



ETD for Chinook Salmon

Objective:

Examine the accuracy of the ETD wand method for detecting CWTs in Chinook salmon at fishery landing sites and spawning grounds

Methods (attempted blind sample designs)

Gillnet Fishery: heads on, fishery observers, all snouts to head lab, April – Oct. 2003 and 2004

Troll fishery: heads on and off, CWT Mark Recovery Program staff, only when DFO staff attended a sampling event to screen un-sampled fish for missed CWTs using a tube detector, only sampled snouts to head lab, 2006

Spawning Grounds (Chilliwack River Indicator Stock): heads on, DFO staff, all snouts to head lab, adults and jacks, 2004, 2005, 2009



Gillnet Test Fishery (2003)

| | 'Beep' | 'No Beep' | Total |
|----------------------------------|-----------|--------------|-------|
| Marked (AFC): 24% of CWTs missed | | | |
| Tagged | <u>25</u> | 8 | 33 |
| Not Tagged | 9 | <u>2</u> | 11 |
| Total | 34 | 10 | 44 |
| Unmarked: 55% of CWTs missed | | | |
| Tagged | <u>9</u> | 11 | 20 |
| Not Tagged | 5 | <u>3,594</u> | 3,599 |
| Total | 14 | 3,605 | 3,619 |



Gillnet Test Fishery (2004)

| | 'Beep' | 'No Beep' | Total |
|--|-----------|--------------|-------|
| Marked (AFC): 0% of CWTs missed | | | |
| Tagged | <u>29</u> | 0 | 29 |
| Not Tagged | 5 | <u>2</u> | 7 |
| Total | 34 | 2 | 36 |
| Unmarked: 76% of CWTs missed | | | |
| Tagged | <u>8</u> | 25 | 33 |
| Not Tagged | 5 | <u>2,697</u> | 2,702 |
| Total | 13 | 2,722 | 2,735 |



Troll Fishery – Head Attached (2006)

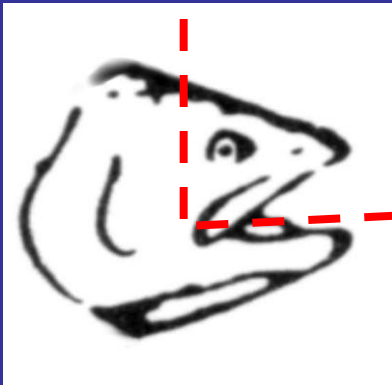
| | 'Beep' | 'No Beep' | Total |
|--|------------|--------------|-------|
| Marked (AFC): 9% of CWTs missed | | | |
| Tagged | <u>139</u> | 14 | 153 |
| Not Tagged | 8 | <u>48</u> | 56 |
| Total | 147 | 62 | 209 |
| Unmarked: 19% of CWTs missed | | | |
| Tagged | <u>35</u> | 8 | 43 |
| Not Tagged | 13 | <u>5,685</u> | 5,698 |
| Total | 48 | 5,693 | 5,741 |



Troll Fishery – Head Off (2006)

| | 'Beep' | 'No Beep' | Total |
|--|------------|--------------|-------|
| Unknown Adipose Fin Status (2% of CWTs missed) | | | |
| Tagged | <u>235</u> | 4 | 239 |
| Not Tagged | 11 | <u>7,406</u> | 7,417 |
| Total | 246 | 7,410 | 7,656 |

- Snouts were removed from bodies by trollers at sea





Spawning Grounds – Head Attached (AFC only)

| | 'Beep' | 'No Beep' | Total |
|--------------------------|------------|-----------|-------|
| 2004: 15% of CWTs missed | | | |
| Tagged | <u>303</u> | 52 | 355 |
| Not Tagged | 14 | <u>7</u> | 21 |
| Total | 317 | 59 | 376 |
| 2005: <1% of CWTs missed | | | |
| Tagged | <u>235</u> | 1 | 236 |
| Not Tagged | 6 | <u>8</u> | 14 |
| Total | 241 | 9 | 250 |



Spawning Grounds – Adult Head Attached (2009)

| | ‘Beep’ | ‘No Beep’ | Total |
|--|------------------|-------------------|--------------|
| Marked (AFC): 3% of CWTs missed | | | |
| Tagged | <u>32</u> | 1 | 33 |
| Not Tagged | 2 | <u>4</u> | 6 |
| Total | 34 | 5 | 39 |
| Unmarked: 29% of CWTs missed | | | |
| Tagged | <u>30</u> | 12 | 42 |
| Not Tagged | 50 | <u>704</u> | 759 |
| Total | 80 | 716 | 791 |



Spawning Grounds – Jack (FL<50 cm) Head Attached (2009)

| | ‘Beep’ | ‘No Beep’ | Total |
|--|------------------|-------------------|--------------|
| Marked (AFC): 0% of CWTs missed | | | |
| Tagged | <u>21</u> | 0 | 21 |
| Not Tagged | 0 | <u>2</u> | 2 |
| Total | 21 | 2 | 23 |
| Unmarked: 14% of CWTs missed | | | |
| Tagged | <u>24</u> | 4 | 28 |
| Not Tagged | 8 | <u>253</u> | 261 |
| Total | 32 | 257 | 289 |



ETD for Chinook salmon – Conclusions/Implications

- Head Attached
 - Marked (AFC): 0-24% of CWTs not detected (0, <1, 3, 9, 15, 24%)
 - Unmarked: 14-76% of CWTs not detected (14, 19, 29, 55, 76%)
- Head/snout Removed
 - 2% of CWTs not detected
- Rates varied for marked and unmarked fish
 - Samplers appear more diligent with AFC fish (higher false positive and lower false negative)
 - Higher rates of missed tags for unmarked fish – confounds MSF analysis because unmarked CWT fish underestimated and MSF benefits underestimated



ETD for Chinook salmon – Conclusions/Implications

- Rates appear too variable for an average bias correction factor
 - May vary by sampler, fish size, equipment performance, sampling environment, training, tag rate, position of tag within the fish
- DFO is reducing dependency on wand method to detect CWTs
 - increases sampling program costs or results in lower sampling rates