Foundational science related to Chinook flow/survival and migration studies:

Research has shown that certain flow thresholds correlate with the migration timing of Chinook salmon in the Lower Sacramento River (del Rosario et al 2013).

Recent studies have shown that higher flows correlate with higher survival rates of out-migrating Chinook salmon smolts in the Sacramento River:

- tagged hatchery late fall-run smolts from 2007 to 2011 (Perry et al. 2010, 2018, Michel et al. 2015, Henderson et al. 2018)
- tagged wild Mill Creek wild spring-run smolts from 2013 to 2017 (Notch 2017).

Cordoleani, F., Notch, J., McHuron, A. S., Ammann, A. J., & Michel, C. J. 2018. Movement and Survival of Wild Chinook Salmon Smolts from Butte Creek During Their Out-Migration to the Ocean: Comparison of a Dry Year versus a Wet Year. *Transactions of the American Fisheries Society*, *147*(1), 171-184.

del Rosario, R. B., Redler, Y. J., Newman, K., Brandes, P. L., Sommer, T., Reece, K., & Vincik, R. 2013. Migration Patterns of Juvenile Winter-run-sized Chinook Salmon (Oncorhynchus tshawytscha) Through the Sacramento–San Joaquin Delta. *San Francisco Estuary and Watershed Science*, *11*(1).

Henderson MJ, Iglesias IS, Michel CJ, Ammann AJ, Huff DD. 2018. Estimating spatial-temporal differences in Chinook salmon outmigration survival with habitat and predation related covariates. Canadian Journal of Fisheries and Aquatic Sciences. *Just-in article published on the web 15 November 2018.*

Michel CJ, Ammann AJ, Lindley ST, Sandstrom PT, Chapman ED, Thomas MJ, Singer GP, Klimley AP, MacFarlane RB. 2015. Chinook salmon outmigration survival in wet and dry years in California's Sacramento River. Canadian Journal of Fisheries and Aquatic Sciences 72:1749-1759.

Newman, K. B., & Brandes, P. L. 2010. Hierarchical modeling of juvenile Chinook salmon survival as a function of Sacramento–San Joaquin Delta water exports. *North American Journal of Fisheries Management*, *30*(1), 157-169.

Notch JJ. 2017. Out-migration survival of wild Chinook salmon (*Oncorhynchus Tshawytscha*) smolts from Mill Creek through the Sacramento River during drought conditions. University of California – Santa Cruz, Santa Cruz, CA.

Perry, R. W., Skalski, J. R., Brandes, P. L., Sandstrom, P. T., Klimley, A. P., Ammann, A., & MacFarlane, B. 2010. Estimating survival and migration route probabilities of juvenile Chinook salmon in the Sacramento–San Joaquin River Delta. *North American Journal of Fisheries Management*, *30*(1), 142-156.

Perry, R. W., Pope, A. C., Romine, J. G., Brandes, P. L., Burau, J. R., Blake, A. R., ... & Michel, C. J. 2018. Flow-mediated effects on travel time, routing, and survival of juvenile Chinook salmon in a spatially complex, tidally forced river delta. *Canadian Journal of Fisheries and Aquatic Sciences*, *75*(11), 1886-1901.