

KINTAMA RESEARCH CORPORATION

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Dr Michael Schiewe
Northwest Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
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Seattle, WA
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Dear Mike:

This letter outlines the collaborative research in the area of acoustic tracking that we have developed in consultation with Dr Ed Casillas and Mr John Ferguson of your staff. We have agreed to co-ordinate the research proposals by NMFS and Kintama Research Corporation to the NWPPC to build on the strengths of both.

In brief, on Kintama's part, our intent is to put in place a proof of principle experiment in 2003 to demonstrate the relevance of a large-scale acoustic tracking array using the commercially available Vemco tracking technology to addressing Columbia River salmon issues, and providing a structured phase-in to a more extensive array. This will be done to address comments from the ISRP on the need for a phase-in period and in recognition of the limited funding available for new research.

The work by Kintama will yield preliminary data that will address movement patterns of larger Columbia River salmon smolts relative to the plume and information on their ocean distribution. This data will be provided to NMFS staff for use in planning the biological applications for the complementary 400 KHz system you are developing for fall (ocean-type) chinook, the majority of which are too small for the Vemco technology. The development of the seabed array by Kintama may also provide an infrastructure capable of hosting the NMFS acoustic detectors for smaller smolts, which NMFS plans to develop over the next 2-3 years.

Specific Proposal: 2003 FY

Our proposal for the 2003 field season is to put in place 4 acoustic detection lines in the ocean. Each of the four lines would extend from near-shore to approximately the 100m isobath on the shelf, since the majority of juvenile chinook are found inshore of the 100m depths (See the Kintama proposal for details). One line would be placed to the south of the Columbia River plume, just north of Cape Meares, to detect the movement of acoustically tagged Columbia River smolts to the south of the plume. Two lines would be placed on the seabed to the north, near Grays Harbor and Cape Flattery. The rationale for

placing only one line to the south is that the majority of Columbia River chinook appear to remain north of Cape Blanco, a major faunal divide, and that this region of the coast is comparatively small. One line to the south of the Columbia River plume should result in multiple detections of salmon resident in this area. To the north of the plume two lines are more appropriate to establish movement patterns, and in particular to identify those animals that make a one-way migration to the north out of the area. A fourth line will be placed off northern Vancouver Island, as this is an area where stream type chinook from the Snake River and upper Columbia River have been found to rapidly reach during their early ocean migrations. Placing the detection line here will quantify the rate of movement and proportion of smolts that survive to this region. As the ISRP recognized, the placement of one line distant from the Oregon-Washington shelf is also important to resolving questions concerning relative use of different areas of the West Coast by Columbia River smolts, particularly the general area of the plume environment (3 lines) and measuring passage into the area to the north (one line).

Tagging will be done using a reduced number of salmon smolts, using the diversion facility at Bonneville to collect 200 PIT-tagged stream-type chinook of specific origin in late April-early May for tagging with acoustic tags. (We should be able to co-ordinate with Prof Carl Schreck's COE-funded study to collect information on the ocean movement of steelhead smolts at the same time, at no added cost). An additional 200 PIT-tagged ocean-type chinook smolts would be collected and tagged in the same manner at Bonneville in June. These fish would represent a mixture of the upper size range of sub-yearling smolts and the full size-spectrum of yearling smolts. Both stream and ocean type smolts would be tagged with V8SC-6L acoustic tags, which would have anticipated lifespans of 4.5 months. During data retrieval in August-September from the acoustic receivers constituting the 4-line array, a contract seine vessel would be used to collect and tag at sea an additional 200 smolts with longer lived (ca. 2 yr) acoustic tags of the same diameter. These larger smolts are capable of accepting a larger, and therefore longer-lived, tag (ca. 20 month life span). Tagging with these tags in August-September would provide an understanding of the longer term over-winter movements of the smolts, plus their movements as 1-ocean fish over the following summer. This approach would add tagged animals to the population to be monitored at about the time that the initial tags applied at Bonneville would reach the end of their expected life spans, and provide information on movement patterns of resident smolts into their second year of ocean life.

We believe that this approach will lead to an initial characterization of the relative ocean movements of stream- & ocean-type chinook plus steelhead in a cost effective manner. This will provide NMFS with an opportunity to use this information to better target key life history types of salmon with their own tag system when it is completed, and Kintama with an opportunity to assess and expand the larger scale tracking network. We would propose that in year 2 (2004) that we would double the size of the tracking array and double the number of tags used if all goals in 2003 were successfully met. Depending on the tracking results from 2003 the existing four acoustic lines could either be doubled in length to extend beyond the 100m isobath or the number of lines could be doubled to eight if analysis of the data from 2003 showed that their offshore extent was adequate. If the results of 2004 also met expectations we would propose increasing the effort again to that of the full proposal we originally submitted to the estuary solicitation. Costs would then increase as outlined in the original proposal to achieve this level of effort. Thus, only if all

aspects of the first two years of work were deemed a success would we expand to the full array we proposed to the NWPPC. Annual determination of whether these goals were met would be made by BPA, who would presumably make this decision with input from NMFS staff and the ISRP.

In addition to providing a clear phase-in of the proposed array and a set of deliverables that must be met, Kintama Research will also actively pursue additional sources of funding in both the US and Canada that will allow us to develop a more extensive array. The benefits of this extended array, if funded from other sources, would contribute to better understanding of the movement of Columbia River salmon.

Costs

We expect that the cost of the scaled-back work proposed for 2003 will amount to \$600,000 US. We anticipate that the cost of scaling up of the work in future years would follow the schedule outlined above, and would be negotiated with Bonneville Power Administration based on the success of the first year's work. A detailed statement of work and budget will be prepared for BPA to reflect this proposal.

Best wishes,

David W. Welch, Ph.D.
President