The winter of 2016 created a severe flood impact along the Boise River throughout many counties including Ada County. This flood impacted many homes, lands, roads and bridges across the county which also resulted in a major mosquito issue in early spring and summer. While the temperature remained low but warm enough to melt the snow, it brought flood water down the river corridor, creating huge pools of standing water when the waters finally started to receded and even before the flowing waters stopped, many pools of water were forming in locations where they were not found before in the last 30+ years. Most of these waters were difficult to access or completely unsafe for the mosquito abatement district personnel to control the mosquitoes developing in the new habitats.

Experienced mosquito personnel mapped more than 257 locations of new areas where no previous water sources had been found (right); over 2500 acres that we could access were mapped. From this, record number of WNV vector species were hatching out (over 20,000 trapped by mid June) and we were received resident complaints in record numbers along with that.

Our surveillance data saw exponential numbers which put us on red alert for a possible WNV outbreak, at which time, the BOCC declared an emergency declaration in June for mosquito control and we did an aerial application through a night-time adulticide application (15,360 acres) along the Boise River in June and later, for the first time, an aerial larvicide application (treated 2000 acres) where hard to reach and unsafe locations along the river needed treated. After the applications, we saw an immediate drop in mosquito populations and they never recovered to the previous high populations for the remainder of the season.
Mosquito Surveillance Operations

Surveillance is a key part of a Mosquito Abatement, as it allows us to track mosquito populations through sampling across the county and decide how best to use our resources to keep mosquitoes at manageable levels. The 2017 Season was challenging due to the heavy winter and spring flooding the county experienced. This year’s surveillance began May 15th and ended September 22nd. During the 2017 season our surveillance crews set 1871 traps at 158 (6 of those being new) different locations throughout the county and caught a total of 61,052 mosquitoes over the 19 week surveillance season. Once caught, they are then individually identified to species and counted, the *Culex pipiens* and *Culex tarsalis* are then grouped into pools of up to 50 mosquitoes to be tested for the West Nile Virus. Of our 61,052 mosquitoes caught, 41,687 of those were West Nile Virus vector species (68% of the population). We had a total of 73 pools come back positive for West Nile Virus this year.

*Brock Palen, Mosquito Division Coordinator*

Mosquito Species Found in Ada County...

Our most common mosquito species found this year was different than in previous seasons, with record high numbers in early spring from the flood waters and our vectors for WNV. West Nile Virus vector mosquitoes, *Culex tarsalis* (CXTA) (n=28,809) and *Culex pipiens* (CXPI) (n=12,704) were significantly higher than average and resulted in ACMAD completing 2 aerial applications. Another species that was historically high was the *Culiseta* genera of mosquitoes (n=5913), or marsh mosquito species which was also likely from the spring flood waters sitting for weeks with limited access to control.

This year was a record breaking amount of *Culex* species in June and the whole year, but half as many floodwater, or *Aedes vexans* (AEVE) (n=11,120) as in 2016. We did not find any new species of mosquitoes this year.

Three most common species found in Ada County in 2017.
In 2017, we found a total of **73 positive pools**, which is an increase from the last 2 years, but this was also expected with the cyclical nature of the virus observed historically in our district and ecological conditions. The 1\textsuperscript{st} positive pool occurring on July 14\textsuperscript{th}, 2017, was a couple weeks later than the last few years. This likely due to the aerial application in early spring which knocked down historical *Culex* number in June from the flooding. In 2017, 70% of the positive pools were *Culex pipiens*. All locations were treated within same day of finding WNV through adulticide applications following our best management plan.

<table>
<thead>
<tr>
<th>Year</th>
<th># of WNV Positive Pools</th>
<th>Week of First onset of WNV +</th>
<th># of Culex Spp. Sampled/Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>73</td>
<td>28</td>
<td>41687</td>
</tr>
<tr>
<td>2016</td>
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<td>30</td>
<td>8613</td>
</tr>
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<td>2015</td>
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<td>18538</td>
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</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>NA</td>
<td>5519</td>
</tr>
<tr>
<td>2009</td>
<td>38</td>
<td>29</td>
<td>10466</td>
</tr>
</tbody>
</table>

*Culex* species trapped in Ada County and WNV + week hits in 2017.
The 2017 mosquito adulticide season started on May 23, 2017. The adulticide crew completed a total of 2727 service requests this season. Of those 2727 service requests, 1069 were generated internally from trapping and 1658 came from resident complaints. We had 842 more service requests, mostly in June, in 2017 than the previous season and we treated a total of 43 positive WNV trap locations in the county this year which was 32 more trap locations than the prior season, this was an increase of almost 300%. The main difference between 2017 and 2015 was that in June of 2015, the complaints were predominantly based on nuisance (floodwater) mosquito complaints versus 2017 being predominantly vector species of mosquito complaints in June.

This year’s first positive pool from trapping occurred in week 28 and we had consecutive WNV positive pools weekly in various parts of the county until week 37.

We responded to WNV positive traps 2 weeks earlier this season than in 2016 and some locations had WNV+ hits multiple times. We responded immediately to all of the positive site locations and fogged 1/4 to 1 mi² around each site to knock down the adult mosquitoes that carried the virus. This season, June was our peak for resident complaint calls before we did an aerial adulticide application, but August was the peak for WNV positive mosquito pools. Due to WNV jumping all over the county each week, the adulticide crews kept busy in late summer with the WNV locations and regular resident complaints which resulted in more treated lane miles and acres compared to last year.

We completed an estimated 99,565.30 acres or 2505.97 lane miles for the 2017 season.

We completed an aerial adulticide application in June for a total of 15,360 acres to knock down the vector species before they started to transmit WNV earlier than normal.

Additionally, to reduce the chance of developing resistance in the mosquito population we rotated between 4 different adulticide products this season.

Charlie McNiel, Adulticide Crew Lead
The 2017 season was a very challenging and fast paced year for the larvicide crew. The new larviciders started out the season, studying and testing for their professional applicator license. All of the new larviciders successfully completed and passed both exams within 2 weeks due to our intensive training program. Then both seasonal and fulltime staff completed training on the new mosquito field software, which included both an in house component as well as hands on training in the field.

Aside from learning a brand new program the crews were also up against heavy spring flooding which resulted in standing water all across the county along the Boise River. As the flood waters started to subside, the crews were there to treat as much standing water as they could reach. By the end of June, crews had treated a total of 406 acres, 36% of those were because of Boise River flooding using either a backpack sprayer or a UTV with a granular spreader, however there was still over 2000 acres we could not reach. Because of the increased amount of mosquito habitat we also hired an additional field technician to help with the flood water treatments.

These extra inspections and applications were in addition to the field technicians normal 300-350 site visits per week. Due to all of the extra standing water and increased mosquito activity, we had an aerial larvicide application on July 6th that covered approximately 2000 acres of the floodplain. This is the first time Ada County Mosquito Abatement has flown a mission to treat for immature stages of mosquitoes and it proved to be a critical tool in our toolbox for controlling the rapidly growing mosquito population.

This year the larvicide crew mapped 5526 new sites bringing the total number of monitored sites to 36,220; this increased the weekly inspected sites from 300-350 a week in 2016, to 400-450 per week in 2017. In addition to new sites, we also have doubled our service requests over the past 3 years. We believe this is due to better public education and awareness along with the flooding event in 2017. We completed over 100,000 inspections and over 55,000 treatments across 746.3 acres on the ground (2746.3 acres total in 2017).

With input from the community we find mosquito problems in areas that we may not have known about without the help of landowners in Ada County.

Robin Howard, Larvicide Crew Lead
Absence/Presence of *Aedes aegypti* or *Ae. albopictus*

Ada County Mosquito Abatement District received $3000.00 in grant funds through IDHW and the CDC for surveillance of the vectors that carry Zika virus and other diseases in the United States as a proactive monitoring effort.

We surveyed for the absence/presence of *Aedes aegypti* and *Aedes albopictus* by setting BG Sentinel traps near nurseries, big box stores and tire chains that import goods from states where the *Aedes aegypti* and *Aedes albopictus* have become a problem in the U.S., like California or Florida. We chose those sites specifically because of the possibility of eggs or adults hitchhiking on the imported goods.

We selected 8 locations across the county that imported goods from areas where these vectors are known to have established in other states. The survey started on July 6, 2017 and ended on July 28, 2017. Over the 3 week study we used BG Sentinel traps, 5 per location per day. The BG Sentinel traps are proven to be an effective way to trap *Aedes aegypti* and *Aedes albopictus*. **Over the 3 week survey we were unable to find any evidence of the two vectors in the county.** We plan to repeat the project again during the 2018 season.
Projects worked on in 2017 continued...

**Attractant Preference for successful trapping:** In addition to a new type of trap, we also tested 11 different attractant combinations at all of the site locations to determine what the most effective lure would be with a BG Sentinel 2 trap. Using a combination of CO2 and lures resulted in more mosquitoes trapped (see chart below). We looked at different types of CO2 dispersal mechanisms and it seemed that dry ice broken into smaller chunks lasted longer and attracted more mosquitoes successfully, but is more costly than potentially using CO2 tanks in the future. We will continue looking at this in the next season as well as work in different trap types in areas for monitoring species and hatch timings. The work completed on the mosquito grant and the lure project was compiled through a local college student via paid internship opportunity.

![% caught by trap type](chart.png)

Training Opportunities and Continuing Education

Continuing education and training of staff is a primary objective of our program in order to use the best management practices available. The majority of training also contributes for recertification credits through the Idaho State Department of Agriculture to continue to carry a Professional Applicators license in the state of Idaho.

From AMCA Annual Meeting

<table>
<thead>
<tr>
<th>2017 Seminar/Conference/Training</th>
<th>People Sent</th>
<th>Hours</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMCA Annual meeting (CA)</td>
<td>2</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>ACMAD in house seminars (Valent/Adapco)</td>
<td>13-16</td>
<td>12</td>
<td>180</td>
</tr>
<tr>
<td>Honey Bee Awareness and Mosquito Control</td>
<td>4</td>
<td>4.5</td>
<td>18</td>
</tr>
<tr>
<td>ACMAD in house training (applicators)</td>
<td>13</td>
<td>130</td>
<td>1690</td>
</tr>
<tr>
<td>IMVCA Spring Workshops</td>
<td>19</td>
<td>8</td>
<td>152</td>
</tr>
<tr>
<td>Summer Weed Tour</td>
<td>2</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>NWMVCA Fall Conference (MT)</td>
<td>2</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>SWIWCA Fall Seminar</td>
<td>8</td>
<td>8</td>
<td>64</td>
</tr>
</tbody>
</table>

Total Hours in Training for 2016: 2216
Bee Awareness & Mosquito Abatement Class

This year, some of our mosquito staff were able to attend a “Bee Awareness for Mosquito Abatement” class put on by Idaho Mosquito and Vector Control Association and Tubbs Berry Farms. The purpose of the class was for mosquito control professionals to learn more about honey bees and how we can continue to educate ourselves and landowners about how we as mosquito control professionals work with local beekeepers. There was “classroom setting” in the field where we learned about honey bees and management techniques and then hands on experience with the hives and insects. There was also a portion where mosquito professionals educated local bee groups on what we do and how we can work together to control public health vector mosquitoes while also protecting pollinators.

Above: Brock Palen, our mosquito division coordinator getting hands on. Right: Class setting learning about honey bees and bee management. Upper Right: Seeing a varroa mite catch tray for the bottom of hives for management of the parasitic pests on bees.
Projects worked on in 2017 continued...

Collecting Game Fish for Mosquito Control?

Ada County Mosquito Abatement is continually looking for ideas to improve Integrated Mosquito Management (IMM) approach following best management practices using new tools. In Idaho, we are limited to a biological control of *Gambusia affinis*, or mosquitofish, due to native minnows in our lakes and streams.

The last few years the Twin Falls Pest Abatement District (TFPAD) have been working with Idaho Fish and Game to capture and release *Lepomis macrochirus*, or Bluegill, in ponds as a mean to control mosquito larvae. This summer, 2 of our staff had the opportunity to attend a catch and release day with TFPAD for bluegill. The got the opportunity to do hands on work and learn the best practices to do use this idea in an IMM program and if it works/successful. We hope to continue to look into this option in the future and see what we can do to add this tool to our program if proven successful for control on immature mosquitoes.

According to TFPAD, monitoring has shown that while Bluegill do not remove all the mosquito larvae, they do remove a percentage of larvae making other methods of treatment more effective. We hope to continue to look into this option in the future and see what we can do to add this tool to our program if proven a successful control on immature mosquitoes.
Budget totals

The mosquito abatement district’s budget is based on general property taxes primarily (95%) and a small portion of sales tax and personal property taxes from the state since it is a special taxing district within Ada County. This season we spent more money on chemical purchases and personnel due to the flooding that occurred in the spring & record breaking mosquito populations and habitat sources. Through the emergency declaration, we hope to recoup some of the costs through FEMA and state emergency funds.

FY15-16 District Revenues
Total $1,115,820

FY15-16 District Expenditures
Total $1,042,005

Most of program funding is spent in larvicide control efforts (70%) and then disease and surveillance (20%) monitoring and then finally adulticide control (10%) of the seasonal staff/chemical budgets.

Two year comparison of B-budget (Operations) Expenses only

<table>
<thead>
<tr>
<th>Year</th>
<th>Chemical</th>
<th>Personnel</th>
<th>Equipment Repair/Maintenance</th>
<th>Fuel</th>
<th>Other supplies/misc</th>
<th>Capital</th>
<th>Training</th>
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</thead>
<tbody>
<tr>
<td>FY17</td>
<td>38.8%</td>
<td>36.8%</td>
<td>2.3%</td>
<td>2.6%</td>
<td>2.3%</td>
<td>10.0%</td>
<td>1.6%</td>
</tr>
<tr>
<td>FY16</td>
<td>52.2%</td>
<td>36.8%</td>
<td>2.6%</td>
<td>2.6%</td>
<td>2.3%</td>
<td>10.0%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

2017

2016
West Nile Virus Historical Update!

Do we still have WNV in Idaho?

- We have had WNV every year in Idaho since 2005, some years are more prevalent in Ada County than others (see the graph below).
- We continue to get questions from the public about if we still have WNV and is it that bad? **The answer to that is yes, we get it**, and its varies from year to year and from person to person.
- We will likely continue to see it in the future and our goal is to stop the spread of the disease when we know it’s present, reduce the risk to human populations by acting quickly to control it and to educate the public on what they can do to protect themselves and their neighbors as good citizens for better, mosquito and disease free community!

(All information as of 1/20/2018)

What you can do:

- **Drain**: any standing water, or replace with clean water every 3 days, like your dog water bowl or bird baths, boat & pool covers, and tires
- **Dress**: Wear protective clothing like light loose long sleeved/pants
- **Defend**: Make sure screens are in good condition on your window and use an EPA approved insect repellent when going outside and mosquitoes are present

For more current information go to:
westnile.idaho.gov/
or
cdc.gov/westnile/

The chart to the right depicts our historical WNV positive mosquito pools for the last 10 years. We tend to see WNV cycle every 3 to 4 years though dependent on climate. In the years where the Culex counts are low and WNV high can show there was a higher potential risk of WNV being transmitted to humans. 2017 was a different year than normal, the peak of Culex was in June while WNV came during the normal time of season in late July and August likely due aerial applications in June/July which allowed for a more normal disease cycle year.
**Mission Statement**

The mission of Ada County Mosquito Abatement District is to control mosquitoes that are both a nuisance and potential vector of disease to Ada County residents.

**Districts Brief History**

Ada County’s original Mosquito Abatement District (MAD) was the Three-Mile Creek District established in 1974, which included 12 sq miles between Cloverdale and Cole Roads and Franklin and Columbia Roads. There were several district annexations made over the next few decades, and in 2004 Ada County Board of County Commissioners agreed to incorporate and operate what was then called the Southwest Ada County Mosquito Abatement District. Today, the district is known as Ada County Mosquito Abatement District (ACMAD) and covers 406 sq miles, with the majority of the district covering major residential and urban areas.

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**Goals from 2017**

One major hurdle for 2017 was getting a new software program to record mosquito field work, which took most of the season and is continuing as we work with developers on the project. This took a lot of testing, training, and processing in the 2017 season which limited our ability to complete all our goals. We will continue to work on these with the main goal to complete abatement activities and get more public outreach about mosquito control and vector diseases!

1. New Software Program Implemented for 2017 season: **Goal in progress.**
2. Increase Remediated sites by setting goals by larvicide area and track through computer program: **28 points created,**
3. Work on Bike Project implementation with new software: **Goal not met due to limitations of new program. Will continue to work through an efficient process**
4. Continue to improve upon training program for start of year and mid year training of seasonal staff: **Goal met and will continue to refine in 2018.**

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**Goals for 2018**

1. Increase Remediated sites by setting goals by larvicide area and track through computer program
2. Work on Bike Project implementation
3. Continue to improve upon training program for start of year and mid year training of seasonal staff
4. Continue to work with new Public Education Specialist to increase education and public outreach

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