Marine Life Protection Act Initiative

Draft Spatial Bioeconomic Model Evaluations of Round 3 MPA Proposals

Presentation to the MLPA Master Plan Science Advisory Team
October 6, 2009 • Los Angeles, CA

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MLPA Master Plan Science Advisory Team

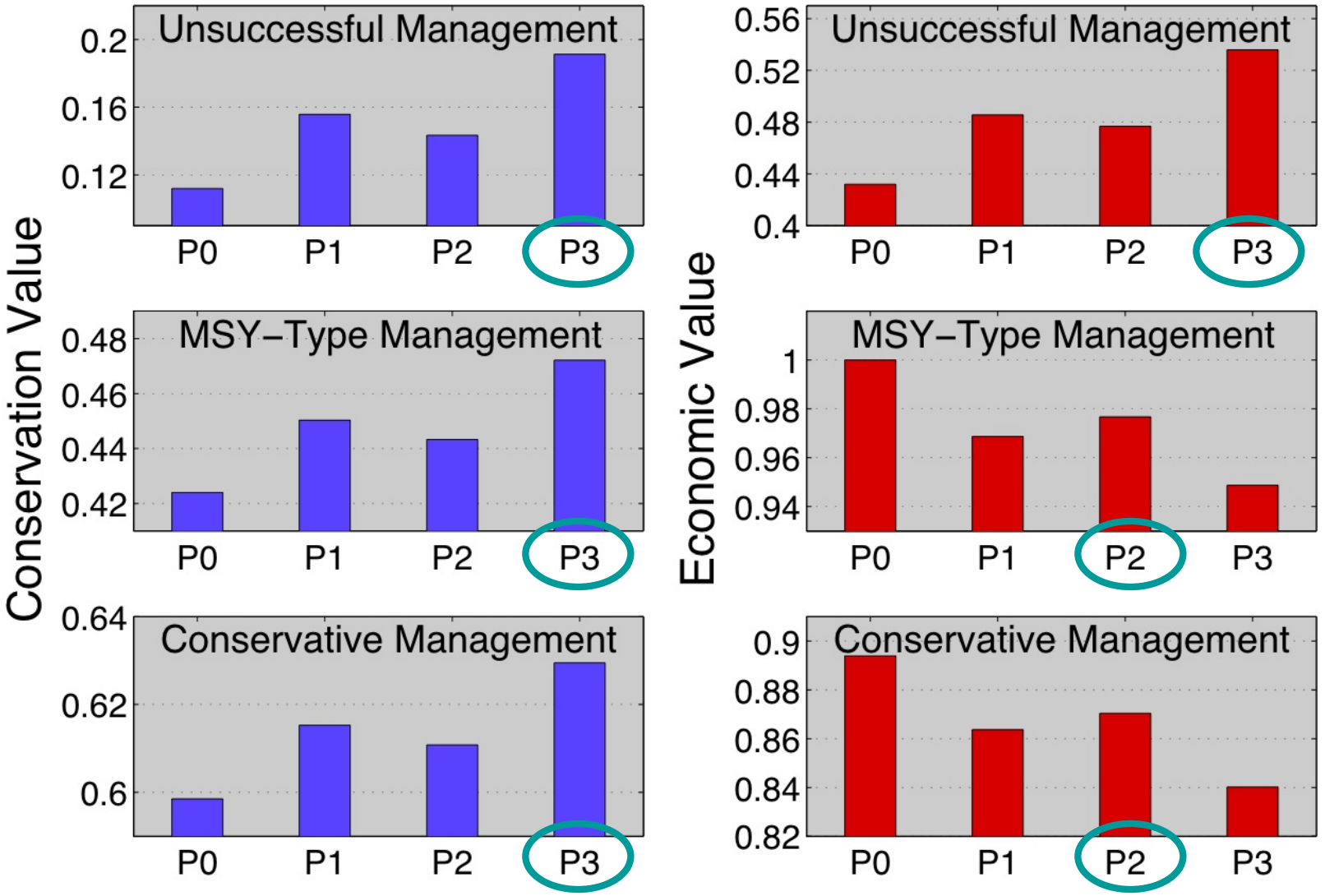
Model Description

- Models of 8 species
- Simulate population dynamics
- Linked to models of spatial fishing effort
- Two variations of the fishing models
  - Original: fishers follow the fish
  - Revised: fishing decision also affected by patch location

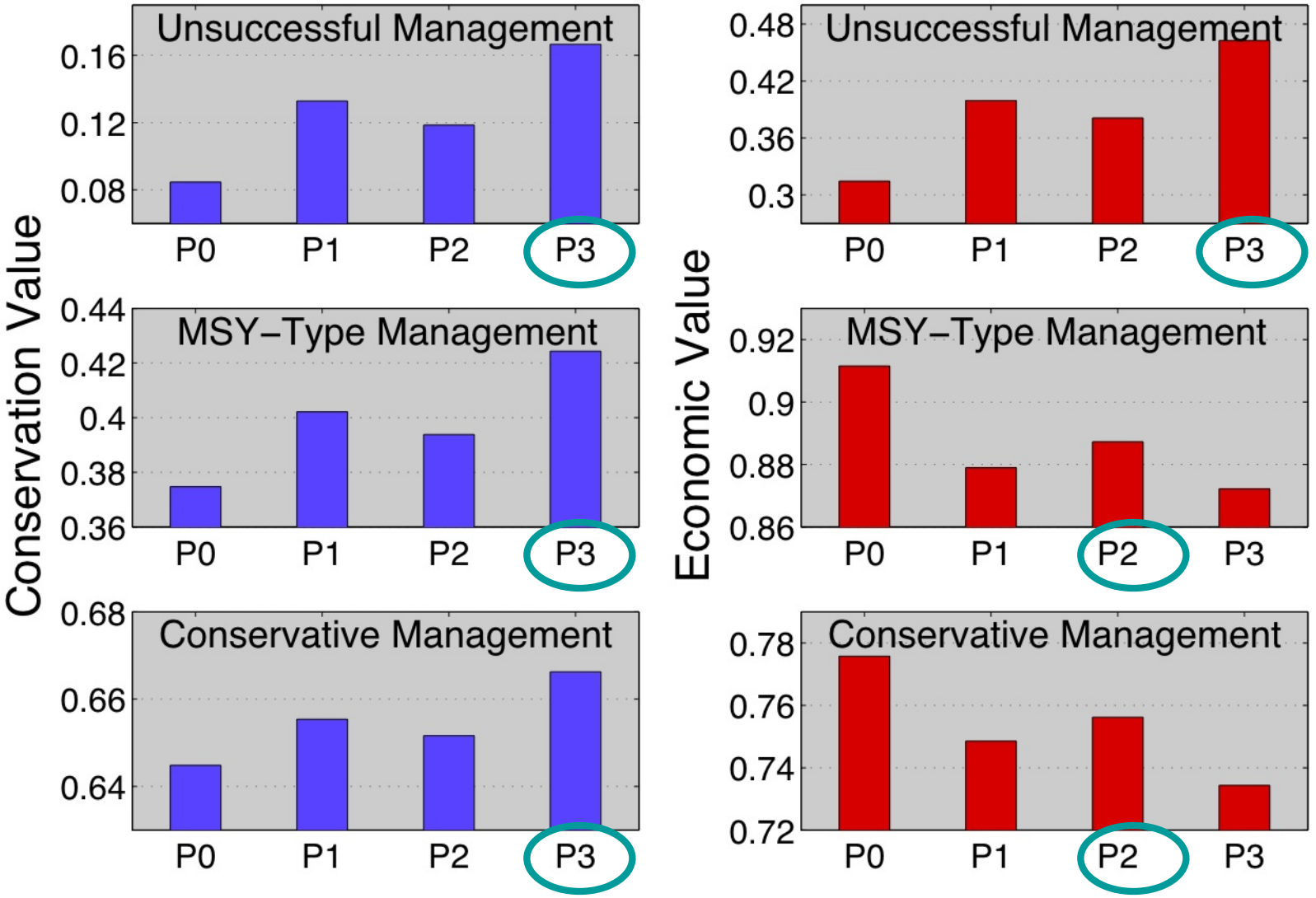
Model Outputs

- **Conservation**
  - Spatial distribution of larval settlement and biomass
  - Total settlement and biomass (summed over study region, weighted sum across species)
- **Economic**
  - Spatial distribution of fishery yield
  - Total fishery yield (summed over study region, weighted sum across species)

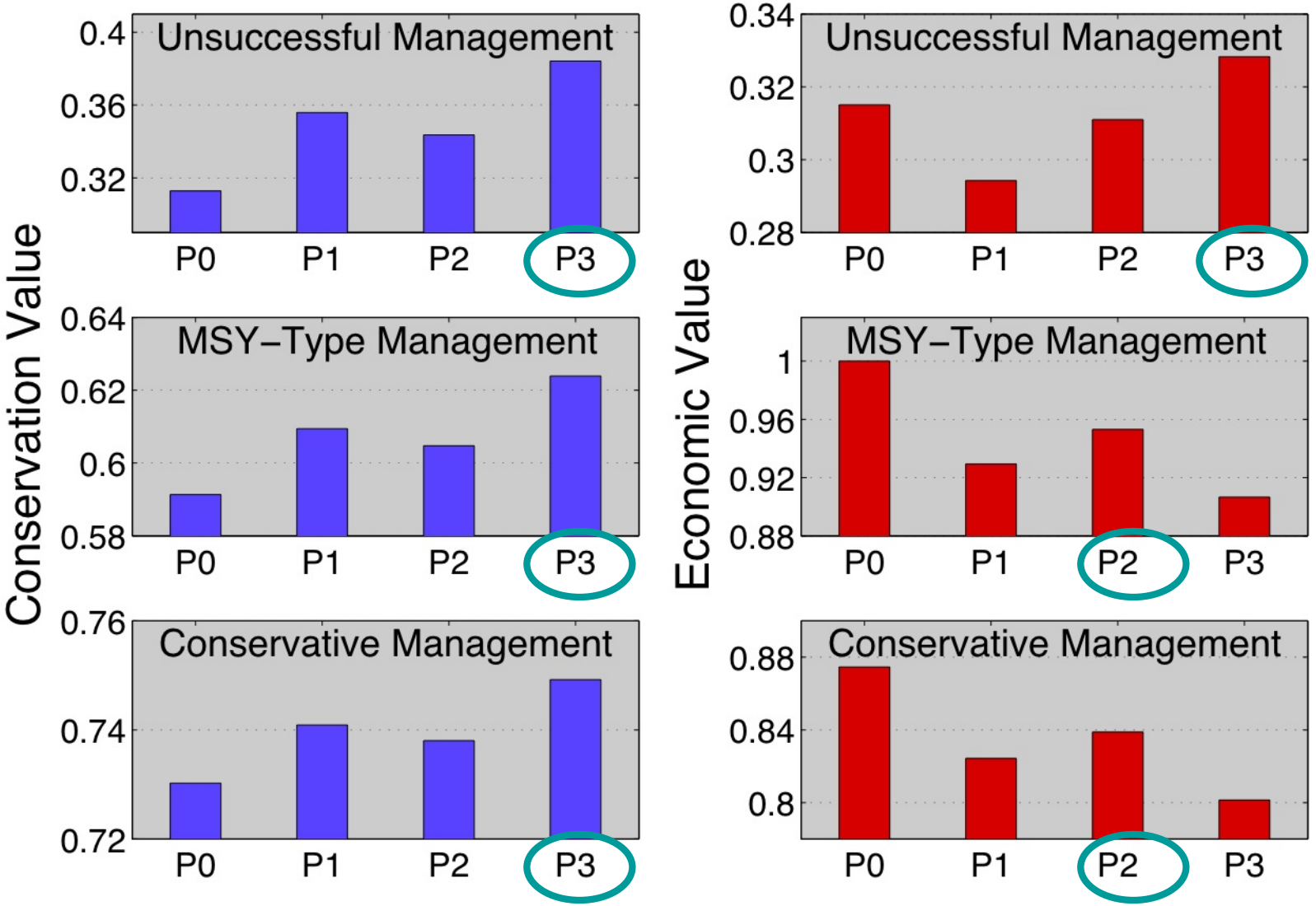
Original Fleet Model: UCSB Rankings



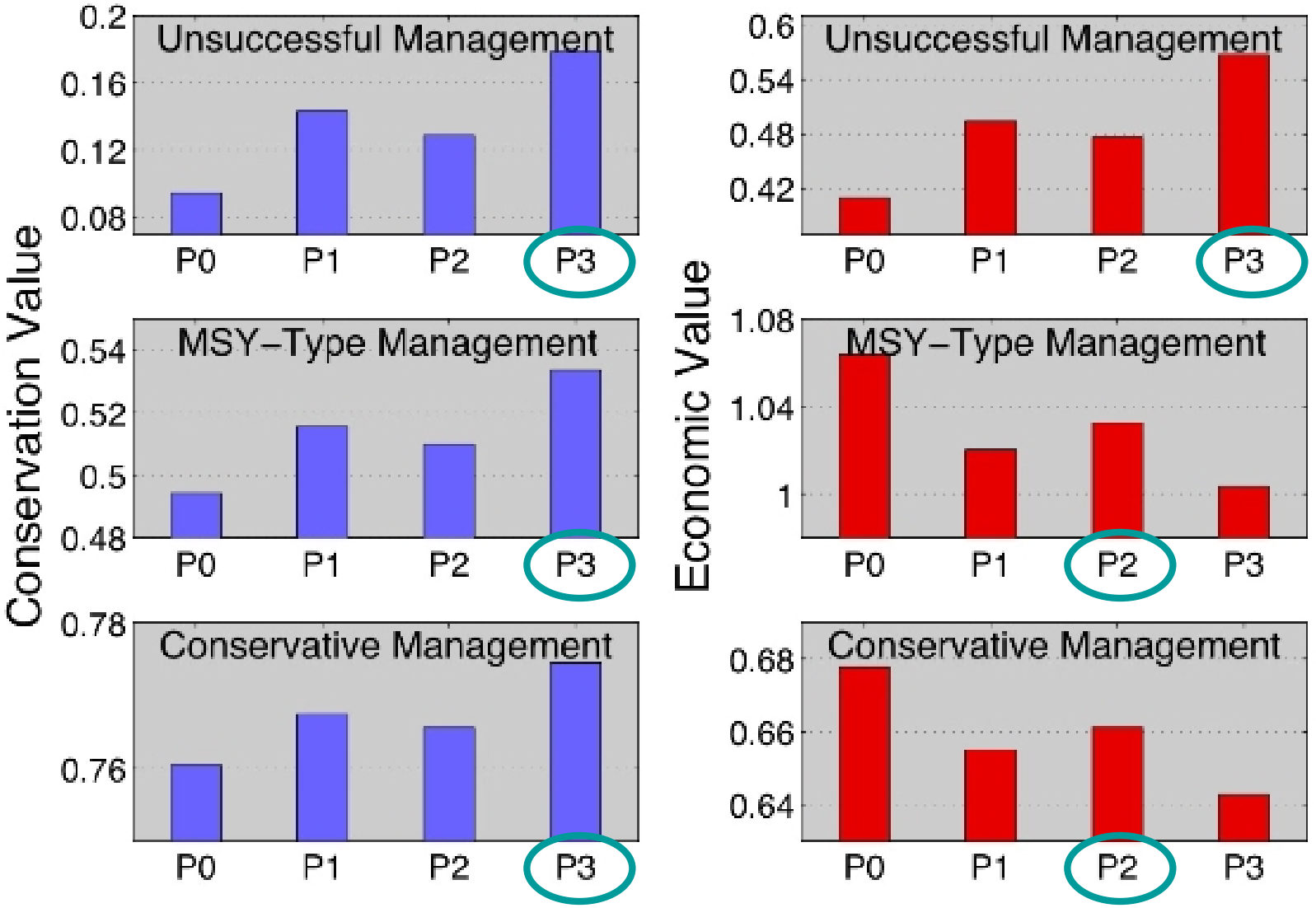
Original Fleet Model: UCD Rankings



Revised Fleet Model: UCSB Rankings



Revised Fleet Model: UCD Rankings

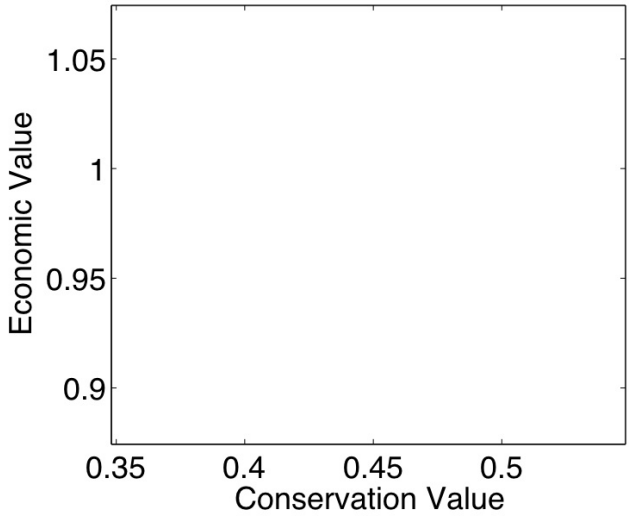


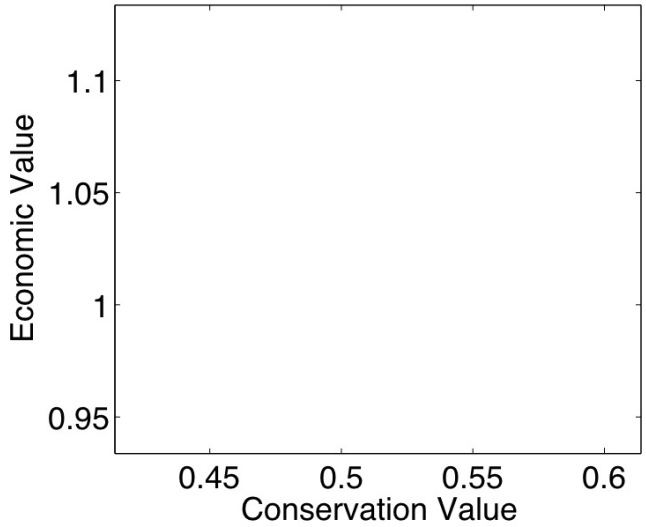
Results: MSY-type Management

UCD

UCSB

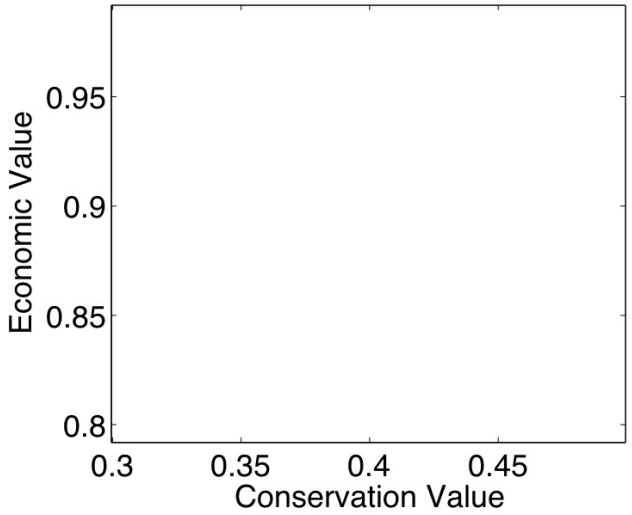
original

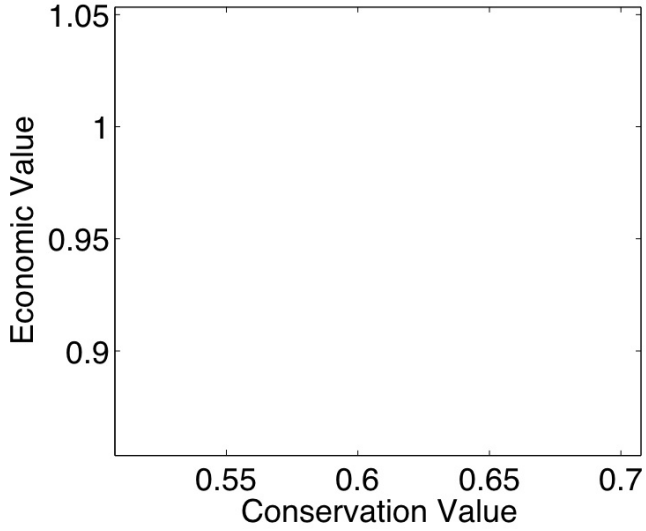




P0 ●
P1 ▲
P2 ■
P3 ♦

revised





Results: MSY-type Management

UCD

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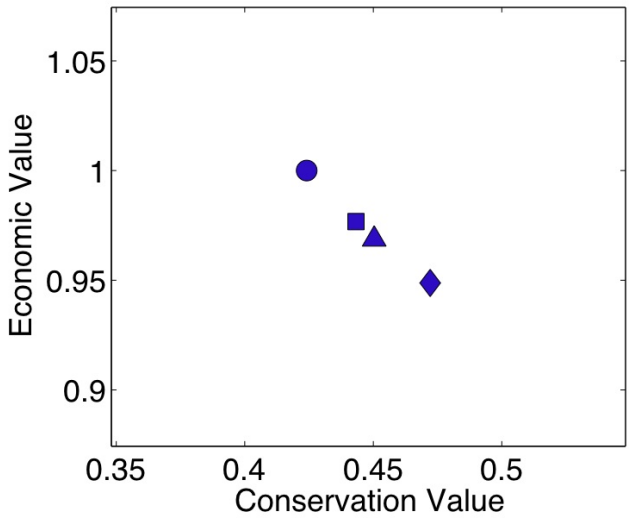

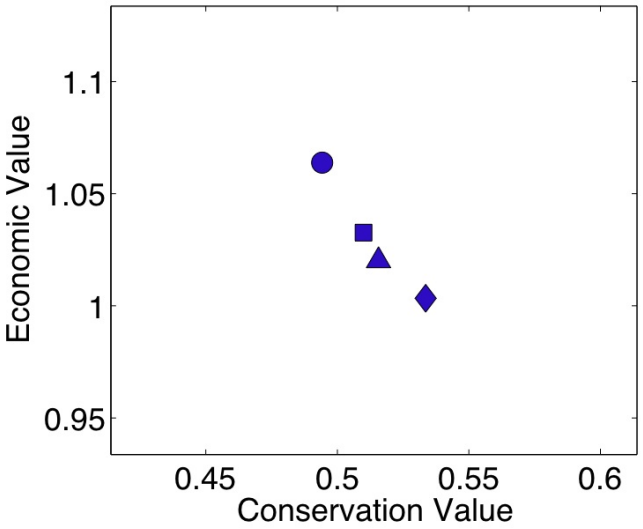

P0
P1
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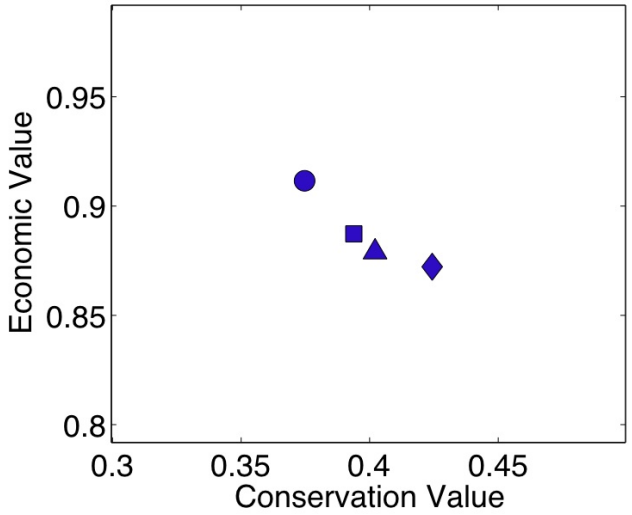
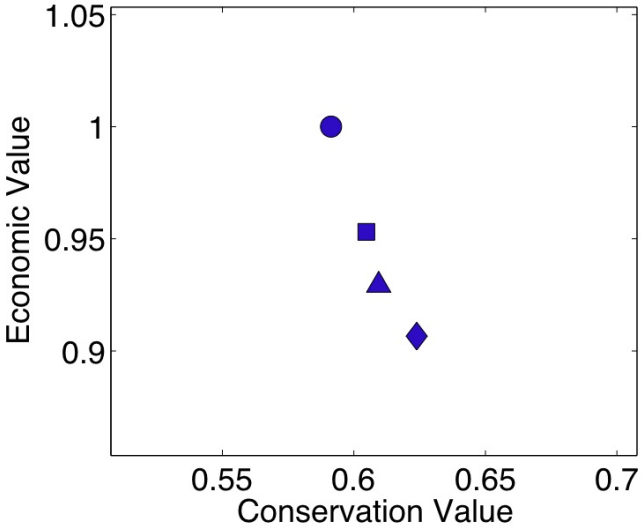
P3

revised



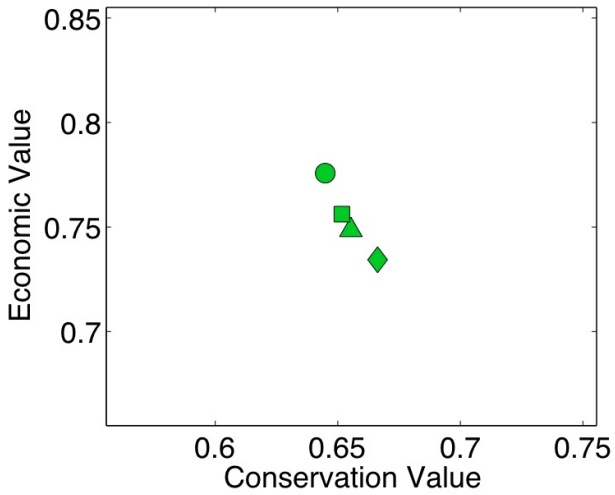


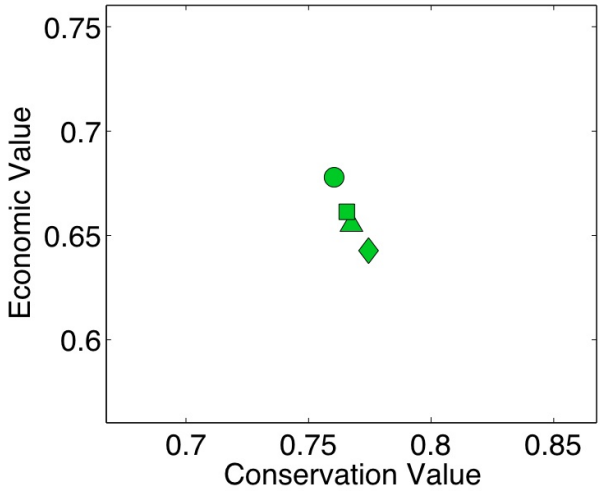
Results: Conservative Management

UCD

UCSB

original





P0
P1
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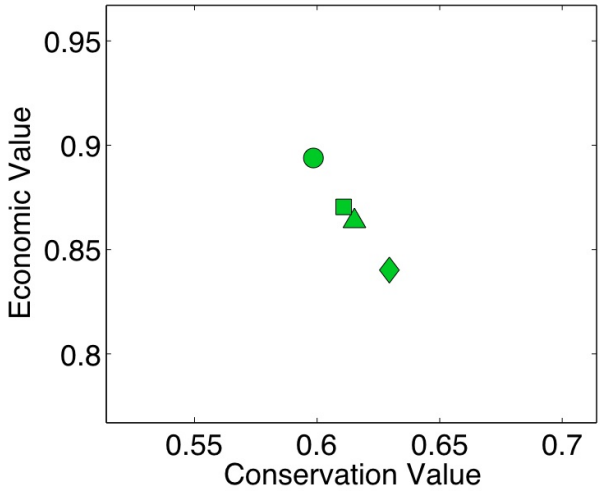
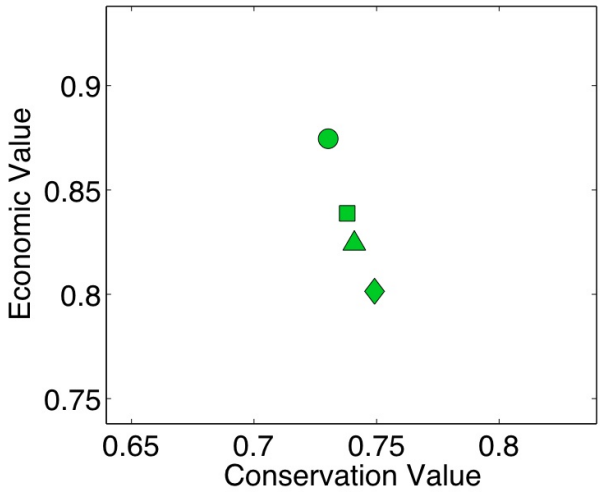
P3

revised



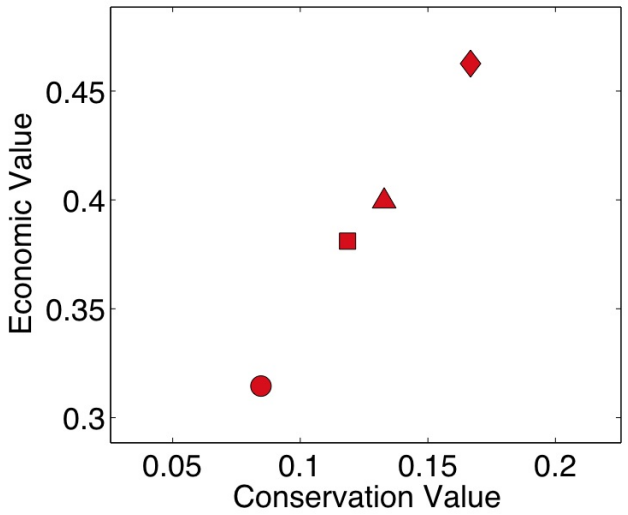


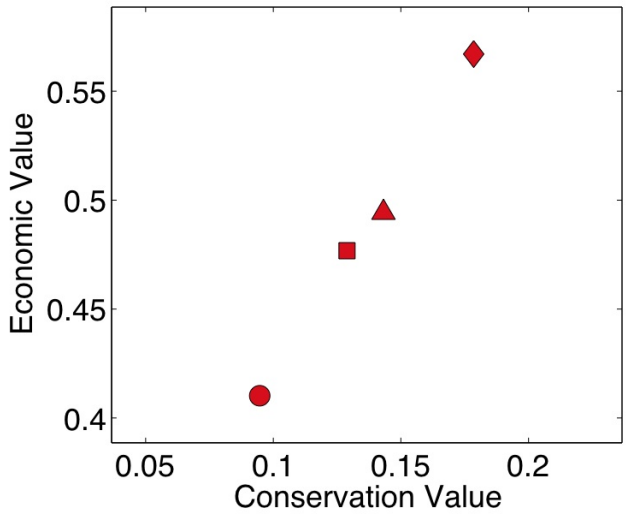
Results: Unsuccessful Management

UCD

UCSB

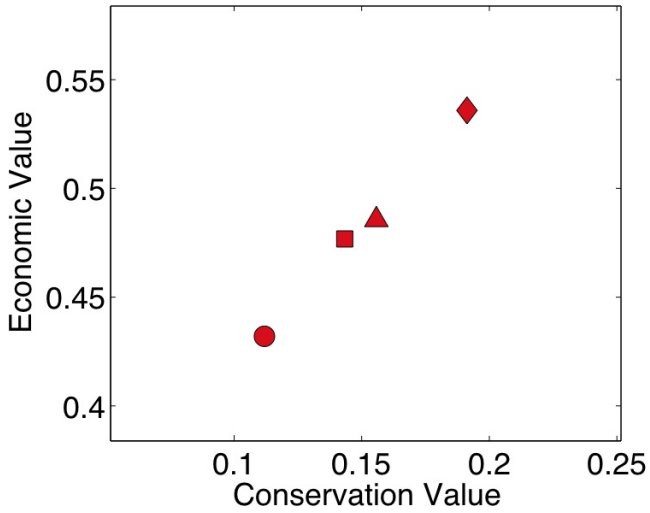
original

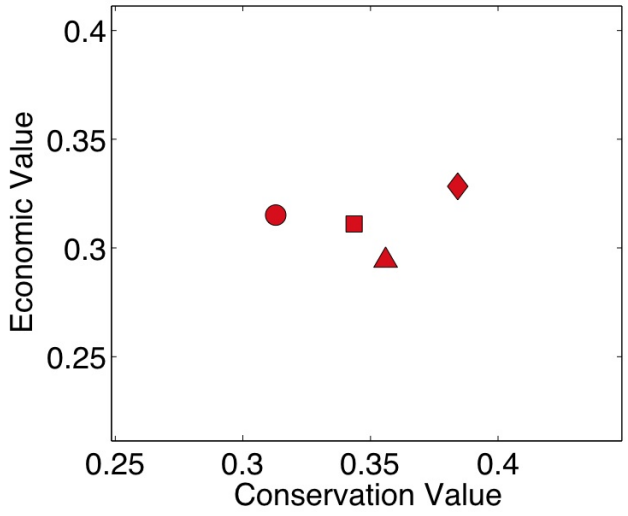




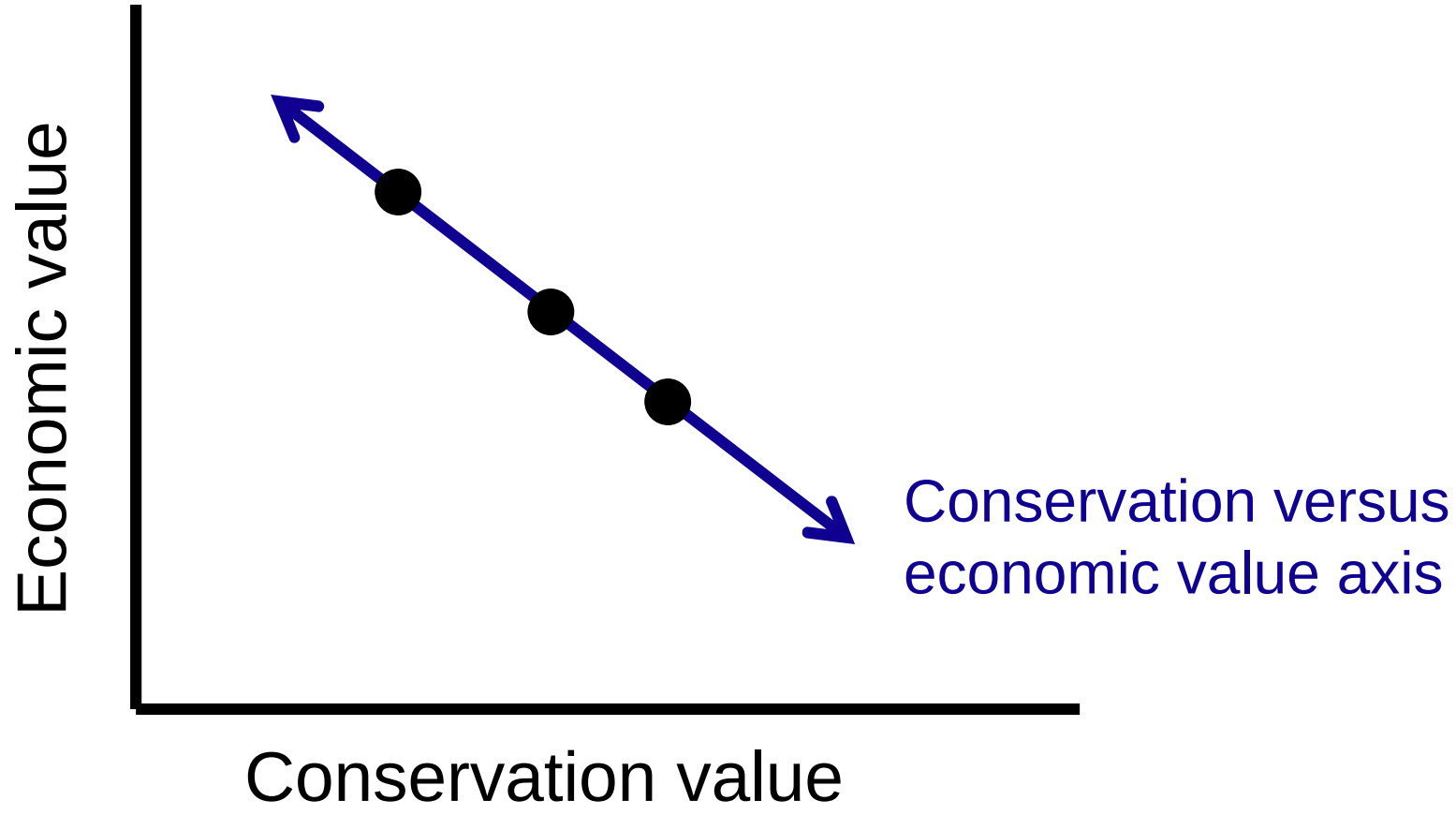
P0
P1
P2
P3

revised



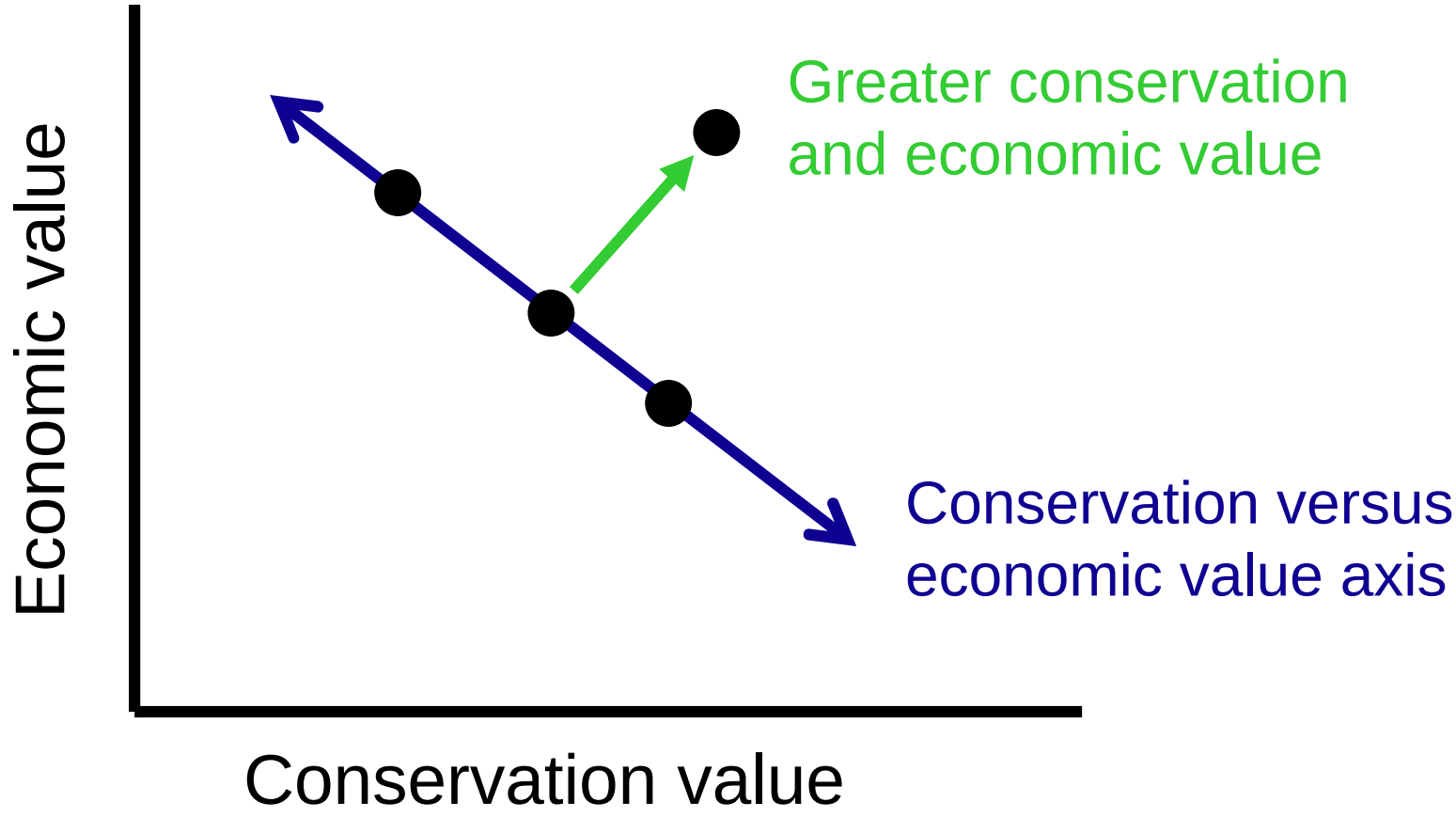


Model Results: Rankings in context



- *Choice along this axis is a matter of policy priorities.*
- *Models can put the options in context.*

Model Results: Rankings in context



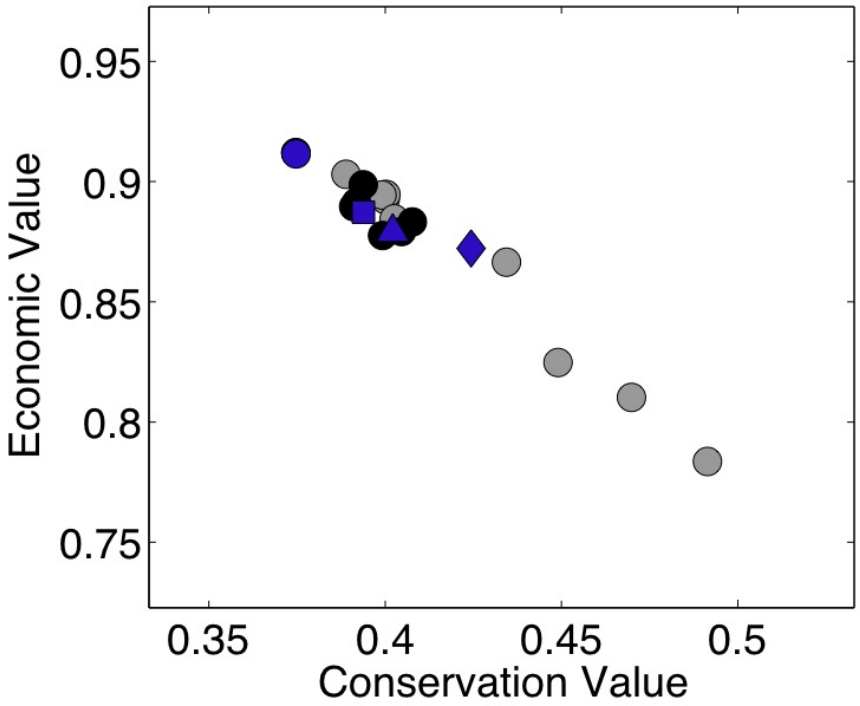
- *Models can reveal where one proposal is superior to another.*
- *Most apparent under assumption of unsuccessful management.*

Model Results: Rounds 1-3

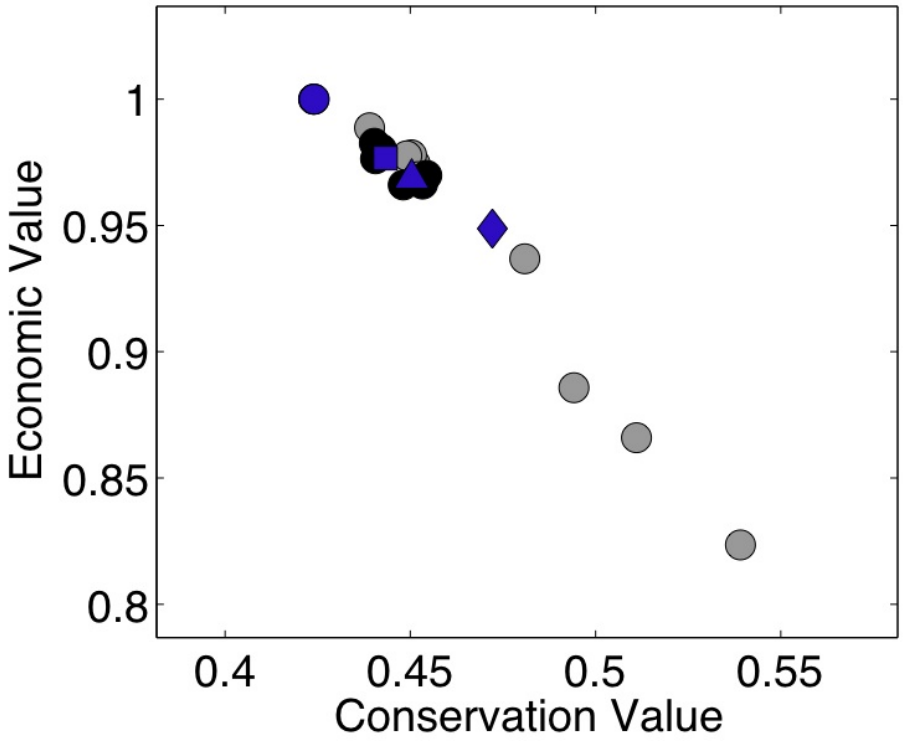
Scenario: MSY-type Management

P0 ● **P2** ■
P1 ▲ **P3** ♦

UCD



UCSB



Round 1 MPA proposals = ●

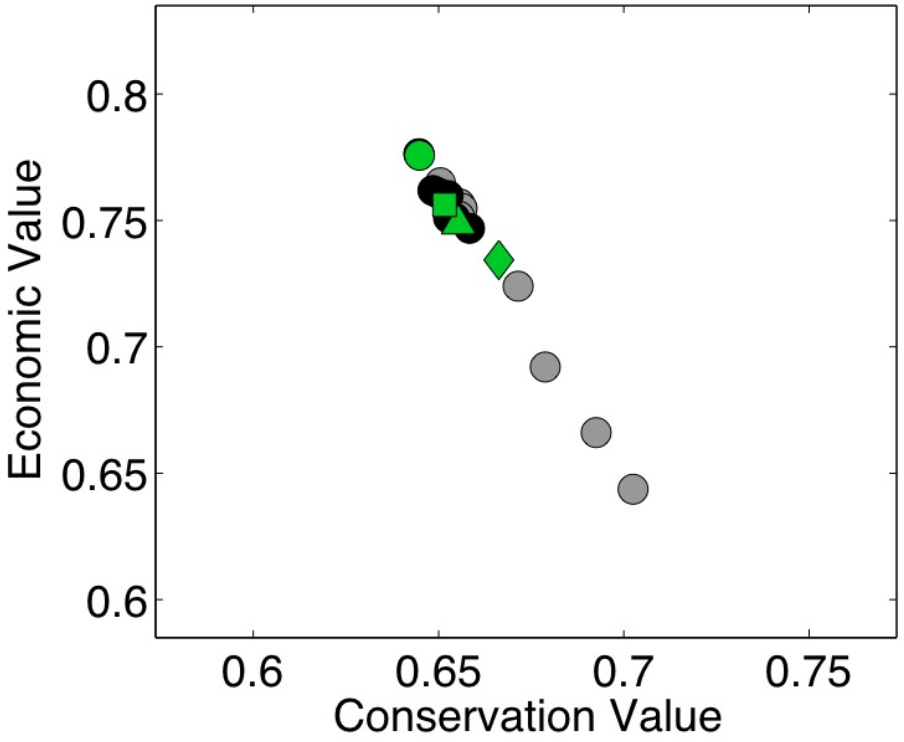
Round 2 MPA proposals = ●

Model Results: Rounds 1-3

Scenario: Conservative Management

P0 P2
P1 P3

UCD



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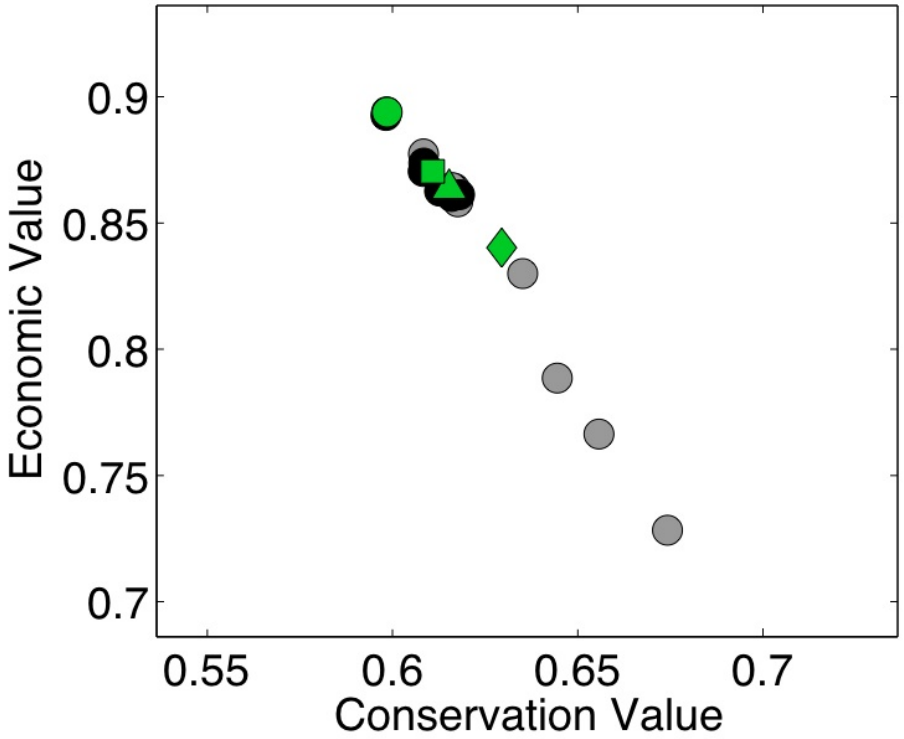


Round 1 MPA proposals =

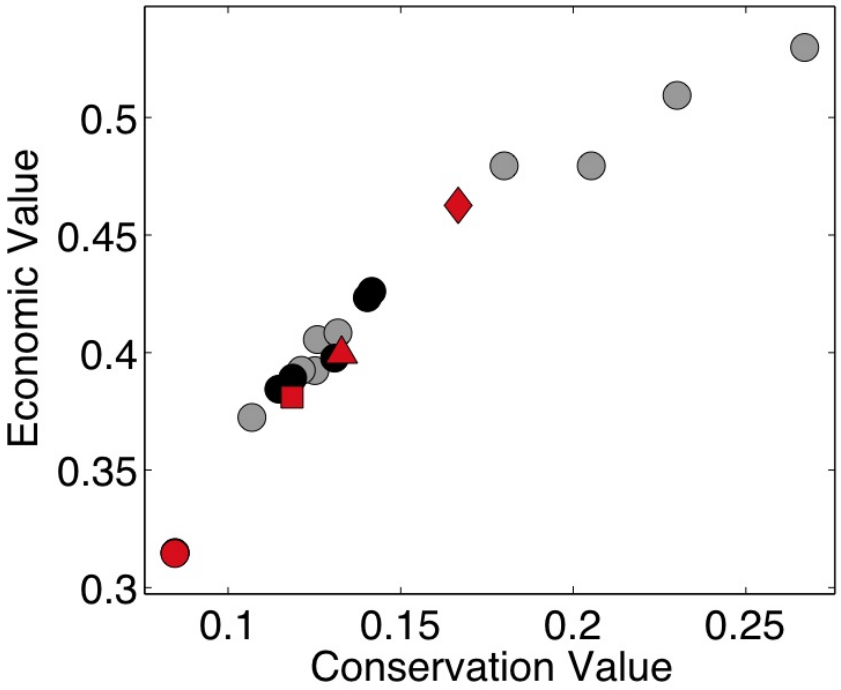
Round 2 MPA proposals =

Model Results: Rounds 1-3

Scenario: Unsuccessful Management

P0 ● P2 ■
P1 ▲ P3 ♦

UCD



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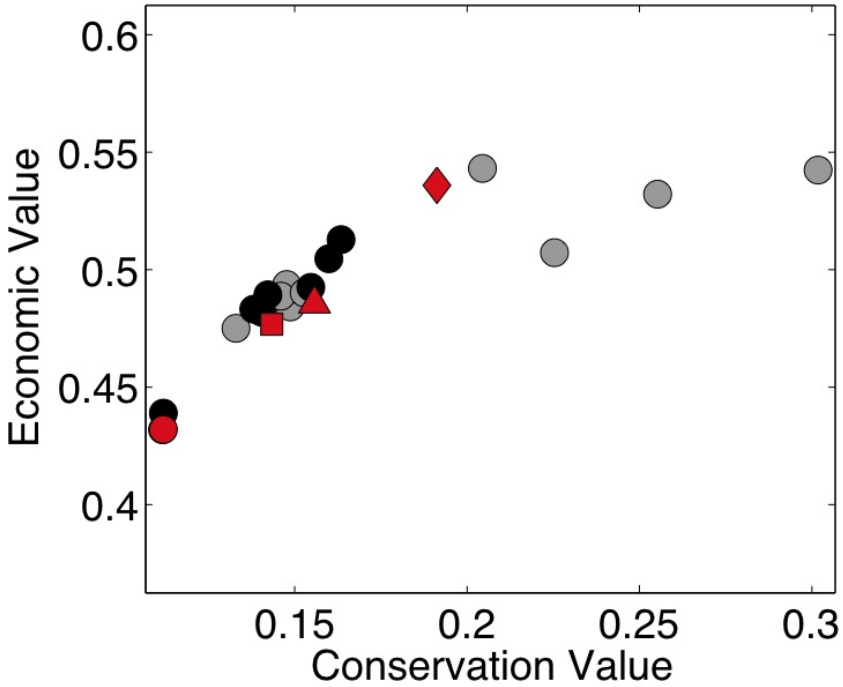

Round 1 MPA proposals = ●

Round 2 MPA proposals = ●

Conclusions

- **Proposal 3** has the highest conservation value for all models and management assumptions. **Proposal 1** comes in second.
- **Proposal 2** has the highest economic value for all models under MSY-type or conservative management assumptions.
- **Proposal 3** has the highest economic value for all models under unsuccessful management assumptions but the lowest under MSY-type and conservative cases.
- Round 3 proposals are concentrated on the economic end of the conservation-economic spectrum, relative to Round 1, but less so than the Round 2 proposals.
- All model outputs from Round 2 evaluations at MLPA website (www.dfg.ca.gov/mlpa).