Data Moderate 2021 Model Notes for Copper Rockfish, Quillback Rockfish, and Squarespot Rockfish

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Model Meeting 1.21.2020

Quillback rockfish

Washington

- "Base" model (6_0_base)
- Base does not have recdevs for a number of reasons.
- Model suggests population is low. A bit surprising given relatively low fishing pressure. High age, and possibly limited habitat could cause such a condition so its possible.
- Recdevs high early, low recent: driven by lack of small fish and increasing mean size in later years. Selectivity is right shifted too.
- Very similar to copper patters in sel, recdevs, comps
- Continued evidence for sigmaR = 0.9 but not doing. Only reason is that it "seems" large. Where to explore what is reasonable?
- Getting warnings "warning: poor convergence in Fmsy, final dy/dy2= -0.0014869" How big of issue?
- Jitter shows 3/100 runs are way off, 2/100 slightly off
- Choice of data weighting makes moderate difference. Interesting to think of when have such limited data to weight.

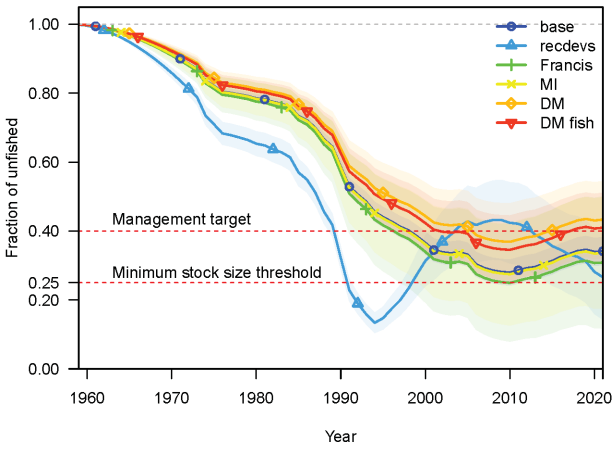
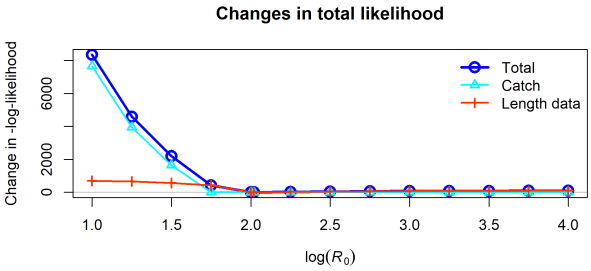
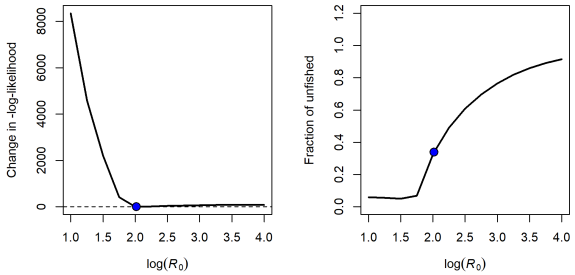
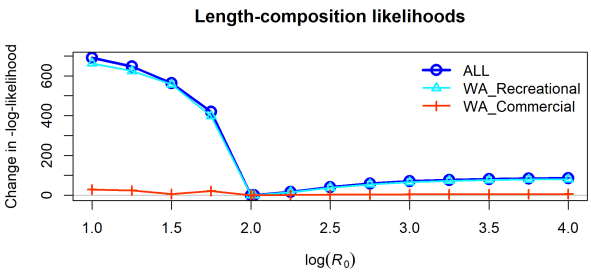


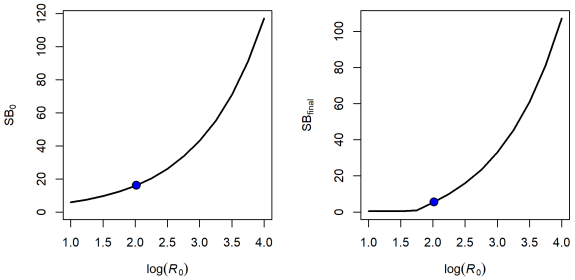
Figure 1: Base model comparisons.

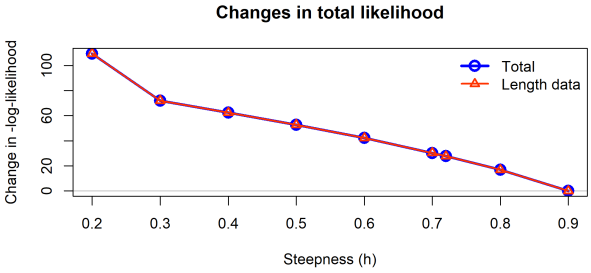
Profiles:

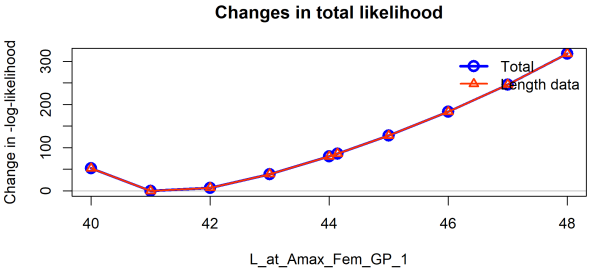

Changes in total likelihood
Change in -log-likelihood
Total
Catch
Length data
log(R_0)

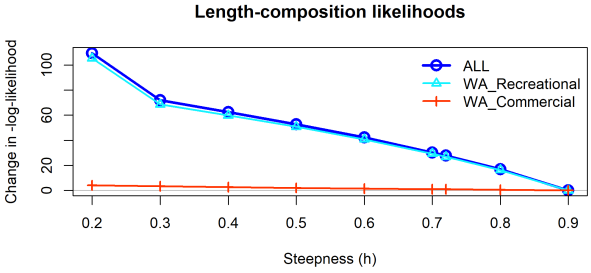

Change in -log-likelihood
log(R_0)
Fraction of unfished
log(R_0)

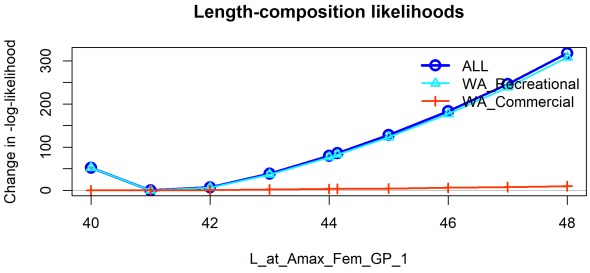

Length-composition likelihoods
Change in -log-likelihood
ALL
WA_Recreational
WA_Commercial
log(R_0)

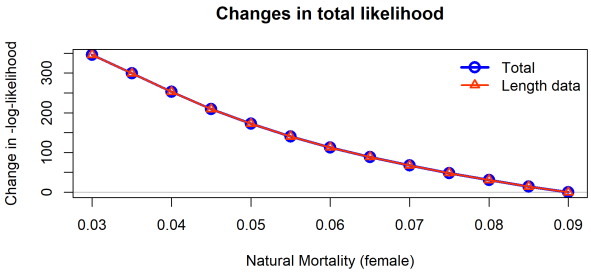

SB_0
log(R_0)
SB_{final}
log(R_0)

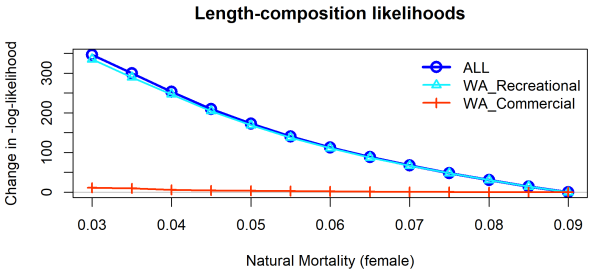

Changes in total likelihood
Change in -log-likelihood
Total
Length data
Steepness (h)


Changes in total likelihood
Change in -log-likelihood
Total
Length data
L_at_Amax_Fem_GP_1


Length-composition likelihoods
Change in -log-likelihood
ALL
WA_Recreational
WA_Commercial
Steepness (h)

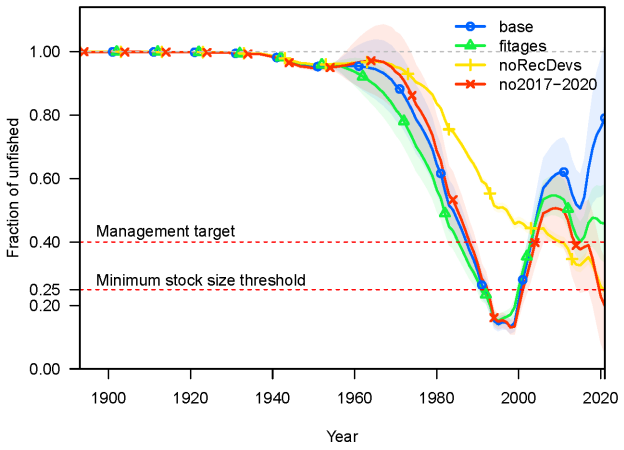

Length-composition likelihoods
Change in -log-likelihood
ALL
WA_Recreational
WA_Commercial
L_at_Amax_Fem_GP_1

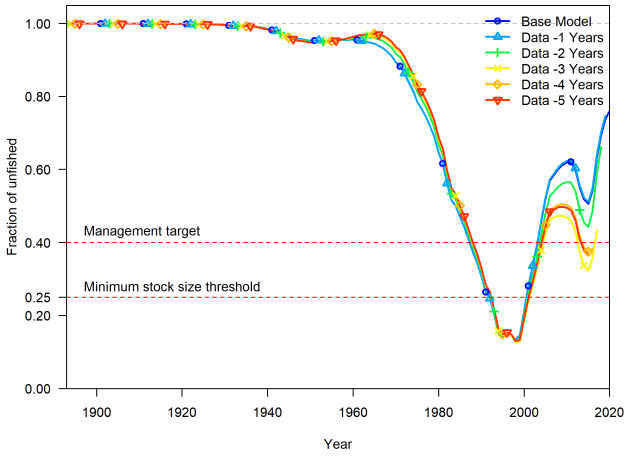




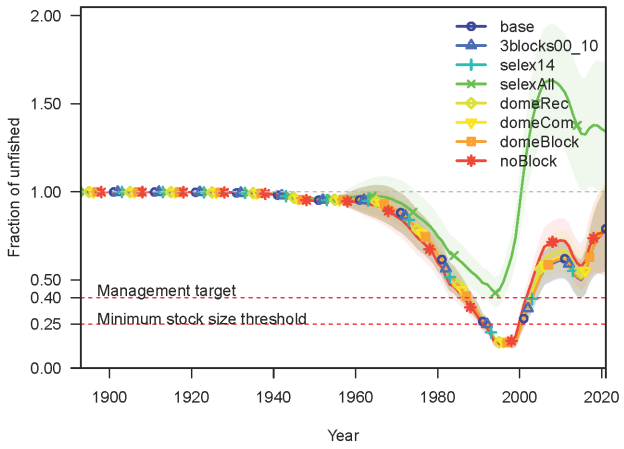
Oregon

- "Base" model (3_0_base)
- Includes recdevs, includes block starting at 1999
- Very strong recruitment pulses driven by comps. 2012 pulse driven by most recent years, in both rec and comm. Other pulses evident in compositions across years. 2012 pulse "saves" population (i.e. removing 2017-2020 comps cause population to decline) seen below and in retro plot





- Given strong recruitment in 1990s, population turns around dramatically. Is this reasonable for a population living to 90?
- Pretty consistent trends across explorations with exception of domed-selectivity. No support for dome in early selex block (model will estimate asymptotic). No suggestion of dome selex though.



- Included ages as ghost fleet, and in fitting. Model with ages fit compares reasonably. Suggests some support of length data results with ages. Base model doesn't include fits to ages.
- Continued evidence for sigmaR = 0.9 but not doing. Only reason is that it "seems" large. Where to explore what is reasonable?

Sigma R = 0.6 Comm NLL 369.766 Rec NLL 760.781 Total NLL 1174.04

Sigma R = 0.9 Comm NLL 366.859 Rec NLL 746.623 Total NLL 1146.49

- Like washington, getting "warning: poor convergence in Fmsy, final dy/dy2= -0.00150056". Is this a concern?
- Jitter show 13/100 runs with poorer likelihoods (5 much poorer)
- Francis and MI have similar moderate data weighting effects. DM draws down the model the most. A little odd since weights are more dramatic for Francis and MI than DM. DM estimates lower R0 and some recdev differences.

Francis Comm = 0.15, rec = 0.22

MI Comm = 0.177, rec = 0.027

DM (fish) theta/(1+theta) Comm = 0.638, rec = 0.522

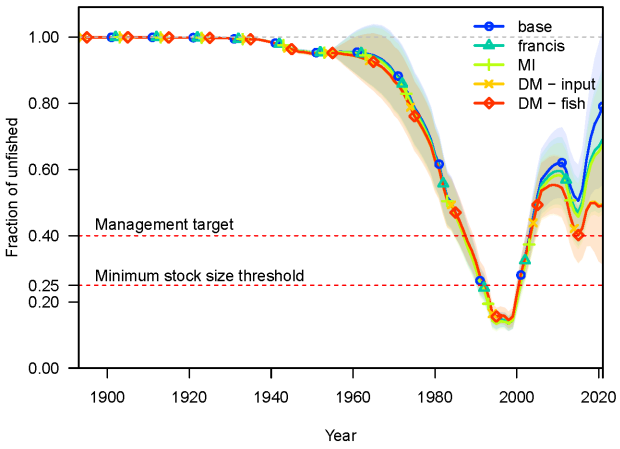
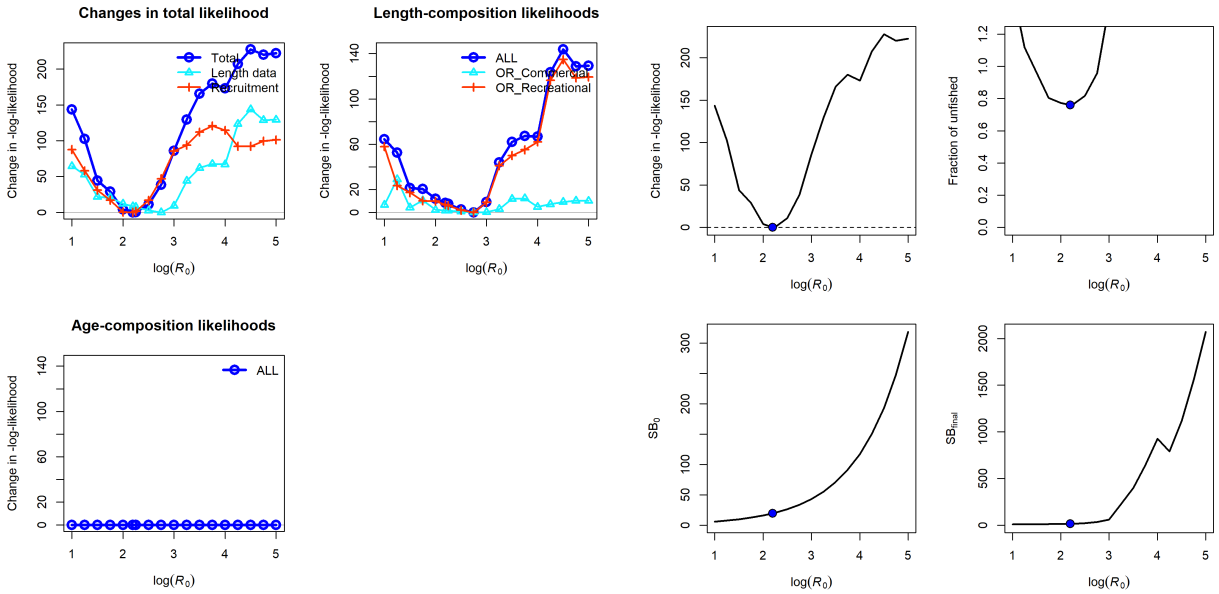
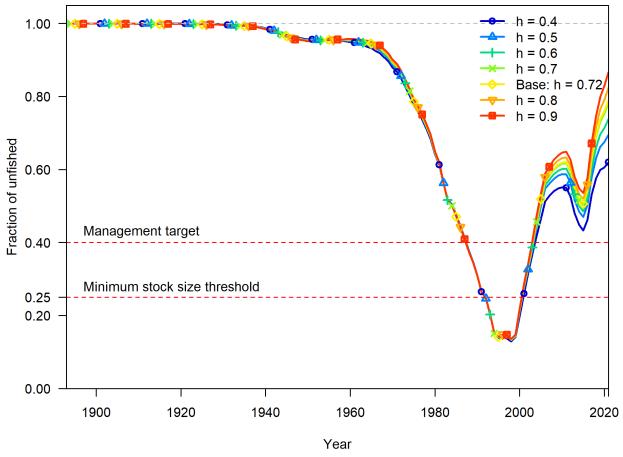
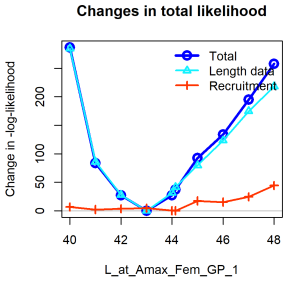


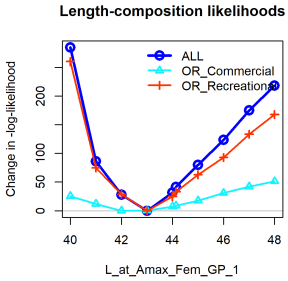
Figure 2: Data weighting comparisons.

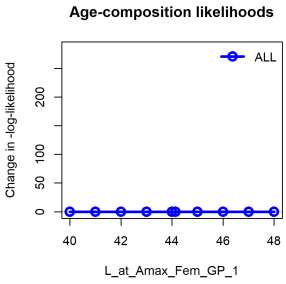


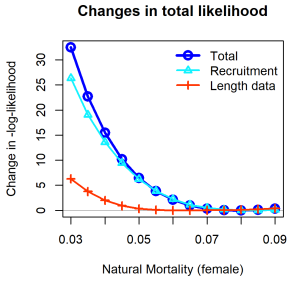
Profiles:

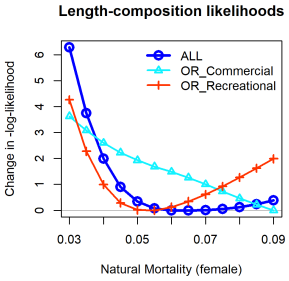


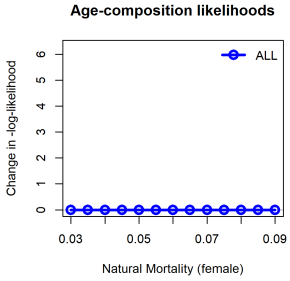






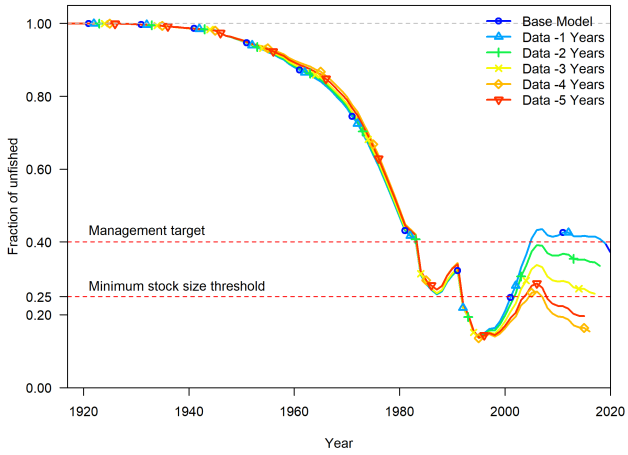






California

- "Base" model (4_0_base)
- Include recdevs but decision similar to WA model. Period of high recdevs followed by period of low.



- Recent peak in recdevs sustains population.
- Model iterpreting catches to be supported by higher 90s recdevs, and rightward shifting comps later to reflect period of low recdevs (and period of lower catches).
- Commercial comps have information for recdevs (due to when excluding them, comm selex shifts far left). One of the reasons to include in this model but not in WA model (other reason is bias adj pattern in "better")
- Similar patterns in comps as for WA with residual pattern.
- Blocking selex doesn't really change much plus no currently known reason for it. Some oddities with high mean length in 1993-1995, otherwise patterns are reasonable.
- Much more left shifted selectivity curve for recreational fishery than in other states. Evidence of domed selex?
- Data weighting effect is moderate. Very near boundaries of targets/limits Francis Comm = 0.17, rec = 0.11

MI Comm = 0.073, rec = 0.16

DM (fish) theta/(1+theta) Comm = 0.844, rec = 0.578

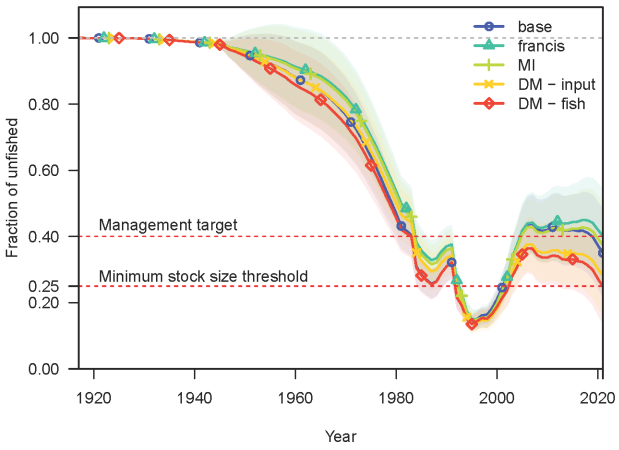
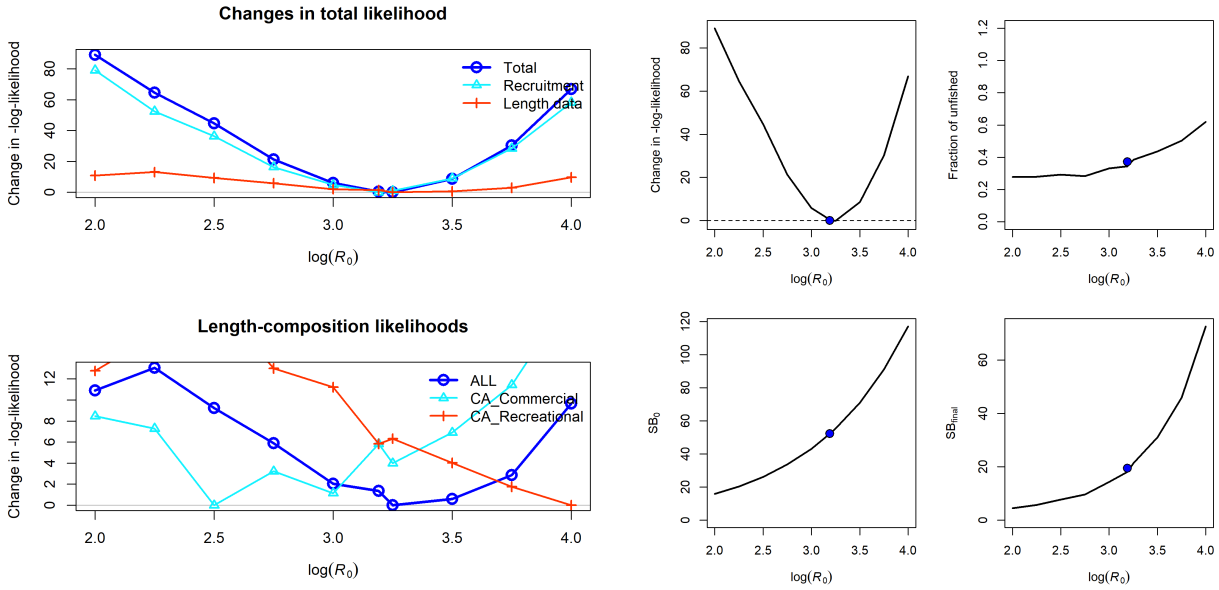
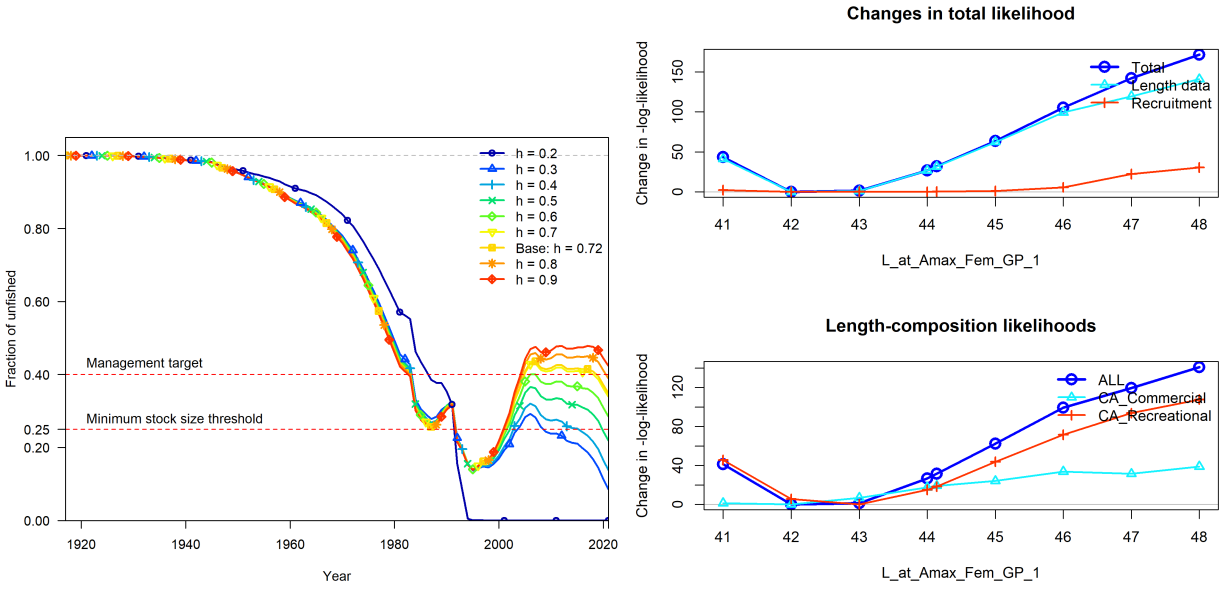
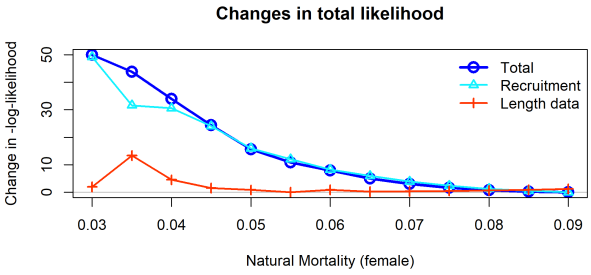


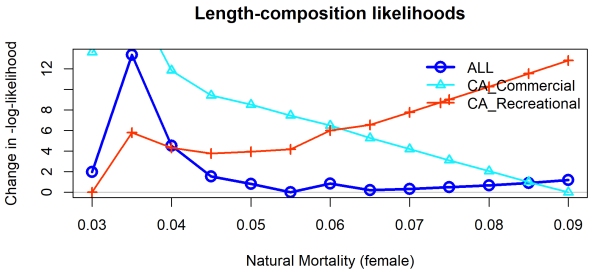
Figure 3: Data weighting comparisons.


Changes in total likelihood
Change in -log-likelihood
Total
Recruitment
Length data
log(R_0)
Length-composition likelihoods
ALL
CA_Commercial
CA_Recreational
Fraction of unfished
SB_0
SB_{final}

Profiles:


Changes in total likelihood
Change in -log-likelihood
Total
Length data
Recruitment
L_at_Amax_Fem_GP_1
Length-composition likelihoods
ALL
CA_Commercial
CA_Recreational
Fraction of unfished
h = 0.2
h = 0.3
h = 0.4
h = 0.5
h = 0.6
h = 0.7
Base: h = 0.72
h = 0.8
h = 0.9
Management target
Minimum stock size threshold
Year





Notes: WA -Check projected catches compared to recdevs vs no recdevs to assess where scale is -Check data weighting for model with recdevs to see scale -Perhaps do a SSS model for washington - would need depletion for a year. Jason says its easy to do -Way to resolve sigmaR is does it creep? Does it improve fits things? -Reinstall profiling package to resolved yaxis and better see the minimum -Estimate M and Linf, since those with K are confounded. Profile K too. To address the profiles saying Linf of 42 is best fitting OR -2015-2016 couldn't retain copper and quillback so dont have lengths CA -Run profiles on data weighting model. -Check what is going on with data weighting since R0 estimates for base more similar to that for DM than to MI or francis