Benefits of Vector Control

1. Vector control is the best line of defense against insect vectored diseases (West Nile Virus, Equine Encephalitis, & Lyme Disease)
    a. Culex pipiens, Culex tarsalis carry WNV
    b. Deer Tick carries Lyme Disease – one Deer tick found in Eastern MT in 2025 on a hunting dog and was positively identified by labs at MSU
        i. https://dphhs.mt.gov/news/2025/May/BlackleggedTicks
            1. Lyme disease, anaplasmosis, ehrlichiosis, Powassan virus, hard tick relapsing fever, and babesiosis are examples of diseases known to be transmitted by the bite of a blacklegged tick.
            2. One tick collected in Dawson County was confirmed to be a blacklegged tick by Rocky Mountain Laboratories in 2024. DPHHS, along with the Centers for Disease Control and Prevention (CDC), confirmed in the fall of 2024 that two ticks found in Sheridan County were blacklegged ticks. These two ticks were tested by CDC and no pathogens that can cause illness in humans were detected, including Lyme disease.
        ii. https://www.montana.edu/extension/broadwater/blog-article.html?id=24544
            1. Found in Dawson County
    c. Persistent and vigilant surveillance will help keep diseases at bay and lower risks to the public
2. Dawson county had 5 cases of WNV in 2025, Richland County is listed as <5
    a. Still a concern for the area
    b. Montana reported 14 neuroinvasive cases last year. This number means high disease concentrations in bird populations
        i. Disease carried by birds, mosquitoes transmit it to people
3. Killing larva at early stages is the best line of defense
    a. Fogging for mosquitoes after they're already bad is only a band-aid (24-48 efficacy at best)
4. Heartworm can be prevalent in two types of mosquitoes present here
    a. Aedes and Anopholes species can transmit Heartworm
        i. Humans can contract heartworm but its effects are not the same
        ii. Carried by raccoons and fox most typically (canids are main hosts that promote maturity)
    b. https://www.cdc.gov/dirofilariasis/about/index.html
5. Storm drains, cemeteries, flood zones, crop irrigation, stagnant pools, tires, containers in yards, etc.
6. A crew on the ground is worth it when it comes to public health and safety!
    a. Public peace of mind
    b. Disease load reduction
    c. Public comfort to enjoy outdoor activities
7. In house testing of mosquito pools could be an option with simple equipment
    a. RAMP or equivalent; machine reader ~$4000, cartridges ~$900/box of 100 tests
8. Bti is most common larvicide
    a. Its multi-step kill process works like this:

    - **Ingestion:** Mosquito larvae actively feed on organic matter in standing water. They consume the Bti spores and crystal proteins (Cry and Cyt toxins) produced by the bacteria.
    - **Activation:** Inside the larva's midgut, the environment is highly alkaline (extremely high pH). This specific condition acts as a trigger, dissolving the crystal proteins and activating the toxins.

- **Gut Rupture:** The activated toxins bind to receptors in the gut lining and punch holes in it, destroying the stomach walls.
- **Death:** This destruction paralyzes the digestive system, causing the larva to stop feeding immediately. The larvae quickly die from starvation or systemic bacterial infection, usually within hours.

This method is highly safe for humans, pets, and most other wildlife. The human stomach is highly acidic, which destroys the proteins before they can ever activate. Furthermore, because Bti is composed of multiple different toxins, it is very difficult for mosquito populations to build a biological resistance.