

NECHAKO FISHERIES CONSERVATION PROGRAM

A Joint Program of the Government of Canada, Alcan and the Province of British Columbia

NECHAKO FISHERIES CONSERVATION PROGRAM TECHNICAL COMMITTEE

DATE: August 29, 2005

Decision Record (2005/06-3)

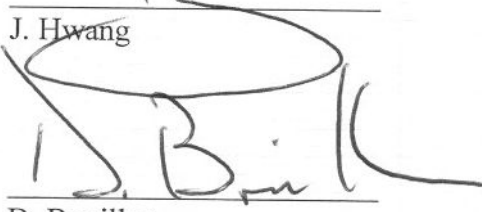
3. The Technical Committee has been made aware of the following:
- Releases from the Skins Lake Spillway (SLS) made as part of the Summer Temperature Management Project (STMP) were decreased to 14.2 m³/s late on August 18, 2005 to decrease flow in the Nechako River below Cheslatta Falls from the STMP base flow to the fall chinook spawning flows. The predicted recession of the flow in the Nechako River at Cheslatta Falls required the SLS release to be increased to 32.0 m³/s on September 1 to ensure that the flow in the Nechako River below Cheslatta Falls did not drop below 32.0 m³/s as noted in Decision Record 2005/06-1.
 - As noted on the attached calculation sheet, the average flow of 32.0 m³/s is to be released from the Skins Lake Spillway from September 1 to March 31 to ensure the Annual Water Allocation is achieved.

Given the above, the Technical Committee has decided that Alcan be directed to maintain the Skins Lake Spillway release as follows:

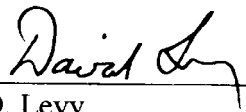
- the average Skins Lake Spillway release over this period September 1, 2005 to March 31, 2006 is to be at or above 32.0 m³/s;
- the minimum release from the reservoir is not less than 31.0 m³/s;
- releases from the Spillway to be managed in a manner to achieve release from the Nechako Reservoir of the annual water allocation without having to spike releases in the latter part of the water year; and,

- the running average of the release is to be calculated and reported monthly to the Technical Committee.

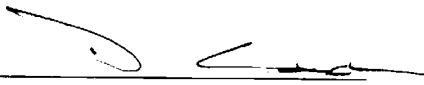
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J. Hwang


D. Bouillon



D. Levy



D. Cadden

Date: August 24, 2005

Project: 3600; NFCP Annual Water Allocation Estimated Winter Base Release *

* NOTE: based on an assumed increase to the spring base flow on April 19, 2005

Annual Average Flow Rate = 36.8 m³/s (as per the 1987 Settlement Agreement)

| TIME PERIOD (JD) | TIME (Days) | FLOW (m ³ /s) | Volume (m ³ /s*Days) |
|----------------------------|-------------|--------------------------|---------------------------------|
| Apr01 (91) to Apr19 (109) | 19 | 30.00 | 570.0 |
| Apr20 (110) to Aug18 (230) | 121 | 49.0 | 5,929.0 |
| Aug19 (231) to Sep01 (244) | 14 | 14.16 | 198.2 |
| Sep02 (245) to Mar31 (90) | 211 | X | 211X |
| | 365 | | 6,697.2 + 211X |

Annual Volume = 36.8*(365) = 13,432 m³/s*Days = 6,697.2 + 211X

X = 31.92 m³/s (1,127 cfs)

The Skins Lake Spillway release required to ensure release of the Annual Water Allocation by March 31, 2005 is 31.92 m³/s (1,127 cfs)

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NECHAKO FISHERIES CONSERVATION PROGRAM TECHNICAL COMMITTEE

DATE: August 31, 2005

Decision Record (2005/2006-4)

1. The Technical Committee has been asked by Fisheries and Oceans Canada (FOC) to review the rationale and need for the Stuart River Enumeration Project in the light of the weaknesses in the data set identified during the NFCP Technical Data Review. The Technical Committee has conducted that review and the findings are attached to this decision record. In summary, the review concluded that:

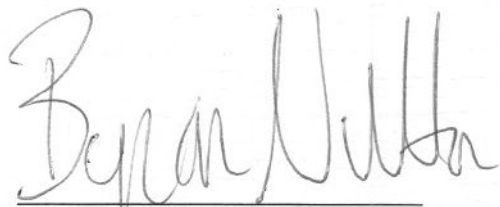
- The Stuart River enumeration project was developed based on a need, identified in 1988 and based on the Nechako River Working Group report appended to the 1987 Settlement Agreement, to identify escapement trends in a nearby unregulated system for comparison with Chinook escapements to the regulated Nechako. The Stuart escapement data would then be used to help identify when extrinsic factors (i.e. outside of the Nechako watershed) might explain unexpected changes in abundance in Nechako Chinook. With the exception of 2004, when the Technical Committee decided that Stuart enumeration data was not necessary, the project has been implemented since 1988 to meet this goal. However, the techniques used to enumerate Stuart River returns varied until 1992 as adjustments were made to refine the methodology (see 1992 NFCP Terms of Reference, march 1992);
- These Stuart-Nechako comparisons were used, in part, to explain an unexpected decline in Nechako adult abundance that occurred in 1993-95 that may have otherwise resulted in the implementation of remedial measures under the terms of the 1987 Settlement Agreement. Over the period 1993-95 it was believed that extrinsic factors were responsible for the observed decline in adult abundance, and this was confirmed by a similar trend that occurred in the Stuart River abundance index.
- During the Technical Data Review, FOC Science Branch and Stock Assessment personnel advised the Technical Committee that they believed the technique currently used to enumerate the Stuart escapement, both in theory and in practice, will result in sufficient variance in the data collected such that its value in identifying future trends in the escapement would be very limited unless the trend resulted in a major change such as occurred in 1993 to 1995. As a result,

they expressed their belief that consideration should be given, by the Technical Committee, to discontinue the annual project.

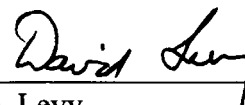
- A strong correlation exists between Nechako River adult returns and the indices of emergent fry and out-migrant juveniles (Figures 2 and 3 in the attached review). The fry and out-migration indices for 2000, 2001 and 2002 (brood years for the 2005 escapement) are generally consistent for the indices for the rest of the program period. The exception is the higher than expected value for the 2002 out-migration index, which resulted from the record escapement, above the upper limit of the Conservation Goal, the previous year. Additionally, physical conditions in the river (flow, temperature, turbidity) were not abnormal during 2000 to 2002. Thus, the Technical Committee does not expect returns to the Nechako in 2005 to be depressed unless affected by influences outside of the Nechako River.

The Technical Committee therefore has reached the decision not to proceed with the Stuart River Adult Enumeration project in 2005. The Technical Committee has also decided not to cancel the carcass recovery portion of the project for 2005.

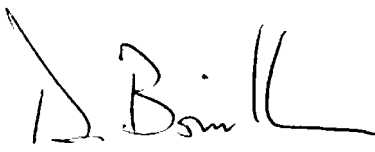
In reaching this decision, the Technical Committee realizes that many decisions altering the existing Nechako Fisheries Conservation Program suite of projects will be made as part of an assessment of future needs that has been initiated. As interim steps in that process, the Technical Committee has recommended an annual review of the Fry Emergence and Juvenile Out-Migration Projects, and now makes the same recommendation for the Stuart Enumeration Project. Based on the assessment carried out to date, the Technical Committee is confident that the cessation of the Stuart project for 2005 will not materially affect their ability to assess any unexpected trends in Nechako Chinook abundance in 2005. The need to cancel this project will have to be reviewed annually, especially in recognition of other changes taking place simultaneously to the data collection program of the NFCP.

for 


J. Hwang



D. Levy



D. Bouillon



D. Cadden

ATTACHMENT 1

NECHAKO FISHERIES CONSERVATION PROGRAM

Review of the need to conduct the 2005 Stuart River Chinook Enumeration and Carcass Recovery Projects

Background

In 1998 the Nechako Fisheries Conservation Program (NFCP) Technical Committee initiated a technical process to complete the analysis of data collected since the inception of the program, and to review the success of projects to meet the objectives of the overall program. This process has recently been completed and the Technical Committee has proposed to review the future need of the suite of NFCP projects in the context of a) the achievement of program objectives, and b) new needs and considerations that have developed in the Nechako watershed since the signing of the 1987 Settlement Agreement. It is anticipated that the review of NFCP projects in the context of the future role of the NFCP will result in significant changes to the current program, and may affect the decision making process now in place to annually review the need for the Fry Emergence and Juvenile Out-Migration studies, and any other changes implemented on an interim basis. Similarly, this review of the Stuart River Chinook Enumeration and Carcass Recovery projects fits within the context of an interim step.

Nechako and Stuart Enumeration Projects

In order to assess potential river-specific changes in survival of Nechako River Chinook salmon the NFCP has conducted an annual enumeration of adult Nechako River Chinook and an annual enumeration of adult Stuart River Chinook (as a reference stream). It is assumed that Nechako and Stuart Chinook share common freshwater and marine conditions downstream of the confluence of the two rivers. Both stocks appear to demonstrate large scale downstream migration of fry within 60-90 days post emergence. DNA analysis on rearing chinook show high use by both Stuart and Nechako juveniles (Bradford, in NFCP technical workshop, 1998). As well, spawner timing in the two systems are similar and the two stocks appear to show common migration timing through the Fraser. Considering these factors, the populations should experience similar extrinsic year-to-year growth, survival and harvest factors. Consequently, differences in population trends over time between the Nechako and Stuart would be expected to result from in-river survival differences above the confluence of the Stuart River.

While the identification of long-term trends was identified by the NFCP Technical Committee as a major objective of the use of a reference stream, the results of the Technical Data Review indicate that variability in the data from the Stuart project weaken the ability to detect changes in production over time.

A second important objective for use of the Stuart River as a reference stream is the ability to detect large single year events that may indicate important differences in fish production rates. Similar large-scale changes in production for both the Stuart and the Nechako suggest extrinsic effects, while major divergence in spawner/recruit values would suggest river specific conditions. While the simultaneous large scale changes in recruit relationships have been detected in both rivers, the Technical Committee has been advised that the variance in the Stuart River enumeration data may make smaller changes or trends more difficult to identify.

These projects have been run annually since the 1988, except for 2004 when Stuart River Chinook were not enumerated. In addition, the project methodology for the enumeration of Chinook in the Stuart River has changed since the project's inception. The number of adult Chinook returning to spawn in the Nechako River has generally met the minimum target of 1700, identified in the 1987 Settlement Agreement (see Figure 1). The exceptions to this general statement (1993, 1994 and 1995) are thought to be the result of extrinsic factors not related to the Nechako River, a conclusion supported by similar trends in the Stuart River escapements.

Nechako and Stuart Carcass Recovery Projects

Biological information is collected from both the Nechako and Stuart Chinook populations through carcass recovery projects. In particular, age data obtained from scales reflects the relative production of different Chinook year classes. This information is required for interpretation of enumeration results, as it indicates the extent to which each brood year has contributed to the spawning population.

These projects have been run annually since 1988. The results of the age analyses have shown that the majority of Chinook salmon returning to spawn in both the Nechako and Stuart rivers are predominately 5 year olds with lesser contribution of 4 and 6 year old cohorts.

Nechako Fry Emergence and Juvenile Outmigration Projects

Fry Emergence and Juvenile Outmigration projects were developed in the early stages of the NFCP to detect short-term changes in juvenile production as an early warning of changes in Nechako River Chinook production. The development and implementation of these projects, as well as the spawner enumeration projects, was directed at providing a basis for identifying changes in production of Nechako Chinook that were either a result of in-river conditions or events that took place after Nechako Chinook left their natal stream. The analyses completed as part of the Technical Data Review have demonstrated that the relationship between Nechako Chinook spawners and emergent fry or juvenile outmigrants is both strong and robust and can be used to identify changes in productivity in absence of comparative adult enumeration data.

The Fry Emergence Project was run annually from 1990 to 2002, providing information on the juvenile progeny of the 1989 to 2001 brood years (see Figures 2). Analyses of the results of this project show:

- emergent fry indices increase proportionately with the number of spawners upstream of the trapping site (there is no density dependence) indicating that the habitat does not appear limiting;
- based on hatching time, size at emergence and condition, chinook life-history parameters appear normal; and
- based on the relationship between spawner numbers and emergent fry, and the gravel quality results, the quality of the incubation environment in the upper Nechako River has not shown any degradation over the study years and appears to be stable.

The Technical Committee evaluated the need for the Fry Emergence project and decided that it was not necessary in 2003, 2004 and 2005.

The Juvenile Outmigration Project has run annually from 1991 to 2004, providing information on the juvenile progeny of the 1990 to 2003 brood years (see Figure 3). Analyses of the results of this project show:

- the timing of juvenile chinook out-migration has been consistent over the duration of the program;
- the number of fry leaving the system is directly and positively related to the number of spawners the previous year (with the exception of 2001 which indicated that the record spawner escapement in that year may have over seeded rearing habitats in 2002);
- the numbers of fry rearing in the river as reflected by catch-per-unit effort values is directly and positively related to the number of spawners the previous year; and,
- the numbers of fry produced in the Nechako River have generally resulted in numbers of returning spawners within the values identified in the Conservation Goal.

The Technical Committee evaluated the need for the Juvenile Outmigration Project and decided that it was not necessary in 2005.

In spite of uncertainties associated with the considerable variability in rearing conditions that exists external to the Nechako River, the habitat capacity of the upper river, as measured through various indices, has been shown to support reproduction and the early life stages of Chinook salmon at numbers that result in the return of Chinook salmon at the levels of abundance identified in the 1987 Settlement Agreement.

Assessment of Need for 2005 Stuart Enumeration Project

The fry and out-migration indices for 2000, 2001 and 2002 (brood years for the 2005 escapement) are generally consistent with the indices for the rest of the program period. The exception is the higher than expected value for the 2002 out-migration index, which resulted from the record escapement, above the upper limit of the Conservation Goal, the previous year. Additionally, physical conditions in the river (flow, temperature, turbidity) were not abnormal during 2000 to 2002. Thus, the Technical Committee does not expect returns to the Nechako in 2005 to be depressed unless affected by influences outside of the Nechako River.

The normal range of production as estimated by fry/spawner and out-migrant per spawner indices, coupled with the fact that flows during these years followed typical regulated values, indicates that spawning and rearing conditions in the upper Nechako were normal in the brood years and that expected returns in 2005 should be normal. Based on this information, if the 2005 enumeration of adult Chinook in the Nechako River results in an escapement less than the minimum target of 1700 identified in the 1987 Settlement Agreement it is unlikely to be a result of in-river habitat conditions.

Based on this logic, it is unlikely that the results of the 2005 Stuart River Chinook Enumeration Project will be needed and therefore it is recommended that this project not be undertaken.

It is, however, recommended that the carcass recovery portion of the project be undertaken in 2005 for two reasons:

- The age-class data that would be collected is directly comparable to data from the brood years – a significant deviation from the normal age structure of the returning adults in either the Nechako or Stuart rivers would be an indicator of abnormal in-river conditions. A significant deviation from the normal in both the Nechako and Stuart rivers would indicate that conditions outside of the Nechako had affected the returns.

Recommendation

It is recommended that the Stuart River Chinook Enumeration Project be suspended for 2005, and that the need for this project be re-assessed in 2006. It is further recommended that the carcass recovery project on the Stuart River be continued in 2005.

Figure 1: Nechako Chinook Escapement - 1988 to 2004

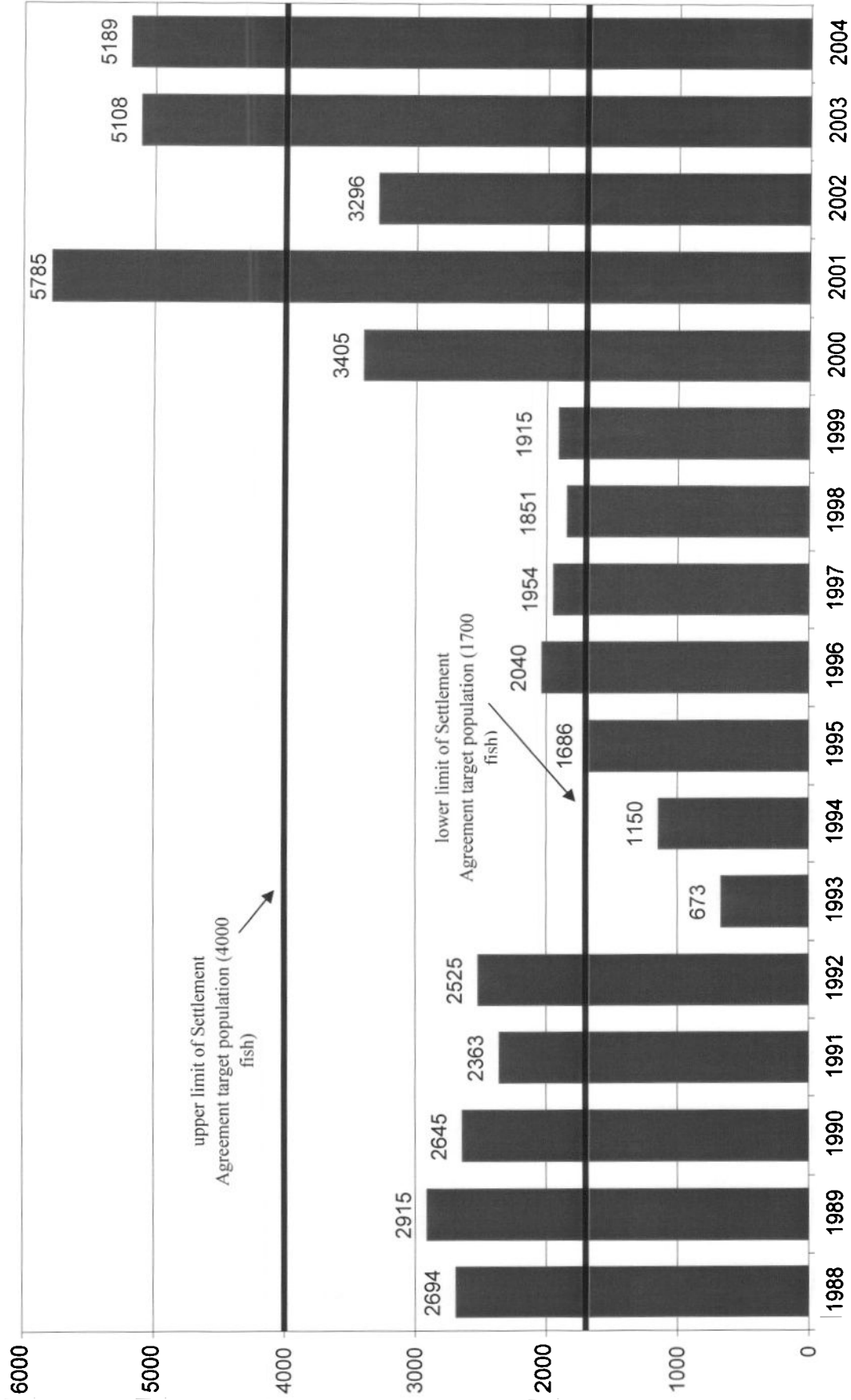


Figure 2: Index of emergence to spawners to 2002

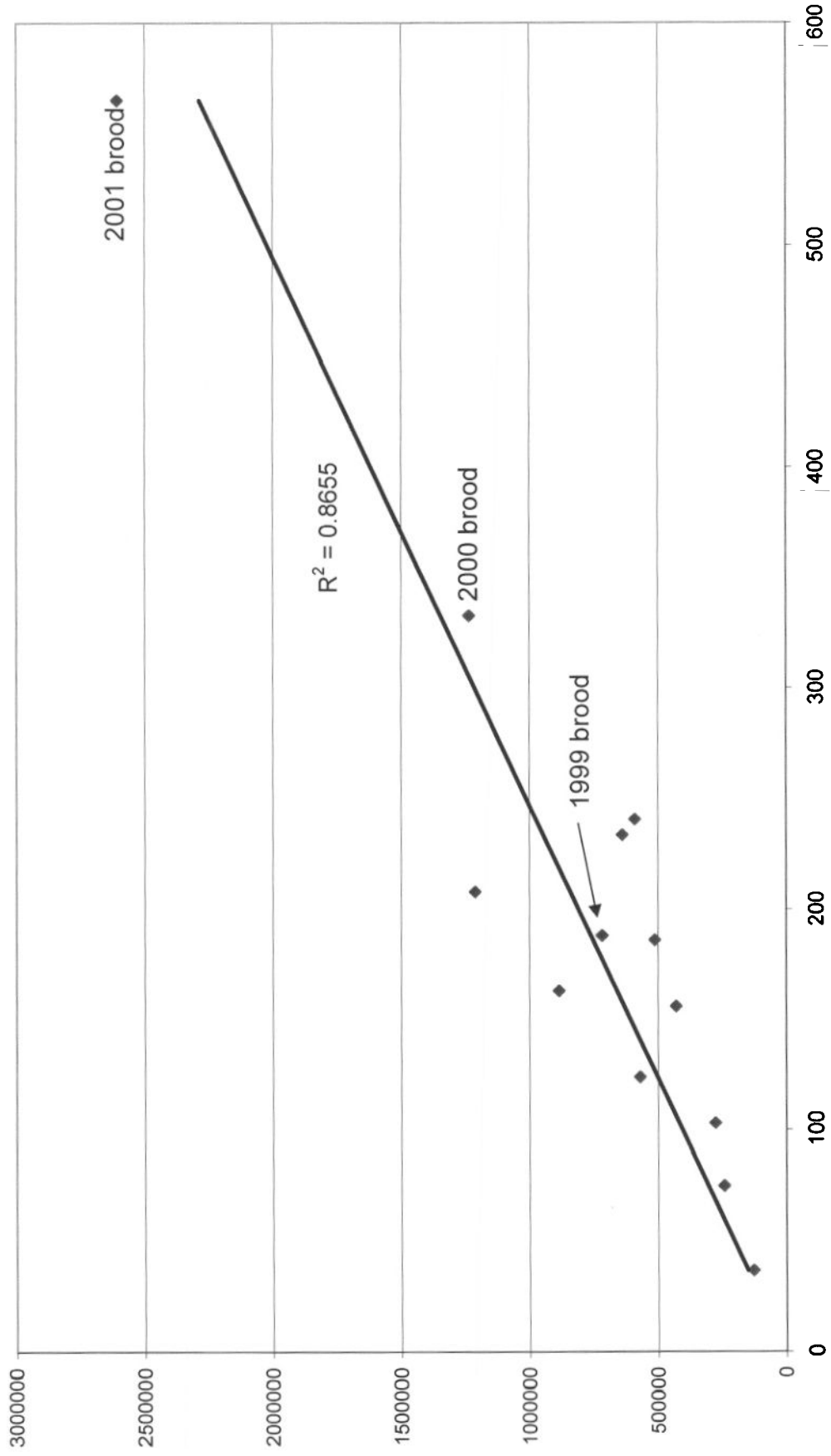
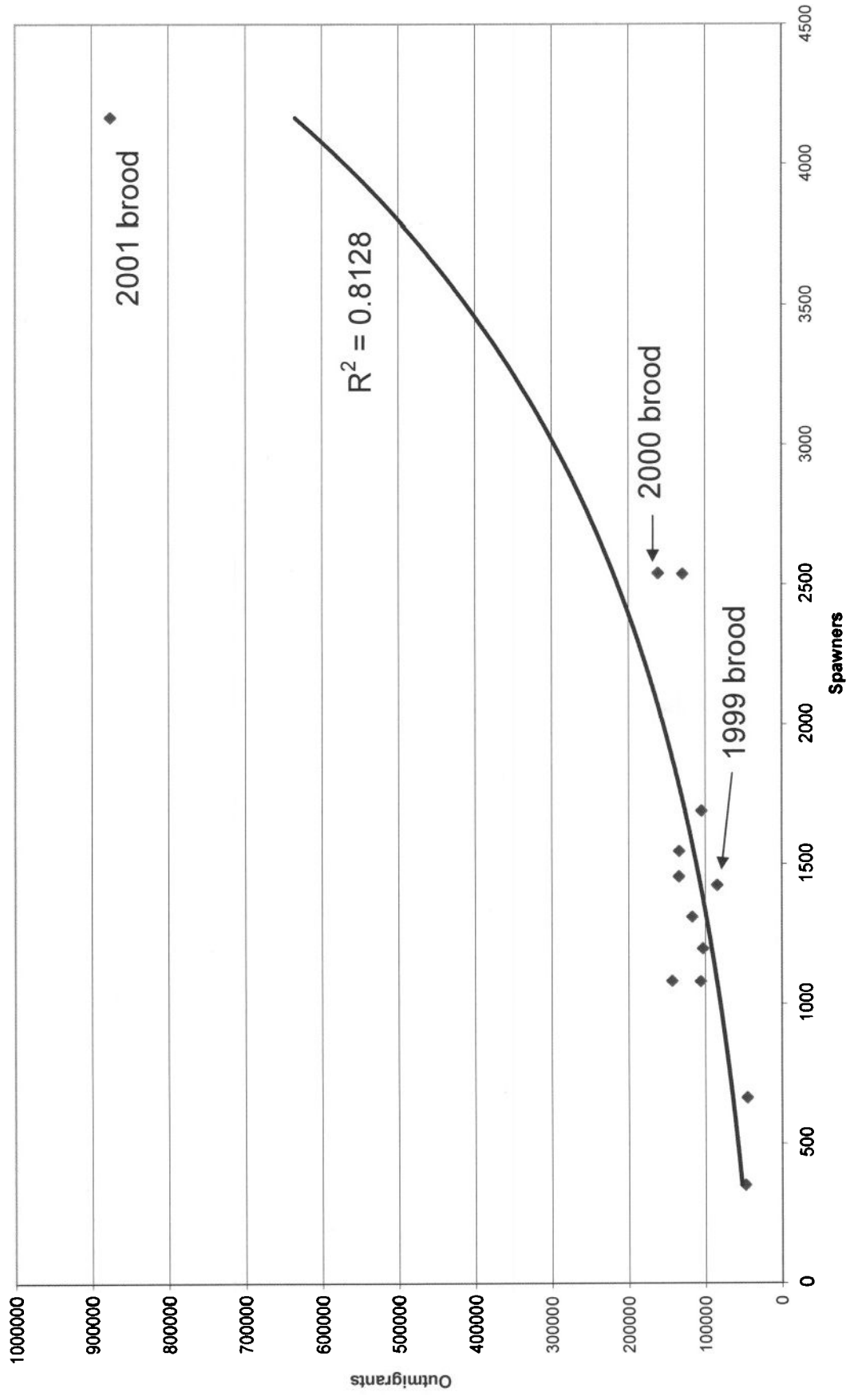


Figure 3: Outmigrants vs Spawners to 2003



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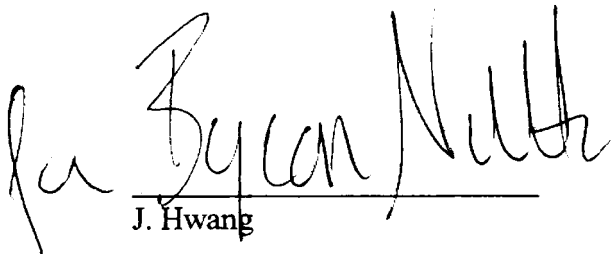
NECHAKO FISHERIES CONSERVATION PROGRAM TECHNICAL COMMITTEE

DATE: January 31, 2006

Decision Record (2005/2006-5)

The Technical Committee has reviewed the value of carrying out the Chinook Fry Emergence Project in 2006. Consideration included the conclusions of the NFCP 2005 Technical Data Review Report, the belief that periodic monitoring should be carried out to confirm habitat stability over a longer term, and the duration of time since the project was last conducted (2001). The review followed the logic in the attached decision flow chart.

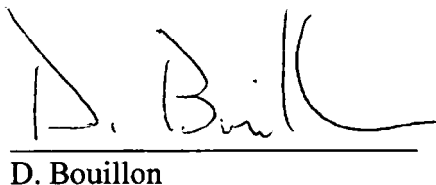
Based on this review, the NFCP Technical Committee has agreed to proceed with this study in 2006. This decision is consistent with the proposed goal (still under discussion) to reduce monitoring frequency to once in each 5 year cycle (the dominant age class for returning chinook adults). This decision brings this project timing in line with the proposed monitoring frequency and takes advantage of the availability of prerequisite data (spawner counts and distribution - already collected in the fall of 2005). The NFCP Technical Committee will confirm the future monitoring frequency for this project through further discussion in 2006.



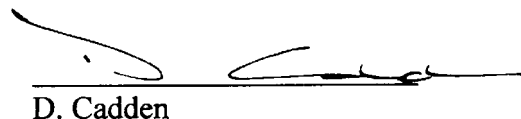
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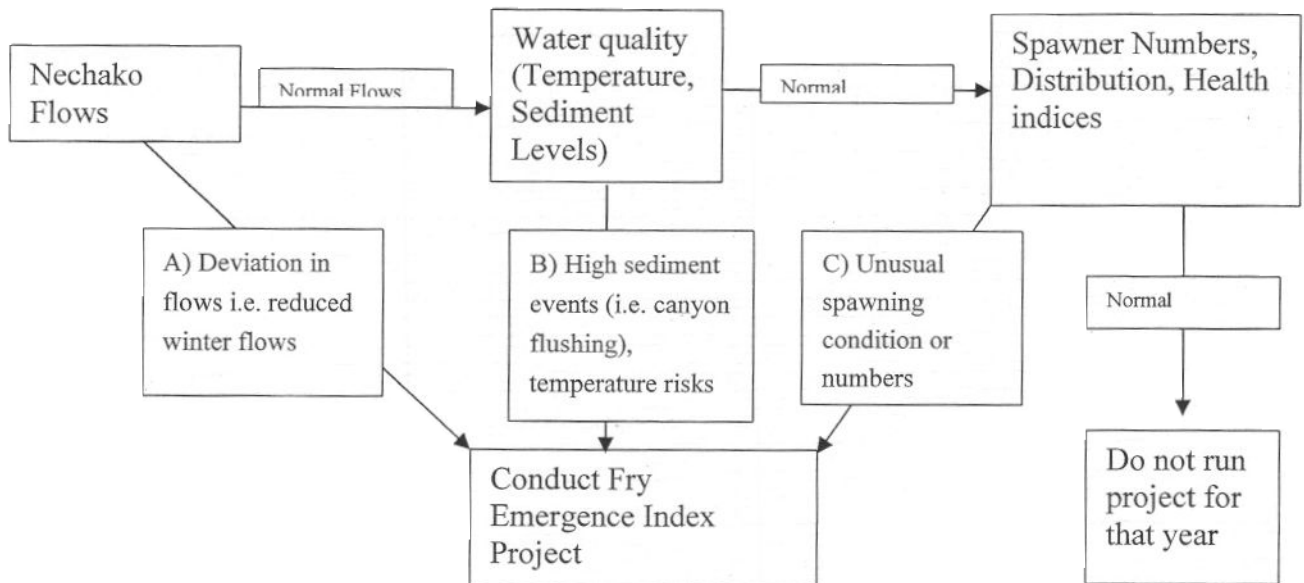


D. Cadden

Figure 1 Flow chart for fry emergence program

Assumptions:

- Continuous time series of data not required,
- Some frequency of monitoring will be required,
- Data prerequisites for decision paths are available (ie. Spawner counts, spawner distribution, and advance warning of calamity/disturbance events).
- Project can be brought back in the future (funding will be available)



Risks of not conducting program – Lack of recruitment data for rearing habitat/outmigration projects. This risk would be low if status quo conditions exist.