Global Comparisons of Fisheries Expansion, Overfishing and Recovery with Implications for National Fisheries Policy

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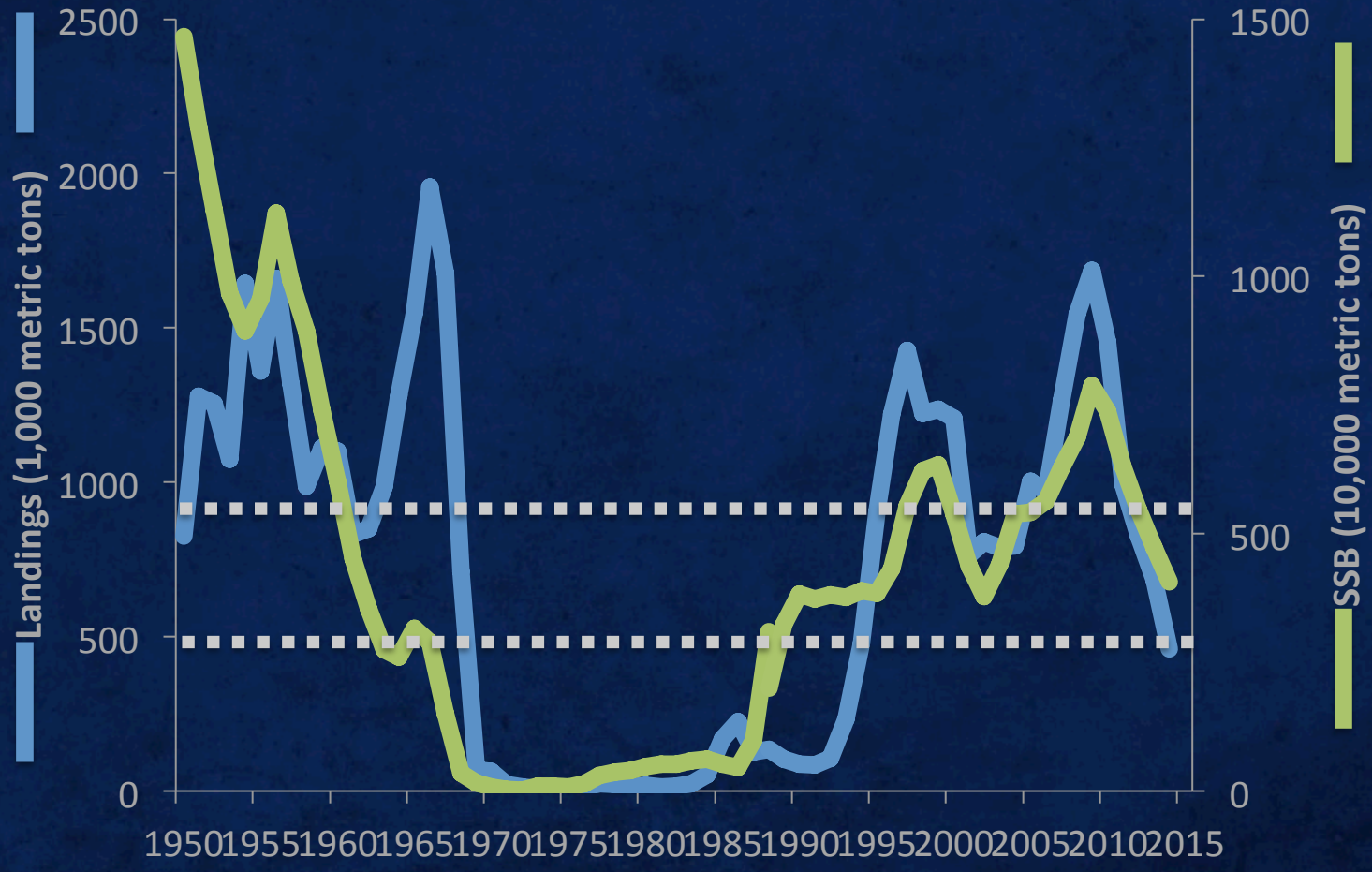
ICES symposium on Targets and Limits for Long Term Fisheries Management
Athens, Greece – October 30, 2015

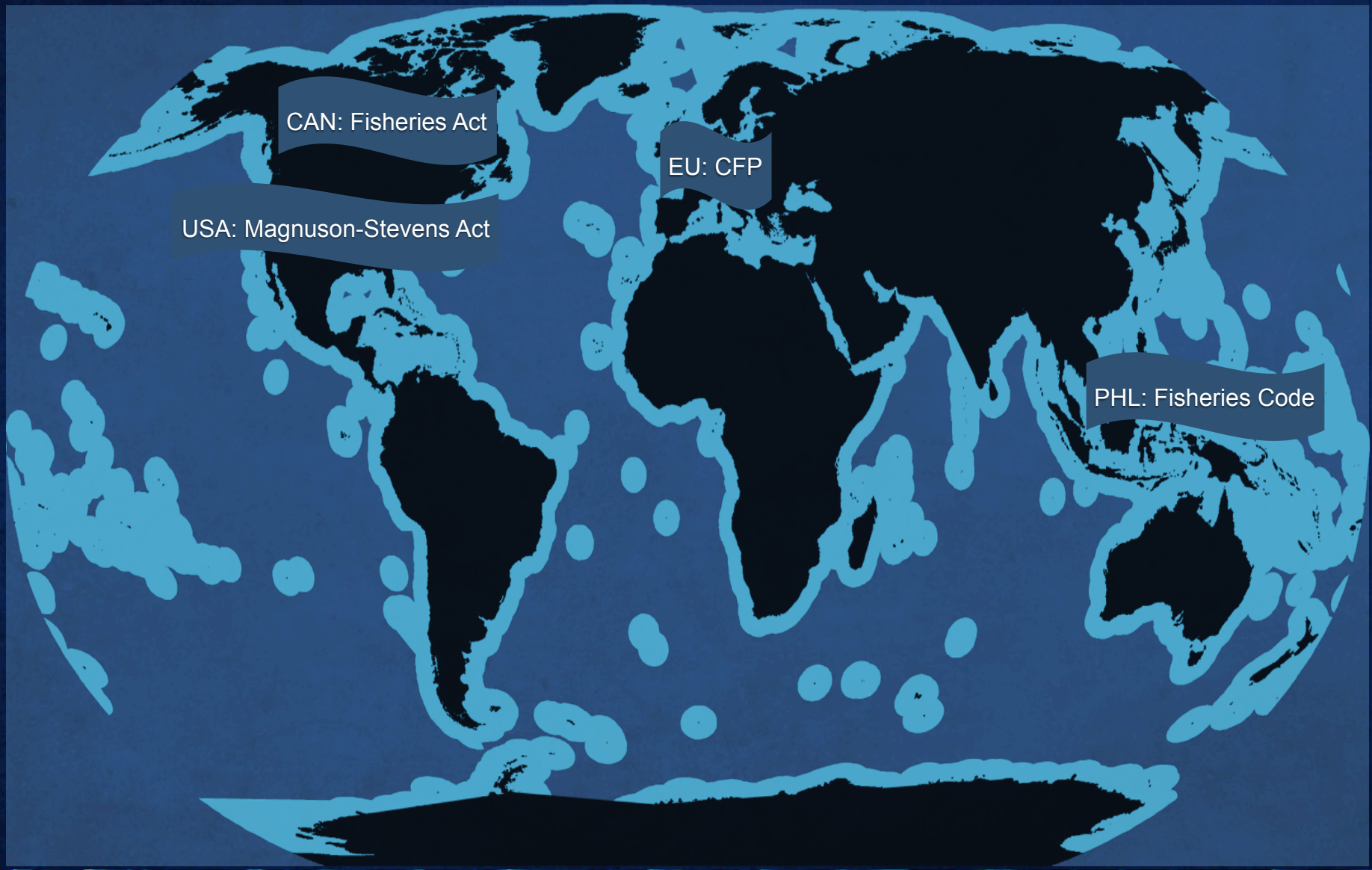
OCEANA Protecting the World's Oceans

One Stock → One Fishery → One Management Plan



Norwegian Spring-Spawning Herring Landings and Biomass

Change implemented through national policies

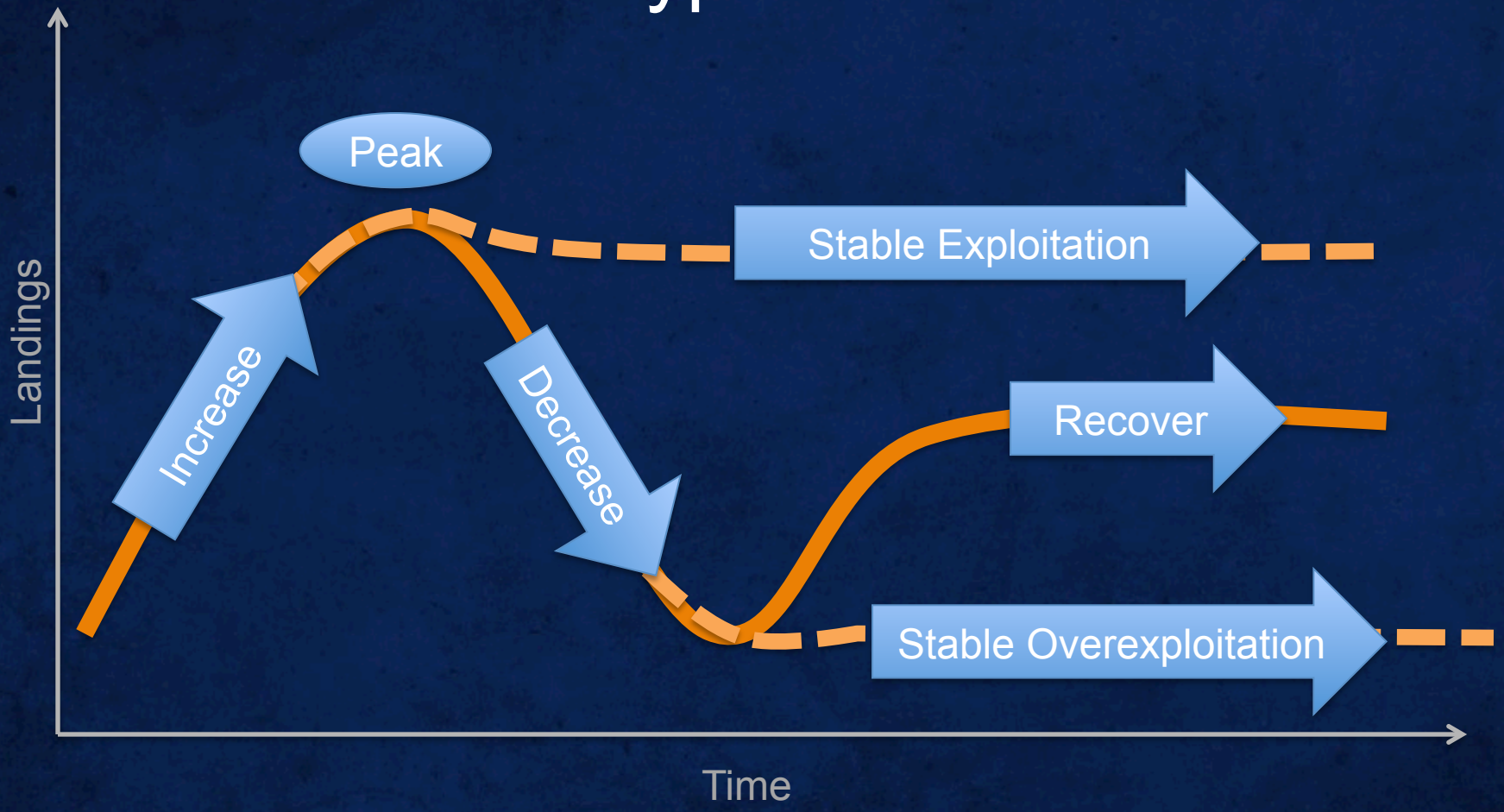


Two Questions:

- Can country landings as a whole be analyzed in the same way as individual fisheries?

- What can we learn from these patterns to help design better national fisheries policies?

Hypothesis

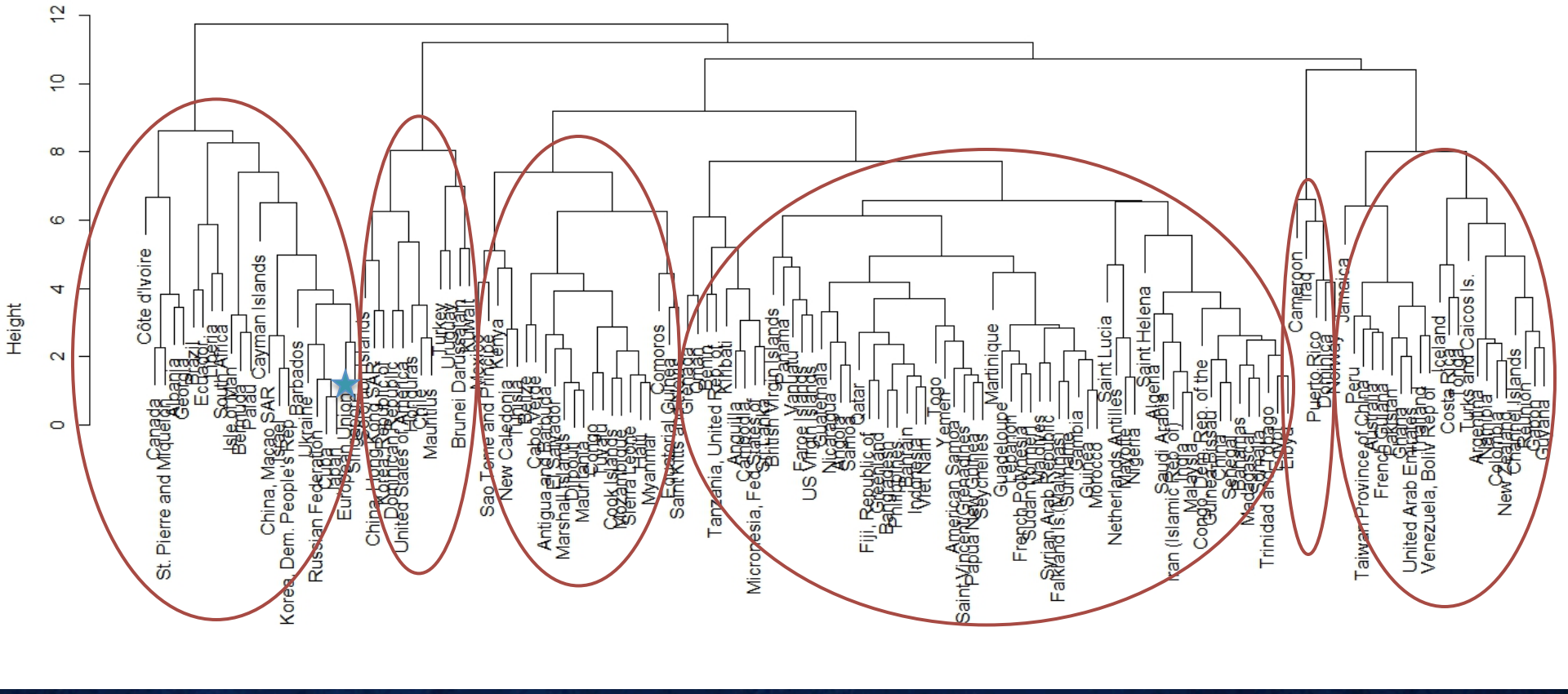

Landings
Time
Peak
Increase
Decrease
Stable Exploitation
Recover
Stable Overexploitation

Methods

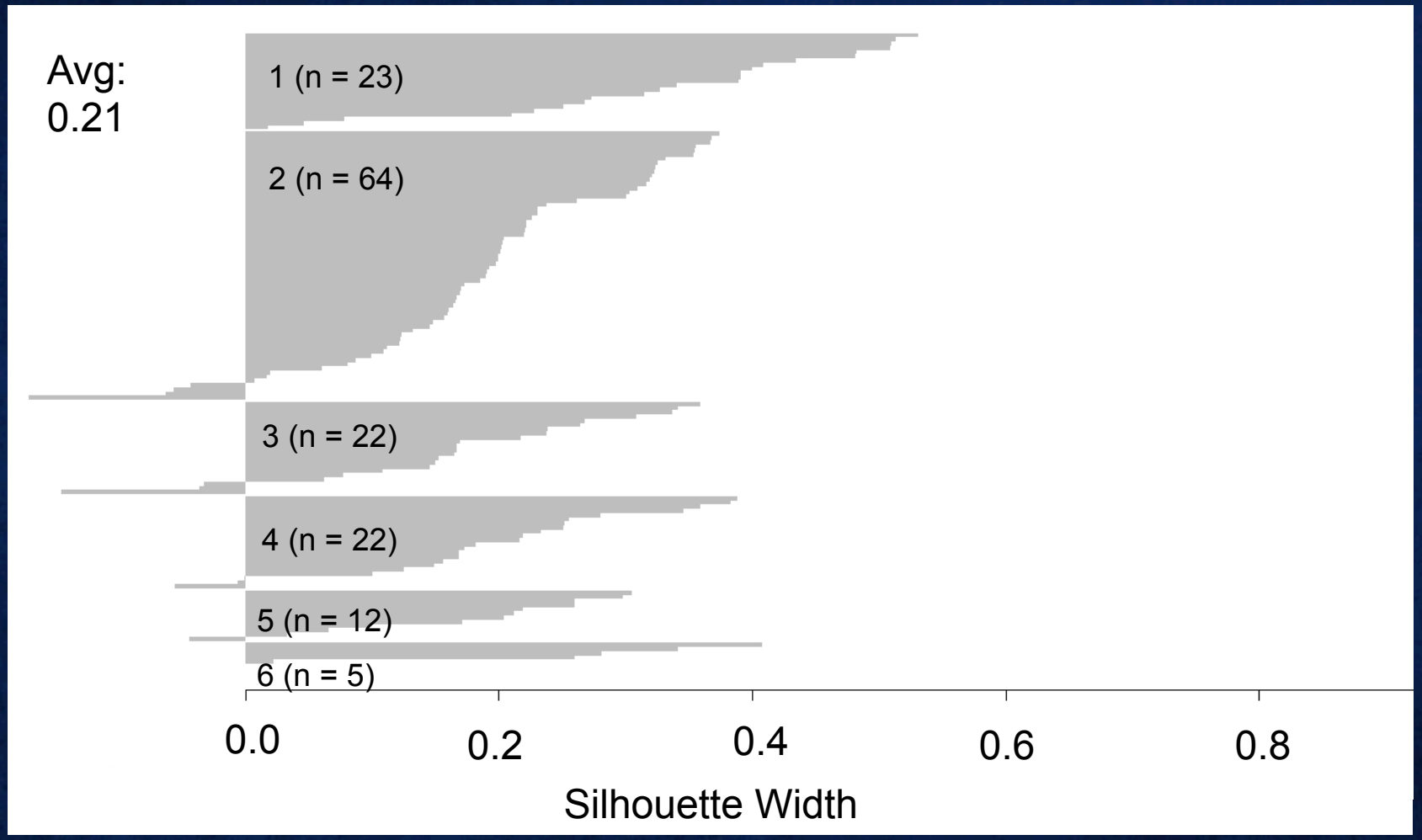
- Time Series Clustering Analysis
  - Dissimilarity based on Euclidean distance
  - R package: TSClust (Montero and Vilar 2014)
  - Split into 6 groups using hierarchical clustering

- Data
  - Downloaded from FAO FishStatJ 2015
  - Filtered and grouped countries for 148 time series
  - Smoothed using a 3-year running average
  - Standardized with mean of zero and unit variance

Hierarchical clustering with 6 groups

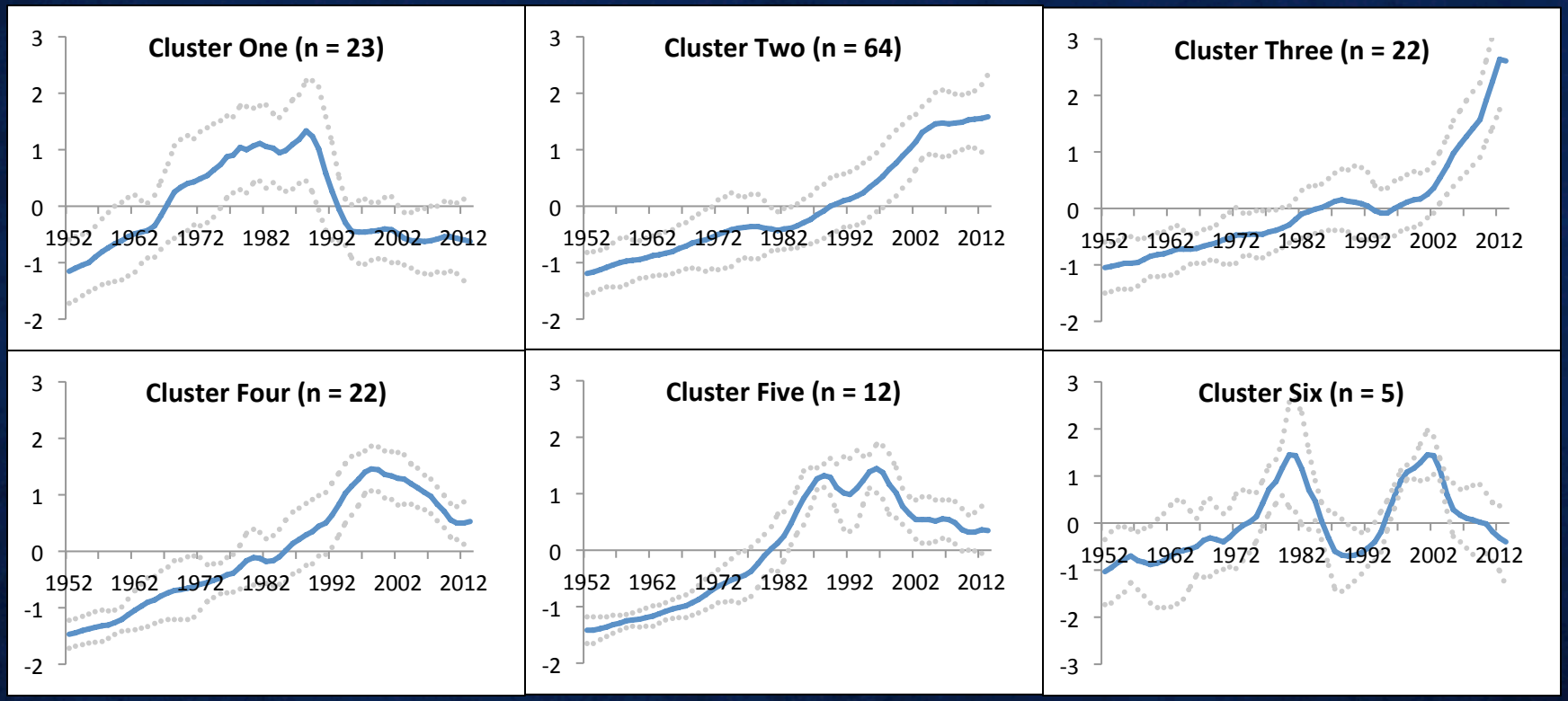


Silhouette Plot

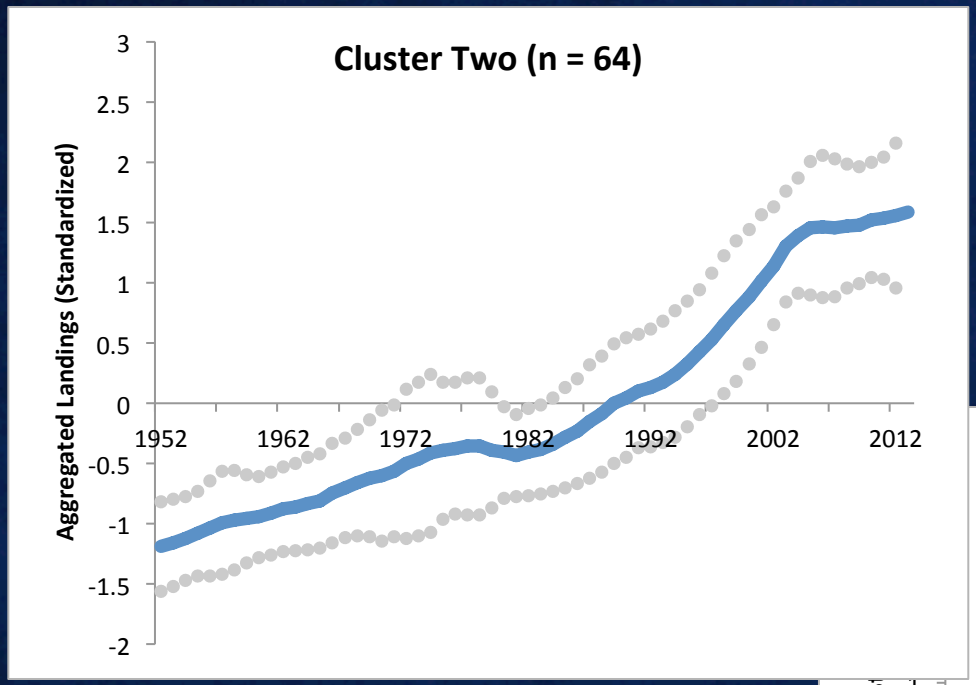


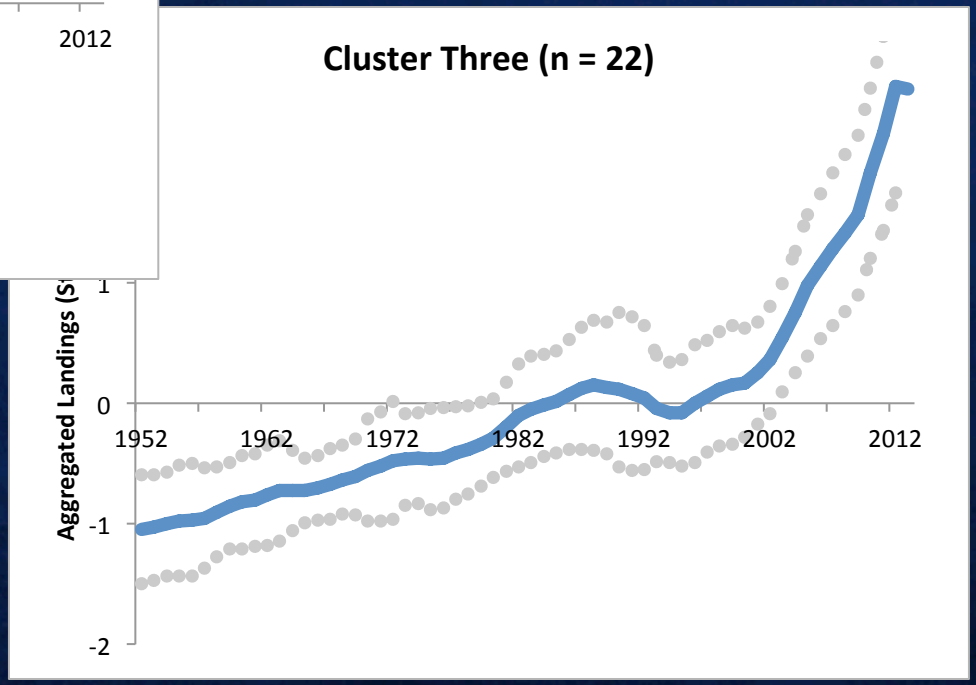
Interpreting Results

Mean Profiles of Six Clusters (standardized, aggregated landings)

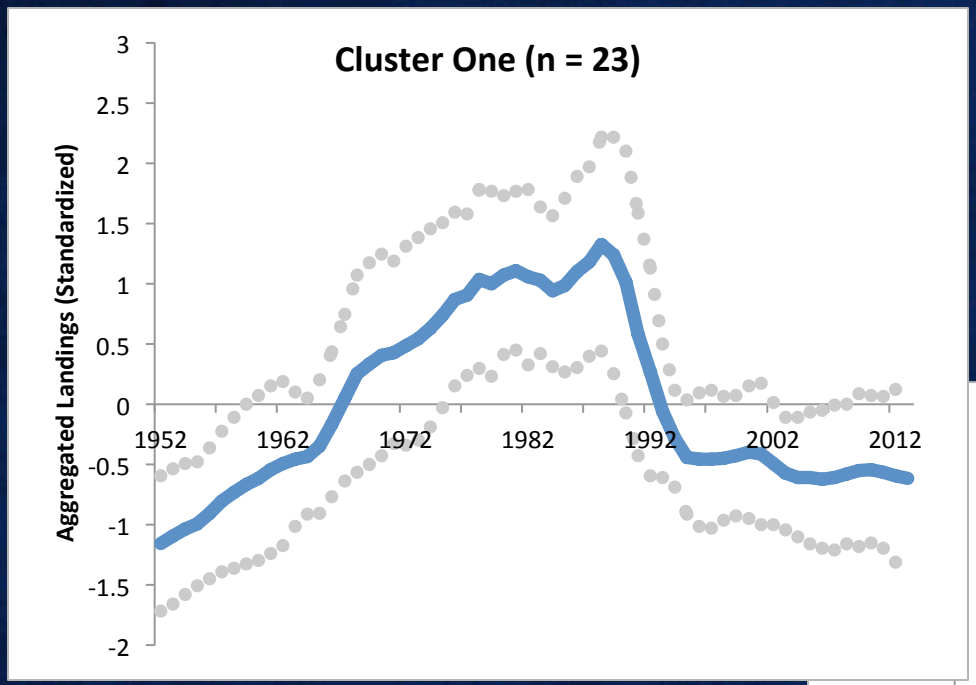


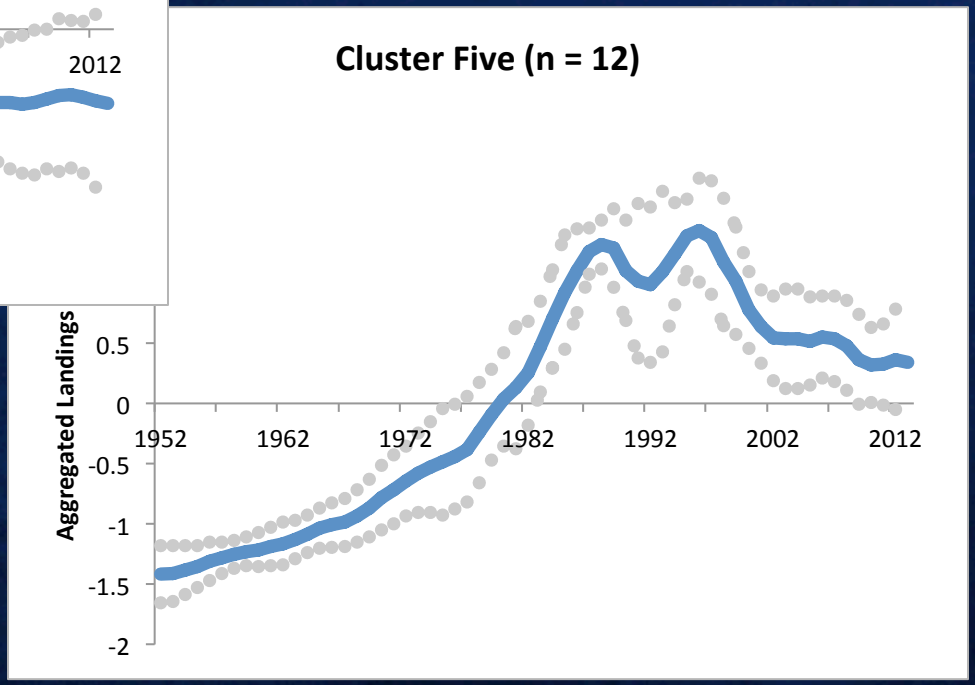
How long can expansion last?





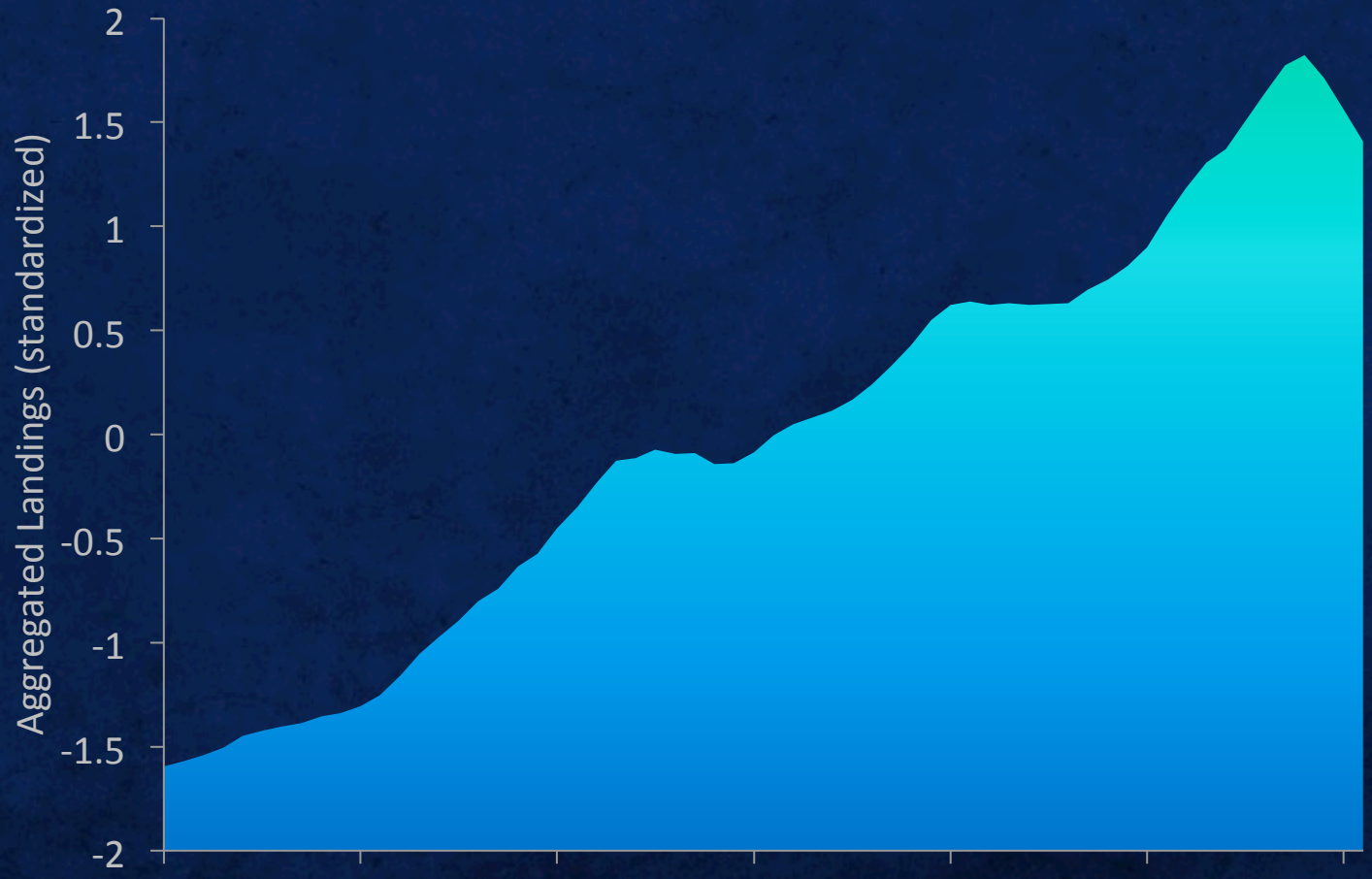
Not Forever!


Cluster One (n = 23)
Aggregated Landings (Standardized)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
1952
1962
1972
1982
1992
2002
2012

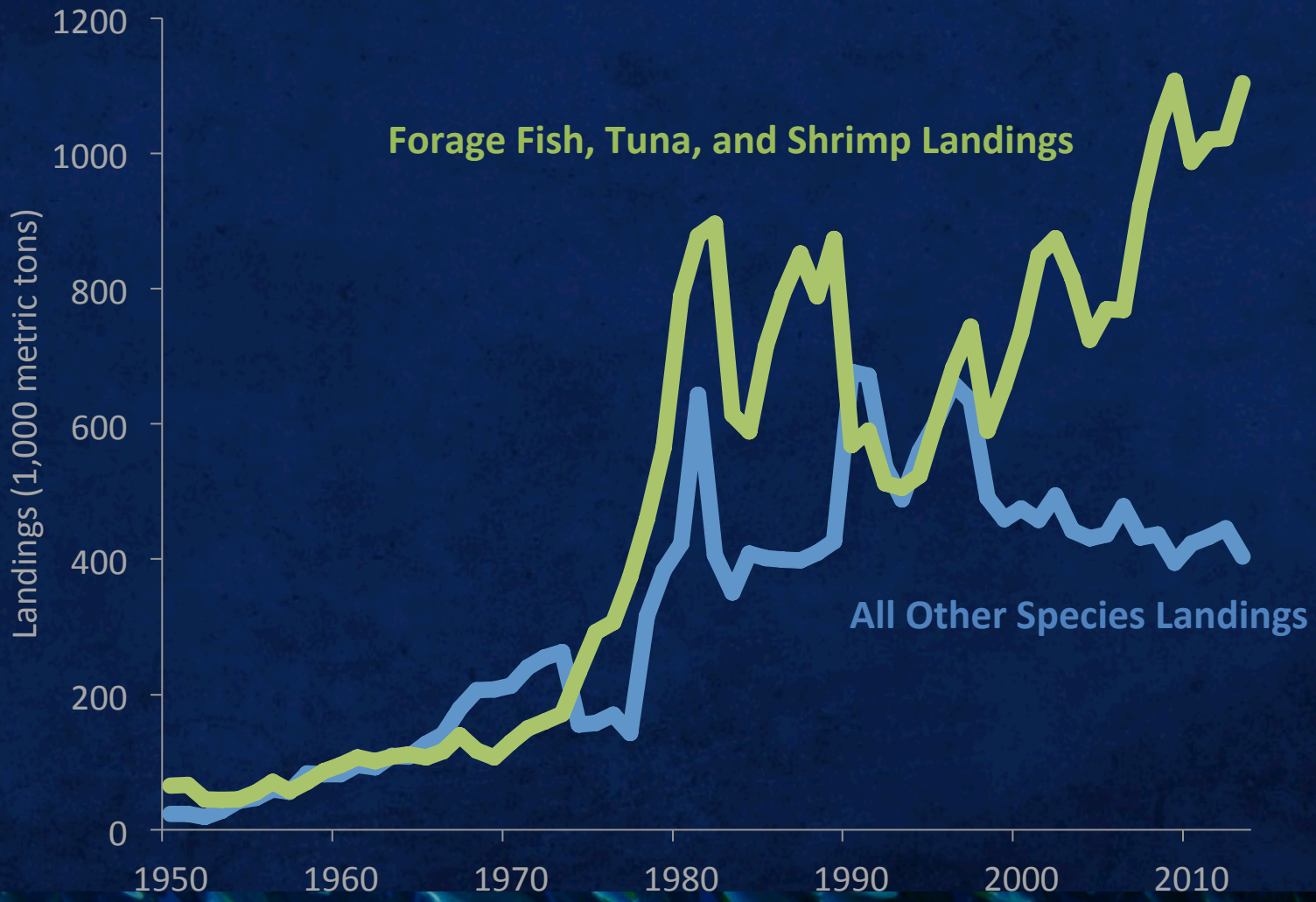

Cluster Five (n = 12)
Aggregated Landings
0.5
0
-0.5
-1
-1.5
-2
1952
1962
1972
1982
1992
2002
2012

Example: The Philippines

- Good management on paper, but lacking enforcement
- Preventing a crash in overall landings is critical

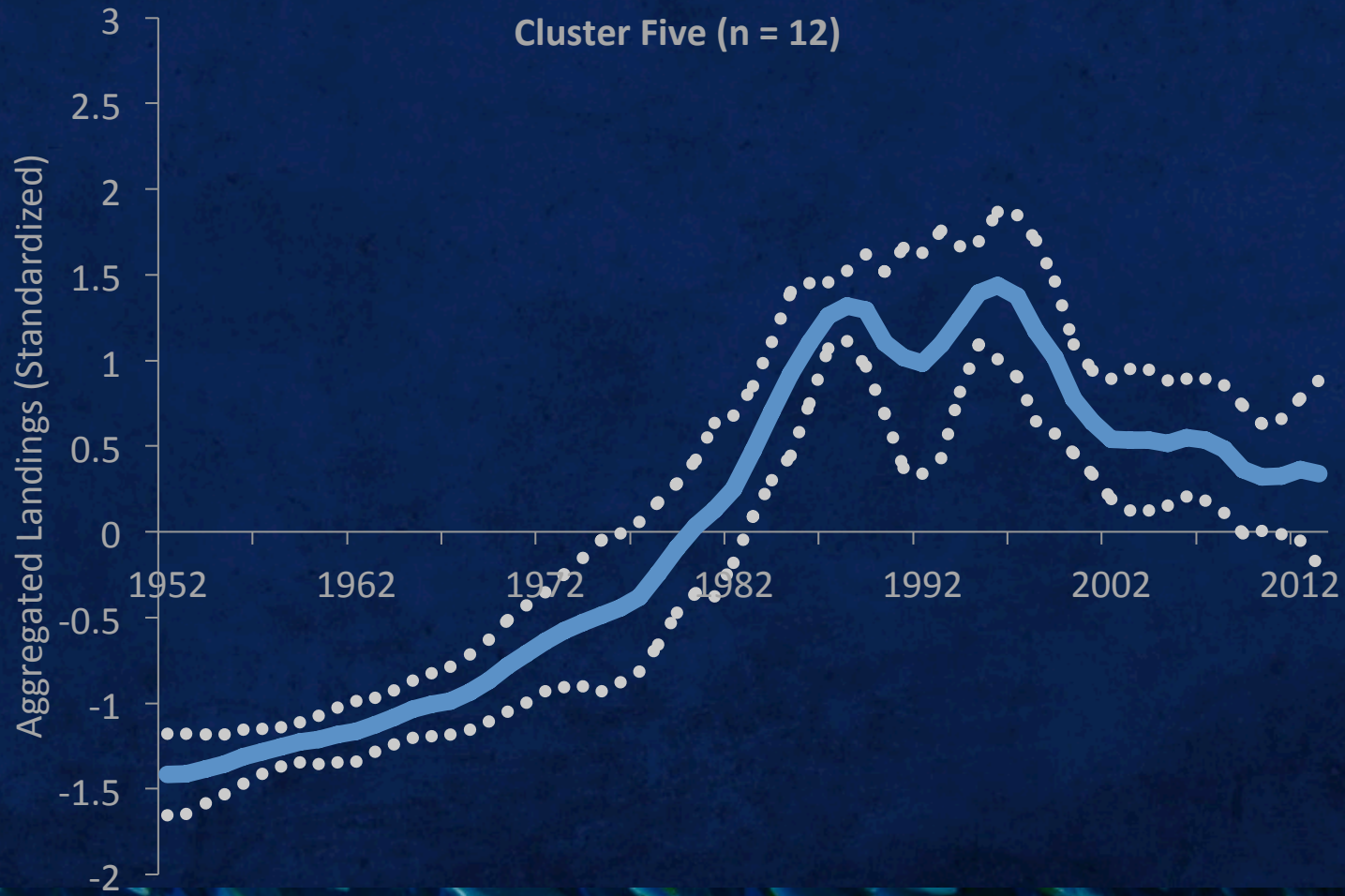


Example: Mexico – a tale of two management regimes

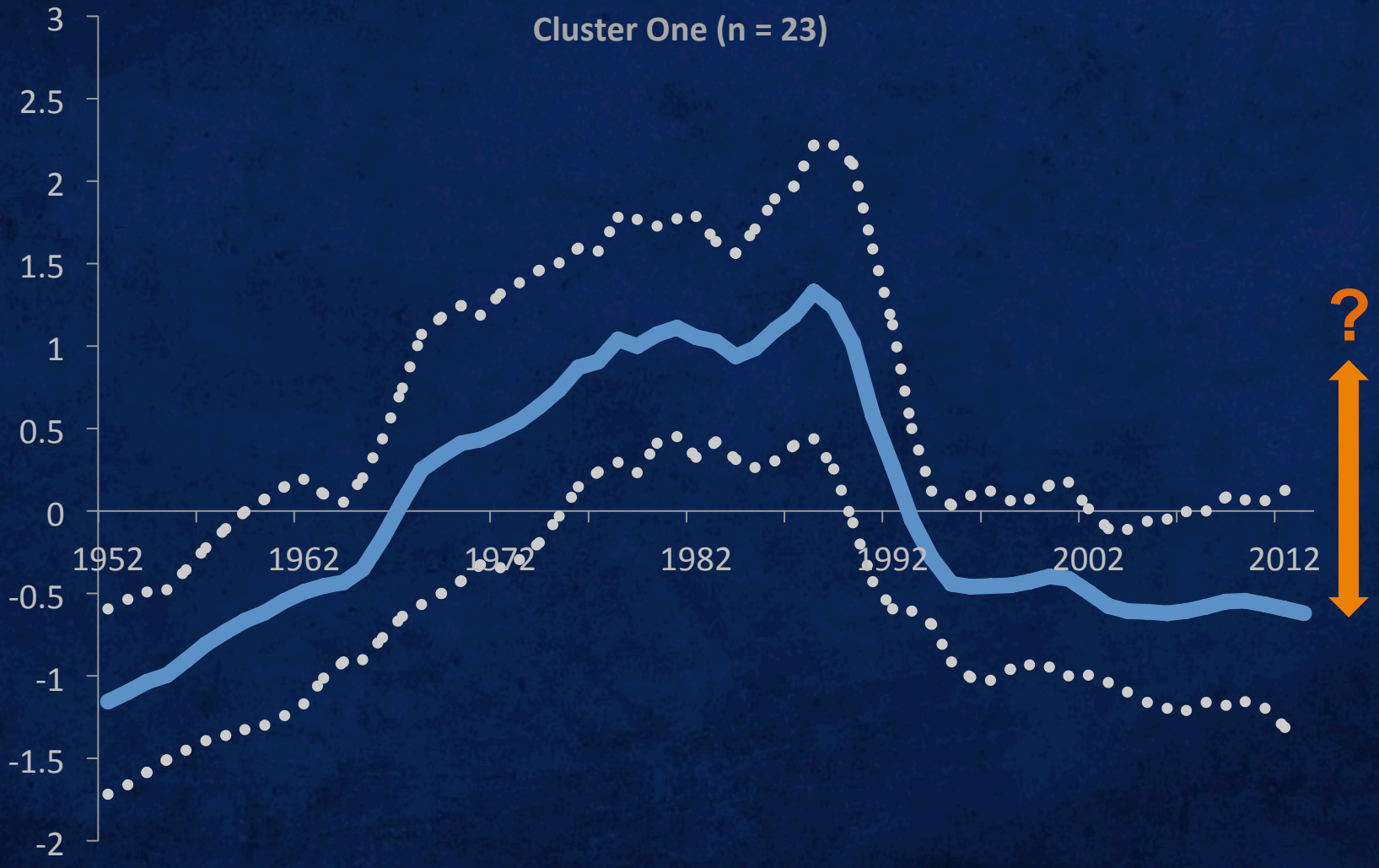


Does stable high yield really exist?

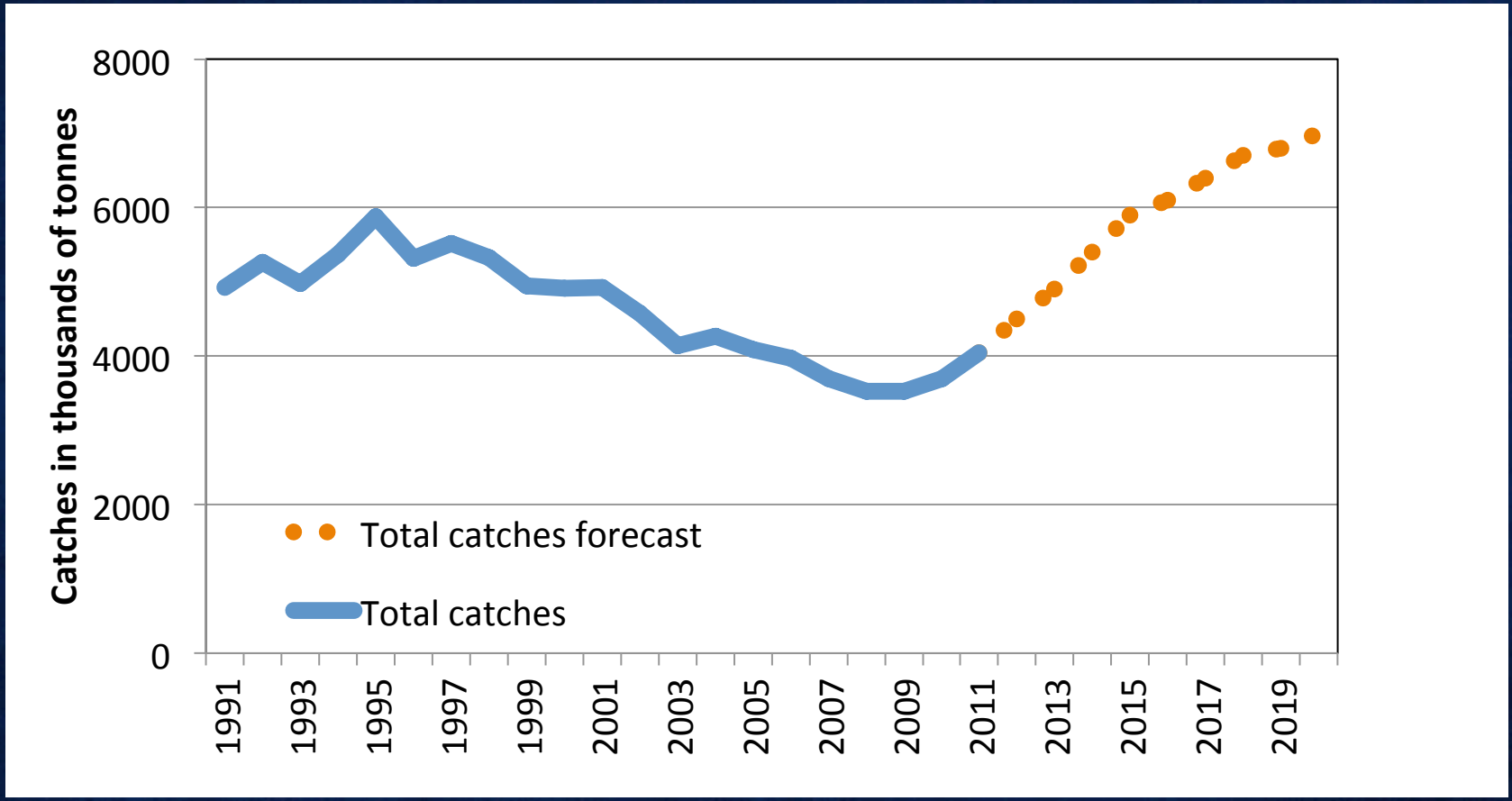
- Long-term catches below the peak, but above the mean



What about recovery?

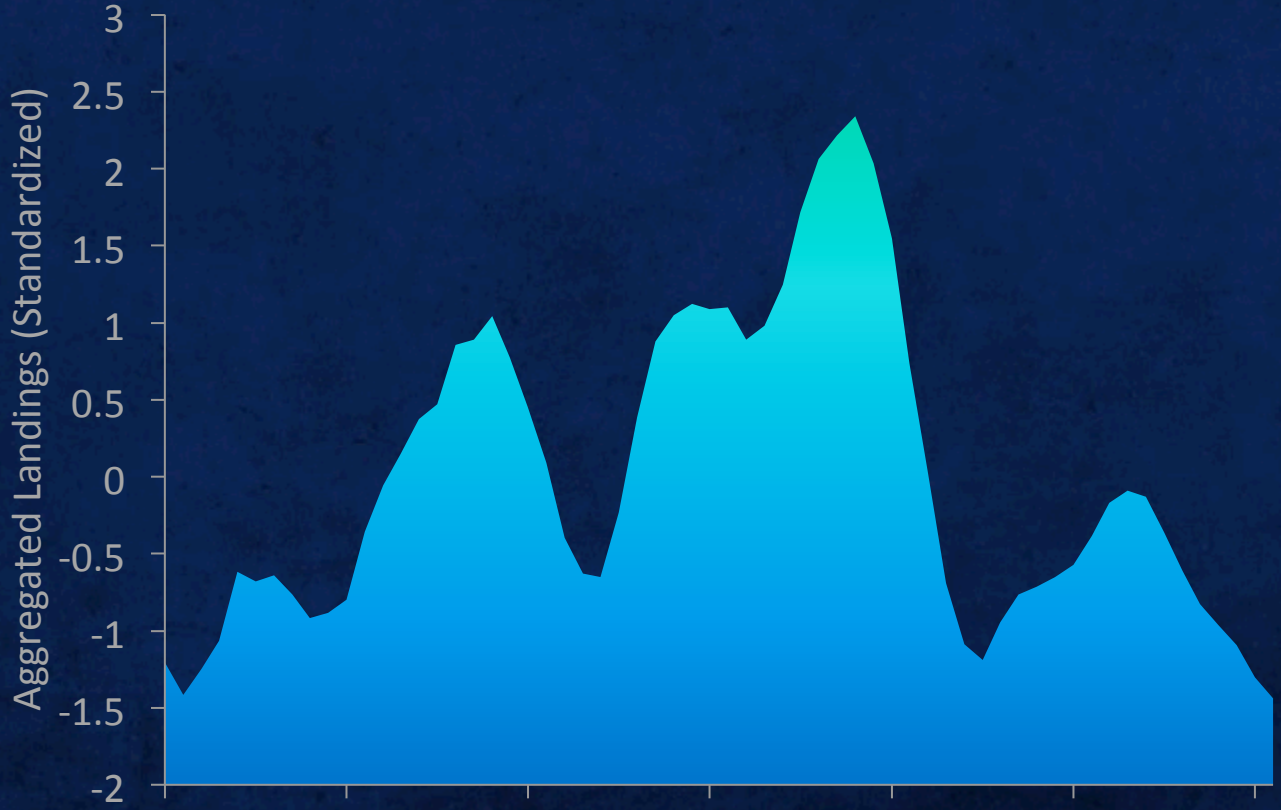


EU Recovery Potential

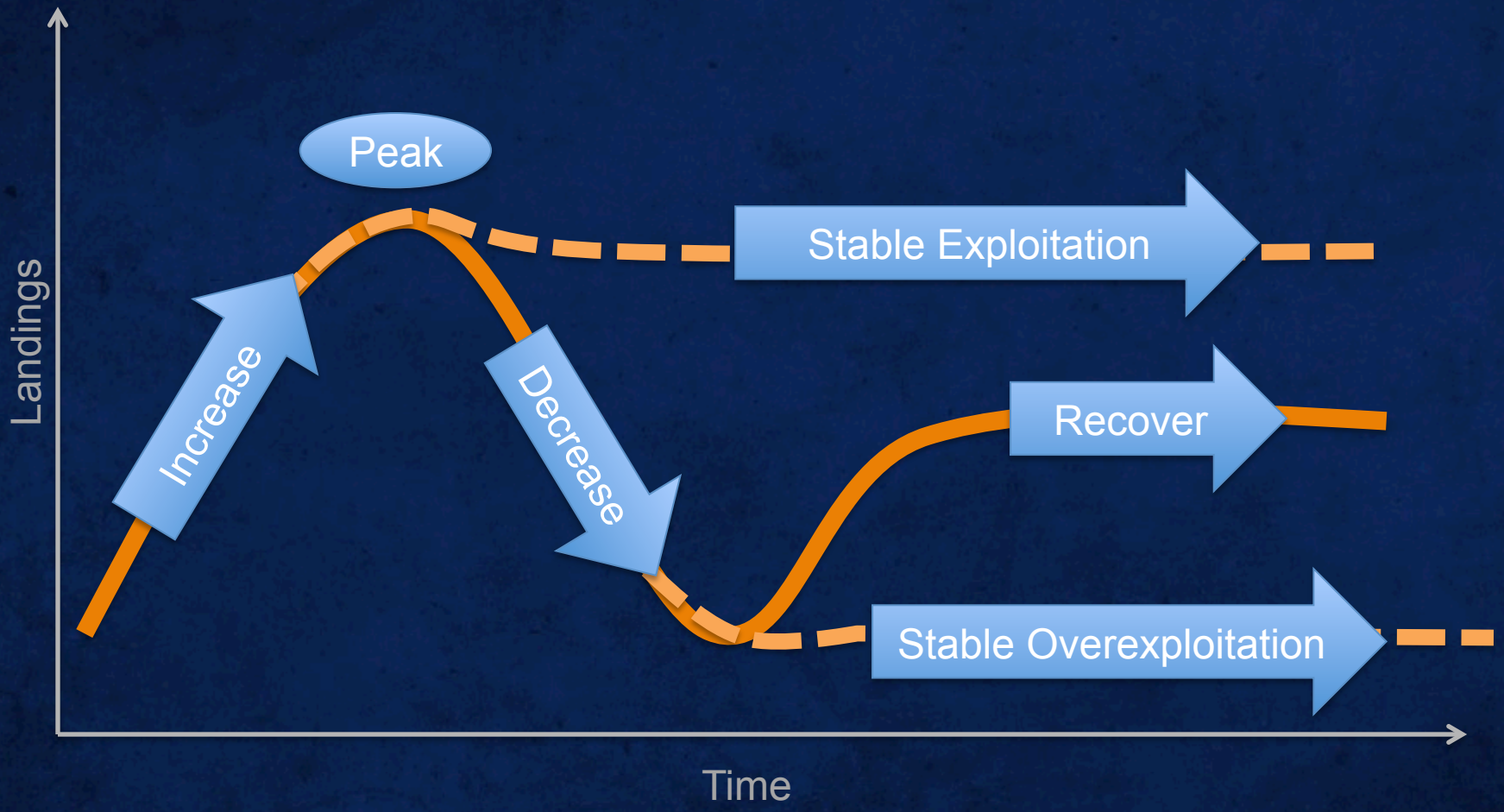


Example: Canada

- 36% of stocks are in the “critical” or “cautious” zone
- Landings could be increased by over 50% if B_{MSY} levels are achieved

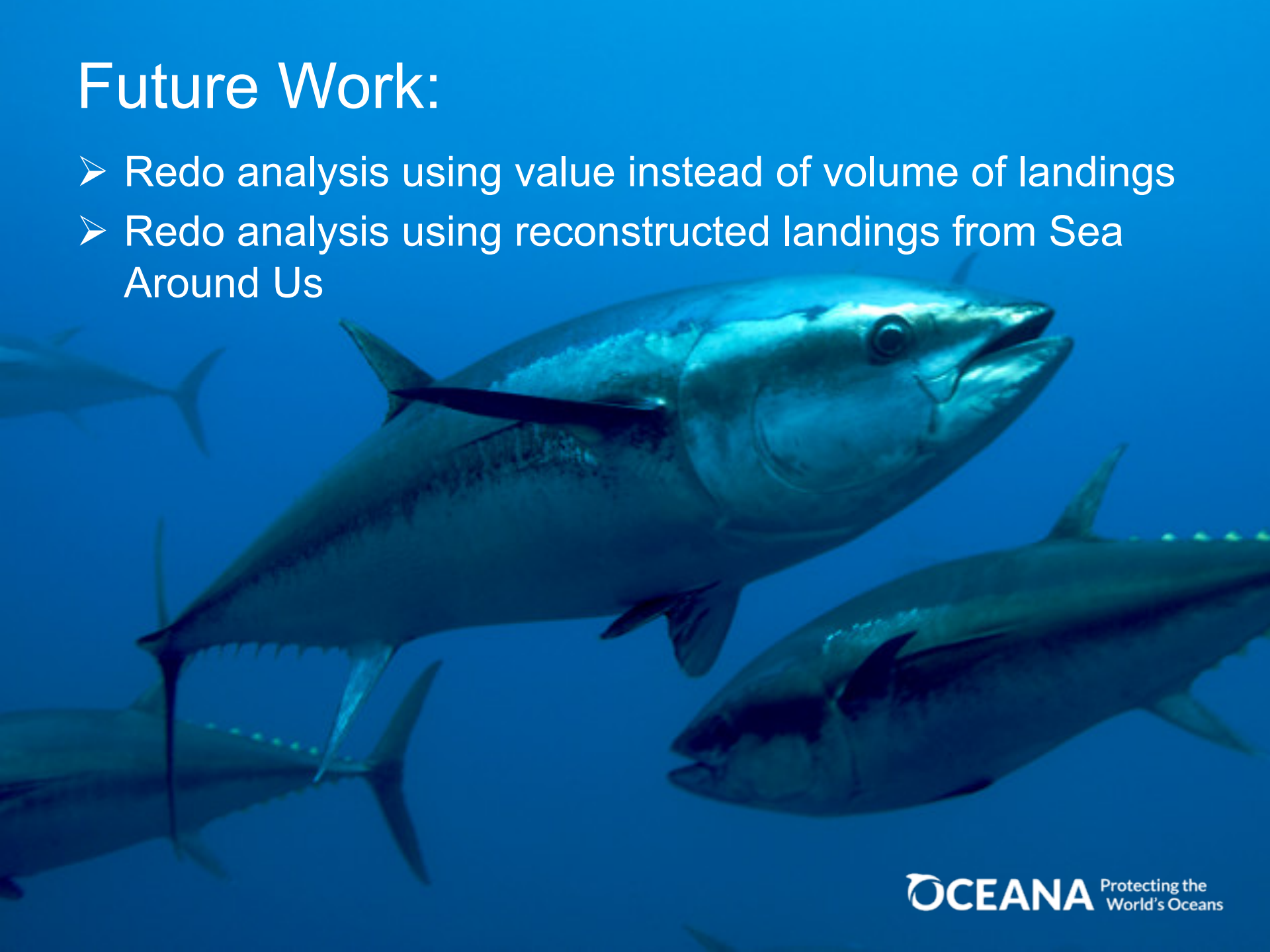


Remember the Big Picture



Future Work:

- Redo analysis using value instead of volume of landings
- Redo analysis using reconstructed landings from Sea Around Us



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- Pablo Montero (University of A Coruña) for assistance with R coding and advice
- Oceana staff and supporters

Thank You!

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Extras

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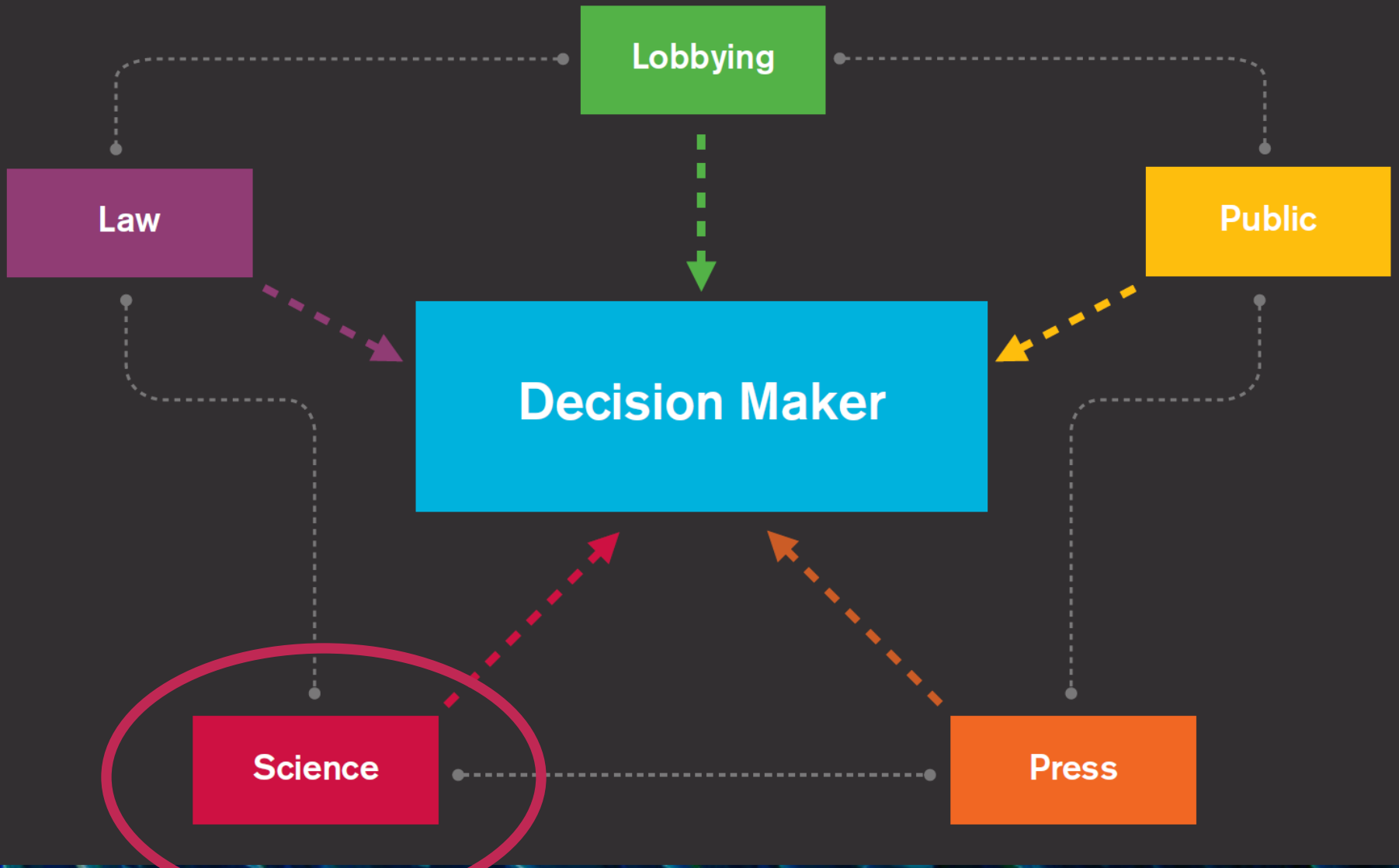

Unexpected patterns of fisheries collapse in the world's oceans

Malin L. Pinsky[a,1], Olaf P. Jensen[b], Daniel Ricard[c], and Stephen R. Palumbi[a]

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MYTHS THAT CONTINUE TO IMPEDE PROGRESS IN ECOSYSTEM-BASED FISHERIES MANAGEMENT

Ecosystem-based fisheries management has been perceived as something desirable but pragmatically unachievable due to several impediments identified earlier during its implementation phase. Over the years, many of these impediments have been resolved but not well communicated to stakeholders, managers, scientists, and policymakers. As a result, several past impediments to implementing ecosystem-based fisheries management have taken on a mythical status. Here we identify six common myths, address why they in fact no longer impede ecosystem-based fisheries management, and propose solutions for moving forward. We assert that these myths need not continue to exist and that improved approaches for fisheries are indeed feasible.

Mitos que siguen impidiendo el progreso del manejo de pesquerías basado en el ecosistema

El manejo de pesquerías basado en el ecosistema se ha percibido como algo deseable, pero de manera pragmática imposible de lograr debido a ciertos impedimentos que fueron identificados durante la fase de implementación del enfoque. Al pasar de los años, muchos de estos impedimentos se han resuelto pero esto no se le ha comunicado a los interesados en los recursos, manejadores, científicos y funcionarios. Como resultado, muchos obstáculos del pasado que impedían implementar el manejo de pesquerías bajo un enfoque de ecosistema, han adquirido un estatus mítico. Aquí se identifican seis mitos comunes, se ahonda en las razones por cuales actualmente ya no son un obstáculo para este tipo de manejo y se proponen soluciones para avanzar al futuro. Se asevera que no es necesario que estos mitos sigan existiendo y que, de hecho, si son factibles nuevos enfoques para manejo de pesquerías.

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FISH and FISHERIES

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Using globa
fisheries

Managing a crucial link i

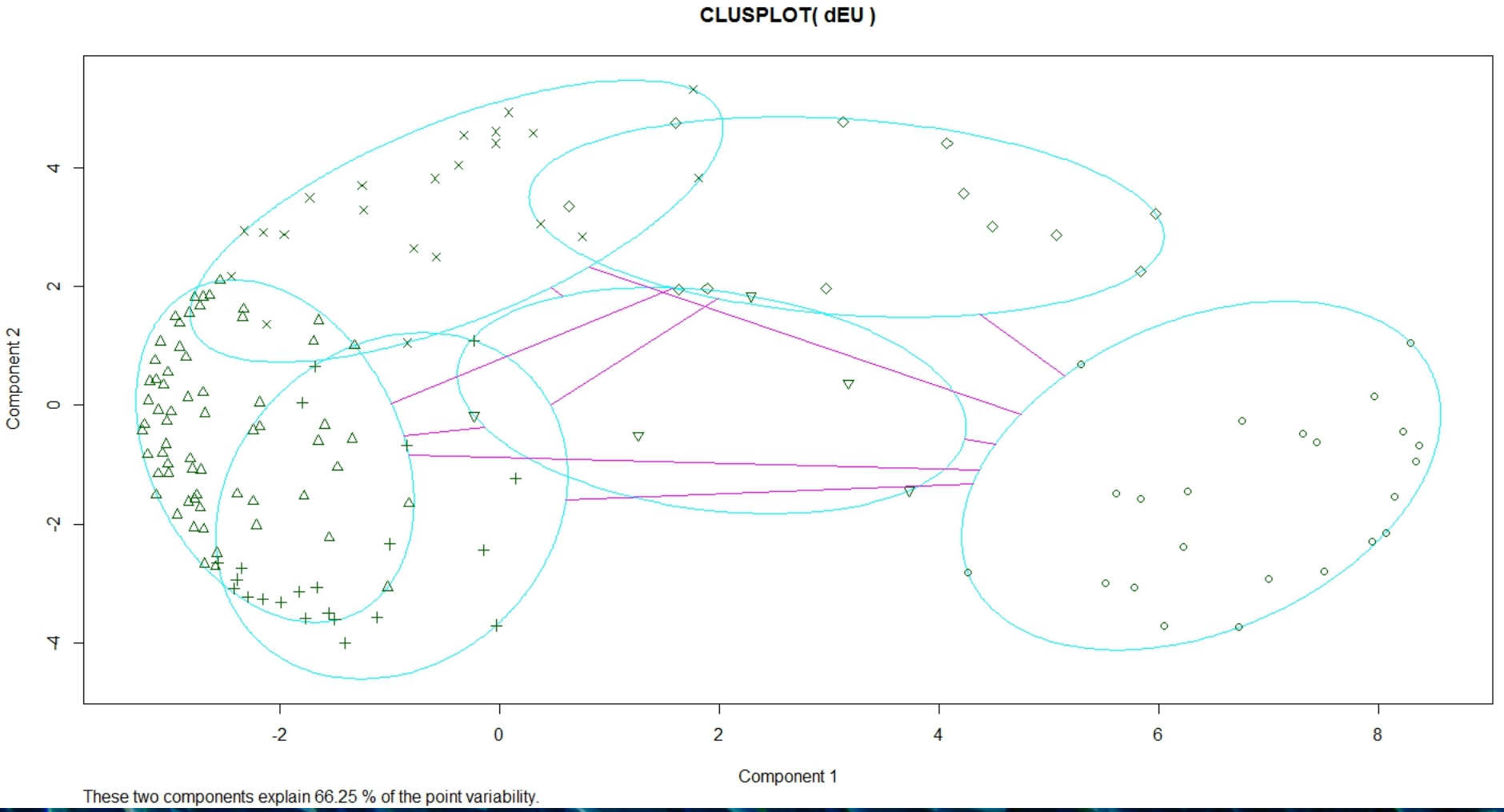
A report from the Lenfest Fo

Examining the knowledge base and status of commerc
exploited marine species with the RAM Legacy Stock
Assessment Database

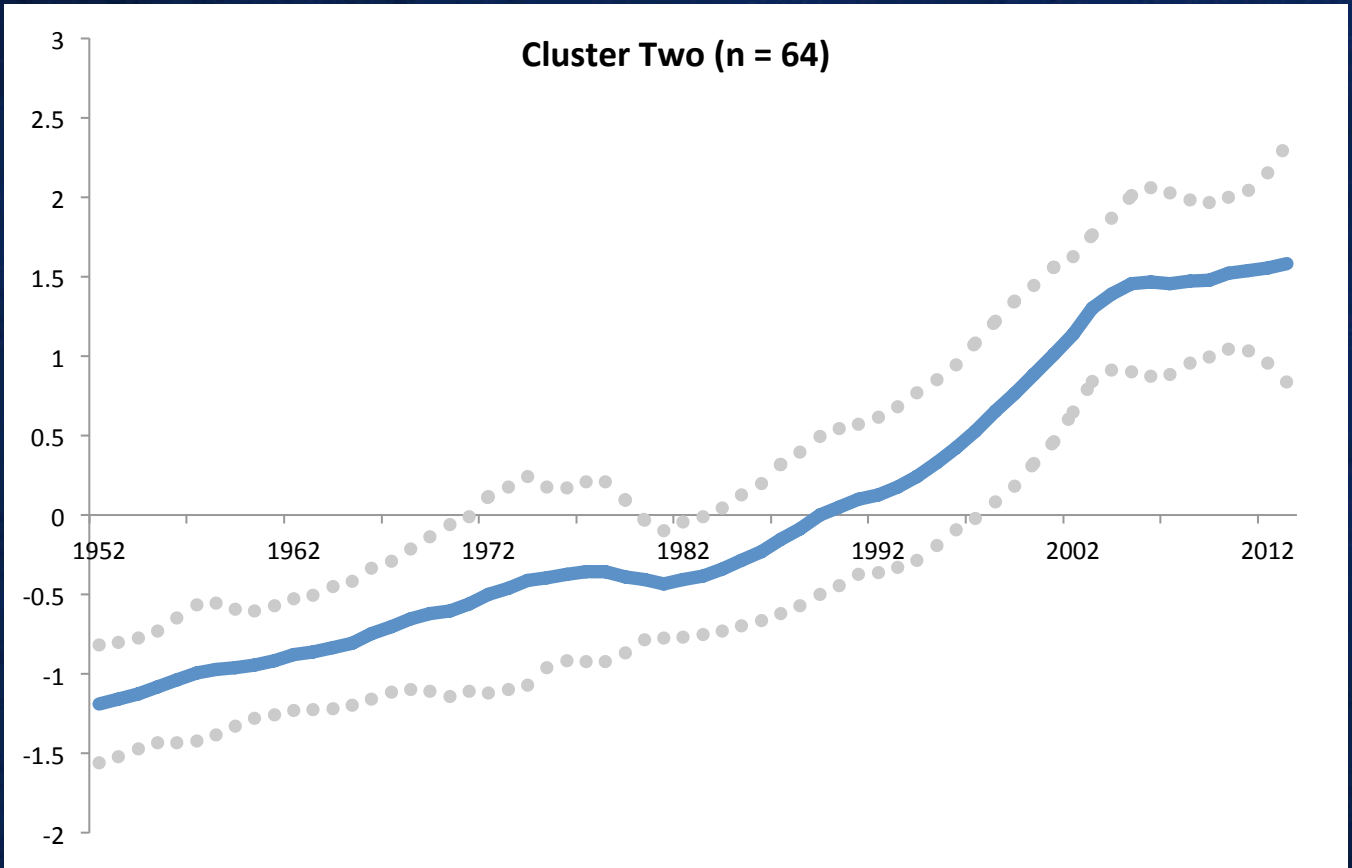
K Kleisner[1], D Zeller[1],

Daniel Ricard[1], Cóilín Minto[1], Olaf P Jensen[2†] & Julia K Baum[3‡]*

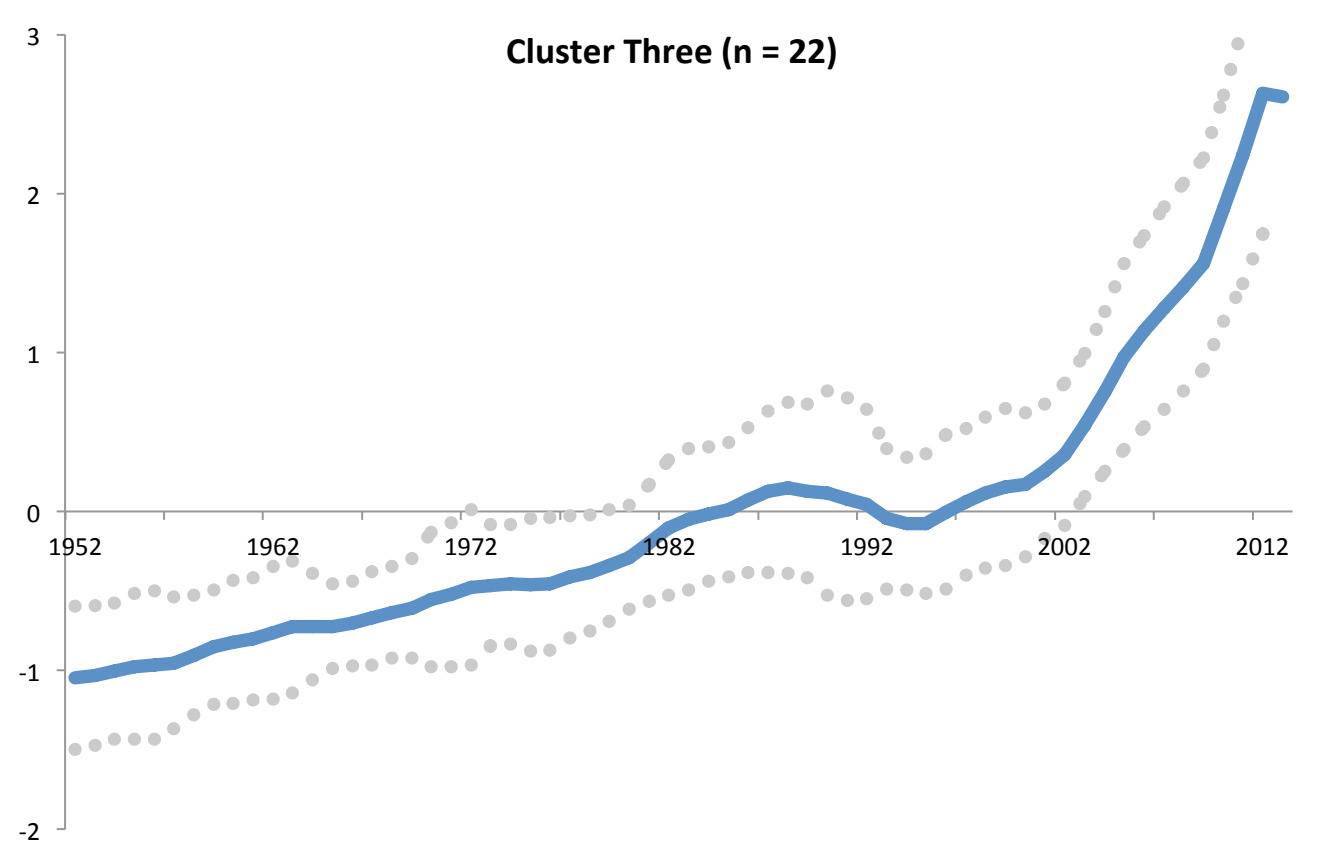
Clustering of Principle Components



“Continuous Expansion”



“Boom & Peak”

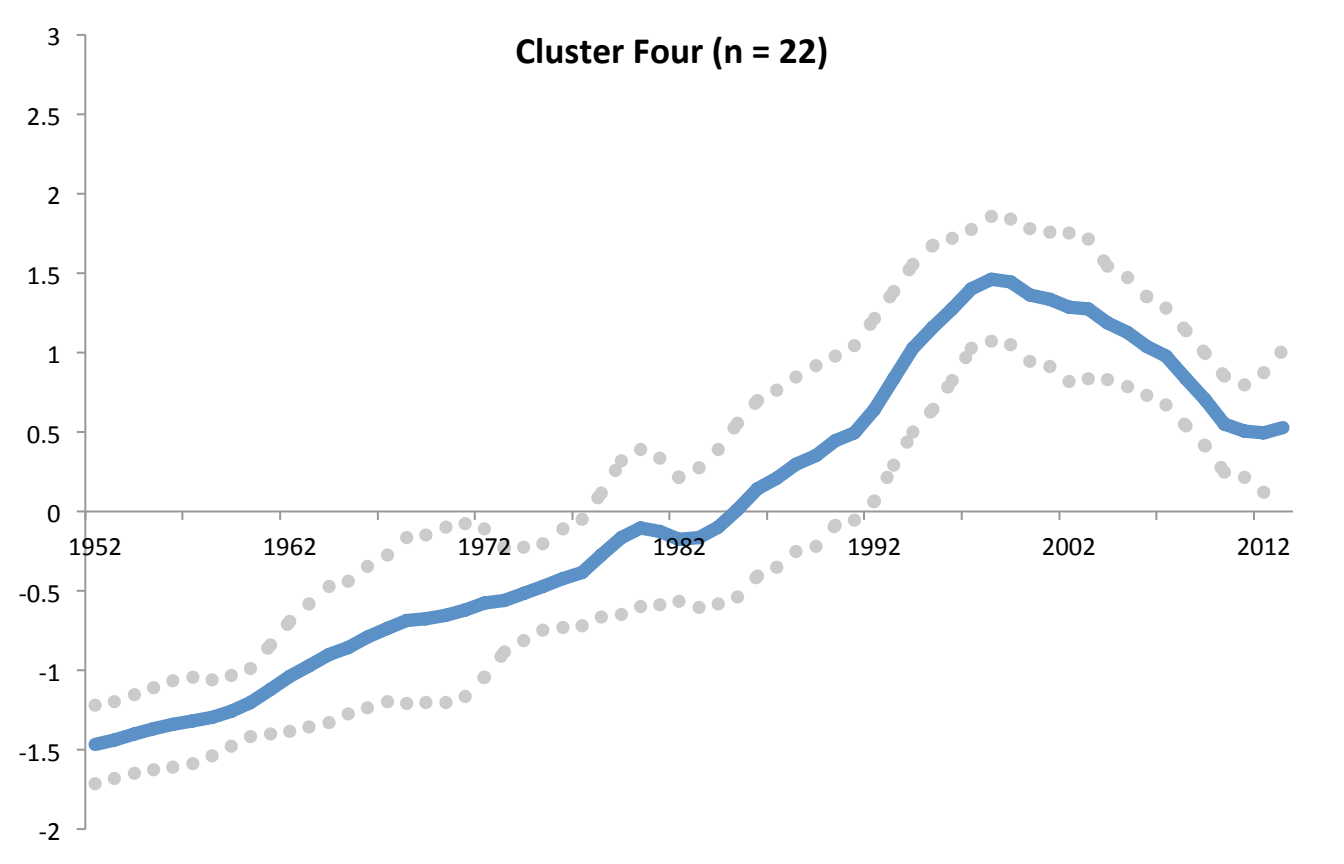


How long can expansion last?

- For the majority of countries landings are still increasing or have just peaked

- We know this can't last forever
  - Option 1: the majority of stocks will crash and with continued fishing they will remain depressed
  - Option 2: rein in fishing effort and cap landings in order to prevent massive declines
    - Some stocks will already be depleted and will need to be rebuilt
    - Some stocks may be able to support higher fishing pressure, following assessment

“Decline and …”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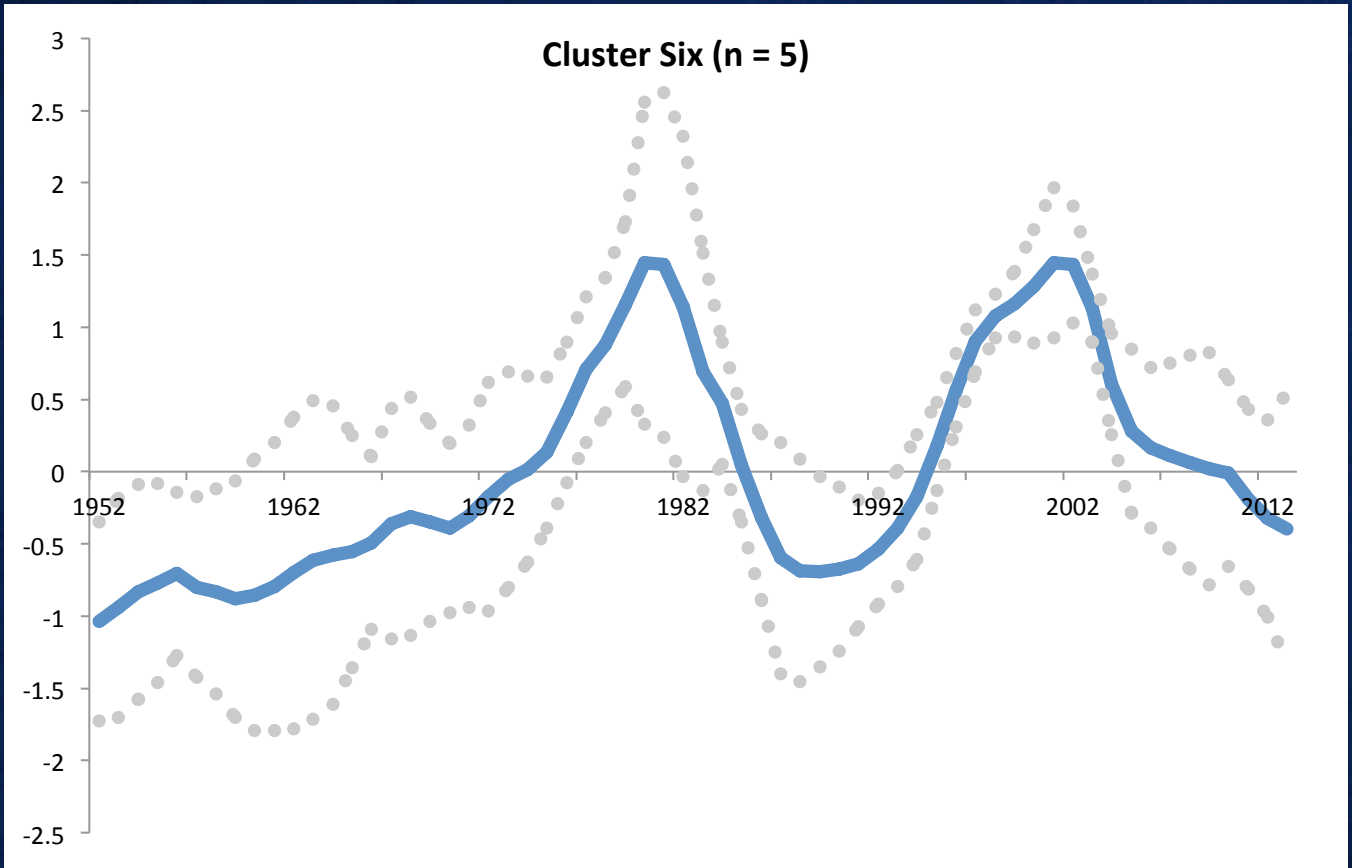
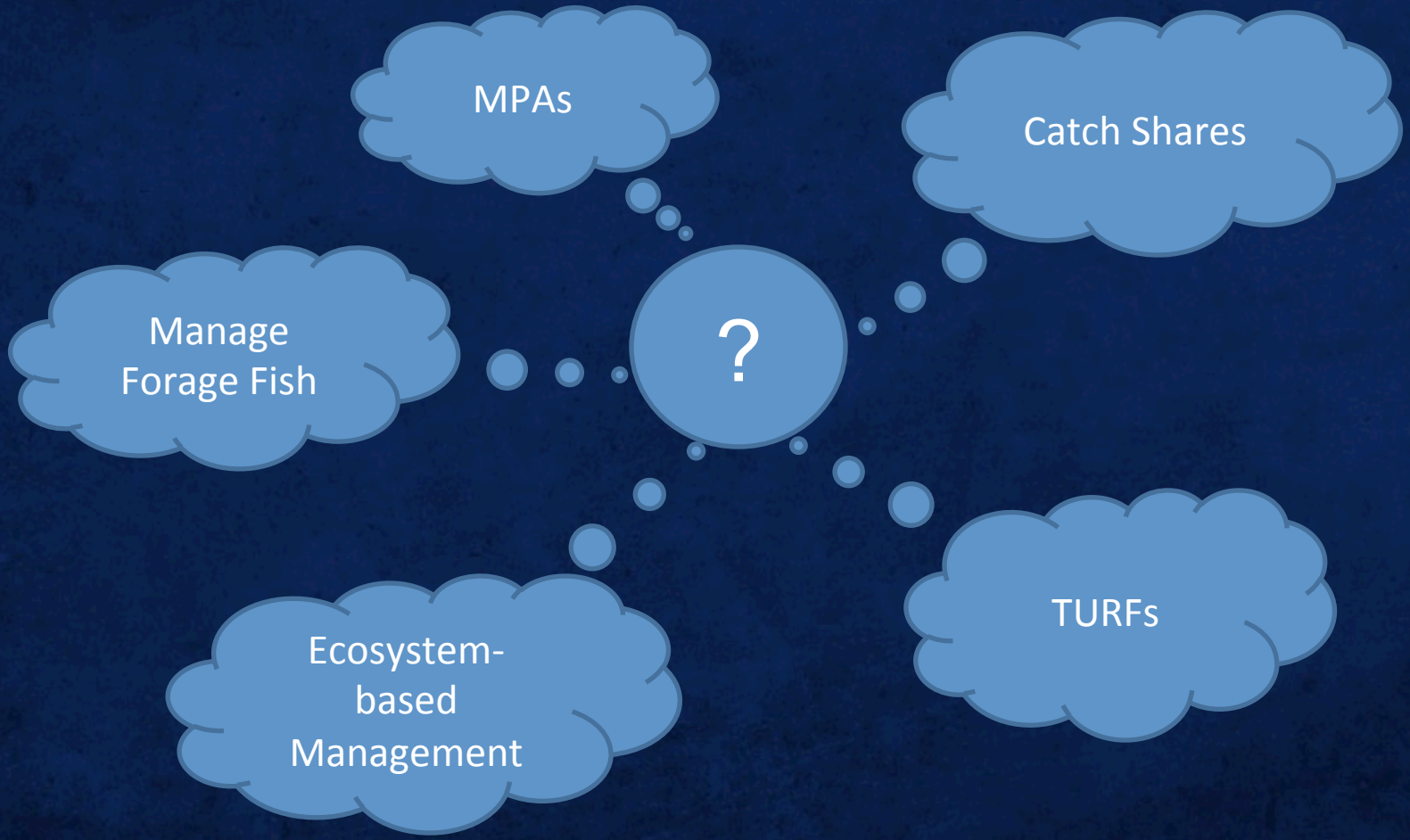
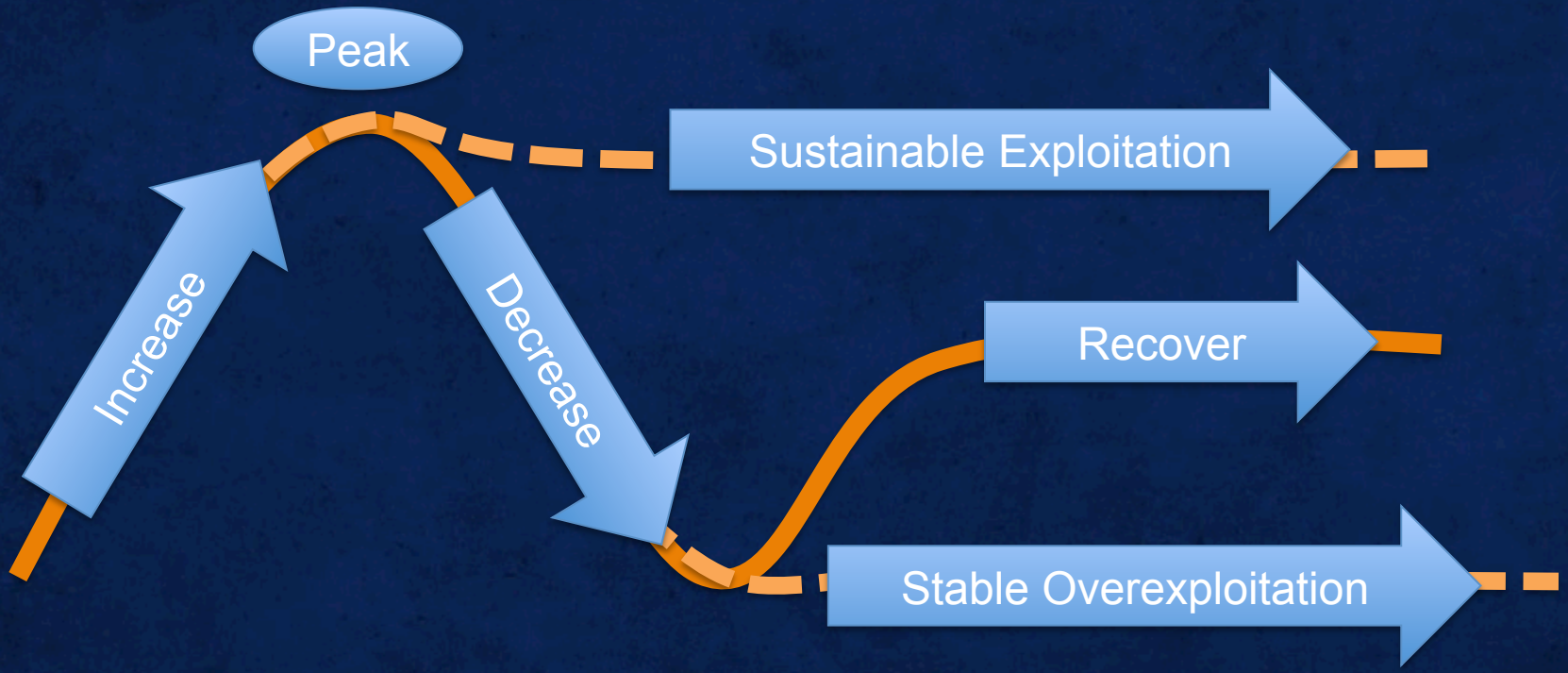
“Cyclical Landings”



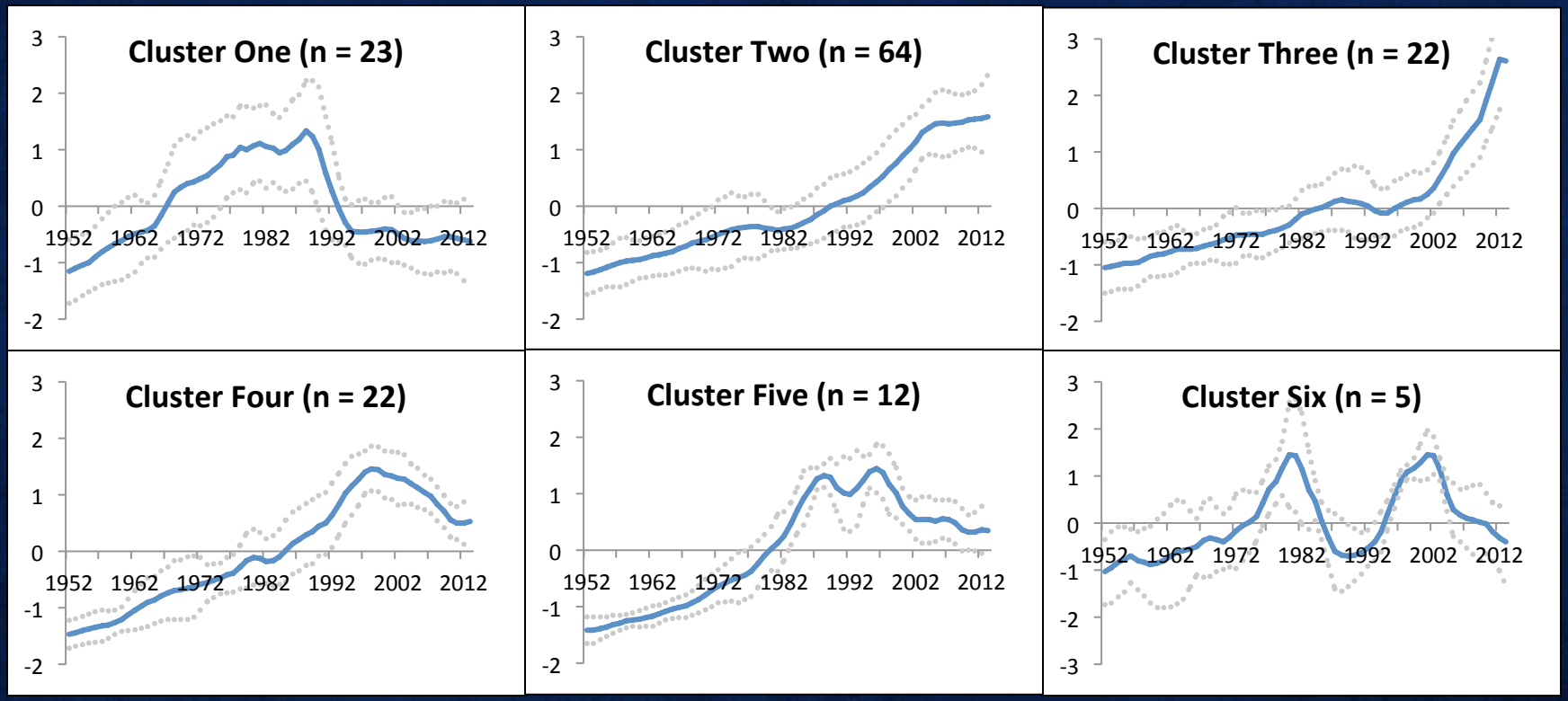
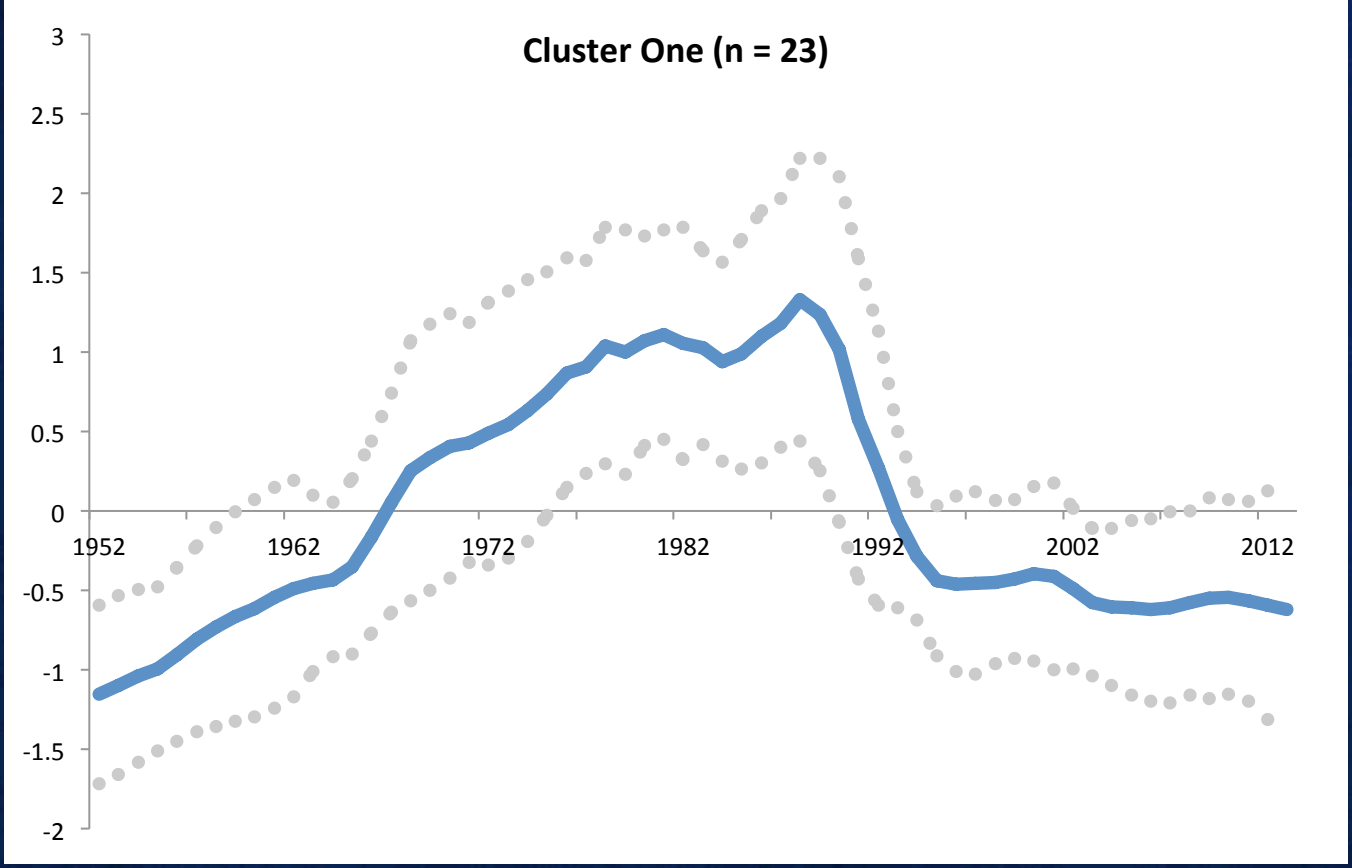
What's a manager to do?



Where to from here?



Mean Profiles of Six Clusters (standardized, aggregated landings)



“Stable Overexploitation”