* Tip for STAT teams from Ian:  
  Don’t forget about the new(ish) -hess\_step option in ADMB & SS3 ([link to User Manual notes about it](https://nmfs-stock-synthesis.github.io/doc/SS330_User_Manual_release.html#using--hess_step-to-do-additional-newton-steps-using-the-inverse-hessian)). Petrale kept getting not-great gradients, but running again after estimation using ss\_win -hess\_step fixed that: “The 2 Hessian step(s) reduced maxgrad from 0.0039747 to 0 and NLL by 4.34284e-11.”
  1. Cole added this option recently to admb. The theory is that the model does the estimation process to find the best fit and NLL but sometimes admb gives up trying to find the best fit and calculated the hessian. If you are not quite at the bottom of the NLL valley you can use the hessian information to fit the true best fit to the data with an associated gradient. This info can be found in the [SS3 manual](https://nmfs-stock-synthesis.github.io/doc/SS330_User_Manual_release.html#hess-step)

The core functions available in r4ss include:

Core Functions

|  |  |
| --- | --- |
| SS\_output | A function to create a list object for the output from Stock Synthesis |
| SS\_plots | Plot many quantities related to output from Stock Synthesis |
| Model comparisons and other diagnostics: |  |
| SSsummarize | Read output from multiple SS3 models |
| SStableComparison | Make table comparing quantities across models |
| SSplotComparison | Plot output from multiple SS3 models |
| SSplotPars | Plot distributions of priors, posteriors, and estimates |
| SS\_profile | Run likelihood parameter profiles |
| SSplotProfile | Plot likelihood profile results |
| PinerPlot | Plot fleet-specific contributions to likelihood profile |
| SS\_RunJitter | Run multiple model jitters to determine best model fit |
| SS\_doRetro | Run retrospective analysis |
| SSmohnsrho | Calculate Mohn’s Rho values |
| SSplotRetroRecruits | Make retrospective pattern of recruitment estimates (a.k.a. squid plot) as seen in Pacific hake assessments |
| SS\_fitbiasramp | Estimate bias adjustment for recruitment deviates |