CONCLUSIONS

Overall, the results presented here of two quantitative food webs, one for each of the Eastern and Western Subarctic Pacific Gyres, should be seen as exploratory analyses given the available data. The results, while intriguing, suggest several specific avenues for future work. From a data perspective, for this multi-species modeling to be useful, it is critical that time series data on biomass or relative biomass trends be collected for as many species as possible, especially competitors and predators of salmon such as flying squid, pomfret and sharks. While limited fisheries exist in the gyre regions, the interest in climate change and the known relationship between Pacific salmon and climate makes examining multi-species interactions an area in which research should be promoted.

Despite the limitations outlined above, the results of the regime-fitting style projections provide some interpretation on the processes linking climate variation to population dynamics of Pacific salmon. Using the gyre models, it appears that Pacific salmon abundance is primarily driven by processes occurring outside of the gyre system *i.e.* in coastal ecosystems. A next step should be to integrate coastal, marginal seas and gyre system models to examine linkages (energy transfer) between these systems. An integrative study connecting gyres to such boundary regions could also explore the dynamics of other migratory species (*e.g.* squid, pomfret, marine mammals and birds) along with the influence of shifting fronts and currents. In order to examine the influence of these processes, seasonal data (especially during transition times) are required. It is important that the gyre models developed here are based on summer data.

Improvements to the gyre models require improved biomass estimates for a number of key species (Table B4), especially species common to both gyres (*e.g.* marine mammals and birds). For a number of species, diet data for the gyre regions were not available, and therefore, diet data from other regions were used. Researchers should be encouraged to collect diet data from the gyre regions. At a minimum, the data collected should include prey identified to the lowest taxonomic group possible, along with number and volume of each prey item.

This study has provided a snapshot of the two sub-arctic gyre systems and increased our understanding of their dynamics and how each system may respond to climate forcing. This work should form the basis for future research in understanding the role of the gyre system in marine productivity of the North Pacific.