

AFSC Stock Assessment Enterprise

Status, prioritization review, and future
direction

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Outline

- Update on 2022 assessments
- Evolution of the AFSC assessment enterprise
- Increasing demands for assessment products
- Stock Assessment Prioritization 2017
- Taking assessment enterprise into the future
- Moving forward in NOAA Fisheries/Council partnership



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2022 assessments

- BSAI flathead sole
 - Full assessment planned 2022
- BSAI skates
 - Full assessment planned 2022
- BSAI Alaska plaice
 - Partial assessment planned 2022

Due to staff attrition, we aim to produce partial assessments for all three in 2022



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Evolution of AFSC Stock Assessment

- The number of assessments has increased dramatically over the past two decades, and their complexity
 - 2002 assessments (1090 total pages)
 - 22 documents for groundfish, 1 document for crab
 - 12 with Tier 3 or higher models, no models for crab
 - 2021 assessments (3054 total pages)
 - 48 documents for groundfish, 5 for crab
 - 29 with models Tier 3 or higher, 4 for crab
 - 53 risk tables added ~250 pages to assessments and 40 pages of SSC minutes
- Meanwhile
 - Staff workloads and demands have adjusted, but staffing levels similar
 - Plan team and SSC review time has not changed
 - Timeframes are compressed (survey/assessment/Council)
 - Some assessment frequencies have been decreased to help



Increasing and disparate demands on a national level-focus on short-term projections

“Regarding time scales, officials from three Councils stated that they have received climate projections for 10 years or more into the future, which are of limited use in fisheries management, which has a shorter-term focus of making decisions in the next few months or years. **Similarly, NMFS scientists need climate and ocean projections at shorter time scales to provide early warnings of near-term extreme events, such as marine heatwaves, and to incorporate near- and mid-term projections of ocean conditions into stock assessments for fisheries managers.** According to officials from one Council, this limited modeling information stems in part from a misalignment between the research priorities of NMFS and the information needs of the Council.” – GAO report to congress



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Increasing demands on AFSC stock assessment enterprise

- Requests from Council partners have increased in frequency and complexity
 - Halibut ABM, MSEs, ensemble modeling, spatial modeling
- Mandates and Initiatives for EBFM/Next Gen Stock Assessment
 - Multi-species modeling, climate, risk tables, ESPs, ESRs, RAPs, CLIM
- Higher Tier level assessments and increased requests for additional SAFE content and responses to comments
- Very compressed schedules to analyze data and produce SAFE
- Species distribution shifts and abundance changes common

Increasing demands NPFMC review bodies

- Adequate review time and number of reviewers is critical
 - Review bodies and capacity are maxed
 - Review capacity can be compromised - time and number of reviewers
 - Potential crises require extra capacity (GOA cod, BS crab)
- Priorities need to be addressed
 - NPFMC requires scientific advice for numerous topics in addition to stock assessment
 - Status quo effort for assessment review is not commensurate with importance, complexity, or emerging issues for a stock
 - More direction and focus on key issues and priorities will improve management advice and review
 - Need for review bodies' recommendations to be coordinated, prioritized and vetted for staff time commitments

National Standards for Stock Assessment Prioritization (SAP)

Methot et al. 2015

- National framework for prioritization of stock assessments
- Implemented on a regional basis to maintain flexibility
- Five step process
 - Determine which stock should be included in prioritization
 - Develop scores based on fishery importance, stock status, ecosystem importance, assessment information, and stock biology
 - Identify current and target assessment level
 - Develop target assessment frequencies
 - Calculate prioritization ranks for each stock



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2017 NPFMC SAP process

- Focus on target frequencies only for Alaska stocks
 - Assessments done on a 1, 2, or 4 year cycle for groundfish
 - Assessments done on a 1, 2, or 3 year cycle for crab
 - Align full assessment with survey frequencies
- Use regional scalar based on high commercial value
 - High value stocks are assessed annually
- The stocks ultimately put forward had low catch/ABC
 - Many flatfish stocks catch < TAC < ABC
- Took into account stability of abundance and current harvest strategies

2017 NPFMC SAP key decisions

- Groundfish/Crab Plan Teams
 - Groundfish proposed reduced frequency for 16 stocks
 - Flatfish, non-targets, rockfish, AI pollock
 - Crab proposed reduced frequencies for 5 stocks
- SSC
 - 10 groundfish stocks recommended for reduced frequency
 - Did not support reduced frequencies for rockfish
 - 4 crab stocks recommended for reduced frequency
- Partial assessments to be completed in off-years
 - Tier 1-3 - Run projection model
 - Tier 4-5
 - Year 2 - Nothing
 - Year 3 - Provide catch/biomass or run RE model



Reduced assessment frequency in 2017

Stock	Pre-2017 frequency (years)	2017- present frequency (years)
AI Pollock	1	2
BSAI Turbot	1	2
BSAI Other Flatfish	2	4
BSAI Sculpin	2	4
BSAI Grenadier	2	4
GOA Shallow Water Flatfish*	2	4
GOA Rex sole	2	4
GOA Deepwater flatfish	2	4
GOA Flathead Sole	2	4
GOA Grenadier	2	4
GOA Sculpin	2	4

* GOA southern and northern rock sole are included in the GOA Shallow water flatfish complex.



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Stocks recommended for reduced frequency in 2017 - Catch / ABC

Stock	Pre-2017 catch/ABC	2017- catch/ABC
AI Pollock	5%	4%
BSAI Turbot	69%	27%
BSAI Other Flatfish	23%	28%
BSAI Sculpin	Ecosystem	Ecosystem
BSAI Grenadier	Ecosystem	Ecosystem
GOA Shallow Water Flatfish*	10%	5%
GOA Rex sole	29%	10%
GOA Deepwater flatfish	3%	2%
GOA Flathead Sole	13%	6%
GOA Grenadier	Ecosystem	Ecosystem
GOA Sculpin	Ecosystem	Ecosystem

* GOA southern and northern rock sole are included in the GOA Shallow water flatfish complex.



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Stocks recommended for reduced frequency in 2017 - ABC avg change

Stock	Pre-2017 ABC average change/year	2017- present ABC average change/year
AI Pollock	11%	9%
BSAI Turbot	103%	15%
BSAI Other Flatfish	5%	6%
BSAI Sculpin	Ecosystem	Ecosystem
BSAI Grenadier	Ecosystem	Ecosystem
GOA Shallow Water Flatfish	8%	4%
GOA Rex sole	2%	15%
GOA Deepwater flatfish	27%	15%
GOA Flathead Sole	10%	3%
GOA Grenadier	Ecosystem	Ecosystem
GOA Sculpin	Ecosystem	Ecosystem

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Review of 2017 SAP

- Effects on management advice
 - Has catch advice met mgmt needs or catch/ABC changed?
 - Comparison of previous year forecast to off-year projection result
- Effects on review process
 - Fewer full assessments to review annually
 - Off-year assessments require minimal attention
- Logistical hurdles
 - Missed scheduled full assessments
 - Unexpected event/change triggers an off-cycle assessment
 - Navigating pandemic, survey cancellations or reductions, species shifts



Review of 2017 SAP - Potential improvements

- Review “off-years” requirements for Tiers 4-6?
 - Consider automated product that informs managers of catch and status
 - Provides an annual “check” versus nothing
- Streamline review of partial assessments
 - Review partials as a group - summarized rather than presented individually
 - Automate output for partial assessments
 - Make agenda time more efficient



Taking stock assessment into the future

- Revisit SAFE Guidelines
 - What's required for best management advice
 - Clarify definitions of benchmark, full, partial assessment types
- Best practices
 - Increase reproducibility/transparency/transferability of assessments
 - Streamline and automate assessment production and products
 - Embracing Next Generation Stock Assessment practices (FIMS)
- Revisit SAP - frequency of assessments
 - 2017 analysis and results still meaningful
 - Review and identify additional low risk stocks
 - Implement additional frequency reductions
 - Balance assessment and mgmt advice needs with AFSC resources



SAFE Guidelines

- Main assessment types
 - New
 - Never assessed before
 - Benchmark
 - Substantially different than previous (model, data, parameters, biological ref. points)
 - Full update
 - Base model run with updated catch and/or survey data with little impact to results
 - Partial update
 - Executive summaries (projection model or running RE model), updating catch data only,



SAFE Guidelines

- Current practices
 - All full assessments presented as benchmarks
 - Full documentation
 - Dedicated review time
 - All recommendations by review bodies addressed by authors
 - Full update assessment process is inefficient
 - For assessments with no model/assessment changes and only data updates
 - Authors tasked with producing full documents
 - Review bodies tasked with intensive review
 - Substantial recommendations more beneficial for a benchmark than full update



SAFE Guidelines

- Redefine and reduce requirements when no substantial changes occur (Full update)
 - Abbreviated document
 - Reference last benchmark assessment for documentation
 - Provide appendices to accompany assessment
 - Streamlined presentation of results both written and oral
 - Efficient documents help the readers
 - Less agenda time needed by review bodies allowing for more focused and in-depth reviews



SAFE Guidelines

- Benefits of separating benchmark from full update assessments
 - New models not necessary every year
 - Authors and review bodies can focus efforts on benchmark level assessments
 - Major reduction in annual assessment review load
 - Offers a more structured approach for conducting assessments
 - Major changes will result will trigger review
 - Align benchmark level assessments with external reviews
 - CIE reviews for major stocks every ~5 years



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Best practices

- Increase reproducibility/transparency/transferability of assessments
 - Effort being led by AFSC stock assessment scientists
 - Standardized approach for documenting entire assessment process
 - Ensures accuracy of data, transparency in workflow, ability to share
 - Allows AFSC to be more flexible with assignments, ease of review, output standardization, author transitions
 - Enhances ability to do team-based approaches
 - Contributes to open source science initiatives



Best practices

- Streamline and automate assessment products
 - Utilize modern tools and techniques to efficiently create SAFEs
 - Automate partial assessments with reproducible code
 - Reduce burden/redundancy of creating documents and figures/tables
 - Produce standardized products
 - Provide authors better guidelines (templates) for what to produce/present
 - Ease the review burden
 - Make it easier for stakeholders to interpret assessment results (increased engagement)



Best practices

- Realized improvements
 - Documentation reduces errors and allows others to review and replicate
 - Standardization allows comparisons across assessments and transferability
 - Supports MSE efforts
 - Streamlining increases efficiency in workflow and production of assessment products
 - Supporting NGSAs better positions AFSC to take on new challenges
 - Climate change, species distributional shifts, responding to unexpected decreases in abundance



Revisit frequency of assessments

- Identify **additional** low risk stocks following 2017 guidance
 - Fishery importance, stock status, role of species in ecosystem, and assessment-specific issues
 - Low risk of overfishing
 - Four flatfish stocks
 - Well above target biomass
 - Catch well below ABC
 - Low risk of overfishing
 - Five data-limited stocks
 - Tier 6 and Tier 5 complex based on catch history
 - ABC defined by time period based on catch history
 - Stocks not targeted
 - Survey biomass unreliable



Nine low-risk candidates for reduced assessment frequency

Stock	Tier	Current	Proposed	Catch/ABC	ABC variability
BSAI Flathead sole	3	2	4	17%	3%
BSAI Arrowtooth flounder	3	2	4	13%	7%
BSAI Alaska plaice	3	2	4	55%	6%
GOA Arrowtooth flounder	3	2	4	14%	10%
GOA Atka mackerel	6	2	4	23%	0%
GOA Octopus	6	2	4	15%	0%
BSAI Octopus	6	2	4	10%	0%
GOA Shark	5/6	2	4	41.3%	40.7%
BSAI Shark	6	2	4	36%	0%



Stocks Warranting Further Consideration

- High value stocks but catch < ABC
 - BSAI yellowfin sole 8% CV (currently annual) , BSAI northern rock sole 10% CV (currently every 2 years)
- Stocks assessed annually relying on biennial trawl survey as index
 - BSAI Atka mackerel 14% CV (currently annual), AI Pacific cod 2% CV (currently annual)
- Rockfish stocks originally proposed but rejected by SSC in 2017
 - GOA thornyheads, GOA RE/BS, GOA shortraker, BSAI shortraker, BSAI other rockfish



Revisit frequency of assessments

- Additional stocks are candidates for reduced frequency
- 2017 analysis still valid to guide decisions
- What improvements or alternate metrics are needed?
- Benefits are more author time to work on assessments, less review time, less agenda time
 - **Low risk of overfishing**
- Goal is to improve efficiency in stock assessment process while maintaining high quality advice



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Summary

- Stock assessments and data time series are maturing
 - Added stocks or increasing Tier levels has stabilized
 - Survey index's have 30+ years of data
- Assessment related products continue to increase
 - ESPs, risk tables, ensemble modeling, MSEs
- Demands have increased
 - Stock assessment and review capabilities are maxed

Need to balance requirements and expectations with workload



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Summary

- Improvements to the stock assessment enterprise
 - Revisit SAFE Guidelines and what should be presented
 - Focus on reproducibility, transparency, and efficiency
- Revisit Stock Assessment Prioritization (SAP)
 - Utilize lessons learned from 2017
 - Re-evaluate additional low risk stocks for less frequent assessments
- Maintain agency/Council partnership to advance stock assessment
 - Endorsement of changes to benefit all
 - Increase stakeholder engagement
 - Work together to maintain level of excellence in assessment and management

Action Items for the PT/SSC/Council

- Endorsement?
 - Reproducibility
 - Streamline/automate assessment products
- Approval and recommendations
 - Potential changes to SAFE Guidelines and definitions of what's produced and reviewed for “full” versus “benchmark” and “off-year” assessments
 - Revisit assessment frequency
 - Utilize 2017 analysis

Enact for 2023 groundfish assessments



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