Investing in Nature
投资自然

IWRA Conference, Beijing, September 2023

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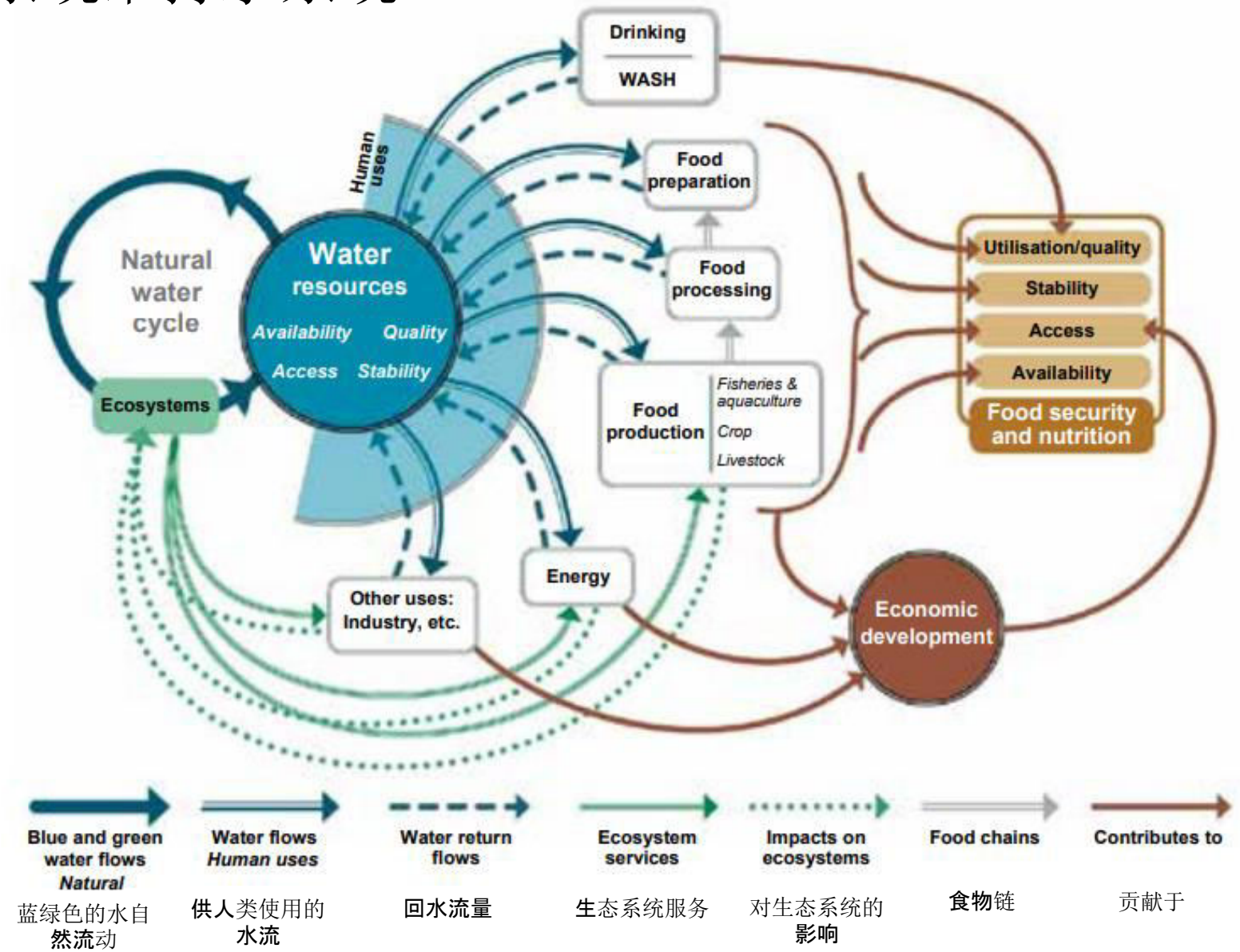
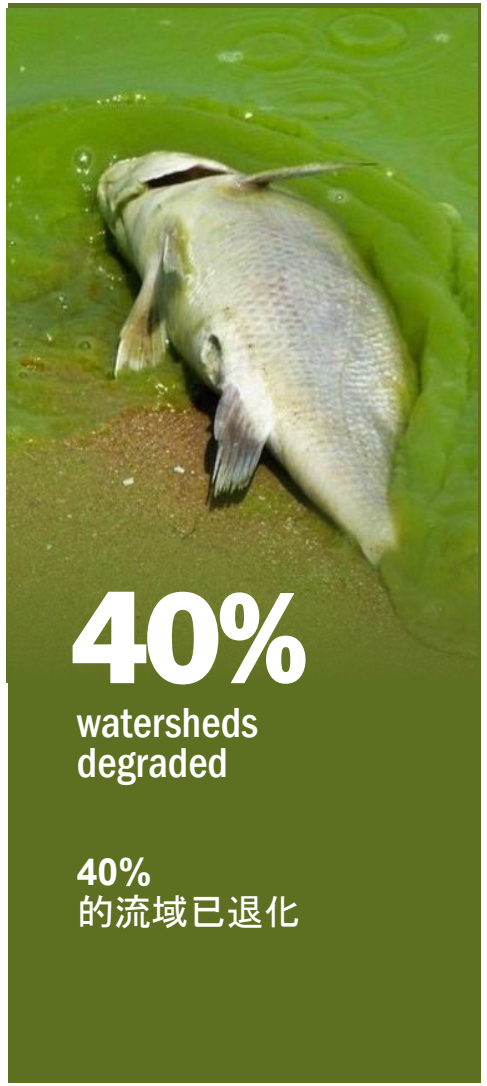
Ecological Systems Sustain Water Systems
生态系统维持水系统



Source: The What, How and Why of the World Water Crisis, 2023, Global Commission on the Economics of Water



40%

watersheds degraded

40%
的流域已退化

37%

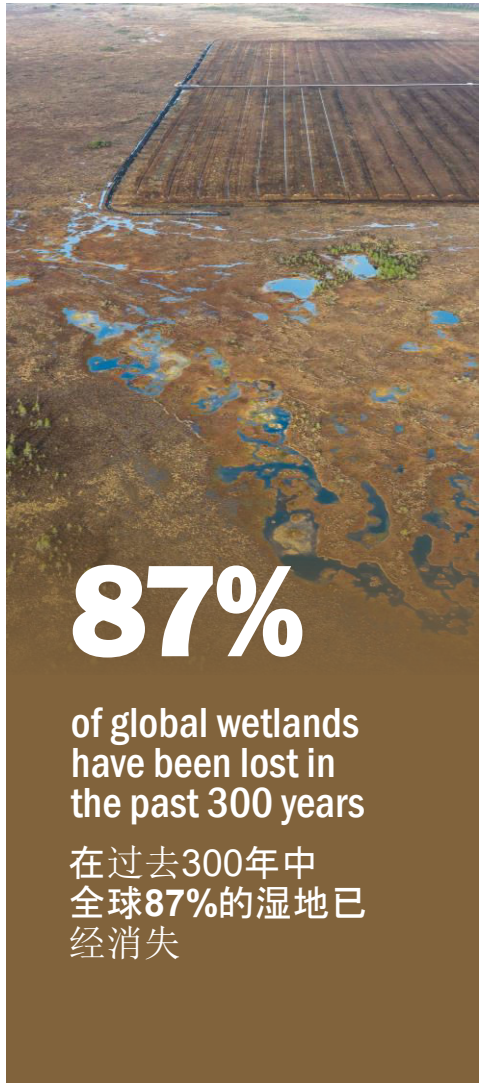
of rivers remain free-flowing

37%
的河流自由流淌

32%

of watersheds suffer severe water shortages

32%
的流域严重缺水



87%

of global wetlands have been lost in the past 300 years

在过去300年中
全球87%的湿地已
经消失

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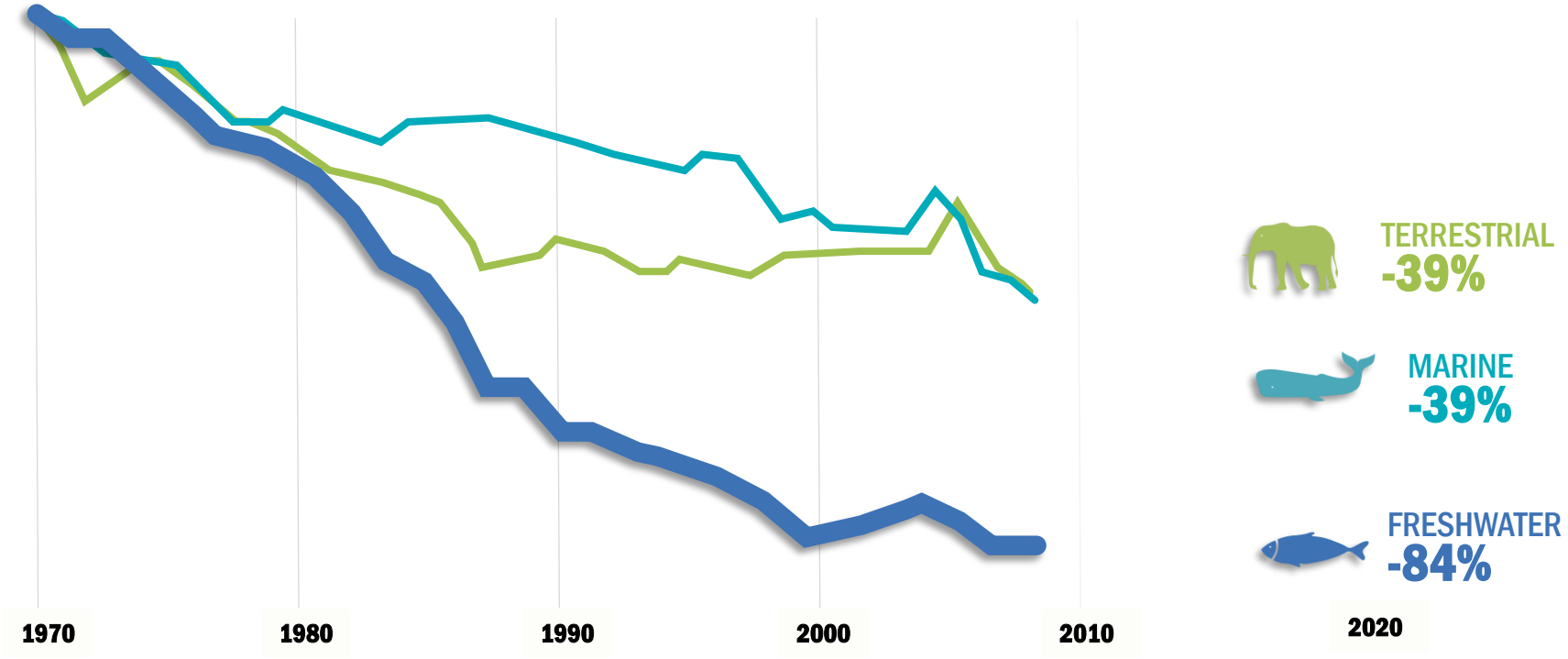
Freshwater Biodiversity Population Decline is Greater than other Biomes
淡水生物多样性种群下降幅度大于其他生物



Source: WWF, Living Planet Index – D, 2014

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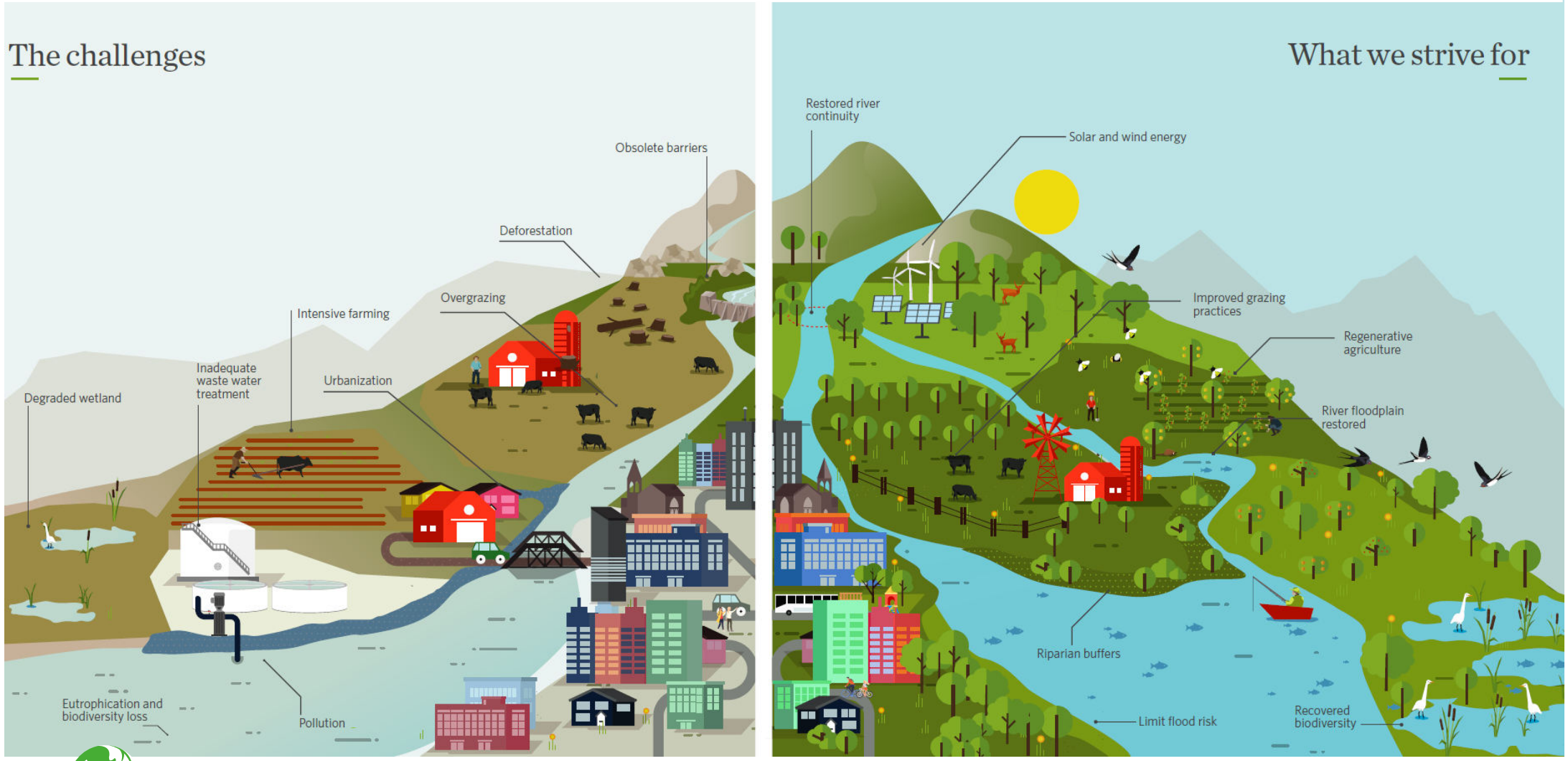
We envision that water systems can be managed to be regenerative and restorative to nature
我们设想可以对水系统进行管理，使其再生并恢复自然



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Examples of nature-based solutions (NBS)
基于自然的水质解决方案（NBS）示例

Agricultural best practices
农业最佳实践

Forest and grassland protection and management
森林与草地的保护与管理

River and riparian corridor protection and management
河流和河岸走廊的保护和管理

Protection and restoration of wetlands
保护和恢复湿地

Urban green infrastructure and storm water management
城市绿色基础设施和雨水管理

State of knowledge regarding the efficacy of NBS
关于NBS效用的知识状况

WATER SECURITY CHALLENGE	WATER AVAILABILITY		DISASTER RISK	WATER QUALITY		Potential for multiple co-benefits
Ecosystem benefit	Dry season flows	Groundwater recharge	Flood risk	Erosion & sediment	Nutrients & pollutants	
Protection						
1 *Targeted habitat protection*	✓	✓	✓✓	✓✓	✓	
Restoration						
2 *Revegetation*	✓	✓	✓✓	✓✓	✓	
3 *Riparian restoration*	✓	✓	✓	✓✓	✓✓	
4 *Wetlands restoration*	✓	✓	✓✓	✓	✓✓	
5 *Floodplain restoration*	✓	✓	✓✓	✓✓	✓	
Management						
6 *Agricultural BMPs*		✓		✓✓	✓✓	
7 *Ranching BMPs*	✓	✓		✓	✓	
8 *Forestry BMPs*	✓			✓	✓	
9 *Fire Management*			✓✓	✓✓	✓	
Created Habitats						
10 *Artificial wetlands*	✓	✓	✓	✓	✓✓	
11 *Sustainable Urban Drainage Systems (SuDS)*	✓✓	✓	✓✓	✓	✓✓	

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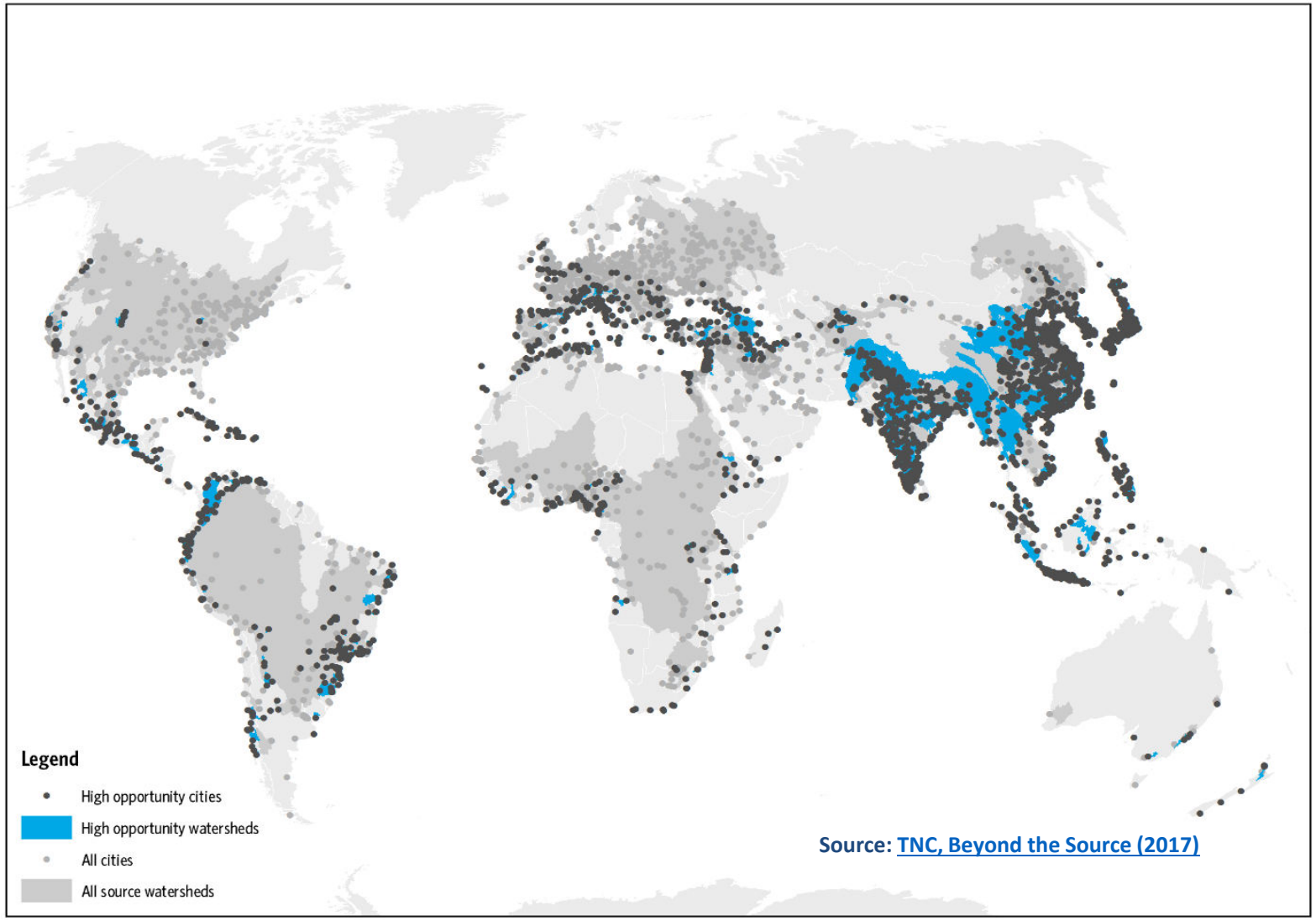
LEGEND	LOW	MEDIUM	HIGH
Magnitude of water security benefit			
Depth of evidence		✓	✓✓
Potential for multiple co-benefits			

Source: [TNC/AFD How to Guide]

NBS to improve water quality: a global opportunity
NBS改善水质：全球机遇

- **1000 cities** could generate a positive ROI
  1000个城市可以产生正投资回报率
- Half of all cities for **less than $2/person/year**
  一半城市的人均年收入低于2美元



Source: TNC, Beyond the Source (2017)

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Challenges 挑战

- Lack of clarity regarding costs and benefits of NBS relative to other investments
  与其他投资相比，NBS的成本和收益不明确
- Lack of ability to work beyond jurisdictional boundaries, or to create collective action
  缺乏超越管辖范围开展工作或采取集体行动的能力
- Lack of data and evidence of impact
  缺乏影响的数据和证据
- Lack of enabling policies or at least, the absence of policy barriers
  缺乏扶持政策，或者至少没有政策障碍

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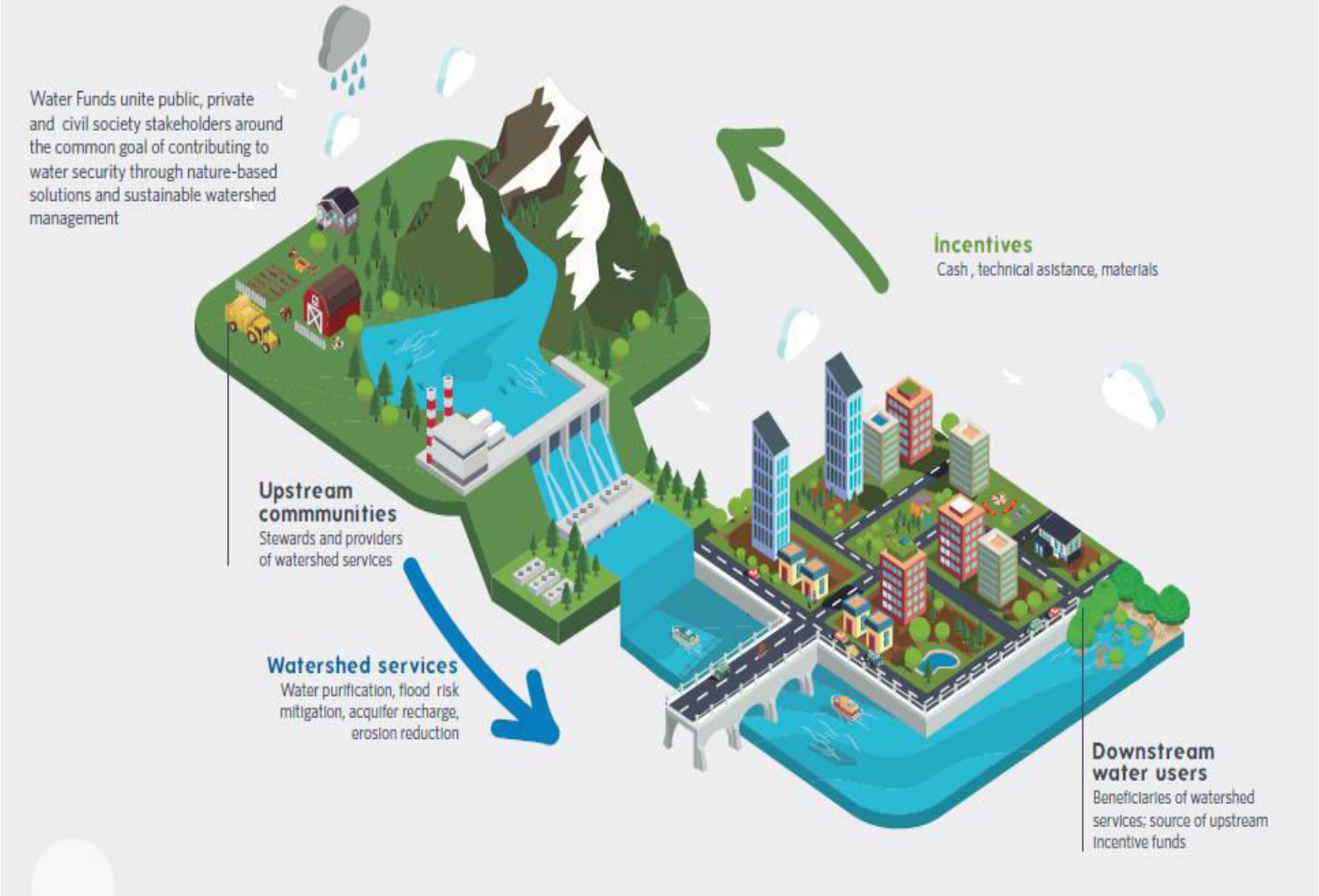
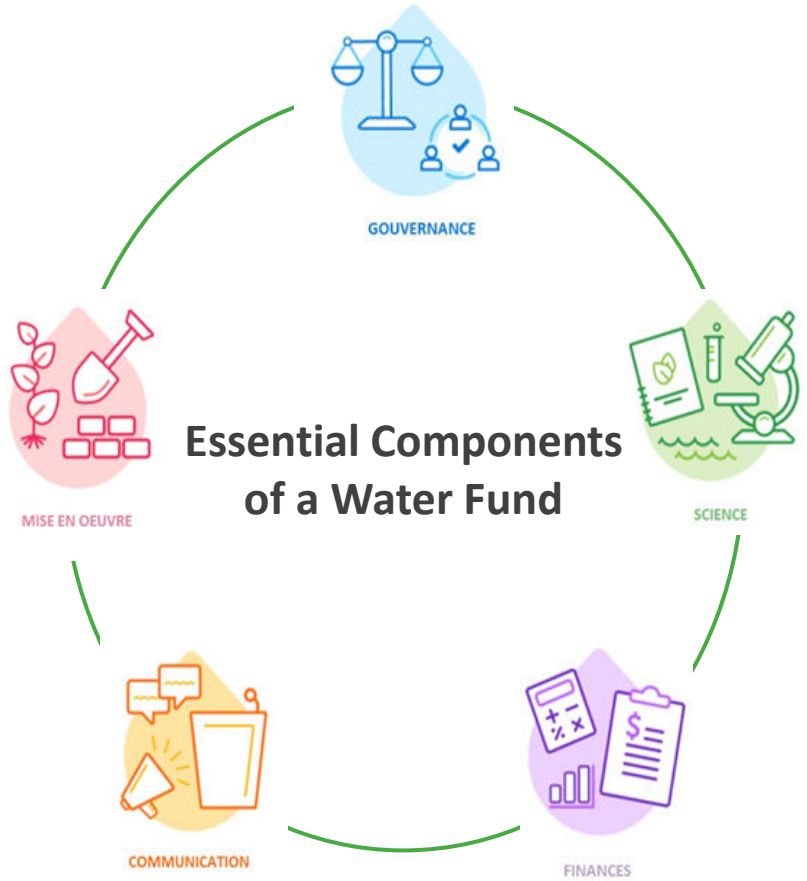
Source: TNC/AFD How to Guide

Water Funds are location specific mechanisms to deliver Nature-based Solutions





Cape Town | Unique Biodiversity is Threatened by Alien Plant Invasions
开普敦 | 独特的生物多样性受到外来植物入侵的威胁

Cape Town | 55 Billion Liters of Water a Year is Lost to Alien Plant Invasion
开普敦 | 外来植物入侵导致每年损失550亿升水

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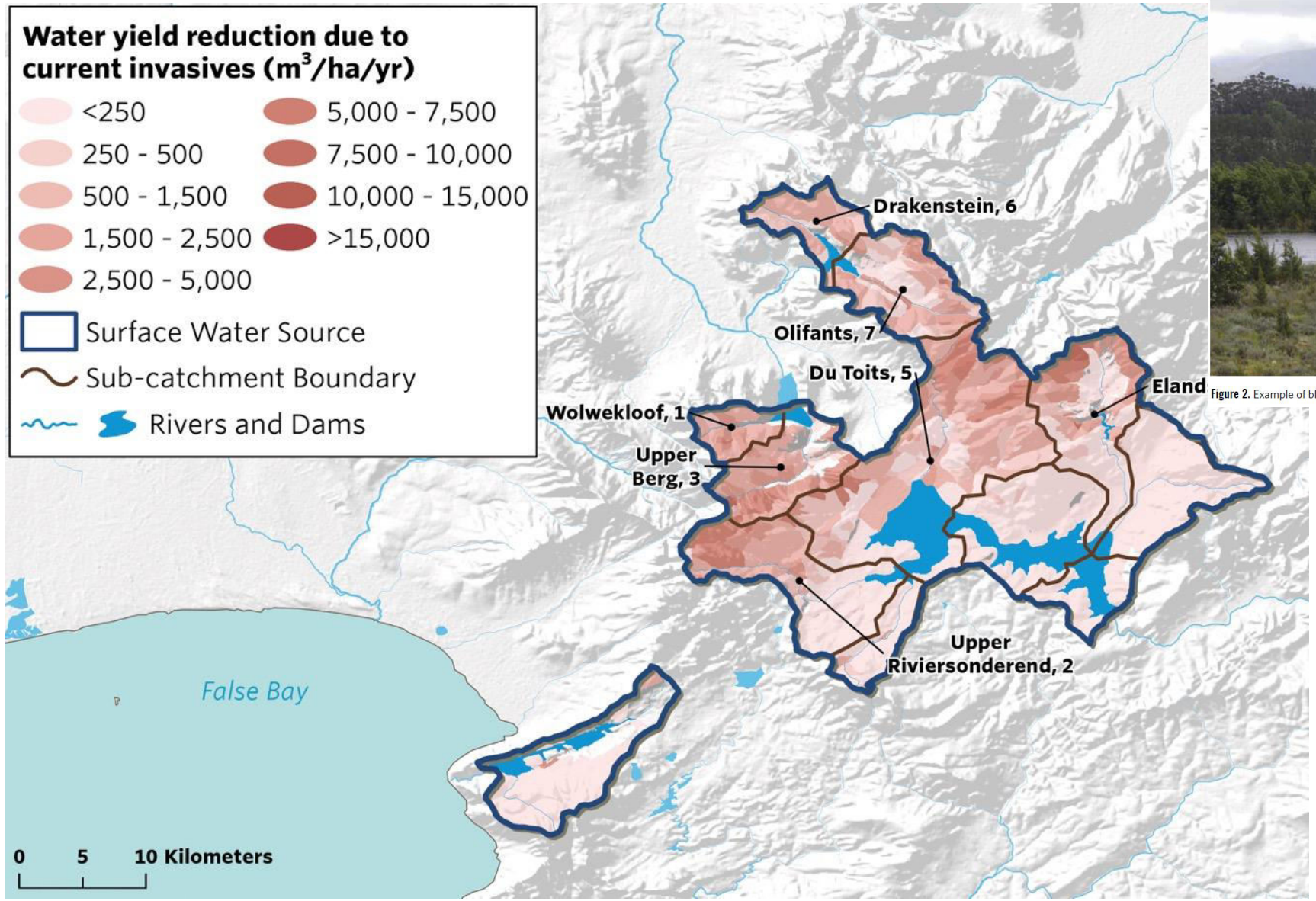

Figure 2. Example of black wattle tree invasion by Theewaterskloof dam.

Two-Thirds of Sub-Catchments are Invaded by Alien Plants

Cape Town | Catchment Restoration Supplies Water at One-Tenth the Cost
开普敦 | 恢复集水区，并以十分之一的成本供水

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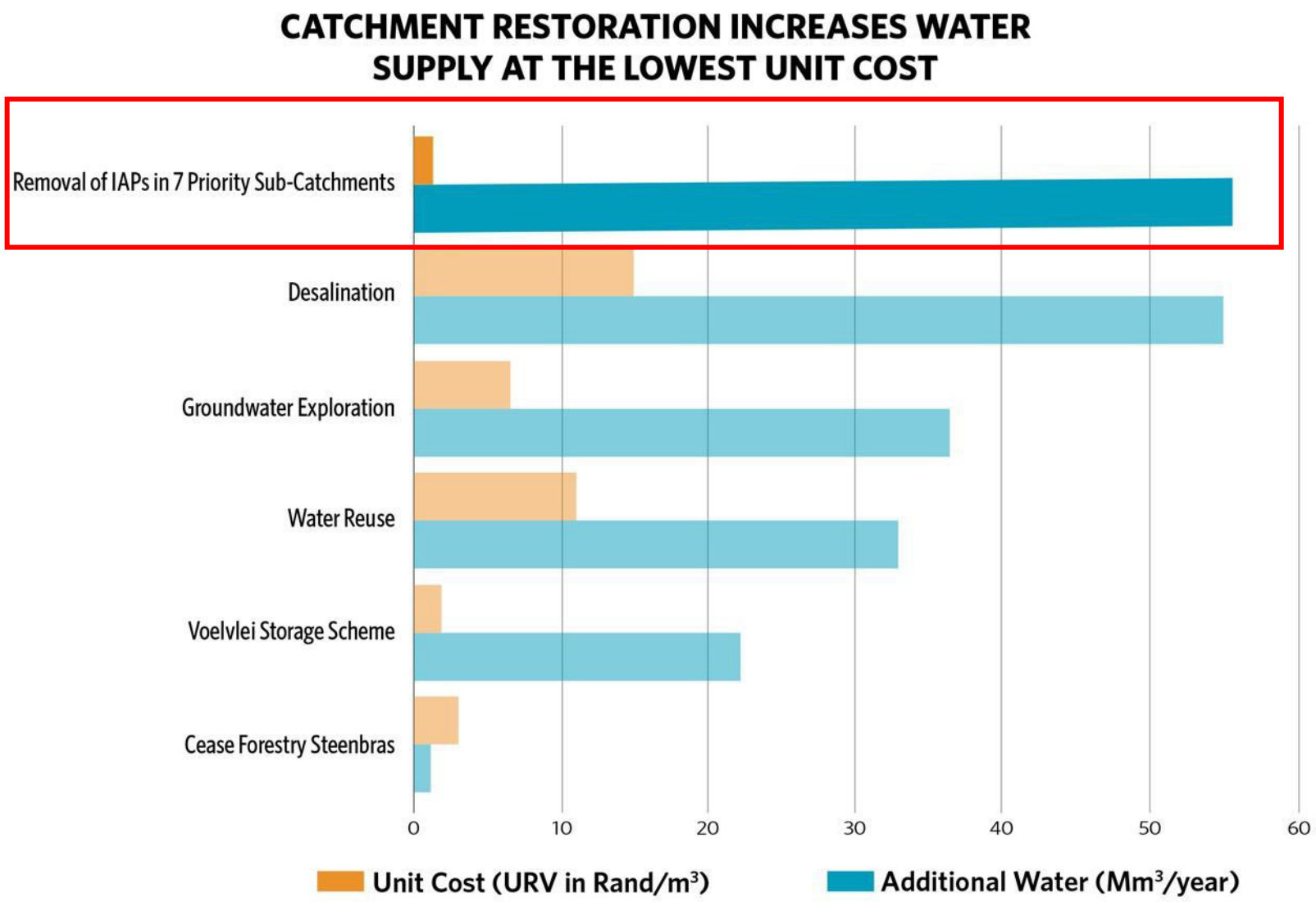

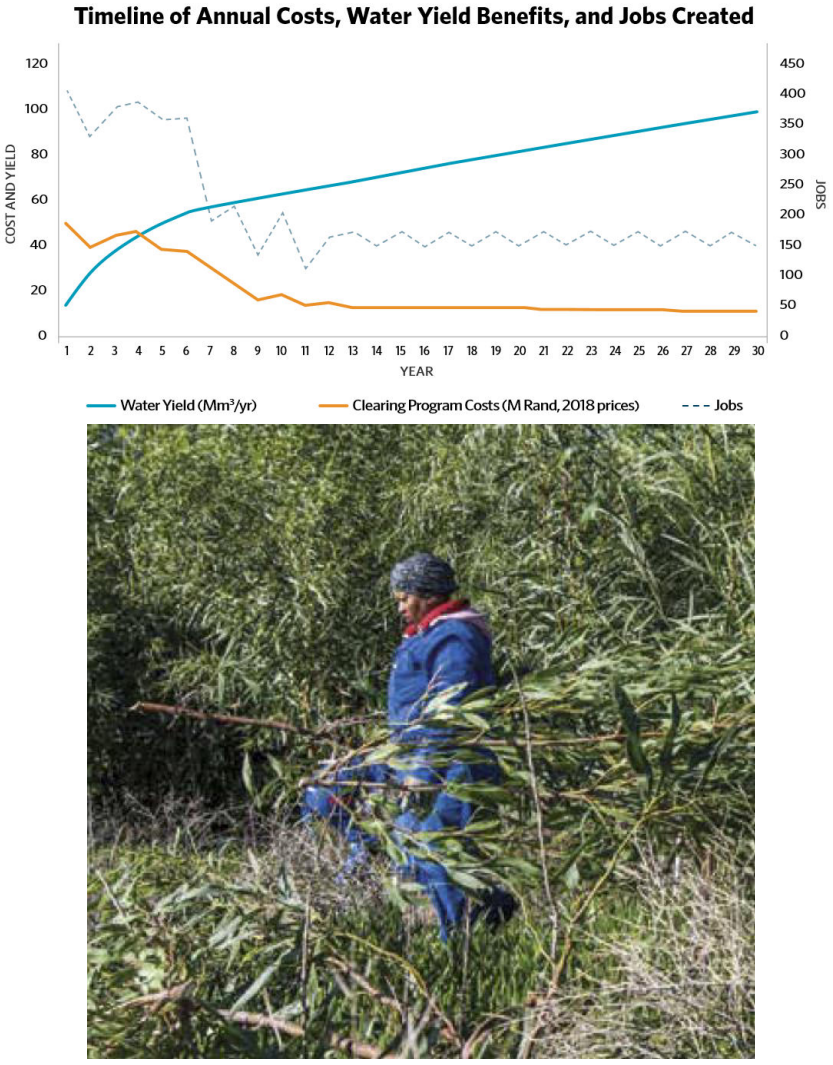

Qiandao Lake| Regenerative Practices to Maintain Balance

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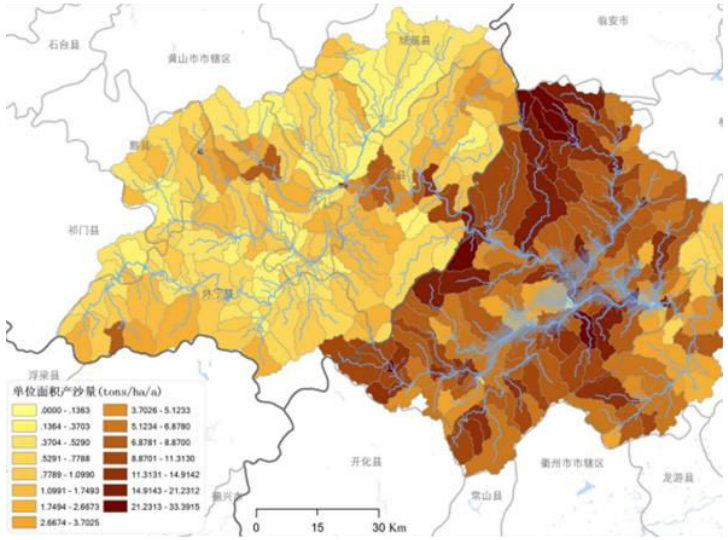
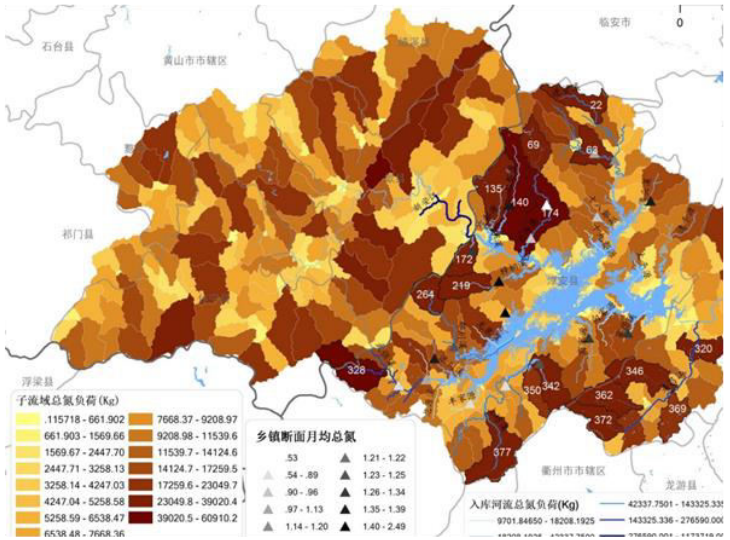
Zhejiang Qiandao Lake (China): Nonpoint source pollution threatens water source quality
浙江千岛湖：面源污染威胁水源质量

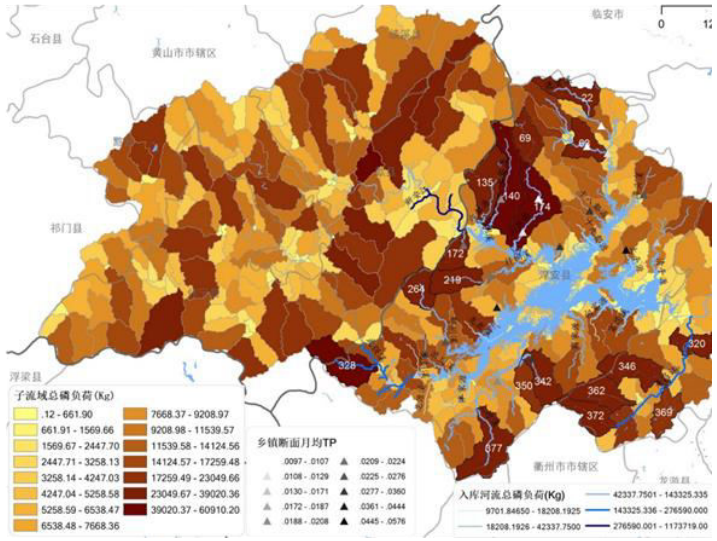
Qiandao Lake Sub-basin sediment yield in unit area



Qiandao Lake Sub-basin Nitrogen load



Qiandao Lake Sub-basin Phosphorus load



Watershed Analysis conducted by the World Bank and TNC
由世界银行和TNC进行的流域分析

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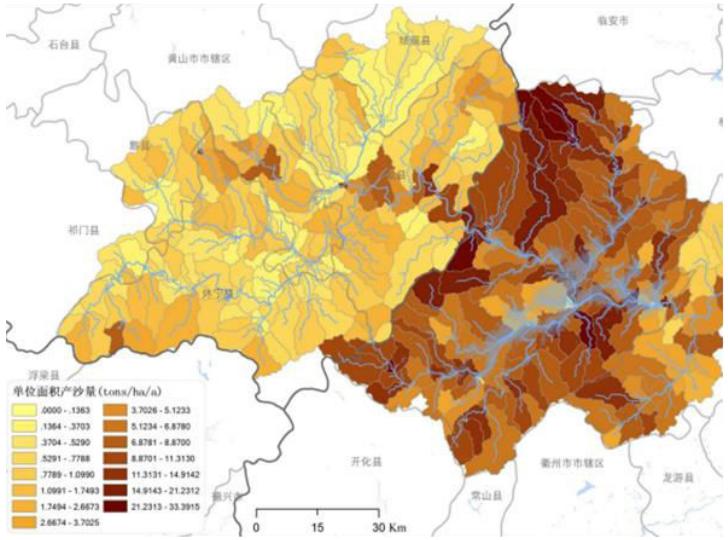
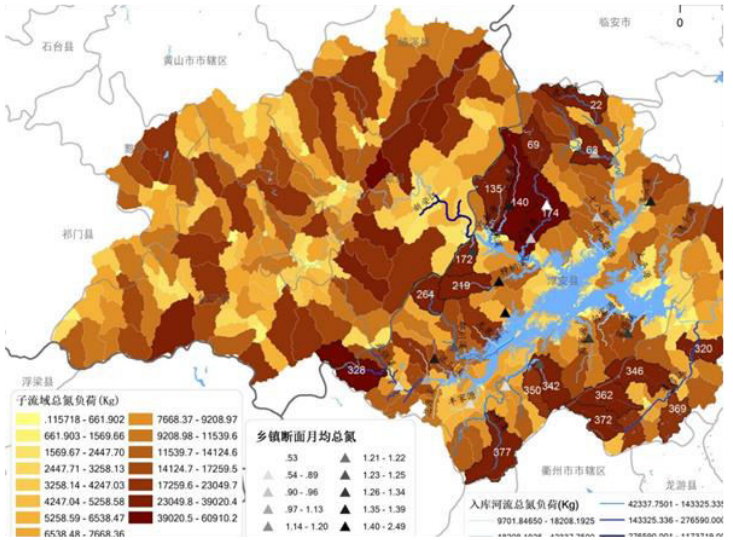
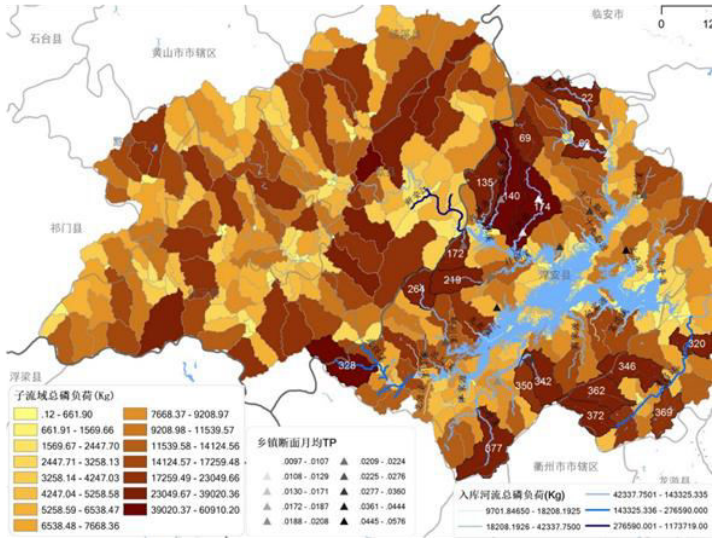


Qiandao Lake Sub-basin Nitrogen load



Qiandao Lake Sub-basin Phosphorus load



Example: (Citrus) Orchard

1. Hedgerows (vetiver)
2. Hedgerows (broadleaf paspalum)
3. Abandoned cell
4. Blank control
5. Groundcover (Astragalus sinicus + Medicago falcata)
6. Groundcover (Lolium multiflorum L.+ Medicago falcata)
7. Groundcover (Lolium multiflorum L. + Vicia villosa Roth var.)
8. No fertilization
9. Groundcover(Astragalus sinicus) + Hedgegrows (vetiver)
10. conditioner

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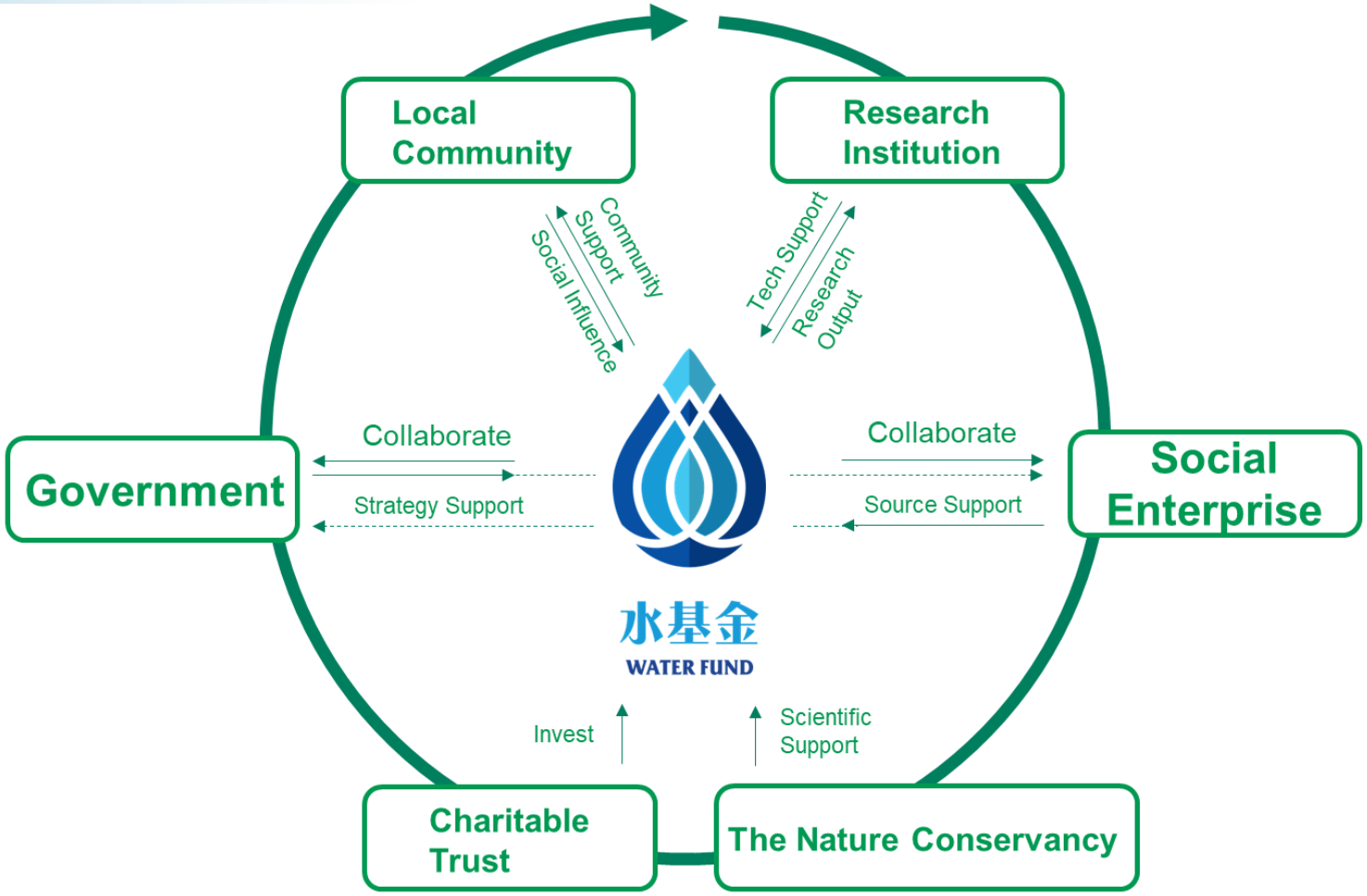
Qiandao Lake Water Fund | Shared purpose, multiple parties
千岛湖水基金 | 多方参与，为同一个目标努力

- **Collaborative Participation**
- **Share Profit**
- **Benefit Environment**



- 协作参与
- **共同受益**
- **造福环境**

Urban storm water management using NBS

Ecosystem services

- Flood management/ flood risk reduction (sewer flooding)
- Water quality
- Community well-being

Beneficiaries

- Water and sewerage utilities
- Cities and public authorities
- Insurance and reinsurance companies
- Local communities

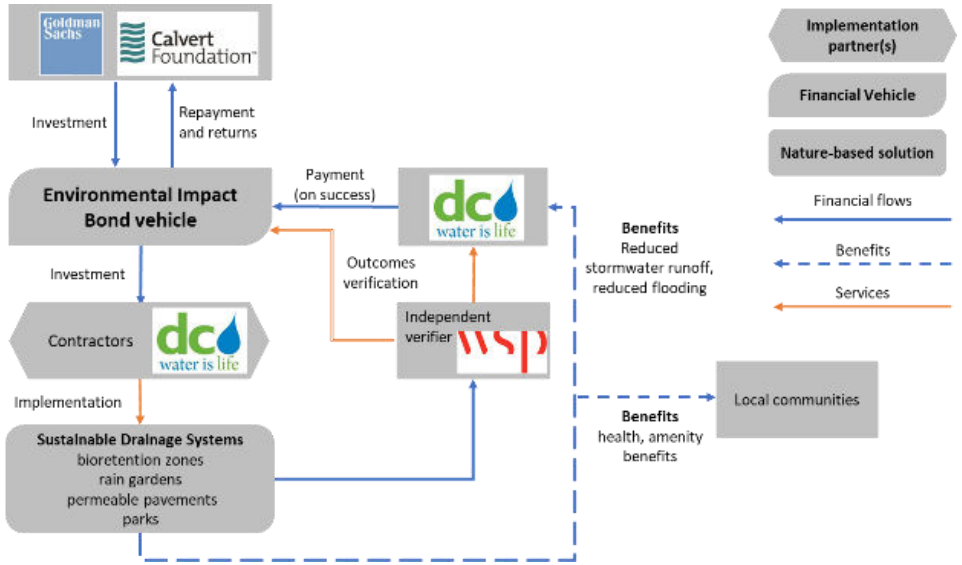
Revenue streams & potential funding/financing solutions

- Network management cost savings
- Regulatory incentives
- PES to land owners
- Environmental impact bonds

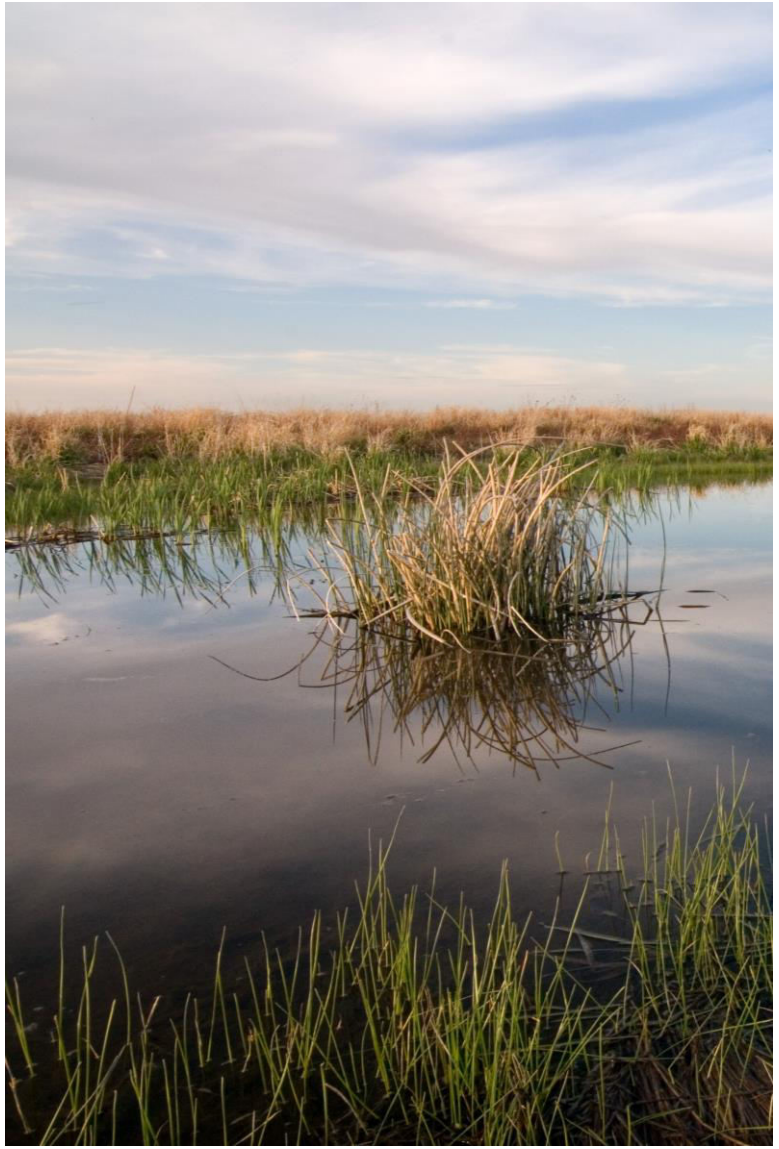
Case study: DC Water Environmental Bond

1st **Environmental Impact Bond** issued by DC water to fund a series of SuDS in Washington DC, complementing grey infrastructure to **address flooding and quality issues from combined sewer overflows**

25MUSD, 5-year bond with risk sharing scheme indexed on performance outcomes ranging from 0.5% (low performance) to 6.3% (high) with base scenario at 3.43%



Wetland Restoration and Mitigation Banking



Main ecosystem services

- Water quality & supply
- Flood risk reduction
- Biodiversity
- Carbon sequestration
- Recreation

Beneficiaries

- Water and sewerage utilities
- Public Authorities
- Water dependent companies

Revenue streams & potential funding/financing solutions

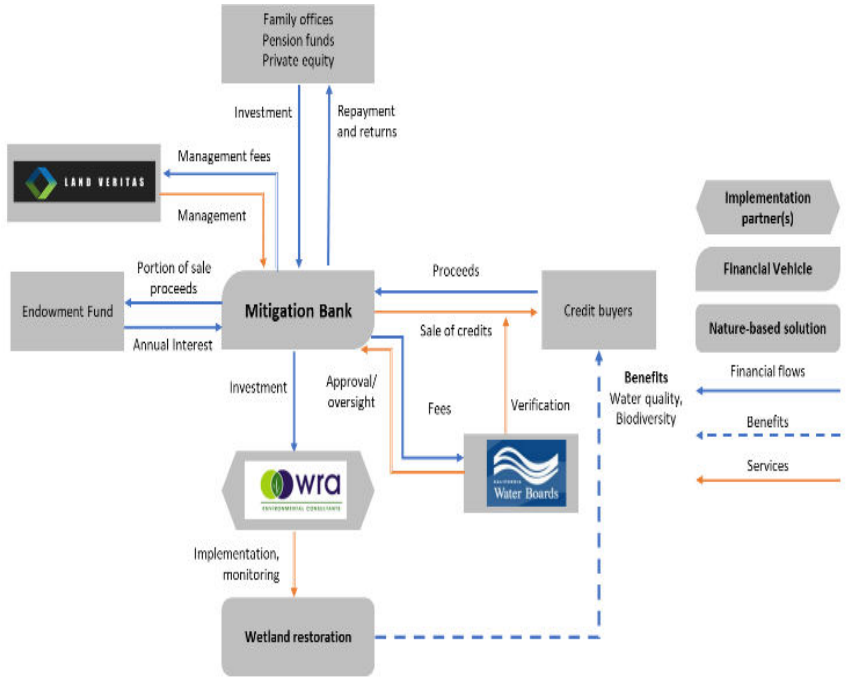
- Cost savings for water treatment
- PES: mitigation credits
- Water company balance sheet

Case study: Petersen Ranch Mitigation Bank

Largest wetland mitigation bank in California and one of the largest in the USA (1,714 hectares)

Specific regulatory framework in the USA: requirement for project developers to **mitigate and compensate any unavoidable environmental impacts by purchasing credits issued by approved mitigation banks**

20MUSD invested in land purchase and restoration of wetlands repaid from sale of mitigation credits



Thank you

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