**Brooks et al. 2024**

Brooks, E.N., and Brodziak, J.K.T. 2024. Simulation testing performance of ensemble models when catch data are underreported. ICES Journal of Marine Science, 81:1053–1072, <https://doi.org/10.1093/icesjms/fsae067>

The study investigates the effectiveness of ensemble modeling in fisheries stock assessments, particularly when catch data are underreported. Using simulated case studies, it evaluates the impact of ensemble model composition, weighting metrics, and projection accuracy, using models with varying assumptions about natural mortality, selectivity, and recruitment. The projections were conducted through AGEPRO, an age-structured population dynamics model. Results demonstrated that ensemble models can outperform single-model approaches, but their success depends on accurately spanning the true model structure and using appropriate weighting methods, such as information-theoretic or equal weights, adjusted per data reliability. The research emphasizes the need for diagnostics and adaptive updates in ensemble configurations to balance accuracy, bias, and uncertainty in fisheries management.

**Flowers et al. 2019**

Flowers, A.M., Allen, S.D., Markwith, A.L., and Lee, L.M. (editors). 2019. Stock assessment of southern flounder (*Paralichthys lethostigma*) in the South Atlantic, 1989–2017. Joint report of the North Carolina Division of Marine Fisheries, South Carolina Department of Natural Resources, Georgia Coastal Resources Division, Florida Fish and Wildlife Research Institute, University of North Carolina at Wilmington, and Louisiana State University. NCDMF SAP-SAR-2019-01. 213 p. <https://digital.ncdcr.gov/Documents/Detail/stock-assessment-of-southern-flounder-paralichthys-lethostigma-in-the-south-atlantic-1989-2017/3689489>

The paper assessed the status of southern flounder stocks in the South Atlantic using data from 1989 to 2017. Despite management efforts, the stock was found to be overfished and subject to overfishing. To project future biomass and fishing mortality under different management scenarios, the authors used AGEPRO, a projection-based modeling tool. AGEPRO incorporated estimates from a statistical catch-at-age model to calculate stock size targets (SSB35%) and thresholds (SSB25%) alongside fishing mortality reference points (F35% and F25%). The projections revealed that fishing mortality in 2017 (F = 0.91) exceeded the threshold, with a 100% probability of spawning stock biomass (SSB) being below the critical threshold, emphasizing the need for immediate management intervention.

**Lee et al. 2017**

Lee, M.-Y., Steinback, S., and Wallmo, K. 2017. Applying a bioeconomic model to recreational fisheries management: Groundfish in the northeast United States. Marine Resource Economics, 32:191-216, <http://dx.doi.org/10.1086/690676>

The paper evaluated the economic and conservation impacts of recreational fisheries regulations for cod and haddock in the Northeast U.S. groundfish fishery by integrating angler behavior and fish stock dynamics into a bioeconomic model. Traditional regulatory approaches often fail to predict how measures like size and possession limits influence both angler participation and fish stock conditions, resulting in unintended economic costs or ecological outcomes, such as high discard rates. Using AGEPRO, the authors conducted age-structured projections to simulate recruitment variability, stock mortality, and the effects of alternative policies over three years. This approach, combined with a utility-based angler demand model, revealed that the stringent 2014 regulations had high economic costs for anglers but minimal conservation benefits, largely due to the sensitivity of outcomes to discard mortality rates.

**Lee et al. 2018**

Lee, L.M., Allen, S.D., Flowers, A.M., and Li, Y. (editors). 2018. Stock assessment of southern flounder (*Paralichthys lethostigma*) in the South Atlantic, 1989–2015. Joint report of the North Carolina Division of Marine Fisheries, South Carolina Department of Natural Resources, Georgia Coastal Resources Division, Florida Fish and Wildlife Research Institute, University of North Carolina at Wilmington, and Louisiana State University. NCDMF SAP-SAR-2018-01. 425 p.

The goal of the stock assessment report on Southern Flounder (Paralichthys lethostigma) was to evaluate population dynamics across the South Atlantic (North Carolina to Florida) and determine the stock's status to guide sustainable fisheries management. The problem addressed was the inadequacy of previous assessments that limited scope to North Carolina, disregarding the broader biological unit stock. To resolve this, a comprehensive model integrating data from multiple states was developed. Projections were conducted using AGEPRO software, which employed a projection-based approach to estimate spawning stock biomass (SSB) reference points, including the target (SSB35% = 5,411 mt) and threshold (SSB25% = 3,984 mt). The model demonstrated the stock was overfished in 2015, with an SSB of 1,097 mt, significantly below the threshold, and a 100% probability of being overfished, emphasizing the need for corrective management actions.

**Mayo et al. 2009**

Mayo, R.K., Shepherd, G., O’Brien, L., Col, L.A., and Traver, M. 2009. The 2008 assessment of the Gulf of Maine Atlantic cod (*Gadus morhua*) stock. US Dept Commer, Northeast Fisheries Science Center Reference Document 09-03; 128 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at <http://www.nefsc.noaa.gov/nefsc/publications/>

The goal of the 2008 Gulf of Maine Atlantic Cod stock assessment was to evaluate the stock's status and recommend sustainable management strategies. The problem identified was declining biomass and recruitment levels, driven by historical overfishing and insufficient management. Using the AGEPRO modeling framework, the assessment integrated revised landings, discard data, and updated age structure analyses. AGEPRO facilitated stochastic equilibrium projections to estimate biological reference points like SSBmsy and Fmsy, accounting for uncertainty in recruitment and fishing mortality. This approach provided a clearer understanding of stock trends and guided the development of targeted conservation measures.

**Nadon et al. 2020**

Nadon. M.O., Sculley, M., and Carvalho, F. 2020. Stock assessment of uku (*Aprion virescens*) in Hawaii, 2020. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-100, 120 p. <https://doi.org/10.25923/57nb-8138>

The goal of the 2020 stock assessment of uku (Aprion virescens) in the Hawaiian Islands was to evaluate the population's status and provide projections under different fishing scenarios to inform sustainable management. The problem addressed was the need for an updated, integrated assessment to better estimate biomass, fishing mortality, and stock resilience using diverse data sources. The solution utilized the Stock Synthesis 3.30 model, integrating commercial and recreational catch, CPUE data, size composition, and fishery-independent diver surveys into a statistical framework. Projections were conducted using AGEPRO, incorporating stochastic simulations to evaluate future stock outcomes under constant catch scenarios, revealing that a catch limit of 135 metric tons would maintain a 50% probability of avoiding overfishing by 2026. This approach provided robust insights into stock sustainability and management thresholds.

**Scarcella et al. 2014**

Scarcella, G., Grati, F., Raicevich, S., Russo, T., Gramolini, R., Scott, R.D., Polidori, P., Domenichetti, F., Bolognini, L., Giovanardi, O., Celić, I., Sabatini, L., Vrgoč, N., Isajlović, I., Marčeta, B., and Fabi, G. 2014. Common sole in the northern and central Adriatic Sea: Spatial management scenarios to rebuild the stock. Journal of Sea Research, 89:12-22, <https://doi.org/10.1016/j.seares.2014.02.002>

The study aimed to improve the management of the common sole stock in the northern and central Adriatic Sea, which faces growth overfishing due to intense juvenile exploitation by rapido trawling. The problem lies in the unsustainable fishing mortality concentrated on young age groups (ages 0–2), impeding stock recovery and long-term yields. Using the AGEPRO model, the researchers conducted spatial simulations of two management scenarios: banning rapido trawling within 6 and 9 nautical miles of the Italian coast during the juvenile recruitment period. These projections revealed that redistributing fishing effort offshore increases spawning stock biomass and medium-term landings, demonstrating that spatial management strategies can mitigate overfishing while balancing ecological and economic objectives.

**Wiedenmann et al. 2018**

Wiedenmann, J., and Jensen, O.P. 2018. Uncertainty in stock assessment estimates for New England groundfish and its impact on achieving target harvest rates. Canadian Journal of Fisheries and Aquatic Sciences. 75: 342-356. <https://doi.org/10.1139/cjfas-2016-0484>

The study investigated the persistent overfishing of New England groundfish stocks despite management interventions and found that overly optimistic catch targets were driven by overestimated stock abundance in assessments and projections, particularly those using AGEPRO methodology. This led to harvest rates exceeding sustainable levels, even as actual catches often fell below targets, delaying stock recovery. The analysis showed that errors in terminal abundance estimates were the primary contributor to these inaccuracies, compounded by variability in recruitment and mass-at-age. By incorporating updated inputs into projection models, the research highlighted opportunities to improve forecasting accuracy and emphasized the need for enhanced assessment methodologies to support sustainable fisheries management.