

# INTRO TO OPAL



**Assessing & mitigating development impacts to ecosystem services and biodiversity**

# **SESSION SCHEDULE**

## **HANDS-ON WITH OPAL (OFFSET PORTFOLIO ANALYZER & LOCATOR)**

**1:30 – 2:15**

**Introduction to OPAL: Background and key concepts**

**2:15 – 3:00**

**Intro to hands-on exercise, with demo of user interface and results**

**3:00 – 4:00**



**Hands-on exercise in small groups (with break!)**

**4:00 – 4:30**

**Presentation of results from a couple of groups**

**4:30 – 5:00**

**Discussion and feedback**

A high-angle, nighttime aerial photograph of a large urban area, likely a metropolis like Mexico City or Tokyo. The city is densely packed with buildings, and the network of streets is clearly visible as a grid of glowing yellow and white lights against the dark night sky. The surrounding rural areas are mostly in shadow.

**Globally, \$57 trillion expected  
spending on new infrastructure  
to keep pace with growth**

**Road & rail network  
length expected to  
increase 60% by 2050**

**Nearly 200 countries and many international financial  
institutions require environmental impact assessments**

# LIMITATIONS OF CURRENT IMPACT ASSESSMENT AND OFFSET APPROACH

Focus on biodiversity & ecosystem processes



Transfer or loss of benefits when ecosystems are removed in one place and offset elsewhere



# GROWING DEMAND FOR INCLUDING ECOSYSTEM SERVICES IN MITIGATION



**MinAmbiente**  
Ministerio de Ambiente  
y Desarrollo Sostenible



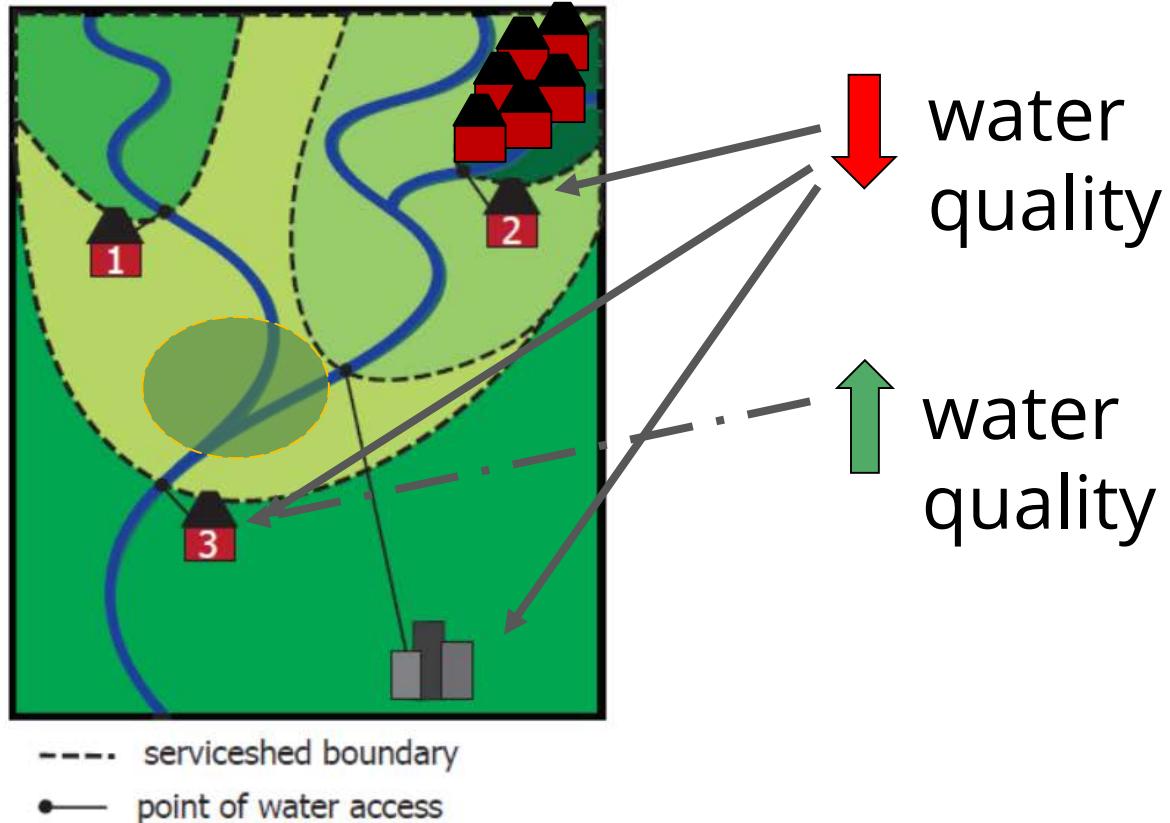


# Offset Portfolio Analyzer & Locator

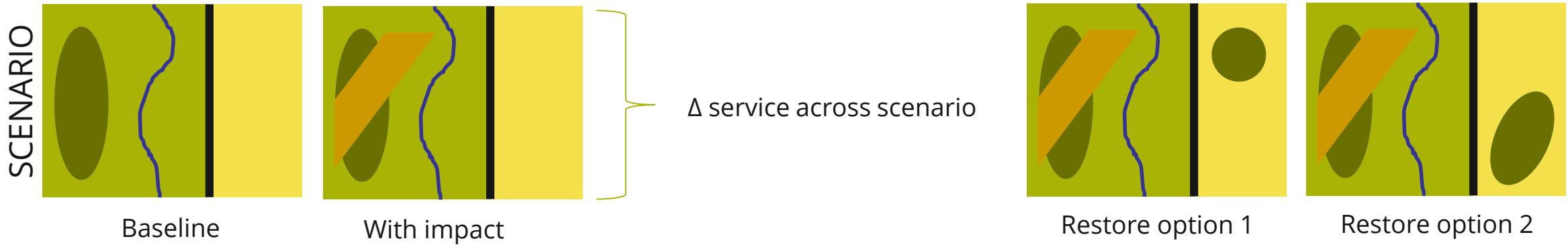
- How much habitat and ecosystem services will be lost with project development?
- How much mitigation is needed to offset losses?
- Where should offsets be located to return services to affected people?

Available at: [www.naturalcapitalproject.org/OPAL.html](http://www.naturalcapitalproject.org/OPAL.html)  
Free & open source, ArcGIS independent

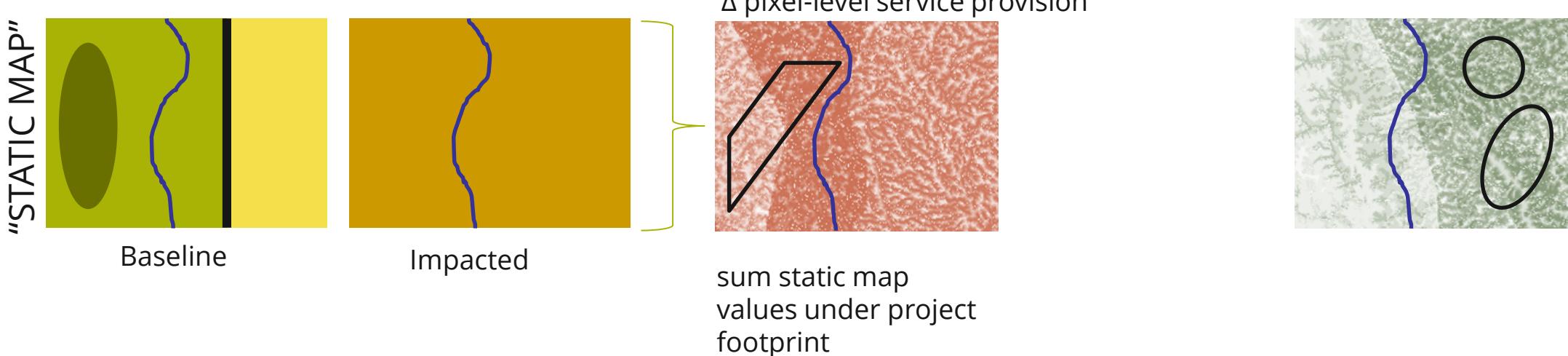
# SERVICE SHEDS TRACK IMPACTS TO PEOPLE



# STATIC MAPS SIMPLIFY REPEATED ANALYSES



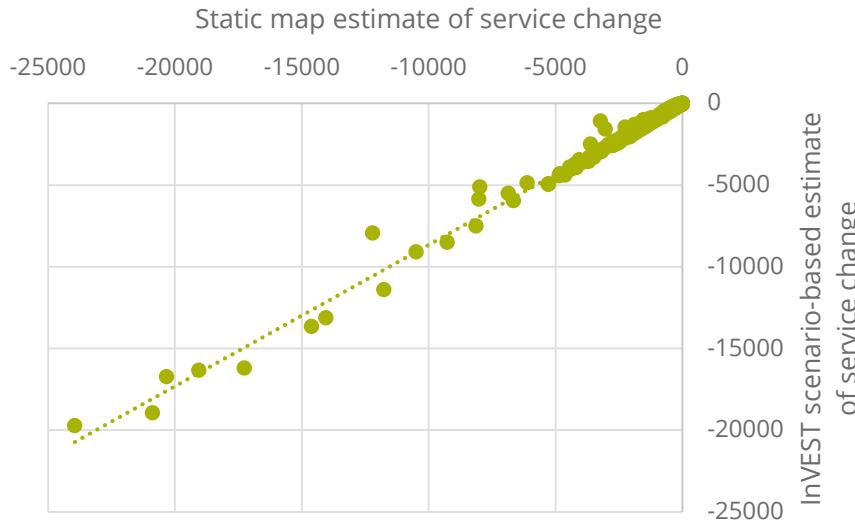
**Need to repeat ecosystem service model runs for each impact scenario and all mitigation options**



**A few upfront model runs provide good repeated approximations of service change for spatially dependent services**

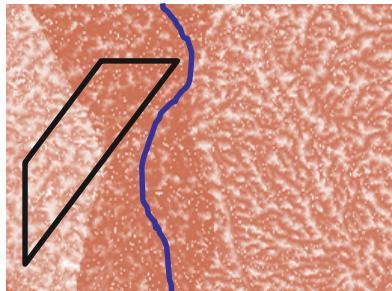
# COMPARING STATIC MAPS WITH SCENARIO APPROACH IN COLOMBIA

## Impact: bare ground

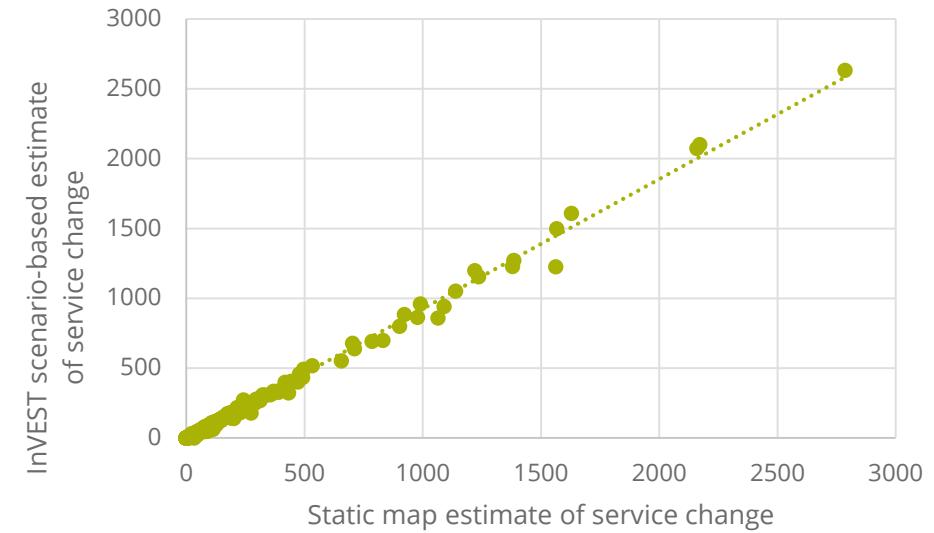


$R^2 = 0.99$

Mean ratio: 1.25



## Offset: protection



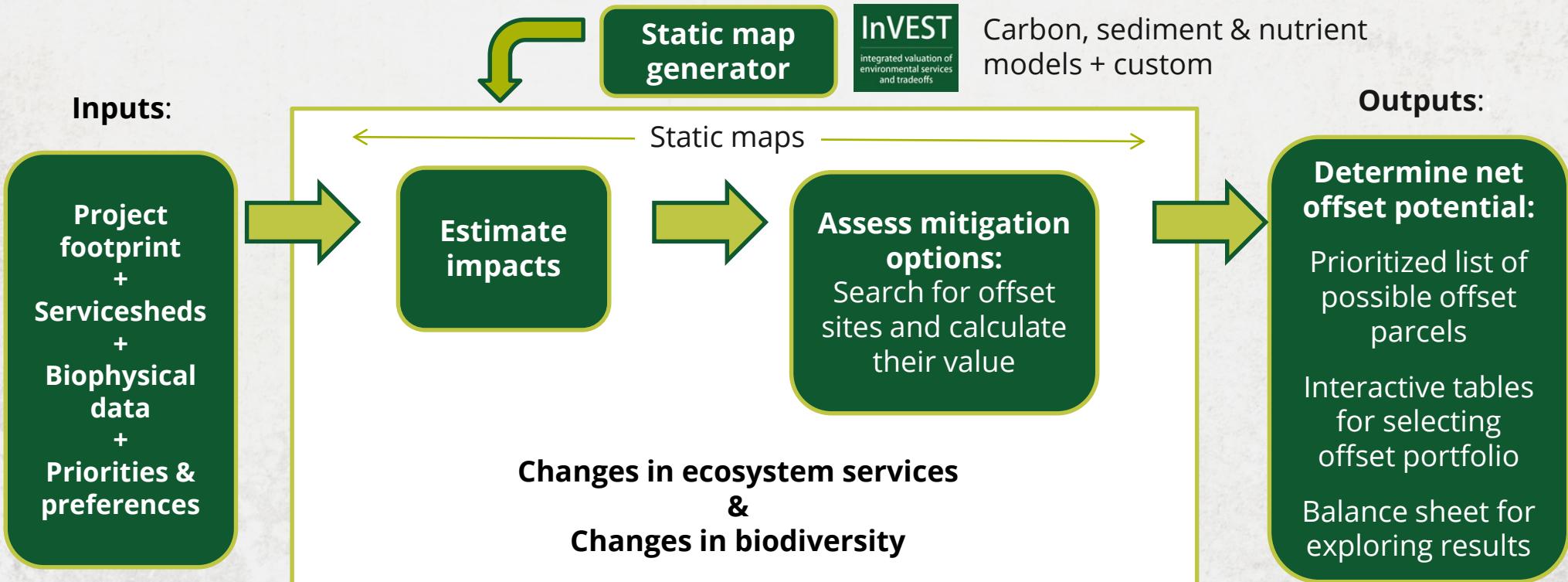
$R^2 > 0.99$

Mean ratio: 1.24





# THE OPAL APPROACH

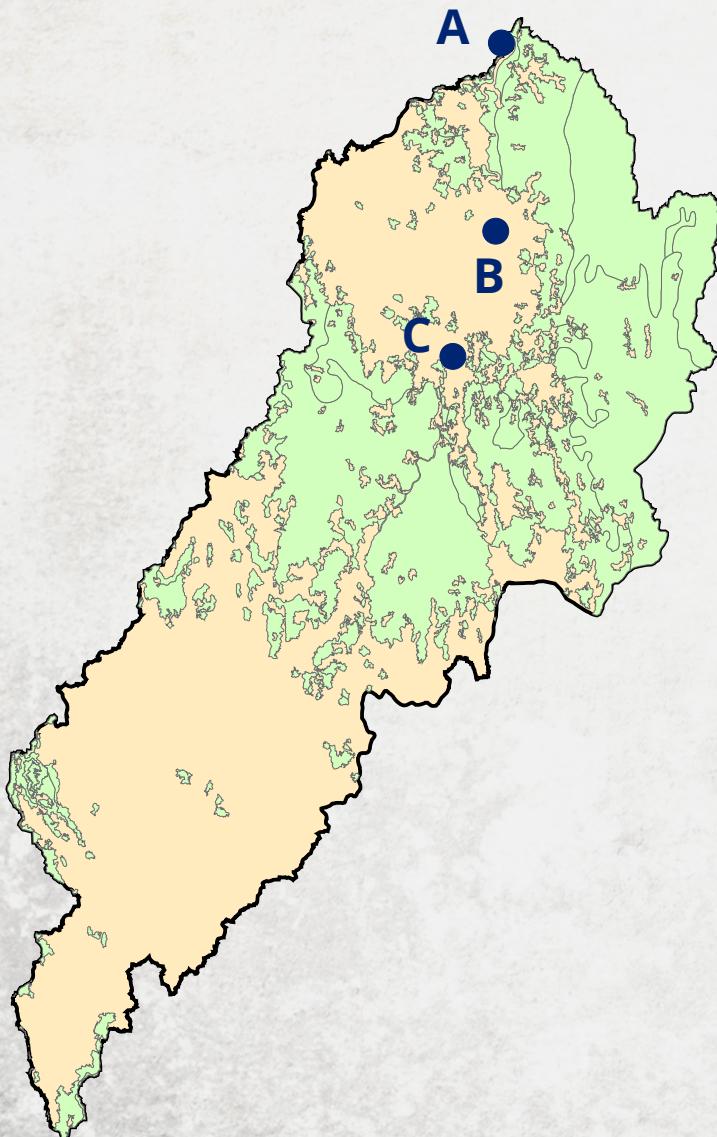


# THREE KEY OPAL STEPS:

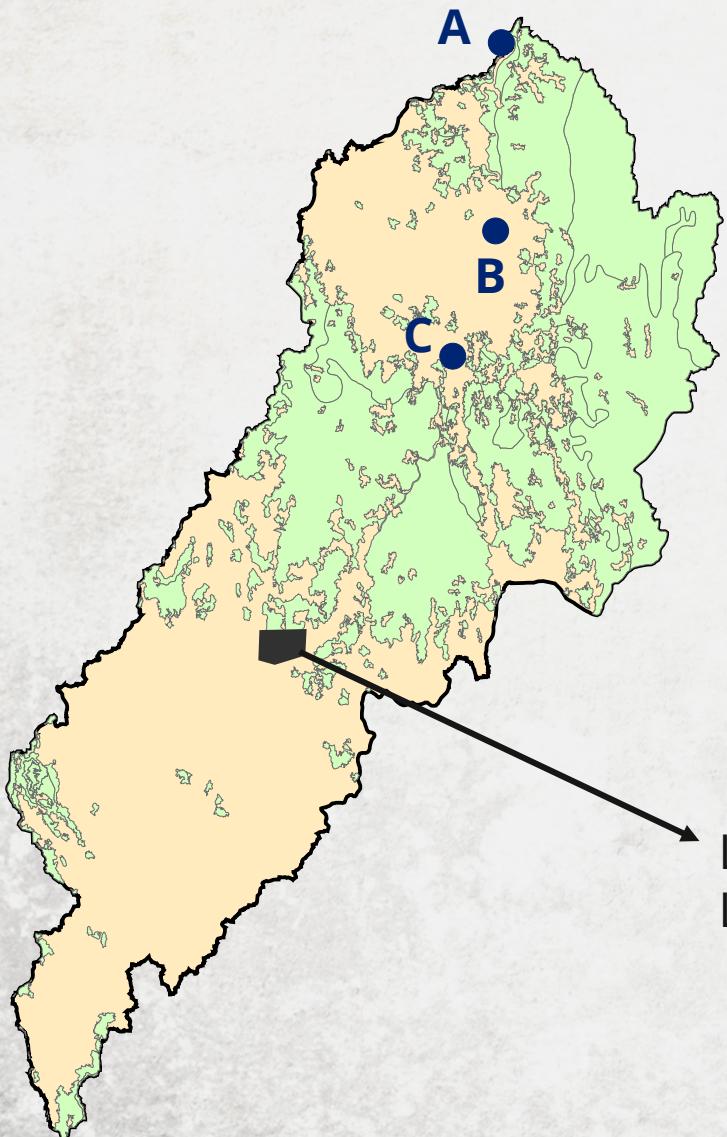
- 1) Estimate impacts to biodiversity and ecosystem services
- 2) Assess mitigation options
- 3) Select potential offset portfolios and track the benefits

# 1) QUANTIFYING IMPACTS

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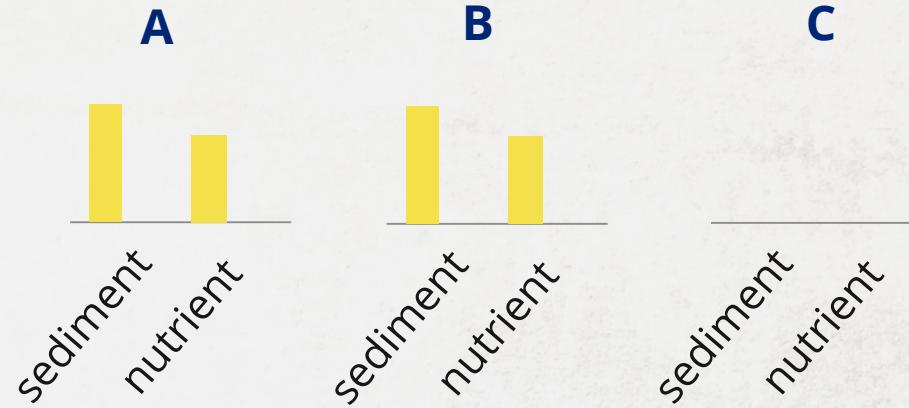


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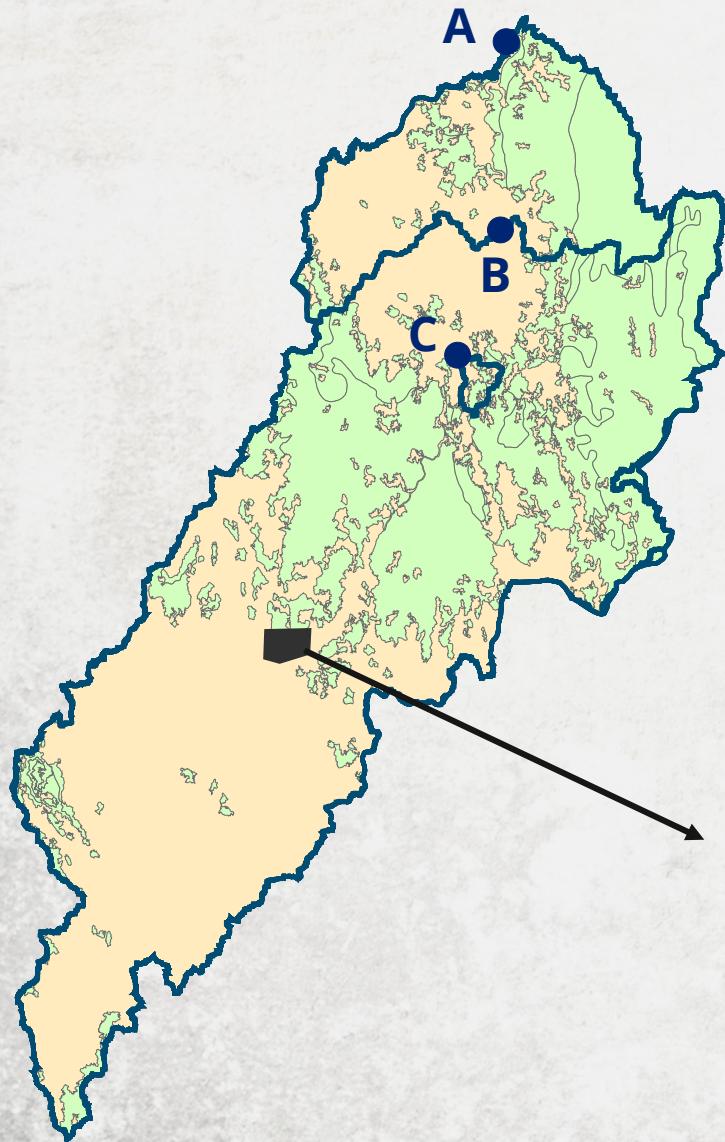


Loss of 1,600 ha  
Loss of soil & nutrient retention

Changes in water quality

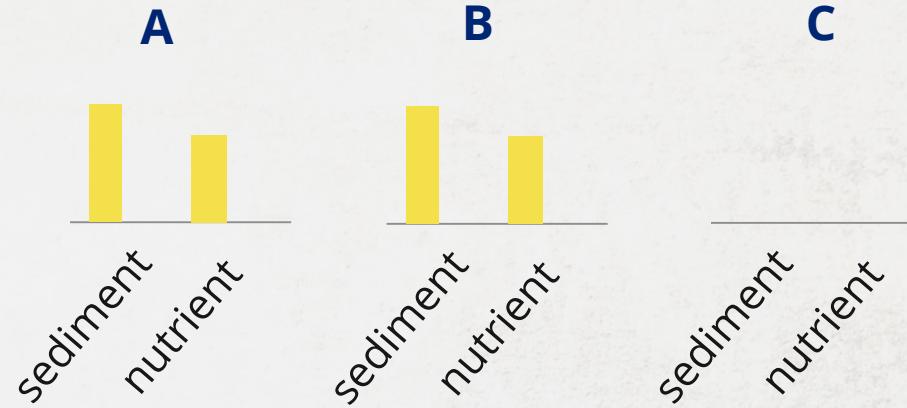


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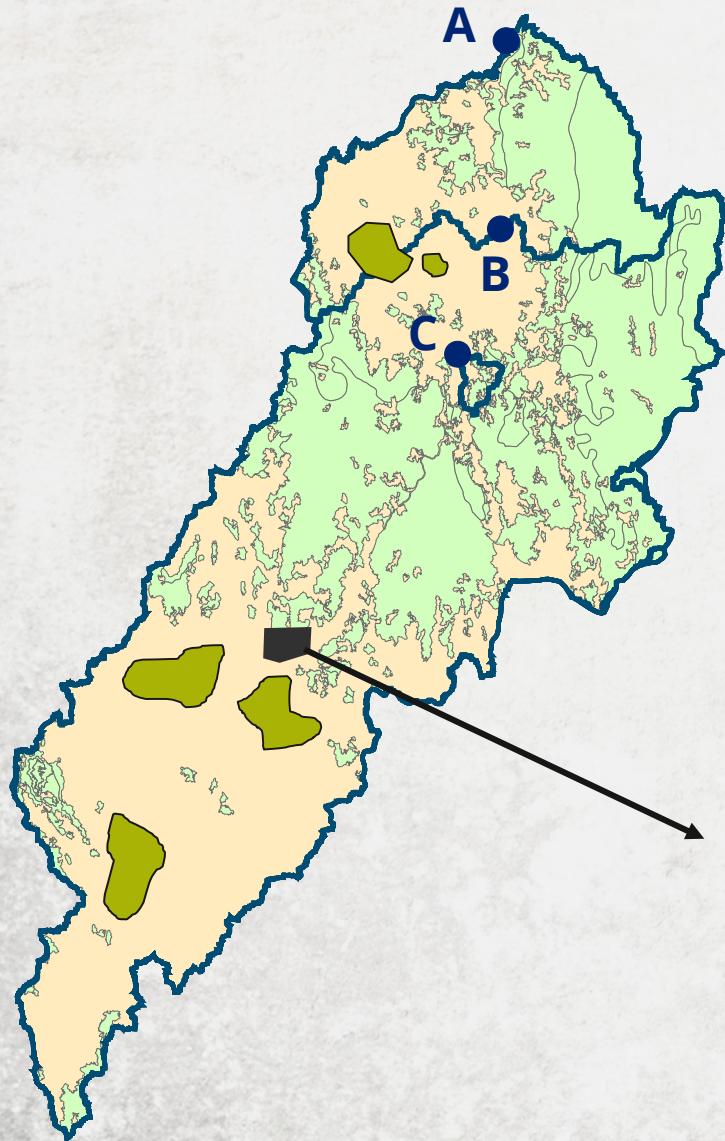


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Changes in water quality

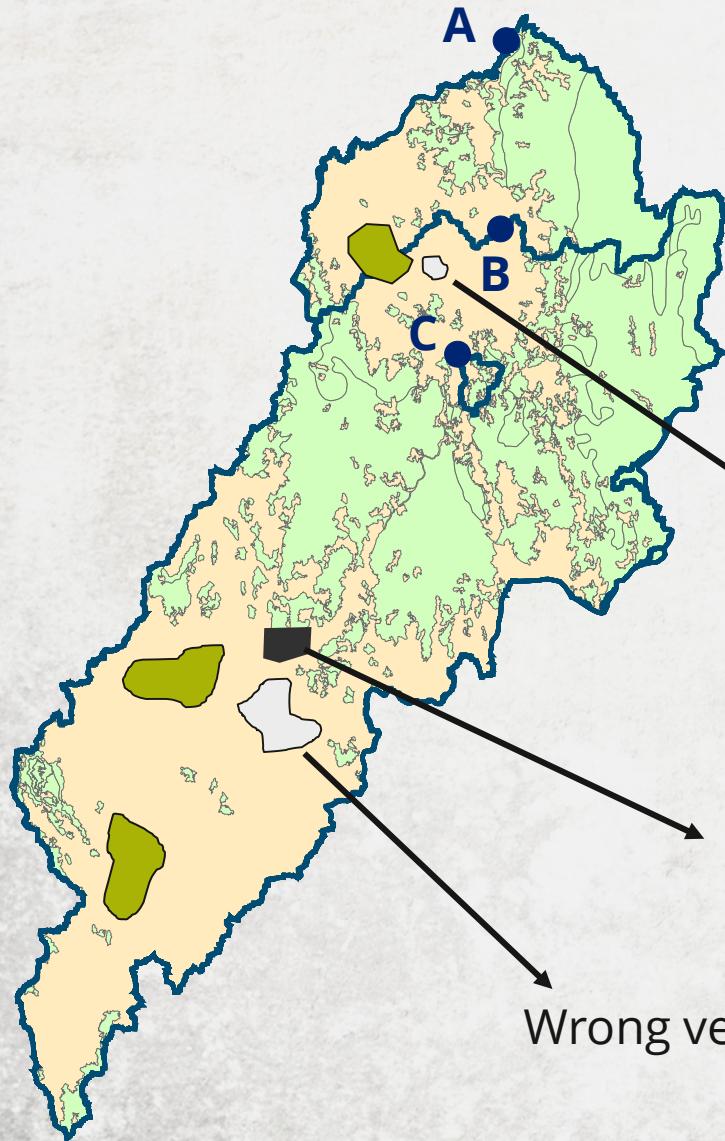


## 2) ASSESSING MITIGATION OPTIONS



Loss of 1,600 ha  
Loss of soil & nutrient retention

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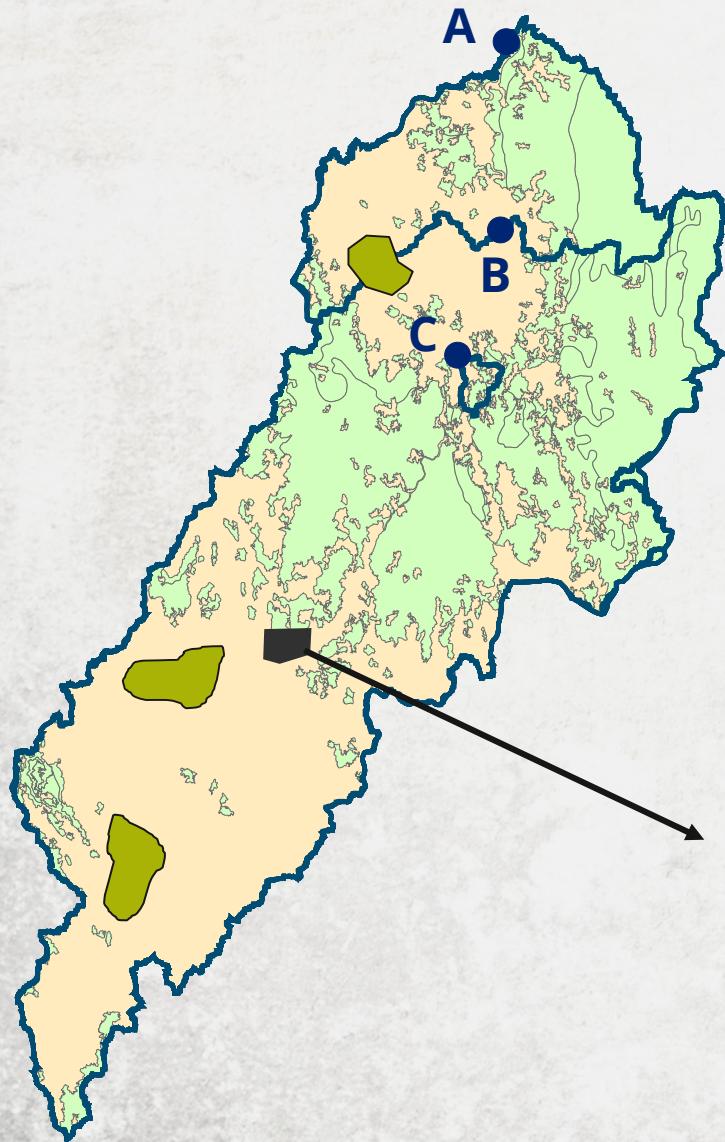


Too small

Loss of 1,600 ha  
Loss of soil & nutrient retention

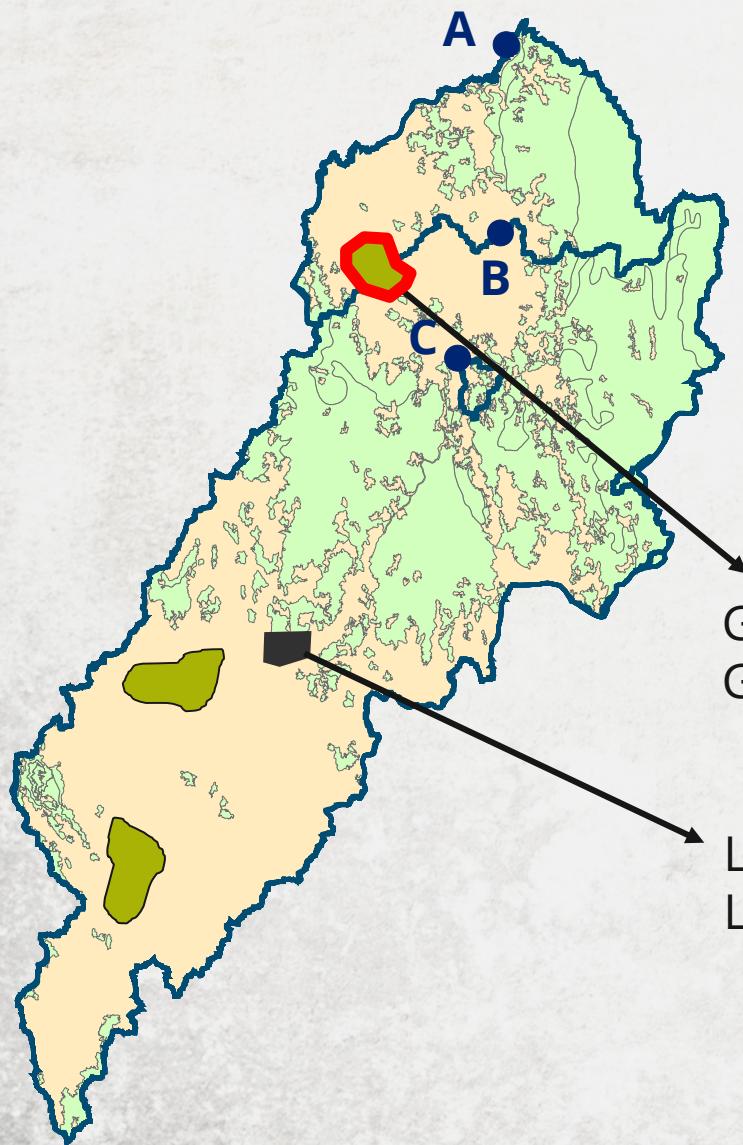
Wrong vegetation type

### 3) SELECTING OFFSETS & TRACKING BENEFITS



Loss of 1,600 ha  
Loss of soil & nutrient retention

### 3) SELECTING OFFSETS & TRACKING BENEFITS

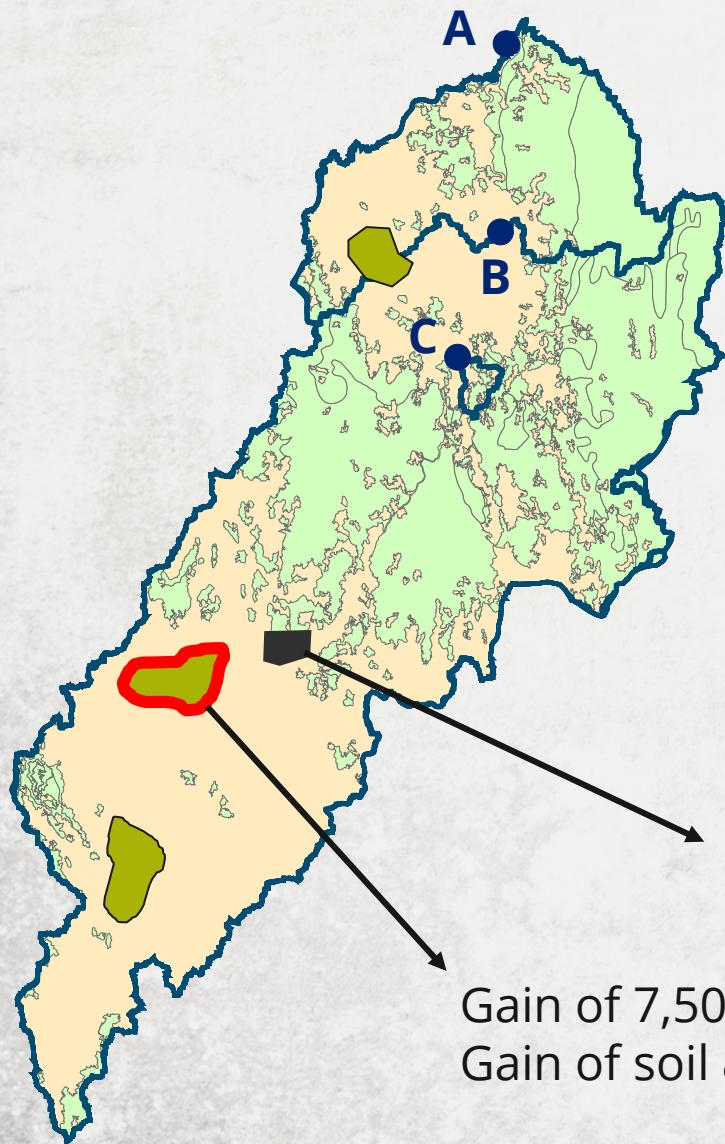


Changes in water quality

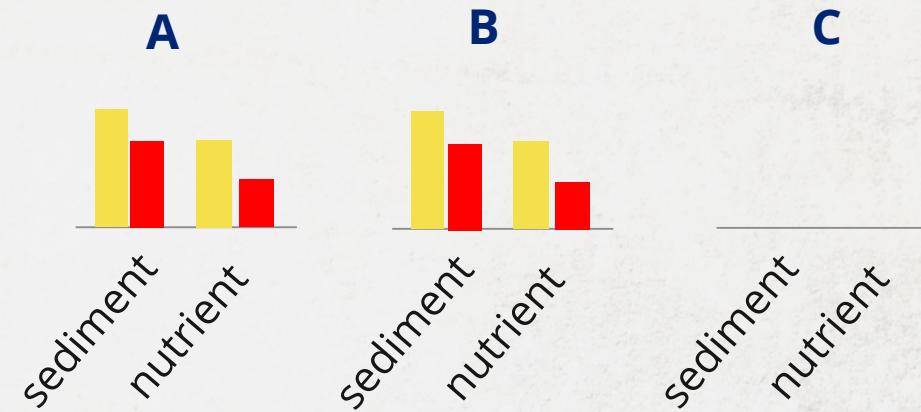


- Loss from development
- Benefit from offset

### 3) SELECTING OFFSETS & TRACKING BENEFITS



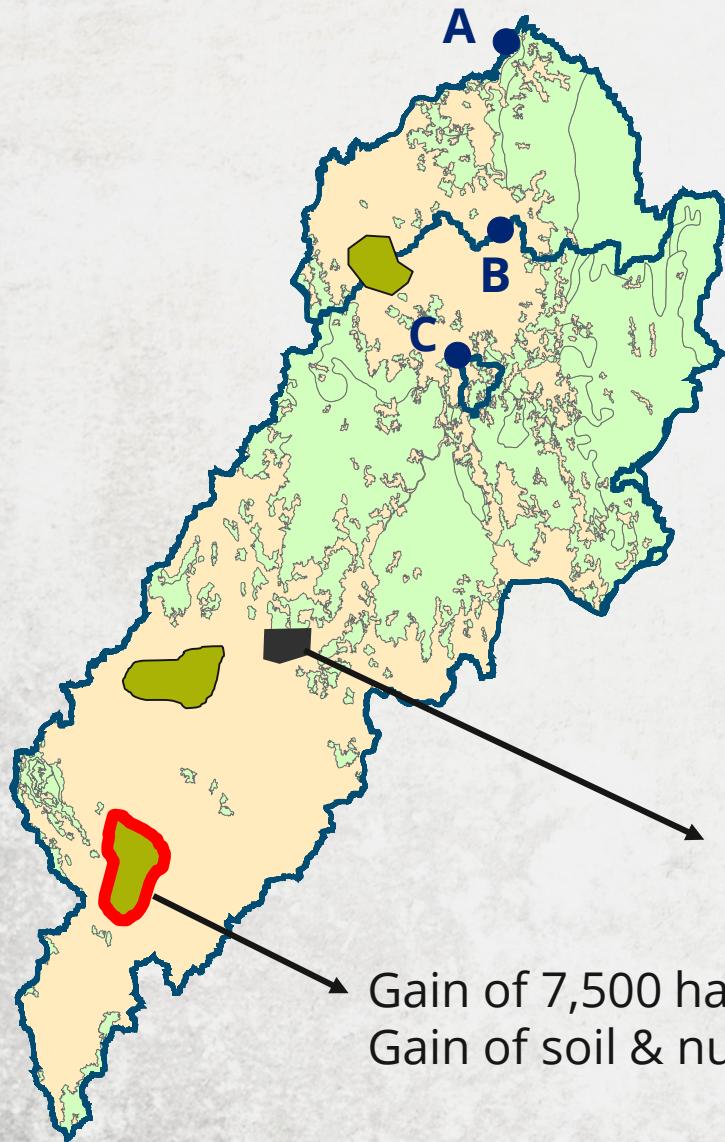
Changes in water quality



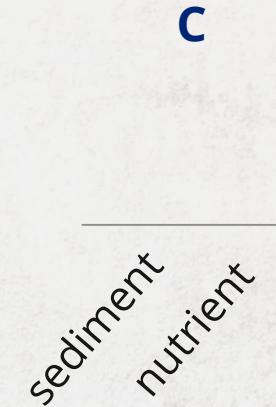
Loss of 1,600 ha  
Loss of soil & nutrient retention

Gain of 7,500 ha  
Gain of soil & nutrient retention

### 3) SELECTING OFFSETS & TRACKING BENEFITS



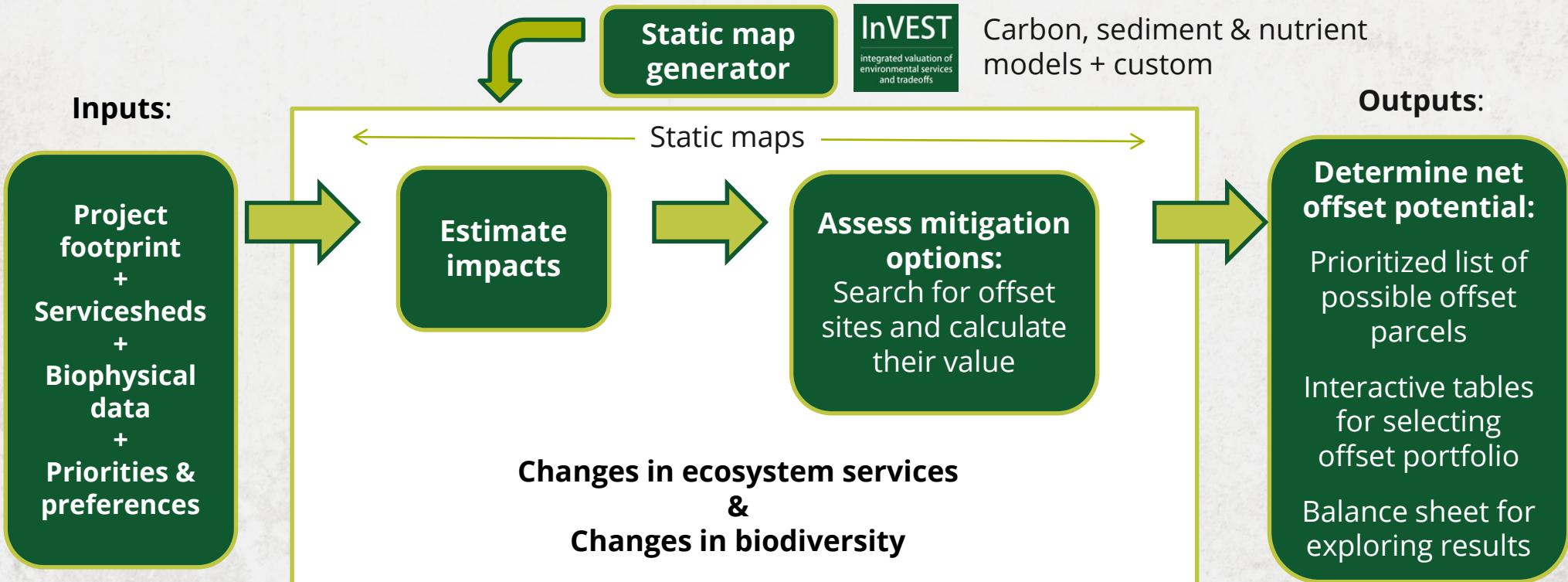
Changes in water quality



- Loss from development
- Benefit from offset



# THE OPAL APPROACH





# OPAL FEATURES

- Uses InVEST or other ecosystem service models to create static maps
- Tracks changes in benefits with servicesheds
- Restoration or protection offset options
- Flexible options for prioritizing offsets
- Rapidly and interactively explore results



**Adaptable to wide variety of contexts**



# LEARN MORE ABOUT OPAL

- Try the hands-on exercise!
- Check out the user's manual and in-tool help
- Post questions on the NatCap User Forum  
<http://forums.naturalcapitalproject.org/>



# Offset Portfolio Analyzer & Locator

- How much habitat and ecosystem services will be lost with project development?
- How much mitigation is needed to offset losses?
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Questions?  
[Imandle@stanford.edu](mailto:Imandle@stanford.edu)