Institutional complexity and resource management in a climate-changed ecosystem: the US fluke fishery

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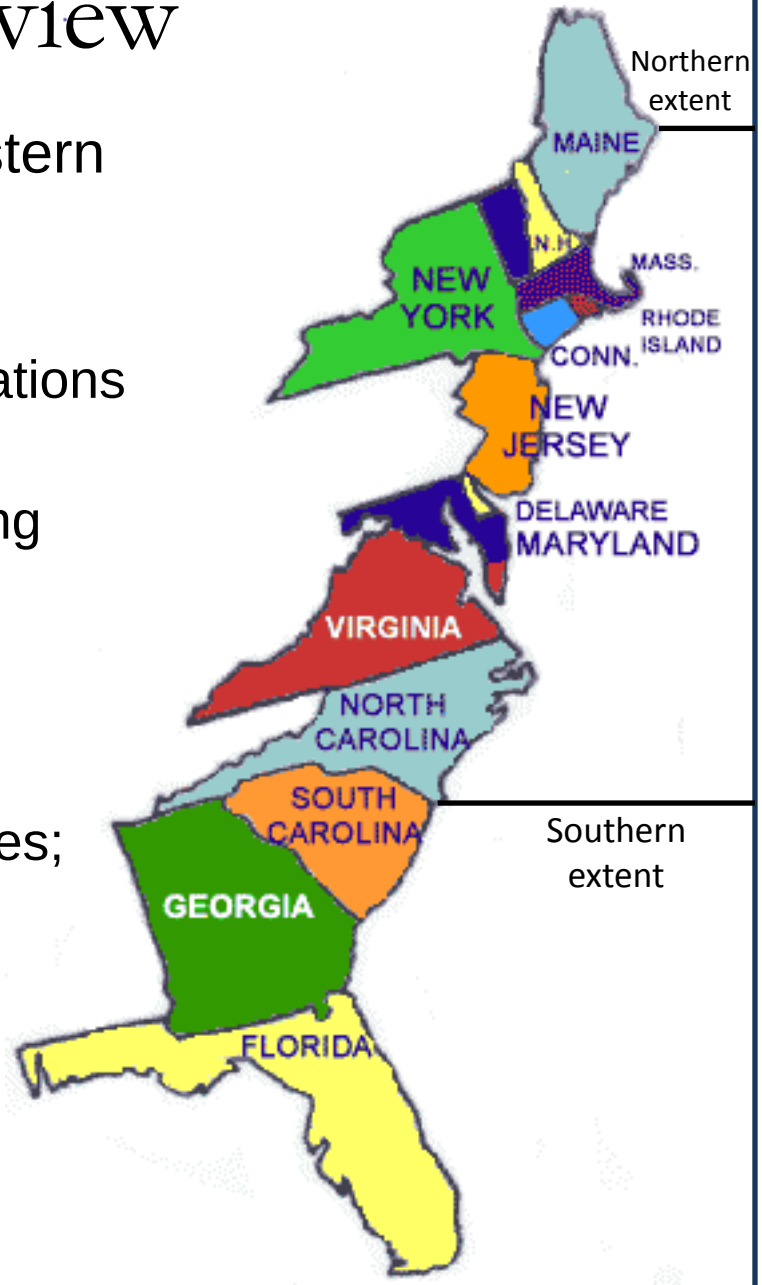
Summer flounder – overview

Most valuable commercial flatfish in eastern US

- ~$30M ex-vessel per year
- 60% of coast-wide allocation; state allocations based on 1980-1989
- Hard quotas, effective at controlling fishing mortality

Top ten recreational fishery in US

- >60% accruing to NY and NJ since 2001
- State-level RHLs based on 1998 estimates; size, bag, season limits
- Ineffective at meeting targets



Summer flounder – overview

Managed as single stock

- Deemed rebuilt (2011)
- For purposes of predicting rec mortality, uniform density assumed

Rapid warming in Mid-Atlantic Bight corrrelated with poleward migration

- COB: VA ➔ NJ over last 40 years
- Possible changes to inshore/offshore patterns
- Difficult to disentangle effects of rebuilding – importance of mechanistic understanding

How well has management accounted for changes?

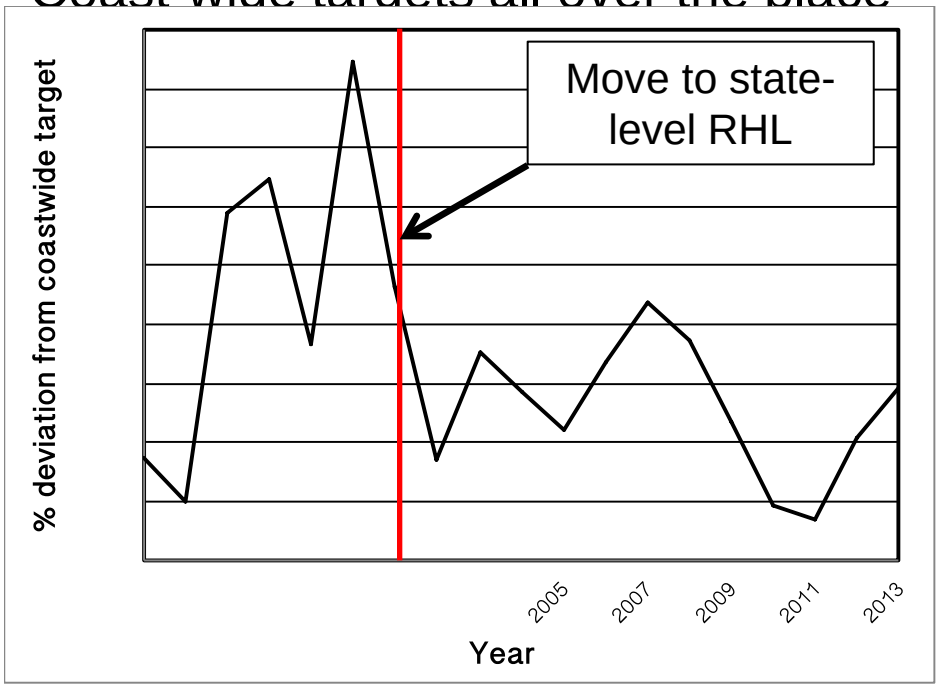
Summer flounder – management

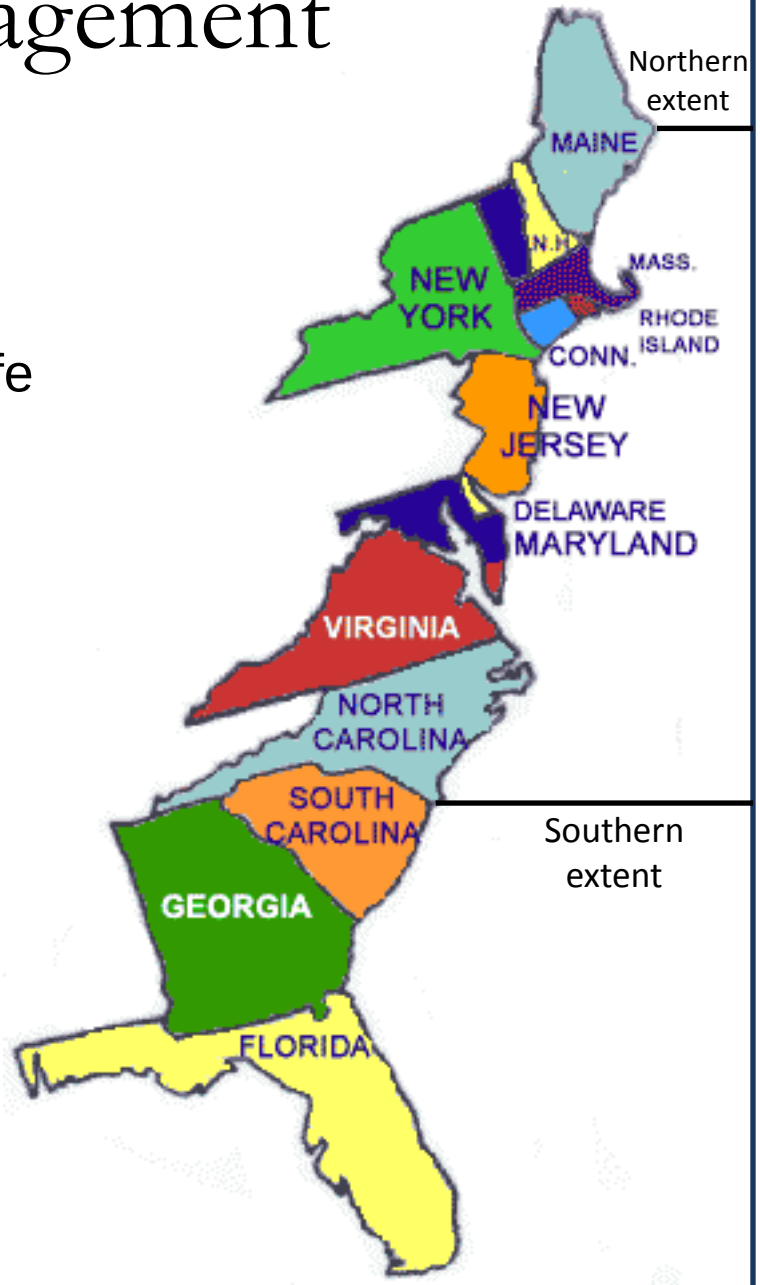
Commercial fishery

- Relatively effective at meeting targets, but...
- Southern fleets steaming further north, safe harbor during storms, etc.

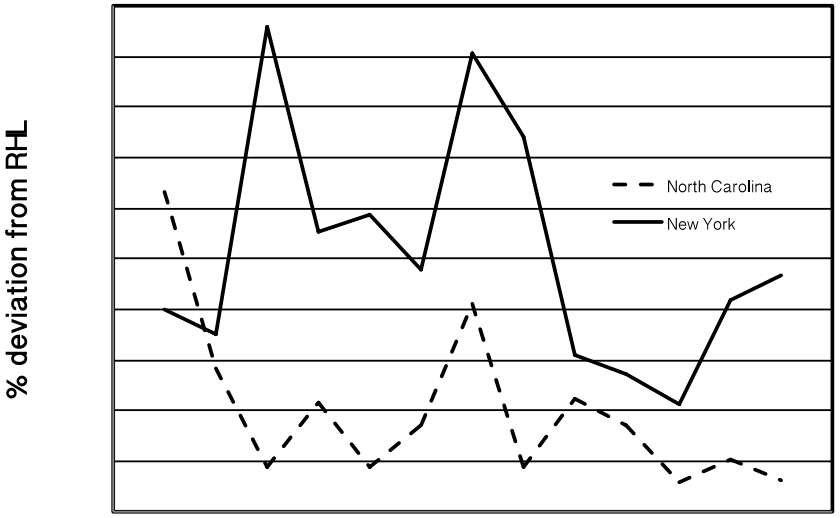
Recreational fishery

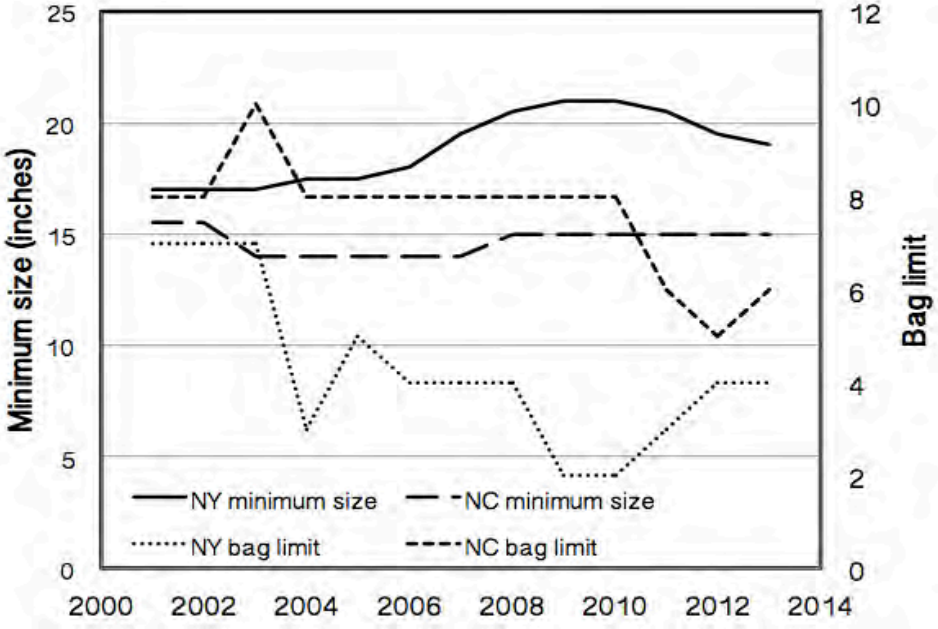
- Coast-wide targets all over the place





Summer flounder – management





Barriers to adaptive management

What are the major issues (among others)?

Data and monitoring

- Recreational participation/harvest difficult to monitor
- Infrequent stock assessments, intra-seasonal migrations, etc.

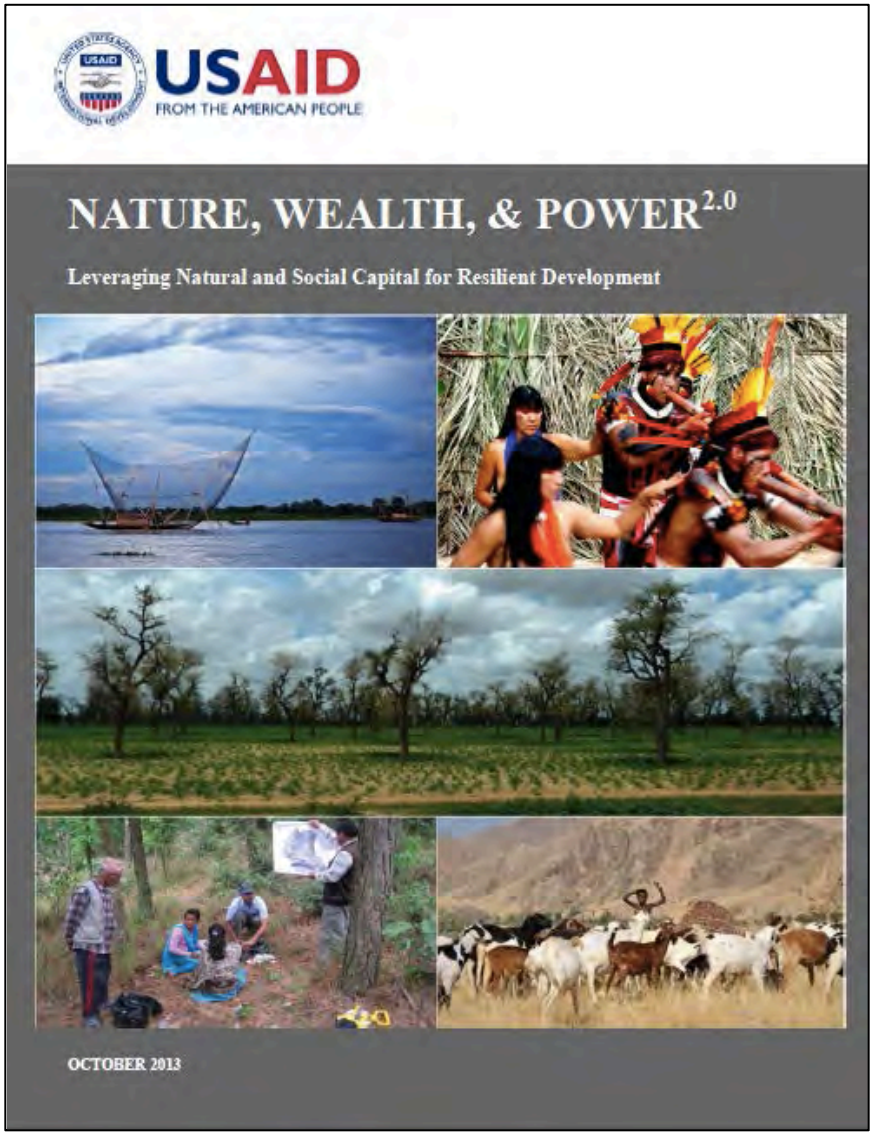
Science (among others)

- Recreational participation/harvest decisions difficult to predict
- Rebuilding vs. temperatures

Management / institutions

- **Management complexity**
- **Inflexible allocations**

Barriers to AM: **Management complexity**



Broader issue: movement toward CBNRM, etc. (decentralization)

From USAID: Decentralize powers and responsibilities to representative and accountable Authorities

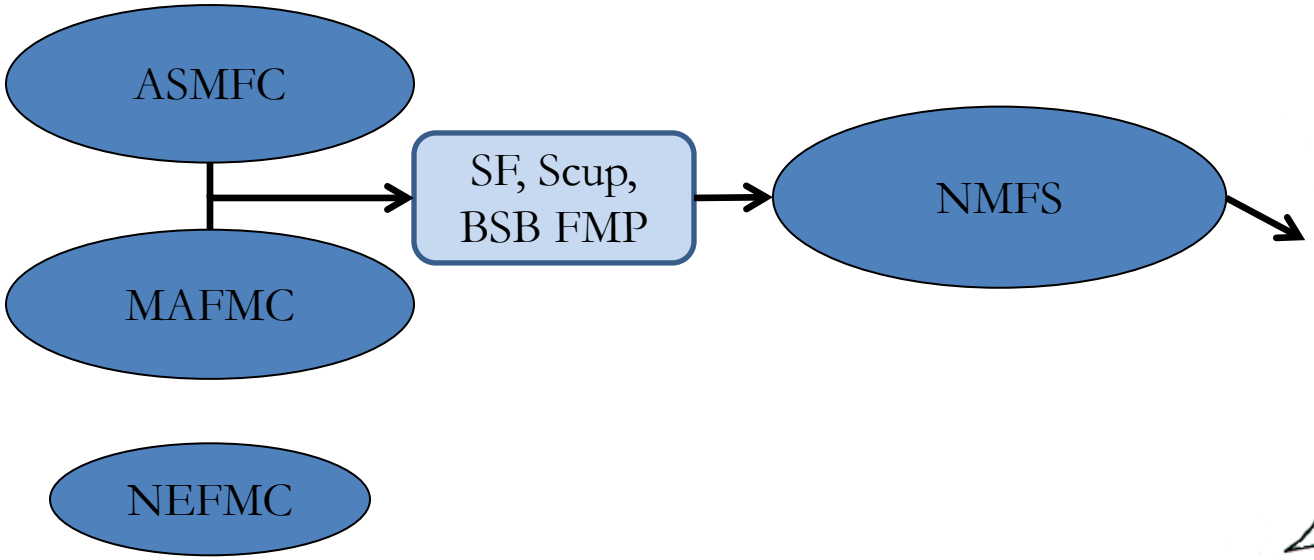
"Decisions should be made at the lowest or smallest level that can effectively deal with the problem"

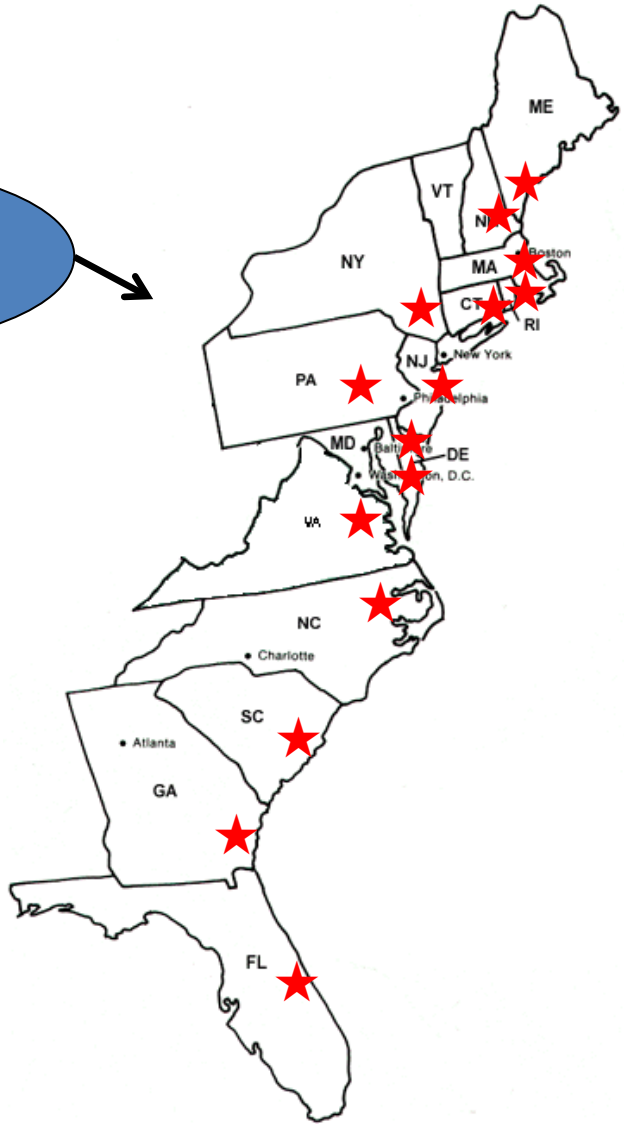
However, new problems emerge; existing ones change in scale and scope

Devolution of authority may undermine effective coordination to deal with "wicked" problems

- Cross-country fishery examples
- US / Fed vs. EU / ECB

Barriers to AM: **Management complexity**





Result: Responses to shifting harvest patterns are

- Backward-looking
- Temporary
- Maintain historical allocations

Barriers to AM: **Inflexible allocations**

Result from a number of factors

- Management complexity
- Scientific uncertainty / mistrust
- Supply-chain factors (commercial quota)
- Lack of compensatory mechanisms
- Other political factors, historical patterns of overfishing

FMP amendment process currently underway, plans to address quota allocations

Any adaptation plan needs to deal with the allocation issue, either directly or through management reforms

Amendment Status

The Council conducted fourteen scoping hearings and solicited comments from the public between September 29 and October 31. Comments were compiled and presented at the Council's December 2014 meeting. Based on these comments, the Council and Board identified four categories of issues to be addressed in the amendment:

1. Fishery Management Plan (FMP) goals and objectives,
2. Quota allocation between the commercial and recreational sectors,
3. Commercial management measures and strategies, and
4. Recreational management measures and strategies.

Possible solutions?

Adaptation teams within councils?

- Small groups granted authority to bypass regular order in certain cases
- Pilot in councils with historically-better relationships w/ industry?
- Pilot in less “sensitive” fisheries?

Rationalization

- Doesn’t require reallocation per-se
- Supply-chain issues result in similar resistance
- Rec fishery probably not valuable enough to justify

Indicator-based allocations?

- Need to improve mechanistic understanding

Common theme: need to be able to act, even when there will certainly be losers, and those losers have significant management authority (and some winners may not have any authority/representation)

Additional lessons

Harvest control mechanisms

- Efficiency vs. equity in catch shares (Kroetz, Sanchirico, and Lew 2015)
- Other gear / vessel restrictions
- Correlated uncertainties in catchability and growth/recruitment/mortality (Kennedy and Barbier 2015)

Thresholds in economic systems

- Resilience to environmental variability
- Processing sector loss and transformation in wholesale markets (Kennedy and Scott 2012)

Fishing and risk management

- Rationalization: Scheld, Anderson, and Uchida (2012)
- Management only has ability to affect specific dimensions of risk
- Agent-based modeling approaches to explicitly consider multiple dimensions

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