

5.D.3.1.1 Model Structure

The IOS Model is composed of six model stages defined by a specific spatiotemporal context and are arranged sequentially to account for the entire life cycle of winter-run Chinook salmon, from eggs to returning spawners (Figure 5.D-135). In sequential order, the IOS Model stages are listed below.

1. **Spawning**, which models the number and temporal distribution of eggs deposited in the gravel at the spawning grounds in the upper Sacramento River between Red Bluff Diversion Dam and Keswick Dam.
2. **Early Development**, which models the effect of temperature on maturation timing and mortality of eggs at the spawning grounds.
3. **Fry Rearing**, which models the relationship between temperature and mortality of fry during the river rearing period in the upper Sacramento River between Red Bluff Diversion Dam and Keswick Dam.
4. **River Migration**, which estimates mortality of migrating smolts in the Sacramento River between the spawning and rearing grounds and the Delta.
5. **Delta Passage**, which models the effect of flow, route selection, and water exports on the survival of smolts migrating through the Delta to San Francisco Bay.
6. **Ocean Survival**, which estimates the effect of natural mortality and ocean harvest to predict survival and spawning returns by age.