Gaining Approval of Erythromycin to Control Bacterial Kidney Disease in Salmon: Profile of Bacteria in the Gastrointestinal Tract of Chinook Salmon (*Oncorhynchus tshawytsha*) Before During and Following Administration of Erythromycin Rations

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Bacterial kidney disease (BKD) is a chronic bacterial infection that affects all salmonids, especially Pacific salmonids. The macrolide antibiotic erythromycin is effective in controlling the mortality from BKD. Although used for years in human and animal medicine, erythromycin has not been approved for use in fish. Researchers at the University of Idaho have been working to gain approval from the Food and Drug Administration for erythromycin feed additive for salmonids under Investigational New Animal Drug Permit 6013. Efficacy, target animal safety and drug depletion studies have been completed. Drug approval was delayed because of concerns that increasing the use of antibiotics in fish could cause increased frequency and transfer of resistance in pathogens that affect humans. To understand the risks of antibiotic therapy in salmonids, we evaluated the culturable aerobic herotrotrophic bacterial microflora of the lower gastrointestinal tract of salmonids before and after erythromycin therapy. Chinook salmon were sampled from Lookingglass Hatchery, Oregon Department of Fish and Wildlife, and from Clearwater Fish Hatchery, Idaho Department of Fish and Game. Bacteria that grew on agar with and without erythromycin were quantified, and random samples of bacterial colonies were identified using biochemical profiles. The posterior intestine contained a variety of bacterial strains and the diversity was reduced after feeding rations with erythromycin. During treatment the proportion of bacteria resistant to erythromycin increased. We found *Staphylococcus* and *Bacillus* strains that were resistant to erythromycin at the end of 28 d of therapy. After the treatment ended, the microflora changed, and diversity increased. No consistent resident microflora was found in the intestine; rather we found the pattern of bacteria in the intestine reflected the bacteria in the feed as well as the water and upstream fish populations. We plan to measure the percent resistant bacteria in fish at the time of release in the spring, and conduct additional studies of resident fish in and surrounding areas of hatchery effluents.