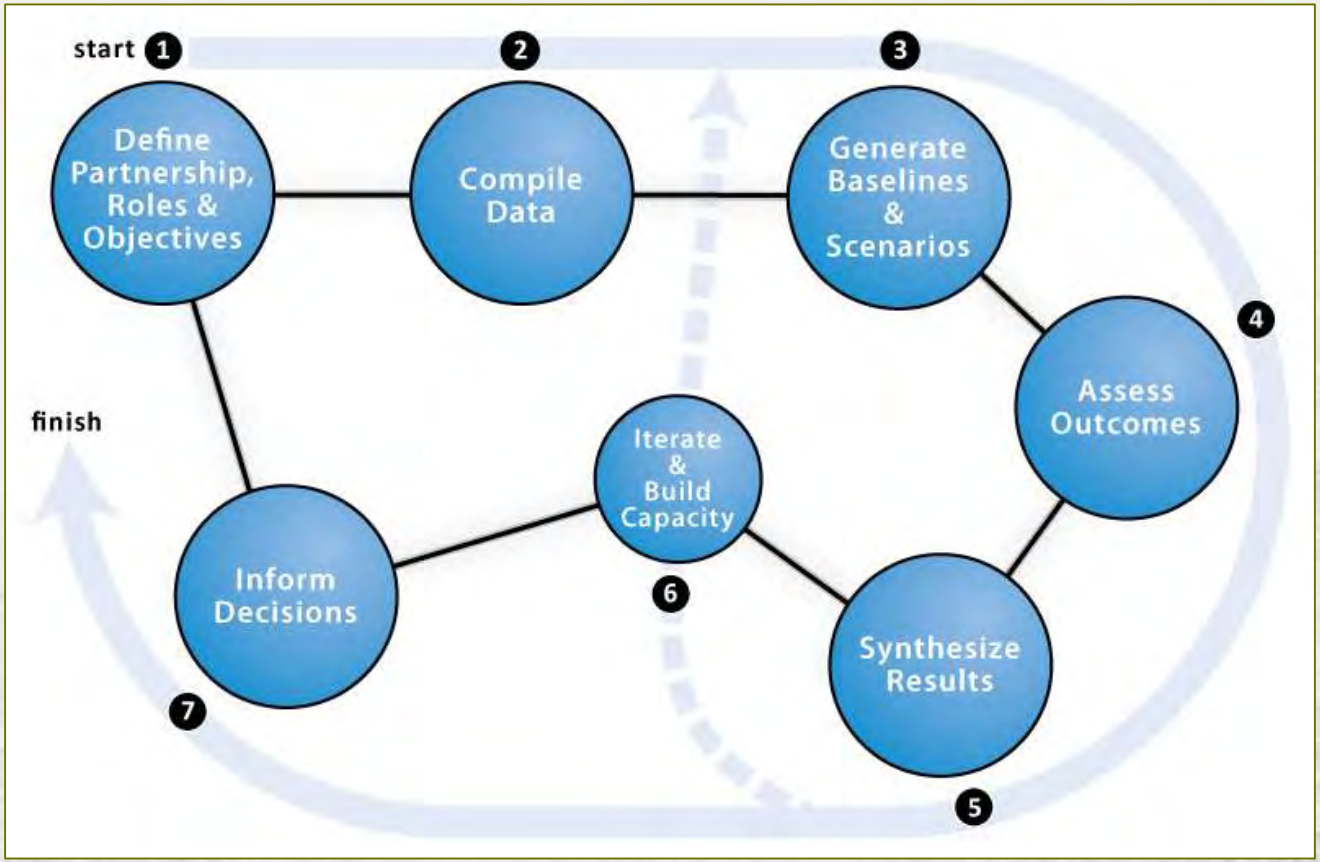
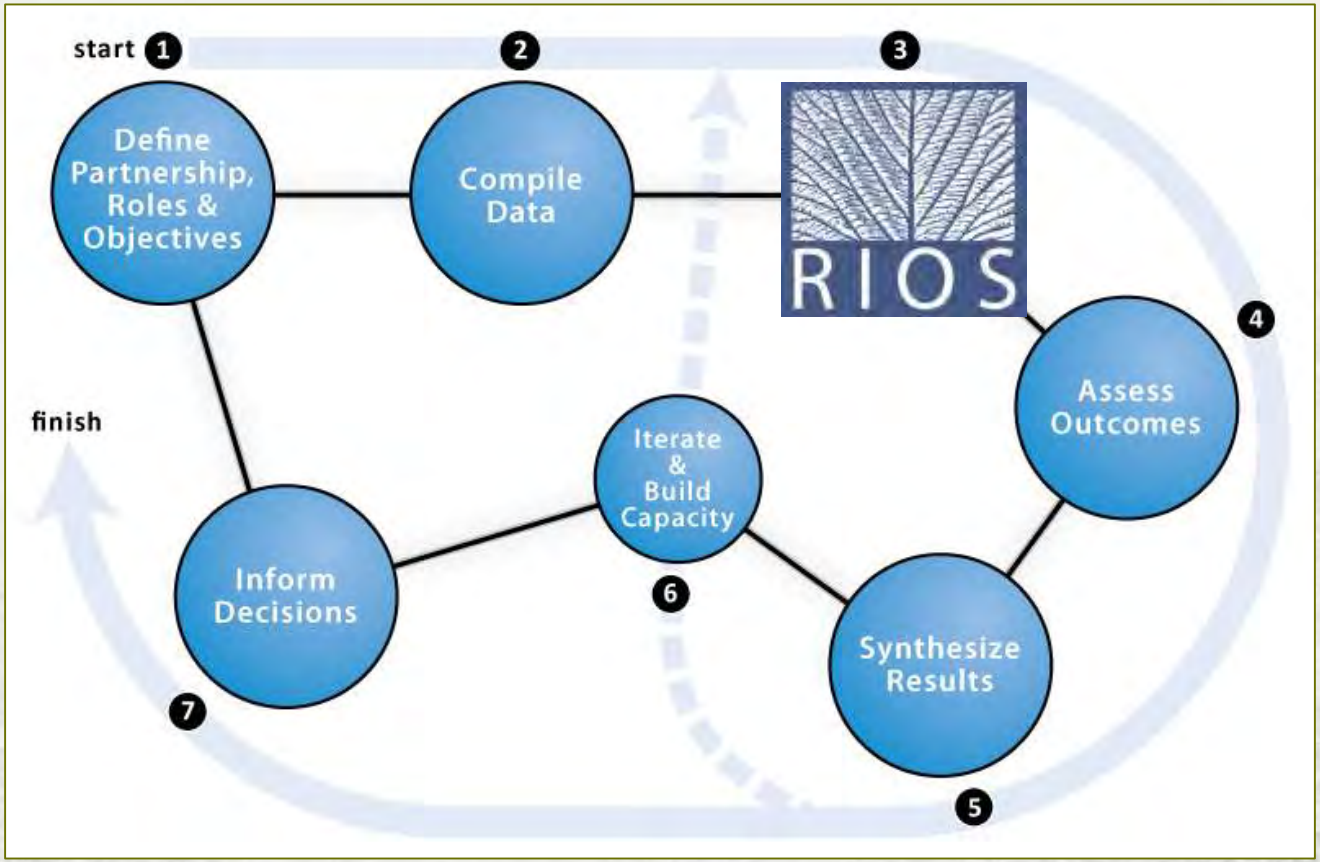
INVESTING IN WATERSHED SERVICES WITH RIOS

Adrian L. Vogl
avogl@stanford.edu

RIOS IN CONTEXT

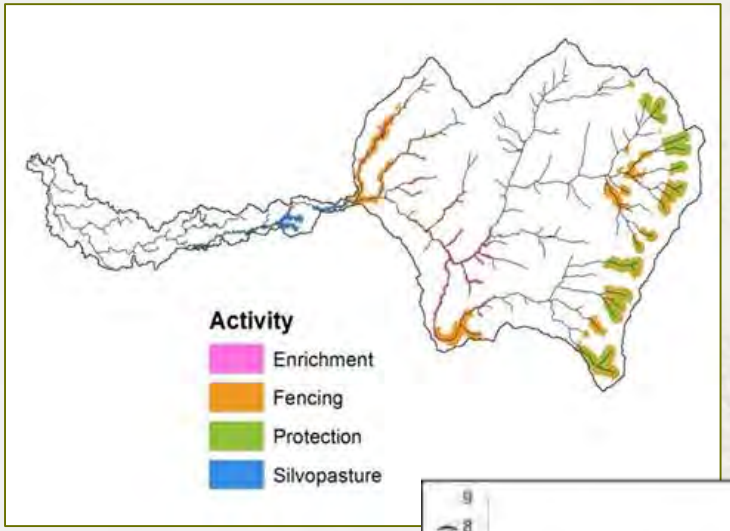


RIOS IN CONTEXT



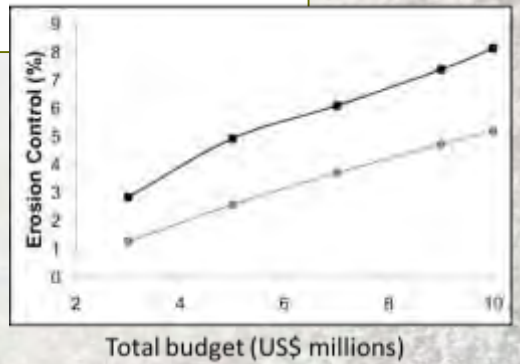
GOALS

- Invest in watershed services with limited budget
- Maximize improvement in multiple services



QUESTIONS

- Which activities are most cost-effective?
- Where should I do them?



IMPROVING INVESTMENT OPTIONS WITH RIOS

- Must address ***physical realities***, ***feasibility***, and ***cost effectiveness***

- Know where you can get best results for ***multiple goals*** AND where it is ***practical*** to work

- Need a method that is ***robust*** and ***replicable*** with local capacity

RIOS DEVELOPMENT PROCESS

Watershed Investment Prioritization Working Group

Core Team

LATIN AMERICAN WATER FUNDS PARTNERSHIP

The Nature Conservancy
Protecting nature. Preserving life.

natural capital PROJECT

Advisory Group

FONAPA

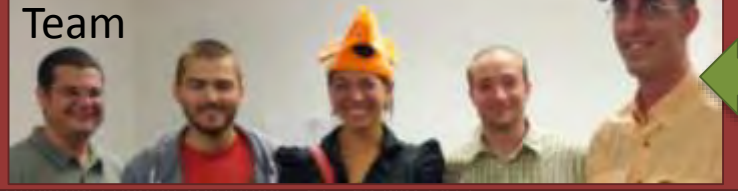
The Nature Conservancy
Protecting nature. Preserving life.

WWF

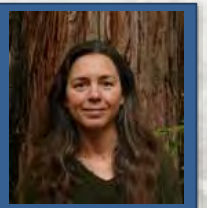
Fondo Agua por la Vida y la Sostenibilidad

FUNDACIÓN FEMSA

Software Development Team



Science Team



RIOS INPUTS

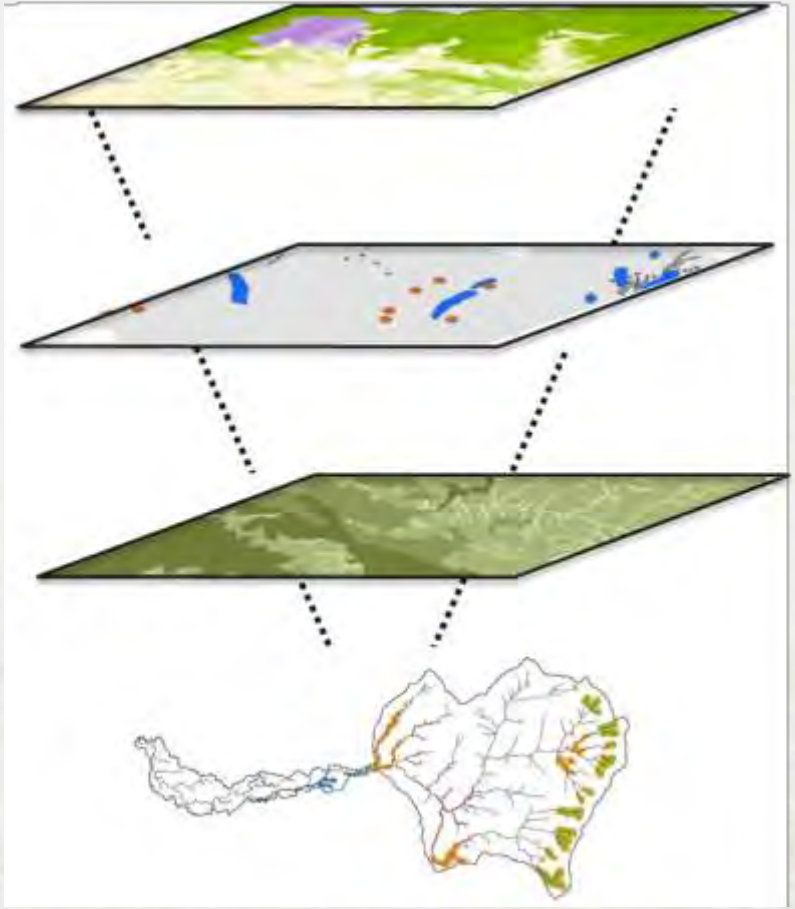
Biophysical effectiveness

Feasible activities

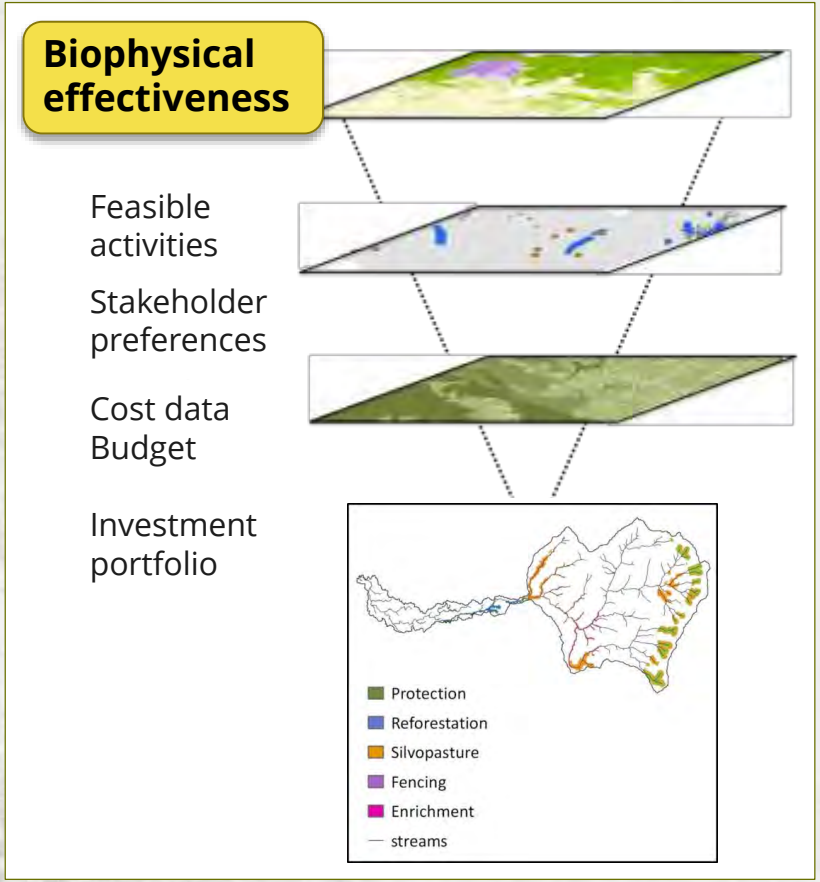
Stakeholder preferences

Cost data
Budget

Investment Portfolio



TYPES OF DATA



Land use/Land cover

Vegetation retention, land practice and management

Topography

Digital elevation model, slope threshold

Erosivity

Based on intensity and kinetic energy of rainfall

Erodibility

Soil detachment and transport potential due to rainfall

Watershed Areas

Catchment areas, beneficiaries

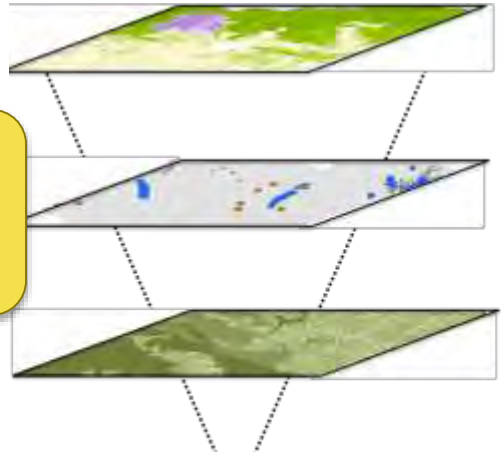
TYPES OF DATA

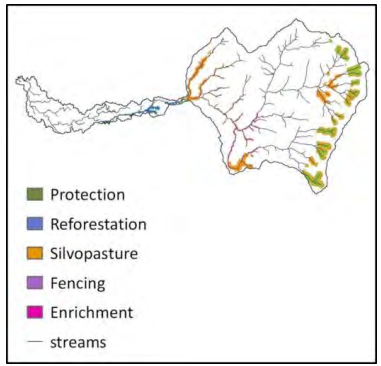
Biophysical effectiveness

Feasibility and preferences

Cost data
Budget

Investment portfolio





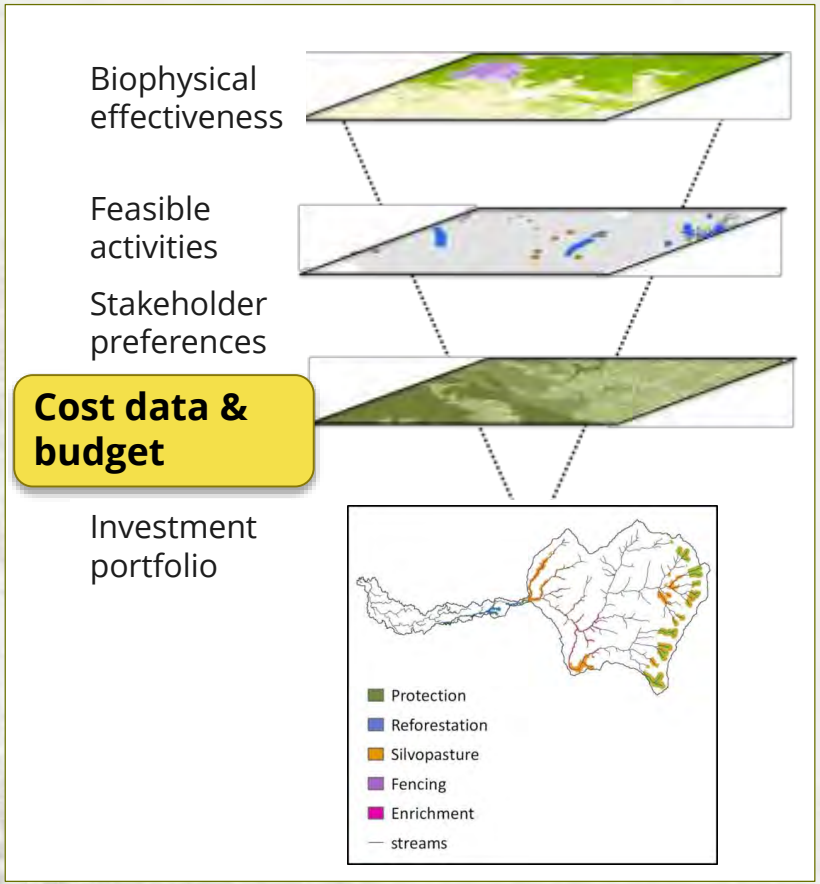
Stakeholder preferences

Legal and logistical restrictions

Opportunity cost

Feasible locations

TYPES OF DATA



How much do activities cost?

Implementation, maintenance, payments

Total budget $

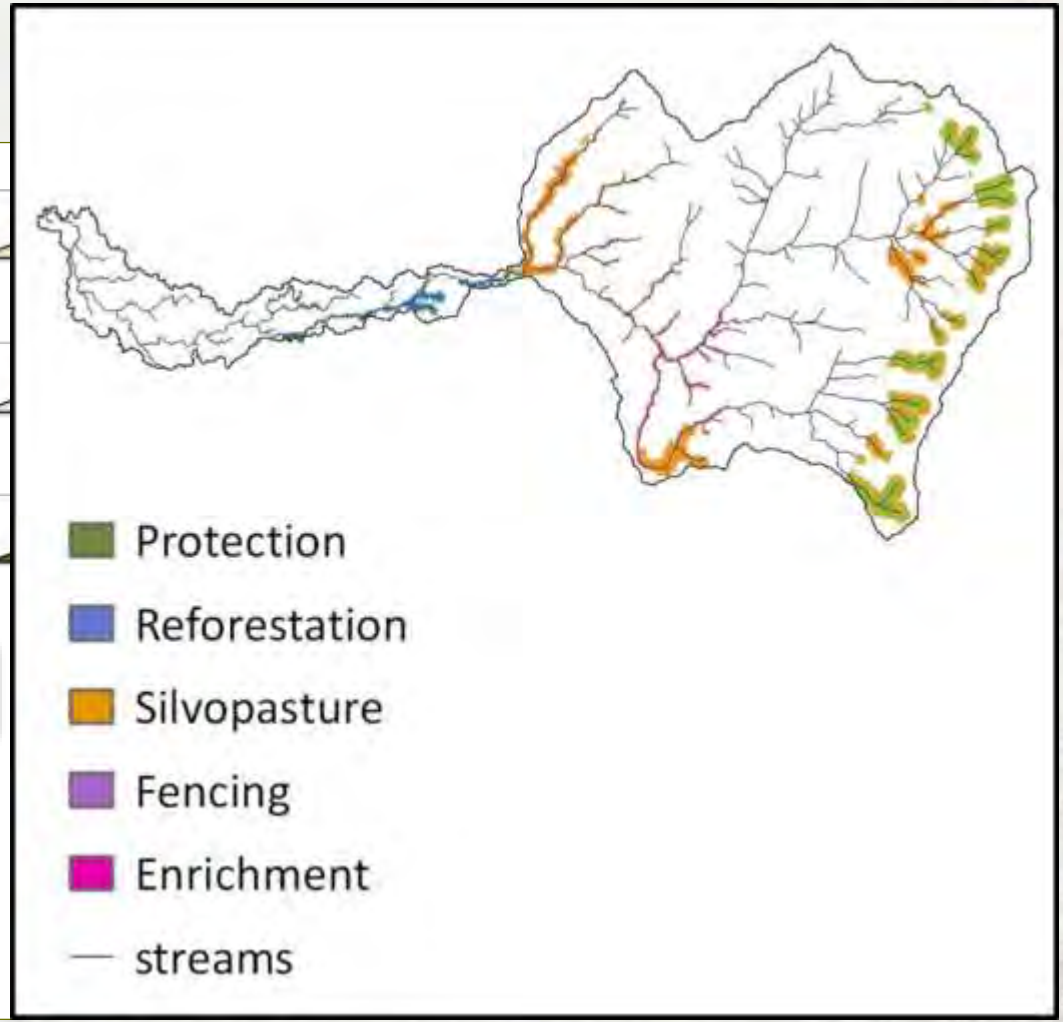
Biophysical effectiveness

Feasible activities

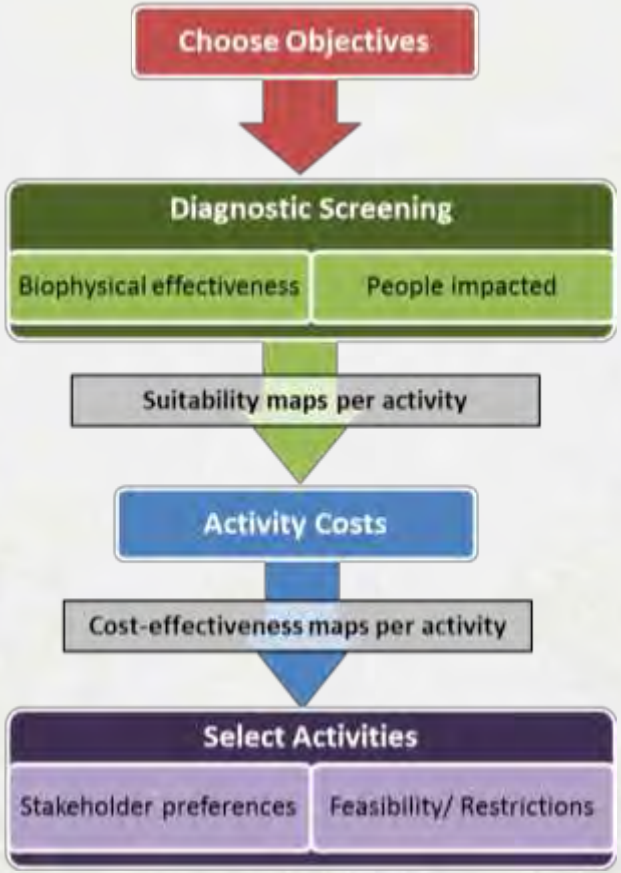
Stakeholder preferences

Cost data
Budget

Investment portfolio



OVERVIEW OF RIOS WORKFLOW

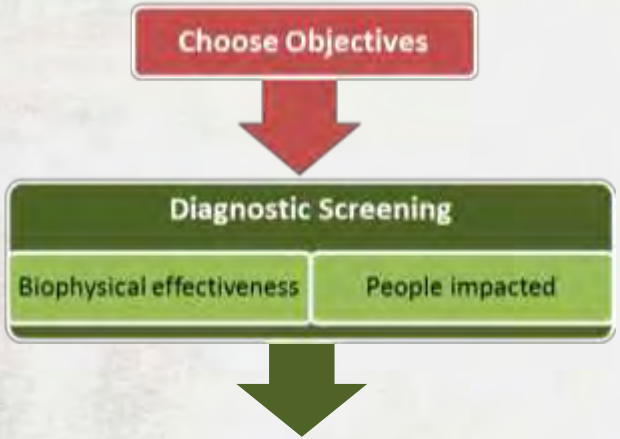


CHOOSE OBJECTIVES

SERVICES

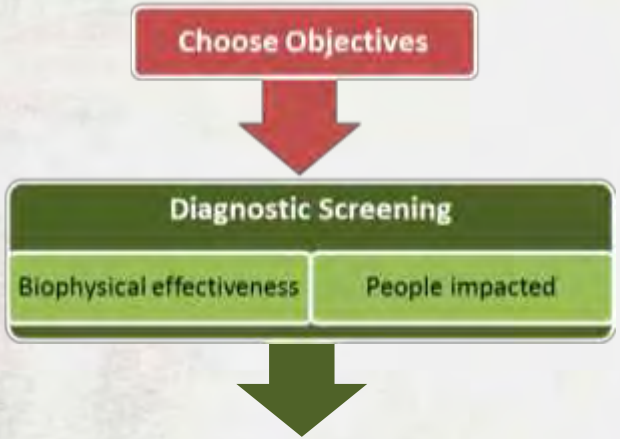
- Erosion Control
- Nitrogen Regulation
- Phosphorus Regulation
- Groundwater Recharge
- Flood Mitigation
- Dry Season Baseflow
- Biodiversity
- “Other”

DIAGNOSTIC SCREENING



1. Choose activities

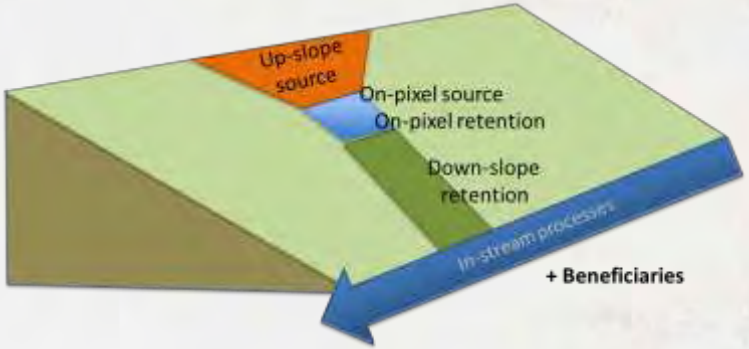
DIAGNOSTIC SCREENING



1. Choose activities

2. Score impact of transitions based on physical characteristics and beneficiaries

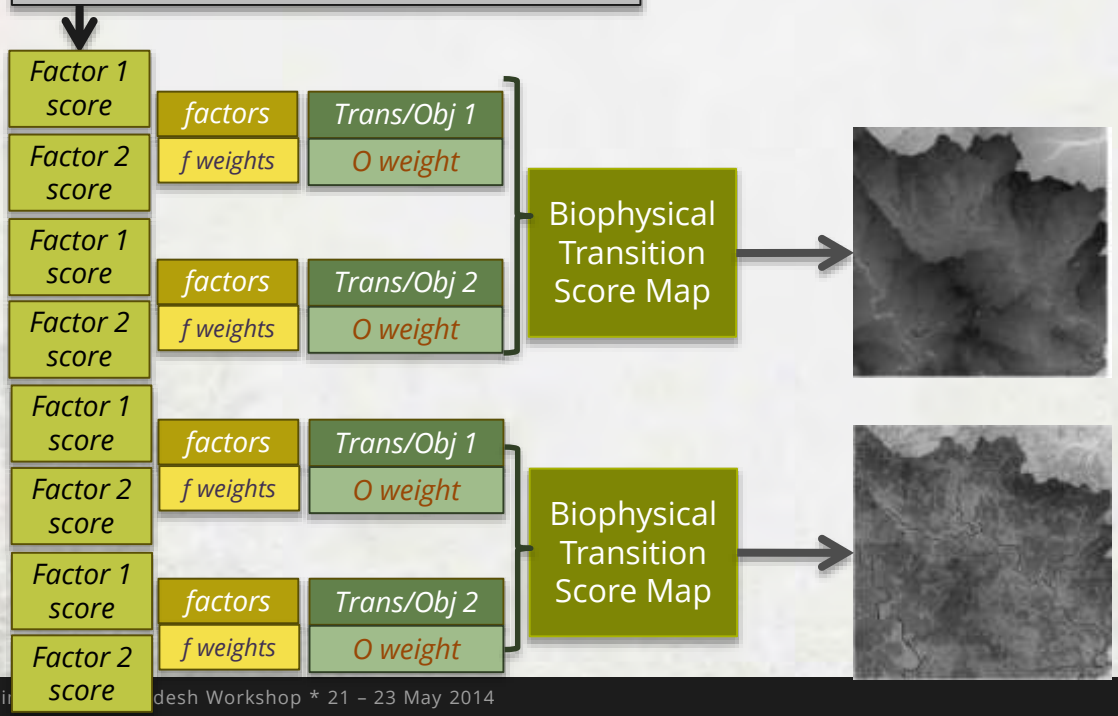
KEY FACTORS



- Factors determined through literature review
- Compromise between process representation and data availability
- Determine effectiveness of *transitions* for meeting objectives, in a specific place

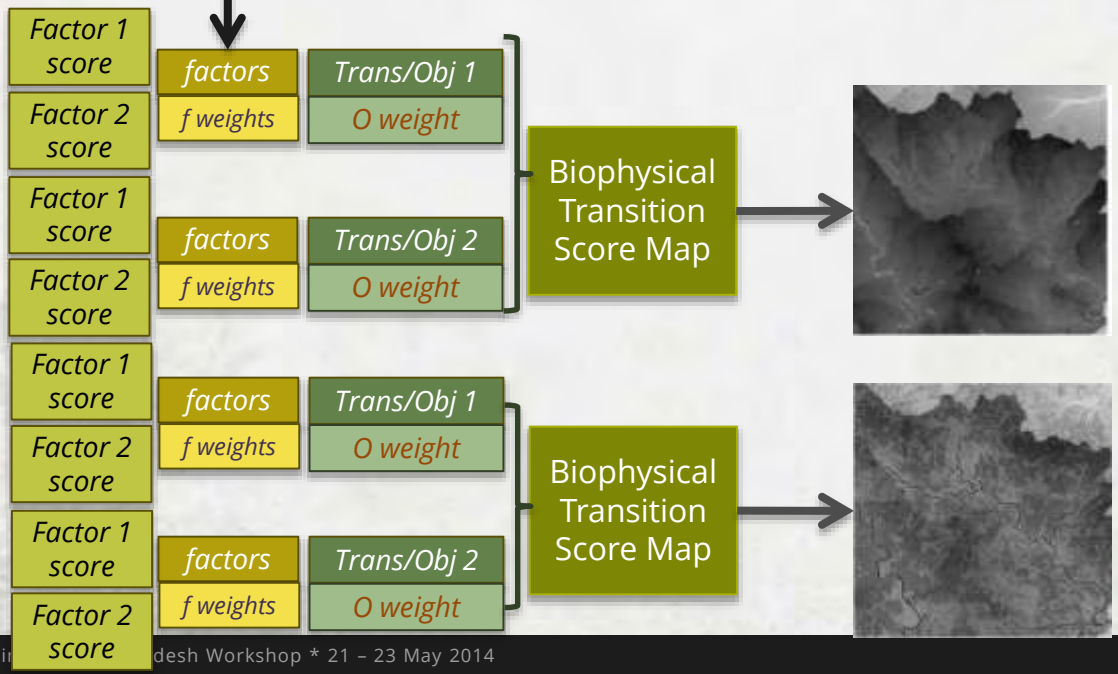
ACTIVITY SCORES

Q: How do landscape characteristics compare to the ideal for each transition?

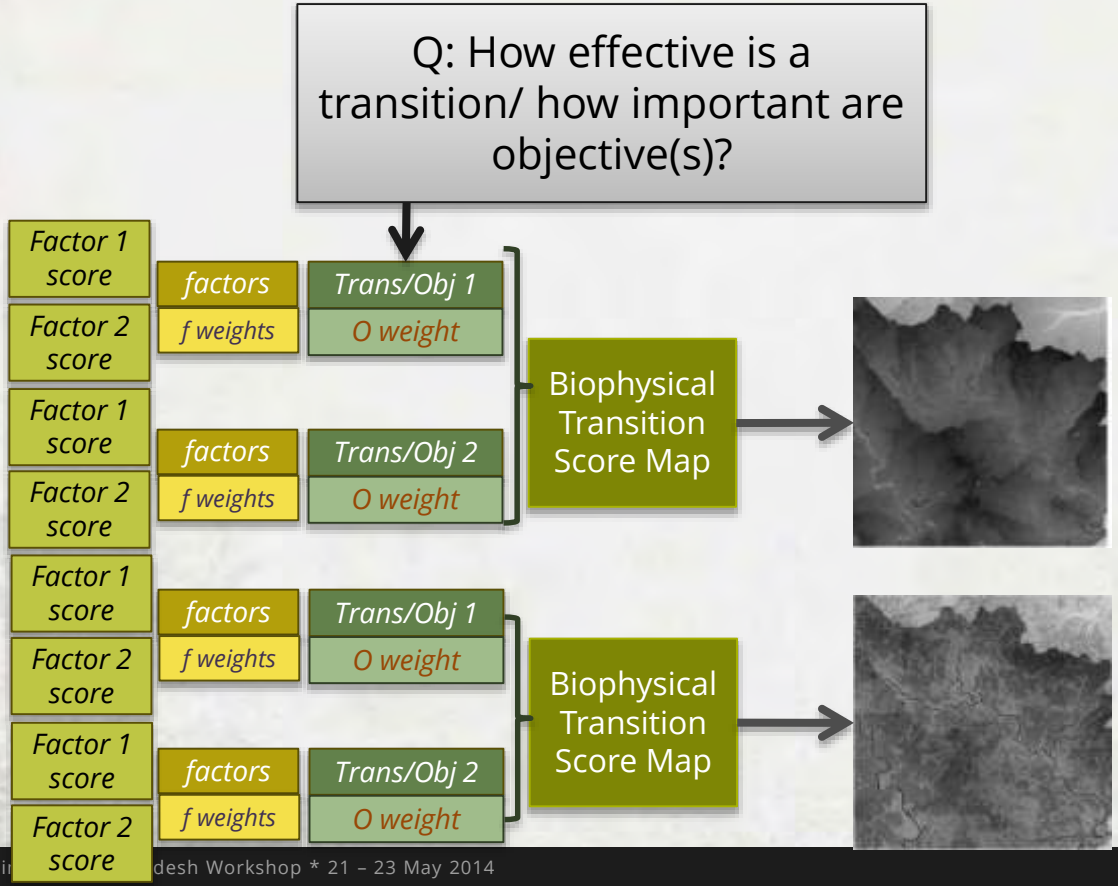


ACTIVITY SCORES

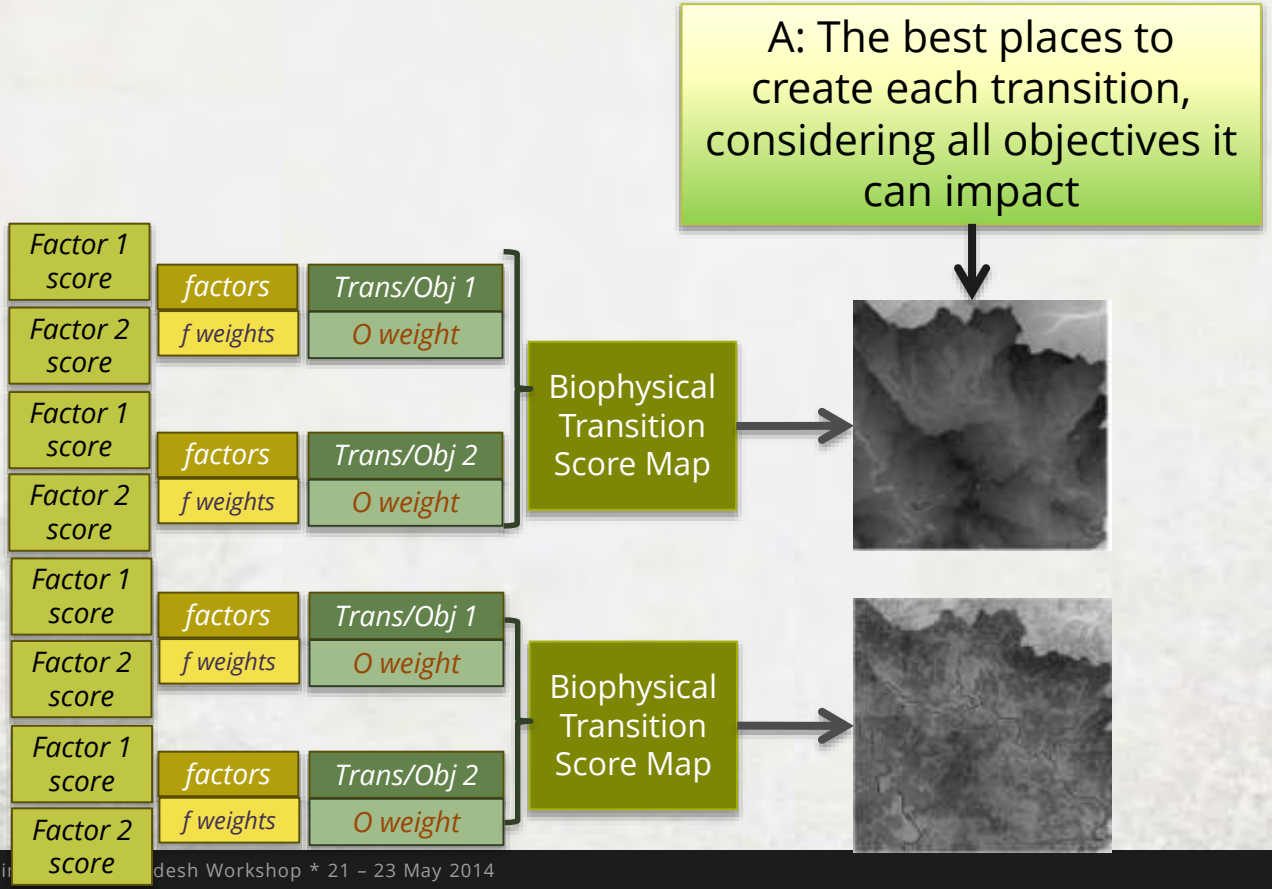
Q: Are some factors more important for determining the effectiveness of a transition ?



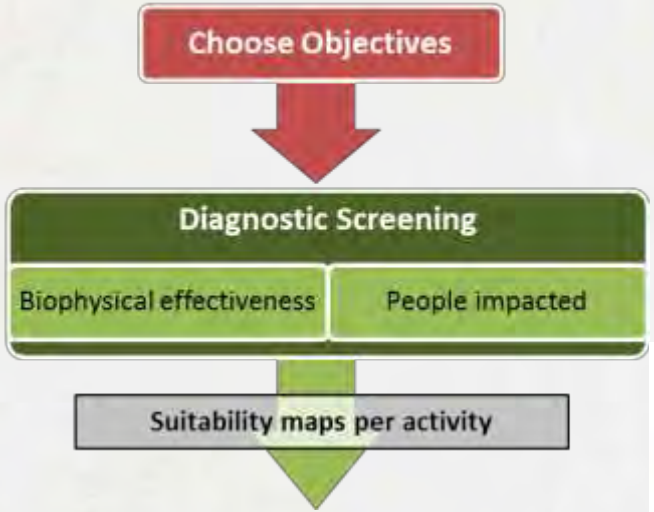
ACTIVITY SCORES

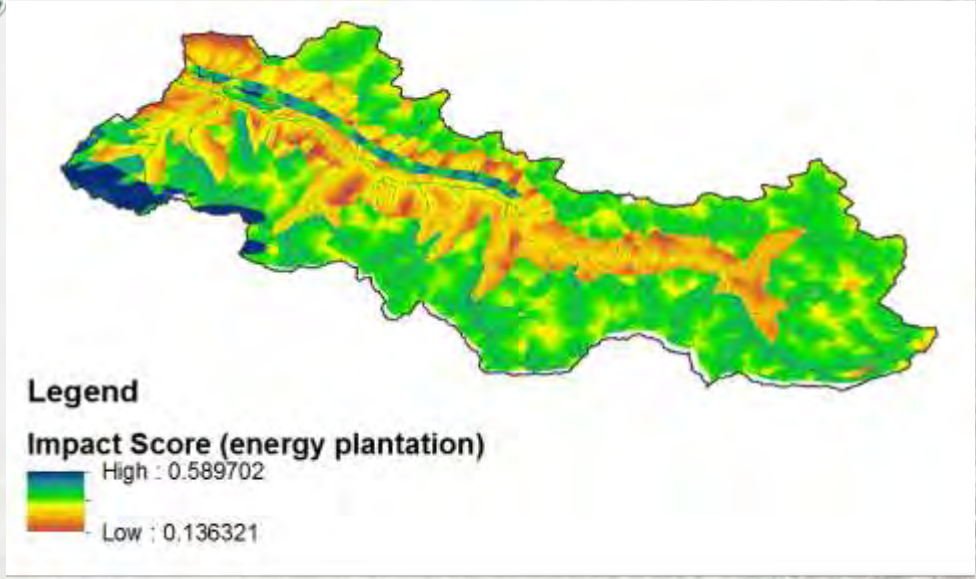


ACTIVITY SCORES

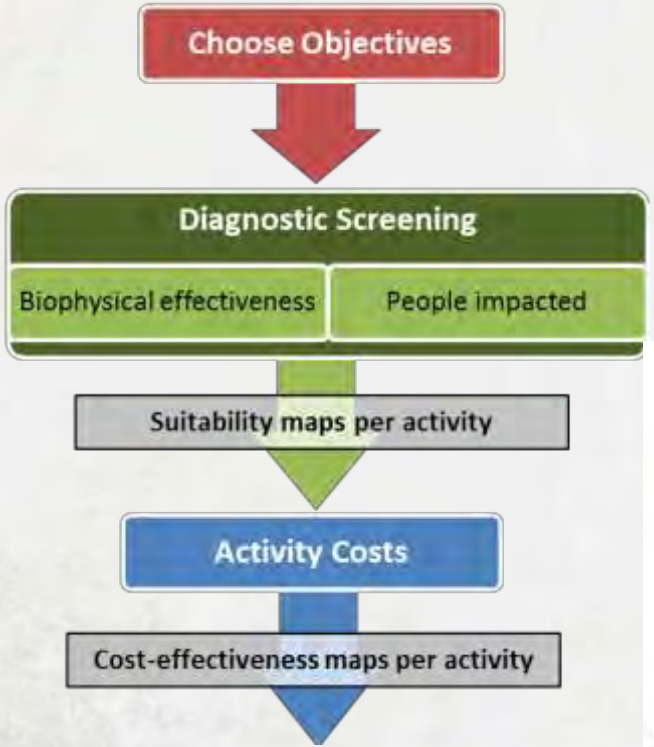


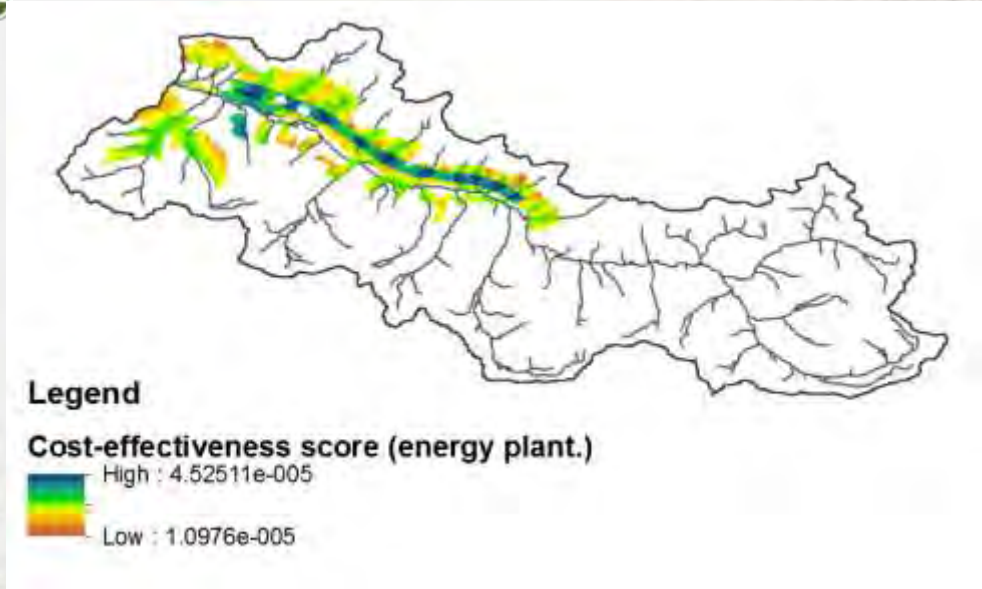
RIOS Steps


Choose Objectives
Diagnostic Screening
Biophysical effectiveness
People impacted
Suitability maps per activity

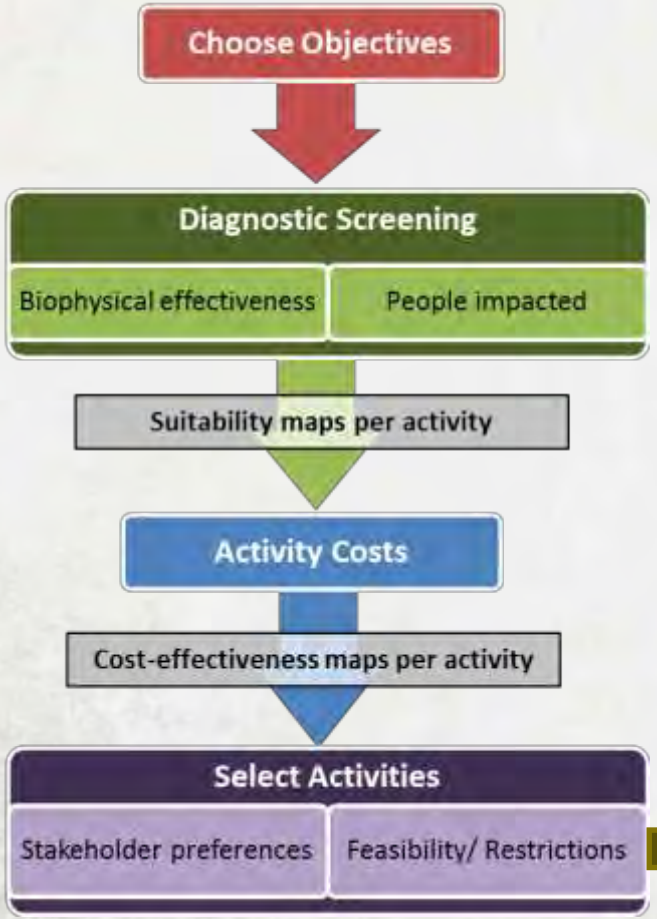

Legend
Impact Score (energy plantation)
High : 0.589702
Low : 0.136321

RIOS Steps

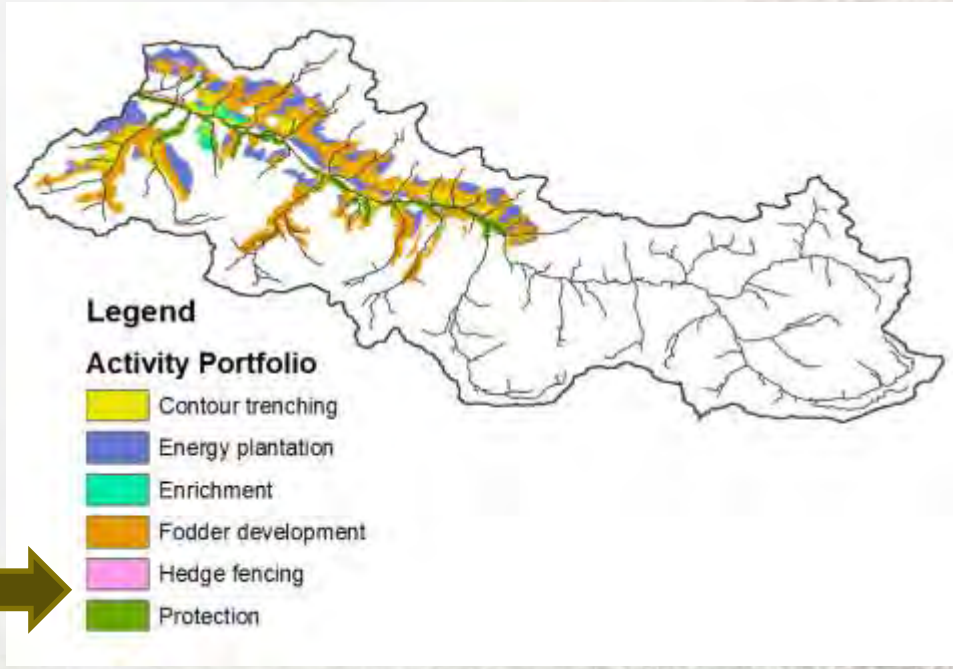

Choose Objectives
Diagnostic Screening
Biophysical effectiveness
People impacted
Suitability maps per activity
Activity Costs
Cost-effectiveness maps per activity

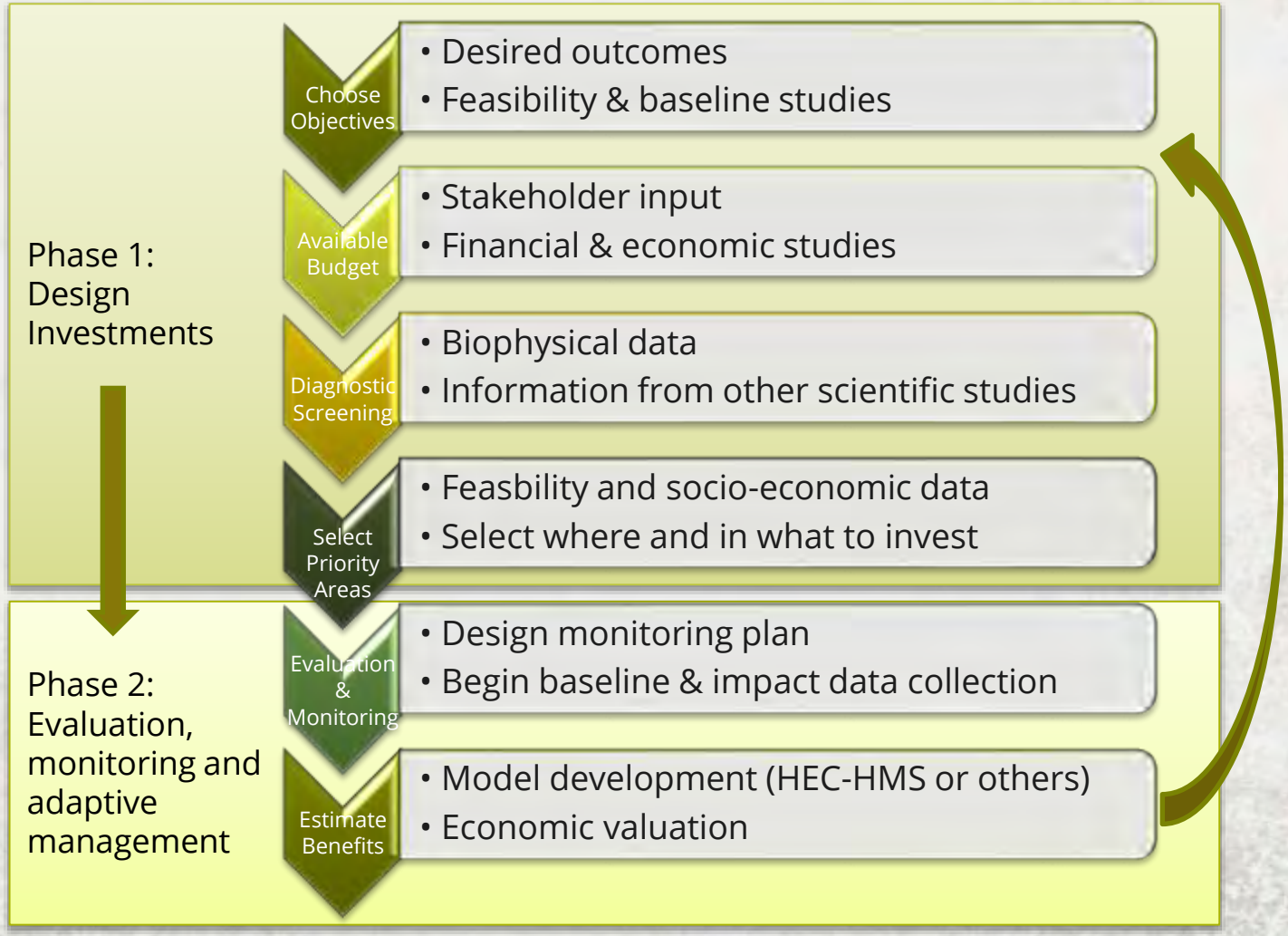

Legend
Cost-effectiveness score (energy plant.)
High : 4.52511e-005
Low : 1.0976e-005

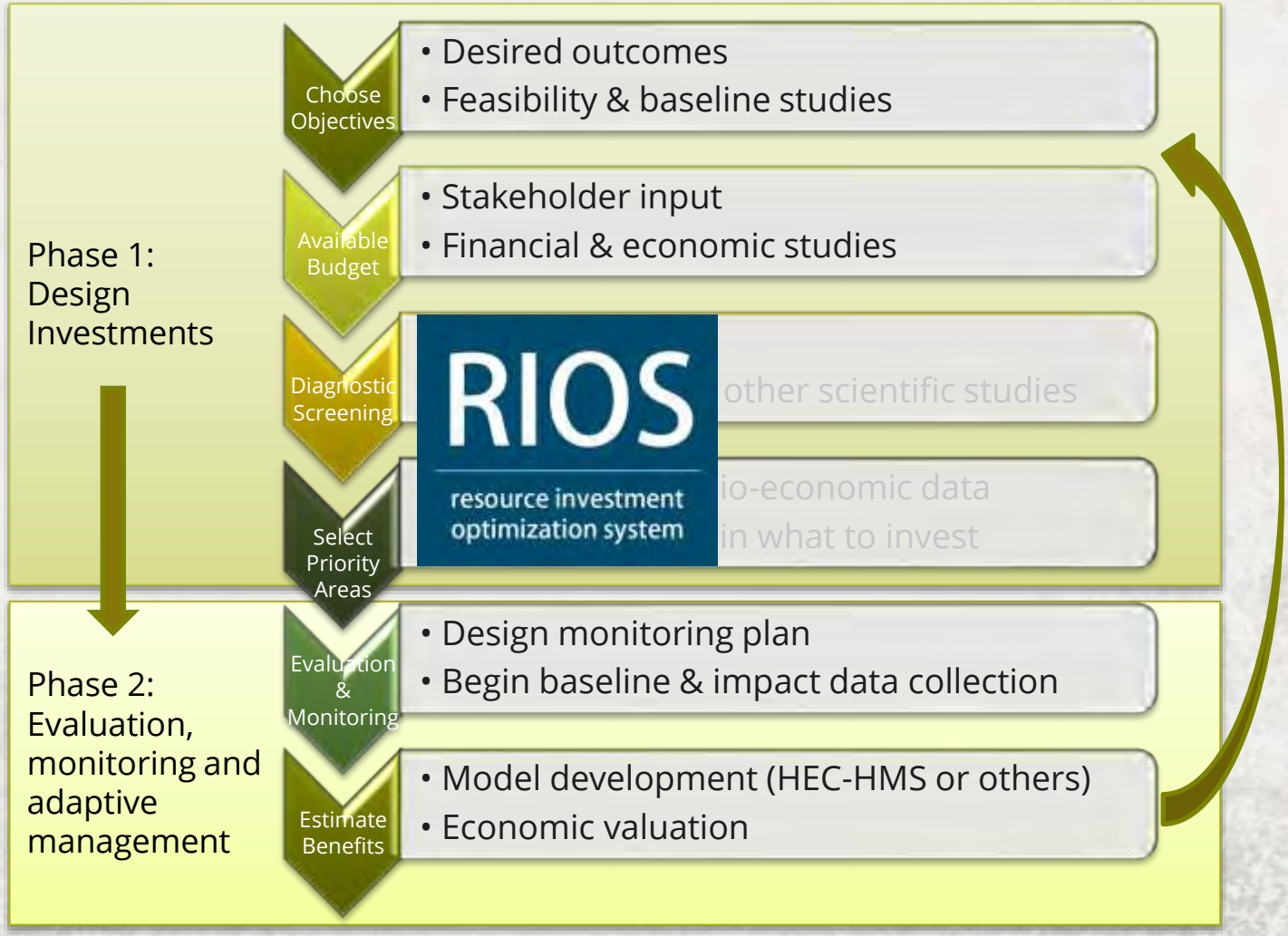
RIOS Steps



WHAT activities to invest in and *WHERE*




Phase 1: Design Investments
Choose Objectives
• Desired outcomes
• Feasibility & baseline studies
Available Budget
• Stakeholder input
• Financial & economic studies
Diagnostic Screening
• Biophysical data
• Information from other scientific studies
Select Priority Areas
• Feasbility and socio-economic data
• Select where and in what to invest
Phase 2: Evaluation, monitoring and adaptive management
Evaluation & Monitoring
• Design monitoring plan
• Begin baseline & impact data collection
Estimate Benefits
• Model development (HEC-HMS or others)
• Economic valuation


Phase 1:
Design
Investments
Choose Objectives
• Desired outcomes
• Feasibility & baseline studies
Available Budget
• Stakeholder input
• Financial & economic studies
Diagnostic Screening
other scientific studies
Select Priority Areas
io-economic data
in what to invest
RIOS
resource investment optimization system
Phase 2:
Evaluation,
monitoring and
adaptive
management
Evaluation & Monitoring
• Design monitoring plan
• Begin baseline & impact data collection
Estimate Benefits
• Model development (HEC-HMS or others)
• Economic valuation

ACKNOWLEDGEMENTS

Development of the RIOS tool was funded by the Gordon & Betty Moore Foundation.

Special thanks to the Water Funds Working Group and the Latin American Water Funds Platform