



# THE XERCES SOCIETY

## FOR INVERTEBRATE CONSERVATION

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*An international  
nonprofit organization  
that protects wildlife  
through the conservation of  
invertebrates and their habitat*

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September 3, 2013

Roy Lowe  
Project Leader  
Oregon Coast National Wildlife Refuge Complex  
U.S. Fish & Wildlife Service  
2127 SE Marine Science Drive  
Newport, OR 97365

Dear Mr. Lowe,

### Re: Concerns regarding negative environmental impacts of proposed adulthood and larviciding at Bandon Marsh National Wildlife Refuge

The Xerces Society for Invertebrate Conservation has grave concerns with the chemical controls proposed for salt marsh mosquitoes at Bandon Marsh National Wildlife Refuge and in the Bandon area, as well as with the procedure used to arrive at this outcome. We formally ask that the Bandon Marsh National Wildlife Refuge abandon plans to spray the adulticide Dibrom and the larvicide MetaLarv S-PT and move to an Integrated Pest Management approach to managing mosquitos at the marsh.

Although no public health emergency has been declared and no existence of mosquito-transmitted disease has been found, a decision was made to spray parts of the refuge with the mosquito adulticide Dibrom and the larvicide MetaLarv S-PT to reduce nuisance biting apparently caused by the salt marsh mosquito, *Aedes dorsalis*. This decision runs directly counter to the stated policy of mosquito management at USFWS wildlife refuges, specifically “we will allow populations of native mosquito species to function unimpeded unless they cause a human and/or wildlife health threat.” (Federal Register 2007).

The adulticide Dibrom (active ingredient naled) is an organophosphate, a class of insecticide known to be highly toxic to a wide range of aquatic organisms, including mayflies, stoneflies, caddisflies, and crustaceans, which provide food for native fish, as well as the aquatic bugs and beetles that are naturally-occurring predators of mosquito larvae (Mulla *et al.* 1984; Xue *et al.* 1993; Marten *et al.* 1993; Laskowski *et al.* 1999; Pinckney *et al.* 2000). Drift from ultra-low volume sprays can affect pollinators such as native bees and butterflies (Emmel 1991; Eliazar & Emmel 1991; Carroll & Loye 2006), and low-flying aircraft used to deliver sprays can disturb nesting birds. Toxicity aside, adulticiding against mosquitoes is widely recognized as being reactive

and ineffective, especially against a species such as *Aedes dorsalis*, which can fly 10–20 miles away from its emergence site. An endless cycle of spraying can result, as adults continue to emerge and disperse from breeding grounds that may be substantially distant from where the adults are biting.

While control of mosquito larvae deals better with the source of the problem, it has been stated that in this instance, the decision was made not to use the more targeted and less broadly toxic biological control Bti in favor of MetaLarv S-PT. MetaLarv is a slow-release formulation of methoprene, a compound that mimics the naturally-occurring juvenile hormone in insects. Because all invertebrates use juvenile hormone in development, this compound is also broadly toxic to aquatic invertebrates, and chronic sublethal exposure has been shown to cause developmental disorders, morphological defects, and reproductive anomalies in dragonfly nymphs, mayflies, beetles, crustaceans, and non-biting midges (Breaud *et al.* 1977; Bircher & Ruber 1988; Meyer 1994; Chu *et al.* 1997; Glare & O’Callaghan 1999; Olmstead & LeBlanc 2001; Walker *et al.* 2005). This compound has also been implicated in some cases with developmental defects in amphibians (LaClair *et al.* 1998; Ankley *et al.* 1998; Degitz *et al.* 2003).

Although reports indicate that no mosquitoes have infested the beach or the town, spraying will also be done in residential areas as well as the marsh. This plan is contrary to the tenets of Integrated Pest Management (IPM), in which a thorough process of surveillance is conducted to determine the “hotspots” of mosquito larval development, and those sites are spot-treated with the least toxic insecticide possible, when and as needed. It may also be placing sensitive species known to inhabit the Bandon area at risk. Bandon’s beaches are areas where both the federally endangered western snowy plover (*Charadrius alexandrinus nivosus*) and a rare and declining endemic species, the Siuslaw hairy-necked tiger beetle (*Cicindela hirticollis siuslawensis*), are known to breed and live year-round (Mazzacano *et al.* 2009). As the western snowy plover is a listed species under the Endangered Species Act, consultation with USFWS Ecological Services is required to ensure this project is not violating the Endangered Species Act.

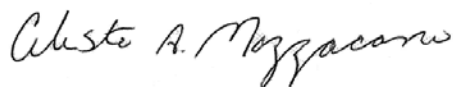
The plan has not addressed the impact that spraying could have on the tens of thousands of shorebirds, waterfowl, and songbirds that use Bandon Marsh as a stopover during migration. These birds have a critical need for aquatic invertebrates as food as they travel south in September and October, and due to disruption of food webs from repeated mosquito adulticiding and use of a slow-release, long-acting methoprene larvicide, waterfowl that migrate in November could also be affected. There is also no mention of how this could affect fisheries. Both organophosphates and methoprene are directly toxic to fish, and many young fish feed on the invertebrates that would be killed under this treatment plan.

It is highly unlikely that the entire marsh is producing mosquitoes at the same rate; thus, it makes little sense to use broad-spectrum insecticides that kill a variety of aquatic invertebrates that are important food for native fish, waterfowl, amphibians, and passerine birds. Use of the broad-spectrum insecticides disrupts the ecosystem further by removing the natural enemies of mosquitoes, including copepods, dragonfly and damselfly nymphs, and aquatic bugs and beetles, which can help suppress or control mosquito populations. With the suite of natural enemies continually being removed, the mosquito problem could intensify. Salt marsh restoration has had

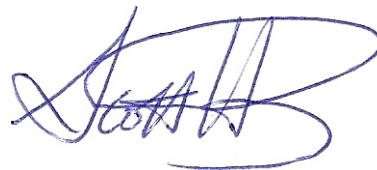
extraordinary success in many East Coast states, where the results of Open Marsh Water Management, including restoration of daily tidal flows and increased access to the marsh by predatory fish, have greatly reduced or even eliminated the need for mosquitocides (Hruby *et al.* 1985; Meredith & Lesser 2007; James-Pirri *et al.* 2012). It is more ecologically sound, cost-effective, and better for site management planning to determine which specific regions of the marsh are enabling high levels of mosquito production and to assess how to better restore them in the future, than to engage in widespread and needless spraying that will be environmentally and financially costly, and of limited effectiveness.

Mosquito eradication is not practical, possible, or necessary. These insects are an integral part of the ecology and food web of wetlands, as are the multitude of other aquatic organisms that will be negatively impacted by a campaign of widespread treatment with organophosphates and methoprene. We urge the Oregon Coast National Wildlife Refuge Complex to develop a rational, environmentally sound, and effective mosquito management plan for the Bandon Marsh area in accord with the tenets of Integrated Pest Management, including: educating the public about the lack of risk of mosquito-borne disease and the importance of personal protection against biting; consistent and through monitoring to determine whether a site is producing mosquitoes in significant numbers, assess seasonal patterns of abundance, pinpoint microhabitats that are “hotspots” of mosquito production, and monitor effectiveness of management actions; and develop and implement a site-specific management plan that preserves the ecological integrity of the marsh and its surroundings.

Sincerely,



Celeste Mazzacano, Ph.D.  
Aquatic Conservation Director



Scott Hoffman Black  
Executive Director

Cc: Head of refuge system

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