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## **Deer Flat National Wildlife Refuge Summary of Mosquito Activity and Pesticide Use Report for 2011**

Mosquito larval inspection activities started in early April and adult mosquito surveillance began in late May. A two man team conducted mosquito larval inspections starting the first week of April and concluded in September. The inspection team was on the refuge 5 days a week conducting inspection and mosquito larvae monitoring. A total of 246 visits were made with 617 man hours logged. A larval density count action level threshold of an average of 5 mosquitoes per dip//10 dips using standard dipping methods was used to determine if mosquito larvicide operations would be considered. CCMAD contracted with Valley Air Service to conduct larvae control operations on DFNWR. In some instances, mainly in area that air craft could not fly, ground operations were conducted. CCMAD mosquito control measures on refuge properties was a targeted larvae control measure using Bti products (**Bacillus thuringiensis israelensis**) brand names: Vectobac 12AS, Vectobac CG, Teknar and Aquabac xt. Also applied in certain areas was the product VectoMax CG (active ingredient: (**Bacillus israelensis/Bacillus sphaericus**)) CCMAD conducted non-target aquatic organism inspections 24 to 48 hours after each application. In every inspection there was no adverse affect noted on non target species.

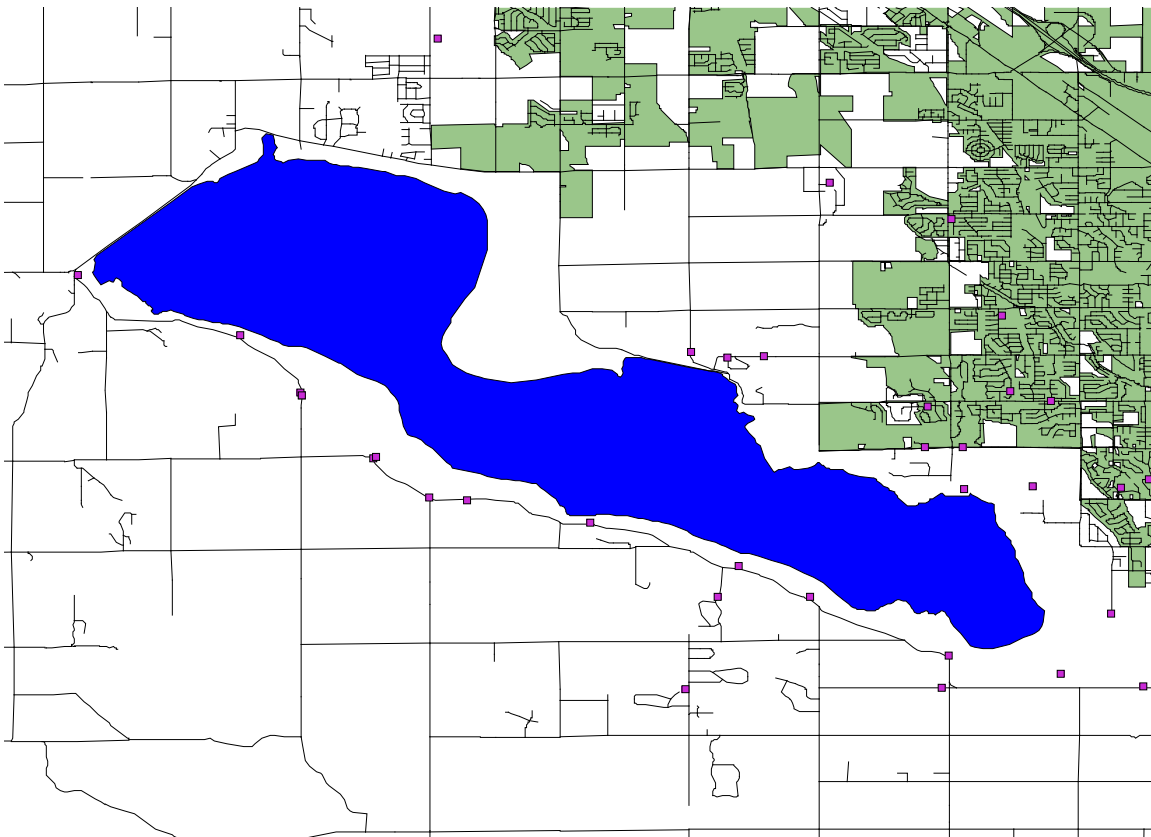
### **Mosquito Control Products Used on Deer Flat National Wildlife Refuge:**

Vectobac 12 AS: EPA Reg. no. 73049-38  
Vectobac CG: EPA Reg. no. 73049-19  
Tecknar CG: EPA Reg. no. 73049-403  
Aquabac xt: EPA Reg. no. 62637-1  
VectoMax CG: EPA Reg. no. 73049-429 (active ingredient **Bacillus thuringiensis/ israelensis/Bacillus sphaericus**)

### **Rates of Application of Products used on Deer Flat National Wildlife Refuge:**

Vectobac 12 AS: 1 to 2 pt. /acre  
Vectobac CG: 8 to 10 lbs. /acre  
Tecknar CG: 8 to 10 lbs. /acre  
Aquabac xt: 1 to 2 pt. /acre  
VectoMax CG: 7-20 lbs. /acre

**Adult Mosquito Surveillance and West Nile Virus:** CCMAD deployed 10 to 12 CO<sub>2</sub> baited light traps on Deer Flat National Wildlife Refuge. Surveillance commenced on May 31, 2011 and concluded on September 4, 2011 when mosquito activity declined to relatively low measurement levels. Included in this report is a map of trap locations and weekly surveillance data from sites monitored. CCMAD also has the capability to conduct West Nile Virus testing using the Rapid Analyte Measurement Platform, (R.A.M.P.). The R.A.M.P. system can provide immediate testing results which can aid in management decisions in conducting mosquito control operations on and adjacent to refuge property. Testing for Western Equine Encephalitis is conducted by the State of Idaho Bureau of Laboratories. In 2009 there were 5 positive West Nile Virus sites detected as a result of CCMAD surveillance. In 2010, there was no West Nile Virus or Western Equine Encephalitis activity noted. In 2011 there was also no West Nile Virus or Western Equine Encephalitis activity noted.



**Map of CCMAD Mosquito Surveillance Sites on or near Deer Flat National Wildlife Refuge.**

CCMAD deployed 10 to 12 trap sites per week. There were 16 trap sites on Deer Flat Refuge. Some of these sites revealed no data and were not surveyed after the first few weeks. Traps are deployed in the early evening and collected the next morning. Mosquito species are frozen then processed by species. Vector species are pooled into test pools and tested for West Nile Virus; positive pools as a result of R.A.M.P. testing

are sent to the Idaho Dept. of Health and Welfare Bureau of Laboratories (B.O.L.) and further tested for Western Equine Encephalitis and St. Louis Encephalitis.

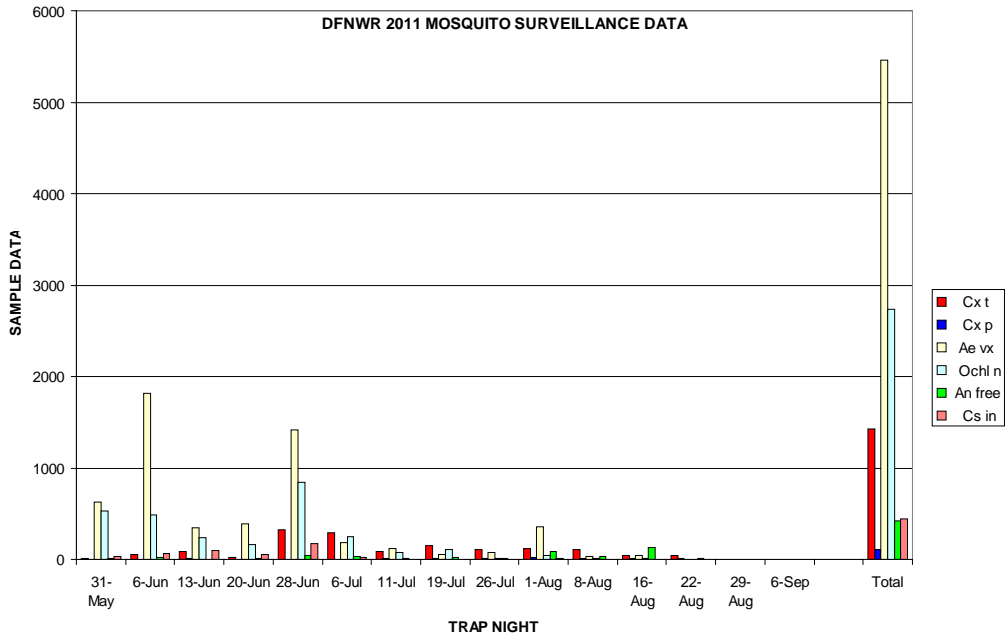
Below are is a chart of weekly mosquito activity on DFNWR. There were six (6) predominate species surveyed May 31 through September 6.

Table 1: Table of Weekly Surveillance for All Mosquitoes Trapped

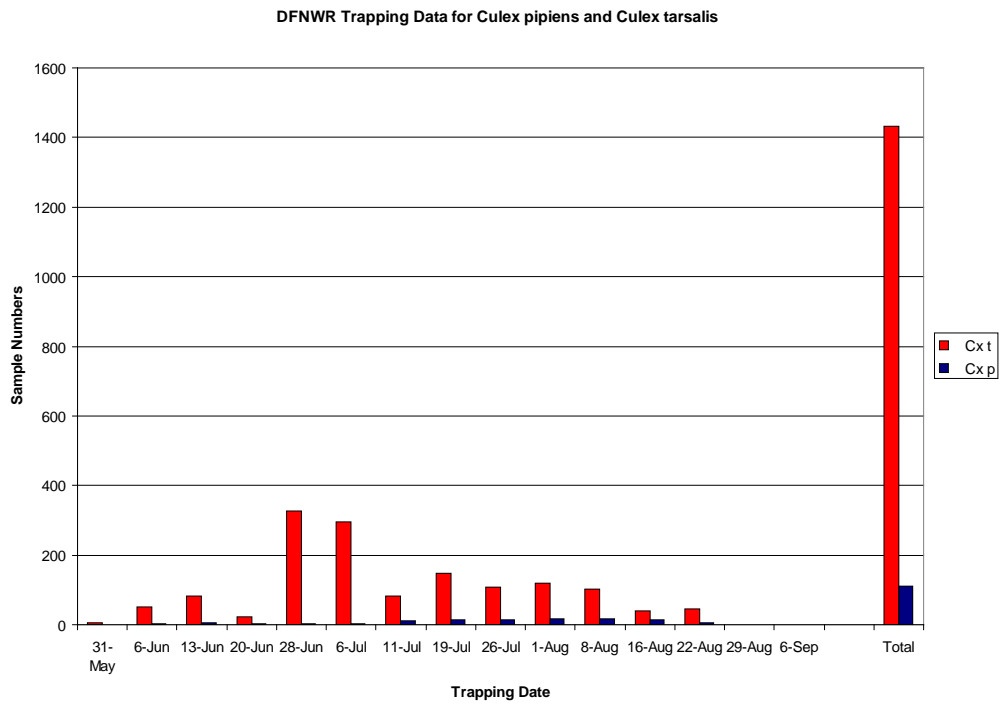
Mosquito Surveillance Data Deer Flat National Wildlife Refuge 2011							
Date	Cxt	Cxp	Ae vx	Ochl n	An free	Cs in	Total
31-May	7	0	632	527	8	30	1204
6-Jun	51	3	1814	482	17	64	2431
13-Jun	83	6	351	233	4	97	774
20-Jun	24	2	387	162	7	51	633
28-Jun	327	2	1416	838	38	169	2790
6-Jul	295	2	182	248	33	19	779
11-Jul	82	10	117	79	14	1	303
19-Jul	148	15	55	103	26	2	349
26-Jul	108	15	71	10	9	1	214
1-Aug	118	18	357	38	90	10	631
8-Aug	103	16	35	8	29	0	191
16-Aug	40	15	42	9	130	1	237
22-Aug	46	6	1	0	13	3	69
29-Aug	0	0	0	0	0	0	0
6-Sep	0	0	0	0	0	0	0
<b>Total</b>	<b>1432</b>	<b>110</b>	<b>5460</b>	<b>2737</b>	<b>418</b>	<b>448</b>	<b>10605</b>

#### Mosquito Species Legend

<b>Cx t</b>	Western Equine Encephalitis Mosquito ( <u>Culex tarsalis</u> )
<b>Cx p</b>	Northern House Mosquito ( <u>Culex pipiens</u> )
<b>Ae vx</b>	Inland Floodwater Mosquito ( <u>Aedes Vexans</u> )
<b>Ochl n</b>	Irrigated Pasture Mosquito ( <u>Ochlerotatus nigromaculis</u> )
<b>An free</b>	Western Malaria Mosquito ( <u>Anopheles freebornii</u> )
<b>Cs in</b>	Winter Marsh Mosquito ( <u>Culiseta inornata</u> )



**Figure 1: Graph of Weekly Species Surveillance DFNWR**



**Figure 2: Graph of Primary Vector Species Survey on DFNWR**

The dominate species of mosquito trapped on DFNWR was *Aedes vexans* at 30% of all mosquito species trapped. Primary disease vectors trapped (*Cx tarsalis* and *Cx pipiens*) accounted for 37% of sample data. This percentage of primary disease vectors was up from 2010 levels (25% of all mosquitoes sampled). There was no positive disease activity on DFNWR.



**CDC CO<sub>2</sub> Light Baited Traps are deployed at sundown and retrieved in the A.M.**

### **Pesticide Use Report**

Ground applications were conducted near areas of nesting eagles where aircraft could not fly into.

**Table 2: 2011 Ground Application Pesticide Use**

<b>Product</b>	<b>Amount Used</b>	<b>Acres Treated</b>
Teknar HP-D	99 diluted gallons	25.03 acres
Teknar G	62 lbs.	6.00 acres
Vectobac 12AS	160.25 diluted gallons	63.71 acres
Vectobac CG	297.56 lbs.	26.87 acres
VectoMax CG	592 lbs.	49.50 acres

In 2010 CCMAD applied 1157 diluted gallons of Bti was applied on 387.38 acres. The total number of granular Bti applied (**ground operations**) was 351 lbs. on 43 acres of shoreline habitat. A total of 430 acres were treated.

**Table 3: Aerial Larvicide Record DFNWR**

<b>Date</b>	<b>Amount (Bti)</b>	<b>Acres Treated</b>	<b>DFNWR Location</b>
<b>May 5</b>	1600 lbs.	200	Access 7 to Access 4
<b>May 26</b>	1600 lbs.	200	Access 7 to Access 4
<b>June 3</b>	1600 lbs.	200	Gott's Pt. to Shaeffer's Lateral
<b>June 6</b>	1600 lbs.	200	Access 8 to Access 5
<b>June 22</b>	808 lbs.	106	North Refuge off Orchard Ave.
<b>June 28</b>	2400 lbs.	300	Access 8 to Access 4
<b>July 14</b>	1760 lbs.	220	Shaeffer's Lateral to Access 1
<b>July 26</b>	3200 lbs.	400	Shaeffer's Lateral to Access 1
<b>July 29</b>	1280 lbs.	160	Upper Embankment Marsh
<b>Aug 10</b>	1600 lbs.	200	Shaeffer's Lateral to Tio Lane

**Total Acres Treated: 2186**

**Total Amount Bti (Vectobac CG): 17448 lbs.**

**2010 Comparison:**

**Total Acres Treated: 1820 acres**

**Total Amount Bti (Vectobac CG): 14195 lbs.**

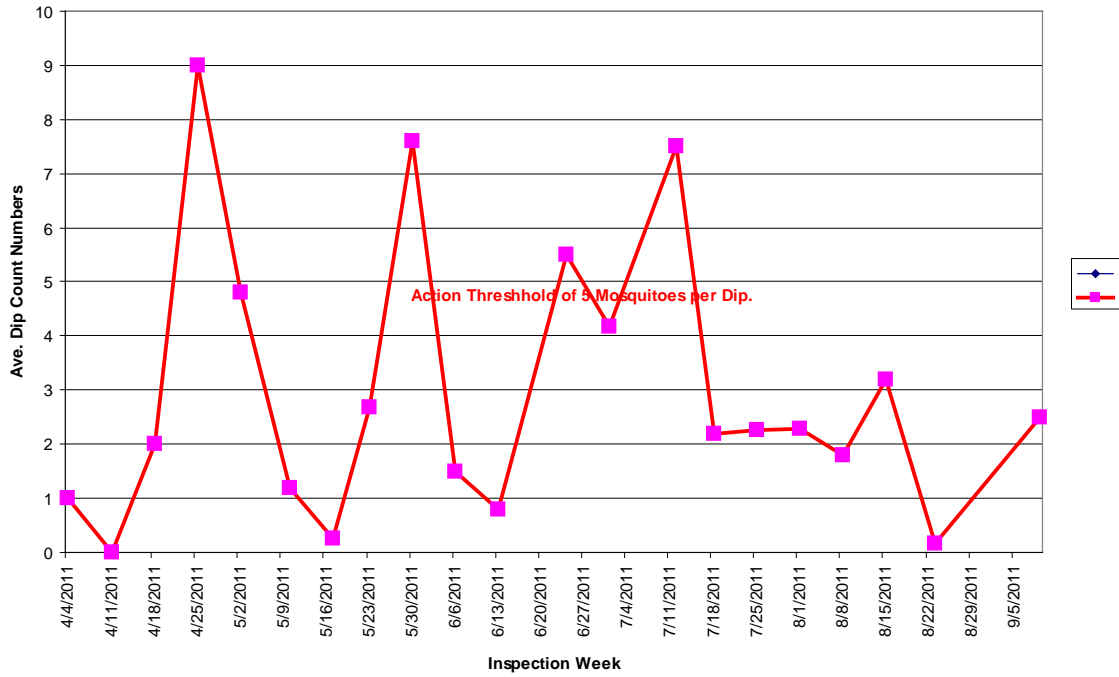
**Total Acres treated on DFNWR both air and ground: 2573.3 acres**

**2010 Comparison: 2207.38 acres**



**Figure 3: Examples of Aerial Larvicide Application Sites DFNWR**

DFNWR Average Weekly Mosquito Larvae Dip Count



DFNWR Weekly Average Mosquito larvae Dip Counts

Inspection Date	Ave. Weekly Dip Count	Aerial Larvicide Application Date
4-Apr	1	
11-Apr	0	
18-Apr	2	
25-Apr	9	
2-May	4.8	5-May
10-May	1.2	
17-May	0.25	
23-May	2.69	26-May
30-May	7.61	3-Jun
6-Jun	1.49	6-Jun
13-Jun	0.8	
24-Jun	5.5	22-Jun
1-Jul	4.17	28-Jun
12-Jul	7.5	14-Jul
18-Jul	2.2	
25-Jul	2.25	26-Jul
1-Aug	2.28	29-Jul
8-Aug	1.8	
15-Aug	3.2	10-Aug
23-Aug	0.16	
9-Sep	2.5	

Fig. 4 and Table 4: Action Threshold for treatment: 5 mosquitoes/ dip using standard 10 dips with 8 oz. dipping cup

Note: The above table and graph shows average dip counts not specific site dip counts.

## Conclusion

There was no positive disease activity noted on DFNWR in 2011. Vector species surveyed did peak between June 28 and July 6 (*Culex tarsalis*) and *Culex pipiens* populations stayed relatively flat through out the surveillance collection time period. The dominate species of mosquito trapped was *Aedes vexans* (51% of total mosquitoes sampled). Even though this is a species of mosquito that is a secondary carrier of WNV and Western Equine Encephalitis, CCMAD tests the species for disease activity. Action thresholds of an average of 5 mosquitoes per dip/ten dip was an affective tool for both disease and secondary disease vector mosquitoes. CCMAD will continue to use 2 man inspection teams to determine larvicide treatment strategies and action.

Site specific threshold levels were met seven times between April 4 and September 9. Adult surveillance and site larval inspections and counts ended the week of September 6 when counts became less than threshold levels or nonexistent.

Off refuge mosquito aduicide operations were conducted in surrounding neighborhoods periodically through the mosquito season using Anvil 10-10. Anvil 10-10 is a non residual Pyrethroid (active ingredient: Sumithrin 10%) Sumithrin breaks down very rapidly after application and has an all agricultural use registration for crops grown around DFNWR.

Respectfully submitted,

Ed Burnett  
District Director

