**Telemetry Study Summary Framework**

**March 1, 2021**

<table>
<tr><td colspan="2">Point of Contact:<br>Name: Jeremy Notch E-mail: jeremy.notch@noaa.gov Phone: (831) 420-3990</td></tr>
<tr><td colspan="2">Study objective:<br>Survival and movement rates of natural origin Chinook salmon smolts from Butte Creek/Sutter Bypass</td></tr>
<tr><td>Study Timing:<br>• Study Duration: 5 years<br>• Release Dates (range): 4/5 – 4/9/2021, 4/19 – 4/23/2021</td><td>Study site(s):<br>Collection site(s): TBD – either PPDD, Butte Sink, or Weir 2, depending on fish availability<br><br>Release location(s): TBD – either PPDD, Butte Sink, or Weir 2, depending on fish availability</td></tr>
<tr><td colspan="2">Fish</td></tr>
<tr><td>• Species-race: spring and fall-run Chinook salmon<br>• Life stage: smolt<br>• Source: wild</td><td>Size (median & range):<br>• Weight 8.3 grams (6-14.6g)<br>• Length: 91.8mm (85-110mm)</td></tr>
<tr><td>Transmitter Information<br>• Type/model: ATS SS400 single battery<br>• Weight (gm): .23<br>• PRI/life of tag: 5 sec PRI</td><td>Implant procedure<br>• Surgical placement of acoustic tag in peritoneal cavity of juvenile salmon. Incision closed using two sutures.</td></tr>
<tr><td colspan="2">Telemetry Receivers:<br>• Receivers Maintained: 12 ATS receivers and 8 Lotek receivers deployed throughout the Butte Sink and Sutter Bypass. Additional receivers deployed in Sacramento River/Delta/SF Bay by USGS and UCSC. Routing through Butte Slough and into the Sacramento River will be covered by additional receivers<br>• Receiver Deployment: Deployed in Sutter Bypass once tagging begins and remain in place for 30+ days after last fish is tagged<br>• Coordination with other studies/receivers needed? (Y): Coordinate receiver deployment with CDFW, tagging spring-run smolts upstream in Butte Creek near Chico<br>Frequency of data download required: Coordinated Acoustic Telemetry receivers.</td></tr>
<tr><td colspan="2">Survival estimate (per species or objective)<br>• Type (project, etc.): NOAA-UCSC IA<br>• Value & SE: .30 (+/-10%)<br>• Sample size/replicate: 200<br>• # replicates: 10<br>• Analytical model: Mark-recapture model. The analysis will be completed by NMFS at the end of the year and USGS (web model) in real time.</td></tr>
<tr><td colspan="2">Hypothesis test and results (if applicable)<br>• $H_o$: NA<br>• $H_a$: NA</td></tr>
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- Conclusion: Observational. Potentially useful in near term synthesis project.

**Characteristics of estimate**

- Effects reflected (direct, total, etc): Evaluate survival in the Sutter Bypass, Sacramento River, Delta and San Francisco Bay across multiple years. Associate movement and survival rates with flow and water temperature in each region to evaluate their influence on smolt survival. Evaluate RT distribution through river, Delta, and presence/absence in South Delta
- Absolute or relative: absolute survival, relative distribution

**Environmental/operating conditions** (if applicable)

- Relevant discharge indices: WIIN Storm Event
- Temperature: <20
- TDG: N/A
- Treatment(s): Flow, turbidity, temperature

**Unique study characteristics:**

The exceptional size of smolts and large number captured by rotary screw trap at Weir 2 in the Sutter Bypass makes this study ideal for acoustic tagging purposes. The average smolt size is large enough that concerns for acoustic tag shedding are low, and the high numbers of fish captured allows for large sample sizes to be tagged and released daily.

Additional collection sites upstream of Weir 2 include the Butte Sink (Sandborn Slough complex) and PPDD Diversion Dam in Chico. These sites are upstream of Butte Slough outfall gates and the east/west split into the Sutter Bypass. Collection of fish at these locations will inform managers of routing and survival at these areas of interest, as well as comparison of survival/residence times in Butte Sink vs the Sutter Bypass. If fish are available at these locations and are of taggable size, these locations will take priority over Weir 2.