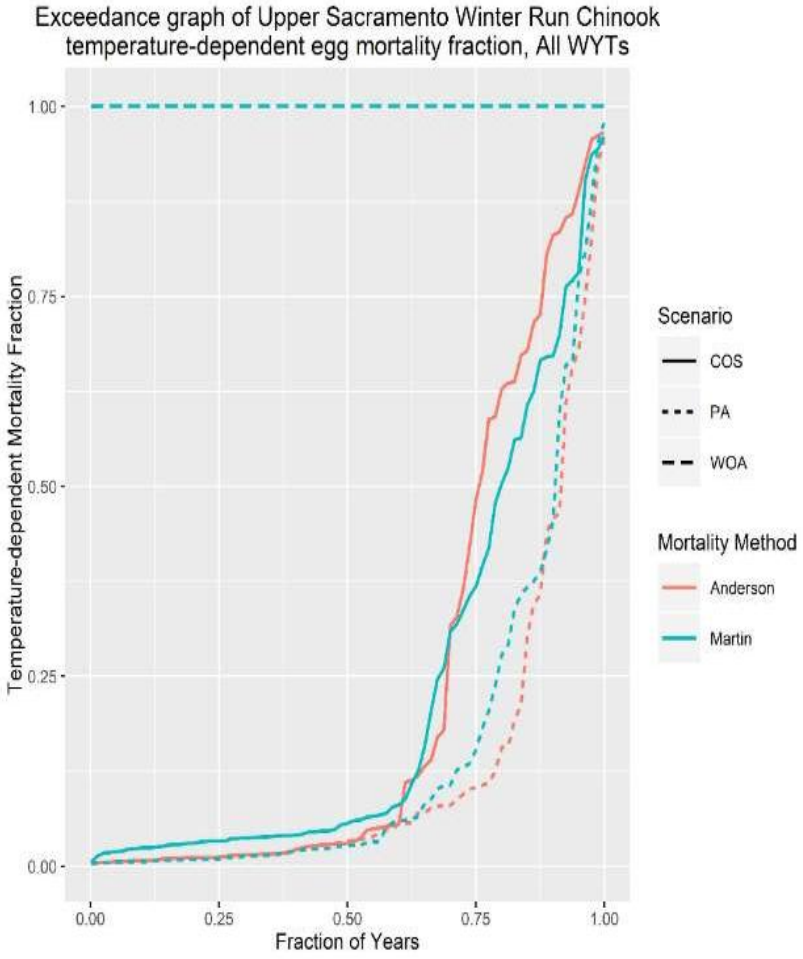
# Shasta Division: Action Components

| Core Operations | Scheduling | Collaborative Planning |
|---|---|---|
| Seasonal Operations | Spring Pulse Flow | Spring Management of Spawning Locations |
| Shasta Cold Water Pool Management | | Cold Water Management Tools (e.g., Battle Creek Restoration, Intake Lowering near Wilkins Slough, Shasta TCD Improvements) |
| Fall and Winter Refill and Redd Maintenance | | Spawning and Rearing Habitat Restoration |
| Rice Decomposition Smoothing | | Small Screen Program |
| Operations with Shasta Dam Raise | | Winter-Run Conservation Hatchery Production |
| | | Adult Rescue |
| | | Juvenile Trap and Haul |

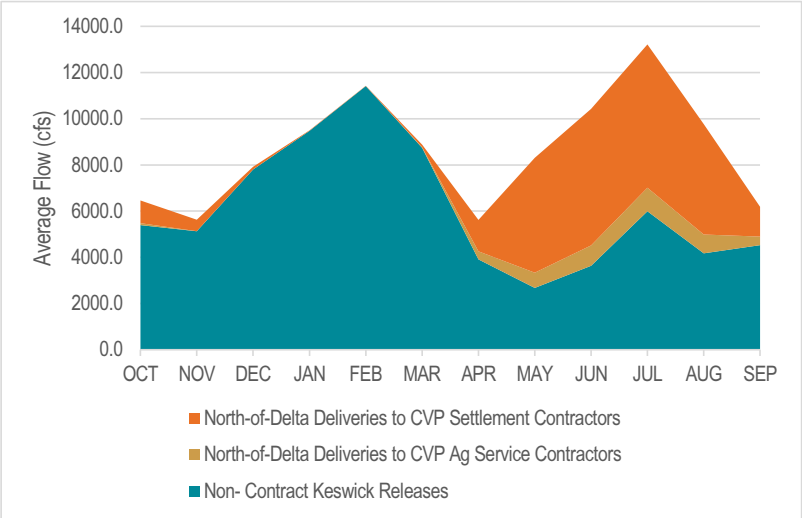
# Shasta Uncertainties

- The description of the PA (e.g., lack of detail in action component explanation)
- The characterization of current operations, COS, and the PA in physical modeling
- The characterization of biological processes in biological modeling (e.g., Anderson hatch model is novel and untested)
- The likelihood that actual operations will adhere to the proposed operations either as modeled or as described in the PA. Moving between Tiers



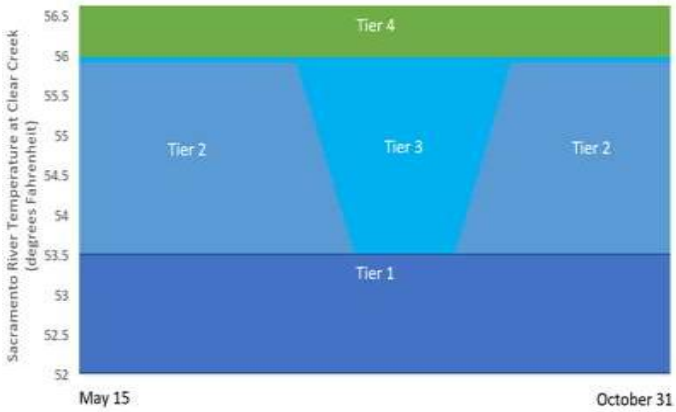
# Figures Depicting Shasta Uncertainties

**Proportion of monthly flows below Keswick, as either north-of-Delta deliveries to CVP Settlement Contractors, North-of-Delta deliveries to CVP Agricultural Service Contractors, or Non-Contract Keswick releases.**



# Figures Depicting Shasta Uncertainties

**Depiction of temperature target operations according to Reclamation's Tiered approach. From ROC LTO BA**




**Characterization of Tier 2 CCR daily average temperature backstop (green line) using historical data. Provided by NMFS SWFSC**

# Temperature-dependent egg mortality by Tier

# Significant Shasta Effects to Individuals: Winter-run

| Action Component | Stressor/Factor | Life Stage (Location) | Life Stage Timing (Work Window Intersection) | Individual Response and Rationale of Effect | Severity of Stressor | Proportion of Population Exposed | Frequency of Exposure | Magnitude of Effect | Weight of Evidence |
|---|---|---|---|---|---|---|---|---|---|
| Tiers 1-4: Shasta Cold Water Pool Management | Water Temperature | Eggs/Fry (Keswick Dam - CCR gauge) | May - October (May 15 - October) | Temperatures > 53.5°F decrease egg survival | Lethal | 1: Medium (23.3% of days)<br>2: Medium (33.1% of days)<br>3: Medium (65% of days)<br>4: Large (86% of days) | 1: Medium (68% of years)<br>2: Low (17% of years)<br>3: Low (7% of years)<br>4: Low (7% of years) | High | High: Supported by multiple scientific and technical publications that include quantitative models specific to the region and species. |
| Fall and Winter Refill and Redd Maintenance | To build storage for the subsequent year class | Juveniles (Upper Sacramento River) | July - December (October, November) | Decreased month-to-month flows cause stranding and decreased floodplain inundation, side-channel habitat. | Lethal | Medium (<50% of the population) | Low (20% of years) | High | Medium |
| Operation of a Shasta Dam Raise | NA | NA | NA | None. Reinitiation triggers apply | NA | NA | NA | NA | NA |