

The U.S. Fish and Wildlife Service's, Stockton Office is providing the following additional information relative to Dr. Chuck Hanson's presentation to the SWRCB regarding the Salmon Protection Objective discussed on October 28, 2004 at the 2004 triennial review of the 1995 Bay Delta Plan. The Anadromous Fish Restoration Program (AFRP) has spent the past several year analyzing the Chinook salmon production data for the Central Valley streams.

The doubling goal as defined for the AFRP in the CVPIA, is based on the doubling of calculated natural production estimates for the baseline 1967 - 1991 period. The numbers presented by Dr. Hanson were based on the doubling of the 1967 - 1991 average in-river escapement. The difference between doubling the in-river escapement estimates and the natural production estimates in Central Valley streams is substantial. The Board has been previously provided with CD's containing Mills and Fisher, Grand Tab, and CHINOOKPROD . These databases form the foundation of our understandings of the doubling goal objective.

Dr. Hanson's comments are in italics.

Slide 2 through 6 -*graphs of in-river escapement used by Dr. Hanson for fall, late-fall, spring, winter, all runs Chinook salmon.*

- a. Natural production is defined in the CVPIA, Title 34, Section 3403. Definitions. (h) the term "natural production" means fish produced to adulthood without direct human intervention in the spawning, rearing, or migration processes. And the CVPIA should not depend on hatchery produced fish to sustain populations of naturally spawning fish.

Newman and Hankin (2004) wrote; "Natural production is defined on an annual basis for a given naturally produced stock, and it is the total catch and escapement within a specified year-long period. Total escapement includes both in-river and hatchery escapement. Assuming that fisheries take place beginning as early as April in a given year and proceed through the spawning season, which may continue as late as February of the following year, the total natural production for a given population is equal to the sum of the ocean and freshwater catches and freshwater spawning escapement that are attributed to natural spawning of that population in previous years. By this definition, returning adults that were survivors of fish released from hatcheries are not included in natural production, but returning adults that are survivors of fish produced via natural spawning, irrespective of the origin of adult parents, are included in natural production."

Using only in-river escapement numbers in Grand Tab does not take into account the unmarked hatchery Chinook salmon portion that do not return to the hatchery. However, these fish are accounted for in the natural production estimate calculations .

Natural production estimates are used to assess the salmon narrative objective of the 1995 Bay Delta plan because they are the basis for the CVPIA, AFRP (3406.b.1) Central Valley doubling goal. Dr Hanson used in his presentation in-river escapements estimates to represent the doubling goal.

Natural production is calculated by the AFRP in CHINOOKPROD using in-river escapements, hatchery escapements, ocean sport and commercial harvest, in-river harvest, and that proportion of total production attributed to hatchery returns. The methods for calculating natural production estimates were defined in the Working Paper on Restoration Needs, and in the Final Restoration Plan for the Anadromous Fish Restoration Program.

From the Periodic Review of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, Table 3; "Water quality conditions shall be maintained,

together with other measures in the watershed, sufficient to achieve a doubling of natural production of Chinook salmon from the average production of 1967-1991, consistent with the provisions of state and federal law”.

b. Unlike slides 2 through 6, that used Grand Tab for the 1967-1991 baseline period, the original data source for this comparison period is from Mills and Fisher. Using the data compiled from the Mills and Fisher paper, the AFRP calculated baseline natural production estimates in a Lotus 123 spreadsheet, CHINOOKPROD. From 1992 through 2003, Grand Tab numbers were used by the AFRP to calculate natural production, based on methods described in the Working Papers and the Final Restoration Plan.

#### Slide 7 - *Increasing trend in adult escapement* - fall, late-fall, winter and spring runs

Slide 7 infers increasing trends in fall run, late-fall run, winter run and spring run Chinook salmon populations in Central Valley streams using escapement rather than natural production. Using both in-river and hatchery escapement numbers from Grand Tab<sup>2</sup>, natural production estimates are calculated in AFRP's CHINOOKPROD production spreadsheet. Increases in natural production for spring-run Chinook salmon occurred in four watersheds; Big Chico Creek, Butte Creek, Deer Creek and Mill Creek. However, only Butte Creek spring-run natural production has exceeded the doubling goal with only 1994 and 1997 below the goal. Fall-run Chinook salmon tributaries where doubling has been reached in at least one of the doubling years (1992 - 2003) include Clear Creek, Battle Creek, Butte Creek, Feather River, Yuba River, American River, Mokelumne River, and Stanislaus River. Note that Battle Creek and the Feather, American, and Mokelumne rivers have hatcheries which artificially supplement their production numbers.

#### **AFRP doubling natural production goals for Chinook salmon for the Central Valley for all races.**

Fall-run production doubling goal = **750,000**

1967-1991 average = 374,638

1992-2004 average = 472,880

Late fall-run production doubling goal = **68,000**

1967-1991 average = 34,764

1992-2003 average = 19,223

Spring-run production doubling goal = **68,000**

1967-1991 average = 34,706

1992-2004 average = 15,762

Winter-run production doubling goal = **110,000**

1967-1991 average = 55,060

1992-2004 average = 6,284

The above AFRP production doubling goals were based on 1967-1991 escapement and catch data, Mills and Fisher, 1992-2003 from Grand Tab and PFMC catch data transcribed to production data as defined in the Working Paper on Restoration Needs.

Natural production estimates overall in the Central Valley have increased by 21% for fall-run Chinook salmon (374,638 to 472,880) but still 37% below the doubling production goal of 750,000. Total Central Valley late fall-, spring-, and winter-run Chinook salmon natural production numbers have declined by 45% (34,764 to 19,223), 55% (34,706 to 15,762), and 89% (55,060 to 6,284), respectively.

Again, an escapement goal is not mentioned in the Bay-Delta Water Quality Control Plan or in Title 34 of the Central Valley Project Improvement Act (Public Law 102-575, CVPIA 1992). Only a doubling goal based on natural production for the period 1967-1991 is mentioned in the CVPIA Act.

Slide 8 - *fall-run Chinook escapement exceeded doubling objective over past four years.*

For the correctly calculated natural production estimates for Central Valley fall-run Chinook salmon, please refer to DOI Exhibit 17 (SWRCB Water Quality Plan Workshop, 10-27-04), G. Doubling goal graphs\_grandtab\_MFbaseline\_1952\_2003\_10\_14\_04.ppt, Slide 2. Slide 2 shows that natural production has never reached the doubling goal during the doubling period.

Slide 9 - *Winter-run cohort replacement rates greater than 1.0 in recent years. NOAA proposal to downgrade listing from endangered to threatened.*

Please refer to Slide 3, DOI Exhibit 17, G. Doubling goal graphs\_grandtab\_MFbaseline\_1952\_2003\_10\_14\_04.ppt. for the magnitude of increase since 1992. For the period from 2000 through 2003, escapement numbers have been 1,263, 8,120, 7,337, and 8,133 winter-run Chinook salmon, respectively. Natural production estimates calculated in CHINOOKPROD for same years are 3,191, 12,808, 12,788, and 15,974 fish, respectively. Even Year 2003's number (15,974) is less than one-third of the 1967-1991 average (55,060), and 14% of the doubling goal (110,000).

Slide 10 of the presentation, referring to Central Valley fish states that:

a. *Spring-run improving but have not yet met doubling goal.*

However, this assessment should have been based on natural production. Using the natural production estimates for Central Valley shown in Slide 5, DOI Exhibit 17, G. Doubling goal graphs\_grandtab\_MFbaseline\_1952\_2003\_10\_14\_04.ppt, since 1992, production numbers have increased, but the 1992-2003 production average is still about one-half of the 1967-1991 average, and less than 25% of the doubling goal (68,000).-

b. *Late fall-run met doubling goal in two of the last six years.*

The 1992-2003 average production was 55% below the 1967-1991 average, and 28% below the doubling goal, with only production numbers in 1998 exceeding the doubling goal. Please refer to slide 4, DOI Exhibit 17, G. Doubling goal graphs\_grandtab\_MFbaseline\_1952\_2003\_10\_14\_04.ppt

Slide 11 - *variety of factors contribute to trends.*

Using natural production estimates, as shown in DOI Exhibit 17, G. Doubling goal graphs\_grandtab\_MFbaseline\_1952\_2003\_10\_14\_04.ppt., a continued restoration effort is needed to reach the doubling goals for Chinook salmon in nearly all Central Valley streams.

b. *Favorable hydrology.*

Flow information from the U.S. Geological Service, and California Department of Water Resources California Data Exchange Center shows highly impaired hydrological conditions for anadromous fish in San Joaquin tributaries and east Delta tributaries. Please refer to DOI Exhibit 17, B. Tuolumne-Flow\_at\_Modesto\_10-4-04.xls., C. Stanislaus-Flow\_at\_Ripon\_10-4-04.xls., D. Calaveras-Flow\_at\_Bellota\_and\_New\_Hogan\_10-4-04.xls.,

E. Cosumnes-Flow\_at\_Michigan\_Bar\_10-4-04.xls., F. San\_Joaquin Flow\_at\_Vernalis\_and\_DO-10-6-04.xls for hydrological conditions on selected tributaries.

c. *Favorable ocean rearing.*

Chinook salmon need favorable freshwater spawning and rearing conditions to attain the doubling goal and to compensate for variable ocean conditions.

d. *Management changes (reduced ocean harvest).*

Reducing ocean harvest may lead to an increase in adult escapement, however, natural production is based not only on adult in-river escapement, but also on hatchery escapement, in-river harvest, and that portion of the in-river escapement attributed to unmarked adult hatchery fish. Please refer to DOI Exhibit 17, M. finalrestplan.pdf., Appendix A, for a complete description of the calculation of natural production.

Slide 12 - *changes in hatchery management.*

Over the period 1970-1992, hatchery propagated fall-run Chinook salmon returning to hatchery facilities made up a relatively small proportion of all adults returning to spawn in the Sacramento River basin but “available data” indicate that most naturally spawning fish were hatchery-produced (Pacific Fishery Management Council 1993, p.II-1).

Slide 13 - *ongoing management investigations.*

d. *Contributing to scientific foundation for improved protection/management.*

The AFRP is addressing habitat restoration needs for Chinook salmon, based on a sound scientific foundation.

To reach the AFRP doubling goal, interagency coordination is needed to develop proactive measures to protect, conserve, and enhance salmon populations.

Cited References

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