

A CLINICAL FIELD TRIAL TO DETERMINE:

**The Efficacy of Florfenicol-Medicated Feed to Control Mortality of
Fall Chinook Salmon *Oncorhynchus tshawytscha* Caused by Furunculosis,
Causative Agent *Aeromonas salmonicida***

Study Number: FLOR-01-EFF.3-22

ORIGINAL

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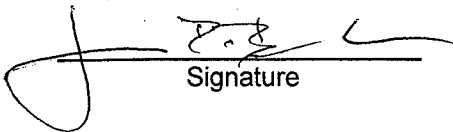
Randy Rickert
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PO Box 739
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Testing Site:

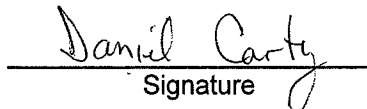
Makah National Fish Hatchery
PO Box 739
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Study start date: July 6, 2004

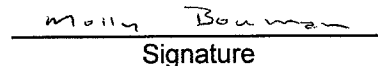
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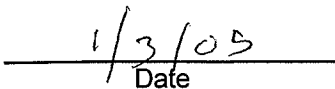
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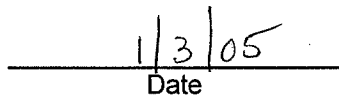
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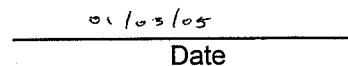
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Abstract

The U.S. Fish and Wildlife Service's (USFWS) Aquatic Animal Drug Approval Partnership (AADAP) program designed and conducted a pivotal efficacy study to generate data needed to help obtain U.S. Food and Drug Administration approval for the use of florfenicol-medicated feed to control mortality in hatchery-reared salmonids diagnosed with furunculosis (causative agent, *Aeromonas salmonicida*). The study was conducted under Study Protocol Number FLOR-01-EFF.3 (3rd revision, revised and signed September 27, 2002; Bowker 2002) and according to Good Clinical Practices at the USFWS's Makah National Fish Hatchery (NFH; Neah Bay, WA) in July, 2004, by AADAP and Makah NFH staff. The florfenicol used in the study was Aquaflor[®], a 50% medicated premix in a palatable base for salmon. The test fish used in the study were fall chinook salmon (FCS) *Oncorhynchus tshawytscha* fingerlings drawn from a reference population of FCS fingerlings that had been diagnosed with furunculosis before the study started. The study's null hypothesis was $H_0: \mu_{\text{treated}} \geq \mu_{\text{untreated}}$, i.e., that mean percent total mortality of FCS fingerlings fed florfenicol-medicated feed at a target dosage of 10 mg florfenicol/kg of fish/d for 10 consecutive days (i.e., "treated" fish) was equal to or greater than that of FCS fingerlings fed non-medicated feed (i.e., "untreated" fish). The study's alternative hypothesis was $H_a: \mu_{\text{treated}} < \mu_{\text{untreated}}$. To test the null hypothesis, a randomized complete block design (RCBD) was used to allocate six replicates of each of the two treatment conditions (treated vs. untreated) across two blocks of test tanks (3 replicates of each treatment condition per block = 6 test tanks per block = 12 test tanks used in the study). During the study, blinding techniques were

employed to minimize data-collection bias. The study lasted 25 d and comprised a 1-d pre-treatment (i.e., acclimation) period, a 10-d treatment period, and a 14-d post-treatment period. During the pre-treatment period, fish in all 12 test tanks were not fed. During the treatment period, fish in the six treated test tanks were fed florfenicol-medicated feed, and fish in the six untreated test tanks were fed non-medicated feed. During the post-treatment period, fish were not fed every day; however, on the days that they were fed, fish in all 12 test tanks received non-medicated feed. A RCBD analysis of variance performed at the end of the 25-d study revealed that mean percent total mortality of fish in the treated test tanks ($\bar{x} = 16.3\%$ based on $n = 6$ test tanks) was significantly less ($P \leq 0.001$) than that of fish in the untreated test tanks ($\bar{x} = 89.7\%$ based on $n = 6$ test tanks). These mortality results—combined with (a) fish health data collected during the study, (b) the fact that dose-verification showed that medicated feed was within 3% of the target dose, and (c) the fact that the pathogen of concern (*A. salmonicida*) was shown to be sensitive to florfenicol—demonstrated that florfenicol-medicated feed treatment was efficacious in controlling mortality in FCS fingerlings caused by furunculosis.