Notes from meeting with Sherri and Jane, May 21-22, 2019

1. Progress on HER since 5/13
    a. Fixed bug that was preventing single time block for maturity
    b. Refine the current retrospective analysis to better accommodate short time blocks for time-varying parameters. Retrospective will not run with short time periods at the end of the model time series. Proposed alternatives to address this:
        i. Remove the last time block and run the retrospective with only 2 time blocks.
        ii. For retrospective peels that results in time blocks <= 2 yrs, fix the parameter to the estimate obtained with 3 yrs.
        iii. For retrospective peels that results in time blocks <= 2 yrs, remove time block. – Preferred alternative. Fix retrospective figure axis.
        iv. If the peels don't run, do not report them in the figures or include them in the calculation of Mohn's rho.
2. Deliverables for HER
    a. Short-term deliverables (things that need to be done in order to present HER as management alternative)
        i. Update data and control files with 2018 data
        ii. Clean up current repository, archive Steve Martell's old code, organize folder structure
        iii. Fix bug that prevents single time block for maturity
        iv. Refine retrospective analysis
        v. Assumption about catch being 100% mature – Jane will lead HER, Sherri will lead LS. Jane will provide Sherri update on Jun 12 and Sherri/Sara/Jane will meet Jun 26 for paired programming session
        vi. Use sample code from the British Columbia herring assessment to estimate MSY- and SPR-based biological reference points – Sherri sending Jane code, information from Jacqueline
        vii. Model selection/time blocks – meeting with Sara/Sherri/Jane on Jun 27. Topics include information criteria, inclusion of time blocks for maturity, alternative cubic spline for M, and how we want to approach the issue of conditioning on catch versus effort. Efforts to move to a hypothesis driven approach have been put on hold.
        viii. Revisit sigmaM – Recommendation from 1/29/19: Leave sigmaM as a range between 0.05 - 0.08 for now. Recommend revisiting sigmaM after we go through a model selection process for HER. Currently we are imposing the best-fitting parameterization of LS onto HER. The final survival time block is only 3 years and does not appear to be well-estimated, causing there to be inconsistent convergence for intermediate values of sigmaM.
        ix. Bayesian implementation of HER (no adnuts)
    b. Long-term deliverables (priorities within 1-3 years from model implementation)
        i. Update technical doc (currently uses a Mac-based version of LaTeX, migrate to different software)

        ii. Other ideas: VPA or other abundance estimation that does not use survey, ageing error matrix (has large effect on estimating recruitment), length compositions, developing reproducible methods for egg deposition index.

3. Goals for HER
    a. Present HER/LS comparison to managers in early September
        i. Include in presentation: What is LS? What is HER? How do they compare? Why are the different?
        ii. Models to compare include: LS (LS best), HER (LS best), HER (HER best conditioned on catch), HER (HER best conditioned on effort)
        iii. Implement Fall 2020
        iv. How does lawsuit impact this goal?
    b. Estimate biological reference points (BRPs) using HER. Update B_0 (currently based on 1998 simulation analysis by Carlile), in order to ultimately submit BOF proposal or use for BOF department comments.
    c. Timeline for Goals:
        i. Sep 2019: present model comparisons and draft BRP using 2018 data
        ii. Feb/Apr 2020: BOF proposals due
        iii. August/Sept 2021: BOF department comments due
        iv. Fall 2020: HER implementation
        v. Spring 2021: BOF
4. Scheduling for Summer 2019
    a. Unavailable to meet:
        i. SSC 6/3-6/10
        ii. Sherri out 7/9-7/12
        iii. RKC survey 7/12-7/21
        iv. NSEI longline survey 7/23-7/29
        v. GPT 9/16-9/20
        vi. Jane vacation 10/18-10/25
        vii. GPT 11/12-11/15
        viii. Block out 3-5 weeks to work on sablefish escape ring study (It works for Andrew for me to wait for fall to do this)
    b. Scheduled meetings with Herring Team
        i. May 21 and 22 at 2 pm – set deliverables, discuss goals, and work out scheduling for summer
        ii. Jun 12 at 2 pm – update on maturity/catch assumption and other progress
        iii. Jun 26 at 1:30 pm – maturity/catch assumption
        iv. Jun 27 at 1:30 pm – model selection/time blocks
        v. Jul 3 – progress report, final decisions on maturity/catch assumptions, re-evaluate timelines, and set up August meetings
        vi. Two meetings in Aug
        vii. Meeting with managers early Sep

Reasons to move from conditioned on catch to effort:

1) Catch has a small amount of measurement error (e.g. slime/ice)

2) Contemporary stock assessments condition on effort
3) If we condition on effort, we can estimate fishing mortality and biological reference points, which can be compared to other stocks (e.g. British Columbia) and better understand the impact of current and historical harvest rates (e.g. Little fish big impact, Lenfest Task Force, are we harvesting conservatively enough given the ecological importance of herring as a forage fish in the ecosystem)

What are the main differences?

What are the main similarities?

What are the improvements in HER > LS? Why move away from LS?

1) LS did not have reliable estimates of error. HER can estimate variance in a Bayesian framework.
2) LS had arbitrary weighting on abundance indices and composition data
3) Improve the model structure, scale, and stability

LS	HER
Imposes bounds on positive parameters	Estimates parameters in log-space to keep them positive and on the same scale
Estimates initial numbers-at-age, recruitment, and natural mortality independently, all of which have a different scale	Estimates mean values + deviations

4) Current HER provides a framework to
    a. conduct retrospective
    b. self-test simulation
    c. Bayesian credible and posterior predictive intervals
    d. Self-weighting data sets
    e. Estimate fishing mortality (annual and age-specific)
    f. Flexible template that can be applied to other herring stocks
    g. Evaluate alternatives for time-varying natural mortality (cubic spline instead of knife-edge blocks)
5) Future HER provides a framework to
    a. Estimate management reference points
    b. Conduct management strategy evaluation
6) Vision for management meeting:
    a. Location: Juneau Douglas with distance sites
    b. Currently set for first week of September, Sept 9 or 10 is preferred
    c. Sara will facilitate technology (Webex or Skype) and monitor distance sites
    d. Start with roundtable introductions. Each of us will sit in front of laptop so distance sites can see our faces during introductions and questions and answer.
    e. We will plan for a **20-minute-long** presentation without questions.

f. Sherri will start presentation and provide an overview of the goals for the meeting. Two topics to address include plan for 2020 forecast and implications for harvest policy and 2021 BOF meeting (HER provides a framework to estimate biological reference points). We want buy-in/support from the managers to use the new model and the purpose of this meeting is to solicit their feedback on the model and timing of implementation.
g. We will tell them to interrupt during presentation if they don't agree with something or if there are questions.
h. Send out agenda for the meeting the week before and ppt meeting the day before

Two models for comparison: LS_bestLS + HER_bestHER_conditionedoneffort

Progress report for 7/3 meeting

1) Bayesian – added more diagnostics, saved diagnostic plots, updated all figures to included posterior intervals (including survival and recruitment), changed color scheme for age composition plots
2) Selectivity – figured out how to scale to 1. Re-ran MCMC. Variance didn't change much. Recommend keeping simpler parameterization that scales to 1
3) **Plan of attack / To do list before 7/12: Is this dependent on Steve?**
    a. Model selection for HER_conditionedCatch and HER_conditionedEffort
        i. Maybe try this for a couple different values of sigmaM? Smaller M will always have lower likelihood, so choice of sigmaM should depend on realism and convergence patterns instead of selection criterion.
    b. For "best" model versions:
        i. Run through her.R, including full Bayesian analysis and comparison with LS
        ii. Run retrospective.R
4) Set August meetings
5) Discuss management reference points

Outline for presentation:

1) How do we assess herring? What is an integrated catch-at-age model (form of ASA)?

    - include which stocks, but that we're focusing on Sitka for this presentation

2) What's the motivation for moving to HER?

3) Similarities and differences between HER and LS

4) What is conditioned on catch versus effort? Why condition on effort?

5) Methods: What models did we look at? Model selection

6) Results: Comparison of HER and LS

How well are we fitting our data sources?
What are our derived biomass trajectories?
How does the model perform if we remove data? (retrospective)
What is our forecast?

7) Discussion:

What did we find? (summary of results + glaring issues + wisdom)

*were the model selection results the same for HER and LS (same parameterization)
*were any of the fits problematic?
*different parameterizations (results) are explained differently and will result in different forecasts

What are our next steps? Priorities prior to implementation (spot to solicit feedback)

What is our goal for implementation? Sitka 2020