THE AMERICAN MOSQUITO CONTROL ASSOCIATION

One Capitol Mall, Suite 800
Sacramento, CA 95814
Phone: (888) 626-0630
Fax: (916) 444-7462
www.mosquito.org

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Christopher W. Claire
Habitat Protection Biologist
Oregon Dept. of Fish and Wildlife
P.O. Box 5003
63538 Boat Basin Drive
Charleston, OR 97420

Dear Mr. Chris Claire,

I appreciate the opportunity to review the design of the proposed Winter Lake Phase III project that was developed by Beaver Slough Drainage District (BSDD), the Coos Soil and Water Conservation District (Coos SWCD), Oregon Department of Fish and Wildlife (ODFW), and the Nature Conservancy (TNC). In my capacity as the Technical Advisor for the American Mosquito Control Association (AMCA), I am very often asked to speak to the design, implementation, and efficacy of mosquito surveillance and management actions of districts and programs. With a couple decades experience managing mosquito populations throughout the country, I offer the following comments for you and your partner agencies. As I understand the Winter Lake Phase III objectives, this project is designed as both an ecological restoration and agricultural improvement project that will complement the previously completed Winter Lake Phase I and Phase II projects.

As an expert in mosquito biology and the transmission dynamics of the pathogens they may transmit, I cannot comment on the capacity of this project to restore habitat for salmonid fish species or improve agricultural use. However, I do understand the past and current concern that this restoration project may have to produce excessive mosquito populations. It is highly encouraging that the project designers are considering the potential for these restorative efforts to create extreme mosquito annoyance and disease transmission issues. I further understand that according to the project plans, the primary focus of Phase I was the installation of seven new tide gates to replace the previously existing and undersized and top-hinged gates. This work was completed in 2017, and the new gates have increased the capacity for water movement into and out of the 1,700-acre BSDD site by 300%. Furthermore, the Winter Lake Phase II project was undertaken in 2018 and added a total of 31,000 feet of tidal channels in 407 acres of the designated Unit 2 portion of the project.

Upon completion of these two phases, however, it is understood that there remains 1,399 acres in areas designated as Units 1 and 3. These Units had no previous internal restorative actions. More importantly, these Units still suffer from rampant hydrologic discontinuity. It is my

understanding that Winter Lake Phase III primarily proposes to remediate this hydrologic discontinuity by replacing 42 existing undersized culverts and associated old style top-hinged tide gates with 38 new culverts and redesigned channels. In review of the provided Winter Lake Phase III Project Action documents, there are multiple design concepts that should limit mosquito production on the site.

It is understood that the project plans to install a total of 38,090 smaller swale type channels designed to provide fish ingress/egress to locations with low areas that could generate stagnant water. These channels may be the key parameter of the Phase III workplan that would decrease mosquito production. I know that, through our work together on the Bandon NWR, Ni'les-tun Unit, you have extensive experience in the remediation of mosquito production on a restored marsh. Together, we spent countless hours on that project discussing the various features that can result in excessive mosquito production. In essence, mosquito production will occur if water is delivered into certain low elevation areas that lack proper water transfer during the warmer months of the year. These areas are locations where tidal water is able to breach berms and other physical features and enter depressions and other lower elevation areas. Then as the water recedes, fish and other natural predators (if they are even able to access these areas of the marsh) can become stranded and eventually die during late spring from warmer temperatures and predation. Mosquitoes are evolutionarily adept at finding these shallow, water holding areas that lack natural predators and lack proper tidal flow. As a result, they can prolifically breed. This mosquito production is exacerbated when tidal flow is further restricted to the 1 or 2 highest lunar tides each month. The addition of 38,090 smaller swale type channels would likely develop an extensive channel network and allow routine tidal water to enter these low lying, potential mosquito production areas. These channels should ensure areas of lower elevations that have trapped water can drain as waters recede on low tide recession.

It is also beneficial to increase tidal water inflow, outflow and mixing throughout the entire site. This more frequent tidal flushing of the march should eliminate the stagnation of water that is favored by multiple local mosquito species. The construction of on-grade tidal/floodplain channels throughout Units 1 and 3 should decrease mosquito production by improving nutrient and energy cycling and decreasing overall water temperatures; thereby, allowing for more fish access to the many low depressions and areas of currently diminished hydrologic function. In addition, the connection of these larger and smaller on grade channels to hydrologic bulbs within low-lying floodplain areas should prevent the stranding risk for juvenile coho throughout the project site. Although important for the ecological restoration of the site, juvenile coho can also be considered excellent predators for mosquito larvae.

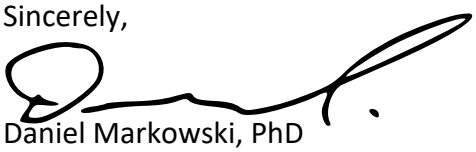
Finally, replacing the existing undersized culverts should allow for proper tidal flow to currently underserved areas of Unit 1 and 3. When combined with the intended increased channeling, strategically placed hydrologic bulbs, the increased tidal flow to these currently underserved areas should provide greater ability to replenish nutrient-rich water and drain low-lying areas that have potential for mosquito production.

It is worth noting that continued monitoring of Units 1 and 3 should be implemented to ensure that the designed channel networks connect all low-lying areas properly. If any areas are not properly connected, the result could be extended periods of standing water and mosquito production sites. Additionally, channel networks should be continually monitored to ensure that they remain properly on-grade and do not become partially filled and thus do not allow for sediments to be transported properly. In looking at the overall Phase III design, I would suggest implementing detailed monitoring in Unit 1's southern extents. In reviewing the designs, there are multiple channels that appear to be designed to provide proper tidal flow and drainage of the area. In particular, channel Mess12a, feeds Mess12b, mess12b2, and Mess4f; channel mess9 feeds Mess12e. In addition, channel Mess11a feeds and connects Mess11b and Mess11d; channel Mess11c feeds Mess11c2. Because this channel network would serve a relatively large floodplain that could have numerous micro depressions or ruts, I would prioritize monitoring efforts to this portion of the project during and after channel construction.

Furthermore, it should be noted that in the many figures provided, there is a sizeable marsh immediately across the Coquille River that is not part of the project. Much of this property appears to be in an elevation zone that could be conducive to mosquito production. Without accessing the property and conducting larval surveillance in the summer month, I cannot be certain if there are areas that are producing mosquitoes. However, it may be beneficial to contact the property owner and seek such permissions to better understand the mosquito production areas that may be along the Coquille River and/or adjacent to the site. The primary pestiferous mosquito species produced in these habitats can fly many miles, if needed, in a day.

In summary, I would like to thank you, again, for the opportunity to comment on the proposed Winter Lake Phase III project. I hope that my assessment of the proposed project is useful to you and your partner agencies. As an individual that spent a great amount of time combatting the mosquitoes in the area, it is genuinely refreshing to see such care and thorough thought dedicated to the reduction of mosquitoes inherent in the project's design. If our past experiences have illuminated anything, it is that restoration projects like this are essential for our well-being and through proper design and forethought we can dramatically minimize the risk of excessive mosquito production. I look forward to walking the site with you upon completion, discussing the many obstacles, and lessons you've learned. Based upon the many design elements included in the presented plan, it is not anticipated that we would encounter a significant population of mosquitoes resultant from the restoration efforts.

Sincerely,



Daniel Markowski, PhD
Technical Advisor
American Mosquito Control Association