

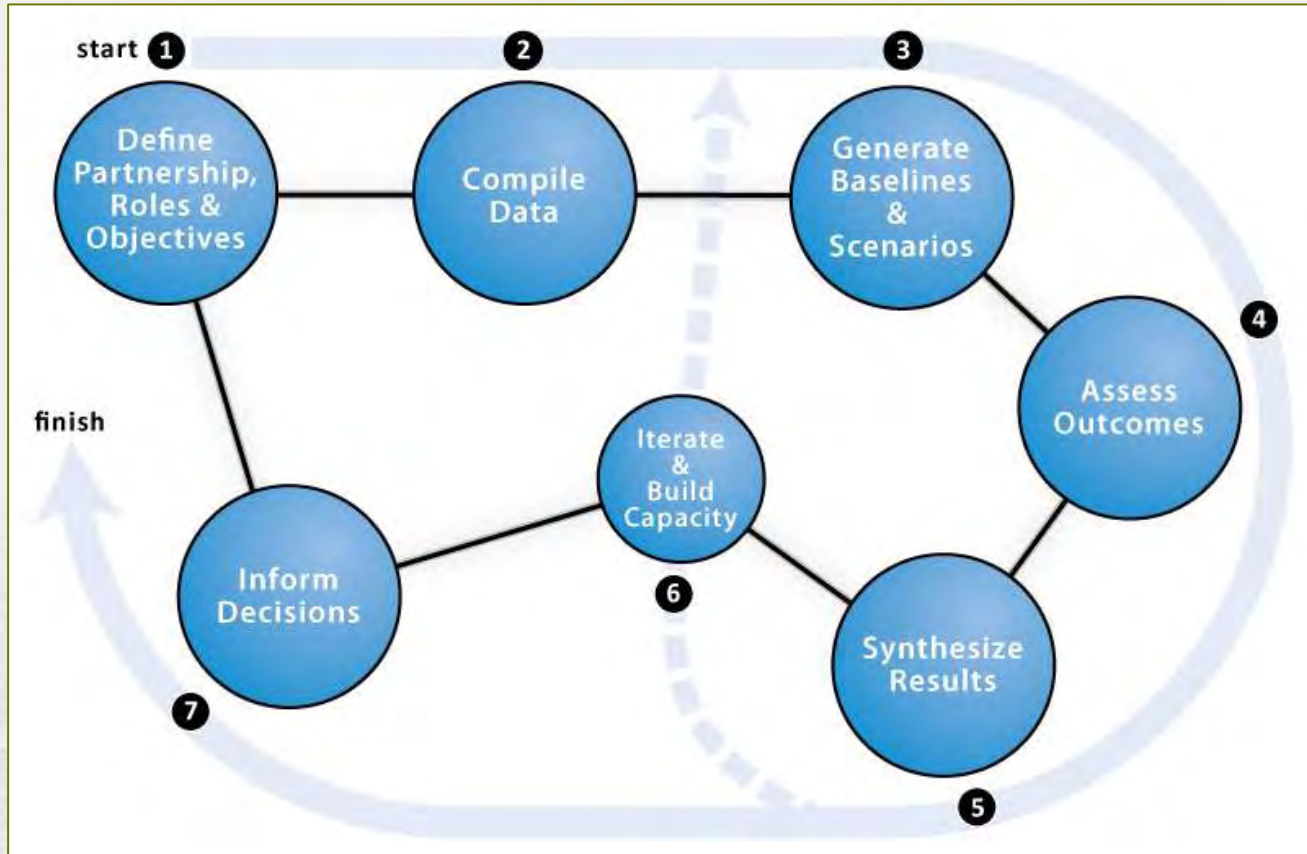
# INVESTING IN WATERSHED SERVICES WITH RIOS

natural  
capital  
PROJECT

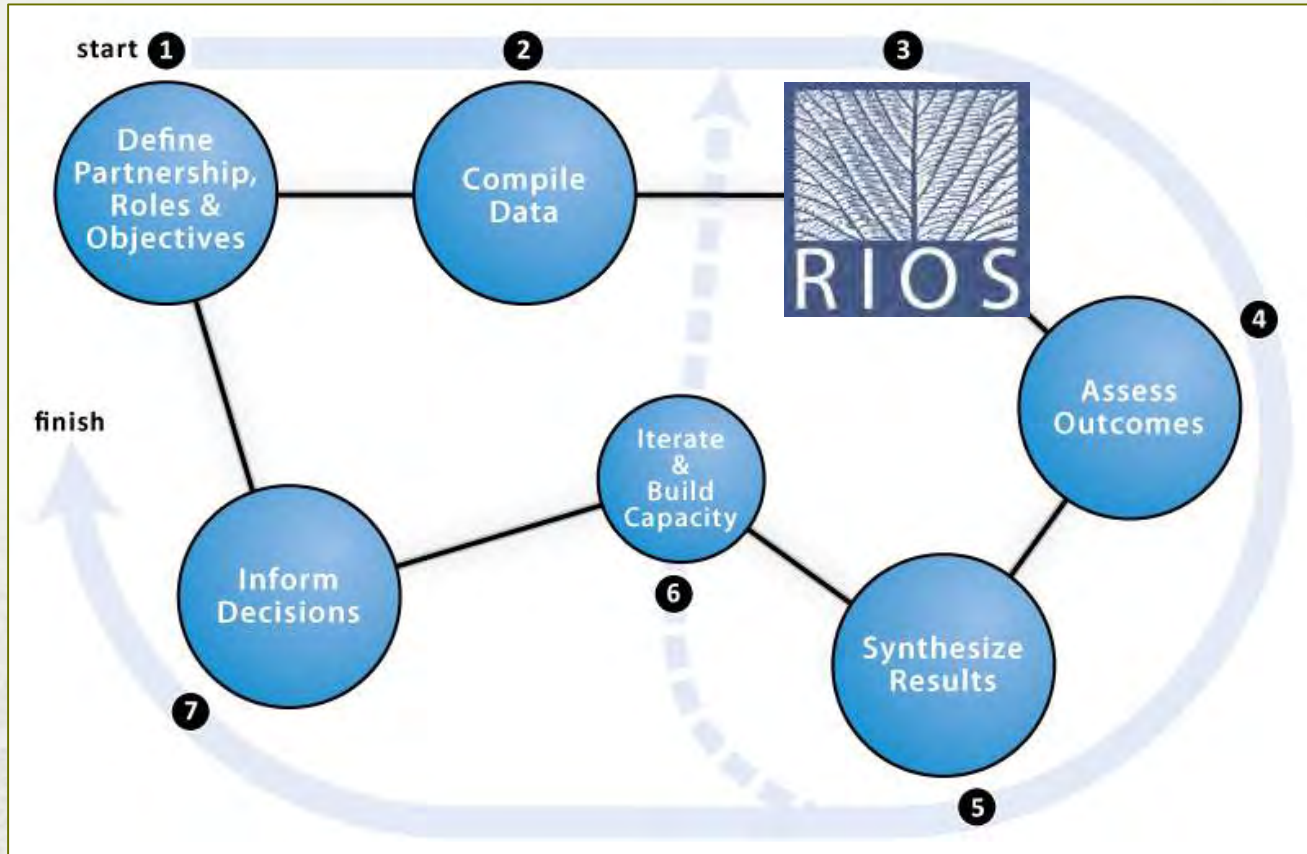


Adrian L. Vogl  
[avogl@stanford.edu](mailto:avogl@stanford.edu)

# RIOS IN CONTEXT



# RIOS IN CONTEXT

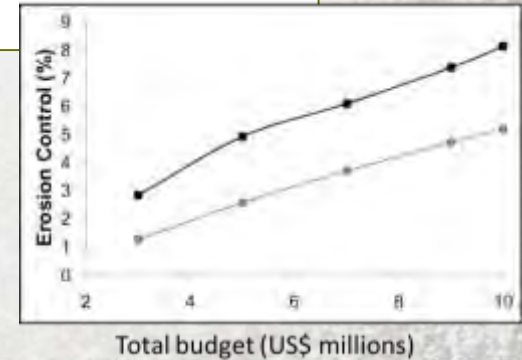
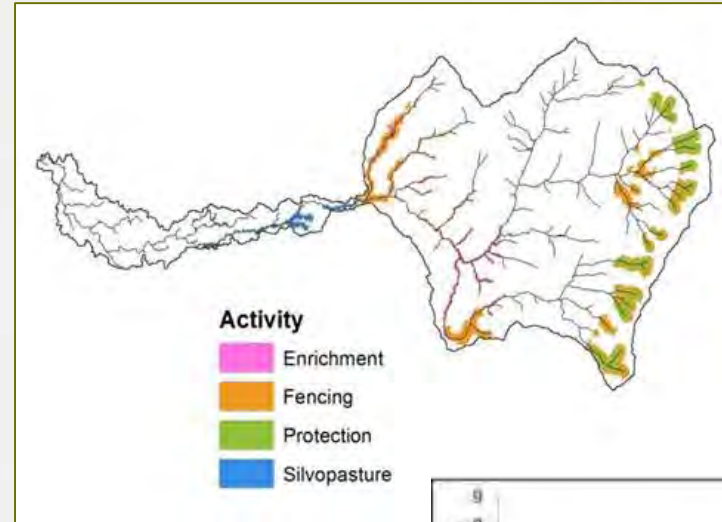


# GOALS

- 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



# EXPANDING WATER FUNDS

## Locations of Water Funds

(in operation as of Jan 2014)

- Created and operating
- In design



Sources: Latin American Water Funds Partnership Dashboard (Nov 2013); TNC Internal Survey of Water Funds (Dec 2013)

# RIOS DEVELOPMENT PROCESS

## Water Fund Investment Prioritization Working Group

### Core Team



### Advisory Group



### Software Development Team



### Science Team



# RIOS INPUTS

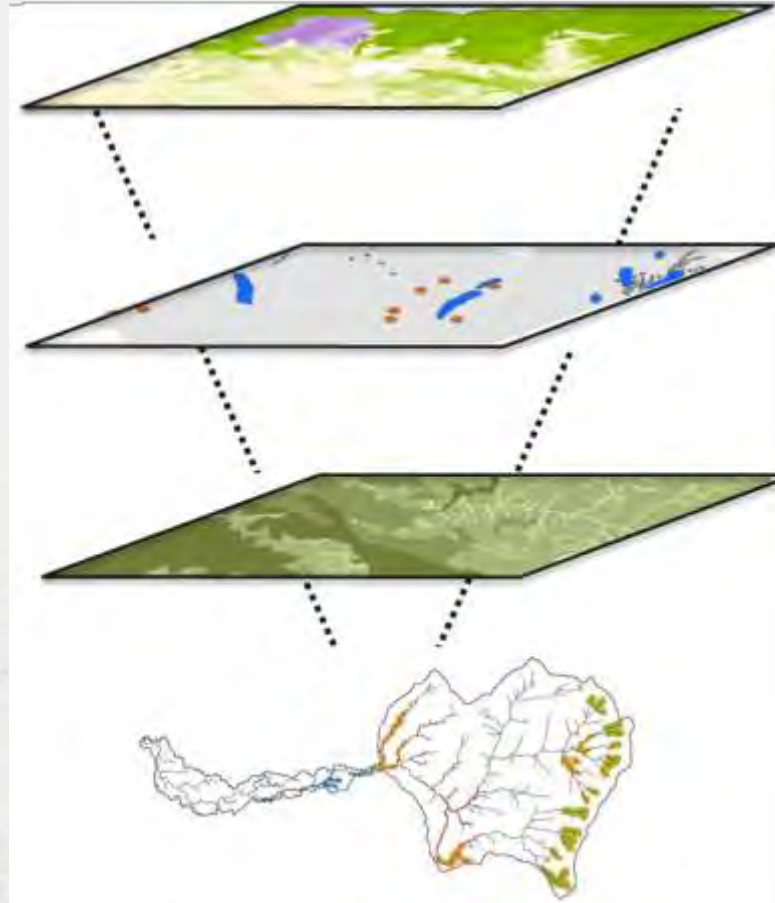
Biophysical  
effectiveness

Feasible  
activities

Stakeholder  
preferences

Cost data  
Budget

Investment  
Portfolio





# TYPES OF DATA

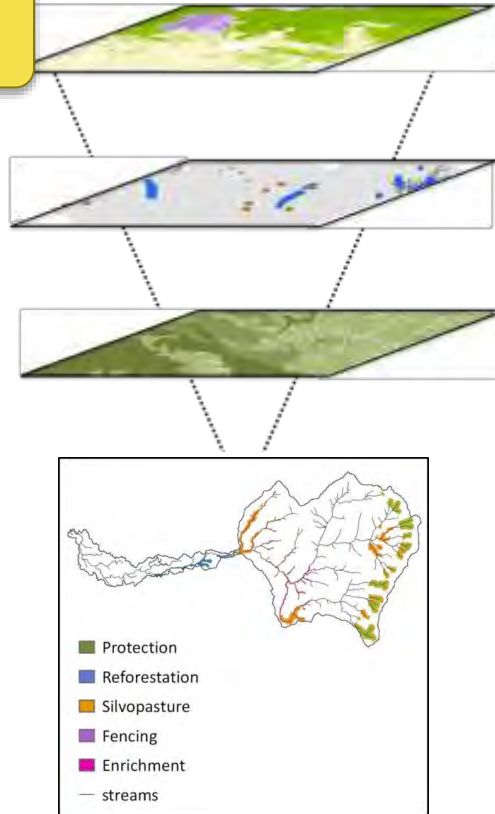
## Biophysical effectiveness

Feasible activities

Stakeholder preferences

Cost data  
Budget

Investment portfolio



## 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

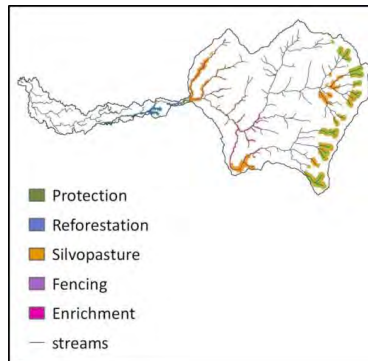
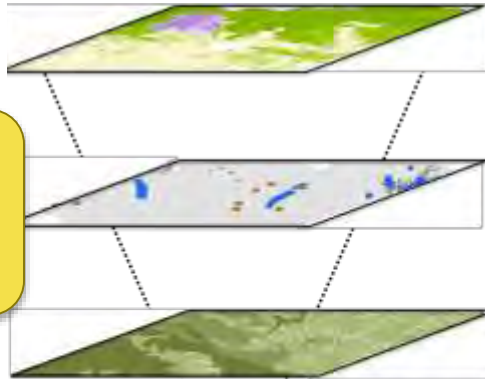
# TYPES OF DATA

Biophysical  
effectiveness

**Feasibility  
and  
preferences**

Cost data  
Budget

Investment  
portfolio



**Stakeholder  
preferences**

**Legal and  
logistical  
restrictions**

**Opportunity cost**

**Feasible locations**

# TYPES OF DATA

Biophysical  
effectiveness



Feasible  
activities

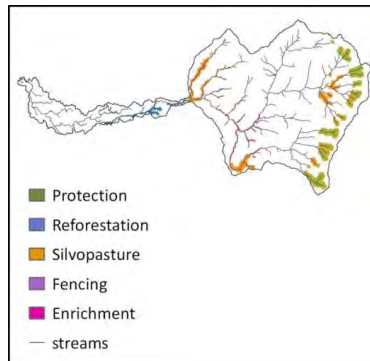


Stakeholder  
preferences



**Cost data &  
budget**

Investment  
portfolio



**How much do  
activities cost?**

Implementation,  
maintenance, payments

**Total budget**



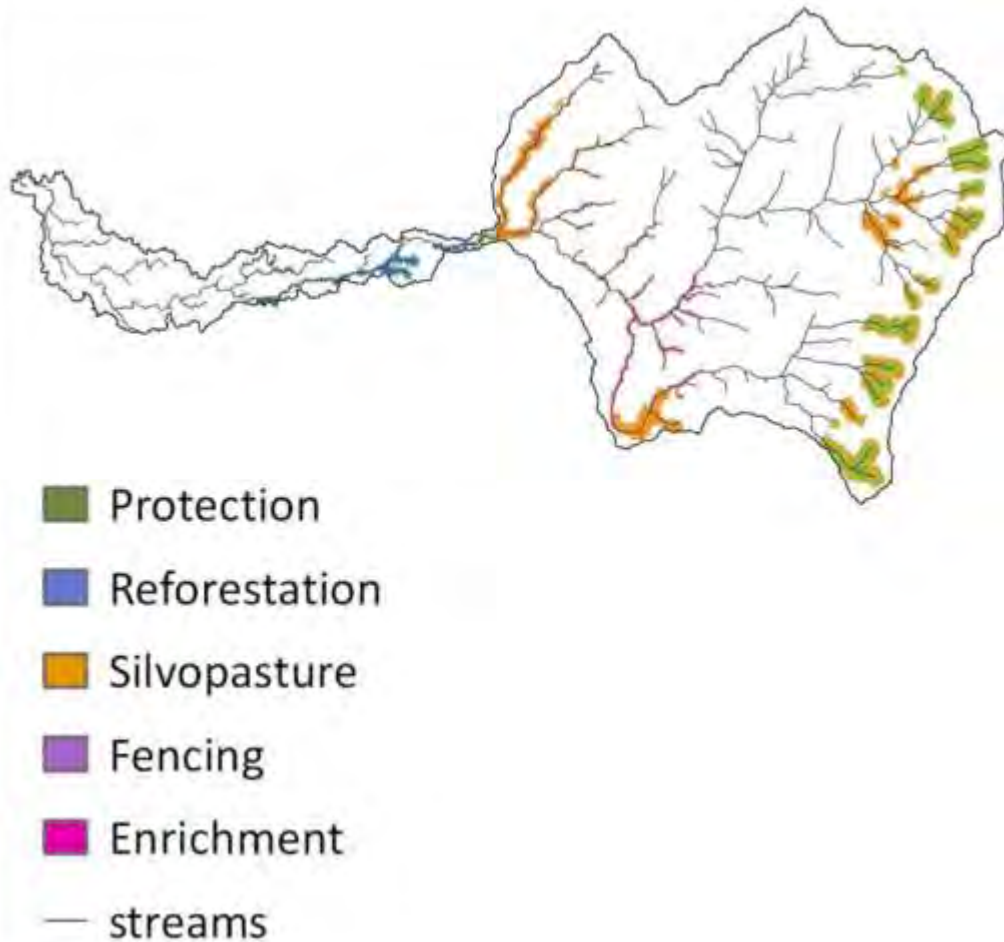
Biophysical  
effectiveness

Feasible  
activities

Stakeholder  
preferences

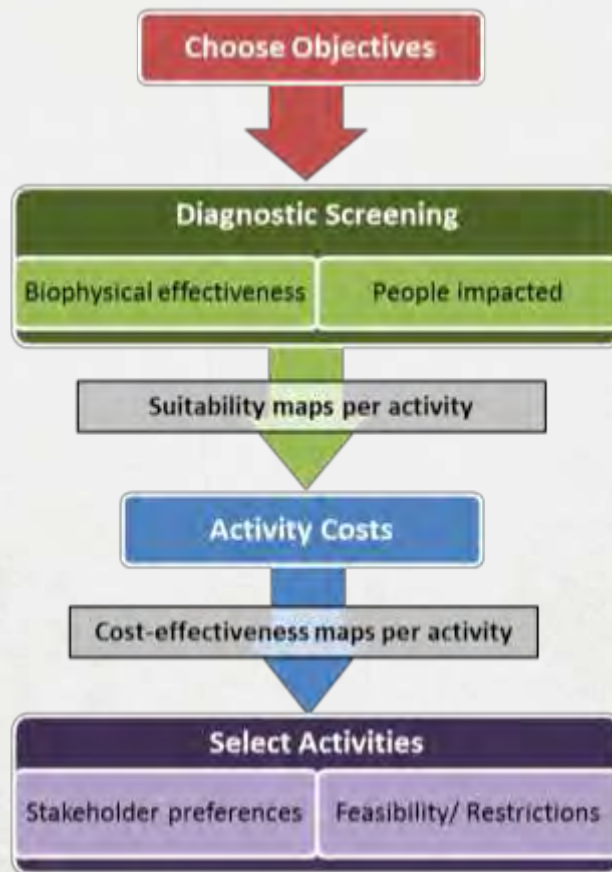
Cost data  
Budget

## Investment portfolio





# OVERVIEW OF RIOS WORKFLOW



# CHOOSE OBJECTIVES

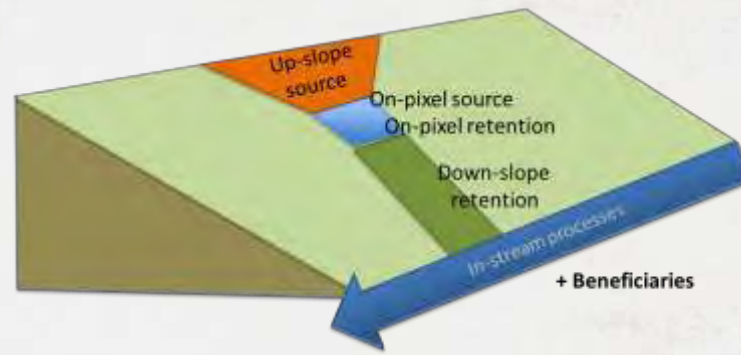
## SERVICES

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

# DIAGNOSTIC SCREENING

# KEY FACTORS

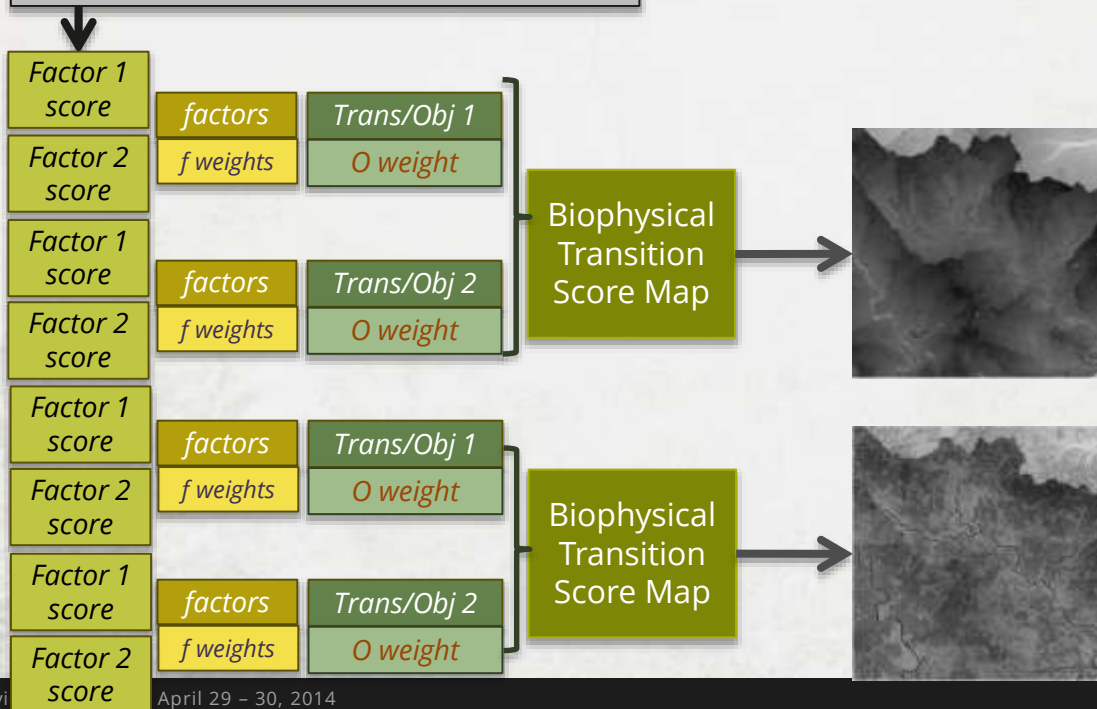
- Factors determined through literature review
- Compromise between process representation and data availability
- Determine effectiveness of *transitions* for meeting objectives, in a specific place



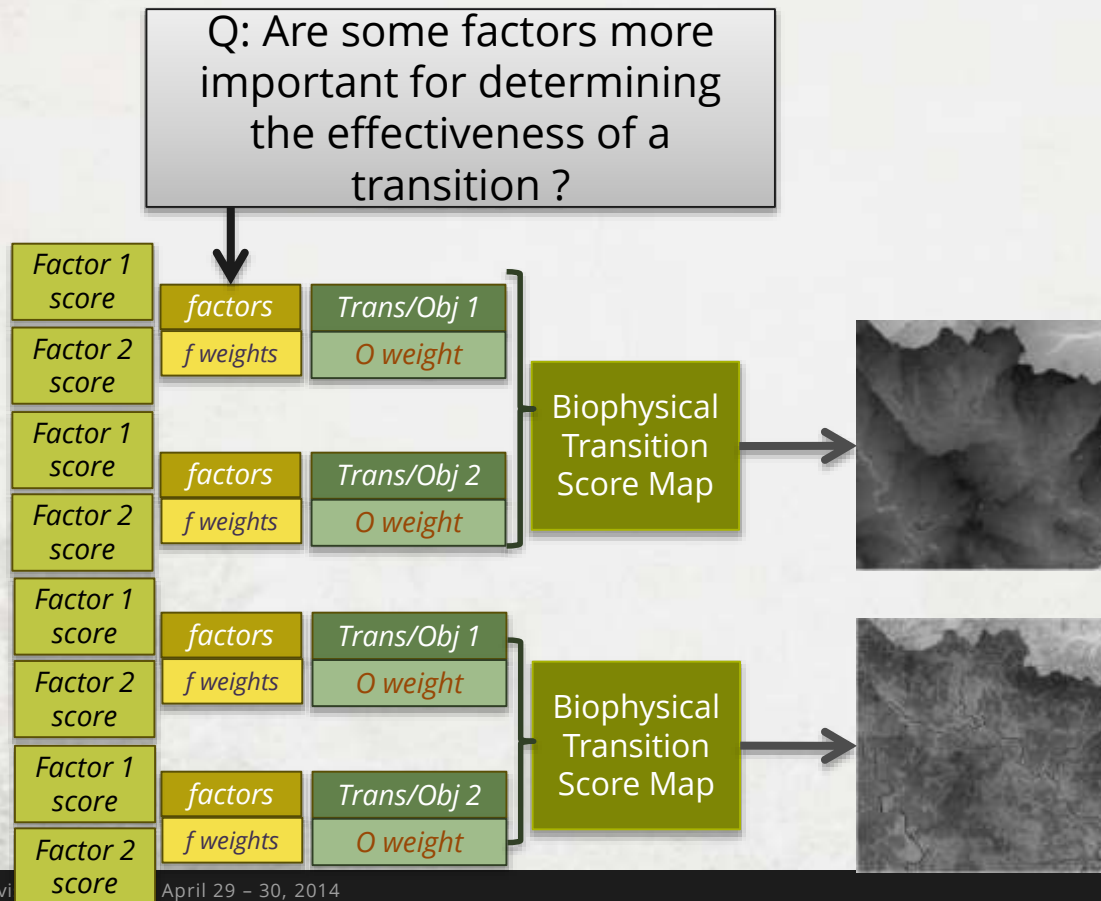


# ACTIVITY SCORES

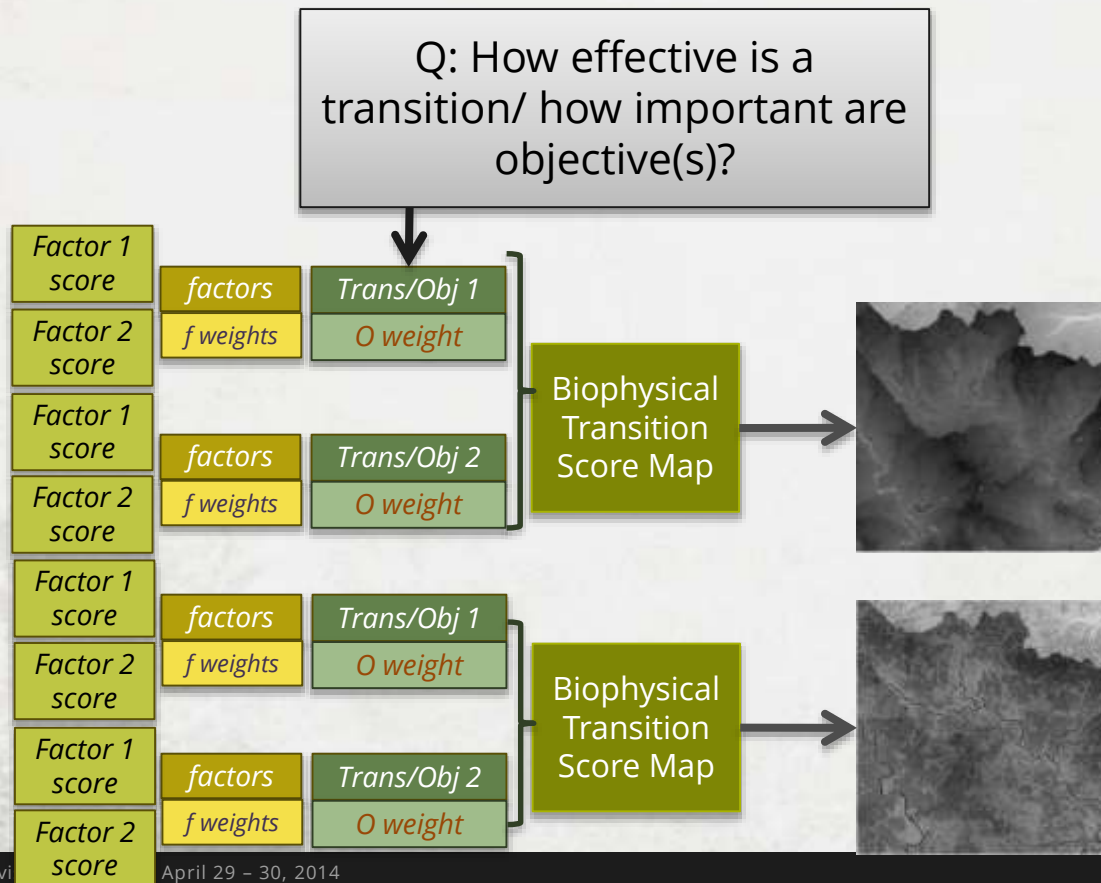
Q: How do landscape characteristics compare to the ideal for each transition?



# ACTIVITY SCORES

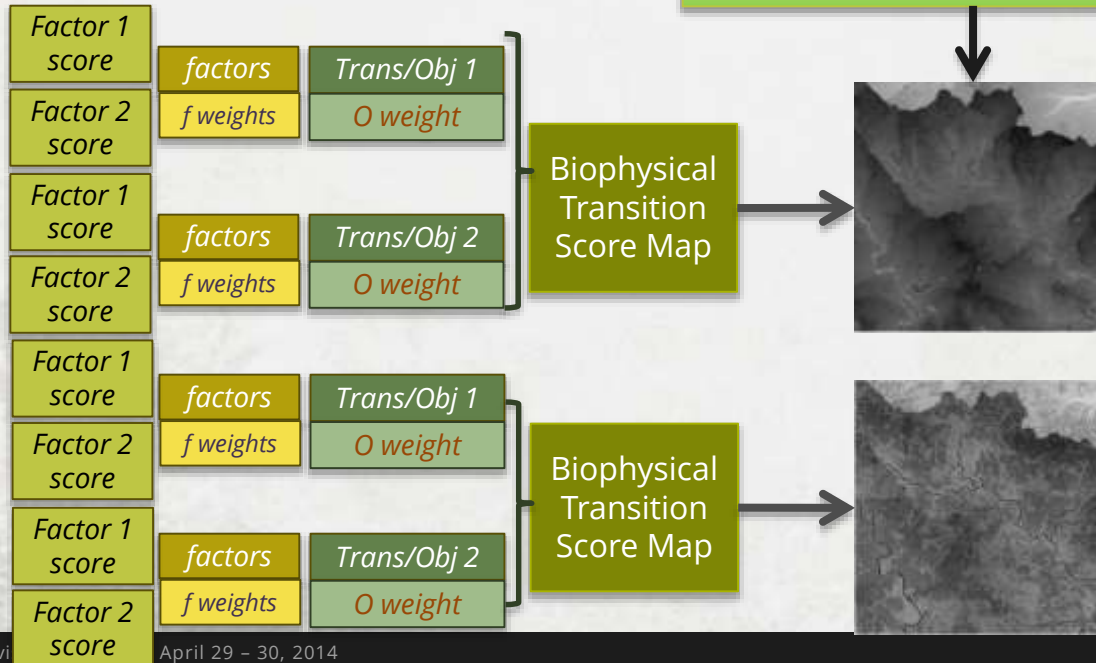


# ACTIVITY SCORES



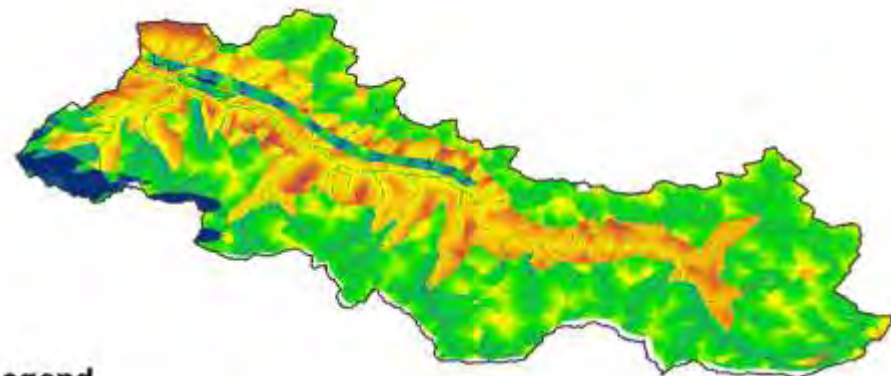
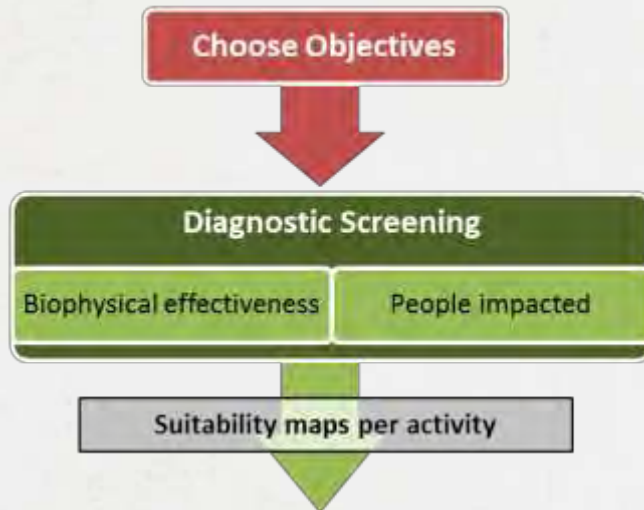
# ACTIVITY SCORES

A: The best places to create each transition, considering all objectives it can impact





## RIOS Steps

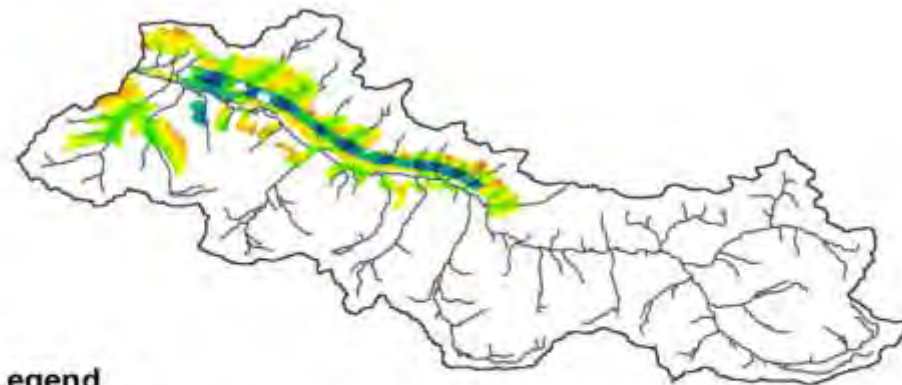
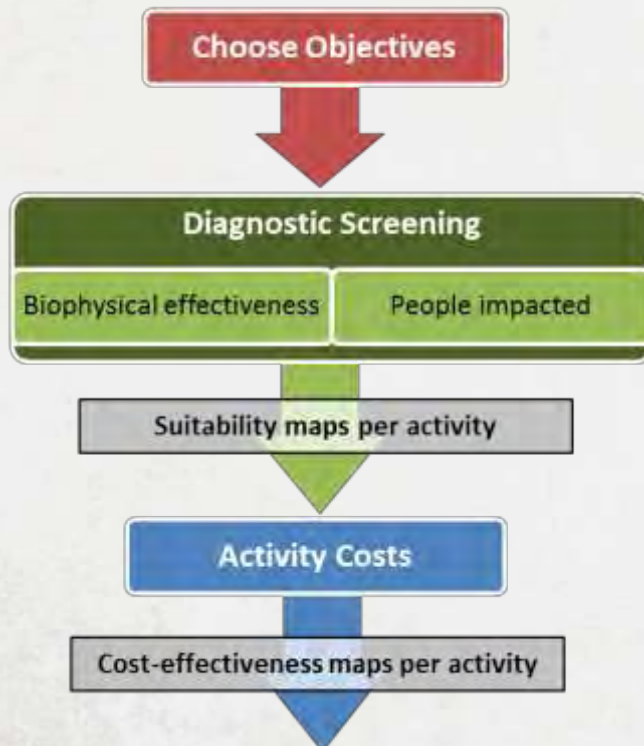


### Legend

Impact Score (energy plantation)

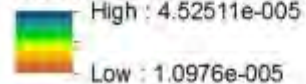


## RIOS Steps

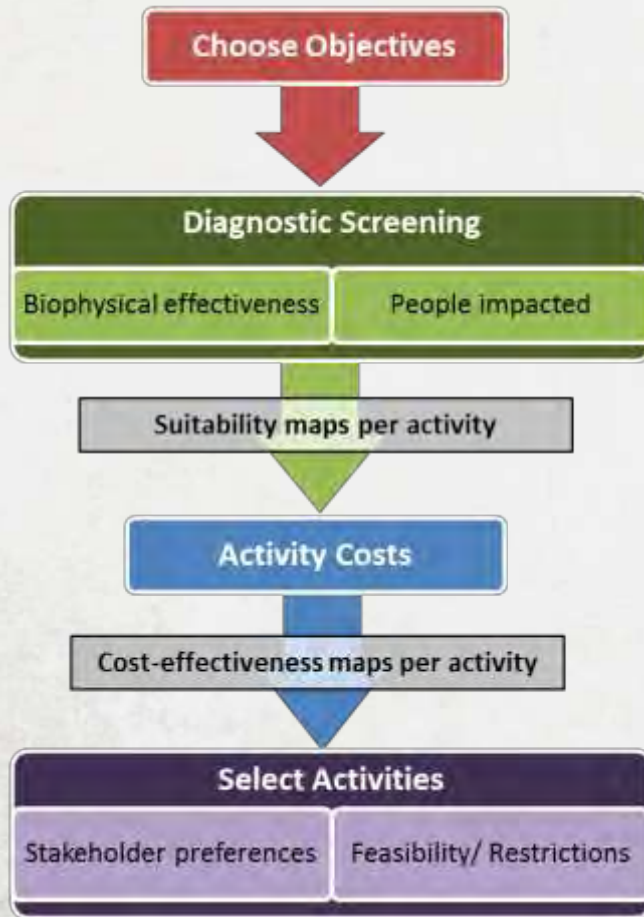


### Legend

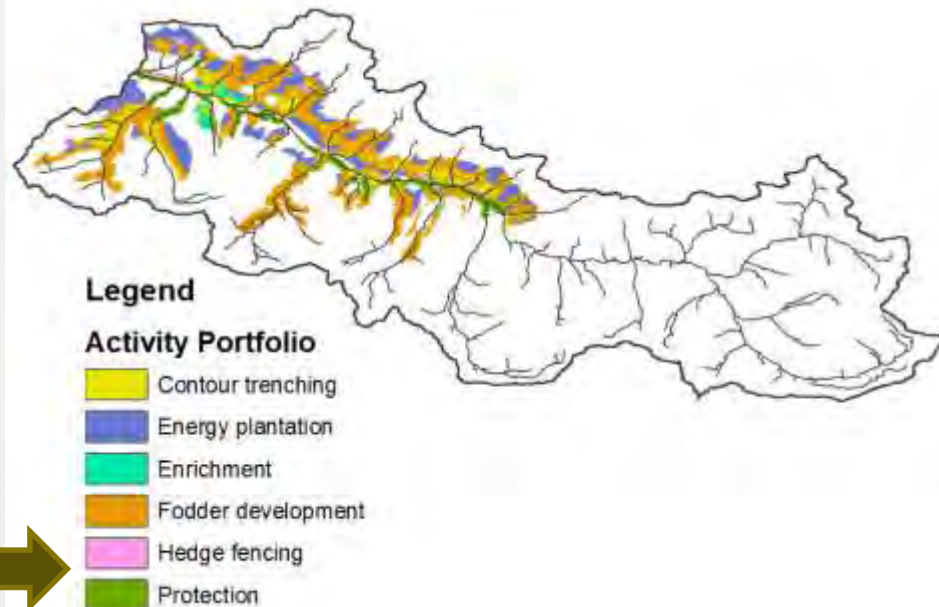
Cost-effectiveness score (energy plant.)

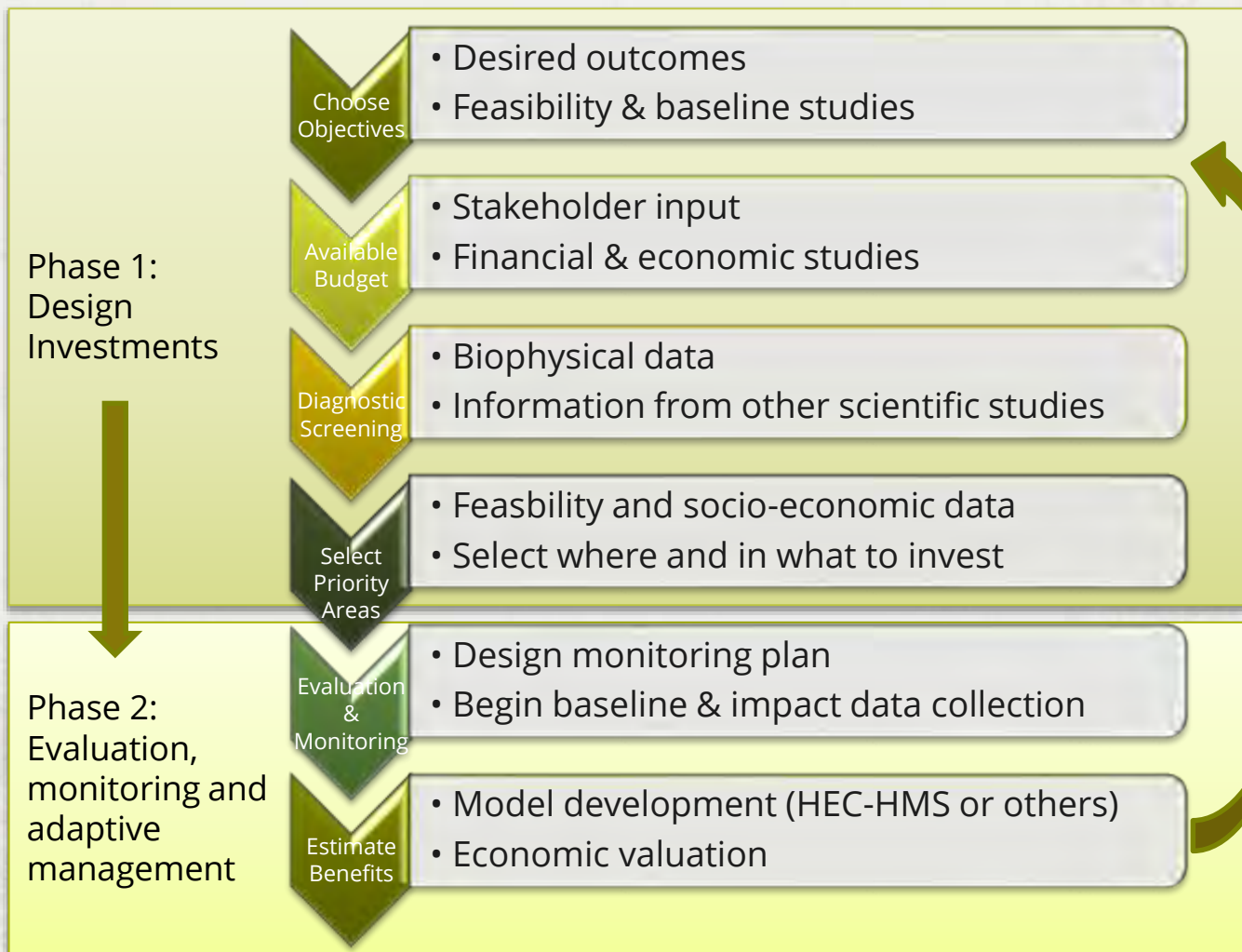


## RIOS Steps

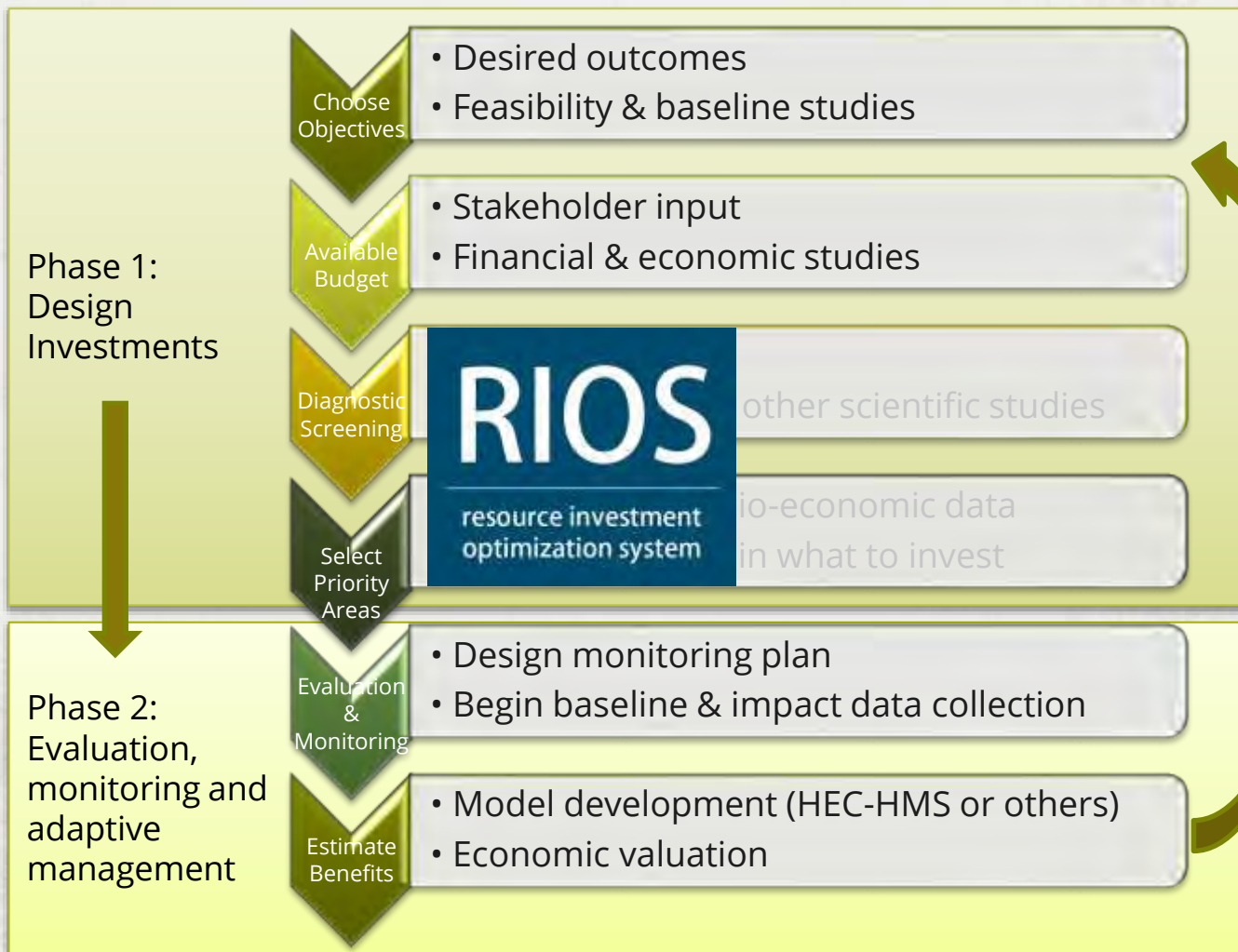


**WHAT** activities to invest in and **WHERE**









# ACKNOWLEDGEMENTS

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



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Conservancy



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ENVIRONMENT  
UNIVERSITY OF MINNESOTA  
Driven to Discover™