INVESTING IN WATERSHED SERVICES WITH RIOS

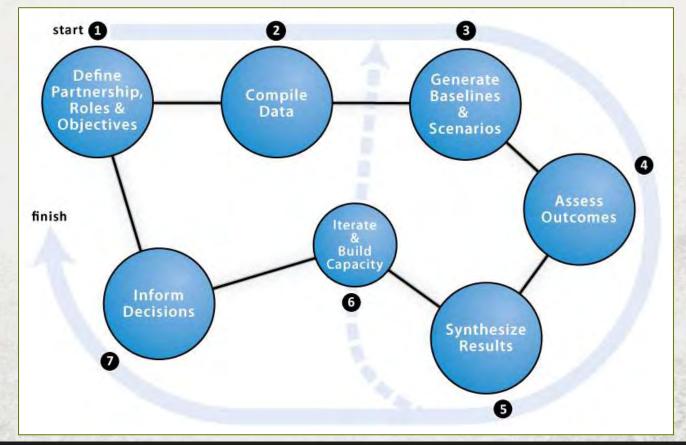




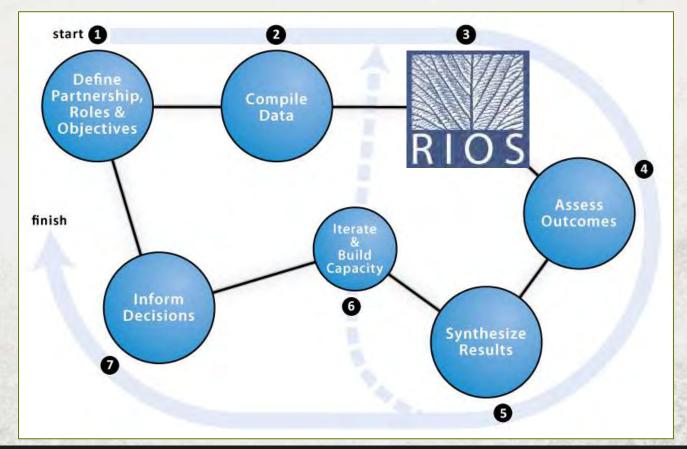
Adrian L. Vogl avogl@stanford.edu

RIOS IN CONTEXT





RIOS IN CONTEXT



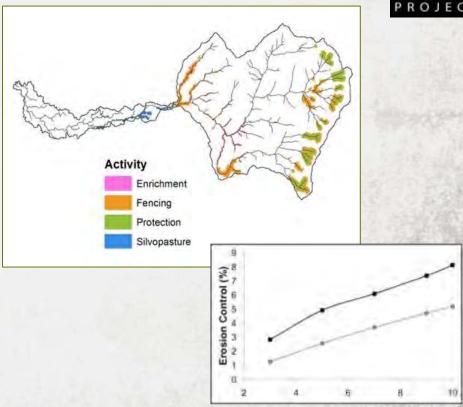
GOALS

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

QUESTIONS

- Which activities are most costeffective?
- Where should I do them?



Total budget (US\$ millions)



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

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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

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Water Fund Investment Prioritization Working Group

Core Team





















Science Team





RIOS INPUTS

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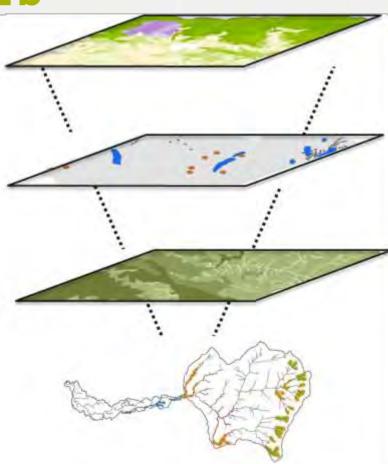
Biophysical effectiveness

Feasible activities

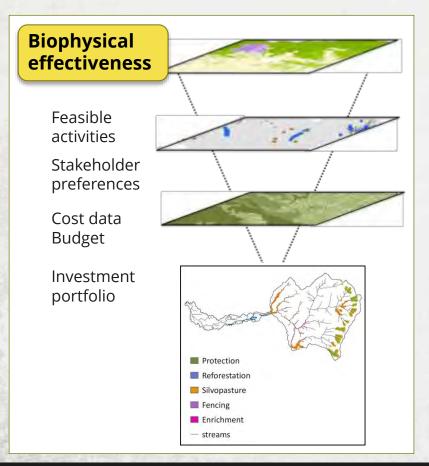
Stakeholder preferences

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

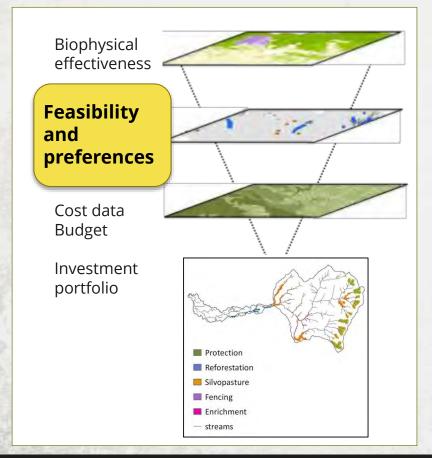
Soil detachment and transport potential due to rainfall

Watershed Areas

Catchment areas, beneficiaries

TYPES OF DATA





Stakeholder preferences

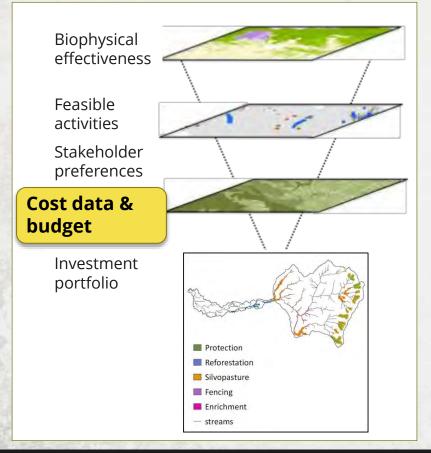
Legal and logistical restrictions

Opportunity cost

Feasible locations

TYPES OF DATA





How much do activities cost?

Implementation, maintenance, payments

Total budget \$

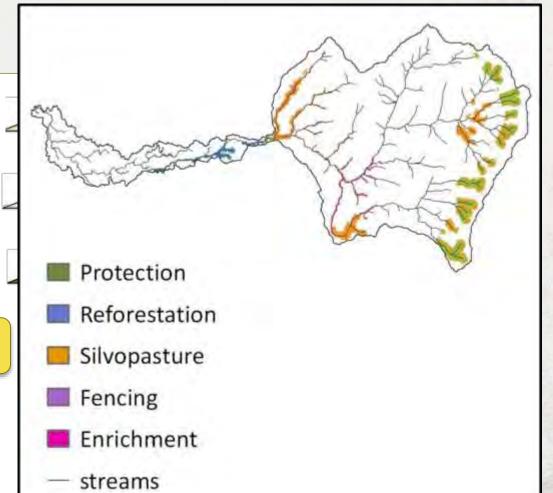
Biophysical effectiveness

Feasible activities

Stakeholder preferences

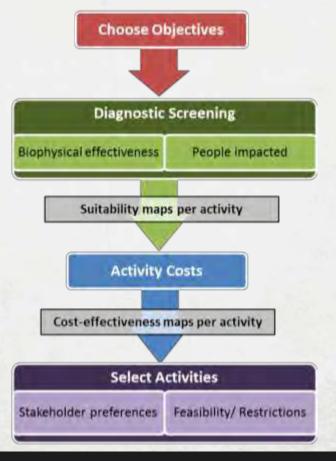
Cost data Budget

Investment portfolio



OVERVIEW OF RIOS WORKFLOW





CHOOSE OBJECTIVES



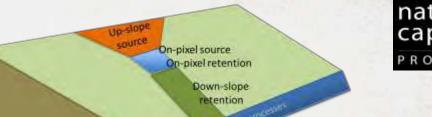
SERVICES

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

DIAGNOSTIC SCREENING



KEY FACTORS



+ Beneficiaries



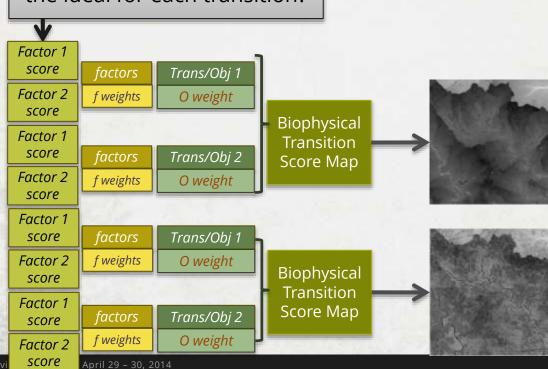
Factors determined
 through literature review

Compromise between process representation and data availability

 Determine effectiveness of transitions for meeting objectives, in a specific place



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



TNC Eastern Divi

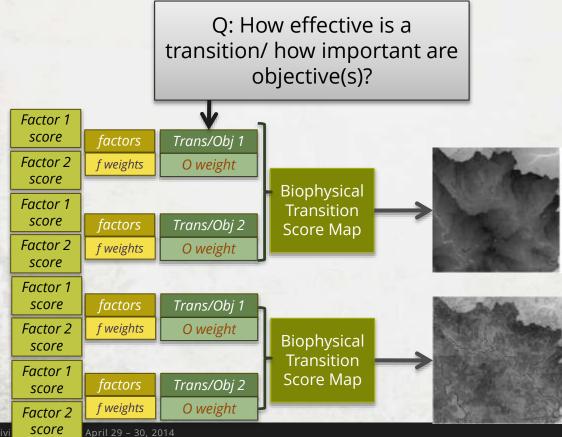
17

April 29 - 30, 2014

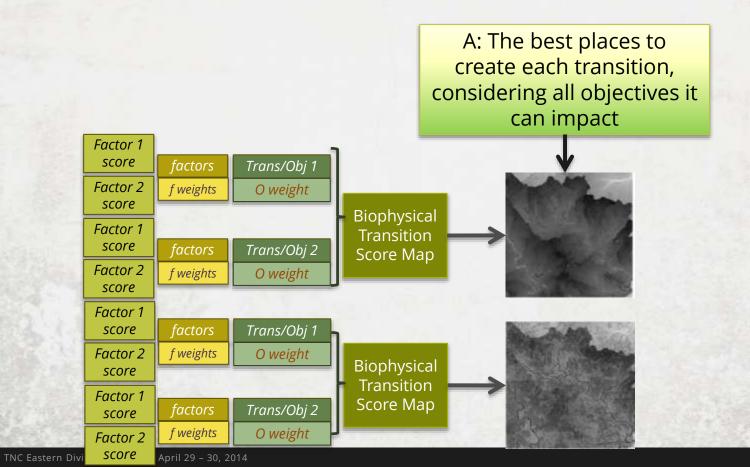


Q: Are some factors more important for determining the effectiveness of a transition? Factor 1 score Trans/Obj 1 factors Factor 2 O weight f weights score **Biophysical** Factor 1 **Transition** score Trans/Obj 2 Score Map Factor 2 f weights O weight score Factor 1 Trans/Obj 1 score factors O weight Factor 2 f weights Biophysical score **Transition** Factor 1 Score Map Trans/Obj 2 factors score f weights O weight Factor 2 score



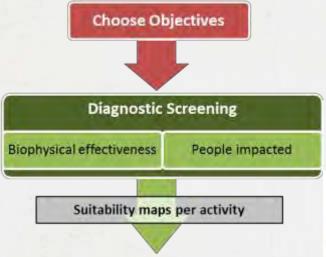


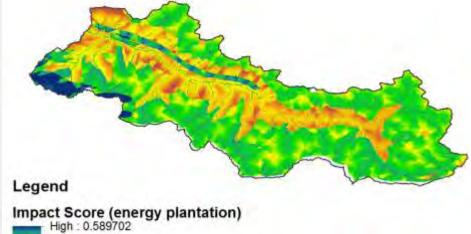




RIOS Steps





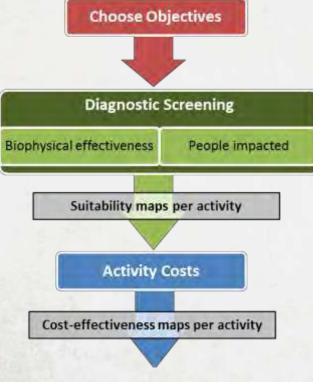


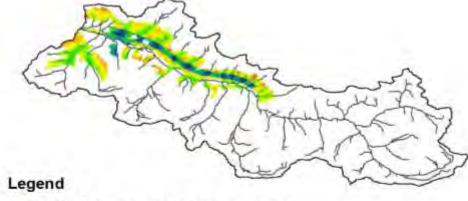
Low: 0.136321

RIOS Steps







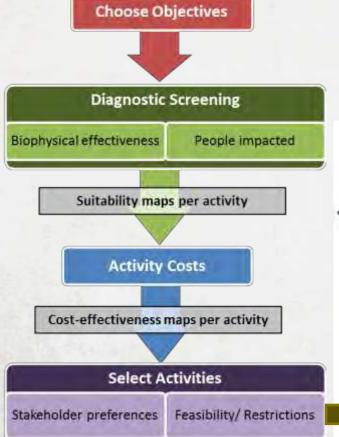


Cost-effectiveness score (energy plant.)
High: 4.52511e-005

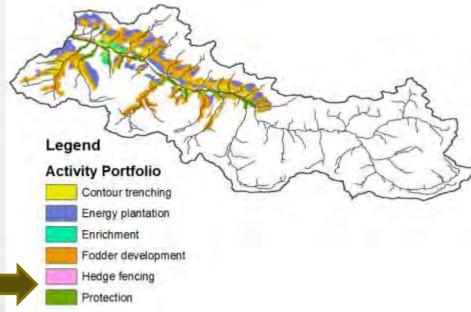
Low: 1.0976e-005

RIOS Steps





WHAT activities to invest in and WHERE



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Desired outcomes

Feasibility & baseline studies

Phase 1: Design Investments Available Budget

Choose

Objectives

- 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

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PROJECT

Desired outcomes

Feasibility & baseline studies

Phase 1: Design Investments Available

Choose

Objectives

- Stakeholder input
- Financial & economic studies

Diagnostic Screening RIOS

Select Priority **Areas**

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

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ACKNOWLEDGEMENTS

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