

**A Tool for Finding
Politically Feasible
Ways to Manage
Ranch-Kept Wildlife**

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This talk will consist of the following components.

1. Modeling a political-ecological system
2. An example: the system that contains the South African ranch-kept rhino
3. How to find the Most Practical Ecosystem Management Plan
4. Resources for computing management plans for other ecosystems

Poaching rhinos is very profitable.

Rhino horn per ounce is more valuable in China and Vietnam than cocaine is in the U.S.

Such prices drive and fuel high-technology poaching such as the use of small planes, helicopters, and veterinarian-acquired darts.

Horn cut from a live rhino is more valuable than dead-cut or stockpiled horn.

Political actors interact with an ecosystem in a political-ecological system.

Groups act to reach economic, militaristic, and political goals but hold internal, possibly distorted perceptions of other groups and the ecosystem.

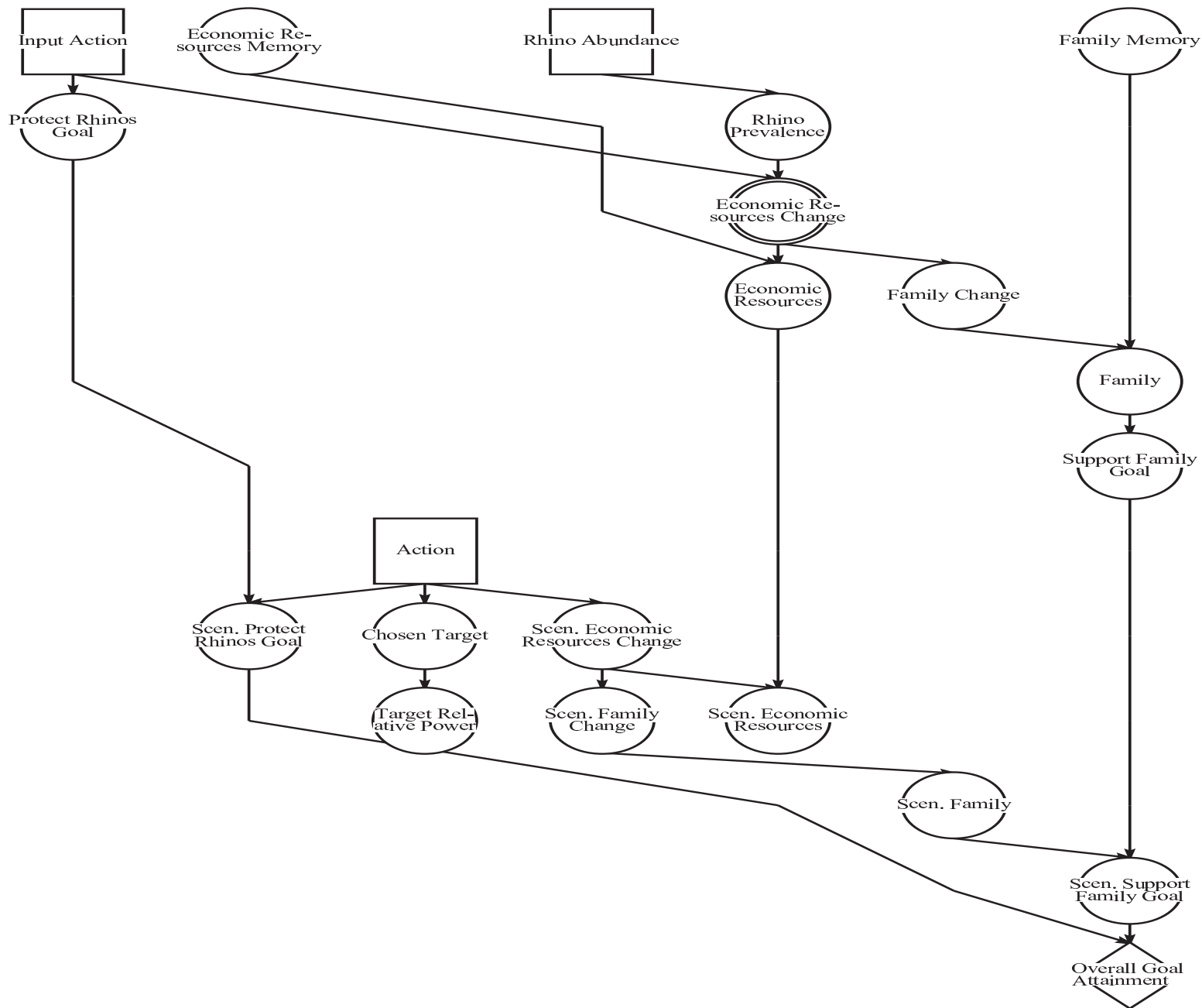
Groups interact with each other and with the ecosystem through time.

Groups and the ecosystem are modeled with Influence Diagrams (IDs).

A group's decision making is simulated with an ID.

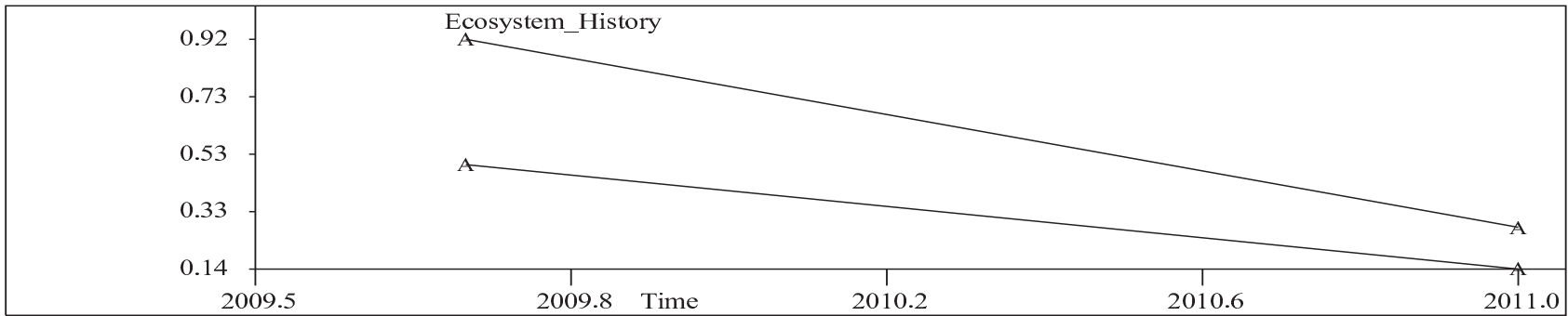
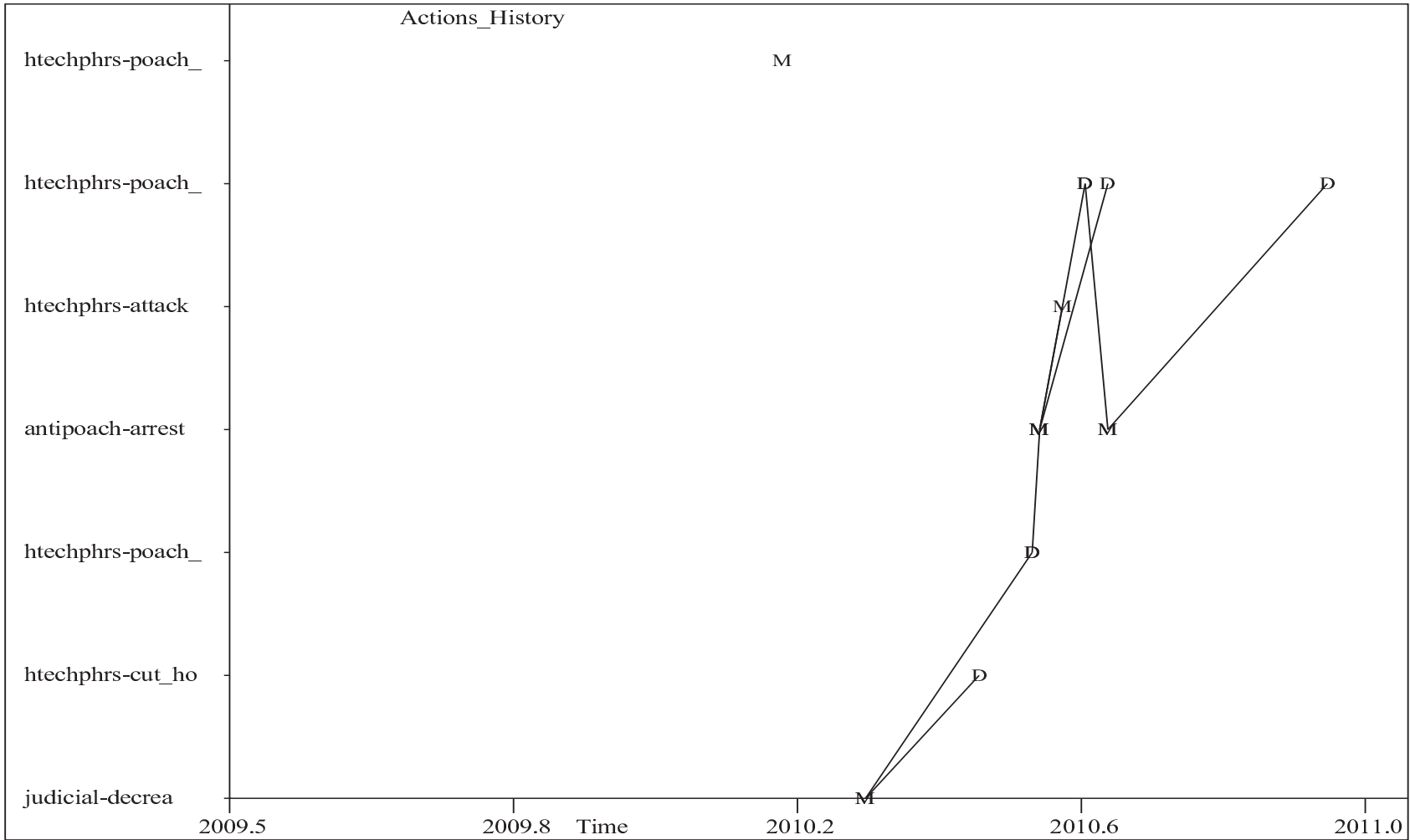
A separate ID contains an Individual-Based Model (IBM) of the population dynamics of ranch-kept rhinos.

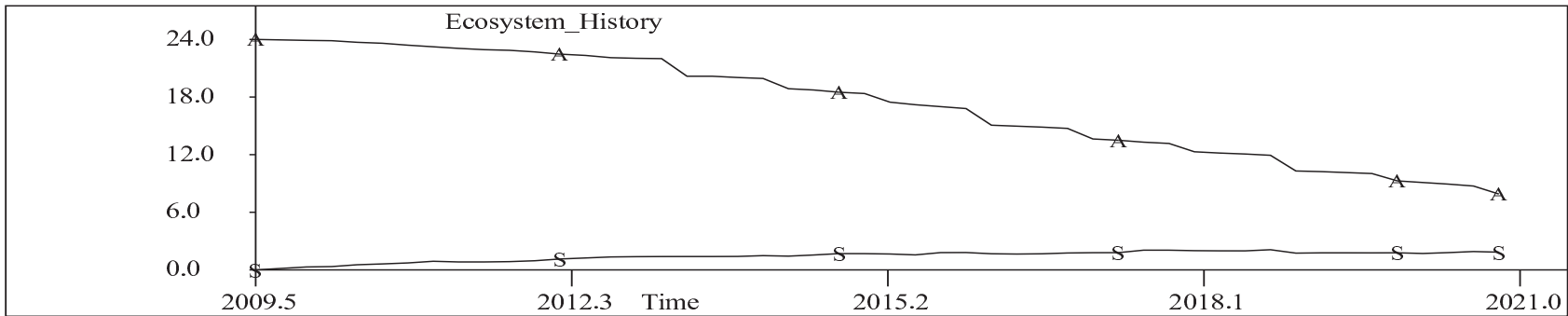
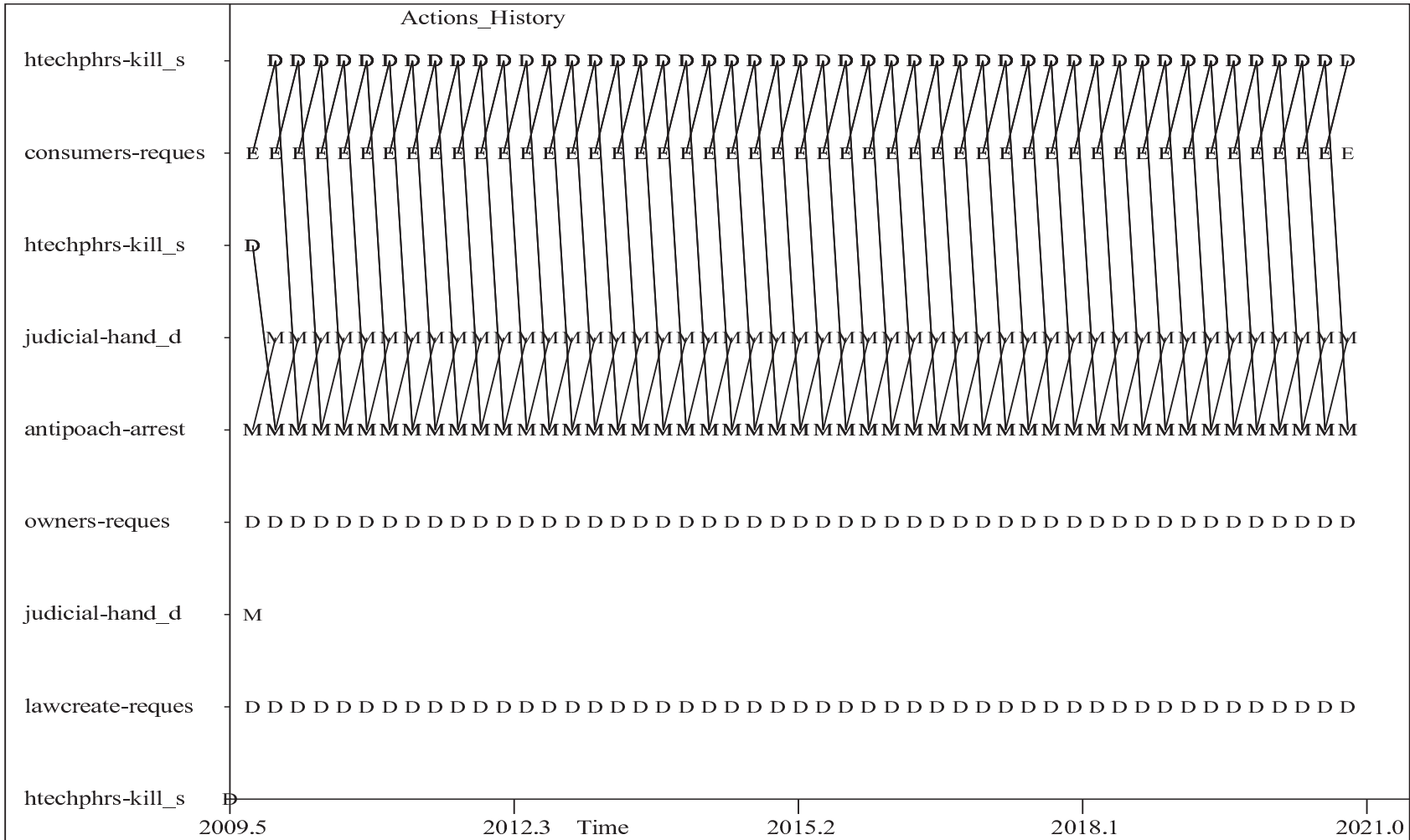
This set of temporally interacting IDs is referred to as an **Interacting IDs** model.



Six groups that affect this rhino meta-population are modeled.

1. Creators of wildlife management legislation
2. The legal system that handles alleged poachers
3. The group of wildlife ranch owners
4. The group of anti-poaching units
5. High-technology poachers
6. Chinese and Vietnamese rhino horn consumers





A politically feasible plan should require only small changes in belief systems.

Define the Most Practical Ecosystem Management Plan (MPEMP) to be a set of group behaviors that result in a sustainable ecosystem wherein each group's belief system is as close as possible to their existing beliefs.

The MPEMP for ranch-kept rhino is computed.

High-tech poacher beliefs are adjusted.

The MPEMP is: poachers stop poaching rhinos.

Belief changes needed to implement this MPEMP:

(a) horn will not fetch high prices

(b) high chance of a long prison sentence

A tool for managing any ecosystem is available.

A user's manual for constructing and using such a tool is *Improving Natural Resource Management: Ecological and Political Models* (Wiley).

The free supporting software is at
www4.uwm.edu/people/haas/rhino_emt

Exercises in the user's manual make it suitable for a course in sustainable management.