PRESERVING TEXAS FISHING: BETTER DATA NEEDED ABOUT PESTICIDE USE

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Sport fishing is big business in Texas. In 1996 alone, sport fishing in Texas created a statewide economic impact of over $ 6.4 billion, according to a study by the American Sportfishing Association. More than 80,000 jobs are dependent on sport fishing in the Lone Star state, providing over $ 1.6 billion dollars in wages and salaries. Texas ranks second only to California in overall economic impact of sportfishing.

In addition to proper fisheries management, there are two essential factors in maintaining the vitality of Texas fishing: preserving and protecting water quality and preserving and protecting aquatic habitat in the state's streams, rivers, reservoirs and bays. Over the last three decades, state and federal environmental agencies have focused their attention and resources on cleaning up the most obvious industrial and municipal wastewater discharges, and many Texans have reaped the benefits in cleaner water. But, there are lingering water quality issues that remain to be tackled. One of the most important relates to the effects of pesticides on water quality, aquatic ecosystems and fish.

Pesticides—including herbicides, fungicides and insecticides—can enter water bodies through direct application to kill aquatic vegetation, by drift from aerial applications, by rainfall run-off from agricultural and urban areas and by spills and illegal dumping. In addition to potentially contaminating drinking water, pesticide pollution can disrupt the delicate ecological balance of the aquatic habitat for fish.

Pesticides can affect fish and other aquatic life even at very low concentrations. Many of the most widely used pesticides in Texas are toxic to fish and aquatic invertebrates at very low levels in water. For example, diazinon, an insecticide widely used in home and garden and agricultural applications, is classified as highly toxic to fish.

Chlorothalonil, the most widely used fungicide in Texas crop production, is highly toxic to channel catfish and sunfish, causing mortality at levels as low as 0.3 parts per million and 4.3 parts per million respectively, and noticeably affecting fish at levels anywhere below 1 part per million.

Pendimethalin, an herbicide used on field corn, cotton, soybeans, peanuts and other crops is rated as highly toxic to fish and aquatic invertebrates, causing mortality in channel catfish, for example, at levels less than 0.5 parts per million.

Other widely used herbicides can also affect aquatic life; they range from slightly toxic (atrazine) to moderately toxic (metolachlor, alachlor).

In addition to fish and aquatic invertebrate mortality, pesticides can have more subtle long-term effects on fish and aquatic ecosystems. Very low levels of some pesticides have been shown to impair reproductive and immune systems of fish, undermining the vitality of the population in a specific stream or reservoir.

Fishing in some Texas water bodies has already been affected by historical pesticide contamination. The Texas Department of Health (TDH) has issued fishing advisories or bans for a number of rivers and reservoirs due to high levels of pesticides in fish tissue (see Sidebar). Most of these bans and advisories are based on contamination from pesticides that are no legal to use, but because of that are highly persistent in the environment.

The Texas Department of Health, however, does not have any designated funding for testing fish for pesticides. TDH can generally only react when a problem has already been identified through a fish kill, citizen complaint or other evidence. In fact, since 1970, TDH has sampled and analyzed fish tissue in only about 54 Texas water bodies, representing only a minor fraction of the state's over 40,000 perennial stream miles, 1.6 million acres of major reservoirs and almost 2000 square miles of bays and estuaries. Over 70% of this testing was done before 1990. In addition, TDH generally tests only for a small standard set of pesticides, many of which are no longer authorized for use, but are highly persistent in the environment. The fish tissue testing is not related to location, timing or type of pesticides being used in the watershed.

Testing of water quality for pesticides has also decreased significantly over the last decade. In 1985, the state's environmental agency (then the Texas Water Commission, now the Texas Natural Resource Conservation Commission, TNRCC), sampled 27 fixed sites for about 35 different pesticides. In 1996, TNRCC sampled for these pesticides at only two sites in the entire state.

TEXAS WATERS WITH FISHING BANS OR ADVISORIES

Trinity River from Fort Worth to Dallas: fishing ban due to high chlordane levels.

Fosdic Lake, Tarrant County: fishing ban due to high levels of chlordane, dieldrin and DDE.

Lake Como, Tarrant County: fishing ban due to high levels of chlordane, dieldrin and DDE.

Mountain Creek Lake, Dallas County: fishing ban due to high levels of several pesticides.

Town Lake, Travis County: fish consumption advisory due to high levels of chlordane.

Arroyo Colorado, Cameron and Hidalgo Counties: fish consumption advisory due to high levels of chlordane, DDE and toxaphene.

Clear Creek, Harris County: fish and blue crab consumption advisory due to high chlordane levels.

Part of the reason for this limited sampling is the high cost of laboratory analysis for pesticides in fish tissue or water. Testing fish tissue for a full range of pesticides, for example, can cost up to $1,500 to $2,000 per fish, making frequent, random testing for pesticides prohibitively expensive.

SAMPLE INCIDENT REPORTS FROM TEXAS PARKS & WILDLIFE DEPARTMENT FISH KILLS DATABASE

- *Lake near Leroy has a fish kill every time it rains . . . TX Ag Department found herbicides from neighboring cotton and wheat fields. # 19902M3*
- *Stressed fish were seen Friday after rainfall [in White Rock Lake]. The fish were all dead Saturday. The City of Dallas tested the water and found diazinon. # 19952M388*
- *Estimated total kill 4240 . . . A fish kill occurred in [Williamson] creek following a heavy rain. Suspected cause was a recent pesticide treatment for fire ants at an apartment complex adjacent to the creek . . Lab reports from water samples . . . show chlorpyrifos at 4ug/l. #19961A826*
- *Large crayfish dying all over Lake McQueeny . . . it is possible that the die-off was related to aquatic vegetation treatment earlier that fall resulting in habitat destruction. # 19971A863*
- *Losses of fish in 2 private ponds. The landowner had sprayed ethyl parathion on the field the week before the losses. The field is next to the Hagerman Wildlife Management Area of Lake Texoma. Ethyl parathion is toxic at 1.6 parts per million and can last up to 690 days in water at 20 degrees Centigrade. Normal breakdown is 60 to 70 days on land. Since this a rainfall season . . notification of the management area was necessary. No clean-up was performed, but some diking was done. # 19912M113*
- *The fish kill of approximately 600 mullet, sunfish and gar occurred in the Bay of Palacios and Matagorda Island Slough . . .The section of the bay where the kill occurred is adjacent to rice fields that are sprayed with pesticide for insects. The game warden reported a pesticide odor during the initial survey of the area. # 1993M281*
- *A late fish kill was reported in the Arroyo Colorado. Red drum were the only reported species affected. No official counts were taken. The cause of the kill is suspected [pesticide] aerial drift. # 19975A802*
- *A partial fish kill involving 100 small minnows, sunfish and yellow bullheads occurred. Investigation by Ft. Worth personnel revealed contamination by organophosphates. #19952M400*

Some testing is conducted in response to fish kills, if funds are available. According to the Texas Parks and Wildlife Department, 11 percent of fish and wildlife kills in Texas over the past 15 years can be attributed to pesticides. Of the over 2.5 million fish killed by pesticides, the TPWD estimates that 40% were killed by agricultural pesticides and 40% by urban run-off containing pesticides. Other causes included illegal fishing (use of rotenone) and industrial spills of pesticides.

In general, however, given the high cost of regularly sampling for all pesticides that could be found in water and fish tissue, it is difficult to ensure, in a cost-effective manner, that Texas fishing is being sufficiently protected from pesticide contamination. There is simply not enough data with which to evaluate the health of our rivers, reservoirs and bays with respect to pesticides.

The problem is compounded by the fact that even when contamination is suspected, or even manifested in stressed fish or a fish kill, it is almost impossible to identify and remedy the cause of the problem. There is usually not enough baseline data and there are rarely funds for adequate testing and investigation.

More importantly, however, because there is currently almost no location-specific data on pesticide use in Texas, it is often difficult to even begin to assess potential sources of pesticide contamination. Our environmental agencies generally know precisely what toxic chemicals are being discharged from a particular industry or municipal wastewater treatment plant and they know when and how much. Under federal and state law, these entities must regularly test and report on their discharges to the appropriate oversight agency. The same is not true for pesticide use, however.

State law requires only that certain categories of persons using certain types of pesticides keep records of their application. Those records are not reported to the state's environmental or agricultural agencies. And, for some pesticides, like most of the aquatic herbicides used to kill hydrilla and other aquatic plants anyone can use the pesticide anywhere without documenting the use or reporting it to the state.

The most cost-effective way to improve this situation would be to require those who use pesticides that create a risk to aquatic environments to report their pesticide use to the state on a regular basis. This type of pesticide use reporting data will give our state agencies a better chance of understanding and remedying pesticide water pollution problems that do arise.

In addition, having pesticide use reporting data would allow the TNRCC and other agencies with water quality protection responsibilities—like lake management authorities or river authorities—to better target their limited water quality and fish tissue sampling resources to the locations, times and types of pesticides being used within a particular watershed. Such targeting will allow much more cost effective and scientifically-sound use of limited resources and provide better assurances that important aquatic habitat is being protected from pesticide contamination.

Selected references:

Pesticide toxicity data: EXTOXNET system, pesticide information profiles, on the web at http://ace.orst.edu/infor/extoxnet/pips.

Value of sportfishing: study by the American Sportfishing Assn.; can be found on the Texas Parks & Wildlife Department web site at http://www.tpwd.state.tx.us/admin/sb1/econom/econsportfish/econsportfish.html

Texas Department of Health fish consumption bans and advisories: TDH, Seafood Safety Division, Fish Advisories and Bans (1997).

Texas Department of Health, Fish Tissue Sampling Data 1970-1997 (1998).

Texas Parks & Wildlife Department, "Spills and Kills" database, available from TPWD.

For more detailed information on pesticide use and water quality in Texas, contact:

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