Spatial Prioritization

Joint presentation:

- Vanuatu (Sam)
- Solomon Islands (Bradley)
- SPC supporting role (Sachin, Nick)

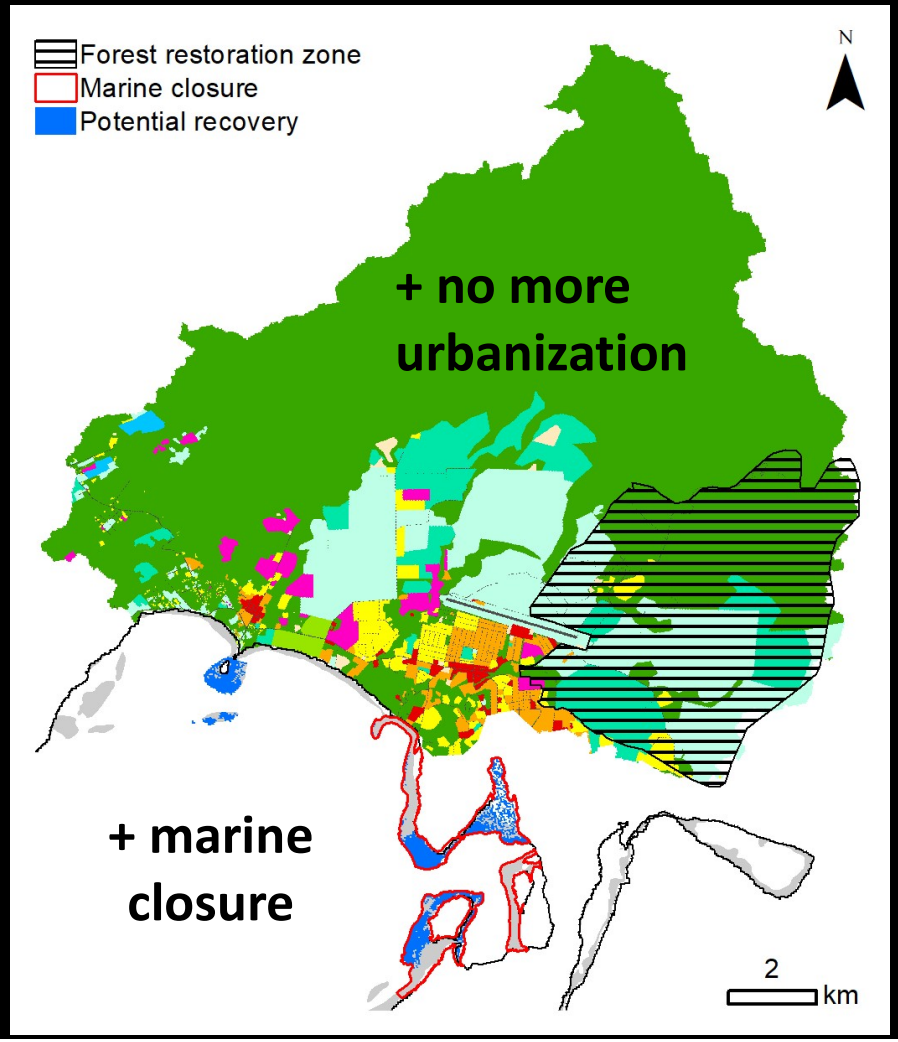
Benefits of R2R Spatial Prioritization Approach

Restore **native forest**:
+1,330 ha

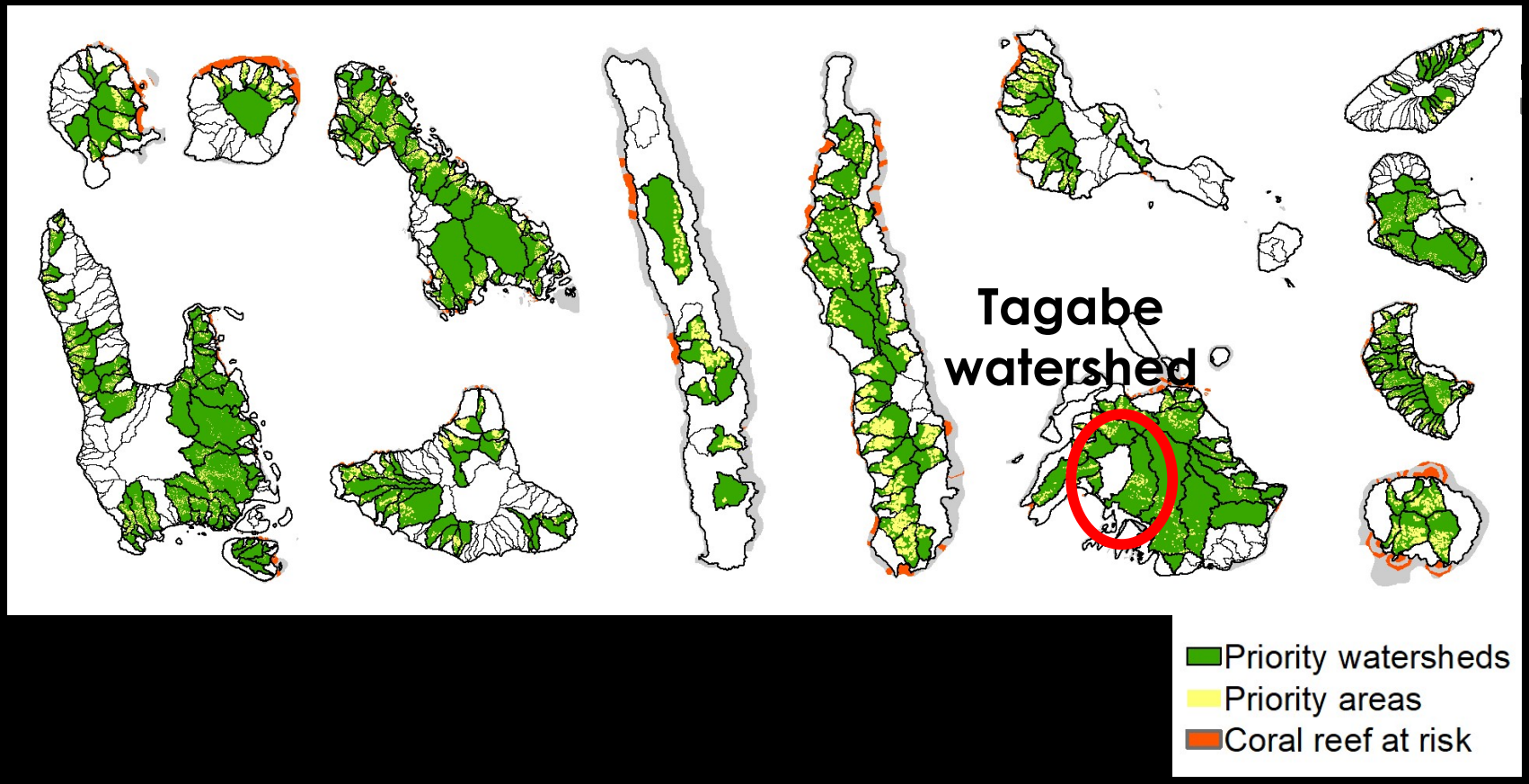
-210 ton/yr of **sediment**

Restore/protect **marine habitat**:
Up to 75 ha

Restore/protect **fish** biomass:
Up to 8.3 ton



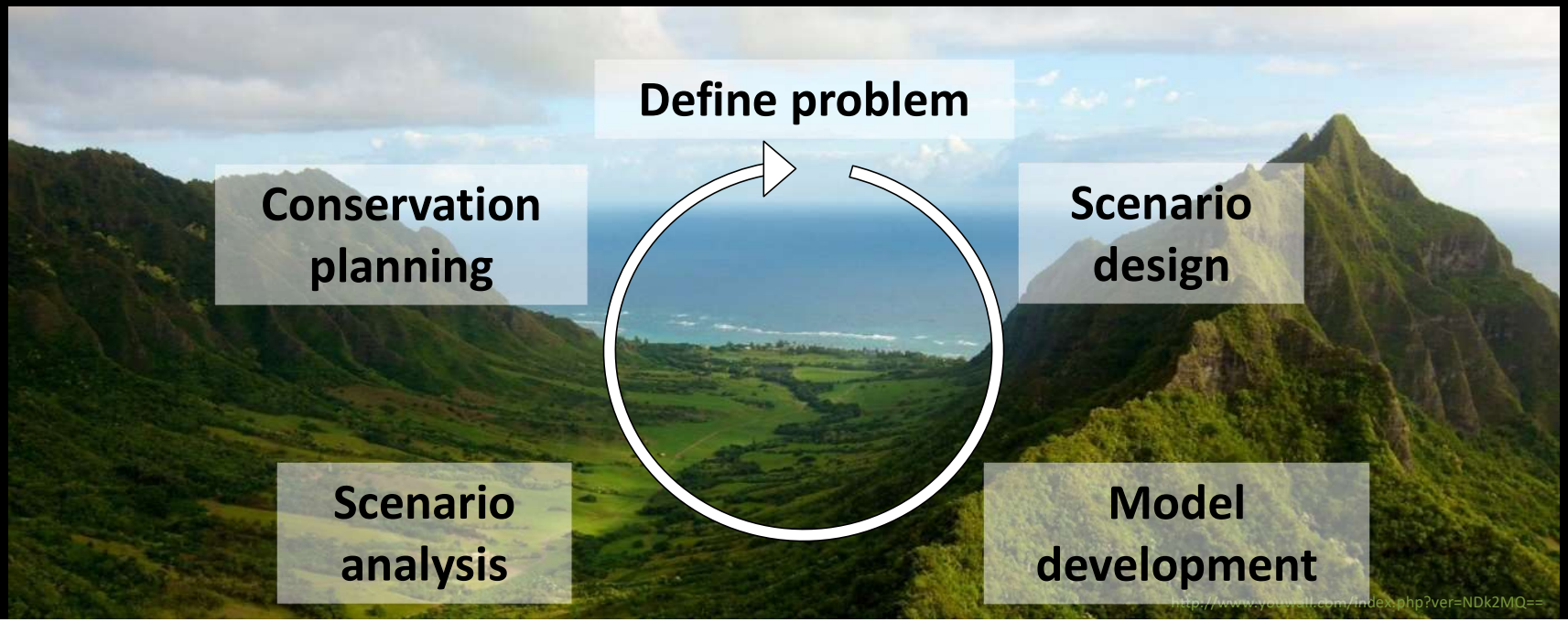
Social & economic drivers



Collaborative management

1. Provide **information** to foster **dialogue** between **decision-makers**

2. Can be applied as part of an **iterative** decision-making **process**



Support decision making

1. Prioritize **conservation areas** at the **national-scale** that can **benefit** both **terrestrial** & **marine** environments

2. Support **local** decision-making by testing **policy actions** & estimating potential **outcomes** prior implementation

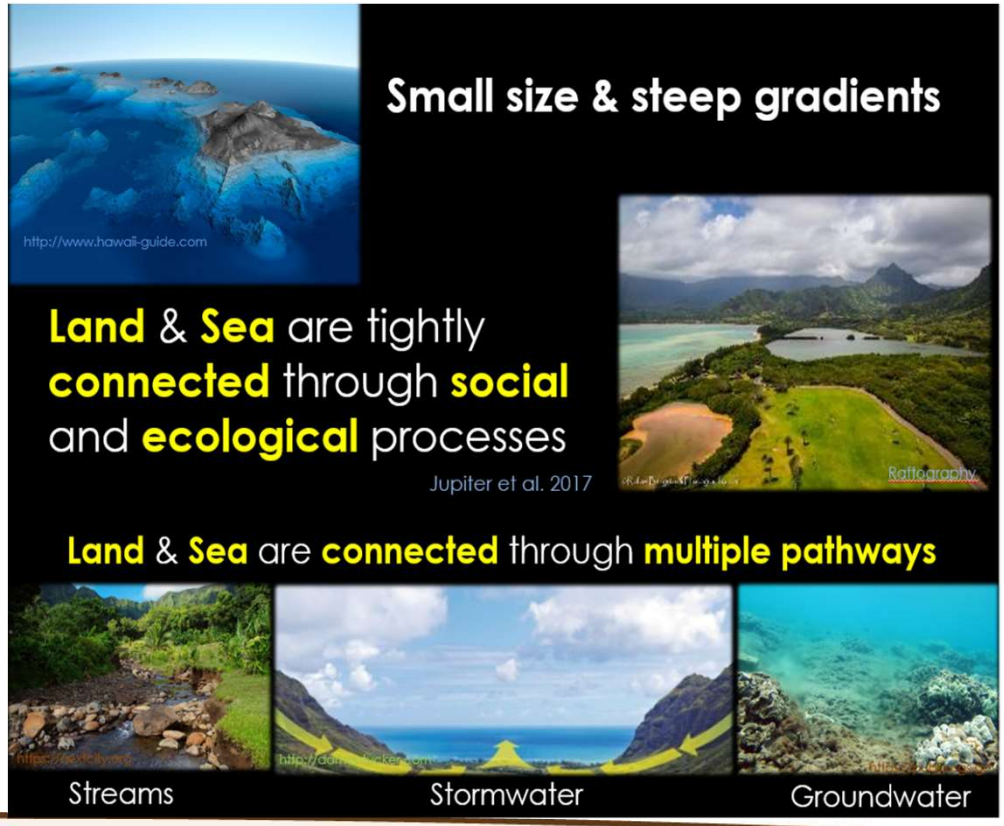
3. Require datasets and information relevant for modelling and fixing scientific uncertainty commonly associated with ecosystem goods and services

Spatial Priotization Procedures

Implementing the R2R conceptual procedural framework for the identification and spatial prioritization of conservation land/sea area

guidelines, technical reports, journal paper, factsheet, infographic poster

- *Delevaux et al. 2018, 2020 & 2021*
- *RPCU 2021*
- *Eichelberger 2022*



Technical Reporting – Vanuatu & Solomon Islands

National scale approach:
Adapt & apply a spatially-explicit framework with scenario planning to identify national priority areas that benefit land & sea

Local scale approach:
Downscale this framework to test the effect of proposed local R2R management actions in one priority watershed

Specific Tasks

- **Water Catchment Areas, HIGH ISLANDS**

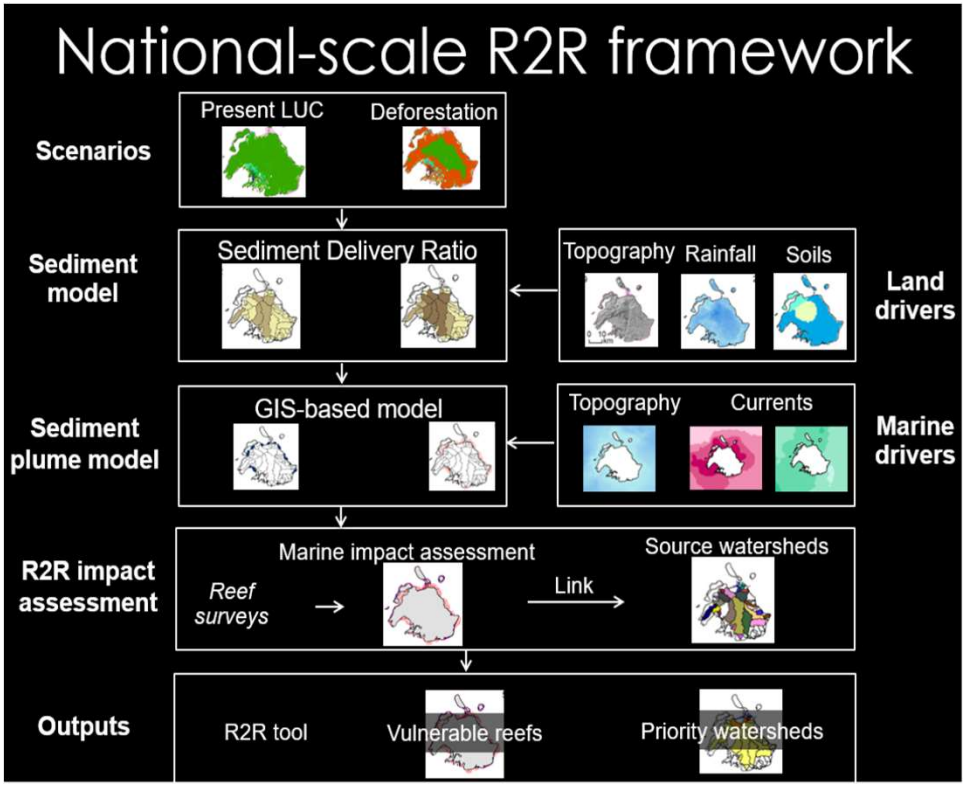
  Evaluate where land-use change and habitat scenarios would impact sediment runoff and downstream coral reefs to identify priority areas on land where conservation restoration could promote coral reef resilience in the face of climate change

- Building the R2R land-sea modelling framework requires inputs of broad range of satellite and empirical data to make it work

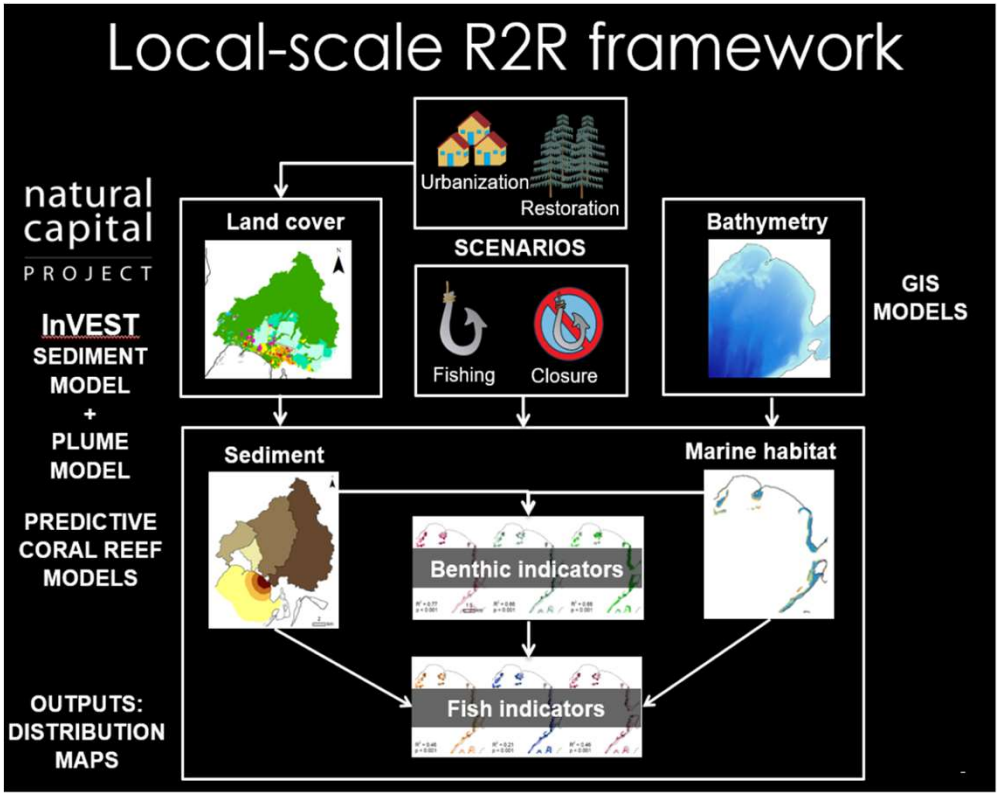
Stepwise Procedures

- Participatory planning processes
- Develop potential future land-use or marine-use change scenarios
- Identify relevant spatial data gaps important for analyses and inputs into land-sea models

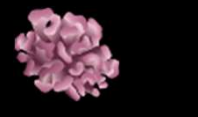
  If yes, then prepare to carry out field work to ground-truth & collect additional primary data
- Prepare sampling protocols & designs for field work



- Coordinate logistical arrangements including teams of people involved and their roles.
- Carry out field work closely adhering to sampling design and following deadlines and details set out in the implementation plan.
- Data processing and analyses
- Additional survey work to optimise calibration of marine and terrestrial models. The exercise should be participatory to promote capacity building.



Calibrate coral reef models



Corals

Macroalgae

Turf algae

Benthic models = sediment + habitat

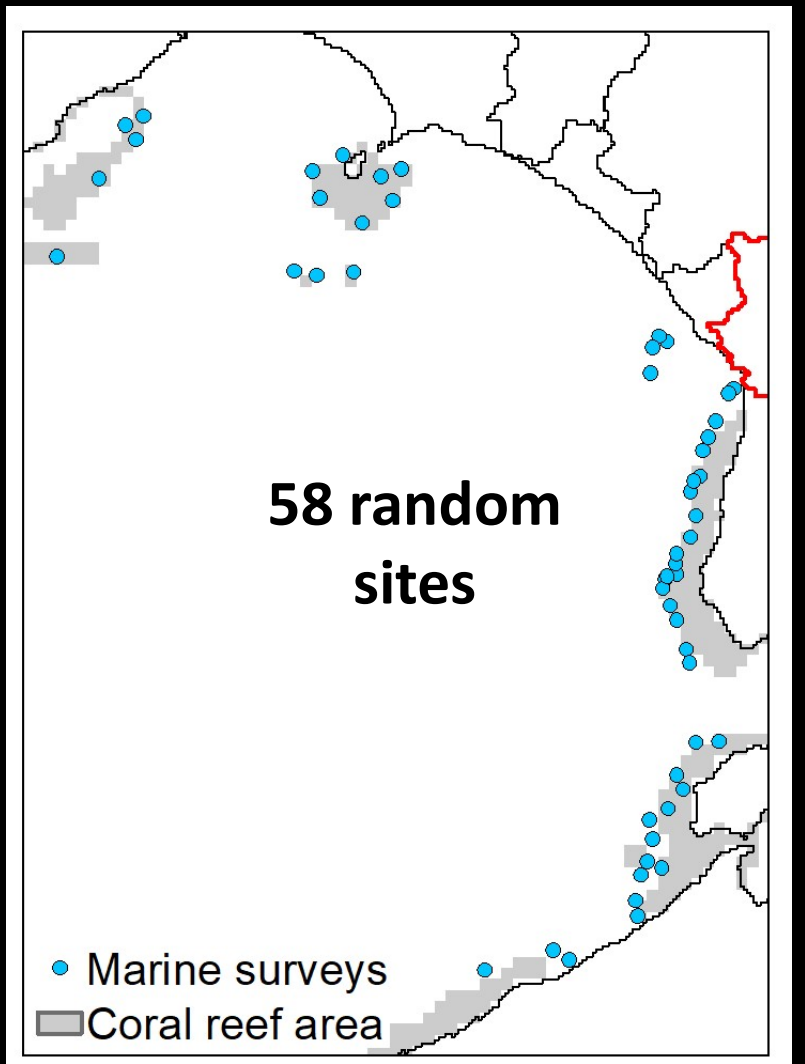
Total biomass

Herbivore biomass

Targeted biomass

Fish models =
sediment + habitat + ***benthic*** indicators

Delevaux et al. 2017, Elith et al. 2008, Smith et al. 2016



Scenario analysis

1. Predict coral reef **benthic** & **fish indicators** under **present** & **each scenario**

2. Calculate the coral reef **indicators** change for **each scenario** compared to **present**

Tracing land-sea linkages

1. Model the **sediment export** & **plume** under **present** & each **deforestation scenario**

2. Identify **coral reef areas** exposed to **significant** change in **sediment** for **each scenario** compared to **present**

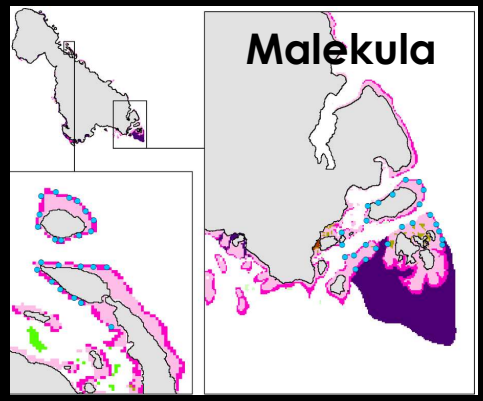
3. Identify the **watersheds** supplying the most **sediment** (>40%) to those **coral reef areas**

Spatial prioritization

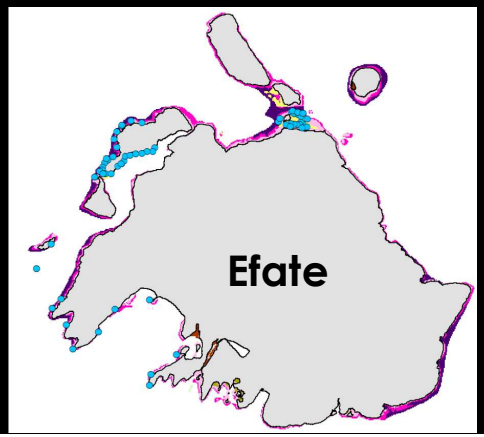
1. Characterize the **potential marine impact** using **coral % cover** & **fish biomass** from **empirical data**

2. Prioritize **watersheds** by **potential marine impact**

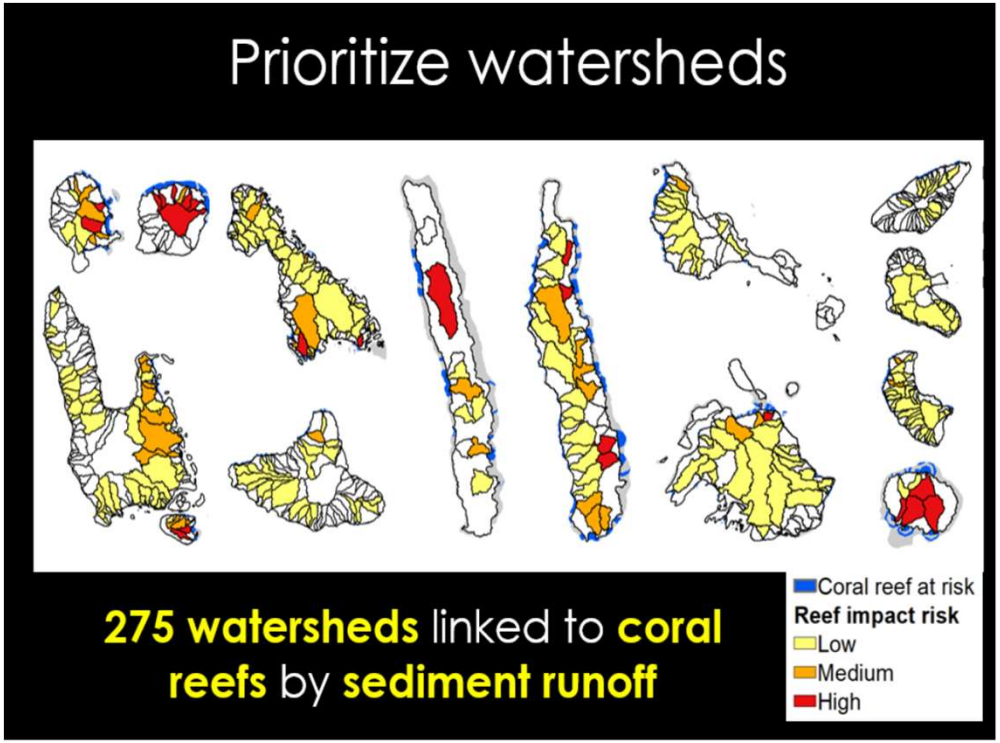
3. Identify **land areas** exposed to **significant** change in **sediment export** under **each scenario** compared to **present**



130 sites

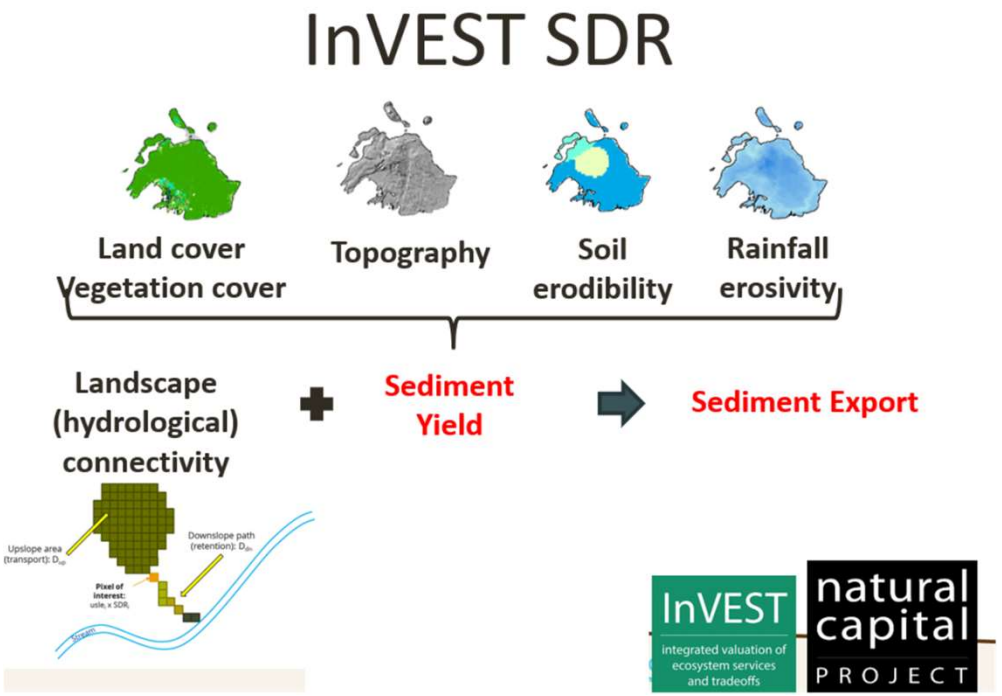


- Prepare technical reports that include clearly the methods employed, model outputs, maps depicting priority areas and sites, and packaged models.
- Present and discuss methods and outputs with other actors or peer review and refinement.



Key Challenges

- Spatial data & data gaps for land-sea modelling
- SPC GEM spatial datasets
- Freely available software packages (InVEST SDR & R)
- Open access QGIS



Decision support tool in data poor regions

- Resolution of input foundational layers (soils, currents)
- Decision support tool relies on static modelling
  - R2R framework can give an idea where may degrade or recover but not a dynamic model where possible to see impacts through measuring indicators

- Suggested approach to address challenges (para. 33)

- Thank you…