



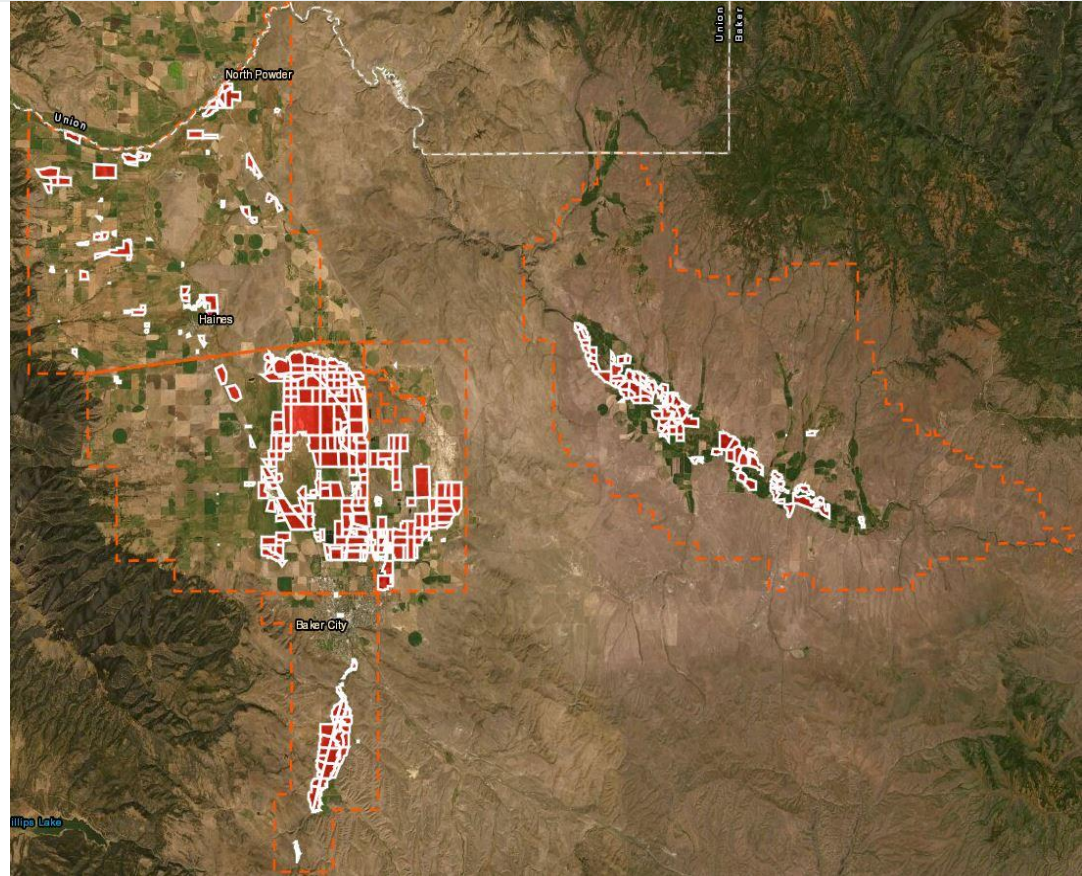
Challenges of mosquito control in flood irrigated habitat

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The District

- Size of District: 310 Square Miles
- Types of Habitats:
 - Flood irrigated pastures: Primary type of habitat in district
 - Permanent water sources: Ponds, sloughs, etc.
 - Storm drains
 - Other





Flood Irrigated Habitat



Can lead to this...



Types of Mosquitoes

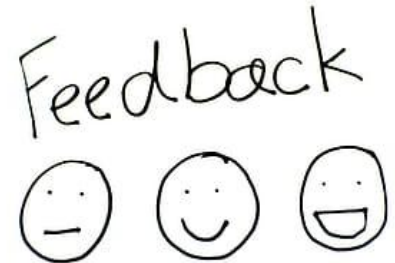
- Floodwater Mosquitoes
 - *Aedes nigromaculis*
 - *Aedes dorsalis*
 - *Aedes vexans*
- Permanent Water Mosquitoes
 - *Culex tarsalis*
 - *Culex pipiens*
 - *Culiseta inornata*
 - *Anopheles freeborni*





Challenges

- **TIMING!**
 - Timing of applications
 - Irrigation timing
- Access to habitat
- Weather
- Cost
- Public Opinion





How we Control Floodwater Mosquitoes

- Follow IPM principles
 - Surveillance
 - Larviciding
 - Adulticiding



Products we Use

- Larvicides

- BTi
- Methoprene
- Bs
- Combo products (BTi+B_s, BTi+S methoprene, etc.)
- Surface oils

- Adulticides

- Pyrethroid products
 - Permethrin
 - Deltamethrin
 - Sumithrin
- Organophosphates
 - Dibrom concentrate

Application Methods

- Larviciding
 - From the ground
 - Backpack applications
 - ATV applications
 - From the air
 - Fixed wing aircraft
- Adulticiding
 - From the ground
 - Truck mounted ULV
 - ATV mounted ULV
 - Barrier Spraying
 - From the air
 - Fixed wing aircraft





Ground Applications

- Larviciding
 - ~800-1200 acres/year
 - Mostly use a BTi & Methoprene combo product for our floodwater habitat the last couple years
- Adulticiding
 - ~15,000-20,000 acres/year
 - Mostly use Pyrethroid products
- Pros:
 - Can be more flexible on when we make an application
 - Can respond rapidly to surveillance triggers
 - Cost effective
- Cons:
 - Can be hard to keep up with treatments at times
 - Access is very difficult in some areas



Aerial Operations

- Larviciding

- 8-10 applications per year
- ~5000-6000 acres per year
- BTi applications

- Adulciding

- 4-6 applications per year
- ~40,000-60,000 acres per year
- Dibrom applications

- Pros

- Can cover a lot of acreage at once
- Less intrusive than ground applications

- Cons

- Costly
- More planning involved, can't respond as quickly
- More dependent on weather

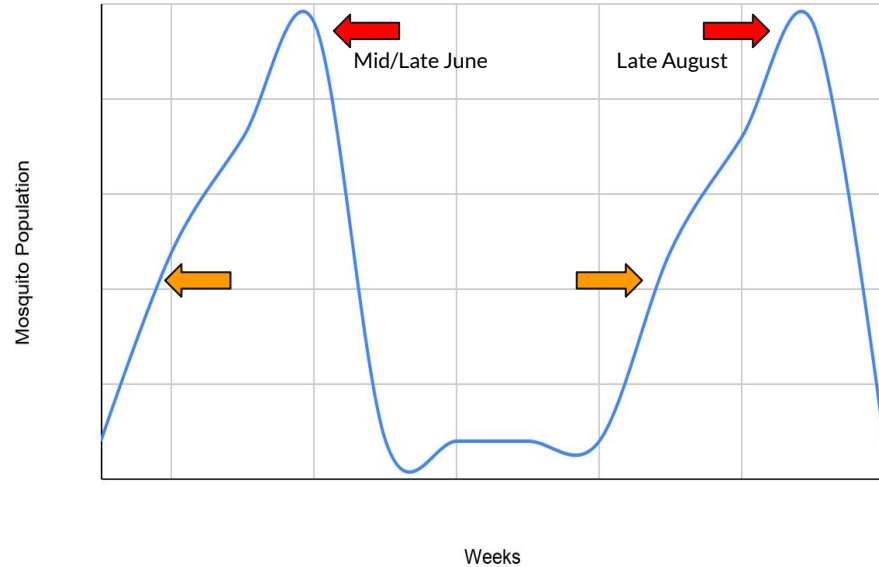


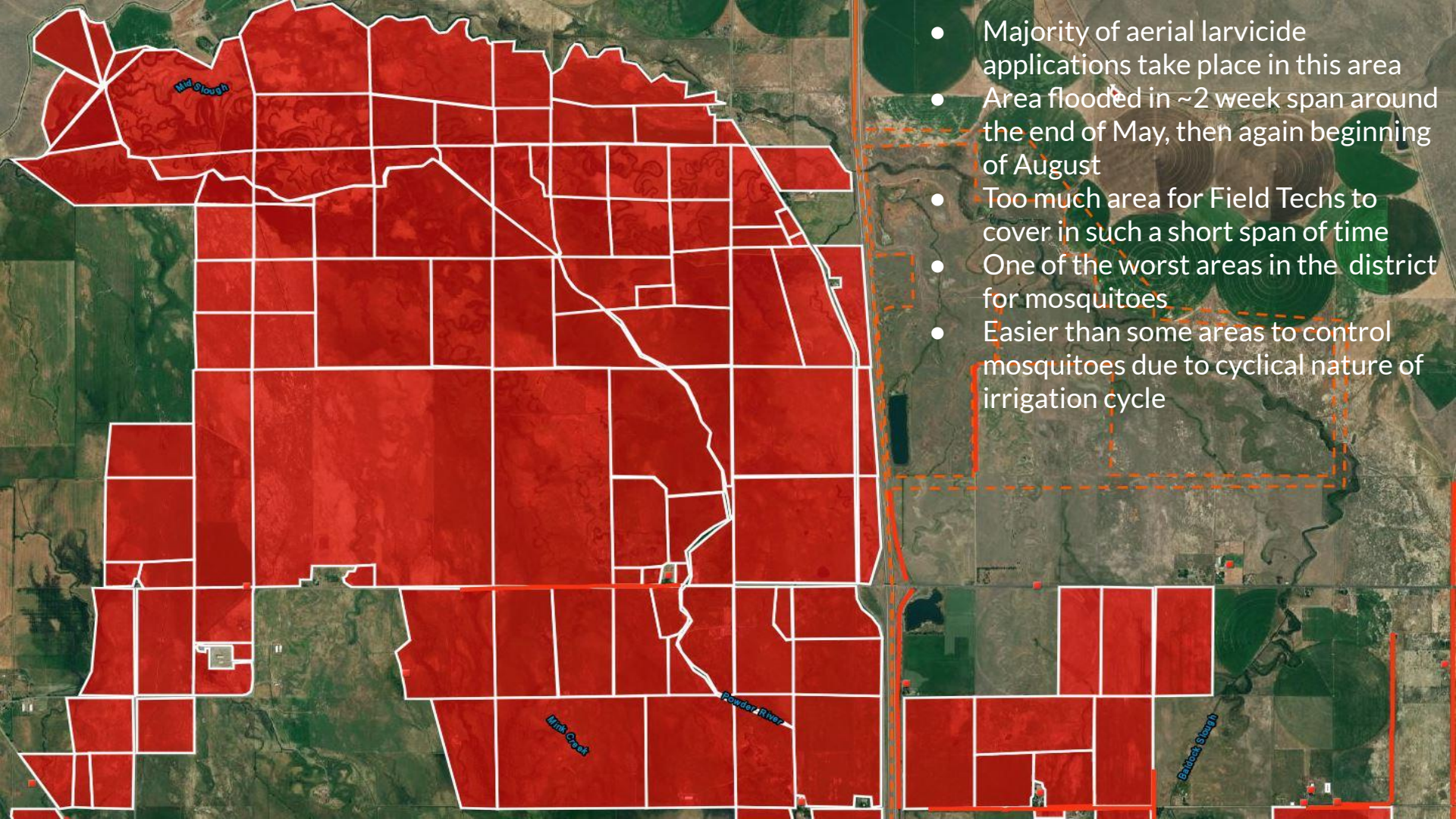
Mosquito Control Patterns

- Broken down into 3 categories
 - “The Big Flood”
 - Seasonal Flooding
 - Variable Irrigation Cycles

Mosquito Control Cycles

- “The Big Flood”
 - Happens 2 times throughout summer
 - High peak mosquito numbers
 - Lots of area to cover
 - Aerial applications highly effective
 - Application timing very important

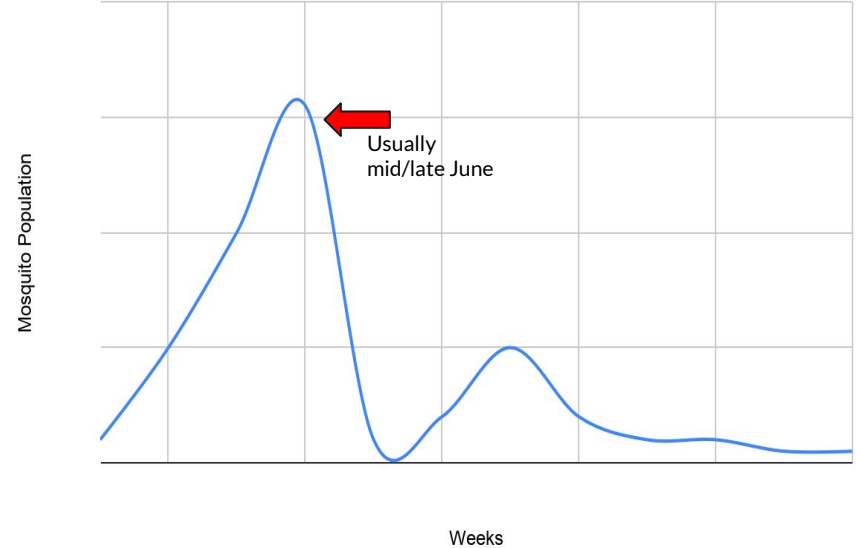




- Majority of aerial larvicide applications take place in this area
- Area flooded in ~2 week span around the end of May, then again beginning of August
- Too much area for Field Techs to cover in such a short span of time
- One of the worst areas in the district for mosquitoes
- Easier than some areas to control mosquitoes due to cyclical nature of irrigation cycle

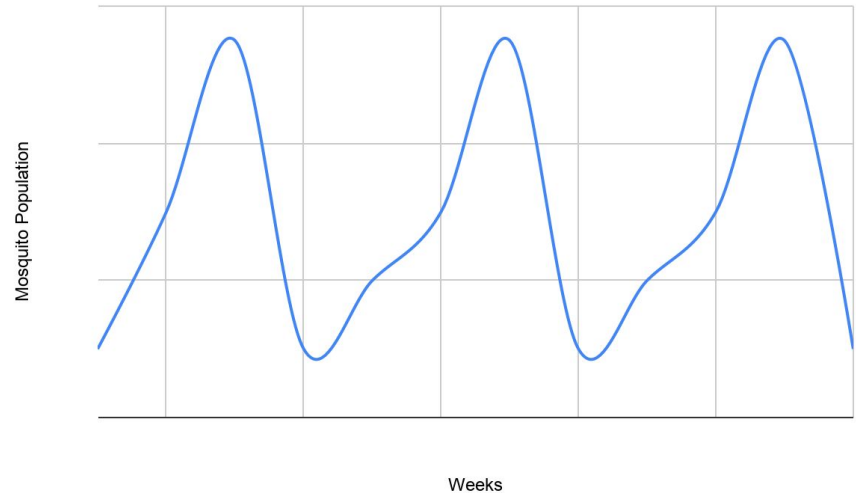
Mosquito Control Cycles

- **Seasonal Flooding**
 - Typically the first areas to flood
 - Irrigation cycles more dependant on snowpacks
 - Usually starts to dry out by august
 - Will make 1 aerial adulticide app if necessary



Mosquito Control Cycles

- **Variable Irrigation Cycles**
 - Irrigation patterns often erratic, making control more difficult
 - Varies depending on water year, type of water rights, etc
 - Some years are much worse than others
 - Will make aerial adulticide applications if aedes numbers are high enough, or if WNV is present in areas





Why do we use a BTi & Methoprene combo formulation?

- Sometimes it takes so long for a site to flood, there is a wide variety of instars found
- Allows us to have more control over 1st-4th instars
- Can treat a site all at once instead of multiple trips to treat different areas of the site
 - Time saving
 - Less intrusive



Field Trials

2017 ground application field trial of VectoPrime FG

- Acres Treated: ~40
- Application Rate: 3.5 lbs/acre
- Target: Aedes larvae, 2nd-4th instar
- Application Method: Fimco spreader on atv
- Results: <90% larval reduction at 48 hours post treatment

Potential trials this year:

- Aerial Application of VectoPrime FG
- Similar rate as the previous trial
- Will target Aedes Larvae



Thanks for listening!

Questions?