Marine Life Protection Act Initiative

Draft Spatial Bioeconomic Model Evaluations of Round 3 MPA Proposals

Presentation to the MLPA Master Plan Science Advisory Team
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MLPA Master Plan Science Advisory Team

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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

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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)

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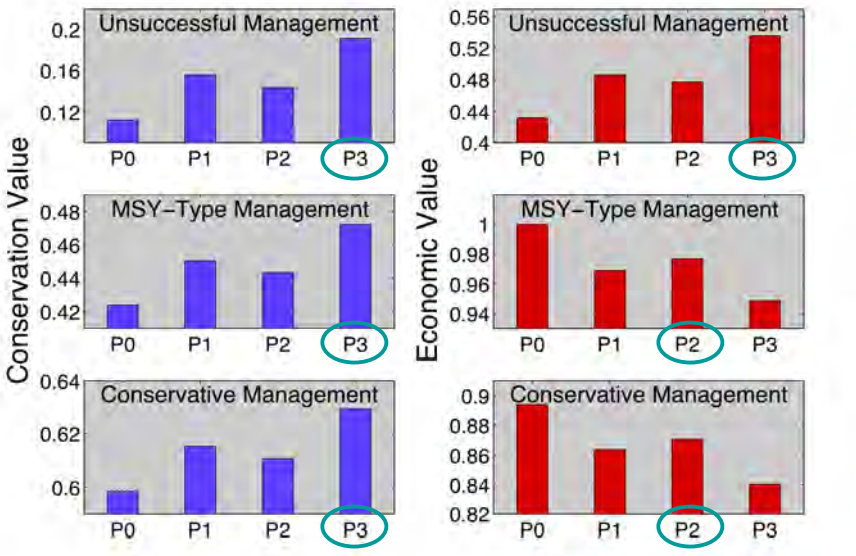
Original Fleet Model: UCSB Rankings



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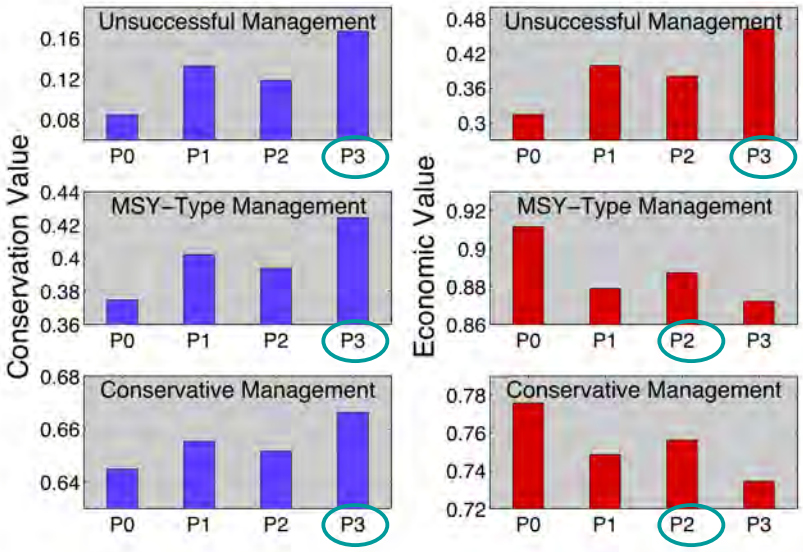
Original Fleet Model: UCD Rankings



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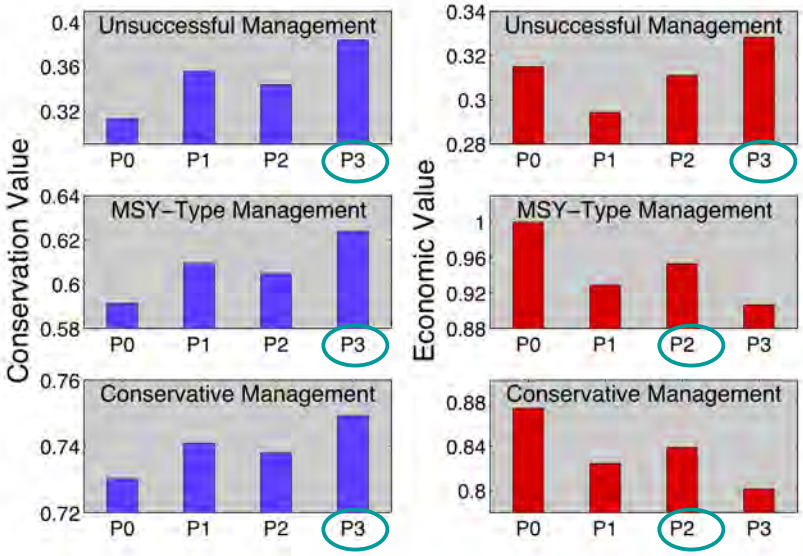
Revised Fleet Model: UCSB Rankings



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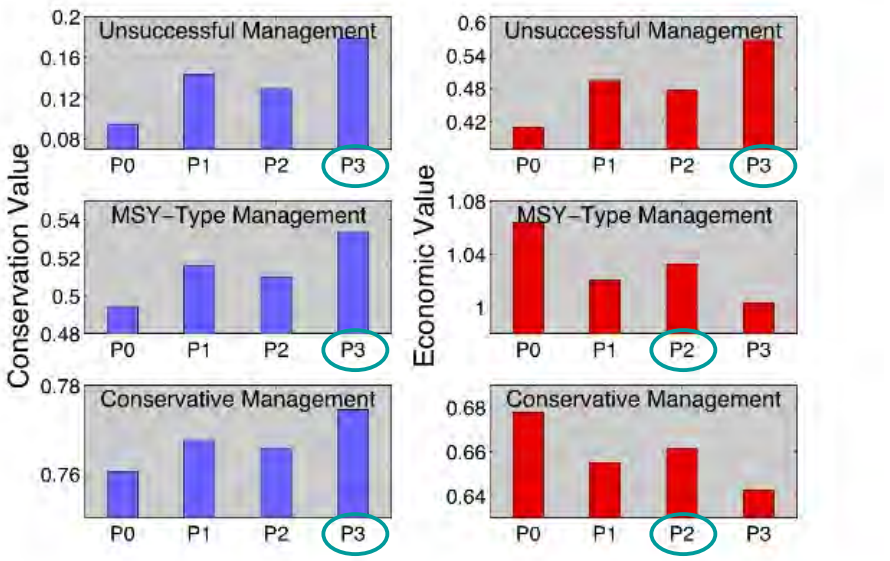
Revised Fleet Model: UCD Rankings



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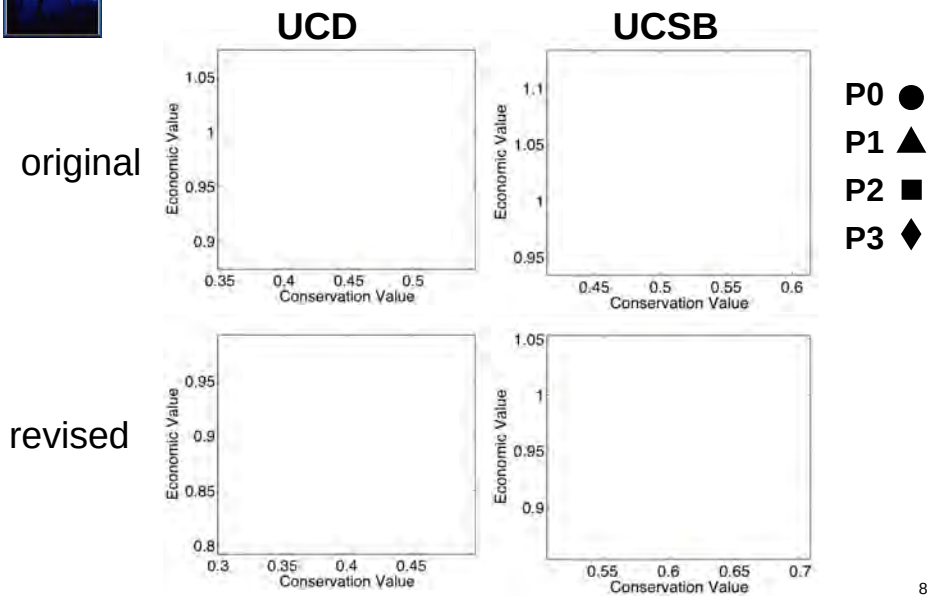
Results: MSY-type Management



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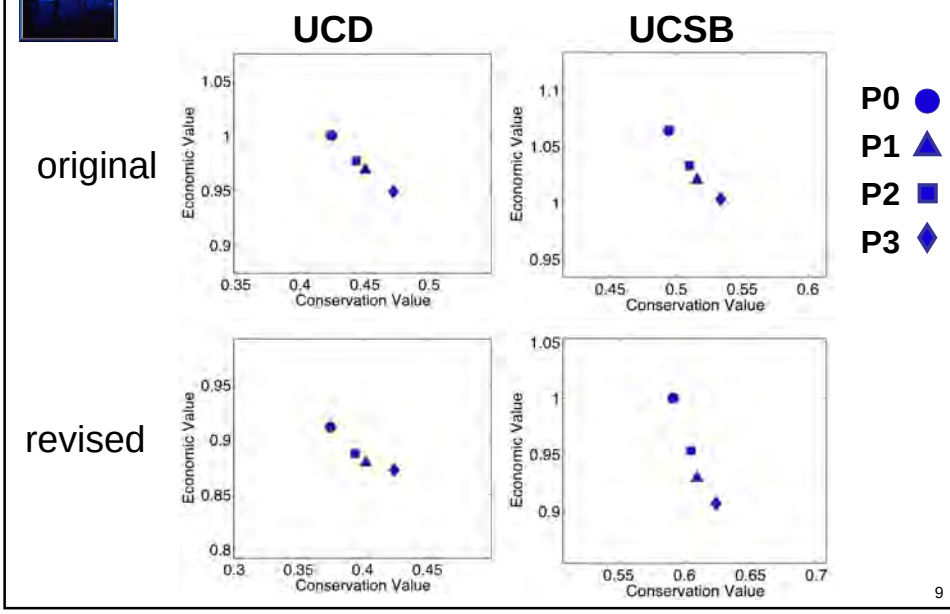
Results: MSY-type Management



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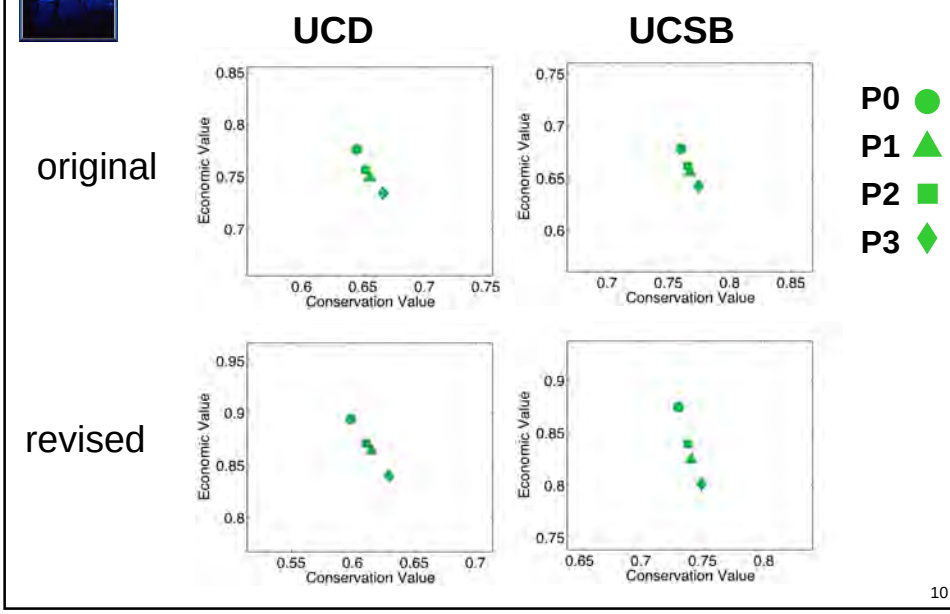
Results: Conservative Management



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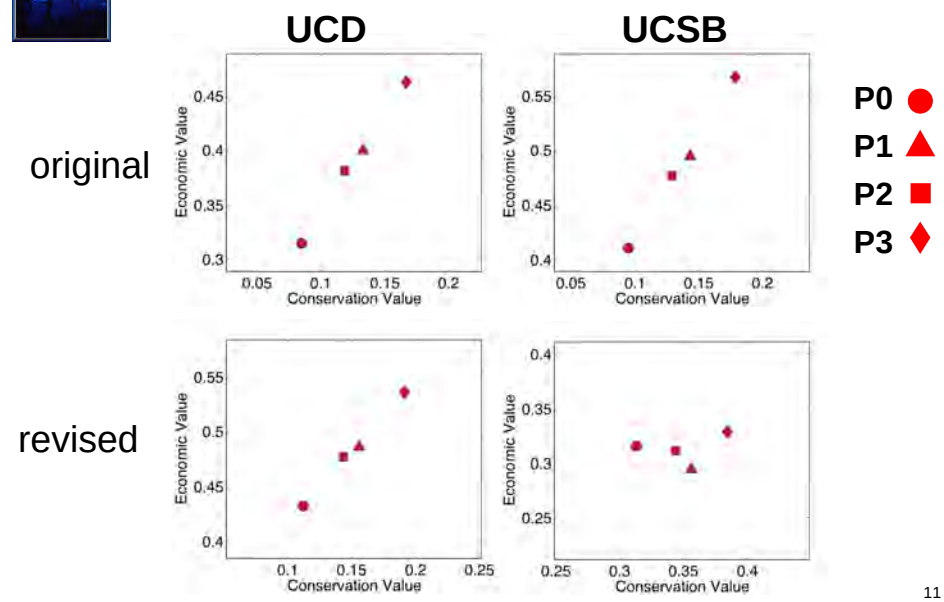
Results: Unsuccessful Management



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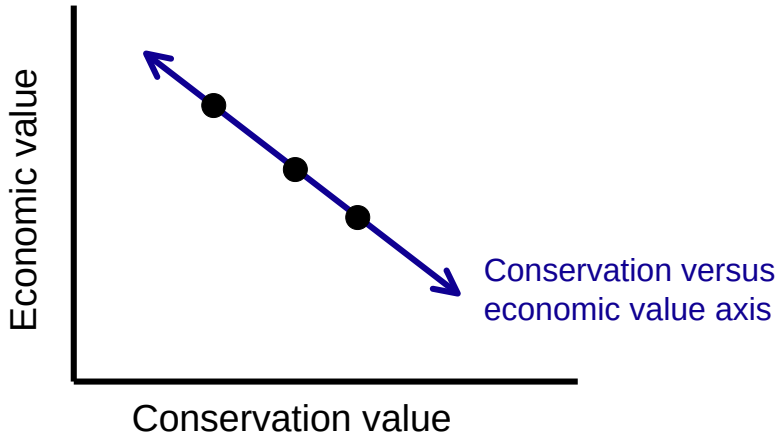
Model Results: Rankings in context



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

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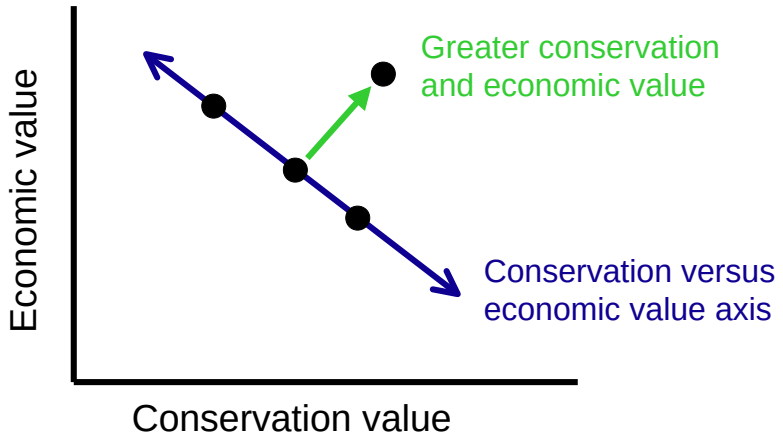
Model Results: Rankings in context



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

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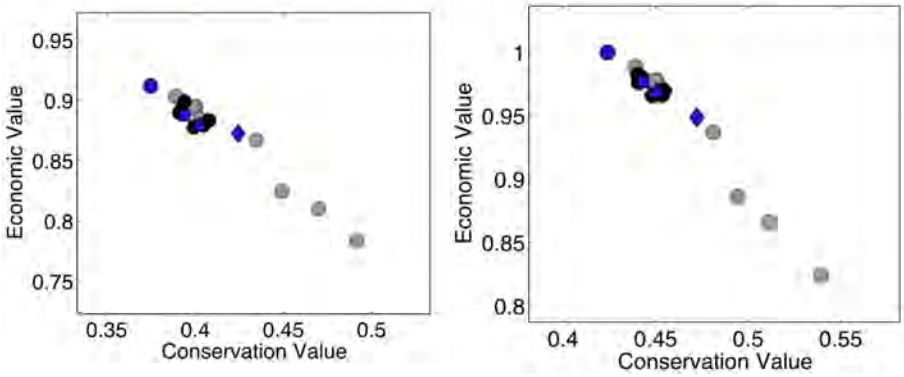
Model Results: Rounds 1-3

Scenario: MSY-type Management

P0 ● **P2** ■
P1 ▲ **P3** ♦

UCD **UCSB**



Round 1 MPA proposals = ●

Round 2 MPA proposals = ●

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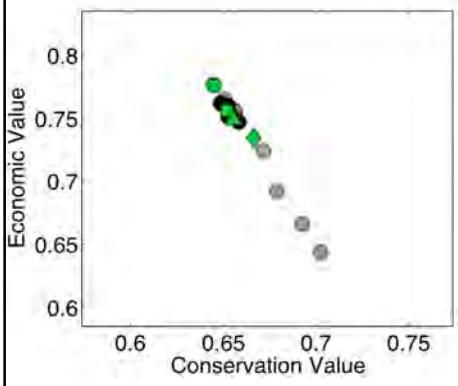
Model Results: Rounds 1-3

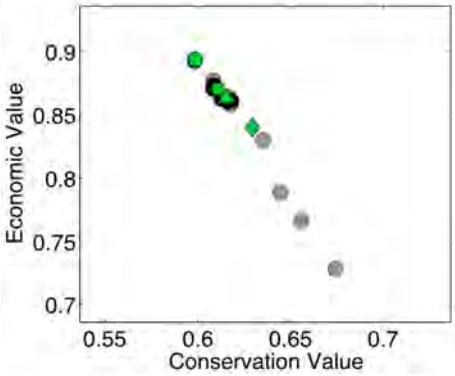
Scenario: Conservative Management

P0 ● P2 ■
P1 ▲ P3 ♦

UCD



UCSB



Round 1 MPA proposals = ●

Round 2 MPA proposals = ●

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Model Results: Rounds 1-3

Scenario: Unsuccessful Management

P0 ● P2 ■
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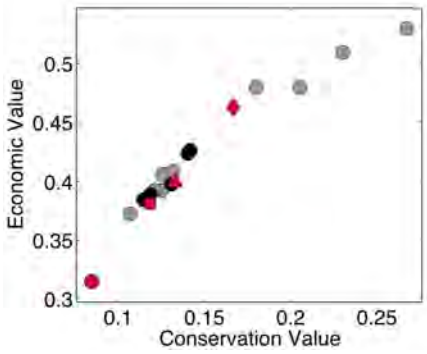
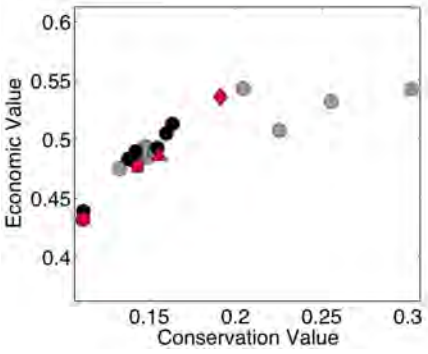
UCD



UCSB



Round 1 MPA proposals = ●

Round 2 MPA proposals = ●

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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).

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