



# Research Priorities

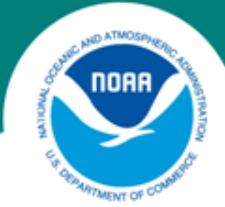
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September 13, 2013



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## FRAM Assessment-related “Off-year” Research Priorities

- **Inputs to Assessment Models**
- **Modeling Improvements**
- **Management and Agency Priorities**



# Data Inputs to Assessment Models

## **1,2,5. Length- and age-composition data:**

- Improve methods for calculating/using catch proportions-at-length/age
  - > Promote use of standardized, more-accurate methods

## **3. Survey GLMM code:**

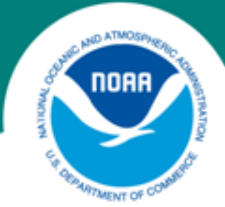
- Improve the calculation of survey indices and associated uncertainty
  - > Create more accurate indices and characterizations of uncertainty

## **4. Catch uncertainty and historical reconstructions:**

- Advance historical reconstructions for all FMP species
- Improve ways of modeling historical catch uncertainty
  - > Reduce ad hoc decisions about historical catches
  - > Better understand possible implications of catch uncertainty

## **6. Ageing error and bias: determination and modeling:**

- Improve methods for determining/specifying ageing error and bias outside and within stock assessment models.
  - > Improve recruitment estimation



# Biological Inputs to Assessment Models

## 9. Treatment of stock-recruitment steepness

- Review meta-analytical and other approaches for determining stock-recruit steepness (h).
  - > Reduce uncertainty in stock assessment outcomes due to unknown steepness

## 10. Maturity: Incorporating error and uncertainty

- Develop methods for estimating and incorporating uncertainty and inter-annual variability in maturity and fecundity-at-age in stock assessments
  - > Improve understanding of historical changes in spawning output
  - > Model historical and future changes in spawning output more realistically



# Modeling Improvements

## 7. Refining data-limited assessments:

- Improve the inputs and assumptions for Tier-2 and Tier-3 stock assessments
- Improve estimation of uncertainty in data-moderate assessments
  - > Increase precision of Tier-2/3 assessments
  - > Better understand relationships between data-limited and benchmark results

## 8. Rebuilding improvements and projections:

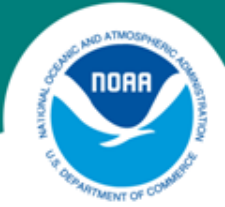
- Increase the range of rebuilding model options
  - > Increased range of rebuilding options
  - > Improved understanding of rebuilding-alternative trade-offs

## 13. Recruitment: Autocorrelation and climate considerations:

- Improve ability to model inter-annual and climate-related recruitment patterns
  - > Improve model estimates, through accounting for such correlations
  - > Improve forecasts, through better understanding of the recruitment processes

## 14. Develop penalties for changes in time varying parameters:

- Investigate methods to estimate inter-annual variability in time-varying parameters (e.g., growth and selectivity)
  - > Improve the specification of time-varying parameters in models



# Management and Agency Priorities

## 11. Stock assessment prioritization:

- Evaluate FMP species using general approach proposed by the NMFS Stock Assessment Prioritization Working Group
  - > More systematic inventory of factors relevant to prioritizing 2015 stock assessments

## 12. Programmatic reviews: Assessment & peer-review:

- Prepare and present materials for independent review of PFMC groundfish assessment and review processes
  - > Agency-required review that may identify ways to improve

## 15. Update IEA groundfish status indicators:

- Update groundfish indicators using most recent assessment results
  - > Up-to-date IEA indicators for use by Council