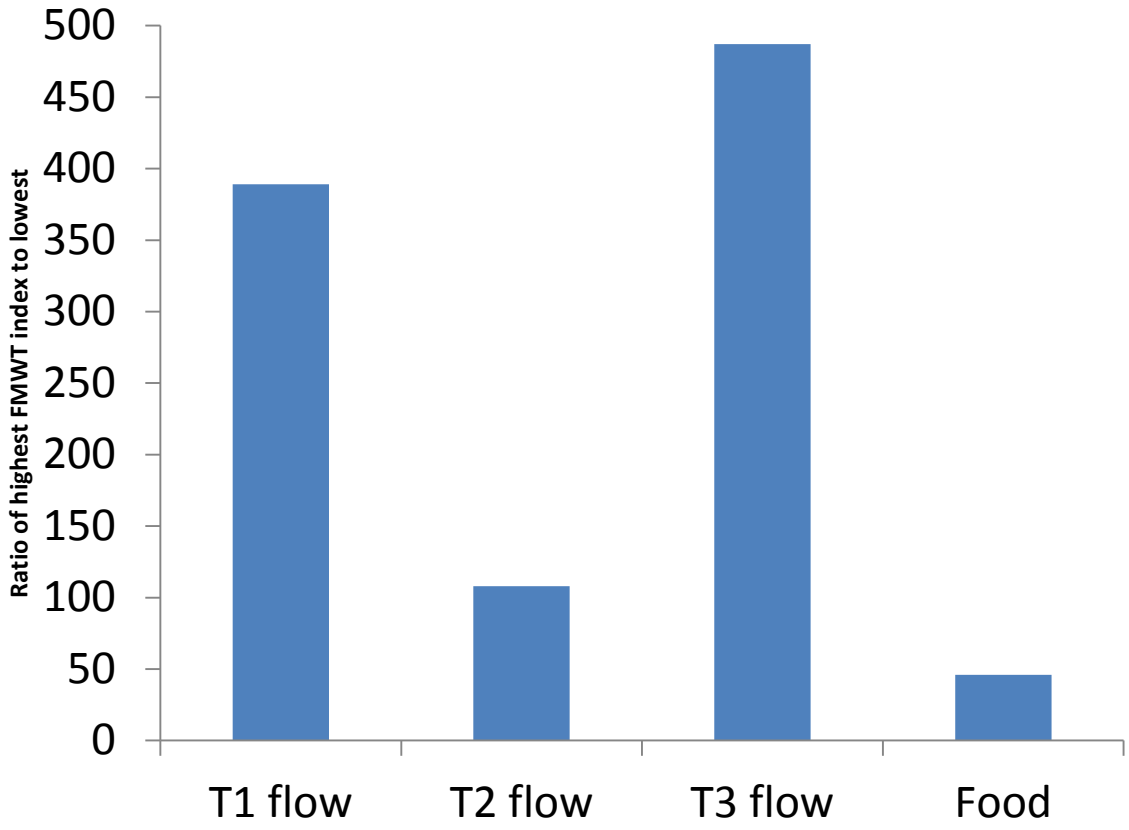
Longfin Smelt conceptual models

Let’s not get too far ahead of ourselves

State of Population Dynamic Science

- Flow affects recruitment; strongest relationship = Dec thru July or Aug (Stevens and Miller 1983)
- X2 works too, decided Jan-June made more sense (Jassby et al. 1995)
- Step change in intercept in 1987 (Kimmerer 2002); consistent with an overbite clam effect on recruitment
- Step change in intercept in 2002 (Sommer et al. 2007); consistent with a broader "POD"
- Considering multiple covariates and autoregressive prior abundance effect, step declines occurred around 1989-1991 (not 1987) and 2004, but 2002 works OK too (Thomson et al. 2010)

The IEP model says: flow has the bigger effect, but…

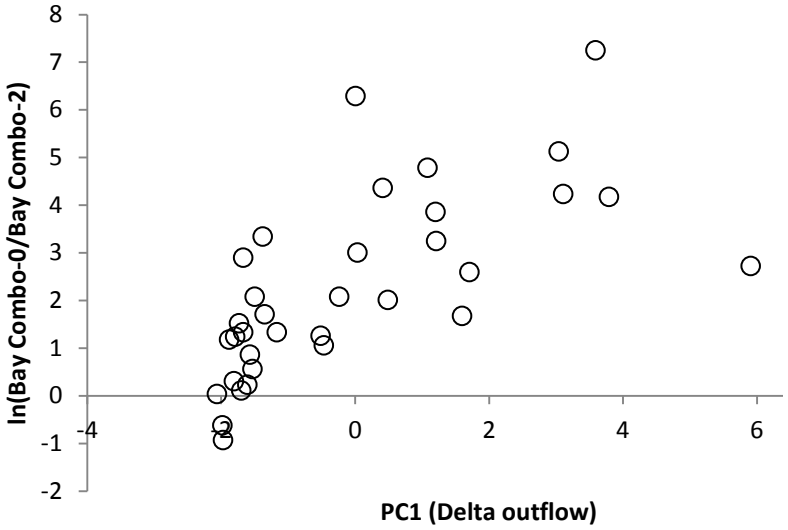


State of Population Dynamic Speculation

- Longfin Smelt have a top down effect on zooplankton (Mac Nally et al. 2010)
- If you statistically wiggle a wet spaghetti noodle around and around enough times, you can explain every aspect of the species dynamics (Maunder et al. 2015)
- The flow effect on recruitment is not log-linear. If the overbite clam had an effect, it was not on the larval stage; maybe it didn't even have an effect at all (Nobriga and Rosenfield 2016)*

*Senior author disagrees, but variance is what variance is

Is the recruitment effect of flow linear?



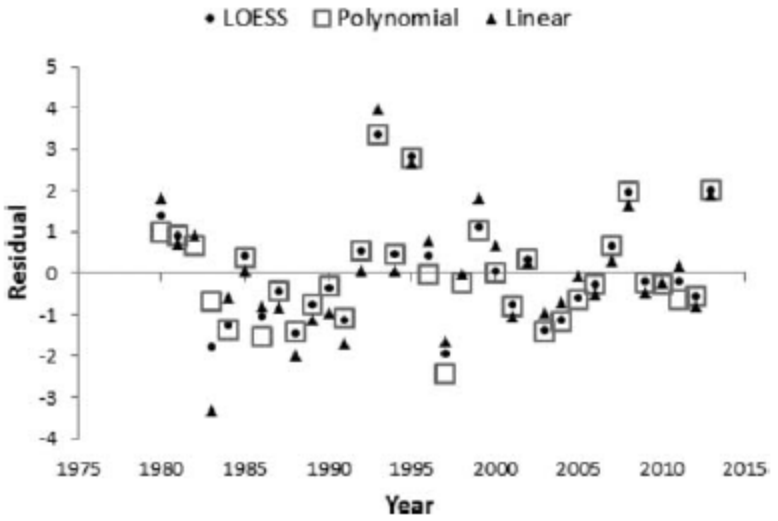


FIGURE 2. Time series of residuals from three regression analyses of the first principal component for the net Delta outflow index (December–May; Sacramento–San Joaquin Delta) in relation to the natural logarithm of Longfin Smelt recruits (age 0) per spawner (age 2) in the San Francisco Estuary (LOESS = locally weighted scatter plot smoothing).

Jon v Matt

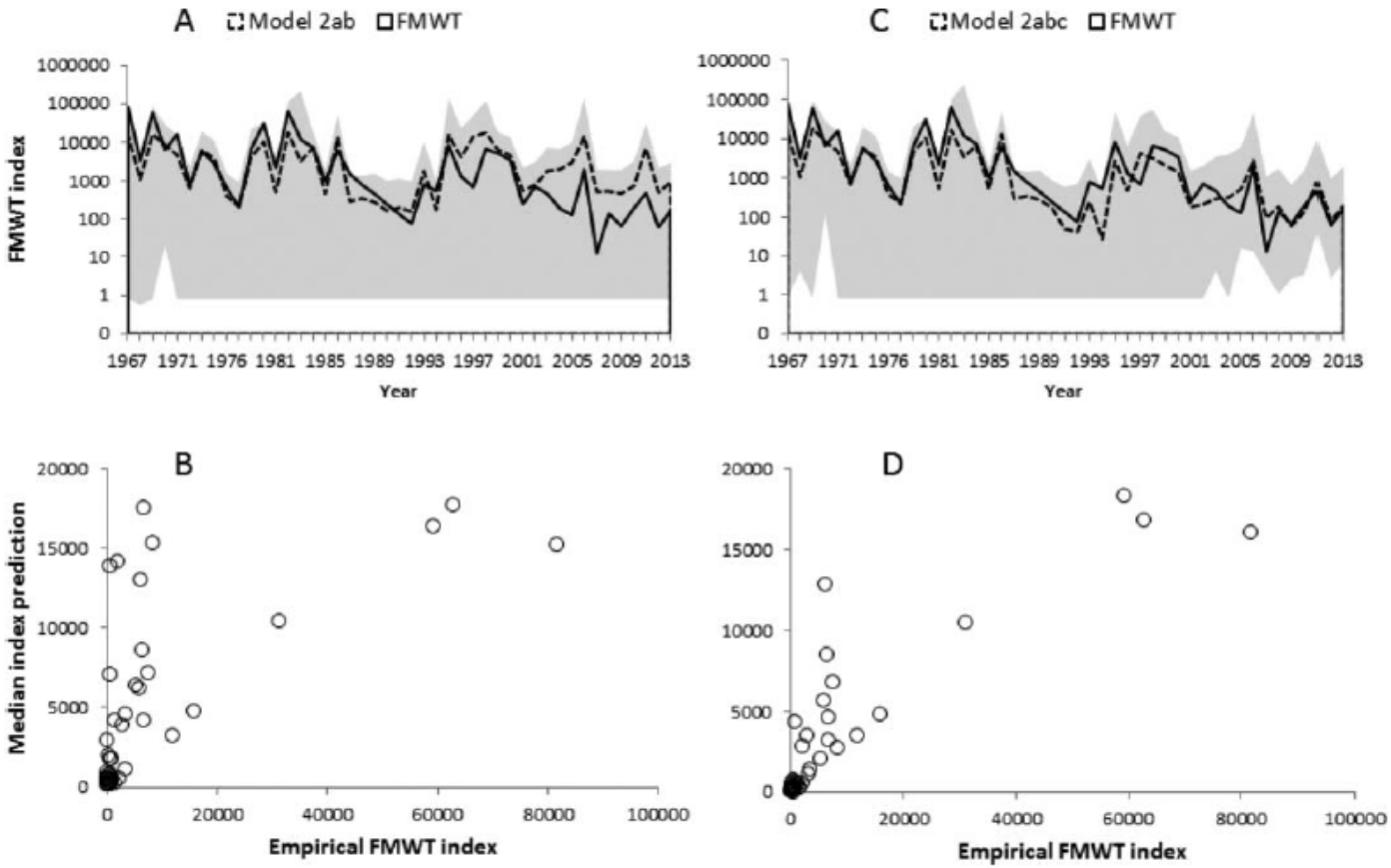
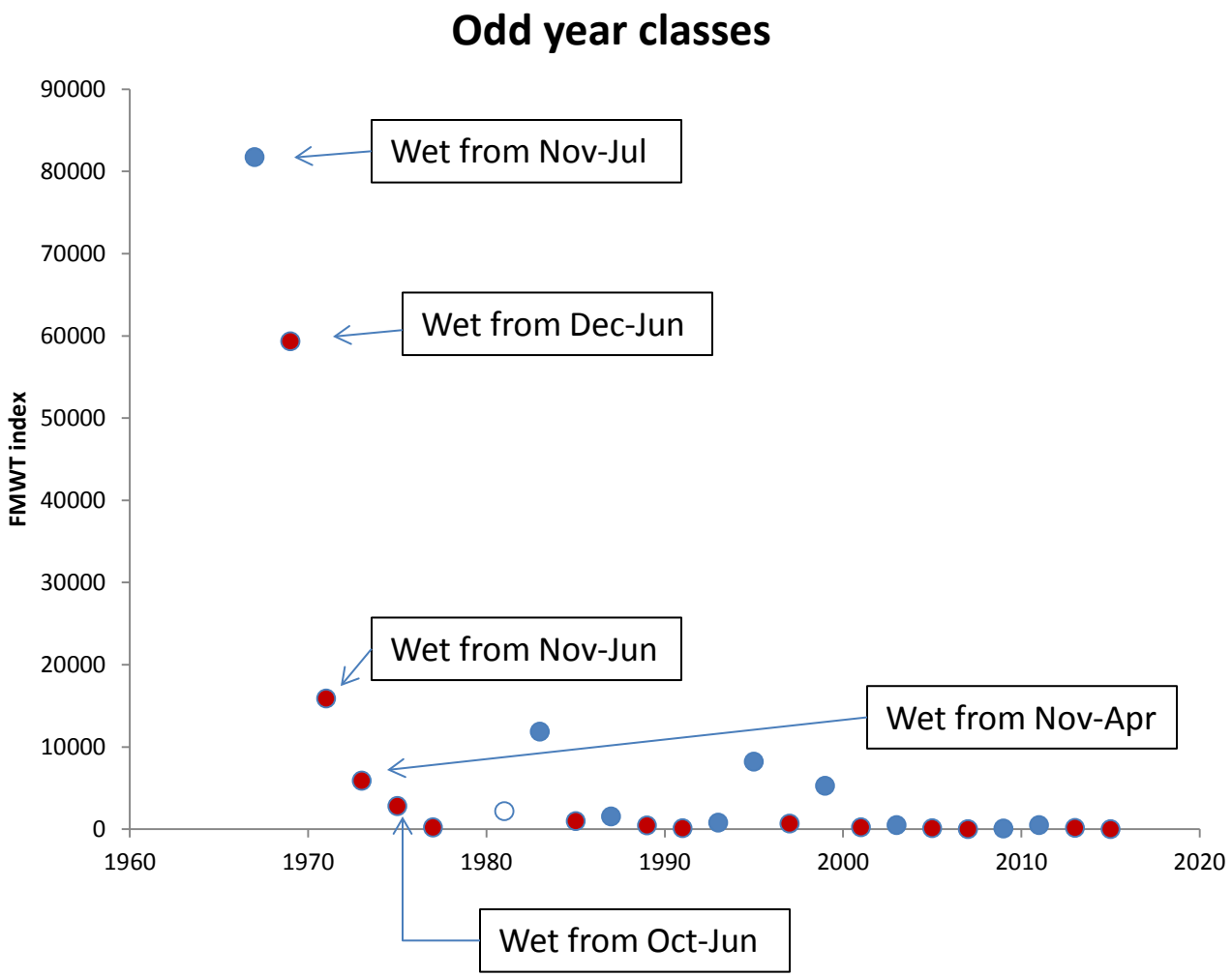


FIGURE 6. The Fall Midwater Trawl Survey (FMWT) index for Longfin Smelt, presented relative to predictions from the two best-supported spawner–recruit models: **(A)** the time series for the FMWT index (solid line), the median prediction (dashed line) from model 2ab (950 model iterations/year), and the range of the central 95% of predictions (gray shading); **(B)** scatter plot of the median FMWT index prediction from model 2ab in relation to the empirical FMWT index; **(C)** the time series for the FMWT index, the median prediction from model 2abc (950 model iterations/year), and the range of the central 95% of predictions; and **(D)** scatter plot of the median FMWT index prediction from model 2abc in relation to the empirical FMWT index.

What about the Lake Washington conceptual model?



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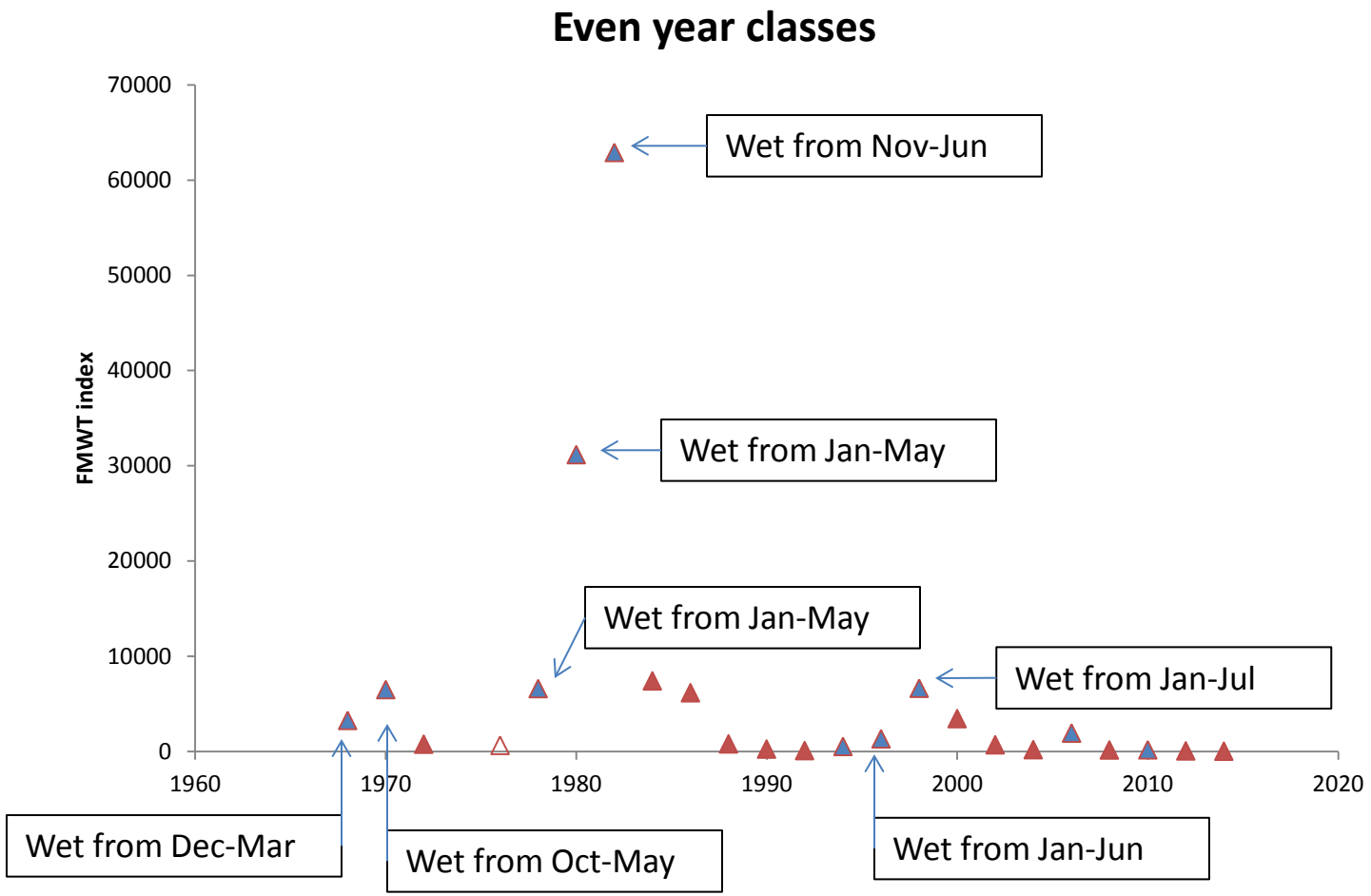

If the Lake Washington CM is the "one":

- Even year classes respond to flow, but odds don't!
- Maybe they competed with one another?
  - Can we test this using only historical data???