TO: Ron Olson

FROM: Kristin Nason

DATE: July 1, 1999

SUBJECT: Detecting a Difference in Tag Loss Rates

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This memo is in response to your request for an estimate of the sample size needed to test whether or not there is a difference in the tag loss rates of the clipped and unclipped groups of either a coho or chinook double index tag group.

Given information from previous studies, we may expect the tag loss rate of a clipped coho group to be around 2%. Given then that the tag loss rate of the first group is 2%, Table 1 illustrates the sample size needed, at different levels of significance, to have the power for a hypothesis test to be able to detect various deviations from 2% that may occur in the second group. For this analysis, the acceptable level of power used was 0.80 (a commonly used value for power). For example, if the tag loss rate of the first group was 2% and the rate of the second group was 4%, at the 95% confidence level, a sample size of 1,130 would be needed for the test to be powerful enough to detect that 2% difference. At the 90% confidence level, a sample size of 890 would be needed.

Because a clipped chinook group is likely to have a tag loss rate up around 6%, Table 2 should be referenced for chinook. Table 2 is useful in the same way as Table 1. For example, if the tag loss rate of the first group was 6% and the rate of the second group was 3%, at the 95% confidence level, a sample size of 740 would be needed for the test to be powerful enough to detect that 3% difference. At the 90% confidence level, a sample size of 590 would be needed. If the second group's rate was 4%, making the difference only 2%, and you wanted to be able to detect that difference at the 95% confidence level, a sample size of 1,840 would be needed.

Please let me know if you have any questions or if you have any other requests.

cc: Jay DeLong, Bob Conrad
    Ken P, Brian T.

Table 1. Coho

Power	Group 1 Tag Loss Rate	Group 2 Tag Loss Rate	Abs(Diff)	Sample Size Needed alpha = 0.05	Sample Size Needed alpha = 0.10
0.8	2%	0.2%	1.8%	520	410
0.8	2%	0.5%	1.5%	850	670
0.8	2%	1.0%	1.0%	2,290	1,800
0.8	2%	1.5%	0.5%	10,660	8,390
0.8	2%	3.0%	1.0%	3,780	2,970
0.8	2%	3.5%	1.5%	1,850	1,450
0.8	2%	4.0%	2.0%	1,130	890
0.8	2%	4.5%	2.5%	780	620
0.8	2%	5.0%	3.0%	590	460
0.8	2%	5.5%	3.5%	460	360

Table 2. Chinook

Power	Group 1 Tag Loss Rate	Group 2 Tag Loss Rate	Abs(Diff)	Sample Size Needed alpha = 0.05	Sample Size Needed alpha = 0.10
0.8	6%	2.0%	4.0%	380	295
0.8	6%	2.5%	3.5%	520	410
0.8	6%	3.0%	3.0%	740	590
0.8	6%	3.5%	2.5%	1,130	890
0.8	6%	4.0%	2.0%	1,840	1,450
0.8	6%	4.5%	1.5%	3,430	2,700
0.8	6%	7.5%	1.5%	4,340	3,410
0.8	6%	8.0%	2.0%	2,530	1,990
0.8	6%	8.5%	2.5%	1,670	1,320
0.8	6%	9.0%	3.0%	1,200	940
0.8	6%	9.5%	3.5%	910	720
0.8	6%	10.0%	4.0%	730	560
0.8	6%	15.0%	9.0%	180	142