

Klamath River Fall Chinook Age-Specific Escapement, 2003 Run

Klamath River Technical Advisory Team
1 March 2004

Executive Summary

The number of Klamath River fall chinook returning to the Klamath River Basin in 2003 was estimated to be

| <i>Age</i> | <i>Run Size</i> | |
|--------------|-----------------|-------------------|
| | <i>Number</i> | <i>Proportion</i> |
| 2 | 3,845 | 0.02 |
| 3 | 94,147 | 0.48 |
| 4 | 96,559 | 0.49 |
| 5 | 862 | 0.01 |
| Total | 195,413 | |

Klamath Ocean Harvest Model preseason forecasts of fall chinook to the Klamath River Basin and their postseason estimates are:

| <i>Sector</i> | <i>Adults</i> | |
|--------------------------|---------------------------|----------------------------|
| | <i>Preseason Forecast</i> | <i>Postseason Estimate</i> |
| <i>Run Size</i> | 113,200 | 191,568 |
| <i>Fishery Mortality</i> | | |
| Tribal Harvest | 41,400 | 29,897 |
| Recreational Harvest | 10,800 | 9,701 |
| Dropoff Mortality | 3,800 | 2,798 |
| <i>Escapement</i> | | |
| Hatchery Spawners | 22,200 | 61,775 |
| Natural Area Spawners | 35,000 | 87,397 |

Age-specific returns to Basin hatcheries, spawning grounds, in-Basin harvest by tribal and recreational fisheries, and the dropoff (non-catch) mortality associated with these fisheries are presented in Table 1.

Introduction

This report describes the data and methods used by the Klamath River Technical Advisory Team (KRTAT) to estimate age-specific numbers of fall chinook returning to the Basin in 2003. The estimates provided in this report are compatible and consistent with the so-called Klamath River Megatable (CDFG 2004) and with the 2004 forecast of ocean stock abundance (KRTAT 2004).

Age-specific escapement estimates for 2003 and previous years, coupled with the coded-wire tag recovery data on the Basin's hatchery stocks, allow for a cohort reconstruction of the hatchery and natural components of Klamath River fall chinook (KRTAT 2004, Goldwasser et al. 2001). Cohort reconstruction results enable forecasts to be developed of the upcoming year's ocean stock abundance, percent of spawners expected in natural areas and ocean fishery contact rates, as described in a companion report (KRTAT 2004). These forecasts are essential inputs to the Klamath Ocean Harvest Model (Mohr et al. 2001); the model used by the Pacific Fishery Management Council to forecast the effect of fisheries on the Klamath River fall chinook stock.

Methods

The basic approach used by the KRTAT to develop age-specific estimates of returning fall chinook to the Basin's hatcheries, spawning grounds, and fisheries, was to develop an age-composition estimate for each sector and then apply this composition to the corresponding sector total (age-unspecific) reported in the Klamath River Megatable. Random sampling methods of various types were used throughout the Basin (Table 2) to obtain the data from which the Megatable totals and the age-composition estimates were derived.

Where possible, an age-composition estimate was based on the reading of a random sample of scales (Table 3). For Trinity River ageing, each scale was read independently by two readers, and a third reader was used to resolve any disagreement between the two primary readers. For Klamath River ageing, each scale was read independently by two readers, and any disagreement was resolved by the two readers re-reading the scale together and agreeing upon a single age. Statistical methods (Kimura and Chikuni 1987, Cook and Lord 1978, Cook 1983) were then used to correct for the possibility of reader ageing-bias, by correlating known-age cwt scales with their corresponding scale-read age assignments.

In some cases, however, the scale sample was either known or thought to be non-random with respect to the age-2 ("jack") component. In these cases, the so-called length "cutoff" method (all fish less than a certain length are assumed to be jacks, and all fish greater than that length are assumed to be adults) was used to estimate the jack component percentage based on a random sample of length frequencies. The length "cutoff" value varied by sector and was based on the location of the sample length frequency nadir, and if appropriate, known-age (cwt) length frequencies. Scale reading was used to estimate the adult age-composition in these instances.

In still other cases, the scale sample size was insufficient to develop a reliable age-composition estimate, or was altogether lacking. In these cases the KRTAT used "surrogate" age-composition estimates from other sectors where such estimates were available, and were thought most likely to reflect the age-composition of the sector of interest.

For Trinity River natural area spawners, an indirect method was used as follows. Age-specific numbers of fall chinook passing the Willow Creek Weir (WCW) were estimated by applying the WCW scale age-composition to the above WCW total run size estimate. Next, the age-composition of Trinity River Hatchery (TRH) returns, and angler harvest between WCW and TRH, were determined based on scale-age assessments and any known-age cwt fish collected at these recovery points. Natural area spawner age-composition was then taken as the difference between the WCW run-size at age and the sum of TRH returns and the angler harvest above WCW.

For the Trinity River natural area spawners below WCW, total escapement was determined through redd surveys conducted in the main-stem and tributary streams (Table 2). Age-structure was assigned from scale collections obtained in these areas.

Results

The specific protocols used to develop age-composition estimates in each sector are provided in Table 4, and a summary of the KRTAT surrounding discussion is given in Appendices A and B for the Klamath and Trinity Rivers, respectively.

A total of 22,447 scales from 16 different sectors were provided for this analysis (Table 3), and of these 1,895 and 2,470 were scales collected from cwt fish from the Klamath and Trinity Rivers, respectively. The scale read-age results for these cwt fish provides a direct check on the accuracy of the scale read-age assignments, and allowed estimation of the known-age, read-age "validation" matrix used in the statistical bias-correction methods (Tables 5a, 5b). Overall, the scale readings were quite accurate and precise, particularly in the case of the Trinity River (>96% accuracy, ages 2,3,4). There were no cwts for validation of read-age-5 scales. For the Klamath River, the

accuracy indicated from comparing scale read-ages to known-ages (cwt fish) was greater than 87%. The statistical bias-correction methods employed are intended to correct for scale-reading bias, but the methods assume that the known-age, read-age validation matrices are themselves well-estimated (Kimura and Chikuni 1987).

The resulting sector-specific age-composition is given in Table 6, and summarized in Table 1. Calculations underlying the results for the Klamath and Trinity Rivers are presented in Appendices C and D, respectively.

Literature Cited

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Acknowledgements

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List of Participants Age-Composition Meeting, Arcata, CA 28-30 January 2004

California Department of Fish and Game
Allen Grover – Ocean Salmon Project
Melodie Palmer-Zwahlen – Ocean Salmon Project
Jeannine Ritchie – Klamath River Project
Mark Hampton – Klamath River Project

Sara Borok – Klamath River Project
Wade Sinnen – Trinity River Project
Carl Reese – Trinity River Project

Hoopa Valley Tribe
George Kautsky
Eric Logan
Kirsten Williams

KMZ Ocean Recreational Fishery
Jerry Barnes

National Marine Fisheries Service
Michael Mohr – Southwest Fisheries Science Center

River Recreational Fishery
Jim Waldvogel

U.S. Fish and Wildlife Service
Joe Polos – Arcata Office
Isaac Sanders – Arcata Office

U.S. Forest Service
Anita Andazola

Yurok Tribe
Desma Williams

Table 1. Age composition of the 2003 Klamath River fall chinook run as determined by the Klamath River Technical Advisory Team.

| Escapement & Harvest | 2 | 3 | AGE 4 | 5 | Total Adults | Total Run |
|---|--------------|---------------|---------------|------------|-----------------|----------------|
| Hatchery Spawners | | | | | | |
| Iron Gate Hatchery (IGH) | 290 | 17,427 | 14,459 | 84 | 31,970 | 32,260 |
| Trinity River Hatchery (TRH) | 586 | 18,155 | 11,650 | 0 | 29,805 | 30,391 |
| Hatchery Spawner subtotal | 876 | 35,582 | 26,109 | 84 | 61,775 | 62,651 |
| Natural Spawners | | | | | | |
| Salmon River Basin | 73 | 1,245 | 2,039 | 17 | 3,302 | 3,375 |
| Scott River Basin | 65 | 4,399 | 7,559 | 30 | 11,988 | 12,053 |
| Shasta River Basin | 155 | 2,798 | 1,325 | 11 | 4,134 | 4,289 |
| Bogus Creek Basin | 183 | 8,258 | 6,760 | 0 | 15,018 | 15,201 |
| Klamath River main-stem (IGH to Shasta R) | 237 | 6580 | 7407 | 89 | 14,076 | 14,313 |
| Klamath River main-stem (Shasta R to Indian Cr) | 61 | 1704 | 1919 | 23 | 3,646 | 3,707 |
| Klamath River tributaries (above Reservation) | 38 | 831 | 924 | 6 | 1,761 | 1,799 |
| Klamath River tributaries (Yurok Reservation) | <u>31</u> | <u>413</u> | <u>676</u> | <u>6</u> | <u>1,094</u> | <u>1,125</u> |
| Klamath Basin subtotal | 843 | 26,228 | 28,609 | 182 | 55,019 | 55,862 |
| Trinity River main-stem (above WCW) | 1,030 | 19,226 | 11,621 | 226 | 31,074 | 32,104 |
| Trinity River main-stem (below WCW) | 26 | 119 | 127 | 13 | 258 | 284 |
| Trinity River tributaries (above Reservation) | 109 | 135 | 454 | 13 | 602 | 711 |
| Trinity River tributaries (Hoopa Reservation) | <u>80</u> | <u>100</u> | <u>335</u> | <u>10</u> | <u>444</u> | <u>524</u> |
| Trinity Basin subtotal | 1,245 | 19,580 | 12,537 | 262 | 32,378 | 33,623 |
| Natural Spawners subtotal | 2,088 | 45,808 | 41,146 | 444 | 87,397 | 89,485 |
| Total Spawner Escapement | 2,964 | 81,390 | 67,255 | 528 | 149,172 | 152,136 |
| Recreational Harvest | | | | | | |
| Klamath River (below Hwy 101 bridge) | 180 | 816 | 770 | 4 | 1,589 | 1,769 |
| Klamath River (Hwy 101 to Coon Cr. Falls) | 369 | 1,718 | 1,611 | 8 | 3,336 | 3,705 |
| Klamath River (Coon Cr. Falls to IGH) | 40 | 1,120 | 1,261 | 15 | 2,397 | 2,437 |
| Trinity River Basin (above WCW) | 175 | 1,116 | 754 | 0 | 1,870 | 2,045 |
| Trinity River Basin (below WCW) | 52 | 304 | 205 | 0 | 509 | 561 |
| Subtotals | 816 | 5,074 | 4,601 | 27 | 9,701 | 10,517 |
| Tribal Harvest | | | | | | |
| Klamath River (below Hwy 101) | 15 | 3,947 | 18,362 | 239 | 22,548 | 22,563 |
| Klamath River (Hwy 101 to Trinity mouth) | 17 | 1,636 | 2,897 | 44 | 4,578 | 4,595 |
| Trinity River (Hoopa Reservation) | 12 | 1,390 | 1,381 | 0 | 2,771 | 2,783 |
| Subtotals | 44 | 6,973 | 22,640 | 283 | 29,897 | 29,941 |
| Total Harvest | 860 | 12,047 | 27,241 | 310 | 39,598 | 40,458 |
| Totals | | | | | | |
| Harvest and Escapement | 3,824 | 93,437 | 94,496 | 838 | 188,770 | 192,594 |
| Recreational fishery dropoff mortality 2.04% | 17 | 104 | 94 | 0 | 198 | 215 |
| Tribal fishery dropoff mortality 8.7% | 4 | 606 | 1,969 | 25 | 2,600 | 2,604 |
| Total In-river Run | 3,845 | 94,147 | 96,559 | 862 | 191,568 | 195,413 |

Table 2. Documentation of the methods used to sample 2003 Klamath River fall chinook run.

| Sampling Location | Estimation Method | Agency |
|---|---|---------------|
| <u>Hatchery Spawners</u> | | |
| Iron Gate Hatchery (IGH) | Direct count. All fish examined for fin clips, tags, marks. Systematic random sample ~10% bio-sampled for FL, scales, sex and all ads bio-sampled. | CDFG |
| Trinity River Hatchery (TRH) | Direct count. All fish bio-sampled for FL, fin-clips, marks sex. Scales collected from all ad-clipped fish and ~10% of non-ads for first two days sampled and 20% of all fish for all remaining days sampled. | CDFG |
| <u>Natural Spawners</u> | | |
| Salmon River Basin | Mark-recapture carcass estimate. River is surveyed twice weekly. Bio-data (scales, FLs, marks) collected from all fresh carcasses. | CDFG,USFS |
| Scott River Basin | Mark-recapture carcass estimate. River is surveyed twice weekly. Bio-data (scales, FLs, marks) collected from all fresh carcasses. | CDFG |
| Shasta River Basin | Video count at lower river weir site. Bio-data (Scales, FLs, sex, marks) collected from carcasses upstream of site. | CDFG |
| Bogus Creek Basin | Video count above weir, direct carcass count below weir. Fish bio-sampled (scales, FLs, sex, fin-clips) in both areas; sampling fell below the 1:10 objective due to large number of carcasses. | CDFG |
| Klamath River main-stem (IGH to Shasta R) | Mark-recapture carcass estimate. River sections are surveyed once weekly. Bio data (scales, FLs' marks) collected from fresh carcasses. | USFWS |
| Klamath River main-stem (Shasta R to Indian Cr) | Redd count based on weekly surveys. Cumulative count based on flagging old redds. Adult estimate is redds times 2. | USFWS |
| Klamath River tributaries (above Reservation) | Periodic redd surveys. Prior weeks redds flagged, only new redds counted. Estimate is redds times 2 + live fish observed on last survey date. | USFS,CDFG |
| Klamath River tributaries (Yurok Reservation) | Only surveyed stream is Blue Creek. Jacks and adult count based on the peak weekly snorkle survey. Weekly dives performed Oct - Dec. | YT |
| Trinity River main-stem (above WCW) | Petersen mark-recapture run-size estimate. All fish at weir bio-sampled for FL, marks, fin-clips. Scale samples taken randomly from every other fish bio-sampled. | CDFG |
| Trinity River main-stem (below WCW) | Adult escapement estimate based on redd count times 2. Several surveys performed. Count is additive for survey period. | HVT |
| Trinity River tributaries (above Reservation) | Only 1 trib, Horse Linto Cr., situated between HVR and WCW location in 2003. Adult estimate based on weekly redd counts times 2. Previous weeks redds flagged to avoid double counting. | USFS |
| Trinity River tributaries (Hoopa Reservation) | Adult estimate based on redd surveys. Survey redd totals are cumulative. Final adult estimate is redds times 2. | HVT |
| <u>Recreational Harvest</u> | | |
| Klamath River (below Hwy 101 bridge) | Estimate is based on a stratified access point creel survey. Bio-data (scales, FLs, marks, fin-clips) collected during angler interviews. | CDFG |
| Klamath River (Hwy 101 to Coon Cr. Falls) | Estimate is based on a stratified access point creel survey. Bio-data (scales, FLs, marks, fin-clips) collected during angler interviews. | CDFG |
| Klamath River (Coon Cr. Falls to IGH) | No creel census in '03. Adults estimated by a ratio of average upper to lower (Coon Ck. To Estuary) creel results from 1999-2002. Jacks estimated from the jack proportion for the Klamath main-stem (IGH to Shasta). | CDFG |
| Trinity River Basin (above WCW) | Estimate is based on the return of reward tags placed on fish at weir. Return rate is applied to run-size estimate to estimate harvest. | CDFG |
| Trinity River Basin (below WCW) | Estimate based on a stratified roving/access creel survey. Bio-data (scales, FLs, marks, fin clips) collected during angler interviews. | HVT |
| <u>Tribal Harvest</u> | | |
| Klamath River (below Hwy 101) | Stratified effort/catch surveys. Bio-data (FLs, scales, fin-clips) collected during net harvest interviews. | YT |
| Klamath River (Hwy 101 to Trinity mouth) | Stratified effort/catch surveys. Bio-data (FLs, scales, fin-clips) collected during net harvest interviews. | YT |
| Trinity River (Hoopa Reservation) | Two-stage stratified effort/catch surveys. Bio-data (FLs, scales, fin-clips) collected during net harvest interviews. | HVT |
| <u>Fishery Dropoff Mortality</u> | | |
| Recreational angling dropoff mortality 2.04% | Not directly estimated. Assumed rate relative to fishery impacts = .02; relative to fishery harvest = .02/(1-.02). | KRTAT |
| Tribal net dropoff mortality 8.7% | Not directly estimated. Assumed rate relative to fishery impacts = .08; relative to fishery harvest = .08/(1-.08). | KRTAT |

Table 3. Scale sampling locations and numbers of scales used for the 2003 Klamath River Basin fall chinook age-composition.

| Sampling Location | Scales | | | Total | Agency |
|--------------------------------------|--------------------------------|------------------------------|------------------------|---------------|------------|
| | Unknown-age read ^{a/} | Known-age read ^{b/} | Not used ^{c/} | | |
| Hatchery Spawners | | | | | |
| Iron Gate Hatchery (IGH) | 1,541 | 1,342 | 1,607 | 4,490 | CDFG |
| Trinity River Hatchery (TRH) | 3,680 | 2,325 | 302 | 6,307 | HVT |
| Natural Spawners | | | | | |
| Salmon River carcass survey | 792 | 0 | 56 | 848 | CDFG, USFS |
| Scott River carcass survey | 1,209 | 0 | 55 | 1,264 | CDFG |
| Shasta River Weir and carcass | 380 | 0 | 51 | 431 | CDFG |
| Bogus Creek Weir | 283 | 43 | 31 | 357 | CDFG |
| Klamath River main-stem | 483 | 2 | 9 | 494 | USFWS |
| Upper Klamath River tributaries | 55 | 0 | 0 | 55 | CDFG, USFS |
| Willow Creek Weir | 515 | 55 | 21 | 591 | CDFG, HVT |
| Lower Trinity River carcass | 45 | 3 | 3 | 51 | HVT |
| Lower Trinity River tributaries | 54 | 0 | 2 | 56 | USFS |
| Recreational Harvest | | | | | |
| Upper Klamath River creel | 0 | 0 | 0 | 0 | CDFG |
| Lower Klamath River creel | 1,392 | 87 | 47 | 1,526 | CDFG |
| Upper Trinity River creel | 0 | 0 | 0 | 0 | CDFG |
| Lower Trinity River creel | 77 | 7 | 3 | 87 | HVT |
| Tribal Harvest | | | | | |
| Klamath River (below Hwy 101) | 3,340 | 353 | 200 | 3,893 | YT |
| Klamath River (Hwy 101 to Trinity R) | 1,212 | 68 | 69 | 1,349 | YT |
| Trinity River (Hoopa Reservation) | 560 | 80 | 8 | 648 | HVT |
| TOTAL | 15,618 | 4,365 | 2,464 | 22,447 | |

a/ Scales from non-ad-clipped fish, mounted and read.

b/ Scales from ad-clipped, cwt fish, mounted and read; not all Klamath scales used in scale validation matrix.

c/ Scales from non-ad-clipped fish, mounted and not read, or un-readable; scales from non-ad-clipped fish, not mounted; scales from ad-clipped fish with no cwt; scales from ad-clipped, cwt fish, mounted and not read.

Table 4. Documentation of the methods used by the KRTAT to determine the age-composition of the 2003 Klamath River fall chinook run.

| Sampling Location | Age Composition Method |
|---|---|
| <u>Hatchery Spawners</u> | |
| Iron Gate Hatchery (IGH) | Actual count; jack/adult structure from scale-age analysis. |
| Trinity River Hatchery (TRH) | Actual count; jack/adult structure from scale-age analysis, applied cwt age-distribution to the ad-clipped, non-cwt fish recovered. |
| <u>Natural Spawners</u> | |
| Salmon River Basin | Jack/adult structure from scale-age analysis. |
| Scott River Basin | Jack breakout <55 cm. Scales were used to apportion adult ages. |
| Shasta River Basin | Jack/adult structure from scale-age analysis. |
| Bogus Creek Basin | Jack/adult structure from scale-age analysis. |
| Klamath River main-stem (IGH to Shasta R) | USFW mark-recapture carcass survey; Schaefer estimate for total adults; jack/adult structure from scale analysis; total run = adults / (1-%jacks). |
| Klamath River main-stem (Shasta R to Indian Cr) | Used scale-age% from Klamath main stem (IGH to Shasta R) as surrogate to calculate jack and adult structure; adults = 2*redd counts; total run = adults/(1-%jacks). |
| Klamath River tributaries (above Reservation) | Adults = 2*redd counts+ live adults observed; jacks/adult structure based on unweighted average age-structure from the Shasta, Scott, and Salmon Rivers (surrogate). |
| Klamath River tributaries (Yurok Reservation) | Number of jacks and adults observed during Blue Creek dive surveys; Salmon River scale-age analysis used as surrogate for adult age structure. |
| Trinity River main-stem (above WCW) | Calculated from total Willow Creek Weir (age structure from scales) population minus TRH (age-structure from scales) minus recreational harvest (jacks from harvest rate used in CDFG Megatable(MT)); adults from |
| Trinity River main-stem (below WCW) | Age % from 51 scales collected in redd surveys for this area ; adults = 2*redd counts; total run = adults/(1-%jacks). |
| Trinity River tributaries (above Reservation) | Used scale data from 56 scales collected in Horse Linto, Willow Creek, and South Fork basins as surrogate to calculate jack and adult structure; adults = 2*redd counts; total run = adults/(1-%jacks). |
| Trinity River tributaries (Hoopa Reservation) | Used scale data from 56 scales collected in Horse Linto, Willow Creek, and South Fork basins as surrogate to calculate jack and adult structure; adults = 2*redd counts; total run = adults/(1-%jacks). |
| <u>Recreational Harvest</u> | |
| Klamath River (below Hwy 101 bridge) | Lower Klamath R. creel census, jack/adult structure from scale-age analysis |
| Klamath River (Hwy 101 to Coon Cr. Falls) | Lower Klamath R. creel census, jack/adult structure from scale-age analysis |
| Klamath River (Coon Cr. Falls to IGH) | Total adults as function of Lower Klamath creel, jack/adult structure from scale-age analysis of Upper Klamath Mainstem (IGH to Shasta) carcass survey. |
| Trinity River Basin (above WCW) | Jacks based on harvest rate; adult structure from scale-age analysis. |
| Trinity River Basin (below WCW) | Lower Trinity R. creel census; jack/adult structure from scale-age analysis. |
| <u>Tribal Harvest</u> | |
| Klamath River (below Hwy 101) | Total count; jack/adult structure from scale-age analysis. |
| Klamath River (Hwy 101 to Trinity mouth) | Total count; jack/adult structure from scale-age analysis. |
| Trinity River (Hoopa Reservation) | Total count; jack/adult structure from scale-age analysis. |

Table 5a. 2003 Klamath River scale validation matrices.

| <u>Number</u> | | Known Age | | | | |
|---------------|---|-----------|-----|-----|---|--------------|
| | | 2 | 3 | 4 | 5 | |
| Read Age | 2 | 7 | 0 | 0 | 0 | Total 539 |
| | 3 | 1 | 236 | 33 | 0 | |
| | 4 | 0 | 17 | 243 | 0 | |
| | 5 | 0 | 0 | 0 | 2 | |
| Total | | 8 | 253 | 276 | 2 | |

| <u>Percentage</u> | | Known Age | | | | |
|-------------------|---|-----------|------|------|------|--------------|
| | | 2 | 3 | 4 | 5 | |
| Read Age | 2 | 0.88 | 0.00 | 0.00 | 0.00 | Total 539 |
| | 3 | 0.13 | 0.93 | 0.12 | 0.00 | |
| | 4 | 0.00 | 0.07 | 0.88 | 0.00 | |
| | 5 | 0.00 | 0.00 | 0.00 | 1.00 | |
| Total | | 1.00 | 1.00 | 1.00 | 1.00 | |

Table 5b. 2003 Trinity River scale validation matrices.

| <u>Number</u> | | Known Age | | | | |
|---------------|---|-----------|------|-----|---|---------------|
| | | 2 | 3 | 4 | 5 | |
| Read Age | 2 | 29 | 3 | 0 | 0 | Total 2470 |
| | 3 | 1 | 1429 | 18 | 0 | |
| | 4 | 0 | 20 | 970 | 0 | |
| | 5 | 0 | 0 | 0 | 0 | |
| Total | | 30 | 1452 | 988 | 0 | |

| <u>Percentage</u> | | Known Age | | | | |
|-------------------|---|-----------|------|------|------|---------------|
| | | 2 | 3 | 4 | 5 | |
| Read Age | 2 | 0.97 | 0.00 | 0.00 | 0.00 | Total 2470 |
| | 3 | 0.03 | 0.98 | 0.02 | 0.00 | |
| | 4 | 0.00 | 0.01 | 0.98 | 0.00 | |
| | 5 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Total | | 1.00 | 1.00 | 1.00 | 0.00 | |

Appendix A. Klamath River – 2003 Details.

Iron Gate Hatchery

After the following discussion, the KRTAT decided to use scale-age-based determination of the jack proportion at IGH. A total of 2,883 scales were used of which 1,342 were from known-age cwt fish.

Desma Williams described a concern wherein the scale mounting process was potentially compromised by scale mounting error which could lead to an error with the validation matrix. The potential error was isolated to specific mounters and by excluding the scales taken from known-age cwt fish mounted by these staff, she preserved 539 of 2,065 validation scales. The KRTAT concluded that at the cost of reduced sample size this process resulted in an un-biased validation matrix and provided a basis for correction of reader bias.

Bogus Creek

The KRTAT determined that scale samples used from Bogus Creek were representative of the true age structure. There were a total of 326 scales used of which 43 were from known-age cwt fish. Scale-age proportions were used to apportion the total Bogus Creek run estimate into all ages.

Shasta River

The KRTAT determined that scale samples collected in Shasta River were representative of the run estimate. There were a total of 379 scales used of which none were from known-age cwt fish.

Scott River

Only 1,209 scales were examined of which none were from known-age cwt fish. The Team concluded that the scale sample was not sufficient to adequately represent jacks which appeared to be in very low number this year. Accordingly, length frequency analysis of over 5,000 measured fish suggested 55 cm and less would be an appropriate length separation for jacks. Accordingly, the jack proportion (0.00539) was estimated by the length frequency “cut-off” method. The adult age structure was estimated using the scale-age data.

Salmon River

The KRTAT determined that scale-based age proportions were representative of the 2003 Salmon River run. A total of 792 scales were examined with none from known-age cwt fish.

Klamath River miscellaneous tributaries

Due to insufficient collection of scales, these tributaries were to be proportioned by age according to the un-weighted average proportions resulting from analysis of the Salmon, Scott, and Shasta Rivers.

Klamath River main-stem

For IGH to Shasta River section, 485 scales were used which resulted in a jack proportion of 0.017. Isaac Sanders had reported an adult total of 14,076 and a jack estimate of 292 (0.02) using the Schaeffer and Petersen mark-recapture methods respectively. Mr. Sanders expressed concern with his estimated total jacks using the Petersen method due to low marking rates. The Team concluded to apply the jack proportion based on scale ageing given the large sample size and its representational nature relative to the total estimate.

Accordingly, the total adult estimate was divided by one minus the proportion of jacks estimated by scale analysis. Next the adult total was apportioned by age using the scale-age data. A similar approach for age composition was applied to the main-stem area between Shasta River and Indian Creek total spawners which were estimated by redd counts multiplied by two.

Lower Klamath River creeks

For both sub-areas (above/below Coon Creek Falls) scale-age proportions were used to apportion all ages for the estimated harvest totals. A total of 1,496 scales were examined of which 87 were taken from known-age cwt fish.

Upper Klamath River creel

In 2003, this area was not directly sampled as was done for the previous four years (1999 through 2002). Instead, the total harvest was estimated for adults by comparing the ratio of average of upper to lower creel results from 1999-2002. Second, the jack proportion of the estimated total harvest was approximated by using that seen in the upper Klamath main-stem spawner survey data (IGH to Shasta River). These main-stem spawner scale data were also used to apportion adult age classes in this unmonitored fishery. Using the upper Klamath main-stem age structure was justified in at least two ways; first, past years' data indicate that the catch in this fishery occurs primarily in the above Shasta to IGH area, and second, the previous year's data, in which direct monitoring of the fishery occurred, resulted in very similar jack proportions in this fishery when compared to the spawner survey data above Shasta River

Yurok Tribal fishery – estuary

The estuary fishery scale sample yielded a jack proportion of 0.00068. This result came from the examination 3,693 scales of which 353 were from known-age cwt fish. The KRTAT agreed that scale-age proportions should be applied to the total estimated harvest for this fishery.

Yurok Tribal fishery – Hwy 101 bridge to Weitchpec

Yurok harvest in the mid and upper-Klamath area was segregated into jacks and adults based upon scale ageing. A total of 1,280 scales were examined of which 68 came from known-age cwt fish.

Blue Creek

Snorkel surveys were used to produce total escapement estimate. Visual counts revealed 31 jacks and 1,094 adults. Adult age composition was approximated using the age structure of Salmon River as a surrogate.

Appendix B. Trinity River – 2003 Details.

Trinity River Hatchery

Sampling for scales was conducted in a systematic random manner. On the first two days of sampling the selection was for every tenth fish and every ad-clipped fish. However, for the balance of the sampling, a systematic random sample in which every fifth fish was selected for a sample. A total of 6,005 scales were aged of which 2,325 scales came from cwt fish both randomly and non-randomly selected. This was the largest validation component for the entire Trinity River ageing project. Jacks were identified by scales, as were the age proportions for adult classes.

Upper Trinity River creel

There were no scales recovered from this fishery as no creel census was implemented in 2003. Total harvest was estimated as 2,045 fish using the mark-recapture method for reward tag returns of WCW marked fish. KRTAT decided that the best method to apportion ages to this total was to first utilize specific cwt information on age as summarized by Wade Sinnen. The approach depends upon the recovery of reward/non-reward program tags applied at the Willow Creek Weir (WCW) and subsequently recovered by the program. In his analysis, a cwt "run-size" allocates proportions of tag codes observed at the TRH recovery area to natural spawning areas below TRH to WCW and the recreational fishery in this zone. In 2003, Wade Sinnen estimated a total of 413 of the 2,045 fish in the harvest estimate to be of specific tag codes. These codes explained the age structure for this subset of harvest. The balance, 1,632 fish, were apportioned by age (2, 3, 4, and 5 year old) using the corrected scale-age proportions from the lower Trinity creel census.

The Team recommended that, assuming funds allow, CDFG should consider re-establishing a creel census to enhance the bio-sampling of this fishery in future years.

Lower Trinity River creel

A total of 84 scales were aged of which 7 were from known-age cwt fish. Team concluded that sufficient scale samples were drawn to enable direct ageing by scales for all ages.

Upper Trinity River natural escapement

The methods used for ageing the Trinity River run above WCW are similar to those used in the estimation of the population, apportioned to three general recovery areas; Trinity River Hatchery, Trinity upper-basin natural spawning escapement, and recreational harvest. At WCW a systematic random sampling (every other fish) of all fish examined produces a collection of scales for program marked fish, some of which are ad-clipped (Trinity River Hatchery origin). Validation of WCW read scales is accomplished with known-aged cwt fish later recovered at either TRH, recreational creel, or spawning grounds which are also referenced to WCW by a unique "program tag" (spaghetti tag applied at WCW with unique identifying number). A total of 570 scales were collected at WCW. Of these, 55 cwt records were subsequently recovered and used in the scale-age validation matrix.

An age-structure for fish passing above WCW is estimated using these scales and a few known-age cwt fish found in upper river areas. Next, specific age structures are estimated for fish returning to TRH and the recreational fishery. These proportions are applied to the total hatchery escapement and estimated fishery harvest respectively providing totals by age within area. These totals are next deducted from the WCW run apportioned by age leaving an age-structure for the natural escapement in the Trinity River natural spawning grounds.

Lower Trinity River natural escapement

The lower Trinity natural estimation area included total spawners estimated in both main-stem and tributary sub-areas. These surveys also collected a total 48 and 54 scales from carcasses for the mainstem and tributary sub-areas respectively. Three of the 48 scales sampled in the mainstem were also associated with the recovery of cwt's. The Team concluded that scale collections were adequate to provide age distributions for both sub-areas for all ages. Age structures based on the scale-ages generated for each sub-area.

Hoopa Valley Tribal fishery

A total of 640 scales were aged of which 80 were from known-age cwt fish. Total harvest was apportioned by age using the scale-age proportions for ages 2-5.

Appendix C. 2003 Klamath River scale-age analysis.

Unknown scales age-composition as read

| | AGE 2 | AGE 3 | AGE 4 | AGE 5 | TOTAL | |
|----------|-------|-------|-------|-------|-------|---------------------------|
| BOGUS | 3 | 159 | 121 | 0 | 283 | |
| LRC | 125 | 682 | 582 | 3 | 1392 | |
| IGH | 12 | 868 | 657 | 4 | 1541 | |
| SALMON | 15 | 332 | 441 | 4 | 792 | |
| SCOTT | 0 | 505 | 701 | 3 | 1209 | |
| SHASTA | 12 | 247 | 120 | 1 | 380 | |
| YTFP EST | 2 | 855 | 2447 | 36 | 3340 | |
| YTFP M&U | 4 | 492 | 704 | 12 | 1212 | |
| MAINSTEM | 7 | 238 | 235 | 3 | 483 | |
| UR TRIBS | 0 | 28 | 25 | 2 | 55 | |
| | 180 | 4406 | 6033 | 68 | 10687 | Total unknown scales read |

Unknown scales corrected age proportions (Kimura method)

| | | AGE 2 | AGE 3 | AGE 4 | AGE 5 | TOTAL |
|----------|---|---------|---------|---------|---------|---------|
| BOGUS | p | 0.01212 | 0.54376 | 0.44413 | 0.00000 | 1.00000 |
| LRC | p | 0.10263 | 0.45506 | 0.44015 | 0.00216 | 1.00000 |
| IGH | p | 0.00890 | 0.54592 | 0.44258 | 0.00260 | 1.00000 |
| SALMON | p | 0.02165 | 0.36903 | 0.60427 | 0.00505 | 1.00000 |
| SCOTT | p | 0.00000 | 0.36697 | 0.63055 | 0.00248 | 1.00000 |
| SHASTA | p | 0.03609 | 0.65239 | 0.30888 | 0.00263 | 1.00000 |
| YTFP EST | p | 0.00068 | 0.16933 | 0.81921 | 0.01078 | 1.00000 |
| YTFP M&U | p | 0.00377 | 0.35357 | 0.63276 | 0.00990 | 1.00000 |
| MAINSTEM | p | 0.01656 | 0.45969 | 0.51753 | 0.00621 | 1.00000 |
| UR TRIBS | p | 0.00000 | 0.48433 | 0.47931 | 0.03636 | 1.00000 |

Known CWT ages

| | AGE 2 | AGE 3 | AGE 4 | AGE 5 | TOTAL | UNKNOWN |
|-----------|-------|-------|-------|-------|-------|---------|
| BOGUS | 0 | 27 | 32 | 0 | 59 | 26 |
| LRC | 7 | 128 | 58 | 0 | 193 | 10 |
| IGH | 15 | 585 | 770 | 4 | 1374 | 162 |
| SALMON | 0 | 0 | 0 | 0 | 0 | 0 |
| SCOTT | 0 | 0 | 0 | 0 | 0 | 0 |
| SHASTA | 0 | 0 | 0 | 0 | 0 | 0 |
| YTFP EST | 0 | 196 | 263 | 1 | 460 | 32 |
| YTFP M&U | 0 | 42 | 48 | 0 | 90 | 14 |
| MAINSTEM | 0 | 1 | 3 | 0 | 4 | 1 |
| UR TRIBS | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | 2180 | 245 |
| LRC - lo | 4 | 36 | 17 | 0 | 57 | 3 |
| LRC - mid | 3 | 92 | 41 | 0 | 136 | 7 |
| YTFP MID | 0 | 3 | 3 | 0 | 6 | 0 |
| YTFP UP | 0 | 39 | 45 | 0 | 84 | 14 |

Validation Matrix

| | | Known Age | | | | |
|----------|---|-----------|-----|-----|---|-----|
| | | 2 | 3 | 4 | 5 | |
| Read Age | 2 | 7 | 0 | 0 | 0 | |
| | 3 | 1 | 236 | 33 | 0 | |
| | 4 | 0 | 17 | 243 | 0 | |
| | 5 | 0 | 0 | 0 | 2 | |
| Total | | 8 | 253 | 276 | 2 | 539 |

Percentages from validation matrix

| | | Known Age | | | |
|----------|---|-----------|------|------|------|
| | | 2 | 3 | 4 | 5 |
| Read Age | 2 | 0.88 | 0.00 | 0.00 | 0.00 |
| | 3 | 0.13 | 0.93 | 0.12 | 0.00 |
| | 4 | 0.00 | 0.07 | 0.88 | 0.00 |
| | 5 | 0.00 | 0.00 | 0.00 | 1.00 |
| Total | | 1.00 | 1.00 | 1.00 | 1.00 |

Appendix D. 2003 Trinity River scale-age analysis.

| WCW 03 = Willow Ck. Weir <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>17</td><td>0</td><td>1</td><td>3</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>16</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>308</td><td>0</td><td>30</td><td>1</td><td>339</td></tr> <tr><td>4</td><td>189</td><td>0</td><td>0</td><td>24</td><td>0</td><td>213</td></tr> <tr><td>5</td><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>2</td></tr> <tr><td></td><td></td><td>532</td><td>0</td><td>31</td><td>28</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 17 | 0 | 1 | 3 | 0 | Scale | 2 | 16 | 0 | 0 | 0 | 0 | Ages | 3 | 308 | 0 | 30 | 1 | 339 | 4 | 189 | 0 | 0 | 24 | 0 | 213 | 5 | 2 | 0 | 0 | 0 | 0 | 2 | | | 532 | 0 | 31 | 28 | 0 | LOWTRINREC = Lower Trinity Recreational <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>7</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>42</td><td>0</td><td>3</td><td>0</td><td>0</td></tr> <tr><td>4</td><td>28</td><td>0</td><td>0</td><td>3</td><td>0</td><td>31</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>80</td><td>1</td><td>3</td><td>3</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 3 | 0 | 0 | 0 | 0 | Scale | 2 | 7 | 1 | 0 | 0 | 0 | Ages | 3 | 42 | 0 | 3 | 0 | 0 | 4 | 28 | 0 | 0 | 3 | 0 | 31 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | 80 | 1 | 3 | 3 | 0 |
|--|------|---------|----|------|-----|-----|--|---------|--|--|--|--|--|--|--------|---|---|---|---|------------|--|----|---|---|---|---|-------|---|----|---|---|---|---|------|---|-----|---|----|---|-----|---|-----|---|---|----|---|-----|---|---|---|---|---|---|---|--|--|-----|---|----|----|---|--|--|--|--|--|--|--|--|---------|--|--|--|--|--|--|--------|---|---|---|---|------------|--|-----|---|----|----|---|-------|---|----|----|---|---|---|------|---|------|---|------|----|---|---|------|---|---|----|-----|----|---|---|---|---|---|---|---|--|--|------|----|------|-----|---|
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 17 | 0 | 1 | 3 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 16 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 308 | 0 | 30 | 1 | 339 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 189 | 0 | 0 | 24 | 0 | 213 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 2 | 0 | 0 | 0 | 0 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 532 | 0 | 31 | 28 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 3 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 7 | 1 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 42 | 0 | 3 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 28 | 0 | 0 | 3 | 0 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 80 | 1 | 3 | 3 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HUPANET = Hoopa Tribal Harvest <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>279</td><td>0</td><td>46</td><td>0</td><td>0</td></tr> <tr><td>4</td><td>278</td><td>0</td><td>0</td><td>34</td><td>0</td><td>0</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>568</td><td>0</td><td>46</td><td>34</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 8 | 0 | 0 | 0 | 0 | Scale | 2 | 3 | 0 | 0 | 0 | 0 | Ages | 3 | 279 | 0 | 46 | 0 | 0 | 4 | 278 | 0 | 0 | 34 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | 568 | 0 | 46 | 34 | 0 | TRH = Trinity River Hatchery <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>139</td><td>3</td><td>34</td><td>30</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>79</td><td>28</td><td>3</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>2284</td><td>1</td><td>1350</td><td>17</td><td>0</td></tr> <tr><td>4</td><td>1413</td><td>0</td><td>0</td><td>20</td><td>906</td><td>0</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>3915</td><td>32</td><td>1407</td><td>953</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 139 | 3 | 34 | 30 | 0 | Scale | 2 | 79 | 28 | 3 | 0 | 0 | Ages | 3 | 2284 | 1 | 1350 | 17 | 0 | 4 | 1413 | 0 | 0 | 20 | 906 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | 3915 | 32 | 1407 | 953 | 0 |
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 8 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 3 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 279 | 0 | 46 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 278 | 0 | 0 | 34 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 568 | 0 | 46 | 34 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 139 | 3 | 34 | 30 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 79 | 28 | 3 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 2284 | 1 | 1350 | 17 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 1413 | 0 | 0 | 20 | 906 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 3915 | 32 | 1407 | 953 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HOOPATRICARCASS = Lower Trinity Tribs (No Scales or CWTs) <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 0 | 0 | 0 | 0 | 0 | Scale | 2 | 0 | 0 | 0 | 0 | 0 | Ages | 3 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | UPTRINREC = Upper Trinity Recreational (No CWTs or scales.) <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 0 | 0 | 0 | 0 | 0 | Scale | 2 | 0 | 0 | 0 | 0 | 0 | Ages | 3 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 |
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOWTRINCARCASS = Lower Trinity Mainstem <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>4</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>19</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>4</td><td>20</td><td>0</td><td>0</td><td>3</td><td>0</td><td>0</td></tr> <tr><td>5</td><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>48</td><td>0</td><td>0</td><td>3</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 3 | 0 | 0 | 0 | 0 | Scale | 2 | 4 | 0 | 0 | 0 | 0 | Ages | 3 | 19 | 0 | 0 | 0 | 0 | 4 | 20 | 0 | 0 | 3 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | | | 48 | 0 | 0 | 3 | 0 | TribesAboveHoopa = Lower Trinity Tribs above Hoopa <table border="1"> <tr><th colspan="2"></th><th colspan="5">Cwt Age</th></tr> <tr><th colspan="2"></th><th>no cwt</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><th colspan="2">unreadable</th><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Scale</th><td>2</td><td>6</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><th>Ages</th><td>3</td><td>11</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>4</td><td>34</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>56</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </table> | | | | | | | | Cwt Age | | | | | | | no cwt | 2 | 3 | 4 | 5 | unreadable | | 2 | 0 | 0 | 0 | 0 | Scale | 2 | 6 | 0 | 0 | 0 | 0 | Ages | 3 | 11 | 0 | 0 | 0 | 0 | 4 | 34 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | | | 56 | 0 | 0 | 0 | 0 |
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 3 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 4 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 19 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 20 | 0 | 0 | 3 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 2 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 48 | 0 | 0 | 3 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Cwt Age | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | no cwt | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| unreadable | | 2 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scale | 2 | 6 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ages | 3 | 11 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 34 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 1 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 56 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

POOLED data from all areas: Scale age-CWT age matrix.
(Includes only fish with both scale age and CWT known age.)

| | | Cwt Age | | | | |
|------------|---|---------|---|---|---|---|
| | | no cwt | 2 | 3 | 4 | 5 |
| unreadable | | 0 | 0 | 0 | 0 | 0 |
| Scale | 2 | 0 | 0 | 0 | 0 | 0 |
| Ages | 3 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 |

VALIDATION MATRIX

| | | Cwt Age | | | | |
|------|-------|---------|------|-----|---|--|
| | | 2 | 3 | 4 | 5 | |
| 2003 | 3 x 3 | 29 | 3 | 0 | 0 | |
| | | 1 | 1429 | 18 | 0 | |
| | | 0 | 20 | 970 | 0 | |
| | | 0 | 0 | 0 | 0 | |

(No 5 yr old recov.)

Scale-CWT age matrix of proportions of column sums.

| | | Cwt Age | | | | |
|---|--|---------|--------|--------|---------|--|
| | | 2 | 3 | 4 | 5 | |
| 2 | | 29.0000 | 0.0021 | 0.0000 | #DIV/0! | |
| 3 | | 1.0000 | 0.9862 | 0.0182 | #DIV/0! | |
| 4 | | 0.0000 | 0.0138 | 0.9818 | #DIV/0! | |
| 5 | | 0.0000 | 0.0000 | 0.0000 | #DIV/0! | |
| | | 30.0000 | 1.0021 | 1.0000 | #DIV/0! | |

Corrected Scale age proportion vectors for scale-aged 2 - 5 fish.

| # scales | Age | Willow Creek Weir | Hoopa Tribal | Lower Trinity | TRH | Lower Trinity | Upper Trinity | Upper Trin | Upper Trinity |
|----------|-----|-------------------|--------------|---------------|----------|---------------|---------------|------------|---------------|
| | | WCW | NET HARVEST | REC HARVEST | HATCHERY | CARCASS | REC HARVEST | Tribs | Rec Harvest |
| 2 | 2 | 0.0278 | 0.0045 | 0.0929 | 0.0198 | 0.0911 | lower Rec | 0.1529 | 2 |
| 3 | 3 | 0.5965 | 0.4969 | 0.5444 | 0.6051 | 0.4177 | lower Rec | 0.1900 | 3 |
| 4 | 4 | 0.3723 | 0.4987 | 0.3627 | 0.3751 | 0.4468 | lower Rec | 0.6386 | 4 |
| 5 | 5 | 0.0035 | 0.0000 | 0.0000 | 0.0000 | 0.0444 | lower Rec | 0.0185 | 5 |
| | | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 1.0000 | 30391 |

From 2003 data correction worksheet

| Age | 2 | 3 | 4 | 5 |
|-----|-------|------|------|-----|
| 2 | 586 | 175 | 1116 | 754 |
| 3 | 18155 | 754 | 0 | 0 |
| 4 | 11650 | 0 | 0 | 0 |
| 5 | 30391 | 2045 | 0 | 0 |

UNKNOWN CWTs

| Age | 2 | 3 | 4 | 5 |
|-----|------|----|------|------|
| 2 | 130 | 24 | 84 | 0 |
| 3 | 4201 | 0 | 3249 | 0 |
| 4 | 2985 | 3 | 2309 | 0 |
| 5 | 0 | 0 | 0 | 0 |
| | 7316 | 3 | 414 | 5642 |

Proportions: 0.03209, 0.59887, 0.36198, 0.00705, 1.00000

Used: Combo of #s:
WCW (J&A scales)
- TRH (J&A scales)
- Rec harvest above WCW (J & A scales)
+ Fudge

Total Adult + Jacks
Natural Escapement, Trinity basin above WCW: Apportioned to age structure.

| Age | 2 | 3 | 4 | 5 |
|-----|---------|-------|------|-------|
| 2 | 1792 | 0 | 1030 | 0 |
| 3 | 0.59648 | 38497 | 0 | 19226 |
| 4 | 0.37225 | 24025 | 0 | 11621 |
| 5 | 0.00351 | 226 | 0 | 226 |
| | 1.00000 | 64540 | 0 | 32104 |

TRH fall chinook return, apportioned by corrected age 2 - 5 structure

| | |
|--------------------------------|-------|
| Total Chinook | 30391 |
| minus Ad-Clip Non-CWT | 280 |
| minus CWT chinook to apportion | 7316 |
| | 22795 |

2003 TRH Special aging:
Because Ad-clipped fish weren't sampled the same during the entire sampling period at TRH, the ad-clipped non-CWT fish (n=280) were aged by known CWTs scales.

Corrected Non-Ad-Clip chinook age 2 - 5 proportion vector

| Age | Non-Ad Scale Scales | Non-Ad Scale apportioned | CWT age comp | Ad Clipped Non-CWT Apportioned | +CWT #s | TRH return apportioned by 2-5 proportions | Proportions |
|-----|---------------------|--------------------------|--------------|--------------------------------|---------|---|-------------|
| 2 | 0.0198 | 451 | 0.0178 | 5 | 130 | 586 | 0.01928 |
| 3 | 0.6051 | 13793 | 0.5742 | 161 | 4201 | 18155 | 0.59737 |
| 4 | 0.3751 | 8551 | 0.4080 | 114 | 2985 | 11650 | 0.38335 |
| 5 | 0.0000 | 0 | 0.0000 | 0 | 0 | 0 | 0.00000 |
| | 1 | 22795 | 1 | 280 | 7316 | 30391 | 1 |

n=3680

TRH Upper Rec Harvest

| Age | 2 | 3 | 4 | 5 |
|-----|--------|------|-----|------|
| 2 | 151 | 24 | 175 | 0 |
| 3 | 0.5444 | 888 | 228 | 1116 |
| 4 | 0.3627 | 592 | 162 | 754 |
| 5 | 0.0000 | 0 | 0 | 0 |
| | 1 | 1631 | 414 | 2045 |

Surrogate L.Trin harvest