

**EATSM Release Summary Form****Date: May-1-2019**

<b>Study objective(s):</b> Survival and movement rates of natural origin steelhead ( <i>O. mykiss</i> ) smolts from Mill Creek (Tehama County)	
<b>Study Timing:</b> <ul style="list-style-type: none"><li>• Study Duration: 3 years</li><li>• Release Dates: 5/5-6/15; 10/1-12/15</li></ul>	<b>Study site(s):</b> <ul style="list-style-type: none"><li>• Collection site: Mill Creek 39.5950.75N, 121.5803.38 W</li><li>• Release location: at screw trap</li></ul>
<b>Fish</b>	
<ul style="list-style-type: none"><li>• Species-race: Central Valley steelhead</li><li>• Life stage: smolt</li><li>• Source: wild</li></ul>	Size (median & range): <ul style="list-style-type: none"><li>• Average Weight: 69.5 g.</li><li>• Average Length: 182 mm</li></ul>
<b>Transmitter Information</b> <ul style="list-style-type: none"><li>• Type/model: ATS SS300/SS400</li><li>• Weight (gm): .30</li><li>• PRI/life of tag: 5 sec PRI</li></ul>	<b>Implant procedure</b> <ul style="list-style-type: none"><li>• Surgical placement of acoustic tag in peritoneal cavity of juvenile salmon. Incision closed using two sutures.</li></ul>
<b>Telemetry Receivers:</b> <ul style="list-style-type: none"><li>• Receivers Maintained: 2 Technologic receivers in Deer Creek maintained by CDFW. Additional receivers deployed in Sacramento River/Delta/SF Bay by USGS and UCSC</li><li>• Receiver Deployment: Deployed in Mill once tagging begins (fall and spring periods) and remain in place for 30+ days after last fish is tagged</li><li>• Coordination with other studies/receivers needed? Yes. Coordination with deployment of receivers in Sacramento River/Delta/Bay</li><li>• Frequency of data download required: 2X year for Mill Creek receivers</li></ul>	
<b>Survival estimate</b> (per species or objective) <ul style="list-style-type: none"><li>• Type (project, etc.): NOAA-UCSC 1A</li><li>• Value &amp; SE: .30 (+/-10%)</li><li>• Sample size/replicate: up to 100 fish in fall and spring tagging period</li><li>• # replicates: NA Fish tagged as available based on RST captures</li><li>• Analytical model: River and STAR models. These models analyses will be completed by NMFS at the end of the year</li></ul>	
<b>Hypothesis test and results</b> (if applicable) <ul style="list-style-type: none"><li>• H<sub>0</sub>: NA</li><li>• H<sub>a</sub>: NA</li><li>• Conclusion: Observational</li></ul>	
<b>Characteristics of estimate</b>	

- Effects reflected (direct, total, etc.): Evaluate survival in Mill Creek, the 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.
- Absolute or relative: Absolute survival

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

- Relevant discharge indices: Mill Creek flow 1,500 cfs or less
- Temperature: <22
- TDG: NA
- Treatment(s): Flow, turbidity, temperature

**Unique study characteristics:** The high numbers of steelhead smolts captured by rotary screw trap in lower Mill Creek (Tehama County) 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 seasonally (fall period and spring period). This study is unique in that it gives managers a snapshot into survival and movement rates of natural-origin Central Valley steelhead smolts.