are well established and have great potential.* However, they lack any identification of

ecological lands³⁶ (The current system includes instead “Waste Land” which is at best misleading). Additionally a process is required to resolve conflicting land uses at the local level.

- *China’s spatial land-use planning systems could benefit from a more ecosystem-based approach*, in which case marine planning, coastal planning, and watershed planning will be done in a complementary way that maximizes the ecosystem services flowing from all its biomes. Currently, marine spatial planning is done to accommodate existing and emerging maritime industries, with insufficient attention to identification of ecologically critical areas, and impacts of degradation from afar.
- *Clarity of intent is required*. Experience with EPRLs for agricultural lands indicates that use of targets is effective in the process to resolve conflict over the EPRLs at provincial and local government levels of implementation. To be effective the approach needs both top down and bottom up approaches for harmonization.
- *Local governments and peoples are key to success*. They sometimes lack knowledge and motivation. Enforcement actions on their own are unlikely to succeed. They need in addition capacity development and positive incentives such as principled, properly financed and centrally controlled eco-compensation or performance payment schemes. These will help resolve impacts on local peoples as well.
- *The current institutional problems are well documented. Resolution requires a new institution*. This would be responsible for: improved coordination and accountability for ecology and greater coordination of all initiatives; more public involvement and transparent monitoring, reporting and accountability; professional compliance and enforcement mechanisms that are separate from the actual decision makers at a local level; development and management of a payment for performance approach; and capacity development for ecological protection.
- *Key nationally important “candidate” EPRL areas can be identified quickly* given current information, although full implementation will take time. Without a freeze development within these candidate areas, essential ecological values will be lost and government could face significant unnecessary extra compensation costs to establish the EPRLs.

A reformed institutional framework and systematic approach to identification and protection of critical ecological values is necessary for China. It is possible to complete implementation within a reasonable timeframe if undertaken in a coordinated and urgent manner. This is necessary to avoid future costly losses of eco-environmental services and to restore those already compromised. The identification and full implementation of Ecological Protection Red Lines, the identification of Ecological lands and improvements to the national protected areas system are key components of that work. High priority must be placed on urban and peri-urban areas, coastal and marine areas and critical watersheds. In this way it will be possible to

³⁶ Ecological Lands would be those lands that are primarily and essential to ensure retention of ecological and environmental service functions but this does not mean that these functions are ONLY supported on those lands.

properly balance the various competing imperatives necessary to achieve an Ecological Civilization.

5. POLICY RECOMMENDATIONS

The Special Policy Study has identified five recommendations and an implementation plan to guide the work that is necessary to respond to the task force conclusions.

5.1 Set into law the definition and characteristics of ecological protection red lines.

Successful implementation requires a single clear definition that identifies acceptable uses for ecological and environmentally redlined areas and that is legally enforceable. It is also critical that national targets are set to guide the identification of candidates for EPRL designation.

- An ecological protection red line (EPRL) defines the minimum spatial area within which strict development controls ensure sustainable provision of ecosystem services vital for national and regional development. EPRL includes natural and constructed ecosystems, terrestrial, freshwater and marine, and degraded areas with potential for ecological restoration to valuable health. The ecosystems may be located in rural or urban settings.
- Ecological protection redlines include three components: Ecosystem Services Protection line, Living Environment Security Protection line and Biological Diversity Protection line³⁷.
- Establish a national target of 35% of China's land area to be within an EPRL on the basis of ecological problems, ecological sensitivity and important spatial characteristics of ecosystem services in China this will include some but not all existing Protected Areas.
- New Law is required but in the interim State Council should be authorized to issue as regulations "Management Measures for Ecological Protection Red Lines" that establish this definition and intent of EPRLs, along with rules and regulations to describe intended uses and restrictions on such activity in order to guide implementation and ensure enforcement of the intended uses and clear identification of a responsible agency.

5.2 Reform the spatial, land-use planning and marine-use planning systems to include EPRLs

Change in the national spatial and land- and marine-use planning processes is required in order to resolve jurisdictional overlaps, and identify and describe a new set of designations and processes associated with EPRLs and Ecological Lands and to remove the designation of Waste Land:

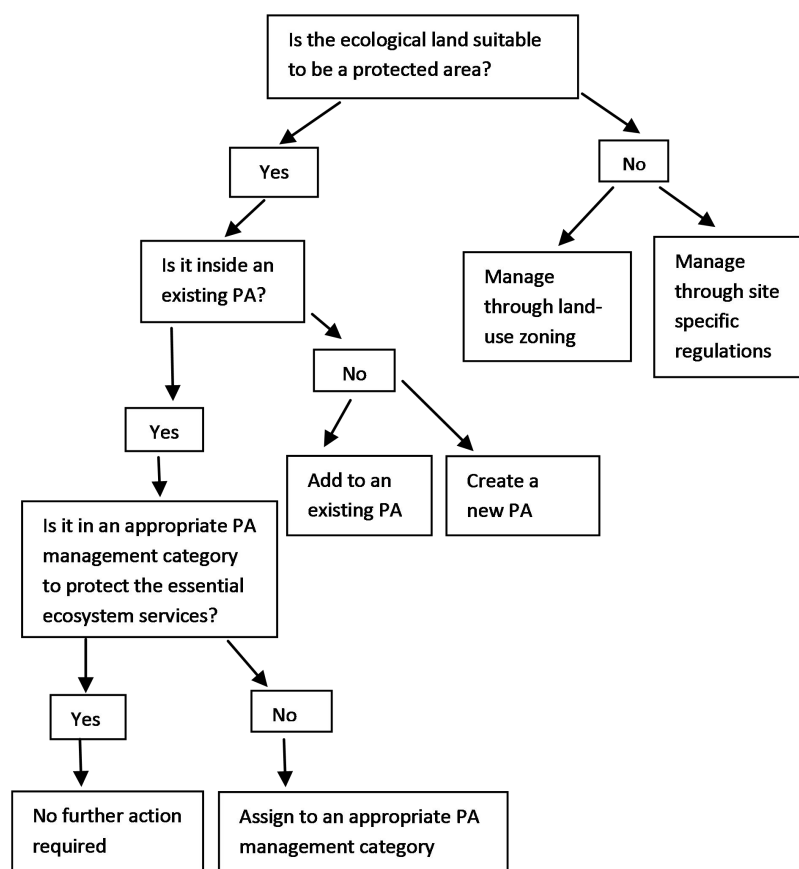
- Establish a new terrestrial land-use category to protect as "Ecological Lands" those lands that have the dominant function of providing ecosystem services.

³⁷ See Chapter 2.2.1 Table 2-3 for a full documentation of these three components.

- Form a new integrated land use planning and spatial planning system and new categories of land designations
- Establish a similar approach to national marine spatial planning undertaken through China's ocean zoning, or by dedicated EPRL initiatives.

The Relationship Between Ecological Lands and Protected Areas

Once ecological lands have been identified, it will be important to ensure that they are appropriately managed. In many, but not all, instances, it may be appropriate to incorporate these ecological lands into China's protected area system. The flow diagram below outlines a possible decision-making process for integrating some ecological lands into the PA system.



5.3 Establish new national coordinating mechanisms for ecological conservation and for monitoring and compliance

The current institutional framework requires a major change focused on establishing a single coordinating and accountability centre for ecological conservation, EPRL designation and management, setting targets, assessing performance, and monitoring and reporting functions. This is a highly significant issue that requires focus on a new operating mechanism. It is not within the remit of the study to advise government on

where such a mechanism or agency should be established. Major functions and responsibilities of this mechanism or agency should include:

- State ecological conservation policy: develop a single integrated national ecology strategy and policies.
- EPRL oversight, coordination and facilitation;
- Oversee and coordinate the work to develop a single integrated national Protected Areas system plan and management approach;
- Plan and Implement the new payment for performance and eco-compensation approach (see 5.5 below);
- Plan and organise regional major ecological construction and restoration projects to protect and restore ecosystem services in EPRL lands;
- Implement unified EPRL monitoring, reporting and enforcement;
- Plan and implement a national capacity development and engagement program.

5.4 Renew and expand a national Protected Areas system

A national PA system plan, new legislation and strengthened management are required to strengthen the status and functionality of existing protected areas. This is consistent with earlier CCICED task force and working group recommendations. Protected Areas form an essential part of the backbone of China's ecological security and have a key role to play in delivering EPR. Therefore it is necessary to:

- Develop a single integrated national PA system plan that includes consolidation of PA categories and management approach and ensure integration with the EPRL system.
- Further examine the need and requirement for a National Park Agency and administration.
- Develop a Protected Areas law to strengthen Protected Area management by improving public engagement, management plans and dedicated financing.

5.5 Design and implement a national program of payment for performance in EPRL

A new eco-compensation program is recommended that would provide incentives to local governments and to those impacted by the designation of Ecological Protection Red Lines. This would be a payment for performance directly to the impacted individuals, cooperatives or local governments, rather than the more traditional simple transfers of moneys to provincial or local government bodies. It will require careful monitoring to ensure that work undertaken does provide desired improvement and protection of ecological services, or other ecological and environmental benefits.

5.6 Implement the Institutional and Operational Priority Actions

5.6.1 Institutionalise the recommended changes

It is important that these changes become a full part of recognized national plans and strategies. For this reason the following actions need to be undertaken.

- Approval of the SPS recommendations by the central Government Economic and Eco-civilization Reform Group.
- Mainstream the Recommendations into the National and Provincial 13th Five-Year Plan to be approved at the March 2016 National Peoples' Congress.
- Refer all law and regulatory changes to the National Peoples' Congress for approval by 2016.

These steps will require some time to implement and must necessarily be undertaken in parallel with a number of immediate actions that are identified below.

5.6.2 Operationalise the EPRLs

5.6.2.1 Critical immediate tasks

In order to meet government leaders stated objective to have the EPRLs identified as quickly as possible, the following tasks need to be underway immediately.

- Define a time-limited national coordination office for EPRLs; this would involve all key agencies and would report to a committee of vice-ministers. The coordination office would provide direction, oversight and coordination of the development and implementation of the EPRL system for China. The coordination office would be responsible to ensure the various policy initiatives, program changes, and actions are well coordinated and initiated by 2015. If a conservation agency were established later, its function would be part of that mandate.
- Refine the EPRL system by:
 - i. Finalizing the definitions and characteristics of a simplified and harmonized system that covers all lands, resources and environment regulatory functions;
 - ii. Identifying nationally significant ecological land as Candidate EPRLs based on the existing analyses undertaken by MEP and CAS;
 - iii. Confirm the national 35% target; and
 - iv. Create a set of technical guidelines for local governments to assist their work in identifying local level EPRLs.
- Develop the rules and regulations that will immediately be set in regulation as “Management Measures” by state council (or, under Section 3 Article 30 of the new Environmental Protection Law) to govern the development and management of the EPRL system. This includes:
 - i. Defining the roles and responsibilities of all agencies and levels of government;

- ii. Defining guiding principles that will govern the EPRL system;
- iii. Defining acceptable uses inside EPRLs;
- iv. Defining the provisions for differentiation and situational flexibility both spatial and temporal;
- v. Developing separate and specific provisions for rural-urban, coastal-marine, resource development areas, rehabilitation lands, etc.; and
- vi. Ordering an immediate development freeze in approved Ecological Function Zones and existing nature reserves. This follows the precautionary principle and avoids a rush to start developments in anticipation of future prohibition or stricter controls. The freeze should remain in place until the EPRL planning of the zone concerned has been completed. At that time it will be clear whether such development is to be permitted, controlled or prohibited.

5.6.2.2 Tasks to be completed within one year

To oversee practical implementation on the ground, the coordination agency should:

- Develop a strategy for establishment and review of an expanded system of pilots for fast implementation of the system approach to land -use planning;
- Fully incorporate new categories into spatial planning; define how to consult on resolving issues and making decisions to establish “National Priority” EPRL areas within the main functional zones as a priority for first phase of planning;
- Define the rules to rationalize the national PA system and categories and set priorities for work to review all existing “designated areas” to place them in the correct category;
- Oversee implementation of the new EPRL regulations;
- Develop and implement a national approach to compliance and enforcement and public monitoring and reporting;
- Develop and implement a strategy for capacity development and stakeholder engagement, targeted at the local level;
- Develop a “decision support and analytic tool” to enable choices between competing land designations during land-use planning; and
- Determine development, approval and funding of the new performance based payments system for local peoples and governments.

The individual ministries, provincial and local governments should:

- Undertake their own EPRL plan (SFA, MOHURD, MOA, MEP, SOA, etc);
- Strengthen protective management of the nature reserve system following self assessment of needs using IUCN assessment toolkit, management effectiveness tracking tool (METT) and adoption of competence standards already proposed by CCICED Protected Areas Task Force (2004); and

- Complete a PA systems review including proposals for completing ecosystem type coverage, species coverage needs and distribution corridors. Priorities include potential Ramsar sites already identified by Birdlife International, key coastal sites identified by the East Asia Australasian Flyway Program and key trans-frontier sites already identified by IUCN WCPA.

5.6.2.3 Tasks to be completed within five to ten years.

- EPRL monitoring and reporting procedures routine; first report complete and publicly available by 2016;
- Full legislation and institutional reform completed by 2020;
- PA system reconfigured, expanded and integrated with EPRLs;
- 10-year EPRL review and revisions;
- Eco-compensation payment and payment for performance system fully institutionalized;
- PA competence standards form basis for in-service training programs, career promotions and professional hiring;
- Evaluation study of EPRL success and economic contribution;
- China assists supply countries to put in place their own EPRL systems.

At the end of this ten year period China will have in place a fully functional comprehensive and systematic approach to the conservation and restoration of ecologically important lands, services and environments that will be the underpinning of an Ecological Civilisation and will also lead the world in practice.

This report is submitted by the CCICED Special Policy Study on Institutional Innovation of Eco-Environmental Redlining.

APPENDICES

Appendix 1: Case Examples

Irrevocable losses - Daxing'anling (Greater Hsingan Mountains)

When naturalist Sowerby visited the Daxing'anling in 1913 he found forests that “rolled on and on, seemingly without end” (Sowerby 1922-23). The conifer forests of NE China at that time compared favourably with those of Canada and the US. As Russian forester Ivashkevich (1916) described, “The Manchurian forest [...] has a tremendous percentage of big trees that I have not only never seen, but have not even heard of before.” Sadly without proper planning or protection, those great forests have become shrunk, fragmented and degraded with huge loss of ecosystem service values. But with redlining and wise restoration, much could still be recovered.

The Daxing'anling Region is located in the most northern part of China, straddling northwest Heilongjiang Province and northeast Inner Mongolia Autonomous Region (47°03'40"- 53°33'25"N and 119°36'20"-127°01'17"E), bordering the Heilongjiang (Amur) river and Russia. This region comprises a large mountainous wilderness of 189,775 km² (106,275 km² in Inner Mongolia and 83,500 km² in Heilongjiang) containing mixed deciduous and coniferous forest with marshes, peatlands and a small amount of agriculture. The region is underlain by discontinuous permafrost at 0.8 – 1.5 m. Annual rainfall is approximately 400-500mm with temperatures ranging from 35 °C to – 50 °C. Drainage is to the Heilongjiang directly or via the Songhua River and represents the principal source of water for the rest of Heilongjiang Province and many important wetlands downstream.

The region is still critically important both for its ecosystem services and for biodiversity conservation. The annual carbon sequestration is likely to be very substantial due to both the annual primary (forest) productivity of 25.2 million m³ and the large proportion of larch and deciduous species that shed needles/leaves in winter, which accumulate in the forest and wetlands soils and bogs and are converted to organic carbon. The entire region is also listed as one of the 50 National Ecological Function Zones jointly issued by the Ministry of Environment Protection and the Chinese Academy of Sciences in 2008, identifying the most important zones for ecological function of ecosystem conservation and water retention in China.

Daxing'anling represents a unique forest and wetland wilderness habitat and is home to cold temperate and polar species (moose, reindeer, wolverine, sable, arctic hare, etc.) that are found nowhere else in China. It is one of the 35 priority areas identified in the NBSAP for biodiversity conservation, and supports 11 Important Bird Areas (IBAs).

Nature reserves in danger – A Hainan case study

The mangrove forests of Qinmeigang near Sanya in Hainan were declared a nature reserve in 1989, with a total area of 200 ha. The site was investigated by a team of 20 PA managers in March 2014.

The boundary of the site is mostly fenced and well marked. The zoning scheme is hypothetical and not meaningful on the ground. However, the team noticed several spatial incursions. Hotel developments around the site have excised small portions of the original nature reserve to construct water treatment facilities. Hotels have blocked and diverted flow from some lateral streams that formerly fed into the mangroves. Hotels discharge waste water into the nature reserve and considerable pollution emanates from ongoing construction of additional hotel complexes upstream of the reserve, including direct discharge of excess concrete and untreated sewage. One section of about 2 ha of the nature reserve has been opened up and is used to store rocks and other construction materials for the surrounding hotel developments. A pipe remains that was used for sucking dredged sand out of the reserves main river bed to be used in neighbouring construction.

Perhaps the most disturbing development is the construction of a marina at the mouth of the main river. This construction greatly reduces the tidal flow in and out of the nature reserve causing significant changes to the salinity and diurnal water levels that in turn create the floral and faunal zonations within the nature reserve.

Other problems include the fact that developments around the nature reserve create a barrier between the mangrove reserve and an adjacent forest nature reserve that formerly acted as a connection for forest birds and squirrels to access the mangrove forests. Jet ski boats are parked inside the nature reserve and cause considerable noise disturbance and oil leak sources. Bright lights and loud noise around the site are a disturbance to insects and nocturnal birds and mammals.

In the absence of native ungulates such as deer and pigs (formerly present at the site) the grazing of some water buffalo may be a positive factor maintaining some open swampy habitat and an attractive population of cattle egrets. Management intentions to remove the buffalo may be misguided, as is the plan to quantitatively increase the area of mangrove through planting (sometimes improper species) on all open habitat in the reserve – mudflats, sand bars and some long abandoned grassy fields. Certainly many birds and crabs (plus apparently absent mud-skipper fish) depend on the open mud and sand flats. It is probably better to allow nature to sort out what species should grow where for a balanced ecosystem.

The nature reserve management is politically weak in the face of pressures from hugely lucrative tourism developments that surround the site. A strict redlining policy could certainly be useful in strengthening protection of this important area. However, it is clear a single line around either the core area or total boundary of the site would not be enough to prevent threats from well outside the nature reserve boundary, especially upstream pollution and downstream changes to the river mouth. The red line would need to be supported by a well-zoned buffer.

Ningbo Designated 10 Categories EPRL Areas to Protect the Eco-system

In order to strengthen the space control and optimize the pattern of urban and rural ecology, the Ningbo government is modifying the Ningbo Master Planning. The key tasks are: delineation of EPRLs; and preventing urban construction near the mountains and waters, specifically: Ningbo nature reserves, scenic areas, forest parks, geological relic protection areas, drinking water source protection areas, flood regulation and storage areas, important water conservation areas, important wetlands, ecological forest, and Protected Areas of special species, which are 10 types in total. In addition, the Ningbo City area delineated prohibited construction areas, limited construction areas, fitness areas, etc., which in turn promoted the zoning classification management and the regional ecosystem services protection.

EPRL Region Protection Planning of Jiangsu Province released

In order to protect the important areas for ecosystem services and eco-security of Jiangsu Province, in May 2012, Jiangsu Province started the program of *Eco-red Line Region Protection Planning of Jiangsu Province*, and it was released in August 30, 2013. The total land area within EPRLs is 22,839.58 square kilometers, accounting for 22.23% of Jiangsu Province, where the first-level control area accounts 3.03%, the secondary control area accounts 19.2%. For marine EPRL areas, the total area reaches 1263.91 km². The main experience of this was:

- (1) Taking the protection of the regional biodiversity and ecosystem services as the leading factors in EPRL delineation.** There are 15 kinds of important protection types, including: nature reserves, scenic areas, forest parks, geological relic protection areas, wetland, drinking water source protection areas, special marine Protected Areas, flood regulation and storage areas, important water conservation areas, important fishing areas, important wetlands, water channel maintenance areas, eco-public forest, Taihu important Protected Areas, and Protected Areas of special species.
- (2) Classified guidance, hierarchical management.** The control measures for the 15 kinds of important protection areas are divided into two levels: the first control areas and the secondary control areas. The first control areas are the core of the EPRLs, with the most stringent protection and all forms of development and construction activities are prohibited. While the secondary control areas focus on ecological protection, with differentiated control measures, although the activities detrimental to the ecosystem are also prohibited.
- (3) Combined the eco-red line assessment and supervision with the eco-transfer payments.** Jiangsu Province issued the *Interim Measures for Assessment and Supervision of Eco-red Line Protection* and *Interim Measures for Eco-transfer Payments*. The eco-transfer payments include subsidies and incentive funds. The subsidies should be calculated comprehensively according to the EPRL areas' level, type, size, local financial security, and other factors, while the allocation of incentive funds are based on the assessment results that related to the task completion on a year around.

Beijing designated ecological land to strengthen regional ecological protection

The Law of Land Administration indicates that the state shall compile general plans to control usages of land including those of farm or construction use or unused. The *Guide on compiling general plans at prefecture level* subdivided three categories of land use, namely farmland, construction land, and unused land, into 10 second classes and 23 third classes. The traditional classification reflects economic and social values; however, biological value is neglected. Ecological land is added into the existing categories to intensify regional ecological protection in Beijing practices.

Ecological land provides fundamental security for regional ecological security and habitable urban construction, with important ecologically sensitive areas and ecologically functional zones included. Based on evaluation of ecological sensitivity and ecological services, the designated ecological land covers 5722.05 km², accounting for approximately 34.87% of the prefecture area, which is comprised of water conservation land, water and soil conservation land, eco-diversity conservation land, ecological protective land, urban green, and others. It is of great importance to protect the regional ecological security by land-use planning. In order to strengthen the delineation and management of ecological land, further researches are needed: the improvement of the existing land use planning system; the coordination of ecological land and other land types; and specific management measures of ecological land.

Marine Ecological Protection Red Line (MEPRL) Identification in Bohai Sea

In 2012, State Administration of Oceanic Administration issued “*Opinions on establishing marine ecological redline institutions in Bohai Sea*”, which require to draw marine ecological red lines and identify management measures of marine ecological red line areas.

MEPRL means the areas are identified and strictly protected to maintain the marine ecological health and ecological security. MEPRLs include important estuaries, important coastal wetlands, sea islands under special protection, marine conservation areas, natural landscape and historical cultural relics and remains, sandy coastlines and sand-source marine protection areas, important fisheries waters and important coastal tourism areas. The marine ecological red line areas are divided into forbidden development zones and restricted development zones.

“*Opinions on establishing marine ecological redline institutions in Bohai Sea*” also identified 4 management goals to strengthen the management of MEPRL in Bohai Sea: (1) The area of marine ecological red line area in the Bohai Sea accounts for at least 1/3 of total of the offshore area of the Bohai Sea; (2) The retention rate of natural coastline of the Bohai Sea should be not less than 30% of the total coastline of the Bohai Sea; maintain the length of the existing sandy coastline; (3) By 2020, the overall standard-reaching rate of water quality should be not less than 80%; (4) The standard-reaching rate of pollutant discharge at the land-based direct outlets in the marine ecological red line areas of the Bohai Sea reaches 100%; by 2020, the total amount of land-based river pollutants discharged to the sea in the marine ecological red line areas should decrease by 10% - 15%.

Designation and Implementation of “Basic Ecological Control Line”

——Experiences from Shenzhen

The “basic ecological control line” (BECL) was designated on the basis of urban green system planning in Shenzhen, 2005, which covered an area of 974.5 km², approximately 50% of the prefecture land. The designation of BECL consistently plays an important role in ecological protection, which prevents disorderly urban sprawl and promotes sustainability of urban development.

Experiences:

- **Systematic management.** Led by the Shenzhen Municipal Government, the planning department is responsible for delineation and adjustment of BECL. Enforcement is stringently carried out by the joint effort of district governments and departments in charge of the following fields: planning, land management, environmental protection, development and reform, agriculture, urban management, and others.
- **Detailed regulation.** In 2005, *Regulation of Shenzhen Municipality for management of basic ecological control line* was promulgated. Then in 2007, the government issued *Opinions on implementation of Regulation of Shenzhen Municipality for management of basic ecological control line*, to clarify the responsibilities of various departments and policies on legal mercantile activities and buildings previously located inside the line. In 2013, the government issued *Opinion on further regulation of basic ecological control line management*, which proposed specific practices to combine the BECL management and ecological civilization construction. N.b. It takes several years to undertake.
- **Integrated system of ecological protection areas.** The main protection areas include: major river and wetland, green and ecological corridors, important seafront land, water source PAs, scenic spots, natural reserves, basic farmland, forest park, and ecological fragile zones where the slope is greater than 25%.

Problems:

- **Contradictions between protection and development within BECL is still intense.** Since some residents have not sufficient awareness of BECL, they may have antagonism against it; therefore the contradiction could go on for a long period.
- **Construction before planning remains a big problem.** Some buildings within BECL are illegal, while some are legal with property certificates or construction permissions, which makes management complex.
- **Regulation of Shenzhen Municipality for management of basic ecological control line** is at a low position in the legal hierarchy, which limits the accountability for violations and punishments.
- **Public engagement is not enough.** There is a lack of mechanisms for stakeholders to participate, which adversely affects the practicality of BECL.

Appendix 2: IUCN PA Category System and Best Practices

The International Union for Conservation of Nature (IUCN) defines a Protected Area as follows:

A Protected Area is a clearly defined geographical space recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (Dudley, 2008).

Protected Areas have proven to be one of the most successful and widely adopted land-use approaches in history. Virtually every country in the world has established Protected Areas. However, a very wide range of Protected Area types, approaches, names and terms have been used, sometimes leading to confusion and misunderstanding and making it difficult to compare information between countries. For example, “national parks” in the UK are very different from “national parks” in Canada and the US.

To help address these concerns, IUCN issued its *Guidelines for Protected Area Management Categories* in 1994. The original objective of the guidelines was to provide a single, international classification system for Protected Areas, to enable information about Protected Areas to be effectively shared and compared both within and among countries. Increasingly, however, the guidelines are being used as a tool for the planning, establishment and management of Protected Areas. The guidelines are recognized by international bodies such as the United Nations and have been endorsed by the Convention on Biological Diversity's Program of Work on Protected Areas. The guidelines are also used by many national governments across the world for defining and recording Protected Areas, and are increasingly being incorporated into national legislation.

The guidelines were subsequently revised in 2008 and further elaborated in 2013, based on the feedback and lessons learned from a very wide range of stakeholders. Today, the guidelines recognize six management categories, as summarised in Table 1a below.

Table 1a: IUCN Protected Area categories (taken from Dudley, 2013)

Category	Name	Description	Primary Management Objective
Ia	Strict Nature Reserve	Strictly Protected Area set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such Protected Areas can serve as indispensable reference areas for scientific research and monitoring.	To conserve regionally, nationally or globally outstanding ecosystems, species (occurrences or aggregations) and/or geodiversity features: these attributes will have been formed mostly or entirely by non-human forces and will be degraded or destroyed when subjected to all but very light human impact.
Ib	Wilderness Area	Large unmodified or slightly modified areas, retaining their natural character and influence,	To protect the long-term ecological integrity of natural areas that are undisturbed by

		without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.	significant human activity, free of modern infrastructure and where natural forces and processes predominate, so that current and future generations have the opportunity to experience such areas.
II	National Park	Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.	To protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.
III	Natural Monument or Feature	Areas set aside to protect a specific natural monument, which can be a landform, seamount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small Protected Areas and often have high visitor value.	To protect specific outstanding natural features and their associated biodiversity and habitats.
IV	Habitat/Species Management Area	Areas aimed to protect particular species or habitats and management reflects this priority. They will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.	To maintain, conserve and restore species and habitats.
V	Protected Landscape/Seascape	A PA where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.	To protect and sustain important landscapes/seascapes and the associated nature conservation and other values created by interactions with humans through traditional management practices.
VI	Protected Area with Sustainable Use of Natural Resources	PAs conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level, non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.	To protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.

In addition to these six management categories, IUCN defines four Protected Area governance types, as summarized in Table 1b below:

Table 1b: IUCN Protected Area Categories (taken from Dudley, 2013)

Governance Type	Description
Governance by government	Federal or national ministry/agency in charge; sub-national ministry/agency in charge; government-delegated management (e.g. to NGO)
Shared governance	Collaborative management (various degrees of influence); joint management (pluralist management board; transboundary management (various levels across international borders)
Private governance	By individual owner; by non-profit organizations (NGOs, universities, cooperatives); by for-profit organizations (individuals or corporate)
Governance by indigenous peoples and local communities	Indigenous peoples' conserved areas and territories; community conserved areas – declared and run by local communities

International Best Practice

International best practice is to establish an integrated Protected Area system, comprised of Protected Areas of many different management and governance types, supported by enabling legislation. IUCN (Davey, 1998) has recommended that Protected Area systems should be:

- **Representative:** The system should contain high quality examples of all the major ecosystem types in the country.
- **Adequate:** The system needs to be sufficiently large, ecologically connected and well managed to sustain viable processes, populations and communities that make up the biodiversity of a country.
- **Coherent and Complementary:** Each PA should make a positive contribution to the overall conservation and sustainable development goals of the PA system.
- **Consistent:** Management objectives, policies and classifications should be applied in a standardized and consistent fashion across all Protected Areas in the system.
- **Cost-effective, Efficient and Equitable:** There should be an appropriate balance between the costs and benefits of Protected Areas and equity in their distribution.

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Appendix 3: Steps in Acquiring Development Permits

Proposal of location	
Issuing department	Urban and rural planning departments
Applicant	A construction project that is subject to the approval or verification of the related department as required by the state provisions, whose right to use state-owned land is appropriated
Audit stage	Before filing the project with the related department for approval
File nature	Location agreement
Management content	Define location, land-use planning and development intensity and other design requirements

Construction land use permit	
Issuing department	Urban and rural planning departments
Applicant	A construction project that needs to apply for state-owned land use right
Audit stage	Before obtaining the land
File nature	Legal evidence for construction unit to apply for land acquisition, allocation and compensation
Management content	Verify whether location, size, development intensity, etc. meet the requirements of planning conditions

Planning permit on construction project	
Issuing department	Urban and rural planning departments
Applicant	Any construction, expansion and renovation of buildings, structures, roads, pipelines and other engineering facilities within a city or town planning area
Audit stage	Before construction
File nature	Legal credentials for the building projects meeting the requirements of urban planning
Management content	Audit the detailed planning; verify function, position, size, development intensity, detailed design, etc. to meet the planning requirements

Planning permit for rural construction*	
Issuing department	Urban and rural planning departments
Applicant	Construction of facilities needed by township and village enterprises, village public utilities or public welfare establishments within a township or village planning area
Audit stage	Before construction
File nature	Legal credentials for the building projects meeting the requirements of urban planning, legal land credential for building units and individuals
Management content	Verify whether location, size, development intensity, etc., meet the requirements of planning conditions; whether construction activities are in line with transportation, environmental protection, disaster prevention and control, heritage protection, and other planning requirements

* Standing Committee of the National People's Congress. [2008] No.74. Urban and Rural Planning Law of the People's Republic of China.

State Council. No.116. Village and town planning construction management regulations.

GLOSSARY

Ecological Protection Redlining Terms	
Eco-environmental red line	Component of the environmental red line relating to safeguarding the ecological environment
Ecological protection red line (EPRL)	A red line that defines those lands that deliver critical ecosystem services and require protection from threatening developments and activities
Ecological protection redlining (EPR)	The act of establishing ecological protection red lines
Environmental red line	A red line that defines danger limits to a variety of environmental hazards, including ecological, chemical, radioactivity, climate, seismic, etc.
Red line	A line or limit that cannot be breached without severe danger, consequences, and/or penalties
Redlining	The process of defining and establishing a red line
Environment and Ecology Terms	
Biodiversity	The diversity of living organisms in a given area, including genetic, species and ecosystem diversity; usually refers to nature but also includes domesticated species and varieties (agro-biodiversity)
Ecological restoration	Recovery of ecosystems damaged by natural disaster or human abuse, either by natural processes or human inputs (rehabilitation)
Ecology/ecological	Study of relationships between living organisms and their physical environment/relating to ecology and its processes
Ecosystem	The complex community of organisms and their environment functioning as an ecological unit, e.g. forest, lake, grassland
Ecosystem services	Beneficial services delivered through the functions and processes of ecosystems
Environment	Physical and biotic living context of humans and other life-forms; can be natural, man-modified or artificial
Habitat	Specific living environment (physical and biotic) of a given species or species assemblage
Protected Area (PA)	A clearly defined geographical space that is recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (IUCN 2013).
Financial Mechanism Terms	
Eco-compensation	A form of payment mechanism used to reward work undertaken to protect ecological health, or compensate for losses and damages caused by measures taken to protect the natural environment
Ecological transfers	Budgetary transfers paid from primary benefitting regions to regions or agencies that generate or protect valuable ecosystem services
Green taxes	Taxes imposed on goods or services (water, timber, etc.) needed to internalize external environmental damage or recover environmental protection inputs from beneficiaries of ecosystem services
Green incentives	Fiscal measures applied to encourage 'greener' development options including grants, tax breaks, eco-compensation, etc.

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