Strategic Interactions Across Boundaries in Invasive Plant Control and Implications for Cooperation

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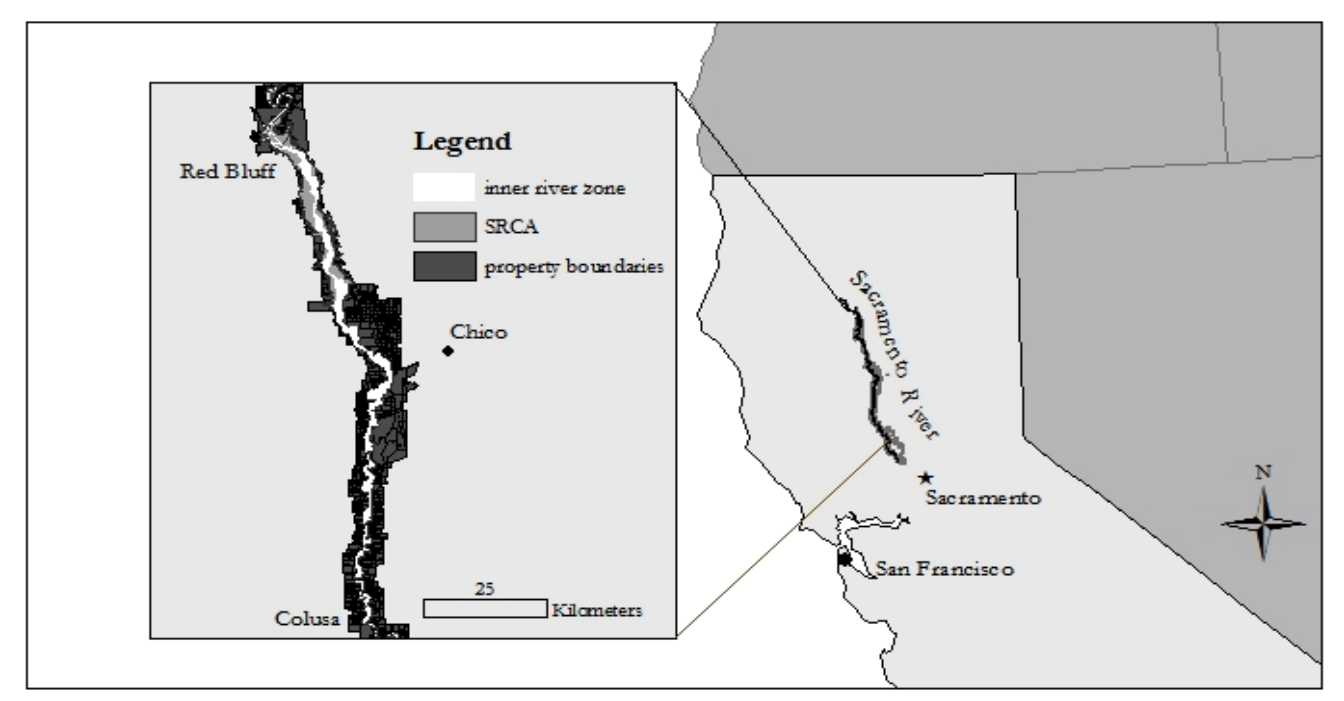
Talk Overview

- Story of the Sacramento River Conservation Area Conflicts and Setbacks
- Drivers of undesirable outcomes for native species restoration
- Understanding decision-making by landowners and how it interacts with your own decisions
- Techniques for avoiding these undesirable outcomes
- Application to the Cal-IPC Invasive Plant Inventory

Decision Concepts

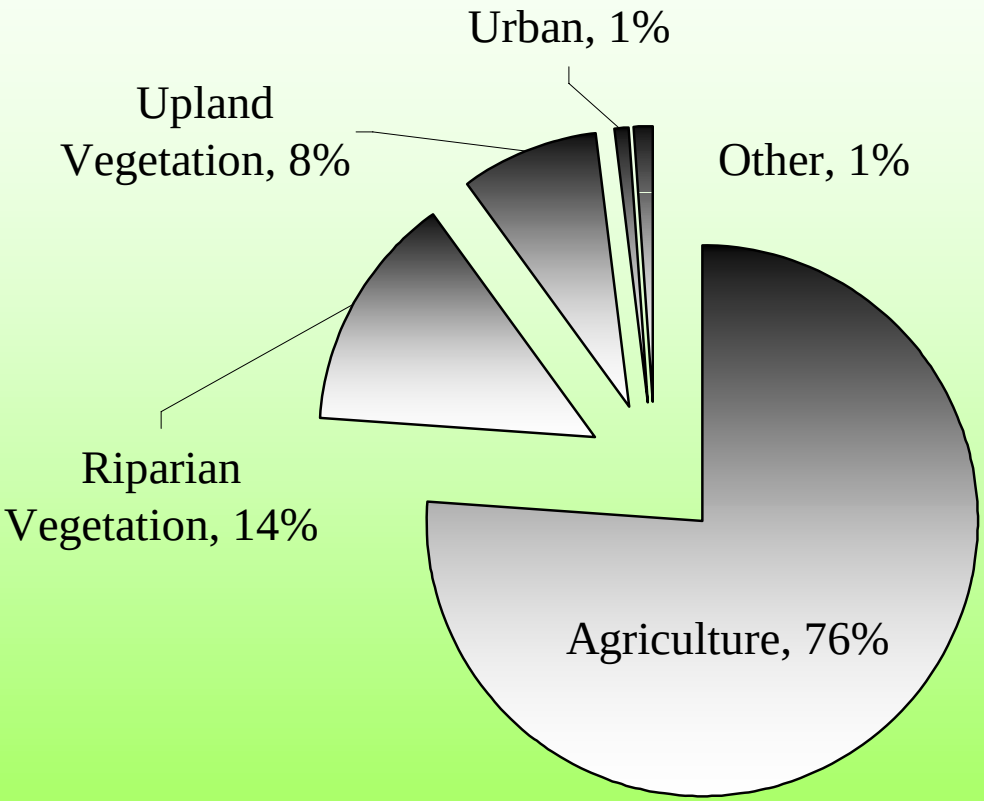
- Strategic Decision-Making
  - Consider responsive actions of others.
  - Factor feedbacks into outcome expectations.
- Cooperative Decision-Making
  - Communicate and coordinate actions
  - Equitably distribute gains to maintain buy-in
- Expectations
  - Decisions made based on expected outcomes, not necessarily actual outcomes
  - Differences in expected outcomes exist

Sacramento River Conservation Area



- Senate Bill 1086 Sacramento River Conservation Area
- Goal: protect, restore and enhance native fisheries and riparian habitat in the corridor
- The Nature Conservancy, River Partners, and other restoration groups have goals related to the SRCA objectives

Land use



- Inner River Zone and Conservation Area

(pre-restoration)

Impacts of Native Riparian Restoration on Agriculture

- Weeds and pests (vertebrate and invertebrate)
- Disturbances
  - fires
  - out of channel flood flows
- Endangered species
- Trespassing
- Pollinators and pest control
- Cultural
- Financial
  - tax revenues
  - economies of scale for production

Externalities

- Costs and benefits resulting from your actions that are borne by other people
- Examples
  - Positive: weed control costs avoided on adjacent property due to your weed control efforts
  - Negative: crop damages from pest species inhabitating plants you established
- Baseline/Perspective Matters

•"How could you so bullishly run over the citizenry by **risking broken levees** with plugging the river channel?"

•"This [restoration project] is only a **water grab for the south state**. Environmentalists are just too naïve to realize they are being duped by the large Southern California developers."

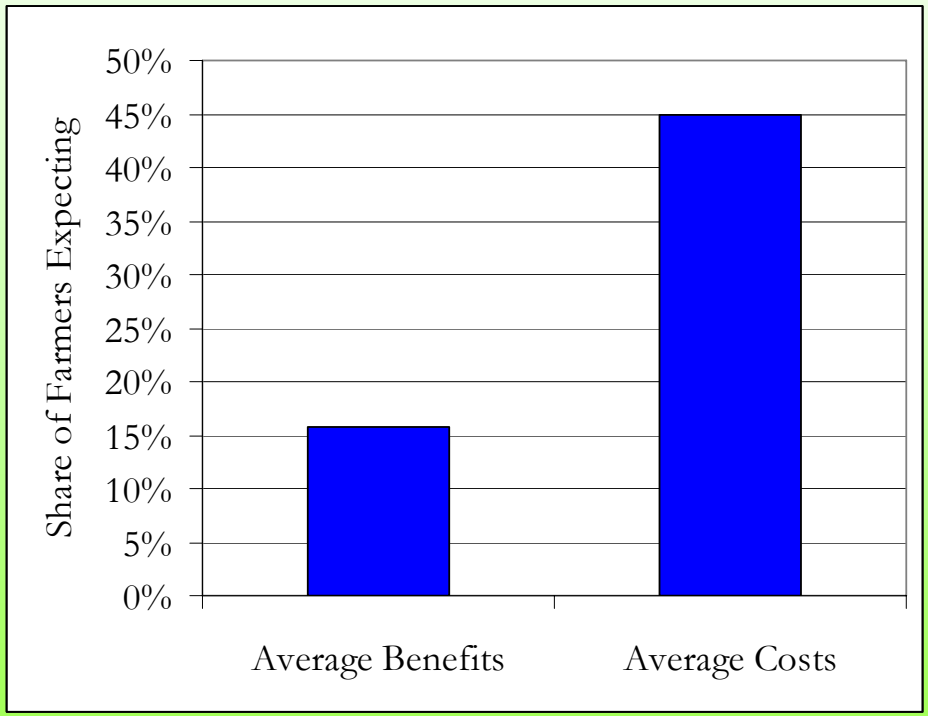
•"The contractors doing the planting care only about spending and making thousands of dollars of tax payers money per acre… **Let God do the job, he is cheaper**".

Comments by farmers concerning the Sacramento River restoration efforts

Impacts of Farmers on SRCA Restoration and Conservation

- Increased usage of chemicals
- Removal of native and endangered species
- Increased fencing, riparian vegetation removal, and rip-rapping
- Political activity to reduce the full project area from 217,000 acres to 80,000 acres (2002)
- 4 of 7 counties have opted out of outer zone participation (2002)
- Colusa City and county enacted more stringent limitations on restoration projects (2006)

Farmer Survey Responses on Externality Expectations From Restoration



	Agree
Benefits Provided	
Pollinators	8%
Pest predators	22%
Fish and game	22%
Scenery	11%
Costs Generated	
Insect pests	37%
Weeds	48%
Endangered species	44%
Flooding	44%
Mammal pests	52%

Markets: Function and Failure for Externalities

	Excludable	**Non-Excludable**
Limited		
Unlimited		

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- **Externalities caused by consumption exist for limited goods only**
- **Externalities caused by degradation exist for all goods**

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  - strong incentives exist to motivate action
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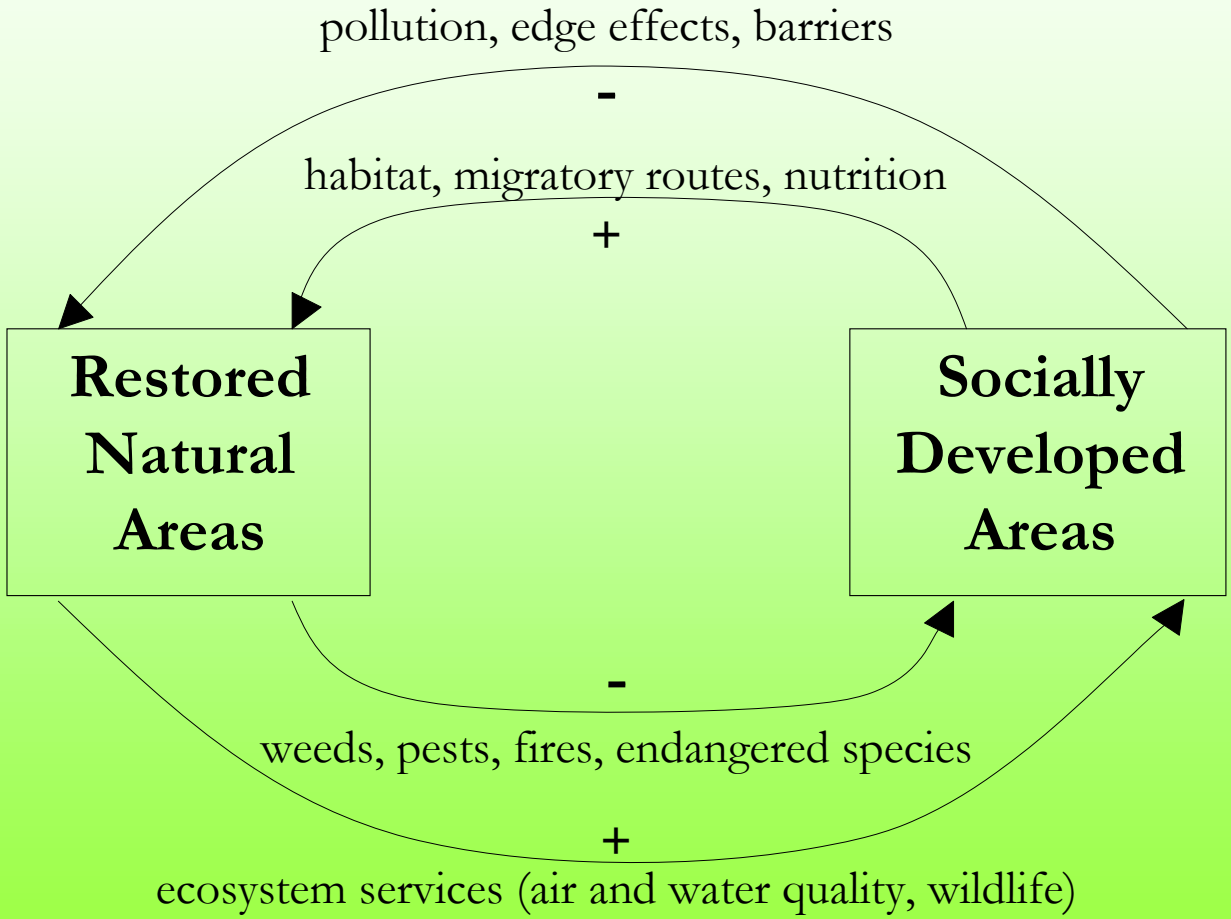
- Diffuse Costs/Benefits
  - weak incentives exist
  - coordination/information/transaction costs can overwhelm cooperative efforts

Interdependence of Restored and Developed Areas



Ecological and Social Compatibility of Restoration Effects by Land Type Pairing

Ecologically Compatible		
Ecologically Incompatible		

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- **Positive externalities are generated under social compatibility**
- **Negative externalities are generated under social incompatibility**

Conflict Scenarios

- Indirect Conflict
  - Effect on neighbor is not part of a desired outcome
  - Likely a technical or financial problem
  - e.g., weeds spreading from restoration sites

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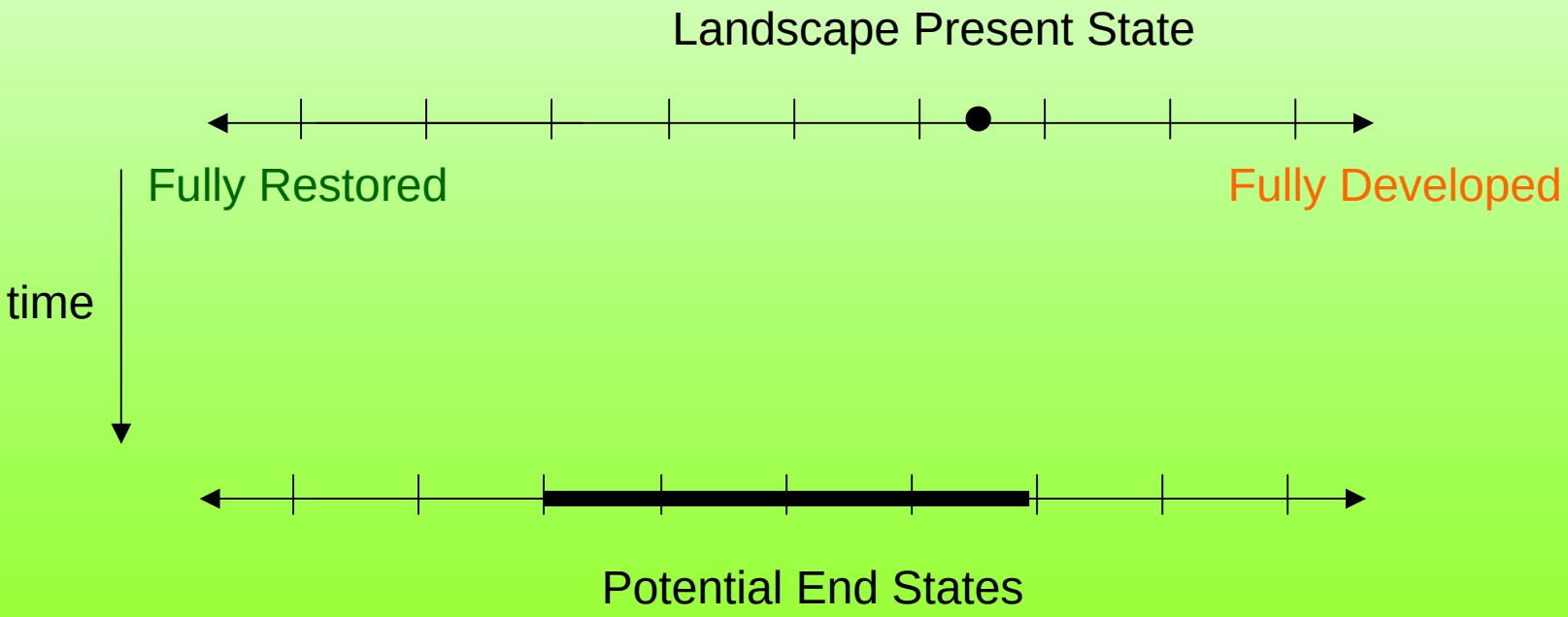
- Direct Conflict
  - Effect on neighbor is part of a desired outcome
  - Some level of compromise likely necessary
  - e.g., endangered species establish on private property limiting land use

Cooperative Outcome

- Extreme goals unlikely (fully restored)
- Universally acceptable

  Most stable = most individual gains = most equitable
- Net welfare gains possible when non-zero sum



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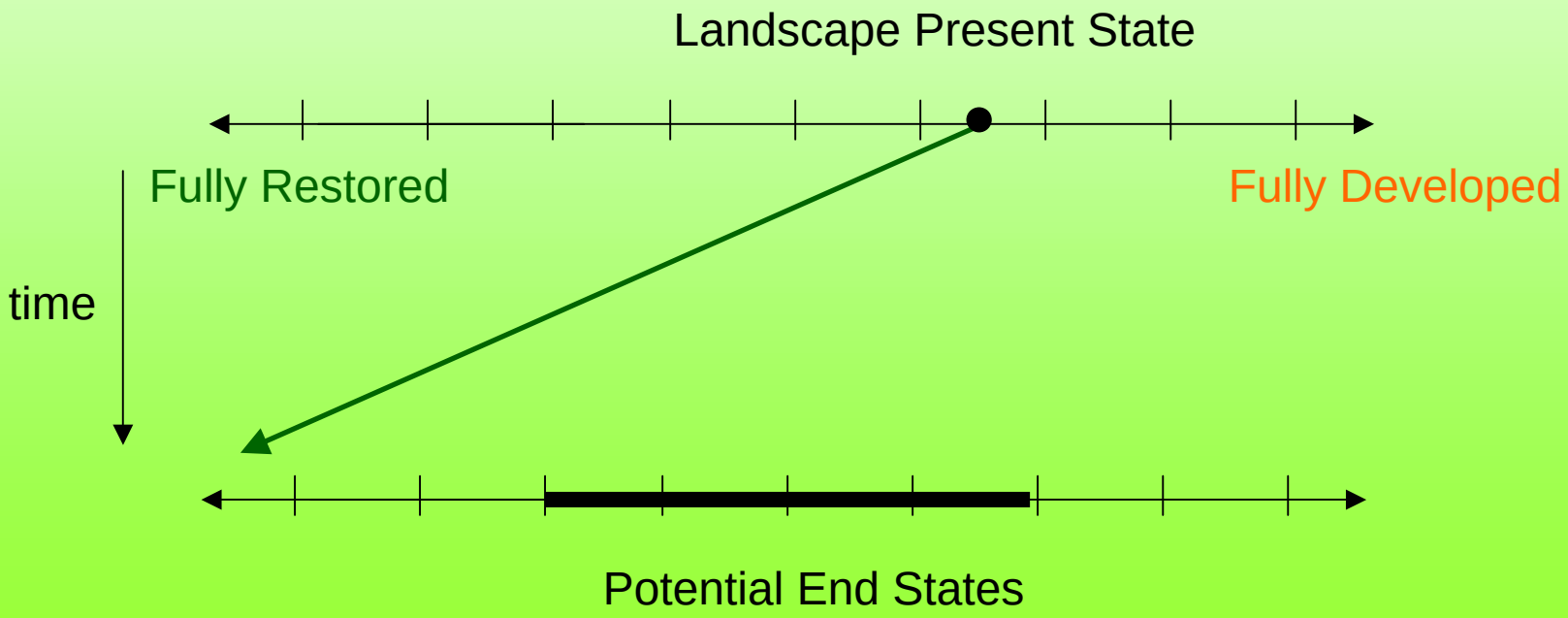

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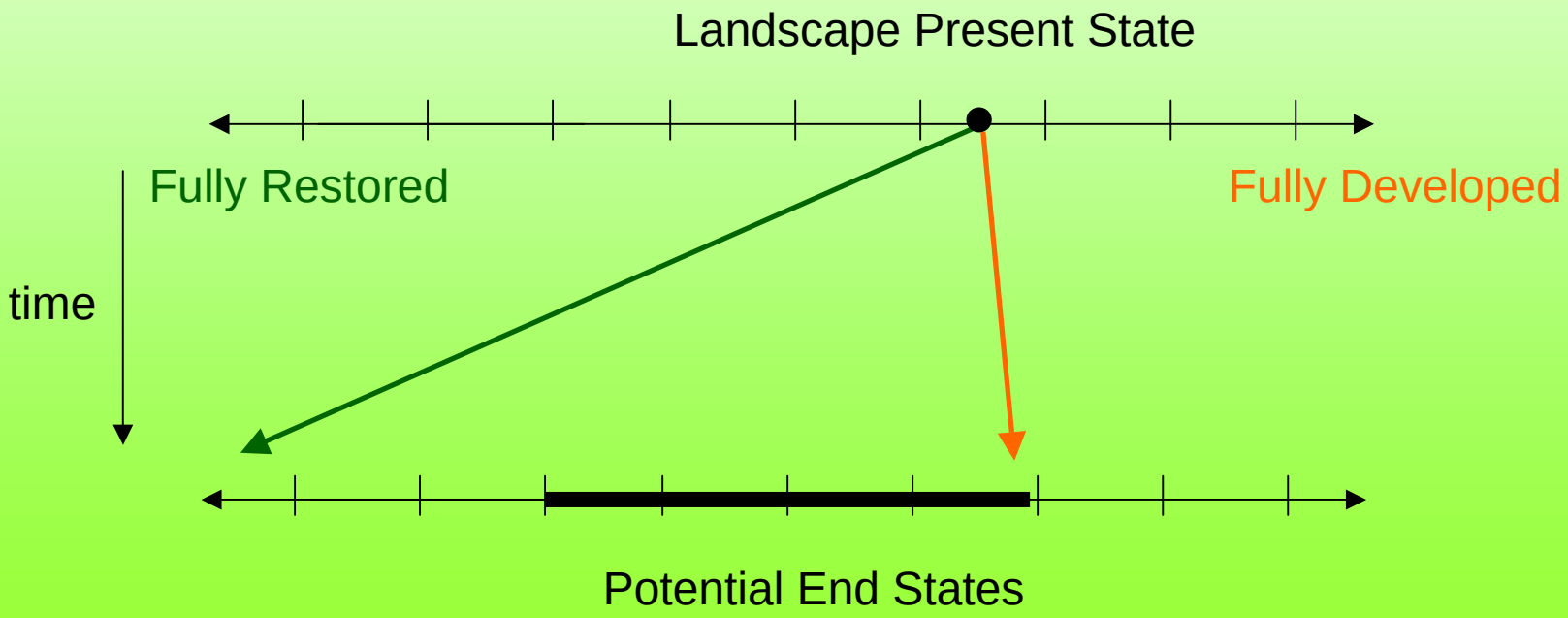

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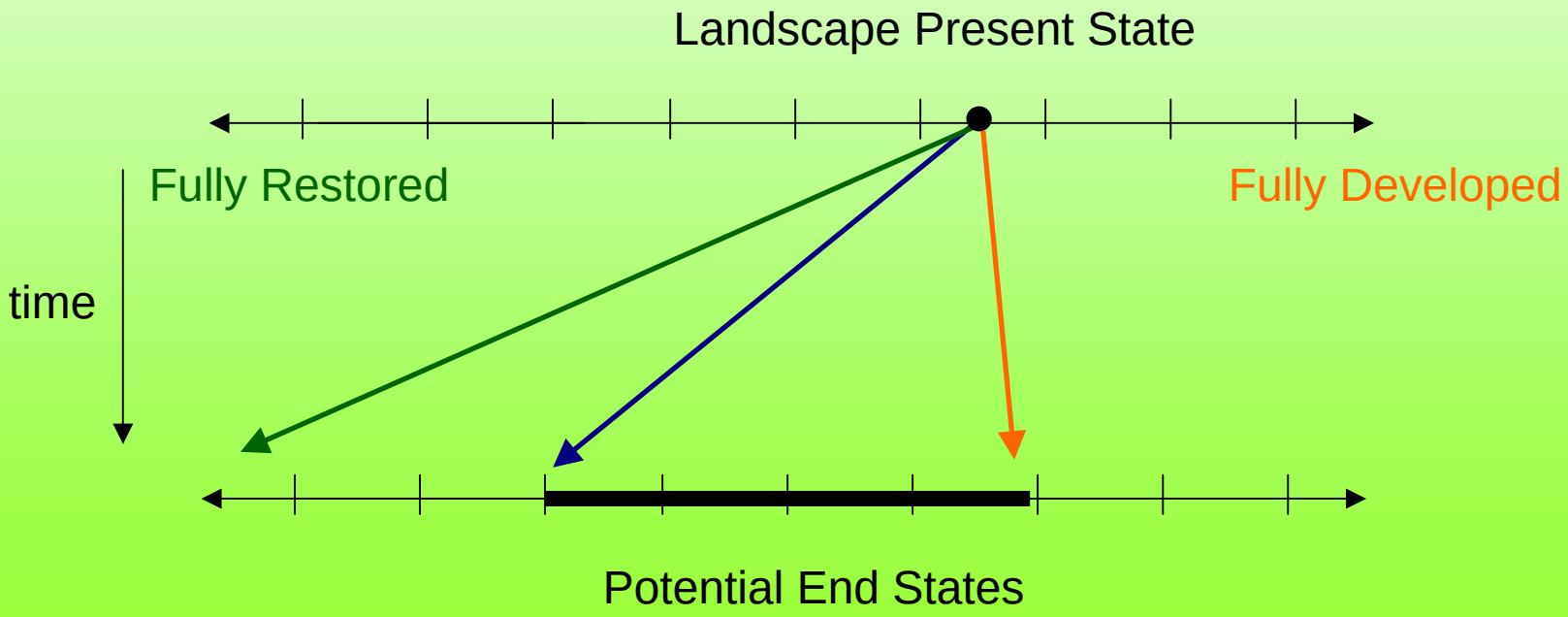


Approaches for Conflict Situations

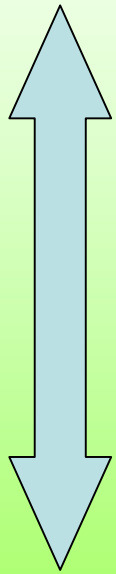
- Indirect Conflict
  - evaluate costs, technical feasibility of control
  - explore collaboration for control efforts, costs

- Direct Conflict
  - identify early, avoid likely situations of most intense conflict to prevent hardening of opinion against your efforts
  - seek compromises where both sides give up least valuable benefits possible
  - consider combining issues for bargaining such as tradeoffs involving two issues not directly related
  - anticipate situations where less extreme goals lead to greater overall ecological benefits

Social Compatibility Continuum

Socially Compatible
Indirect Conflict and low mitigation costs
Indirect Conflict and moderate mitigation costs
Direct Conflict with viable tradeoff opportunities
Direct Conflict with issue pairing opportunities
Direct Conflict with no net benefit improvement options

Best Option

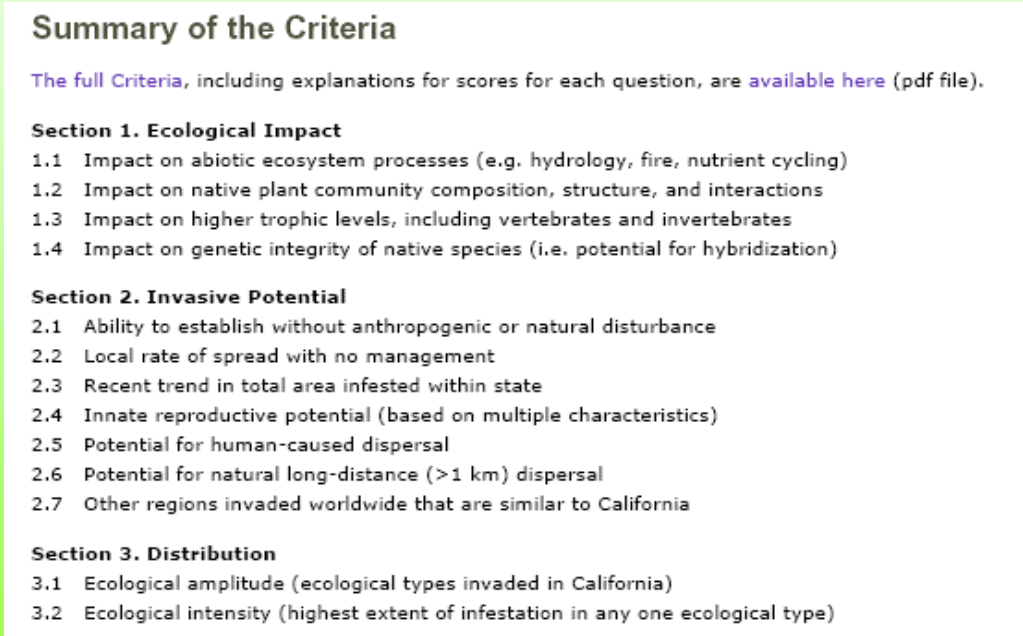


Worst Option

Cal-IPC Invasive Plant Inventory

- Current criteria categories:
  - Section 1. Ecological Impact
  - Section 2. Invasive Potential
  - Section 3. Distribution

- Suggested criteria category:
  - Section 4. Social Impact



Summary of the Criteria

The full Criteria, including explanations for scores for each question, are available here (pdf file).

Section 1. Ecological Impact

1.1 Impact on abiotic ecosystem processes (e.g. hydrology, fire, nutrient cycling)
1.2 Impact on native plant community composition, structure, and interactions
1.3 Impact on higher trophic levels, including vertebrates and invertebrates
1.4 Impact on genetic integrity of native species (i.e. potential for hybridization)

Section 2. Invasive Potential

2.1 Ability to establish without anthropogenic or natural disturbance
2.2 Local rate of spread with no management
2.3 Recent trend in total area infested within state
2.4 Innate reproductive potential (based on multiple characteristics)
2.5 Potential for human-caused dispersal
2.6 Potential for natural long-distance (>1 km) dispersal
2.7 Other regions invaded worldwide that are similar to California

Section 3. Distribution

3.1 Ecological amplitude (ecological types invaded in California)
3.2 Ecological intensity (highest extent of infestation in any one ecological type)

Possible Social Impact Criteria

4.1 Associated land uses

4.2 Impact on associated land uses

4.3 Current responses of associated land uses (control efforts, support/usage)

4.4 Impact on associated land uses of most effective control option

4.5 Technical/compromise options for improving private cooperation

4.6 Land uses, scenarios for most successful control efforts

Conclusions

- Restoration can elicit individually rational social feedbacks that offset ecological gains
- Mitigation of negative offsite effects (externalities) for other land uses can have substantial benefits
- Social impacts of invasive species and control efforts should be considered for planning
- Land uses with social and ecological compatibility should be prioritized
- Land uses with direct conflict require strategic pre-planning and potentially modified project goals