Stocking Bluegill for Mosquito Control

Kirk Tubbs Manager Twin Falls County Pest Abatement District

Abstract:

Small Bluegill (*Lepomis macrochirus*) fish were stocked at various rates in seasonal ponds to supplement mosquito larval control. Stocking at rates of 50 fish per acre gave a measurable drop in mosquito larval counts. Blue Gill can be used as an effective alternative to Gambusia as part of an Integrated pest management approach.

Introduction:

Mosquitoes spend over half their life cycle in standing water. In the larval and pupae stage they are subject to predation by other aquatic organisms including fish. Mosquito larvae are generally found in the shallow protected water at the edge of a pond. Small fish are able to prey upon mosquito larva.

Gambusia also known as mosquito fish have commonly been used for mosquito control worldwide. The use of Gambusia in Idaho is restricted due to concern that fish released may find their way to waters where they could potentially compete with some native minnow species.

The use of Bluegill was recommended by Idaho Department of Fish and Game because while not native Blue gill are found throughout the state. Due to their present distribution, additional releases are not likely to pose any additional impact on native species.

Study Area:

Twin Falls County Idaho is located in an arid desert. Most standing water is a result of Irrigation or retention of storm water. Most ponds are seasonal; they hold water during the summer irrigation season. In the non irrigation season these pond dry up or are small enough that they freeze solid.

Eight seasonal ponds were selected for fish planting. Ponds Ranged in size from .2 to 1acre in size. One location with side by side ponds was chosen to provide a side by side comparison. In addition two ponds with year round water were also stocked in hopes to create a source for brood stock in future years.

Study Methods:

All ponds in this trial were sampled and treated in 2009 as part of our regular mosquito control program. In 2010 we treated these ponds following our standard procedures. Larvae were sampled on a 1-2 week interval during the summer. Standard Larval dipping cups were used. At least ten dips were taken at each location. Finding an average larva per dip of 0.1 resulted in the location receiving a treatment of a bacterial Larvicide using either *Bacillus thuringiensis* subspecies *israelensis* (Bti) or Bacillus sphaericus (BS). All ponds were treated when mosquito larvae were present, and the fish were considered a

supplement to our control work. Larval counts were compared to determine effectiveness of the predacious Bluegill.

On July 16 Bluegill were captured from local pond by eletroshocking. The larger fish put into ponds were overwintering was expected, the rest received small fish. Once fish were stocked, no extra care was give and surveillance and control work was conducted as normal.

Results

Over all mosquito numbers were higher in 2009 than 2010. This was reflected in both larval surveillance and adult trap counts (Fig2). The plan of comparing 2009 larval counts to 2010 larval counts in each pond did not provide meaningful comparison. The difference in rain fall between the two years gave us much higher mosquito numbers, also many of the ponds held significantly more water and had a greater area for rearing mosquitoes than they did the previous year. Using only data from 2010; similar ponds without fish were compared to stocked ponds to see if there was a measurable. Because many of these ponds were in different locations with different terrain it was hard to provide a true side by side comparison for every pond. Because of the difficulty in providing good comparisons, data was generalized rather than show the level of control that was obtained with progressively higher stocking rates.

Overall results from stocking Bluegill were a reduction in mosquito larvae. In most ponds, Bluegill survived and could be spotted in the pond throughout the season fish did not survive in two locations that dried up during the summer and results from those ponds are not listed.

Stocking Rates have been standardized to fish per acre for ease of comparison. Figure one shows a comparison of two ponds located adjacent to each other with one stocked at 50 fish per Acre. Stocking Fish resulted in an overall decrease in larva from the time of stocking on July 16th until the pond dried up in September. There was a 15 percent reduction in July during which the fish were only in for half the month and a 24 percent reduction in August.

All other ponds lacked a true side by side comparison, the results of comparing them to similar ponds is shown in table 1. Results are generalized because of the diversity of ponds compared. Stocking rates of 37 to 44 fish/acre resulted in an immediate change to mosquito larval counts in the first 15 days. This reduction was only maintained during the 15-30 day period following stocking. When rates were above 50 fish/acre the reduction in mosquito larvae continued for additional 30 days. The one exception was the pond containing 110 fish per acre began to show little to no change after 15 days. In reviewing all of our data, it was noted that almost every time this pond was sampled, a Great blue heron was fishing in the pond. Kids were observed fishing in the pond as well on one occasion. Mink tracks had also been observed near the pond. It appeared that predation on our fish was significant enough to mitigate the remaining bluegills effect on mosquito larvae.

A stocking rate of 50 bluegill per acre is the minimum recommended stocking rate. If predation is expected doubling the stocking rates as well as supplemental stocking during the mosquito season is recommended.

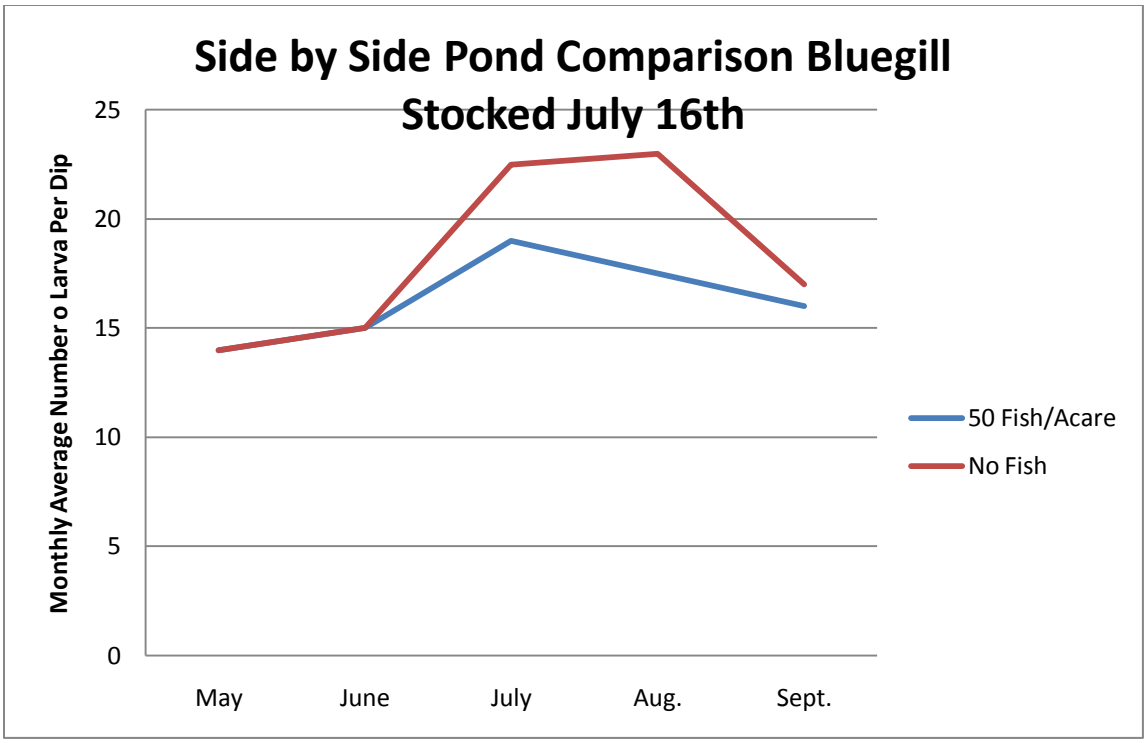

Figure 1

Pond #	Fish/Acre	Measurable Change during first 15 Days after stocking	Measurable Change 15-45 days after stocking
1	25	No	No
2	37	Yes	No
3	44	Yes	No
4	50	Yes	Yes
5	80	Yes	Yes
6	110	Yes	No

Table 1

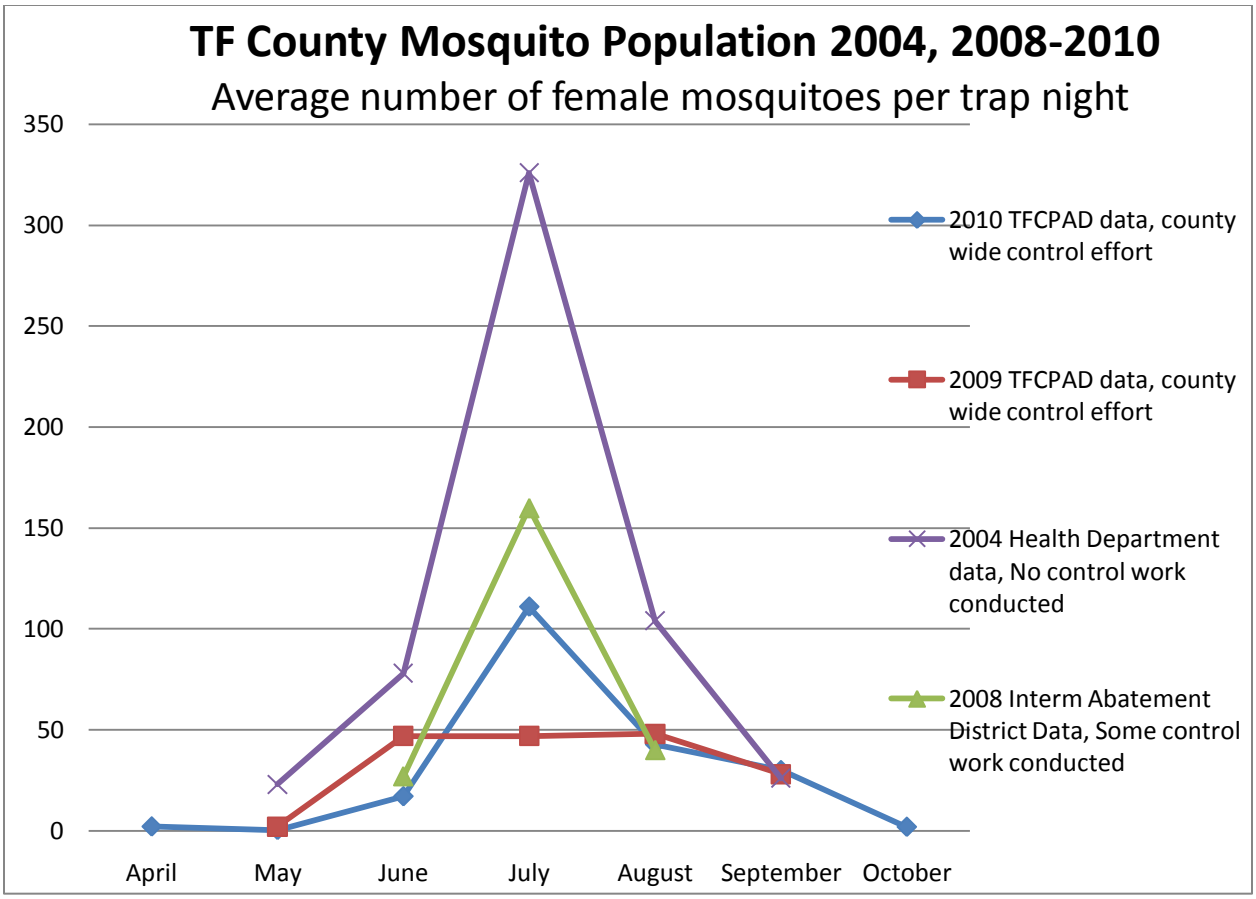
TF County Mosquito Population 2004, 2008-2010
Average number of female mosquitoes per trap night
350
300
250
200
150
100
50
0
April
May
June
July
August
September
October
2010 TFCPAD data, county wide control effort
2009 TFCPAD data, county wide control effort
2004 Health Department data, No control work conducted
2008 Interm Abatement District Data, Some control work conducted

Figure 2