# Introduction to the City Biodiversity Index

# 城市生物多样性指数简介

宜可城—地方
可持续发展协会
东亚秘书处

# 城市生物多样性监测评估体系：城市生物多样性指数

# Urban Biodiversity Monitoring and Assessment systems: City Biodiversity Index

图片来源：视觉中国VCG211385573015


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# 大纲Outline

1.《昆蒙框架》及《生物多样性公约》相关协定支持城市生物多样性保护

GBF and CBD related agreement supporting urban biodiversity

2.新加坡城市生物多样性与城市生物多样性指数

Singapore urban biodiversity and City Biodiversity Index

3.中国的城市生物多样性指数开发与调查监测体系构建

City Biodiversity Index developed in China, audit and monitoring system related

# 1.《昆蒙框架》及《生物多样性公约》相关协定支持城市生物多样性保护

## GBF and CBD related agreement supporting urban biodiversity

- 《生物多样性公约》与城市相关内容
- “自然城市”倡议/平台

# 《生物多样性公约》COP 15与城市相关内容

## Related Cities and Regions context in CBD COP 15

### 生物多样性公约第十五次缔约方大会：通过的与地方及次国家政府直接相关的决定

- **CBD/COP/DEC/15/4**
  - **“昆明-蒙特利尔全球生物多样性框架”**
  - **Kunming-Montreal Global Biodiversity Framework**
- **CBD/COP/DEC/15/5**
  - **“全球生物多样性框架”的监测框架**
  - **Monitoring framework of the GBF**
- **CBD/COP/DEC/15/6**
  - **规划、监测、报告和审查机制**
  - **Mechanism for planning, monitoring, reporting and reviewing**
- CBD/COP/DEC/15/7
  - 资源调动
  - Resource mobilization
- CBD/COP/DEC/15/8
  - 能力建设与发展及技术和科学合作
  - Capacity-building and development and technical and scientific cooperation
- **CBD/COP/15/12**
  - **与次国家政府、城市及其他地方当局合作，加强实施“2020年后全球生物多样性框架”和《行动计划》（2022-2030）**
  - **Engagement with subnational governments, cities and other local authorities to enhance implementation of the post-2020 global biodiversity & Plan of Action (2022-2030)**
- CBD/COP/15/27
  - 外来入侵物种
  - Invasive alien species
- CBD/COP/15/24
  - 海洋生物多样性养护和可持续利用
  - Conservation and sustainable use of marine biodiversity
- CBD/COP/15/28
  - 生物多样性与农业
  - Biodiversity and Agriculture
- CBD/COP/15/29
  - 生物多样性与健康
  - Biodiversity and Health
- CBD/COP/15/L34
  - 部门内和部门间将生物多样性纳入主流的长期战略办法的决定

# 《生物多样性公约》COP 15与城市相关内容

Related Cities and Regions context in CBD

## 第15/4号决定“昆明-蒙特利尔全球生物多样性框架”：与城市相关的2030年目标
## Decision 15/4 Kunming-Montreal Global Biodiversity Framework: 2030 Targets relevant to cities Decision 15/4 Kunming-Montreal Global Biodiversity Framework:

该框架到2050年的四个长期目标,该框架包括23项全球行动目标，这些行动目标将立即启动并到2030年完成。成果将有助于实现以成果为导向的2050年目标。

The framework's four long-term goals by 2050. The framework has **23 action-oriented global targets** to be initiated immediately and completed by 2030.Together, the results will enable achievement towards the outcome-oriented goals for 2050.

- **目标12/Target 12：**敦促提高城市地区蓝绿空间的面积、质量和连通性，改善蓝绿空间的可达性及其产生的惠益
- **目标14/Target 14：**确保将生物多样性问题纳入各级政府和所有部门的政策、法规、规划和不同战略，让城市和地区更宜居。
- **目标7/Target 7：**减少所有来源的污染风险和不利影响
- **目标11/Target 11：**恢复、维持和增进自然对人类的贡献，包括生态系统功能和服务
- **目标2和3/Target 2&3：**30x30目标——到2030年，至少30%的陆地、内陆水域、沿海和海洋生态系统退化区域得到有效恢复（目标2），并得到有效养护和管理（目标3）

# 《生物多样性公约》COP 15与城市相关内容

## Related Cities and Regions context in CBD

### 城市和次国家政府如何支持“全球生物多样性框架”的实施工作?
### How cities & subnational governments can support GBF implementation?

- 使生物多样性和生态系统恢复方面的**优先事项和行动**与《国家生物多样性战略和行动计划》**保持一致**
- 优先考虑和**实施有助于实现“全球生物多样性框架”目标**（例如2、3、7、11、12和14）的**项目**、计划及措施
- 将**生物多样性**考量因素**纳入土地利用和空间规划以及基础设施交付**（生态基础设施）**决策**的**主流**
- 运用**基于自然的解决方案和基于生态系统的方法**，以应对城市挑战
- **与各国政府合作**，制定实施《行动纲领》的行动计划，并鼓励其确定、强化和传播政策工具、指导方针、财政机制或工具，以及促进地方生物多样性行动及城市和次国家政府能力建设的计划

- **Align priorities & actions** on biodiversity & ecosystem restoration with National Biodiversity Strategy & Action Plans
- Prioritise & **implement projects**, programmes & measures that **contribute to GBF targets**: eg 2, 3, 7, 11, 12 & 14
- **Mainstream biodiversity** considerations into **land use & spatial plans and decisions on infrastructure delivery** (ecological infrastructure)
- Apply **Nature-based solutions & ecosystem-based approaches** to address urban challenges
- **Collaborate with national governments** to develop action plans to implement that POA, & encourage them to identify, enhance and disseminate policy tools, guidelines, financial mechanisms or instruments, & programmes that will facilitate local action on biodiversity & build capacity of cities & subnational governments

# 城市生物多样性指数作为城市自评估推荐使用工具

## City Biodiversity Index as a Self-assessment Tool for City in CBD

联合国 环境规划署

CBD

生物多样性公约

Distr.
GENERAL

CBD/COP/DEC/15/12*
19 December 2022

CHINESE
ORIGINAL: ENGLISH

生物多样性公约缔约方大会
第十五届会议 – 第二阶段会议
2022 年 12 月 7 日至 19 日，加拿大蒙特利尔
议程项目 16B

生物多样性公约缔约方大会通过的决定

**5/12. 与次国家政府、城市和其他地方当局协作加强执行《昆明-蒙特利尔全球生物多样性框架》**

**行动领域 6**

**评估和改进决策信息**

(a) 邀请使用新加坡城市生物多样性指数作为城市和地方政府的自我评估工具，根据各自的基线衡量和监测生物多样性保护工作的进展情况；

(b) 支持次国家政府、城市和其他地方当局加强收集、分析和报告地方和景观生物多样性的数据，共同制作数据，更好地提供获得数据、科学证据和专门知识的渠道，以改进决策。

CBD/COP/DEC/15/12
Page 5

**Action area 6**
**Assessment and improved information for decision-making**

(a) Invite the use of the Singapore Index on Cities' Biodiversity as a self-assessment tool for city and local governments to benchmark and monitor the progress of their biodiversity conservation efforts against their own individual baselines;

(b) Support subnational governments, cities and other local authorities in co-producing data, and in gaining and offering better access to data and scientific evidence and expertise to improve decision-making, enabled by improved capturing, analysis and reporting of local and landscape-based biodiversity data.

# 2. 新加坡城市生物多样性与城市生物多样性指数（CBI）

## Singapore urban biodiversity and City Biodiversity Index

- 新加坡城市生物多样性保护框架
- 联合国支持下的城市生物多样性指数
- 新加坡城市生物多样性调查与评估
- 新加坡城市生物多样性监测与报告

# 新加坡城市生物多样性保护框架

## Framework of Singapore Urban Biodiversity

**新加坡生物多样性**

管理机构为新加坡国家公园局，并由国家生物多样性中心提供工作支持：

- 制定、实施和协调保护战略、政策、指南；
- 制定、实施和协调生物多样性研究和监测计划；
- 加强、标准化和维护可靠的生物多样性数据库——生物多样性和环境数据库系统 (BIOME)；
- 建立与维持伙伴关系等
- ……

The National Parks Board’ s stewardship as the Scientific Authority in Nature Conservation for Singapore is supported by the National Biodiversity Centre (NBC):

- Formulate, implement and coordinate strategies, policies and guidelines on biodiversity conservation
- Formulate, implement and co-ordinate research and monitoring programmes on biodiversity
- Strengthen, standardise and maintain reliable biodiversity databases (Biodiversity and Environment Database System, BIOME);
- Synergise and maintain partnerships……

国家保护计划/National Plan for Conservation

国家生物多样性战略与行动计划
National Biodiversity Strategy and Action Plan (NBSAP)

自然保护总体规划
Nature Conservation Masterplan

城市生物多样性/Urban Biodiversity

**城市生物多样性指数**
**City Biodiversity Index**

**生物多样性影响评估指南**
**Biodiversity Impact Assessment Guidelines**

**鸟类安全建筑指南**
**Bird-safe Building Guidelines**

环境研究
Environmental Studies

栖息地修复手册
Handbook on Habitat Restoration

新加坡野生动物/Wildlife in Singapore
生态系统保护/Ecosystems
自然社区倡议/Community in Nature Initiative……
等等……

Source: https://www.nparks.gov.sg/biodiversity

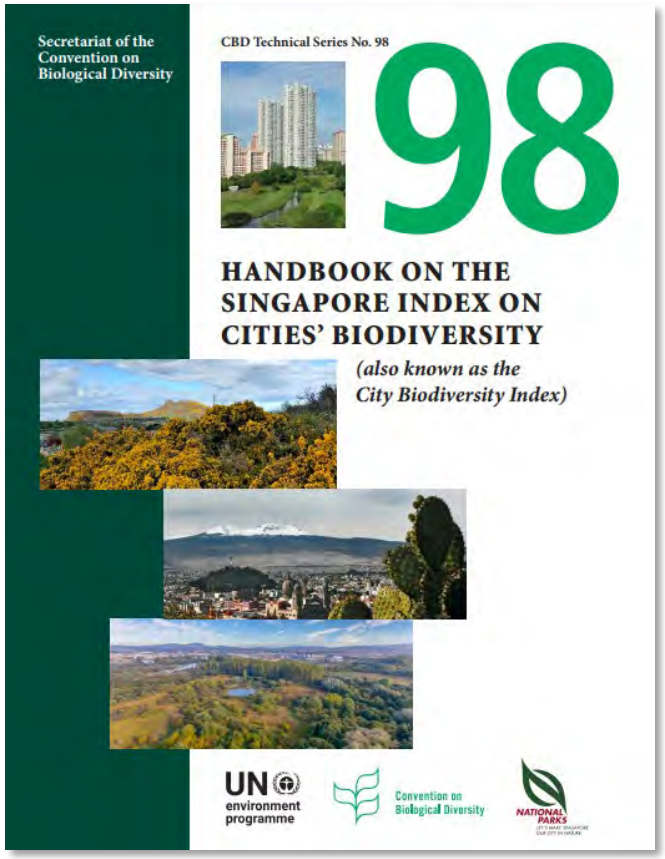
# 联合国支持下的城市生物多样性指数
## City Biodiversity Index

**唯一旨在支持城市自我**监测和评估城市生物多样性保护工作，**且整合了地方**一级生物多样性指标的工具。**修**订版的指数已于2021**年正式**发布，**内容**进一**步涵盖了生物多**样性和生态系统可为人类提供的服务。

**宜可城北京代表**处正在对修订版的指数进行适用中国城市的开发，**并将**为中**国城市开**发相应的能力建设项目。

The **only index** designed to **support cities** in **self-monitoring** and **evaluating** their **urban biodiversity conservation efforts** and **integrate biodiversity indicators at the local level**. The revised version of the Index, published in 2021, includes wider coverage of the services biodiversity and ecosystems provide to people.

The ICLEI Beijing Office is **localizing** the revised Index, and will develop relevant capacity building programs for cities in China.




**共同开发机构**
**Partners & Initiatives**

# 城市生物多样性指数(2021版）

## City Biodiversity Index

| 第一部分：城市概况 City Profile |
| --- |
| 位置与面积（地理坐标（经纬度）；气候（温带或热带等）；降雨/降水量（范围和平均值）；包括明确标示出城市边界的谷歌地图或卫星图)<br>**Location and Area**(Geographical coordinates, Climate, Google Maps or satellite imagery indicating city boundaries) |
| 城市的物理特征 (地理、海拔、不透水地表的面积、棕地信息等)<br>**Physical Characteristics**(Geography, altitude, impermeable surface area, brownfield information, etc.) |
| 人口特征 （包括城市总人口和人口密度；如要将城市置于区域中考察，也可提供该地区的人口作为参照)<br>**Demographic Characteristics**(total urban population, population density, etc.) |
| 经济参数 （国内生产总值GDP、国民生产总值GNP、人均收入、主要经济活动、驱动力及对生物多样性的压力）<br>**Economic Parameters**(GDP, GNP, per capita income, main economic activities, pressures on biodiversity, etc.) |
| 生物多样性特征 （市内的生态系统和物种、具有地方重要性的关键物种的种群数量、相关的生物多样性定性数据）<br>**Biodiversity Characteristics**(Ecosystems and species, population numbers of locally important key species, etc.) |
| 生物多样性的行政管理（相关信息包括：负责生物多样性的机构和部门，如何通过国家公园、自然保护区、森林保护区、专门保留地、公园等形式对自然区域进行保护）<br>**Biodiversity Governance**(Institutions and departments responsible for biodiversity, approaches to conservation, etc.) |
| 相关网站链接，包括城市官网，专门的环境或生物多样性网站以及生物多样性主管部门的网站<br>**Relevant Website Links**, including official city websites, dedicated environmental or biodiversity websites, etc. |

# 城市生物多样性指数(2021版）
## City Biodiversity Index

宜可城—地方可持续发展协会 东亚秘书处

### 第二部分：指标 Indicators

| 城市生物多样性本底 City Biodiversity Baseline | | |
|---|---|---|
| | 自然区域在城市中的占比<br>Proportion of natural areas within the city | 4 分 |
| | 为遏制生境破碎化而采取的增加连通性的举措或建立的生态网络<br>Initiatives to increase connectivity or establish ecological networks to curb habitat fragmentation | 4 分 |
| | 建成区的本土生物多样性（鸟类）<br>Native biodiversity in built-up areas (birds) | 4 分 |
| | 本土维管植物物种数量的变化<br>Change in the number of native vascular plant species | 4 分 |
| | 本土鸟类物种数量的变化<br>Change in the number of native bird species | 4 分 |
| | 本土节肢动物物种数量的变化<br>Change in the number of native arthropod species | 4 分 |
| | 生境恢复<br>Habitat Restoration | 4 分 |
| | 受保护的自然区域的比例<br>Proportion of protected natural areas | 4 分 |
| | 外来入侵物种的比例<br>Proportion of alien invasive species | 4 分 |

| 生物多样性提供的生态系统服务 Ecosystem Services Provided by Biodiversity | | |
|---|---|---|
| | 水量调节<br>Water Regulation | 4 分 |
| | 气候调节 – 树木和绿色植物的益处<br>Climate Regulation - Benefits of trees and green plants | 4 分 |
| | 娱乐服务<br>Recreational Services | 4 分 |
| | 健康与福祉 – 公园邻近度/可达性<br>Health and Well-being - Proximity/Accessibility to parks | 4 分 |
| | 粮食安全韧性—都市农业<br>Food Security Resilience - Urban agriculture | 4 分 |

| 生物多样性治理与管理 Biodiversity Governance and Management | | |
|---|---|---|
| | 机构能力 Institutional Capacity | 4 分 |
| | 为生物多样性分配的预算 Budget allocated for biodiversity | 4 分 |
| | 政策、法规和条例——是否有地方生物多样性战略和行动计划<br>Policies, laws, and regulations | 4 分 |
| | 城市自然资本评估现状 Current status of urban natural capital assessment | 4 分 |
| | 城市蓝绿空间管理规划的状况<br>Status of urban blue-green space management and planning | 4 分 |
| | 以生物多样性相关举措应对气候变化<br>Biodiversity-related initiatives to address climate change | 4 分 |
| | (作为基于自然的解决方案的)绿色基础设施政策和/或激励措施 Green Infrastructure Policies or Incentives | 4 分 |
| | 跨行业和机构间合作<br>Cross-sectoral and inter-departmental cooperation | 4 分 |
| | 参与和伙伴关系：是否存在与生物多样性相关的正式或非正式的公共咨询程序<br>Existence of formal or informal public consultation procedures related to biodiversity | 4 分 |
| | 参与和伙伴关系：与城市合作开展生物多样性活动、项目的机构/私营企业/非政府组织/学术机构/国际组织的数量<br>Number of institutions/private enterprises/NGOs/academic institutions cooperating with the city on biodiversity activities/projects | 4 分 |
| | 城市每年度实施的生物多样性项目的数量<br>Number of biodiversity projects implemented annually by the city | 4 分 |
| | 教育 Education | 4 分 |
| | 公众意识 Public Awareness | 4 分 |
| | 社区科学 Citizen Science | 4 分 |

# 新加坡生物多样性调查与评估——基线研究

## Singapore Biodiversity Baseline Audit and Assessment: Baseline Study

### 陆域生物多样性基线调查与研究

研究区域/Study Area

栖息地基线研究/Habitat Baseline Study

- 植被分布与类型调查/Vegetation Mapping
- 栖息地分布与类型调查/Habitat Mapping
- 水文调查与评估/Hydrology

目标种群基线研究/Target Species Groups' Baseline Study

- 维管束植物/Vascular Plants
- 鸟类/Birds
- 爬行动物与两栖动物/Reptiles and Amphibians
- 哺乳动物（除蝙蝠）/Mammal (Except bats)
- 蝙蝠/Bats
- 蝴蝶/Butterflies
- 蜻蜓目/Odonates
- 淡水生物/Freshwater Organisms

### 海域生物多样性基线调查与研究

研究区域/Study Area

栖息地基线研究/Habitat Baseline Study

- 栖息地分布与类型调查/Habitat Mapping
- 物理参数/Physical Parameters

海洋生物多样性群落调查/Marine Biodiversity Community Surveys

- 红树林植物群落/Mangrove Flora Community
- 红树林动物群落/mangrove Faura Community
- 潮间带群落/ Intertidal Community
- 动物群落(泥滩、软沉积物、沙)/Infauna Community (Mudflats, Soft Sediments, Sand)
- 珊瑚礁生物群落 / Coral Reef Community
- 浮游生物群落 /Plankton Community

维管束植物/Vascular Plants：

样线法、样方法/line transects, quadrat plots and/or modified gentry plots.

鸟类/Birds：

定点记数法、样线法/point counts and/or line transects.

爬行动物与两栖动物/Reptiles and Amphibians：

样线法/ line transects

哺乳动物（除蝙蝠）/Mammal (Except bats)：

相机捕捉法、样线法/camera traps and/or line transects.

蝙蝠/Bats ：

声音记录，雾网和/或竖琴网。飞行路线和水体是调查蝙蝠的适宜位置/acoustic recording, mist nets and/or harp traps. Flyways and waterbodies are particularly good locations for bat surveys.

蝴蝶/Butterflies ：

样线法/ line transects.

蜻蜓目/Odonates：

样线法/ line transects.

淡水生物/Freshwater Organisms ：

网样带和诱饵捕捉，其他方法(如电钓)/net transects and baited traps, but other methods (such as electrofishing)

Source：Biodiversity Impact Assessment (BIA) Guidelines Revised version (May 2024). Published by National Biodiversity Centre National Parks Board

# 新加坡生物多样性调查与评估——指数评价结果

## Singapore Biodiversity Baseline Audit and Assessment：Assessment Results

新加坡第一次进行城市生物多样性评价是基于2010年数据，并在2014年完成，作为新加坡第五次向《生物多样性公约》报告的国家生物多样性报告的支持数据。新加坡应用了23个指标中的18个指标进行城市生物多样性评价，评价得分结果为55分（满分为72分），得分占比为76%。由于数据缺乏的原因，另外5个指标将在第二轮评价中应用。

Singapore first applied the SI in 2010，finished in 2014, and this establishes the baseline for Singapore's future applications of the SI. Singapore applied 18 out of 23 indicators and obtained a score of 55 out of 72points (76%). The five indicators that were not applied were the ones where a score can only be obtained from the second application onwards.

| 评价部分<br>SI Component | 得分结果<br>Score |
|---|---|
| 城市生物多样性本底<br>Native Biodiversity in the City | 14/20 |
| 生态系统服务<br>Ecosystem Services | 8/16 |
| 生物多样性治理与管理<br>Governance and Management of Biodiversity | 33/36 |
| 总计<br>Total | 55/72 |

Component 1: Native Biodiversity in the City **城市生物多样性本底**

| Indicator | Raw value | Score |
|---|---|---|
| 1. Proportion of Natural Areas | 29% | 4 |
| 2. Connectivity Measures | Mean Mesh Size = 1599ha | 4 |
| 3. Native Biodiversity in Built-up area (Birds) | 30 bird species | 2 |
| 4. Change in no. of vascular plant species | 2145 plant species | NA |
| 5. Change in no. of bird species | 321 bird species | NA |
| 6. Change in number of butterfly species | 295 butterfly species | NA |
| 7. Change in number of hard coral species | 255 hard coral species | NA |
| 8. Change in number of freshwater fish species | 34 fish species | NA |
| 9. Proportion of protected natural areas | 4.7% | 1 |
| 10. Proportion of invasive alien species (birds) | 3% | 3 |

Component 2: Ecosystem Services **生态系统服务**

| Indicator | Raw value | Score |
|---|---|---|
| 11. Regulation of Quantity of Water | 63.2% | 2 |
| 12. Carbon Storage and Cooling Effect of Vegetation | 31.9% | 3 |
| 13. Recreational Services | Area of parks with natural areas and protected or secured natural areas = 0.75ha/1000 persons | 3 |
| 14. Number of formal educational visits per child below 16 years to parks with natural areas or protected or secured natural areas per year | 0.01 visits/child/year | 0 |

Component 3: Governance and Management of Biodiversity **生物多样性治理与管理**

| Indicator | Raw value | Score |
|---|---|---|
| 15. Budget Allocated to Biodiversity | 0.6% | 1 |
| 16. Number of Biodiversity Projects Implemented by the City Annually | 79 projects | 4 |
| 17. Existence of Local Biodiversity Strategy and Action Plan | Singapore's NBSAP was launched in September 2009 and an update is currently being prepared. | 4 |
| 18. Number of essential biodiversity related functions that the city uses | 7 functions | 4 |
| 19. Number of city or local government agencies involved in inter-agency co-operation pertaining to biodiversity matters | 10 agencies | 4 |
| 20. Existence and state of formal or informal public consultation process pertaining to biodiversity related matters | Formal or informal process exists as part of the routine process (e.g.: URA Master Plan public consultation) | 4 |
| 21. Number of agencies/private companies/NGOs/academic institutions/international organisations with which they city is partnering in biodiversity activities, projects and programmes | 66 partners | 4 |
| 22. Is biodiversity or nature awareness included in the school curriculum? | Yes, biodiversity or elements of it are included in the school curriculum. | 4 |
| 23. Number of outreach or public awareness events held in the city per year | 1340 outreach or public awareness events per year | 4 |

# 新加坡城市生物多样性监测与报告——支持NBSAP

## Singapore Urban Biodiversity Monitoring and Reporting——Contribution to NBSAP

对国家战略方案的执行情况进行定期监测和评价至关重要。新加坡的整体保护议程将与总体规划进程同步，每五年进行一次审查。通过城市生物多样性评价，并对应制定的国家生物多样性战略与行动计划，持续监测与报告行动目标与计划的进展。

Regular monitoring and evaluation of the implementation of the NBSAP is essential. Singapore's overall conservation agenda will be reviewed every 5 years, in tandem with the Master Planning process. Continue to monitor and report on progress towards action goals and plans through City Biodiversity Index and corresponding national biodiversity strategies and action plans.



**新加坡第五次与第六次国际生物多样性报告**

| “爱知目标” | 城市生物多样性指数评价结果 | 新加坡国家生物多样性战略与行动计划 |
|---|---|---|
| Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained. | Indicator 1: Proportion of Natural Areas: 29%, 4 points.<br><br>Indicator 2: Connectivity measures - mean mesh size: 1599Ha, 4 points.<br><br>Indicator 4: Change in number of vascular plant species: 2145 native vascular plant species, currently no SI score (baseline data).<br><br>Indicator 5: Change in number of bird species: 321 bird species, currently no SI score (baseline data).<br><br>Indicator 6: Change in number of butterfly species: 295 butterfly species, currently no SI score (baseline data).<br><br>Indicator 7: Change in number of hard coral species: 255 hard coral species, currently no SI score (baseline data).<br><br>Indicator 8: Change in number of freshwater fish species: 34 fish species, currently no SI score (baseline data).<br><br>Indicator 9: Proportion of protected natural areas: 4.7%, 1 point. | Under the Species Recovery programmatic plan of NParks' Nature Conservation Master Plan, threatened species are identified and prioritised based on endemism, conservation status and habitat range. This will help to guide actions towards increasing populations of the species identified.<br><br>Strategy 1 - Safeguard Our Biodiversity<br><br>Various species conservation and recovery programmes are in place:<br><br>• Giant clam restocking programme<br>• Freshwater crab conservation working group, for the Singapore freshwater crab (*Johora singaporensis*)<br>• Rare native plant propagation and reintroduction |

# 新加坡“自然中的城市”框架
## Singapore’s “City in Nature” Framework

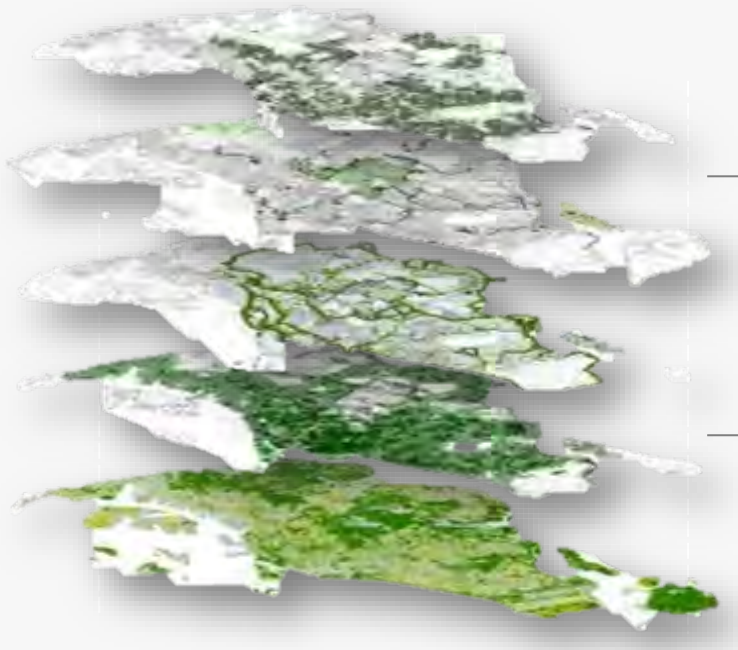
*Content retrieved from the slide prepared by Wendy Hwee Min Yao, Singapore National Parks Board, for the *Roundtable on Urban Biodiversity Actions: Local and Subnational Governments’ Biodiversity Practices and the Road to Post-2020*, 18 July 2019

以生物系统和亲生命本性设计为基础
Underpinned by Biophilic Systems and Design

社会层
Social Layer

改建层
Recreation Layer

基础层
Base Layer



生态层
Ecological Layer

绿化层
Greenery Layer

**可持续经济增长**
**Sustainable Economic Growth**

**高度宜居**
**High Livability**

**生态韧性**
**Ecological Resilience**

**气候韧性**
**Climate Resilience**

**社会韧性**
**Social Resilience**

# 城市生物多样性指数应用反馈

## Application of City Biodiversity Index

国际已有超过36个城市应用该指数
国内适用城市代表：昆明市、深圳市、青岛市、嘉兴市、湖州市、南阳市、 成都市等

Over 36 cities globally have applied this index.
Representative domestic cities applying this index include: Kunming, Shenzhen, Qingdao, Jiaxing, Huzhou, Nanyang, Chengdu, and others.


**国际**
应用城市代表

- Singapore
  新加坡
- Brussels, Belgium
  比利时 布鲁塞
- Montreal, Canada
  加拿大 蒙特利尔
- Helsinki, Finland
  芬兰 赫尔辛基
- Hyderabad, India
  印度 海得拉巴
- Nagoya, Japan
  日本 名古屋
- Auckland, New Zealand
  新西兰 奥克兰
- Lisbon, Portugal
  葡萄牙 里斯本
- Bangkok, Thailand
  泰国 曼谷
- London, UK
  英国 伦敦

# 3. 中国的城市生物多样性指数开发与调查监测体系构建

## City Biodiversity Index developed in China, audit and monitoring system related

- 中国的《城市生物多样性指数》开发
- 城市生物多样性调查监测体系

# 城市生物多样性指数（中国）
## City Biodiversity Index

在多个中国城市适用的基础上，征求了包括来自中国环科院的专家，来自空间规划领域清华同衡设计院的专家，来自保尔森基金会的多位专家，来自地方城市昆明环科院的专家等等多位业内专家的建议意见， 开发了适用于中国城市的《城市生物多样性指数》。
On the basis of applying to many Chinese cities, we have solicited the suggestions and feedbacks of many experts, including experts from the Chinese Academy of Environmental Sciences, experts from the THUPDI in the field of spatial planning, experts from the Paulson Institute, experts from the Kunming Academy of Environmental Sciences in local cities, etc., and developed the City Biodiversity Index applicable to Chinese cities.

### 评价基本定位
### Basic Principle

本评价是方便地方政府对当地的生物多样性状况进行自评价的工具；
Self-assessment tool;

用于各城市根据各自的基准情况来评估和监测其生物多样性保护工作的进展。
According to the baselines to evaluate and monitor processing

### 适用对象
### Applicable Objects

是以城市生物多样性管理的政府相关单位为主要使用对象；
Mainly for local government;

其他参与到城市生物多样性保护与实施的机构、规划设计单位等亦可使用。
For related organization, implementation departments, planning institutes etc.

### 评价范围
### Assessment Scope

面向市县级，多以市域为评价范围；
Mainly in the scope of administrative region

评价市域、中心城区的城市生物多样性状况与管理实施情况；
Part of the indications applied to urban area;

可适当下延到街区尺度。
Consideration on the street scope

### 修编的目的与意义
### Purpose and significance

填补空白，提升在中国的适用性、可操作性；
Improvement of the feasibility and manipuility in China
促进城市生物多样性在国内城市管理、资源保护、绿色发展等工作领域的主流化；
Promoting biodiversity main-streaming
作为支持生物多样性工作国际交流合作的一种重要工具。
Promoting international communication

# 城市生物多样性指数（中国）
## City Biodiversity Index

**第一部分 城市概况 City Profile**

**第二部分 指标：核心指标+导向指标 Indicators: Core and Guiding**

### 城市生物多样性本底
City Biodiversity Baseline
（核心）+（导向）

**生境保护** Habitat Protection
- Proportion of protected natural areas
- Proportion of habitat restoration

**空间连通** Spatial Connectivity
- Proportion of blue-green spaces in urban areas
- Ecological connectivity
- Compliance with other effective area-based conservation measures (OECMs)

**物种调查** Species Survey
- Change in the number of native bird species
- Conservation of key and endemic species
- ……

### 生物多样性提供的生态系统服务
Ecosystem Services
（核心）+（导向）

**调节服务** Regulating
- Water regulation
- Canopy cover
- Urban heat island intensity

**健康福祉** Health & Well-being
- Pollinators
- Per capita urban green space
- Park proximity and accessibility

**供给服务** Provisioning
- Food security resilience of urban agriculture
- ……

### 生物多样性治理与管理
Governance and Management
（核心）+（导向）

**多元共治** Multi-stakeholder Governance
- Interdepartmental government collaboration
- Development of biodiversity conservation plans
- Biodiversity-related initiatives to address climate change

**意识提升** Awareness Raising
- Multi-year biodiversity monitoring
- Citizen science

**减少干扰** Reducing Disturbances
- Measures to reduce/eliminate night lights and impacts of mongooses on birds

**产业引导** Industry Guidance
- Promotion of biodiversity-friendly industries
- ……

# 城市生物多样性指数（中国）
## City Biodiversity Index

| | | | |
|---|---|---|---|
| 城市生物多样性本底 City Biodiversity Baseline | **中心城区蓝绿空间的比例 Proportion of Blue and Green Space** | | |
| | 评价对象：生境保护<br>Evaluation Object：Habitat Protection<br>核心指标<br>指标依据<br>《昆蒙框架》行动目标12提出生物多样性保护和可持续利用纳入主流可大幅提高城市和人口密集地区的绿色和蓝色空间面积、质量、连通性、可达性和益处，并为此设定了“供公共使用的绿色/蓝色空间占城市建成区的平均份额”的指标。这与本指标的设定相类似。<br><br>在《中国生物多样性战略和行动计划（2023-2030年）》提到城市生物多样性作为优先行动之一，要“加强城市和人口密集地区蓝绿空间及生态廊道建设，提高城市生态系统服务功能和自维持能力”。<br><br>本指标的评价范围为中心城区，其概念是与国土空间规划中对中心城区的界定范围一致，用中心城区的范围，一方面是与指标1、5、6对于自然区域的生态空间区别开，一方面对于中心城区的范围，各城市的国土空间总体规划有明确界定，方便城市进行计算。…… | 指标计算方法<br>Indicator Calculation Method<br>（中心城区蓝绿空间面积/中心城区总面积）*100%<br><br>数据来源<br>**自然资源与城乡规划管理部门、水利水务管理部门、住房与城乡建设管理部门、城市园林绿化主管理部门、林地草地湿地相关管理部门、遥感卫星数据、航空摄影测量数据（以下简称航测数据）等。** | 评分依据<br>Scoring Criteria<br>《城市用地分类与规划建设用地标准》（GB50137-2011）绿地与广场用地占规划城市建设用地结构10.0%-15.0%；<br><br>根据住建部《2022年中国城市建设状况公报》，全国城市建成区绿地率平均值39.29%；各省最高43.3%（江西省），最低甘肃省33.1%（甘肃省）；<br>根据国家园林城市评价标准，国家生态园林城市的建成区蓝绿空间占比指标标准为45%，国家园林城市的建成区蓝绿空间占比指标标准为43%。<br>0分：m < 10.0%；<br>1分：10.0%≤m < 32.0%；<br>2分：32.0%≤m < 38.0%；<br>3分：38.0%≤m < 45.0%；<br>4分：m≥45.0%。 |
| 城市生物多样性本底 City Biodiversity Baseline | **本土维管植物物种数量的变化 Change in the Number of Native Vascular Plant Species** | | |
| | 评价对象：物种调查<br>Evaluation Object：Species Survey<br>核心指标<br>指标依据<br>由于该指数专注于城市生物多样性，因此有必要将本地动植物的多样性列入指标中。城市生物多样性指数的评估研讨会上，因监测五个分类群的工作量过于繁重，与会者决定将监测的分类群数量从五个减少到三个，分别为维管植物、鸟类与节肢动物。<br><br>维管植物入选为受监测分类群之一的原因在于它们占地球植被的90%以上，随处可见，而且对它们的研究和记录已较为充分。<br>…… | 指标计算方法<br>Indicator Calculation Method<br>指标13反映的是本土维管植物物种数量的变化。<br>第一次应用城市生物多样性指数时在“第一部分：城市概况”中记录的数据将被用作计算本土维管植物物种数量变化的基准。<br>从之前到最近一次调查，物种数量净变化值依此计算：<br>维管植物物种数量的总增长数（由于重引入、重新发现及由于更深入和全面的调查而发现的新物种等）。<br><br>**数据来源**<br>**生态环境管理部门、自然资源管理部门、林地草地湿地相关管理部门、自然团体组织、高校、科研单位、出版物、公民科学家、业余博物学家等。** | 评分依据<br>Scoring Criteria<br>“第一部分：城市概况”中所列的数据将被用来衡量物种多样性的变化。城市第一次应用城市生物多样性指数时获取的数据将被视为所有后续监测的基准信息。在该指数的后续应用中，城市将计算各分类群物种数量的净变化值。<br>以下评分标准基于的考量为：即便在短时间内较难成功恢复或重引入物种，物种恢复和重引入的工作必需得到应有认可。由于植物和节肢动物的物种数量比鸟类多，因此为植物和节肢动物设定了更高的评分阈值。<br>0 分：本土维管植物物种数量减少；<br>1 分：本土维管植物物种数量保持不变或增加的物种数少于6种；<br>2 分：增加了6种本土维管植物物种；<br>3 分：增加了7种本土维管植物物种；<br>4 分：增加了8种或更多本土维管植物物种。 |

# 城市生物多样性调查与监测体系——“天地空一体化”

## Urban Biodiversity Audit and Monitoring System

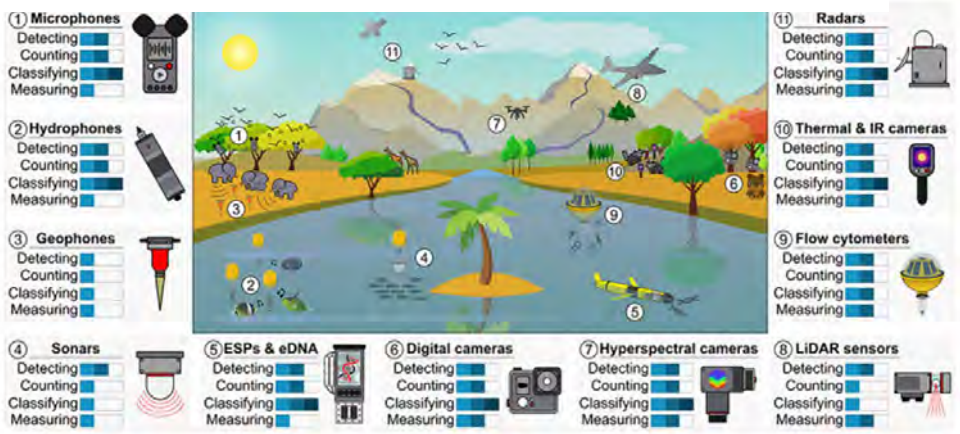

遥感调查
Remote Sensing Investigation

先进的基因检测方法
Advanced genetic methods

大数据等背景数据收集
Background technologies

相机、声学等记录
Automated recording units

Source: Dalton, D.T.; Berger, V.;Adams, V.; Botha, J.; Halloy, S.;Kirchmeir, H.; Sovinc, A.; Steinbauer, K.; Švara, V.; Jungmeier, M. A Conceptual Framework for Biodiversity Monitoring Programs in Conservation Areas. Sustainability 2023, 15, 6779. https://doi.org/ 10.3390/su15086779




Source: Marc Besson, et al. Towards the fully automated monitoring of ecological communities, Wiley, 2022.

《生物多样性（陆域生态系统）遥感调查技术指南》
(HJ 1340—2023)

遥感数据获取与处理、遥感指标分析等
Remote sensing data acquisition and processing, etc.

表 1　植物资源调查方法

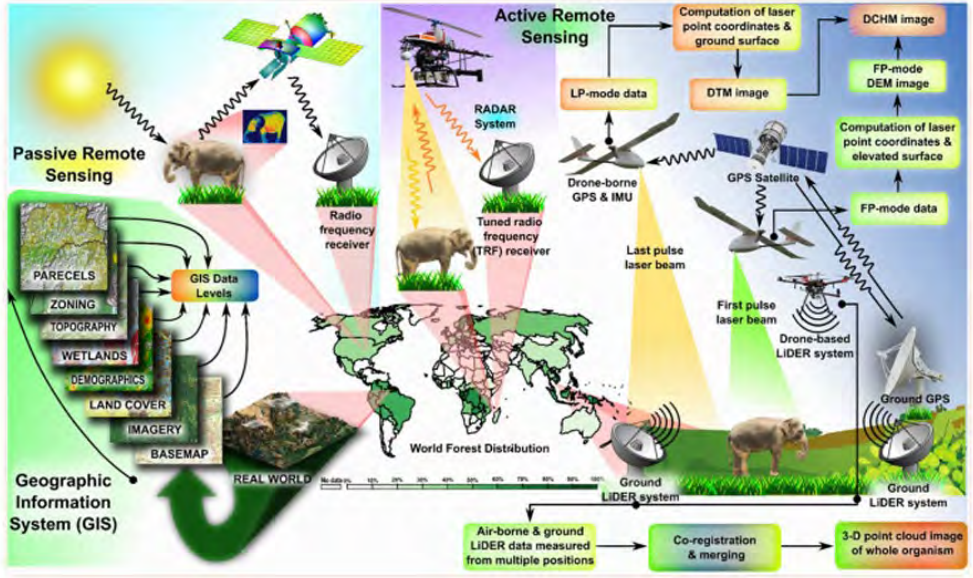
| 植物类别 | 调查方法 | |
|---|---|---|
| | 普查 | 重点调查 |
| 陆生维管束植物 | 线路法、样方法 | 样带法、样方法、全查法 |
| 水生维管束植物 | 样线法、样方法 | 样带法、样线法、样方法 |

《城市生物多样性调查技术导则》
(中国风景园林学会团体标准)

样线法、样方法、鸣叫调查法、直接计数法
红外相机自动拍摄法等
line transects, Quadrat method, Call-count Survey, etc.



| | | |
|---|---|---|
| 鸟类 | 样线法、无人机拍摄法 | 适合所有类型鸟类 |
| | 样点法 | 适合陆生、小型鸟类 |
| | 直接计数法 | 适合水鸟及其他集群鸟类 |
| | 红外相机自动拍摄法 | 适合稀有、活动隐蔽鸟类 |
| | 鸣声调查法 | 适合鸮形目、鸡形目、雀形目等重点关注鸟种 |
| 爬行动物 | 样线法、样方法、人工覆盖物法 | 适合所有类型爬行动物 |




Source: Rout George Kerry, et al. An overview of remote monitoring methods in biodiversity conservation, Springer Nature, 2022.

# 城市生物多样性调查与监测体系-案例分享

## Urban Biodiversity Audit and Monitoring System-Thamesmead Case

https://clevercities.eu/

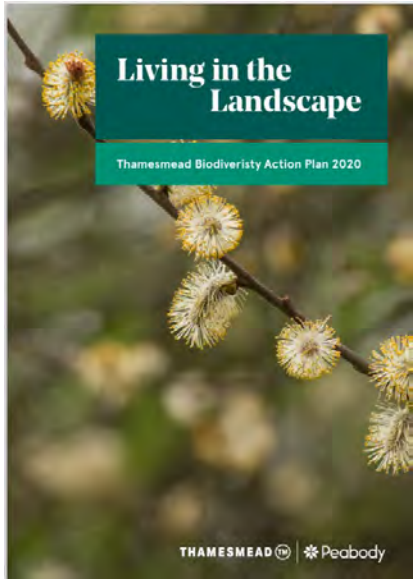
**欧盟地平线 2020 计划（Horizon2020）项目“智在城市”（CLEVER Cities），**旨在促进欧洲、南美洲和中国城市，采取**基于自然的解决方案（环境效益、社会效益、经济效益），形成应对机制与推动力**，来应对城市挑战，提升社会包容性。

**The EU Horizon 2020 "CLEVER Cities" project promotes nature-based solutions in cities across Europe, South America, and China to address urban challenges and enhance social inclusion.**

- 由皮博迪（Peabody）公司主导生态修复与人居环境提升行动，其中包括评估泰晤士米德的栖息地的生境价值、生态系统条件与城市建成环境中的自然栖息地状况。
- 泰晤士米德生物多样性调查与监测方法包含标准的**生态调查、声音监测、DNA分析、相机捕捉、遥感或激光雷达监测、定量分析**。这些方法适用于从场地尺度到区域尺度的不同维度，方便根据不同的条件进行调查与监测。

Urban Monitoring Methods Factsheet

| Monitoring Method | Standard Ecological Surveys | Passive Acoustic Monitoring | DNA Analysis | Camera Trapping | Remote Sensing | Metrics and indices |
|---|---|---|---|---|---|---|
| | The suite of surveys undertaken to support planning. Typically focusing on habitats and protected species | Citizen Science Suitable. The collection of audio data from automated devices that can be left in situ for a period of time. | Citizen Science Suitable. The analysis of DNA from tissue, faeces, fur or environmental samples (water, soil, air) to determine the species or species assemblage present | Citizen Science Suitable. The collection of visual data from automated devices that can be left in situ for a period of time | The use of reflected or emitted radiation (e.g., light) to obtain detailed images of an object or location of interest. e.g. LiDAR | Methods intended to provide consistent and often quantitative assessments of biodiversity |
| Landscape ↑ Scale of Use ↓ Site | Variable cost-effectiveness when upscaling to landscape level application<br>Typically designed to support site-level assessments, e.g., species presence/absence | Noise pollution via soundscape analysis<br>Species diversity via soundscape analysis<br>Species presence via manual or automated analysis | Support habitat condition/quality assessments from environmental samples based on inferences from species diversity/assemblages<br>Species richness from environmental or bulk tissue samples<br>Species presence/identification | Comparison between sites to determine occupancy, density and activity patterns.<br>Assess site wide species richness<br>Assess location specific species richness or investigate a specific habitat feature (e.g., badger sett) | Typically used to support landscape-level assessments, e.g., connectivity, canopy cover, carbon sequestration, habitat mapping.<br>Unlikely to be cost-effective at individual site level | Acoustic indices to assess all (e.g., species richness) or part (e.g. anthropogenic noise) of a soundscape<br>Spatial or temporal comparisons<br>Assess and inform site level habitat management, e.g. using UKHab and Defra Biodiversity Metric |
| Pros | Covers all protected species<br>Widely accepted methods<br>Increasing use of new technologies<br>Accurate results | Can record all vocalising species – typically bats but increasing options (e.g., birds/invertebrates)<br>Automated collection of large datasets<br>Increasingly accurate automated analysis options | Comparatively low cost<br>Covers all taxonomic groups and a range of environmental samples<br>Covers typically underrepresented aspects of biodiversity<br>Reduced number of survey visits | Can record a range of mobile species<br>Automated collection of large data sets<br>Can address a range of monitoring questions<br>Increasingly automated process | Highly detailed datasets<br>Contribute to a range of monitoring questions<br>Reduce survey effort and number of visits<br>Range of application methods for different cost levels | Consistent means of assessment<br>Allows for consistent comparisons – spatial and/or temporal<br>Range of options and applications |
| Cons | Species-specific technical expertise / equipment requirements<br>Resource and time intensive = significant costs<br>May not suit all monitoring questions | GDPR considerations in public spaces<br>Equipment must be left on site – risk of theft/damage<br>Formatting of devices / analysis of data / verification of automated results can be time consuming and requires technical expertise | Technical expertise to interpret results<br>Dependent on comprehensive DNA libraries<br>Cannot assess abundance<br>Potential for contamination | GDPR considerations in public spaces<br>Equipment must be left on site – risk of theft/damage<br>Limited detection range<br>Analysis can be time consuming and require technical expertise to verify identification | Can require expensive equipment and highly specialised skills<br>May not be cost-effective in some circumstances<br>Risk of data gaps/occlusion | Potential to oversimplify<br>May require specialist skills<br>Reliability of some options (e.g. acoustic indices) not widely agreed<br>Reliant on input data quality |




SELECTING THAMESMEAD'S PRIORITY HABITATS AND SPECIES

Table 2: Thamesmead Priority Species

| Species | London BAP | Greenwich BAP | Bexley BAP | Thamesmead BAP | Remarks |
|---|---|---|---|---|---|
| Black poplar | ● | ● | ● | ● | Very rare species requiring special efforts |
| Viper's Bugloss | | | | ● | Typical of biodiverse green roofs and dry grasslands. Will benefit wild bees |
| Stag Beetle | ● | ● | ● | ● | Dead wood for stag beetle will benefit other species |
| Dragonflies | ● | | | ● | Scarce emerald damselfly in 2008 London BAP review. Dragonflies good indicator of wetland health |
| Bumblebees | | | | ● | Selected as a flagship group to benefit all pollinators |
| European eel | ● | | | ● | Culturally important and threatened. Thames21 projects underway |
| Tench | | | | ● | Suggested by anglers. Will require appropriate lake management |
| Reptiles | ● | | | ● | Group benefits from more sunny, rough vegetation |
| House sparrow | ● | | | ● | A focus for Built Environment improvements |

# 关键信息总结
## key Points

### 调查评估与监测/Survey, Assessment, and Monitoring

- 建议有条件的城市开展城市生物多样性本底调查、评估与监测；
- Conduct baseline surveys and assessments of urban biodiversity.

### 数据收集与管理/Data Collection and management

- 建议城市构建其城市的生物多样性数据库与信息平台，有助于生物多样性的长期监测与保护实施效果评估；
- Build a biodiversity database and platform to support long-term monitoring and evaluation.

### 行动计划编制与实施/LBSAP Compiling and Implementation

- 建议城市在国家与省级生物多样性战略与行动计划的指导下，根据城市自身情况与保护要求，开展城市层面的生物多样性战略与行动计划、生物多样性保护规划；
- Develop city-level biodiversity strategies and action plans based on local needs.

### 交流分享与国际合作/Multilevel and multi-stakeholder engaged Collaboration and Cooperation

- 构建交流合作平台，开展多层级的、国内外城市间的合作交流，构建多层级的、多利益相关方参与的城市生物多样性伙伴关系。
- Establish platforms to foster multi-level and multi-stakeholder partnerships for urban biodiversity.

# 《生物多样性公约》COP 15与城市相关内容

## Related Cities and Regions context in CBD

### 城市和次国家政府如何支持“全球生物多样性框架”的实施工作?
### How cities & subnational governments can support GBF implementation?

- 使生物多样性和生态系统恢复方面的**优先事项和行动**与《国家生物多样性战略和行动计划》**保持一致**
- 优先考虑和**实施有助于实现“全球生物多样性框架”目标**（例如2、3、7、11、12和14）的**项目**、计划及措施
- 将**生物多样性**考量因素**纳入土地利用和空间规划以及基础设施交付**（生态基础设施）**决策**的**主流**
- 运用**基于自然的解决方案和基于生态系统的方法**，以应对城市挑战
- **与各国政府合作**，制定实施《行动纲领》的行动计划，并鼓励其确定、强化和传播政策工具、指导方针、财政机制或工具，以及促进地方生物多样性行动及城市和次国家政府能力建设的计划

- **Align priorities & actions** on biodiversity & ecosystem restoration with National Biodiversity Strategy & Action Plans
- Prioritise & **implement projects**, programmes & measures that **contribute to GBF targets**: eg 2, 3, 7, 11, 12 & 14
- **Mainstream biodiversity** considerations into **land use & spatial plans and decisions on infrastructure delivery** (ecological infrastructure)
- Apply **Nature-based solutions & ecosystem-based approaches** to address urban challenges
- **Collaborate with national governments** to develop action plans to implement that POA, & encourage them to identify, enhance and disseminate policy tools, guidelines, financial mechanisms or instruments, & programmes that will facilitate local action on biodiversity & build capacity of cities & subnational governments

# “自然城市”倡议/平台

## CitiesWithNature

CitiesWithNature
citieswithnature.org

ICLEI 宜可城—地方可持续发展协会 东亚秘书处

由宜可城与多个合作伙伴共同推进的全球倡议，旨在提升自然在各地城市和周围地区的价值。倡议所提供的线上交流互动平台，使城市及其合作伙伴能在共同的承诺下，齐力迈向更可持续的城市未来。

A partnership initiative led by ICLEI and various global partners that recognizes and enhances **the value of nature in and around cities** across the world. It provides an online platform for cities and their partners to engage and connect, working with shared commitment towards a more sustainable urban world.


**全球地方生物多样性保护知识分享平台**
**Engagement Platform**

汇集各类工具包、技术资料和资源库;
为各利益相关方分享有关城市与自然的故事、图片、影音资料

- 昆明 Kunming
- 成都 Chengdu
- 湖州 Huzhou
- 深圳 Shenzhen
- 嘉兴 Jiaxing

主要合作伙伴
**Key Partners**

其他伙伴
**Supporting Partners**

IUCN · The Nature Conservancy · UN environment programme · Cities4Forests · European Committee of the Regions · WWF · GoLS · 等等 and more

**联合国《生物多样性公约》秘书处**已将“自然城市平台”认定为各级地方政府报告其对2020年后全球生物多样性框架的承诺和雄心的**正式渠道**。

CitiesWithNature has been recognized by the Secretariat of CBD as the **official vehicle for local and subnational governments to report their commitments and ambitions for the post-2020 global biodiversity framework**.

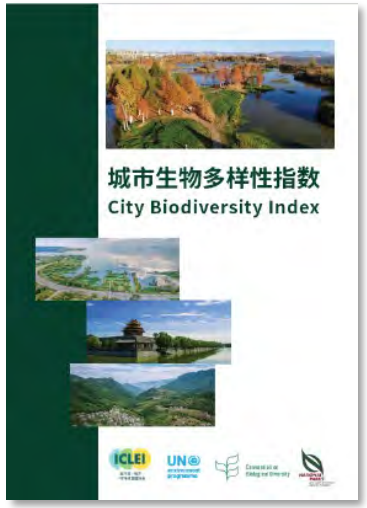
“城市与自然行动平台”有助于对承诺进行分析。这包括帮助城市**设定自己的目标、跟踪进展情况**以及与国内和国外其他城市比较行动。该平台还支持城市收集有关其对各自国家活动贡献的信息。

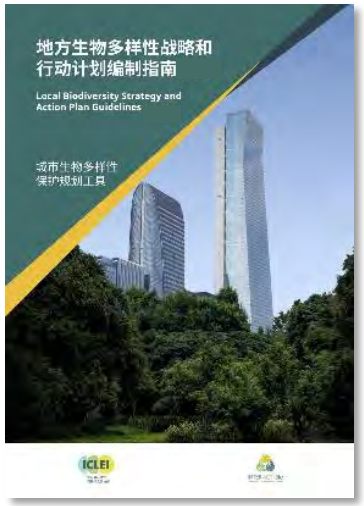
The CitiesWithNature Action Platform facilitates the profiling of commitments. This includes helping cities to set their own targets, **track progress and compare actions with other cities,** both nationally and globally. The platform also supports cities in gathering information on their contribution to their respective countries’ national activities.

# 城市生物多样性网络
## Urban Biodiversity Network

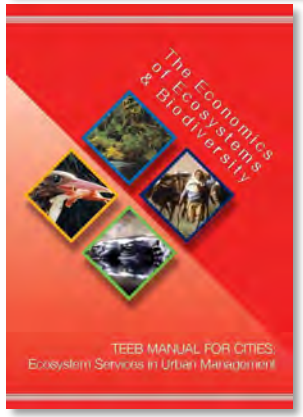
宜可城—地方可持续发展协会 东亚秘书处

### 城市生物多样性工具包







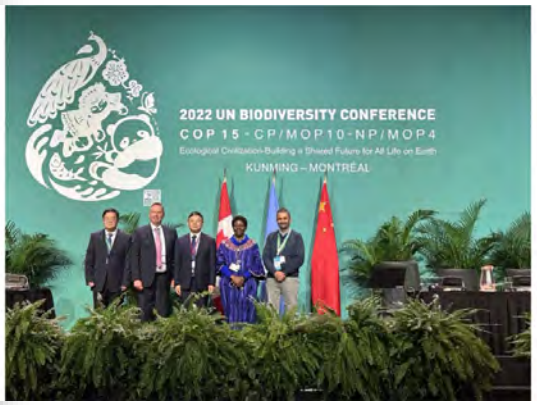

TEEB: Manual For Cities
生态系统与生物多样性经济学(TEEB):城市手册


ecoBudget Guide
自然预算指南


Local Action for Biodiversity Guidebook
生物多样性地方行动指南


将自然主流化:改善生物多样性和生态系统服务的地方整合规划工具包

### 全球城市网络与国际共享交流平台





**COP15 7th 城市峰会及中国日，加拿大蒙特利尔**
**COP15 City Summit and China Day, Montreal, Canada**

- 组织了**12个**中国地方政府和城市参与峰会和“中国日”活动Brought 12 Chinese local governments participated in the CBD COP event

**国际城市生物多样性论坛, 中国昆明**
**Urban Biodiversity International Forum, Kunming, China**

- 包括**全球二十余个地方政府代表**在内的200余人线下参会
- more than 200 on site participants including 20 over local governments domestic and oversea

宜可城—地方
可持续发展协会
东亚秘书处

# 感谢您的聆听

## Thank You for Your Attention

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