Deltares
Enabling Delta Life

弹性城市设计的合作方式
Collaborative approach for the design of resilient cities

适应辅助工具
ADAPTATION SUPPORT TOOL

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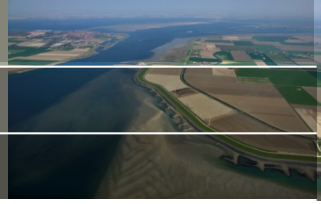
适应的背景情况 Context for Adaptation



气候变化 Climate change:

- 降雨强度增大 Increase rainfall intensity
- 气温增高 Increase in temperature
- 海平面升高 Sea level rise
- （干旱增多）(Increase in drought)

人口持续增长和都市化进程
Continuous population growth and urbanization

- 土地使用的改变导致 Land use change leading to
  - 渗透减少和径流增加
    Reduced infiltration and increased runoff
  - 城市热岛效应增加
    Increased urban heat island effect
- 需水量增大 Increased water demand
- 三角洲城市土地下沉 Land subsidence in delta cities

为当前或过去形势而设计的城市 => 翻新
Cities designed for current or past conditions => retrofitting

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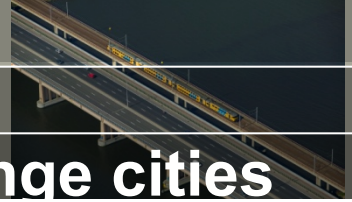
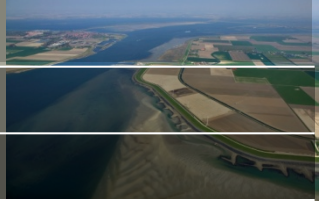
城市自然为本的解决方法 – 海绵城市
Urban Nature based solutions – Sponge cities





城市自然为本的解决方法是指在处理社会问题时对自然可持续的管理和使用

Urban Nature-based solutions (NBS) refers to the sustainable management and use of nature (e.g. Green Infrastructure) for tackling societal challenges.

- 有效的气候适应 Effective in climate adaptation
- 额外的利益 Additional benefits
- 为绿色添加功能 Adding function to green

实践中涉及**软件和硬件工程解决方法**

In practice both **soft and hard engineering solutions**.

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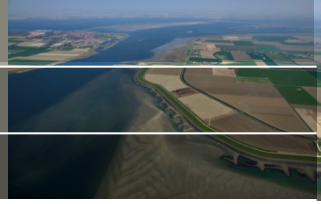
气候适应 – 利益相关者管理
Climate adaptation – Stakeholder engagement



最大化 Minimizing:

- 洪水 Flooding
- 热应力 Heat stress
- 干旱 Drought

最大化 Maximizing:

- 居住性 / 城市重建
  Livability / urban regeneration
- 健康潜能 Health potential
- 可持续的经济发展 Sustainable economic development

在现行城市中气候适应包含了很多利益相关者：
In existing cities climate adaptation involves many stakeholders:

例如：城市规划者，污水排水部门，道路部门，景观设计者，项目开发者，房产企业，等等
E.g. urban planners, drainage departments, road department, landscape designers, project developers, housing corporations, etc.

共同创造是利益相关者管理的一部分
Co-creation as part of stakeholder engagement

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适应辅助工具 Adaptation Support Tool (AST)

适应辅助工具 The Adaptation Support Tool:

协助利益相关者（ 城市规划者，污水排水部门，自治市，观设计者，项目开发者，房产企业，等等）

Assist stakeholders (urban planners, drainage departments, municipalities, landscape designers, project developers, housing corporations, etc.)

在**做决策**过程中 in the process of **decision making** and

提供**一个协作规划过程**使城市更有弹性

enabling **a collaborative design process** towards more resilient cities.

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适应辅助工具应用 新奥尔良市
AST application New Orleans

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适应辅助工具在适应过程中
AST in the adaptation process

问题分析
Problem analysis
- 揭露 Exposure
- 风险 Risk
- 水力，热应力模型 等等

Hydraulic, Heat stress model, …

探索适应选项
Exploring adaptation options

- 适应辅助工具 AST

详细的适应测量的效果分析
Detailed effect analysis of adaptation measures
水力，热应力模型等等
- Hydraulic, Heatstress model, …

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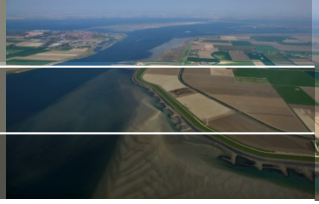
适应辅助工具 2.0 - 用户界面
AST 2.0 - User interface

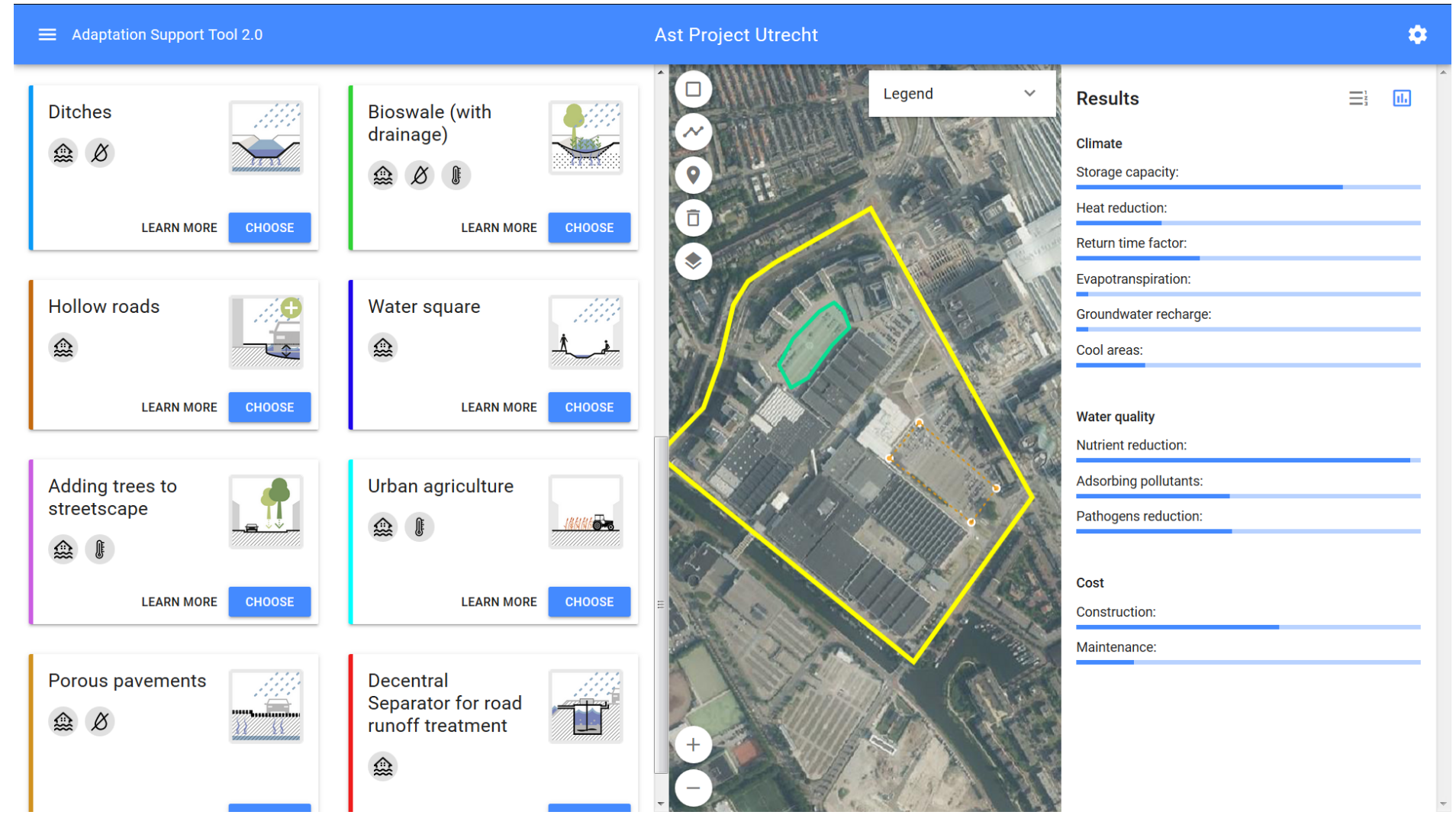


应用测量
Applied measures

地图窗口 Map window

关键业绩指标
Key performance indicators

适应辅助工具 2.0 – 用户界面
AST 2.0 - User interface



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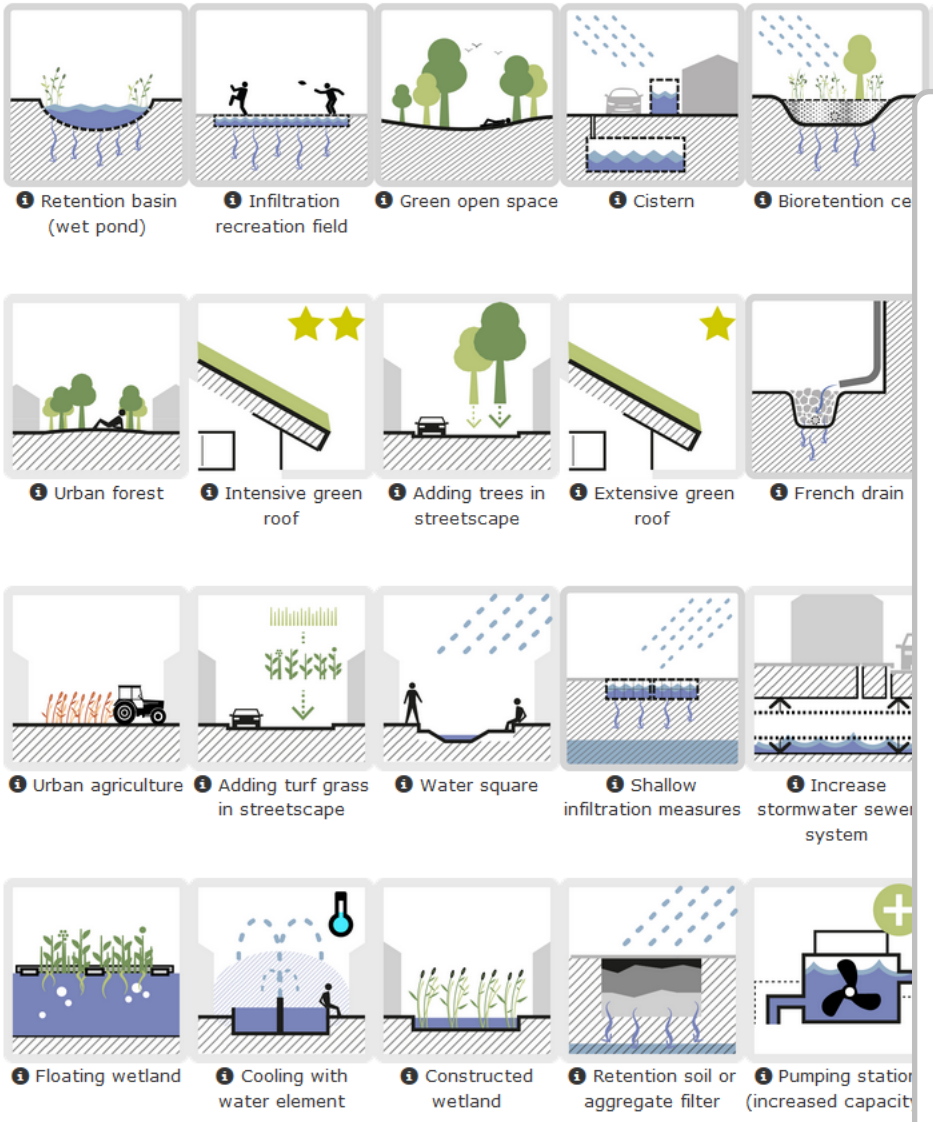
适应辅助工具 2.0 - 70种适应测量方法
AST 2.0 - 70 Adaptation measures



Bioswale (with drainage)

Pluvial flooding | Drought | Heatstress

A bioswale is a ditch with vegetation, a porous bottom and below that a layer of gravel, packed in geotextile with an infiltration pipe/drainpipe. It allows rainwater storage, infiltration and transport while helping to enhance biodiversity and quality of life.

For more information click here

适应辅助工具 – 会议
AST - Sessions

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乌得勒支中心 – 展示区 – 适应辅助工具 2015
Utrecht Center – Fair area - AST 2015

利益相关者：自治市 + 展览会
Stakeholders: Municipality + Fair

志向：最绿色、气候弹性和健康的城市区域
Ambition: Most green, climate resilient and healthy urban area

适应辅助工具曾被用来合作探索潜在的适应测量方法
AST used to collaboratively explore potential adaptation measures

资金：乌得勒支市，展览会，欧盟
Funding: City of Utrecht, Fair, EU

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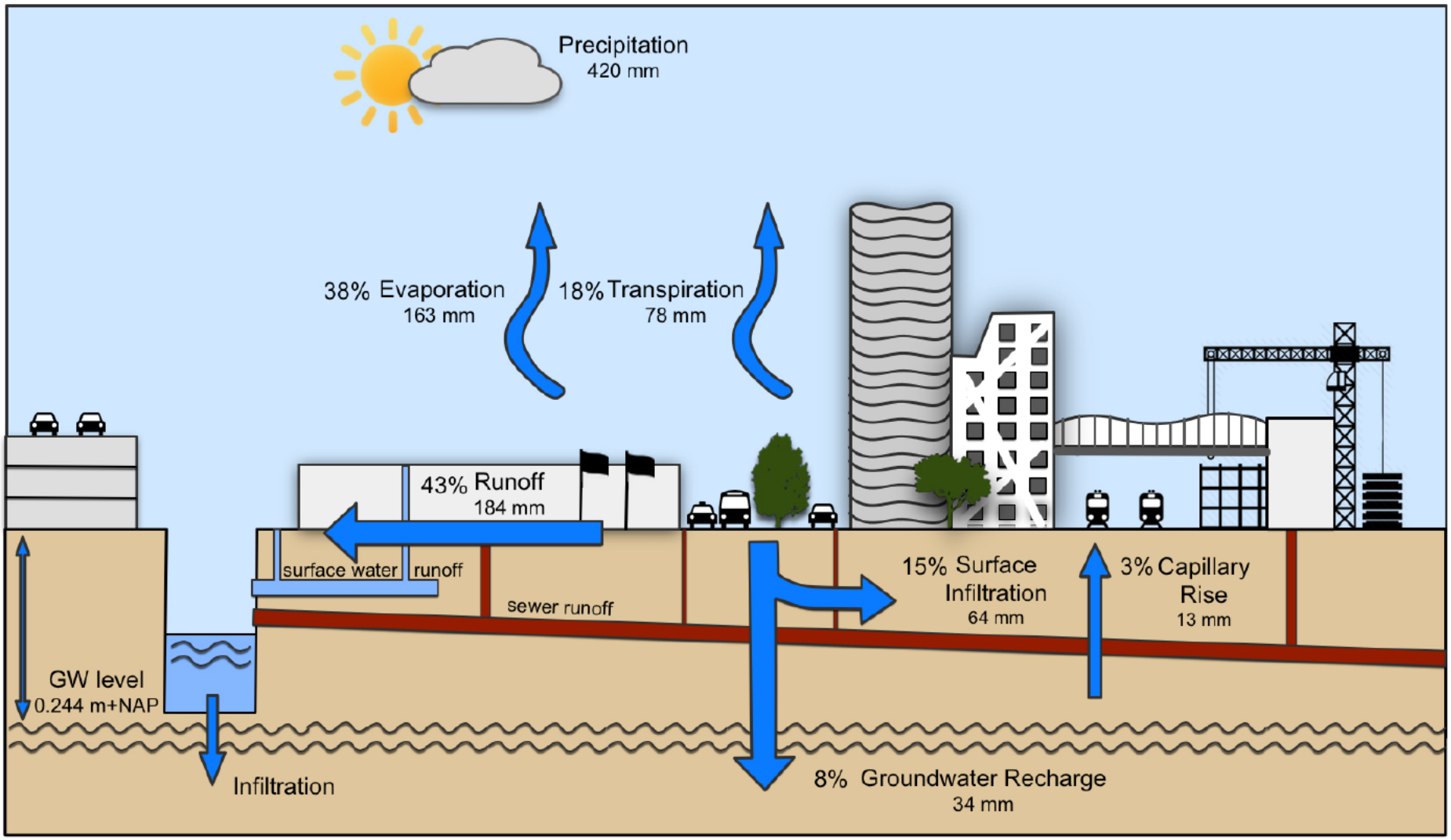
通过改变水流来增加弹性
Change the water flow to increase resilience



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适应辅助工具2018投放使用
AST to implementation 2018

Source: http://cu2030.nl

Source: www.stefanoboeriarchitetti.net

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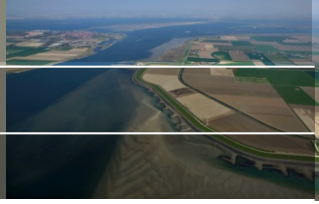
用适应辅助工具进行合作规划 – 经验
Collaborative planning with AST - Experience

优势 Advantages:

- 共同创造很有效
  Co-creation really works
- 设计规划得到了利益相关者的支持
  Designs that are supported by the stakeholders
- 不同的利益相关者的立场得以明确
  Positions of the different stakeholders can become very clear
- 解决方法基于区域特性
  Solutions are location specific
- 讨论围绕着特定干预的机遇和利益展开
  Discussions are focused on opportunities and benefits of specific interventions

更多信息 More information



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Voskamp IM, Van de Ven FHM (2015) Planning support system for climate adaptation: Composing effective sets of blue-green measures to reduce urban vulnerability to extreme weather events. Building and Environment 83, p 159-167. http://dx.doi.org/10.1016/j.buildenv.2014.07.018

van de Ven FHM , RPH Snep, S Koole, RJ Brolsma, R van der Brugge, J Spijker, T Vergroesen (2016) Adaptation Planning Support Toolbox: Measurable performance information based tools for co-creation of resilient, ecosystem-based urban plans with urban designers, decision-makers and stakeholders, Environmental Science & Policy, Volume 66, 2016, Pages 427-436, https://doi.org/10.1016/j.envsci.2016.06.010

McEvoy S, FHM van de Ven, MW Blind, JH Slinger (2018) Planning support tools and their effects in participatory urban adaptation workshops, Journal of Environmental Management, Volume 207, 1 February 2018, Pages 319-333, https://doi.org/10.1016/j.jenvman.2017.10.041