**Interaction coefficients through time from pairwise CCM** (actually multivariate equivalent to incorporate spawner numbers as a predictor of recruitment)







For all MPGS

- consistent direction but magnitudes vary

- upwelling months different relationship among mpgs

- flow important for upper salmon

- hatchery releases strong negative

- harvest positive (likely bc harvest adaptively reduced in lower years)

- CSL at Bonneville negative (except middle fork)

- SRKW LPod consistently negative

**Interaction coefficient for hatchery release (time-averaged)**

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- Hatchery releases have strong negative effects on rearing and smolting cohorts (offsets 1,3)

**Interaction coefficients for hatchery variables**



- Negative effect appears to be getting smaller (improved broodstock? release timing?)

- Highest magnitude of effect for IM and UP

**Interaction coefficients of pinniped variables by spp and scale (time-ave)**



**Interaction coefficients of CSL Haulouts over time**



- swings from negative to positive and back again