Appendix D: Tanner crab molt increment data

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Tanner crab growth data

Input data file for Tanner crab growth data is '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2017-09.TannerCrab/Data/MoltIncrementData/TannerCrab.20160701.csv'. Figure 1 shows molt increment data collected from crab near Kodiak Island in the Gulf of Alaska and in the eastern Bering Sea (EBS). THe Kodiak data was collected over a 20+ year period during opportunistic surveys and caged grow-out experiments. The EBS data was collected in 2014, 2015, and 2016 through cooperative research conducted by the AFSC/NMFS and the Bering Sea Research Foundation (BSFRF).
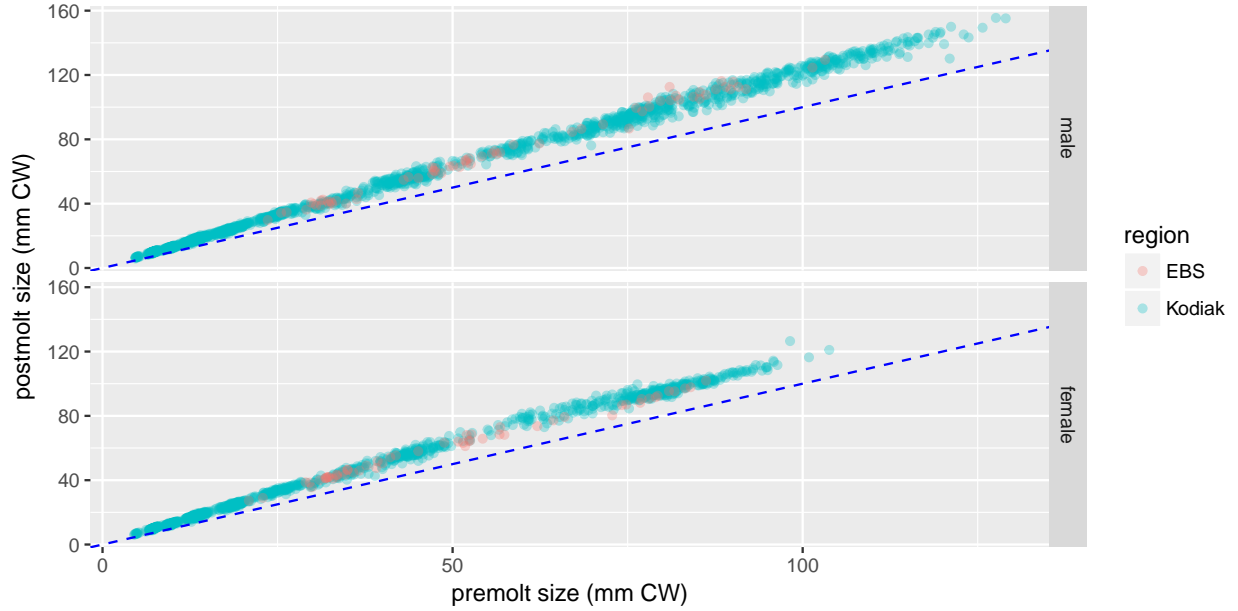
Figure 1: Tanner crab molt increment data, by region and sex.

Mean growth

Sex-specific parameters for post-molt size as a power function of pre-molt size ($z_{post} = e^a \cdot z_{pre}{}^b$) were estimated in R using the glm function from the EBS data on the log-scale using the regression formula $ln[z_{post}] = a + b \cdot ln[z_{pre}]$. The resulting estimates

Table 1: Estimated growth parameters for the EBS molt increment data with post-molt size as a power lae of pre-molt size..

parameter	males	females
a	0.2708370	0.6106653
b	0.9922623	0.8975509

Sex-specific parameters from the 2016 assessment model reflecting estimated mean growth are listed in Table 2, where $z_{post} = e^a \cdot z_{pre}{}^b$.

Table 2: 2016 assessment model mean growth parameters.

parameter	males	females
a	0.4220295	0.6999999
b	0.9721004	0.8850577

Growth parameters estimated from the Kodiak data, used as prior mean values for parameters in the assessment model are listed in Table 3.

Table 3: Growth parameters based on Kodiak data, used as prior means for parameters in the assessment model.

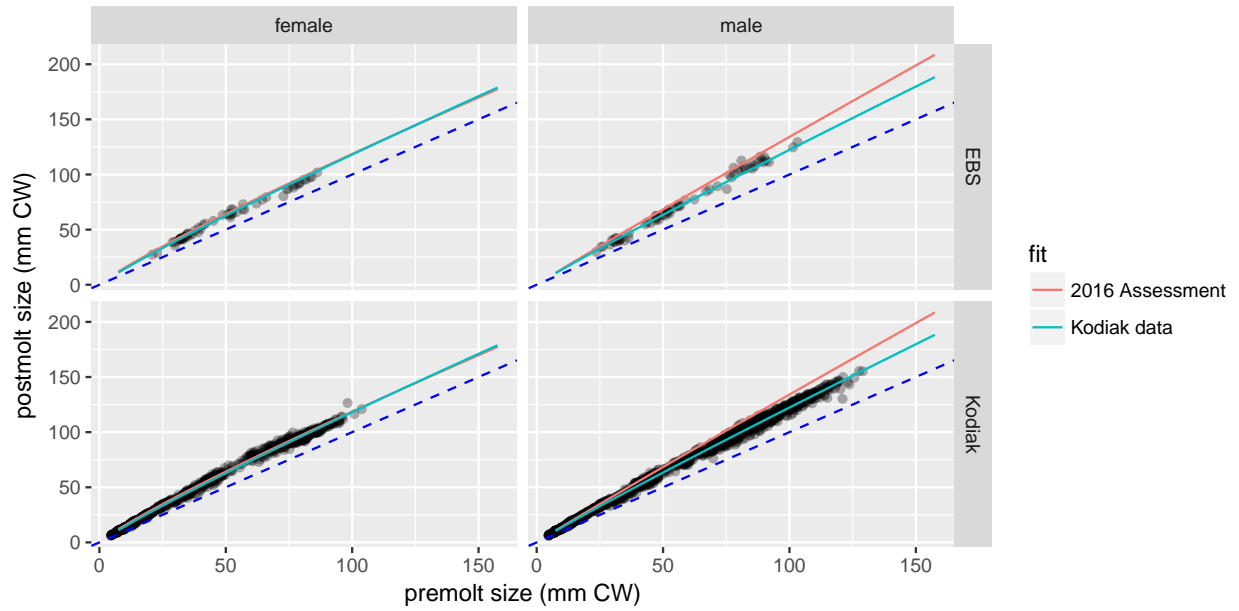| parameter	males	females
a	0.437941	0.5656024

Figure 2: Tanner crab growth data, by region and sex. Colored lines indicate mean growth, by sex, as determined by the assessment model.

Absolute residuals

Residuals to assessment model estimates are shown in Figure 3 as **observed postmolt size - predicted postmolt size**.
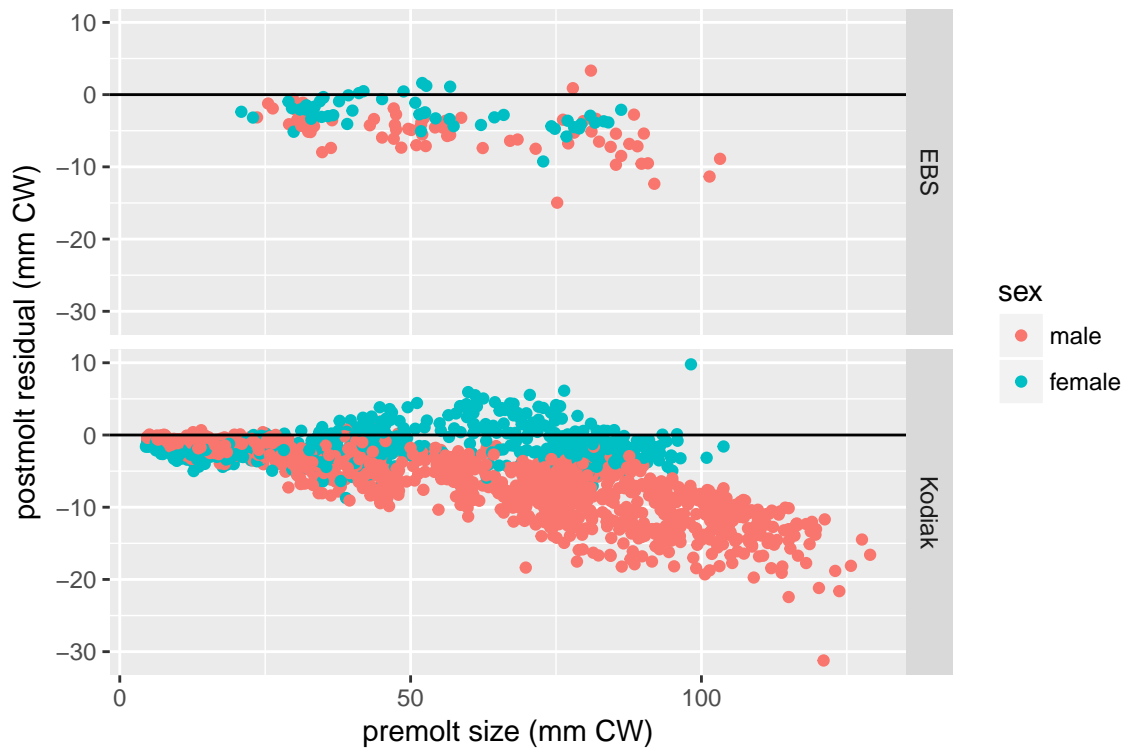
Figure 3: Absolute-scale residuals to mean growth as determined by the assessment model, by region and sex.

Relative residuals

Residuals to assessment model estimates are shown in Figure 4 as **(observed postmolt size - predicted postmolt size)/observed postmolt size**.
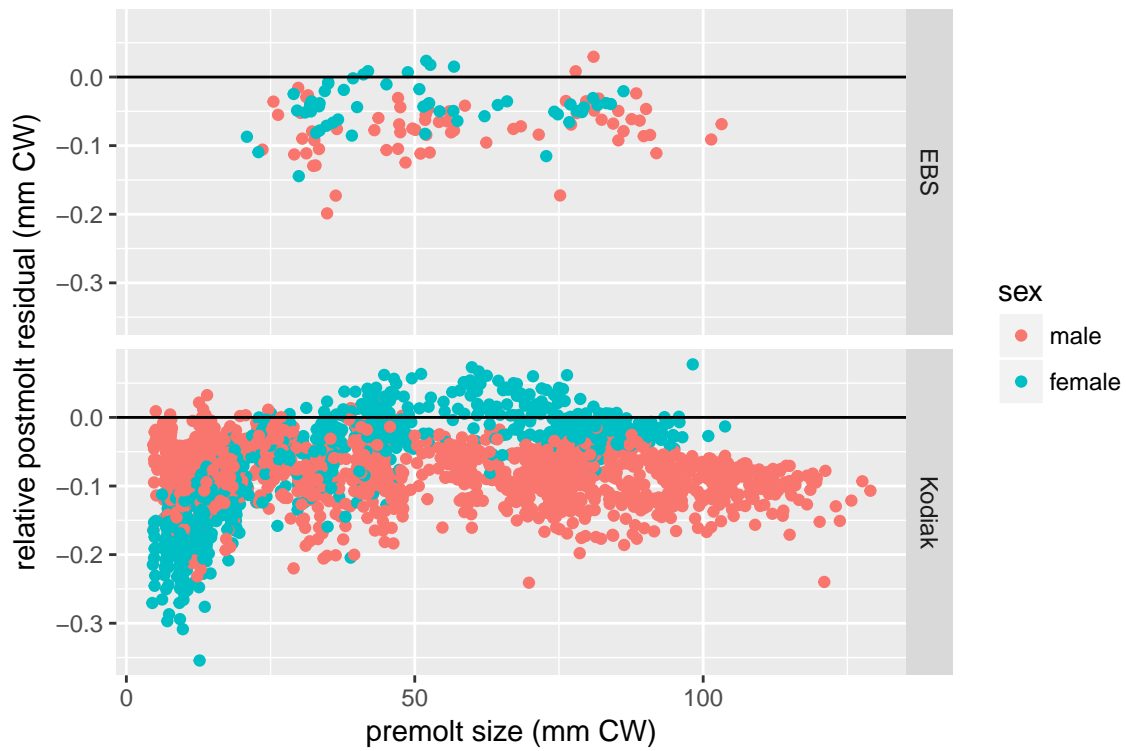
Figure 4: Relative-scale residuals to mean growth as determined by the assessment model, by region and sex.