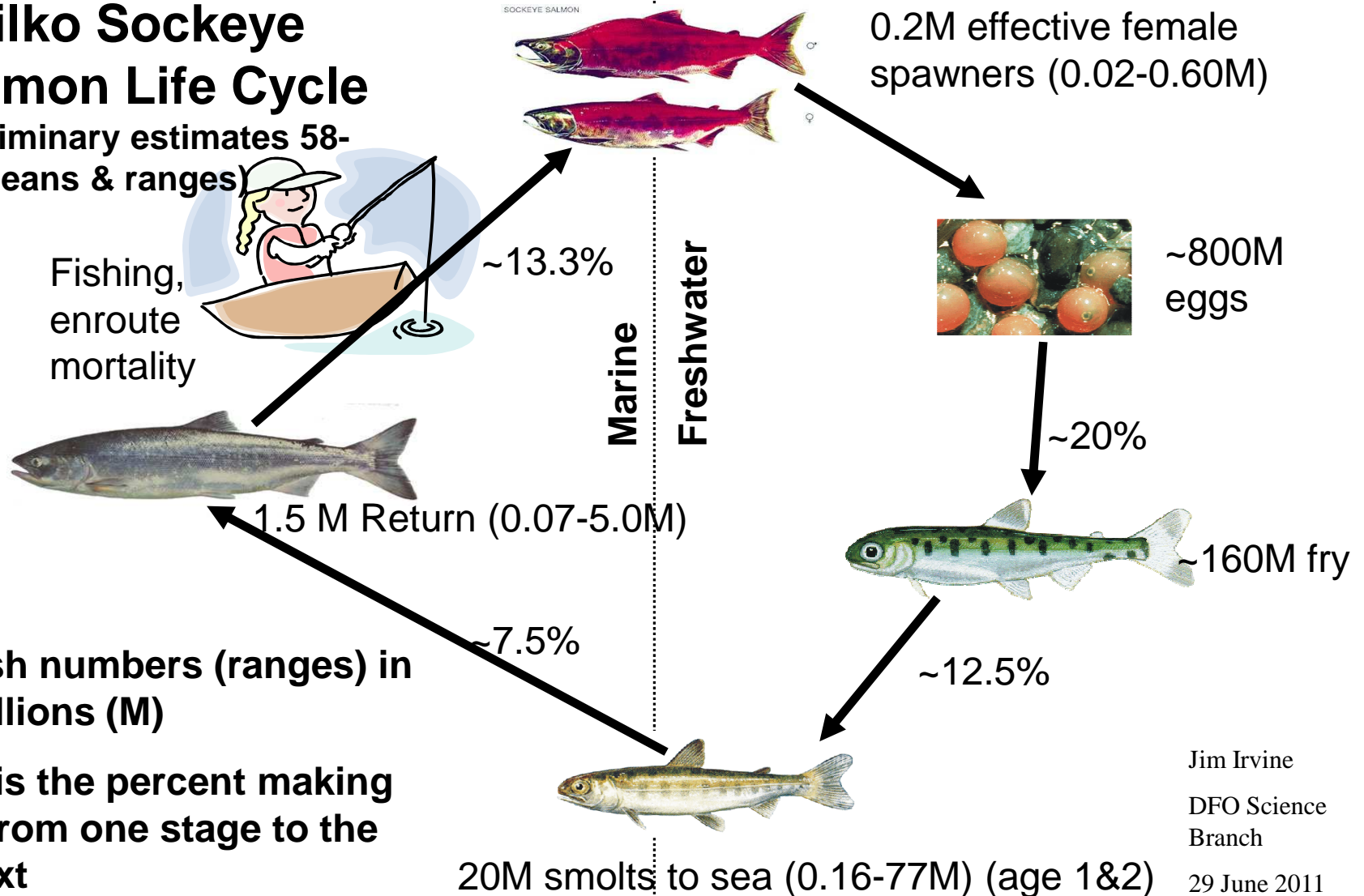




Chilko Sockeye Salmon Life Cycle

(preliminary estimates 58-09 means & ranges)





Freshwater (mostly) Summary

- Freshwater survival time series, FS1 (Fig. 1D), had a variable but declining trend from the early 60's until 05 and then, suddenly, the 3 highest survivals on record, including an earlier period of lake fertilization. These high survivals yielded 77 and 71 million age 1 smolts in OEY 2007 and 2008 respectively (Fig.1E), the largest cohorts by far, but only ~24.5 million in OEY 2009.
- Density dependent (DD) effects on growth & survival of young sockeye appear to have shifted (extremely high smolt productions in 07 & 08 ocean entry years (OEY), consistent with a lake environment with some recent environmental change (Fig. 1E)
- Smolt condition varied through time (probable DD effects) that likely influenced smolt-to-adult survivals (Fig. 2)
- Survival declines from the early-1960's to the late-1990's (Fig. 1D) were partly compensated for by generally increasing smolt-to-adult survivals from the 1960 oey until the late-1980's (Fig. 1A).



Ocean (mostly) Summary (Cont'd)

- Long-term means and decadal survival patterns were statistically identical for age 1 & age 2 smolts when arranged by OEY despite older smolts being 44% longer & 3.5 times heavier (Fig. 1B, 1C)
- In general, recent production declines (1990-2009) were caused by increasing mortalities after smolts left Chilko Lake (Figs 1A, 1B, 1C)
- Reduced fishery exploitations after the mid-1990's were partly responsible for increased spawner numbers (Fig. 3)
- The 2007 and 2008 cohorts produced highly contrasting returns (Fig. 1F).



Conclusions

- Chilko sockeye salmon returns influenced by factors affecting survival at multiple life history stages, both in fresh water and the ocean, as well as changing fisheries
- Low returns for Chilko Lake sockeye in 2009 occurred despite high freshwater survivals and were caused by anomalously low smolt to adult survivals
- Good returns to Chilko Lake in 2010 were the result of high freshwater survivals and average (compared to long term) smolt to adult survivals