

LOWER YAKIMA RIVER SUSPENDED SEDIMENT TMDL

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LOWER YAKIMA RIVER VALLEY



Prepared by the Washington Department of Ecology

August 1998

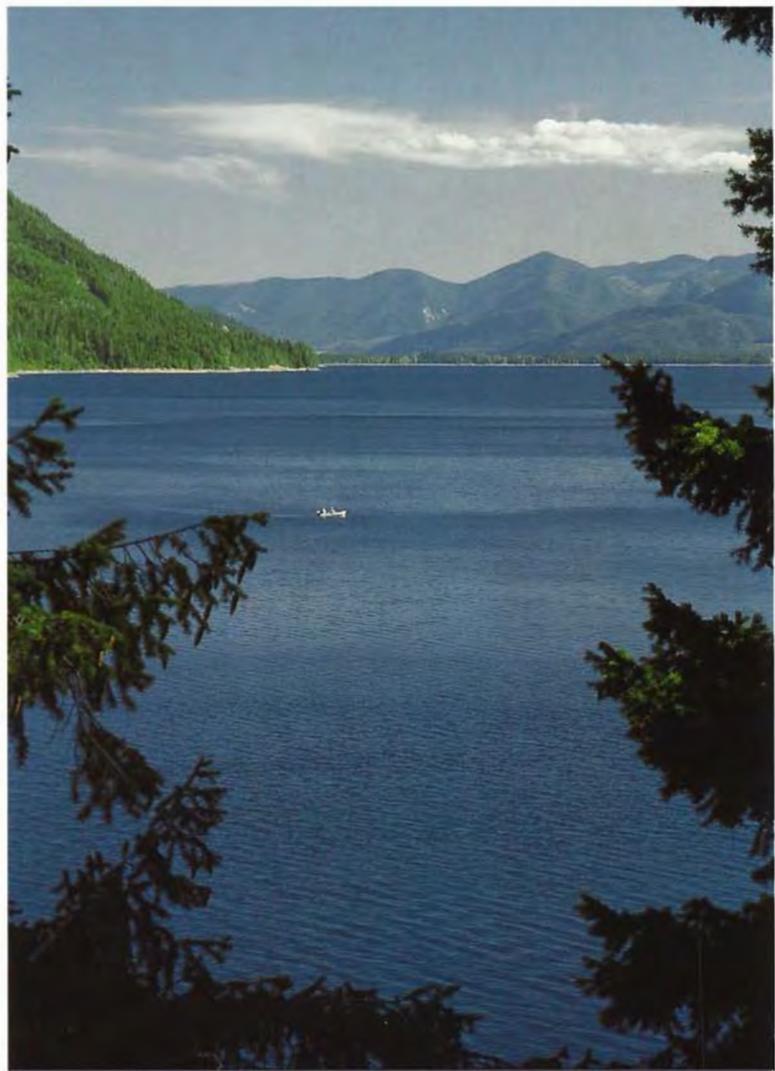
APPENDIX 14



PERSISTENCE
OF THE
D D T
PESTICIDE
IN THE YAKIMA
RIVER BASIN
WASHINGTON



U.S. GEOLOGICAL SURVEY CIRCULAR 1090



PERSISTENCE
OF THE
D D T
PESTICIDE
IN THE YAKIMA
RIVER BASIN
WASHINGTON

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U.S. GEOLOGICAL SURVEY CIRCULAR 1090

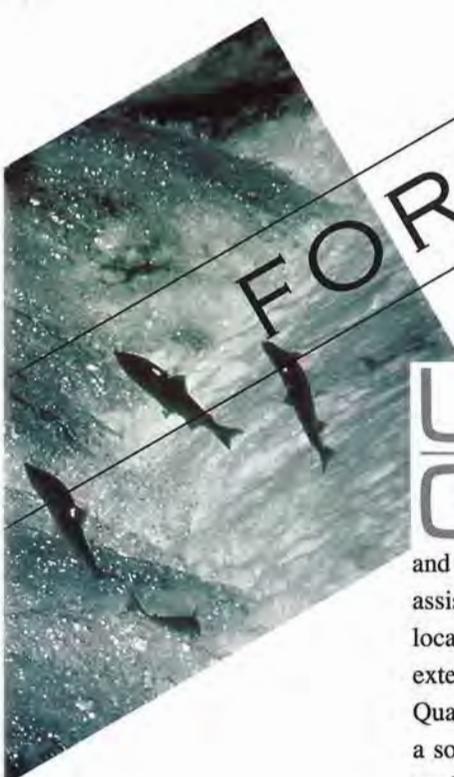
U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY
Dallas L. Peck, Director

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FOREWORD



Established in 1879, the U.S. Geological Survey (USGS) has provided scientific information on the Nation's water, energy, and mineral resources for the benefit of Americans. A major part of the mission of the U.S. Geological Survey is to assess the quantity and quality of the Nation's water resources and to provide information to assist resource managers and policymakers at Federal, State, Tribal, and local levels in making sound management decisions. To a significant extent, these responsibilities are being carried out in the National Water-Quality Assessment (NAWQA) Program, whose goals include providing a sound understanding of the natural and human factors that affect water quality.

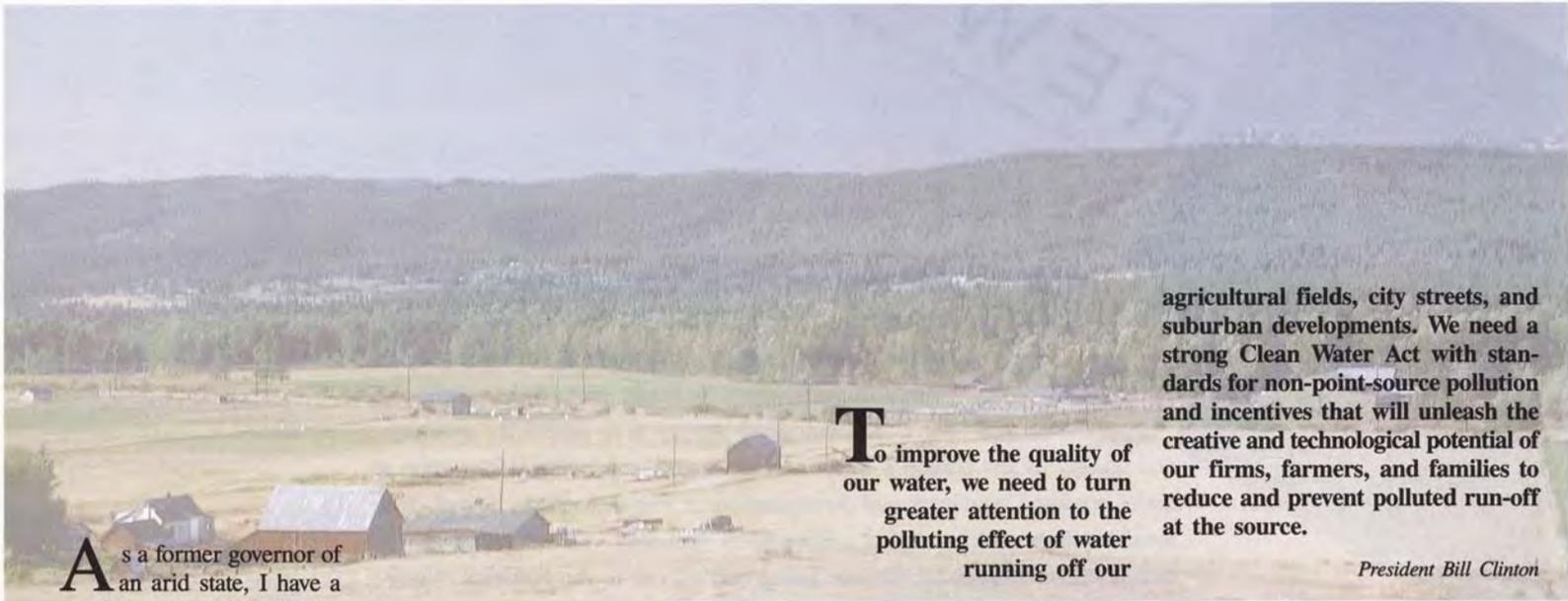
The NAWQA Program will include investigations in 60 study areas throughout the Nation that represent a variety of geologic, hydrologic, climatic, and cultural conditions. These studies are building blocks for understanding regional differences in physical, chemical, and biological characteristics of the Nation's ground water and surface water. An important goal of the program is to ensure that key findings are available to the public so that they can be aware of the quality of the Nation's water resources.

This report is part of a series of nontechnical publications based on results from the NAWQA Program. The purpose of these publications is to describe key findings from the individual investigations and to relate those findings to water-quality issues of regional and national concern. By disseminating this information, the U.S. Geological Survey seeks to increase awareness of water-quality concerns when considering the Nation's environmental issues.

Director

DDT IN OUR E

A NATIONAL AND



As a former governor of an arid state, I have a special appreciation for the value of water resources. Unless we have sufficient supplies of good quality water when and where we need it—and understand how natural and human conditions affect water quality—we cannot wisely manage this vital resource. As part of the

National Water-Quality Assessment, the U.S. Geological Survey will continue to work with state and local agencies to assess and protect our Nation's water resources.

*Bruce Babbitt, Secretary
U.S. Department of the Interior*

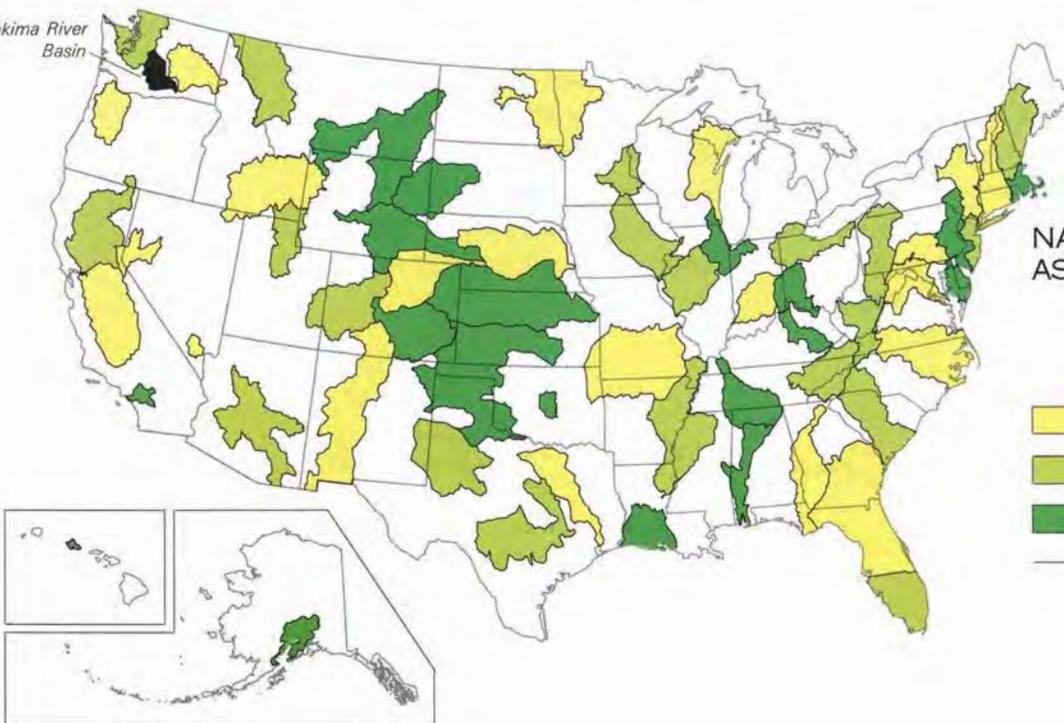
To improve the quality of our water, we need to turn greater attention to the polluting effect of water running off our

agricultural fields, city streets, and suburban developments. We need a strong Clean Water Act with standards for non-point-source pollution and incentives that will unleash the creative and technological potential of our firms, farmers, and families to reduce and prevent polluted run-off at the source.

President Bill Clinton



Yakima River Basin

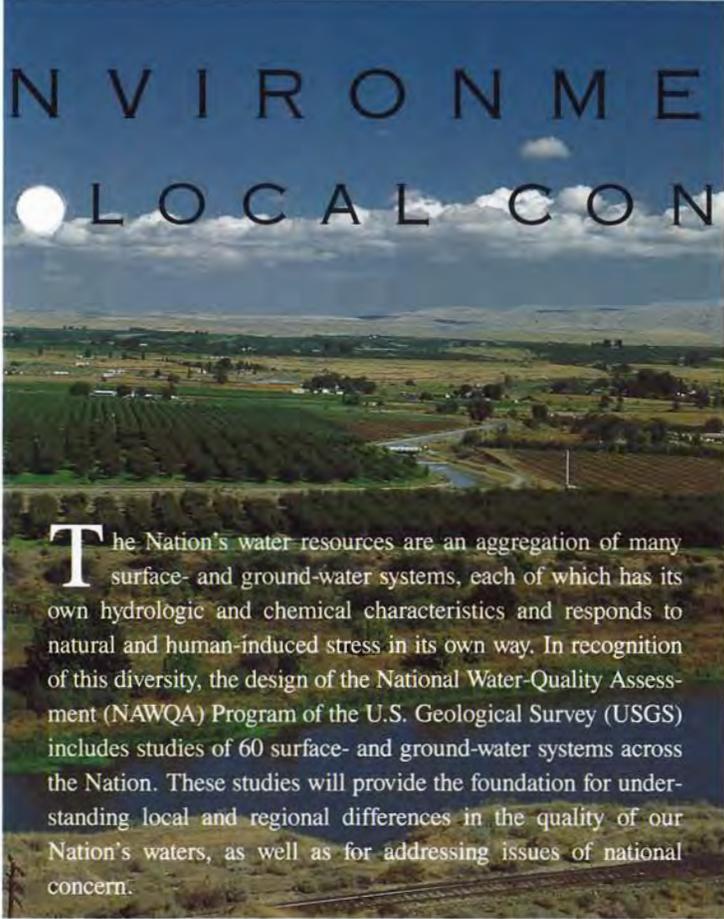


NATIONAL WATER-QUALITY ASSESSMENT STUDY AREAS

EXPLANATION

- STUDIES STARTED IN FISCAL YEAR 1991
- STUDIES PROPOSED FOR FISCAL YEAR 1994
- STUDIES PROPOSED FOR FISCAL YEAR 1997
- BOUNDARY OF STUDY AREA

ENVIRONMENT . . . LOCAL CONCERN



The Nation's water resources are an aggregation of many surface- and ground-water systems, each of which has its own hydrologic and chemical characteristics and responds to natural and human-induced stress in its own way. In recognition of this diversity, the design of the National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey (USGS) includes studies of 60 surface- and ground-water systems across the Nation. These studies will provide the foundation for understanding local and regional differences in the quality of our Nation's waters, as well as for addressing issues of national concern.



A major national concern is the degradation of water quality that results from non-point sources of pollution, such as agricultural runoff that contains fertilizers and pesticides. Although crop yields are improved greatly by applications of fertilizers and pesticides, the increased production often comes with a price that is measured in terms of effects on human health, streams, fish, and other wildlife. One of the first studies in the National Water-Quality Assessment Program was done to characterize these effects on streams and fish in the

Yakima River Basin.¹ Soil, water, sediment, and fish were sampled for a variety of chemicals that have been and (or) continue to be used in the basin.

This report focuses on the occurrence of one of these chemicals in the Yakima River Basin—the insecticide DDT. Even though two decades have passed since its production and distribution was banned (1972), DDT and its breakdown products DDE and DDD are still widely dispersed in the environment. Concentrations of DDT, DDE, and DDD remain elevated in agricultural soils,

KEY CONCERNS

Where do DDT and its breakdown products DDE and DDD [Total DDT (T-DDT) = DDT + DDE + DDD] occur? In agricultural soils? In stream water? In stream sediment? In fish? In birds and mammals?

What are the sources of T-DDT in the basin? How does T-DDT enter streams?

Have concentrations of T-DDT decreased in stream water and fish since the ban on the production and distribution of DDT in 1972?

How do concentrations of T-DDT in fish in the Yakima River Basin compare with concentrations elsewhere in the Nation?

Are T-DDT concentrations of concern relative to human health and fish predators in the Yakima River Basin?

stream water, suspended and streambed sediment, and fish in the Yakima River Basin. Elevated concentrations of these compounds are a continued concern of residents, resource managers, and policymakers in the basin. Why? Because its broad toxicity can affect many organisms other than insects for which it was designed, such as fish and birds. Its persistence in the environment can lead to dangerous accumulations and adversely affect the reproductive capabilities of birds and other wildlife. And, its cancer-causing potential can possibly affect human health.

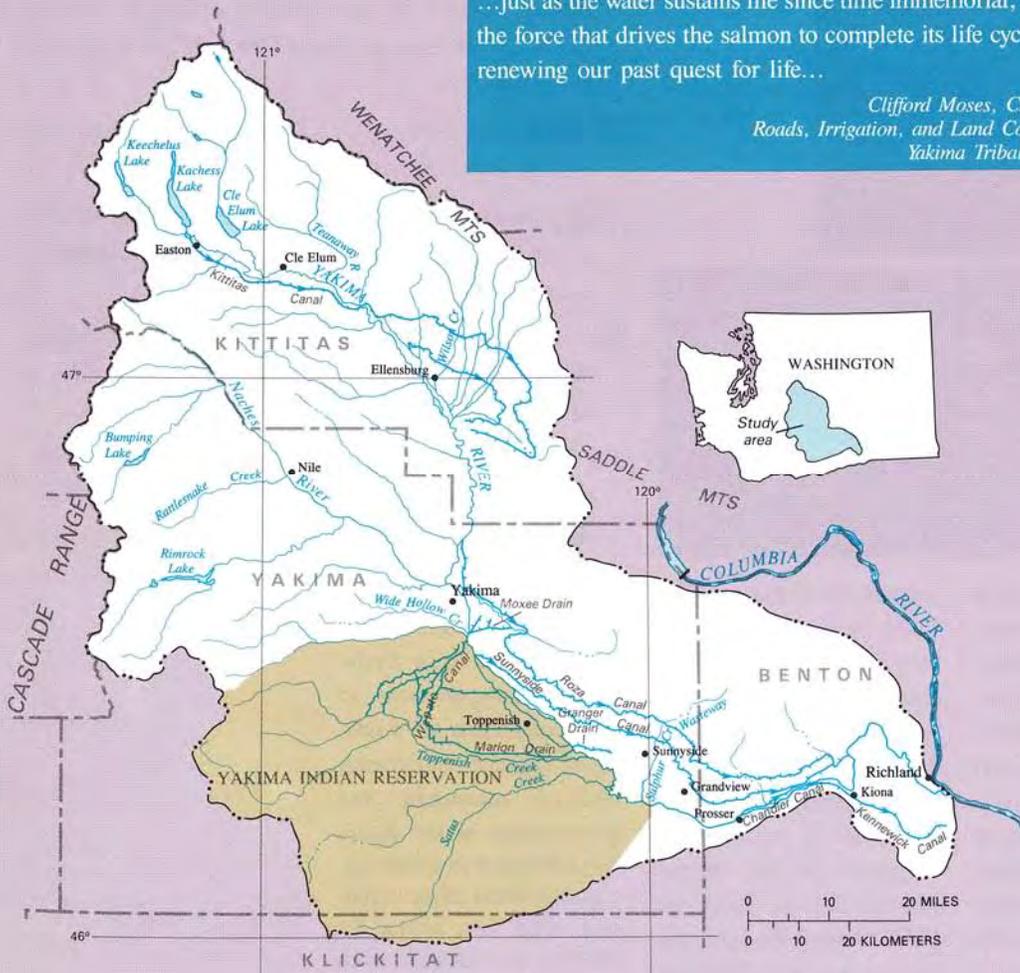
¹The U.S. Geological Survey is preparing a detailed interpretive report on the occurrence of DDT and 90 other pesticides in the Yakima River Basin.

THE YAKIMA



... just as the water sustains life since time immemorial, so does the force that drives the salmon to complete its life cycle; thus renewing our past quest for life...

*Clifford Moses, Chairman,
Roads, Irrigation, and Land Committee,
Yakima Tribal Council*



YAKIMA RIVER BASIN

Drainage area: 6,155 square miles
Population: 250,000 (1990)

EXPLANATION

-  YAKIMA INDIAN RESERVATION
-  BOUNDARY OF DRAINAGE BASIN
-  CANAL - Arrow indicates direction of flow



DDT: BANNED BUT NOT FORGOTTEN

Use of DDT was prevalent for about three decades after its introduction in the early 1940's. As in most agricultural areas of the world, crop yields in the Yakima River Basin were improved by widespread applications. However, after its adverse effects on birds and other wildlife and its cancer-causing potential became well known, the production and distribution of DDT was banned nationwide by the U.S. Environmental Protection Agency in 1972.

Only days after DDT was banned, another chemical, known as dicofol (trade names such as Kelthane, Acarin, Hilfol, Mitigan, and Cekudifol), was registered with the U.S. Environmental Protection Agency as an agent that would kill mites, particularly on citrus and cotton crops. Dicofol originally con-

tained as much as 15 percent DDT. Since about the mid-1980's, U.S. manufacturers of dicofol have pledged to reduce DDT concentrations to 0.1 percent. Although application of dicofol was approved for hops (new plantings only), mint, and apples in the basin, little of the compound has been used because target pests have become resistant.

Does the banning of DDT 20 years ago and the minimal use of dicofol mean that DDT is no longer a threat in the Yakima River Basin? Probably not because some of the characteristics that made DDT desirable as an insecticide make it a potential hazard in the environment for many decades. The persistence of DDT and its breakdown products assure a long-lasting presence in soil, streams, fish, birds, and other animals.

HAZARDOUS TRAITS OF D D T

BROAD TOXICITY. DDT and its breakdown products, DDE and DDD [Total DDT (T-DDT) = DDT + DDE + DDD], affect many organisms other than insects for which it was designed, such as clams, fish, and birds.

PERSISTENT. T-DDT is chemically stable and is not readily broken down by microorganisms, heat, or ultraviolet light. T-DDT can, therefore, persist in soil, water, sediment, and animal tissue for years.

LOW SOLUBILITY IN WATER AND HIGH ACCUMULATION IN FAT. T-DDT is relatively insoluble in water. However, T-DDT is stored readily in the fatty tissue in animals, where it is resistant to metabolic breakdown.

FOOD-CHAIN EFFECT. Once in streams, T-DDT makes its way into streambed sediment and into plants and animals at the base of the food chain. Fish acquire T-DDT through uptake in food, by feeding on, for example, smaller fish or stream invertebrates (aquatic insects, snails, and clams). Fish also accumulate T-DDT directly from water passing over their gills. Terrestrial animals and birds eat the contaminated fish and invertebrates, and so on up the food chain.



CROP YIELDS IN THE YAKIMA RIVER BASIN HAVE BEEN, AND CONTINUE TO BE, IMPROVED BY THE WIDESPREAD APPLICATIONS OF PESTICIDES.

What is DDT?

What are DDE and DDD?

What is the chemical composition of the DDT compounds?

What are the possible effects on human health?

How much is too much for human consumption?

DDT is a general-purpose insecticide.

DDT breaks down to other compounds DDE (in the presence of oxygen) and DDD (in the absence of oxygen).

DDT compounds are chlorinated hydrocarbons (also known as organochlorines) that consist of carbon, chlorine, and hydrogen.

D D T—DichloroDiphenylTrichloroethane

D D E—DichloroDiphenyldichloroEthylene

D D D—DichloroDiphenylDichloroethane

DDT and its breakdown products [Total DDT (T-DDT = DDT + DDE + DDD)] can affect the human nervous system, liver, kidneys, and skin. The compounds have been classified as probable human carcinogens (compounds that cause cancer) by the U.S. Environmental Protection Agency.

The U.S. Environmental Protection Agency has not set a standard for the protection of human health against which T-DDT concentrations in water or fish can be compared. This report presents preliminary and theoretical degrees of risk that reflect the lifetime (considered to be 70 years) chance of contracting cancer from consumption of T-DDT in water or fish. Risk calculations are based on the current (1993) understanding of the cancer-causing potency of T-DDT (extrapolated from studies by the U.S. Environmental Protection Agency of the effects on laboratory animals). The calculations include some uncertainty because of limited information on human fish-consumption rates and the toxicity of T-DDT (see p. 17 through 20 for further explanation of human risk).

Consumption of water—Daily consumption of 2 quarts of drinking water with a T-DDT concentration of 0.1 microgram per liter³ by a 150-pound person over a 70-year lifetime corresponds to an incremental increase in cancer risk of 1 per 1 million people.

Consumption of fish—Weekly consumption of one 5-ounce serving of fish filets with a T-DDT concentration of 0.01 microgram per gram⁴ of fish by a 150-pound person over a 70-year lifetime corresponds to an incremental increase in cancer risk of 1 per 1 million people.

The Food and Drug Administration established an action level of 5 micrograms of T-DDT per gram of whole fish (wet weight). Action levels are established to regulate levels of contaminants in human food and animal feed sold to the public. Action levels do not apply to consumers of noncommercial, locally caught fish, such as sport fishermen and their families.

The most conspicuous effect of T-DDT has been on the reproductive capabilities of fish-eating birds, such as the great blue heron and the bald eagle. Studies have shown that elevated concentrations result in thin egg shells that break easily in the nest.

The chronic-toxicity criterion for T-DDT in water for the protection of freshwater aquatic life, established by the U.S. Environmental Protection Agency and adopted by the Washington State Department of Ecology, is 0.001 microgram per liter.

The guideline for the protection of fish predators, established by the National Academy of Sciences, is 1 microgram of T-DDT per gram of a whole fish (wet weight).

³One microgram is equal to one-millionth of a gram or one-thousandth of a milligram, and a milligram is equal to the weight of about six crystals of salt. One microgram per liter also is expressed as one part per billion (analogous to about one person in China).

⁴One microgram per gram is equal to one part per million (analogous to about one person in the State of Idaho).



GOOD FOR FRUITS—Bigger apples, juicier fruits that are free of unsightly worms . . . all benefits resulting from DDT dusts and sprays.



FOR THE HOME—Helps to make healthier, more comfortable homes . . . protects your family from dangerous insect pests. Use DDT powders and sprays as directed . . . then watch the bugs "bite the dust"!

What are the possible environmental effects?

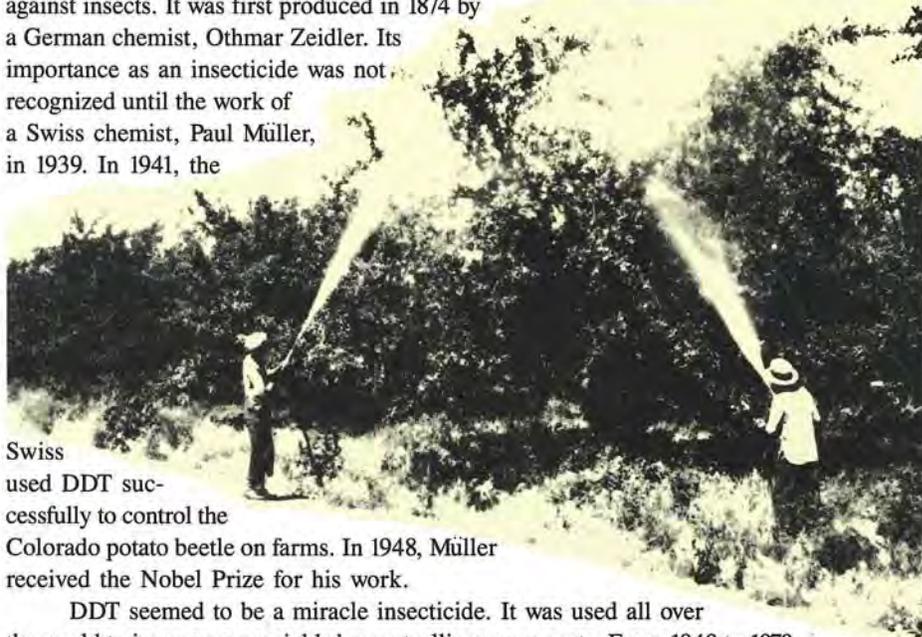
How much is too much for aquatic life and fish predators?



THE HISTORY OF DDT FROM MIRACLE TO MENACE

“DDT was a miracle: Highly toxic to insects, virtually insoluble in water . . . it seemed to be the universal solution to insect problems.”

DDT was the first of a family of synthetic chemicals that revolutionized man's war against insects. It was first produced in 1874 by a German chemist, Othmar Zeidler. Its importance as an insecticide was not recognized until the work of a Swiss chemist, Paul Müller, in 1939. In 1941, the



Swiss used DDT successfully to control the Colorado potato beetle on farms. In 1948, Müller received the Nobel Prize for his work.

DDT seemed to be a miracle insecticide. It was used all over the world to improve crop yields by controlling many pests. From 1940 to 1970, more than 4 billion pounds were used, with 80 percent used in agriculture. Production reached its maximum in the United States in 1961 when 160 million pounds were manufactured; this accounted for nearly one-fourth of the Nation's insecticide use. DDT also was an effective control for insects that carried diseases, such as malaria and yellow fever. It was used during World War II by Allied Forces to control mosquitoes and as a personal insecticide in clothes to control lice. In the 1950's and 1960's, municipal foggers traveled the roads and sprayed DDT into the air to eliminate mosquitoes; gasoline-powered lawn mowers were adapted to drip DDT into the hot exhaust system to assure temporary relief from mosquitoes in the homeowner's yard.

The DDT miracle, however, was short lived. Its broad toxicity affected many organisms other than insects for which it was designed, such as fish and birds. Its persistence led to dangerous accumulations. In the 1960's, the “food-chain DDT and its breakdown from low to high in the tract public attention. The peregrine falcon, for instance, disappeared from parts of its range. These environmental health risks associated in *Silent Spring* by the Rachel Carson. The book alerted citizens all over the country for the decision by the Environmental Protection Agency to ban production of DDT a decade



tions in animals. By the 1970's, the “effect” (accumulation of DDT products in organisms food chain) began to attract almost conspicuous effects on birds. The problems and potential with DDT were described by the distinguished biologist Rachel Carson, which sparked interest among the public and laid the groundwork for the U.S. Environmental Protection Agency to ban the production and distribution of DDT in 1972.

George Woodwell,
Science, November 1984



The great expectations held for DDT have been realized. During 1946, exhaustive scientific tests have shown that, when properly used, DDT kills a host of destructive insect pests, and is a benefactor of all humanity.



DDT FOR ROW CROPS—25 more barrels of potatoes per acre . . . actual DDT tests have shown crop increases like this! DDT dusts and sprays help truck farmers pass these gains along to you.



GOOD FOR STEERS—Beef grows meatier nowadays . . . for it's a scientific fact that—compared to untreated cattle—beef-steers gain up to 50 pounds extra when protected from horn flies and many other pests with DDT insecticides.

EXCERPTS FROM A FULL-PAGE COLOR ADVERTISEMENT FOR DDT IN THE JUNE 30, 1947 TIME MAGAZINE.

IS DDT CONTAMINATION IN THE YAKIMA?

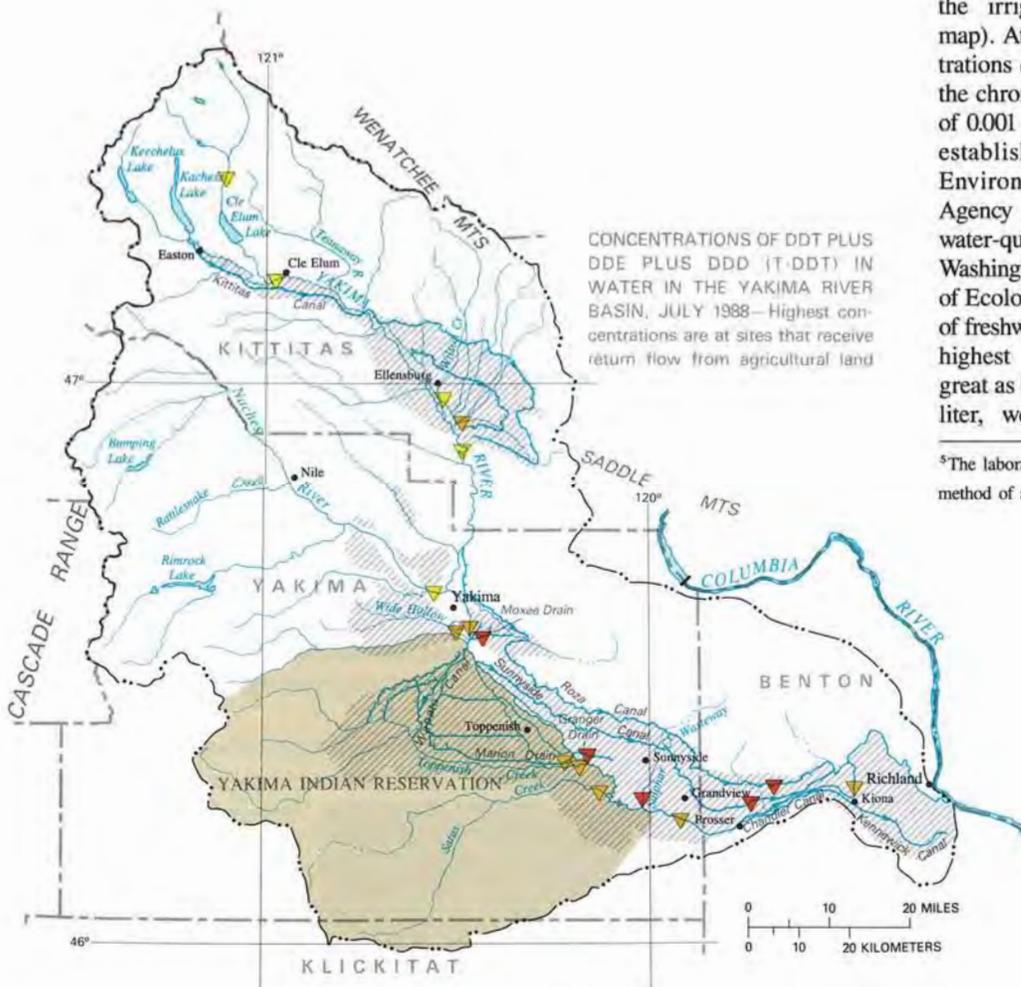
IS DDT IN THE STREAMS? HOW WIDESPREAD IS IT?

In July 1988, DDT and its breakdown products [Total DDT (T-DDT) = DDT + DDE + DDD] were detected in water at 13 of the 18 sites (about 72 percent) sampled in the main stem and tributaries of the Yakima River during the irrigation season (see map). At all 13 sites, concentrations equaled or exceeded the chronic-toxicity criterion of 0.001 microgram per liter established by the U.S. Environmental Protection Agency and adopted as the water-quality standard by the Washington State Department of Ecology for the protection of freshwater aquatic life. The highest concentrations, as great as 0.120 microgram per liter, were in agricultural-

return flows. The lowest concentrations of T-DDT in stream water in July 1988 were in the forested headwaters of the basin. These concentrations were below the chronic-toxicity criterion and the laboratory-reporting level.⁵

In July 1988, T-DDT concentrations in water in the main stem of the Yakima River varied from place to place. The highest concentrations were in the lower 110 miles of the river where the basin is farmed intensively and where main-stem flow is dominated by return flow from agricultural land. Because of diversions for irrigation, main-stem flow provides minimal dilution of

⁵The laboratory reporting level is the lowest reliable concentration for a particular method of analysis that is reported by the laboratory.



N A T I N G S T R E A M S A R I V E R B A S I N

DO CONCENTRATIONS OF T-DDT VARY DURING THE YEAR?

contaminants from the relatively large return flows from agricultural land. Concentrations near the mouth of the river at Kiona were not as high as those sampled in the river where tributaries that carry agricultural-return flow enter the main stem, probably because of dilution and the settling out of T-DDT associated with the sediment.

Concentrations of T-DDT were high in streambed sediment at sites that received return flows from agricultural land. Samples collected in Wide Hollow Creek during 1987-90 showed a maximum concentration of 2.1 micrograms of T-DDT per gram of streambed sediment.

Throughout 1988-89, T-DDT concentrations exceeded the chronic-toxicity criterion for the protection of freshwater aquatic life in several agricultural-return flows (Moxee Drain, Wide Hollow Creek, Granger Drain, and Sulphur Creek Wasteway). The concentrations ranged from 0.003 to 0.120 microgram per liter.

Concentrations were highest during peak irrigation and heavy rainfall in the agricultural areas. Although lower than those of the agricultural-return flows, concentrations in the Yakima River at Kiona equaled or exceeded the chronic-toxicity criterion in 9 of 10 samples that were collected year-round in 1988-89.



RIDGE AND FURROW IRRIGATION PROMOTES SURFACE RUNOFF OF AGRICULTURAL SOILS TO THE STREAMS.

WHAT IS THE SOURCE OF T-DDT IN STREAMS?

Are elevated concentrations of T-DDT in streams a vestige from the past or is T-DDT presently entering streams? Analyses of water samples collected from May 1988 through December 1989 indicate that runoff of agricultural soils is a near-continuous source of T-DDT to the Yakima River. During peak irrigation and periods of heavy rainfall, contaminated agricultural soils erode from fields into the streams. Some of this soil remains suspended

in the water. The amount of T-DDT in the water is directly related to the amount of suspended sediment (see graph). A portion of the suspended particles settles out and carries some T-DDT to the stream bottom. Some T-DDT dissolves in the water. Dissolved T-DDT is released directly from suspended and streambed sediment. Some T-DDT also dissolves in runoff that enters streams from agricultural land.

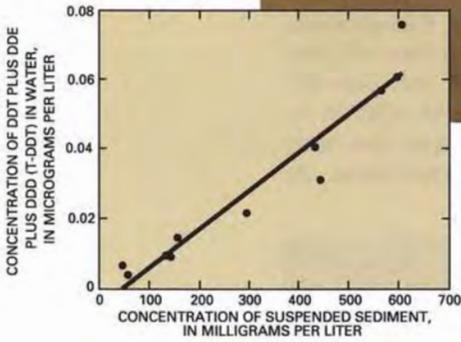
Analyses of a few

samples of agricultural soils show that concentrations of T-DDT are about four times higher than concentrations of T-DDT in the suspended sediment in the water and streambed sediment (see bar chart). Apparently, soil eroded from agricultural land is the major source of T-DDT in streams. Because of the large reservoir of T-DDT in agricultural soils, the compounds are likely to be present in stream water and stream sediment for many decades.

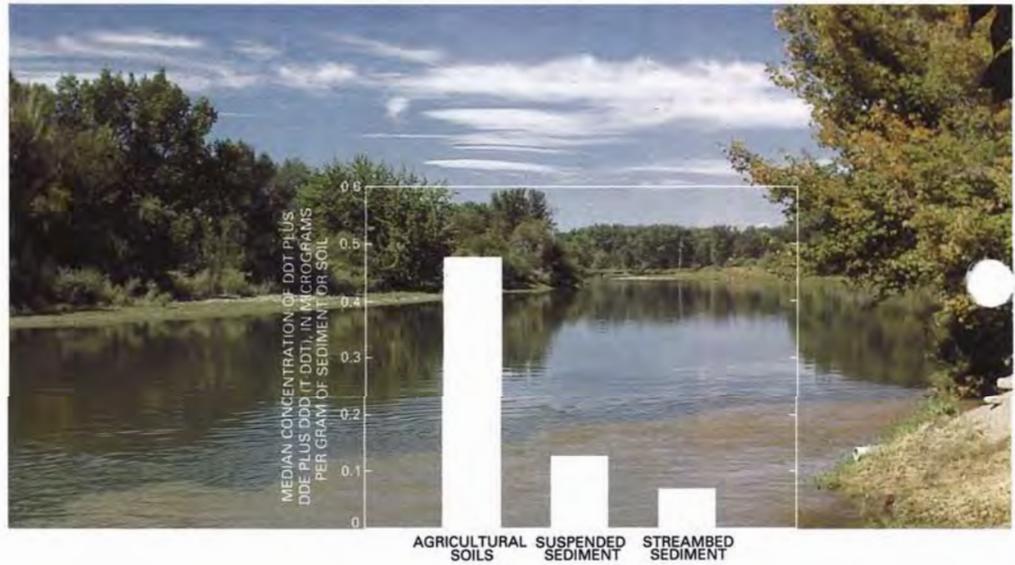




TURBID STREAM WATER AT THE JUNCTION OF GRANGER DRAIN AND THE YAKIMA RIVER, WHICH RESULTS FROM SURFACE RUNOFF OF AGRICULTURAL SOILS DURING PEAK IRRIGATION AND PERIODS OF HEAVY RAINFALL.



CONCENTRATIONS OF SUSPENDED SEDIMENT AND DDT PLUS DDE PLUS DDD (T-DDT) IN WATER IN MOXEE DRAIN, 1988-89—The amount of T-DDT in the water is directly related to the amount of suspended sediment in the water



CONCENTRATIONS OF DDT PLUS DDE PLUS DDD (T-DDT) IN AGRICULTURAL SOILS ARE AT LEAST FOUR TIMES HIGHER THAN THOSE IN SUSPENDED AND STREAMBED SEDIMENT—Each bar represents a median; the number of samples with concentrations above the "median concentration" equals the number of samples with concentrations below it

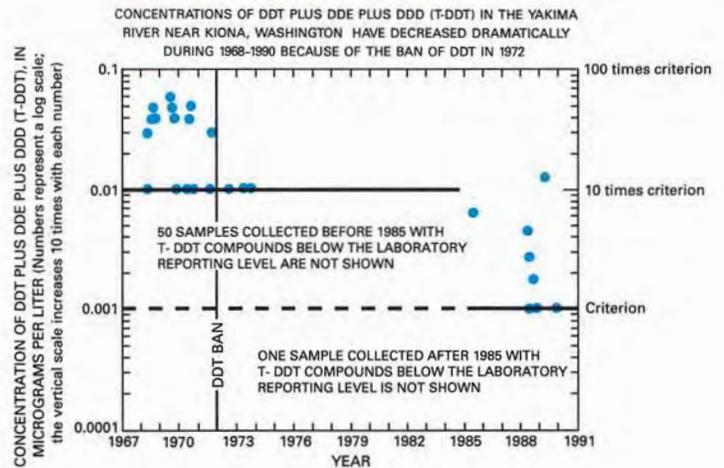


ARE CONCENTRATIONS OF T-DDT CHANGING IN STREAMS?

Concentrations of T-DDT in the Yakima River have decreased since the ban on DDT in 1972. Concentrations in the main stem at Kiona decreased from about 0.06 microgram per liter in 1969 to generally less than 0.01 microgram per liter in 1990 (see graph). However, the 1990 level is still as much as 10 times higher than the chronic-toxicity criterion for the protection of freshwater aquatic life established by the U.S. Environmental Protection Agency. The long-term decrease in concentrations of T-DDT in stream water results, in part, from de-

creased concentrations of T-DDT in agricultural soils. In addition, the decrease in concentrations of T-DDT in stream water probably is a consequence of reduced soil erosion from agricultural fields and less suspended sediment. Over the past 20–30 years, erosion of soils in the Yakima River Basin has been reduced because (1) irrigation practices have changed (from less use of ridge and furrow irrigation to more use of sprinkler and drip irrigation), (2) cropping patterns have changed (fewer acres are used to grow row crops, such as sugar beets,

potatoes, corn, and beans, and more acres are used to grow permanent crops, such as apples, pears, and grapes), and (3) cover crops of grasses and grains have been planted in orchards and vineyards. Data for T-DDT in soils or suspended sediment in the early 1970's are not available to confirm the relations. Long-term trends in T-DDT concentrations at other sites in the Yakima River and in agricultural-return flows are unknown because historical data are lacking.



EXPLANATION

- LABORATORY REPORTING LEVEL—The laboratory reporting level is the lowest reliable concentration for a particular method of analysis. As methods improve, the reporting level is lowered, such as in 1985
- - - CHRONIC-TOXICITY CRITERION FOR T-DDT—Established by the U.S. Environmental Protection Agency for protection of freshwater aquatic life
- CONCENTRATIONS OF T-DDT AT OR ABOVE THE LABORATORY REPORTING LEVEL

IS DDT CONTAINED IN THE YAKIMA RIVER

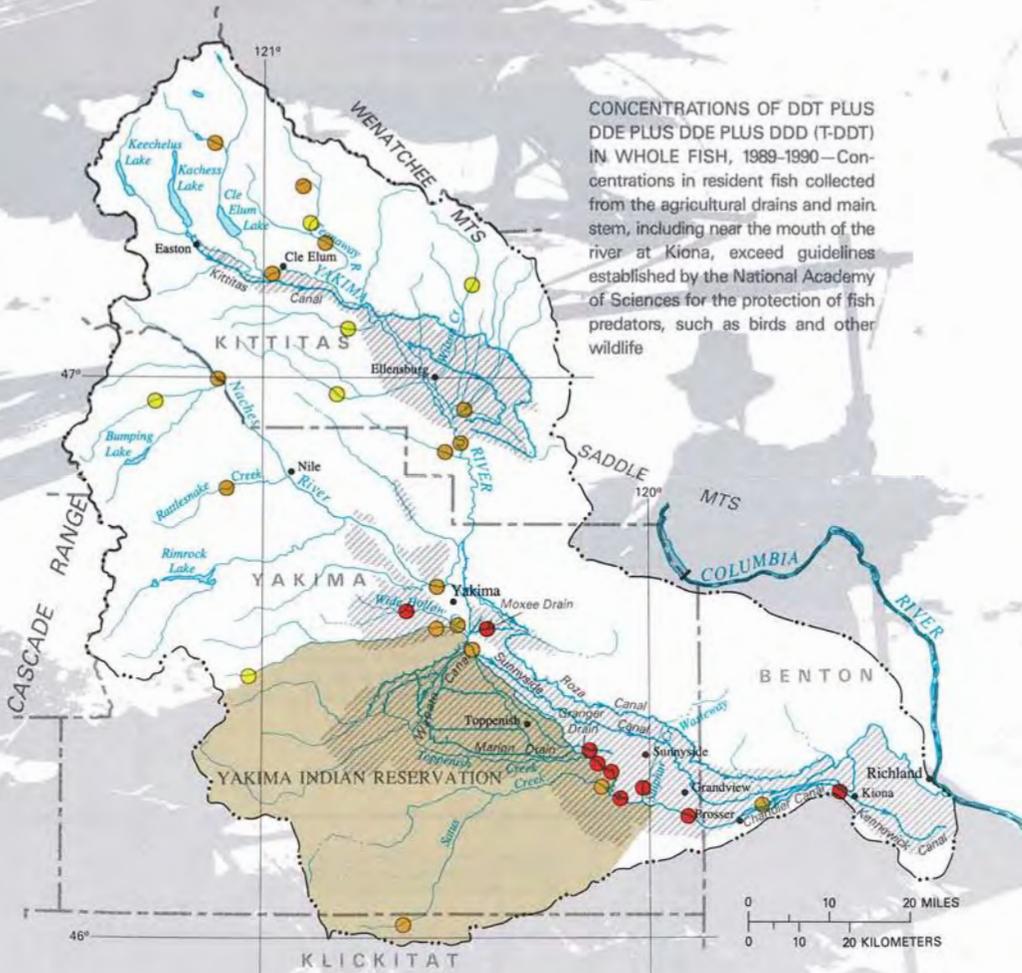
WHAT IS THE SOURCE OF DDT IN FISH?

Fish acquire some DDT and its breakdown products [Total DDT (T-DDT) = DDT + DDE + DDD] through uptake in food, by feeding on, for example, stream invertebrates or smaller fish that have fed on contaminated plants. Fish also accumulate T-DDT directly from water passing over their gills.

T-DDT is stored in the fatty tissue of the fish and is not readily metabolized (broken down). The accumulation of T-DDT depends, in part, on fat content—fish with a low fat content do not accumulate as much T-DDT as fish with a high fat content—and, in part, on age, sex, species, and availability of food.



PREPARATION OF MOUNTAIN WHITE-FISH FOR TISSUE ANALYSIS.



CONCENTRATIONS OF DDT PLUS DDE PLUS DDD (T-DDT) IN WHOLE FISH, 1989-1990—Concentrations in resident fish collected from the agricultural drains and main stem, including near the mouth of the river at Kiona, exceed guidelines established by the National Academy of Sciences for the protection of fish predators, such as birds and other wildlife



YAKIMA INDIANS COLLECTING FISH NEAR UMTANUM, WASHINGTON, FOR MEASUREMENT AND ANALYSIS OF RESIDENT FISH POPULATIONS IN THE YAKIMA RIVER.

YAKIMA RIVER BASIN

EXPLANATION

- IRRIGATED AREA
- YAKIMA INDIAN RESERVATION
- BOUNDARY OF DRAINAGE BASIN
- CANAL—Arrow indicates direction of flow

CONCENTRATIONS OF DDT PLUS DDE PLUS DDD (T-DDT) IN MICROGRAMS PER GRAM, WET WEIGHT—The National Academy of Sciences guideline to protect fish predators equals 1 microgram of T-DDT per gram of whole fish, wet weight

- Less than 0.01
- 0.01 to 1
- Greater than 1

MINATING FISH RIVER BASIN?



The Yakima River supports a complex web of human activities and fishery and wildlife needs that depend on a healthy river system. Man requires high-quality water for drinking and recreation, and ample quantities for irrigation and industry. The river also provides habitat for (1) wildlife that live and feed along the banks, (2) fish that reside in or migrate to and from the basin, and (3) millions of microscopic aquatic organisms at the bottom of the food chain. Water is the link to life, and we need to continue daily efforts to sustain a healthy river system, while we efficiently meet our water needs.

*Mike Llewelyn, Olympia, Washington
Washington State Department of Ecology*



U.S. GEOLOGICAL SURVEY HYDROLOGISTS COLLECTING FISH SAMPLES FOR TISSUE ANALYSIS FROM RATTLESNAKE CREEK NEAR NILE, WASHINGTON.

ARE CONCENTRATIONS OF T-DDT DETECTABLE IN FISH THROUGHOUT THE BASIN?

Samples of resident fish collected in 1989-90 at 31 sites in the basin, including pristine headwater sites, show that T-DDT is detectable in fish throughout most of the basin.⁶ Concentrations of T-DDT are lowest (less than or equal to 0.01 microgram of T-DDT per gram of whole fish, wet weight) in species that reside in the headwaters, such as rainbow trout. Concentrations are highest (a maximum of 4.8 micrograms of T-DDT per gram of whole fish, wet weight) in species that reside in agricultural-return flows and in the lower 110 miles of the Yakima River where main-stem flow is

dominated by agricultural-return flow, such as largescale suckers, mountain whitefish, bridgelip suckers, and chisel-mouth. Concentrations in fish collected from agricultural-return flows and the main stem in the lower valley, including near the mouth of the river at Kiona, exceeded guidelines established by the National Academy of Sciences for the protection of fish predators (1 microgram of T-DDT per gram of whole fish, wet weight).

Data collected by the U.S. Geological Survey in 1989-90 do not include fish samples for T-DDT in migrating salmon and steelhead trout in the Yakima River Basin. Previous studies (1985)

by the Washington State Department of Ecology indicate that concentrations of T-DDT were substantially lower in young, ocean-bound salmon and steelhead trout than in the adults of resident species, such as largescale suckers. Downstream migrating spring salmon and steelhead smolts (young fish) intercepted at Prosser had concentrations of 0.57 and 0.10 microgram of T-DDT per gram of whole fish, respectively. These concentrations fall in the middle to lower range of those observed in resident fish in the basin and below the recommended maximum guideline for the protection of fish predators.

⁶All analyses of fish collected by the U.S. Geological Survey during 1989-90 were performed by a U.S. Fish and Wildlife Service contract laboratory.

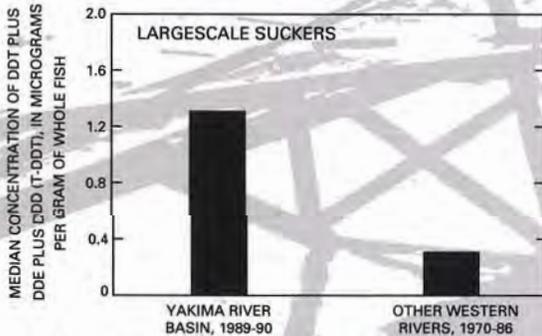
HOW DO CONCENTRATIONS OF T-DDT IN FISH IN THE YAKIMA RIVER BASIN COMPARE WITH CONCENTRATIONS IN FISH IN OTHER STREAMS THROUGHOUT THE NATION?



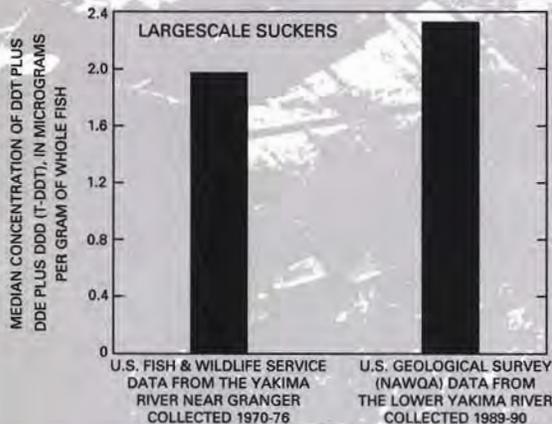
Fish in the Yakima River Basin have among the highest concentrations of T-DDT in the Nation, as suggested by a comparison of this study with a national study of fish collected by the U.S. Fish and Wildlife Service at 112 stations in major rivers in 1984-85. The median concentration of T-DDT in largescale suckers collected in 1989-90 in the main stem and agricultural return-flows of the Yakima River Basin (about 1.3 micrograms of T-DDT per gram of whole

fish) is greater than concentrations of T-DDT in fish collected by the U.S. Fish and Wildlife Service at 103 of the stations (more than 90 percent). Concentrations of T-DDT in largescale suckers in the main stem and agricultural return-flows in the basin are about four times higher than concentrations of T-DDT in largescale suckers in 13 other western streams sampled from 1970 to 1986 by the U.S. Fish and Wildlife Service (see bar chart). The highest average concentra-

tions of T-DDT in the Nation were in fish collected in 1984-85 by the U.S. Fish and Wildlife Service from the Yazoo River in Mississippi (greater than 5 micrograms of T-DDT per gram of whole fish). Other concentrations of greater than 1 microgram of T-DDT per gram of whole fish (guideline for the protection of fish predators) were in fish from intensively farmed areas of the Arkansas and lower Colorado Rivers, the Rio Grande, and Lakes Michigan and Ontario.



CONCENTRATIONS OF DDT PLUS DDE PLUS DDD (T-DDT) IN LARGESCALE SUCKERS IN THE YAKIMA RIVER BASIN (NAWQA DATA) ARE ABOUT FOUR TIMES HIGHER THAN IN LARGESCALE SUCKERS IN THIRTEEN OTHER WESTERN STREAMS (U.S. FISH AND WILDLIFE SERVICE DATA)



CONCENTRATIONS OF DDT PLUS DDE PLUS DDD (T-DDT) IN LARGESCALE SUCKERS FROM 1970 THROUGH 1976 ARE SIMILAR TO THOSE OBSERVED IN 1989-90

Each bar of the graphs represents a median; the number of samples with concentrations above the "median concentration" equals the number of samples with concentrations below it. The National Academy of Sciences guideline to protect fish predators equals 1 microgram of T-DDT per gram of whole fish, wet weight

Nationwide, concentrations of DDT in freshwater fish are lower now than at any time since monitoring of organochlorine pesticides was initiated in the 1960's, in keeping with the removal of DDT from the marketplace. U. S. Geological Survey findings for the National Water-Quality Assessment of the Yakima River, which suggest relatively stable, high concentrations over the past decade, imply that the soils and sediments of the Yakima watershed harbor a sizeable mass of residual DDT.

*Christopher J. Schmitt
U.S. Fish and Wildlife Service Contaminant Biomonitoring Program*

ARE CONCENTRATIONS OF T-DDT CHANGING IN FISH?

Data collected at 112 stations in major rivers across the nation by the U.S. Fish and Wildlife Service in 1976 and 1984-85 indicate that concentrations of T-DDT in fish showed no significant changes at 91 stations, decreased at 20, and increased at 1. The concentrations in largescale suckers collected in the lower Yakima River by the U.S. Geological Survey in 1989-90 were similar to

those collected near Granger in the lower Yakima River by the U.S. Fish and Wildlife Service from 1970 through 1976 (see bar chart). This similarity suggests that even though total concentrations of T-DDT in stream water have declined, the amount of T-DDT in the basin (including in the water, sediment, and invertebrates) remains high enough to maintain elevated concentrations in fish.

IMPLICATIONS OF FINDINGS ON MANAGEMENT OF DDT IN THE YAKIMA RIVER BASIN



It is important to understand that estimating risks from exposures to pollutants involves many uncertainties and assumptions. These uncertainties and assumptions span the entire development of risk predictions, ranging from determining the concentrations of pollutants in water and fish to estimating the levels of human exposure. The U.S. Environmental Protection Agency is encouraged by the apparent reduction in T-DDT concentrations in streams during the last 20 years. However, we are concerned that T-DDT residues are still present in fish. This concern stems from the knowledge that people are eating locally caught fish in the Yakima River Basin, sometimes in substantial amounts. Therefore, we feel it is important to further control the inputs of T-DDT to streams in the basin through the efforts of farmers, soil conservation districts, and others to minimize soil erosion and irrigation water runoff.

*Charles E. Findley
U.S. Environmental Protection Agency,
Region 10, Director, Water Division*



Even though two decades have passed since its production and distribution was banned, DDT and its breakdown products [Total DDT (T-DDT) = DDT + DDE + DDD] are still widely dispersed in the environment. Concentrations of T-DDT remain elevated in agricultural soil, stream water, suspended and streambed sediment, and fish in the Yakima River Basin. Concentrations in water commonly exceed the chronic-toxicity criterion for the protection of freshwater aquatic life, which was established by the U.S. Environmental Protection Agency and adopted as the water-quality standard by the Washington State Department of Ecology. Concentrations of T-DDT in fish in the basin are among the highest in the Nation and commonly exceed the guideline for the protection of fish predators estab-

lished by the National Academy of Sciences. Highest concentrations in water and fish occur in agricultural-return flows in the lower 110 river miles in the basin.

Are concentrations of T-DDT of concern relative to human health in the Yakima River Basin? Currently (1993), no standards for the protection of human health exist against which T-DDT concentrations in water or fish tissue can be compared. Preliminary and theoretical degrees of risk reflect the lifetime chance of contracting cancer from consumption of T-DDT in water or fish tissue. A "lifetime" generally is considered to be 70 years. Calculated risks are only theoretical estimates that provide guidance to agencies that regulate water quality or protect human health and information for identifying

potential health concerns to researchers and the public. The risks are calculated on the basis of current understanding of the cancer-causing potency of T-DDT (extrapolated from U.S. Environmental Protection Agency studies of laboratory animals, primarily rats and mice). These calculations include some uncertainty and assumptions, including possible differences in toxicological response of humans and laboratory animals to T-DDT and are based on limited information on relevant factors, such as fish-consumption rates. A human-health impact analysis is being conducted by the Washington State Department of Health to assess if T-DDT concentrations reported in this study pose a health threat to people who consume fish from the Yakima River Basin.



WHAT DO THESE FINDINGS MEAN TO PEOPLE WHO DRINK THE WATER?

In June 1989, treated Naches River water from the city of Yakima Treatment Plant was sampled; no data were available for treated river water at Cle Elum. The concentration of T-DDT in the drinking-water supply was 0.00036 microgram of T-DDT per liter. Daily consumption of 2 quarts of city of Yakima drinking water by a 150-pound person over a 70-year lifetime corresponds to an

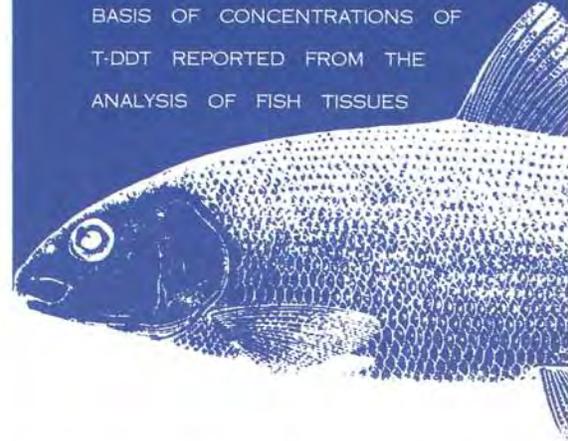
incremental increase in cancer risk of about 4 per 1 billion people (see inset on human risks). T-DDT concentrations are low in the drinking-water supply because the intake is located upstream from intense agriculture and because the treatment process used by the facility removes most of the sediment and, thus, most of the T-DDT associated with the sediment.



RESIDENTS ENJOYING THE BEAUTY AND EXCITEMENT OF THE YAKIMA RIVER.

IMPLIC

THE WASHINGTON STATE
DEPARTMENT OF HEALTH
HAS DETERMINED THAT A HUMAN-
HEALTH IMPACT ANALYSIS SHOULD BE
CONDUCTED TO DETERMINE IF CON-
CENTRATIONS OF T-DDT IN FISH IN
THE YAKIMA RIVER BASIN POSE A
THREAT TO HUMAN HEALTH. THIS
DETERMINATION WAS MADE ON THE
BASIS OF CONCENTRATIONS OF
T-DDT REPORTED FROM THE
ANALYSIS OF FISH TISSUES



WHAT DO THESE FINDINGS MEAN

Samples of resident fish collected in 1989-90 in the Yakima River Basin show that T-DDT is detectable in fish throughout most of the basin. Concentrations of T-DDT in all fish collected in 1989-90 are below an action level of 5 micrograms of T-DDT per gram of food that has been established by the Food and Drug Administration to regulate concentrations in human food and animal feed sold to the public. The action level represents the limit at which the Food and Drug Administration can remove products from the market. Action levels do not apply to consumers of non-commercial, locally caught fish, such as sport fishermen and their families.

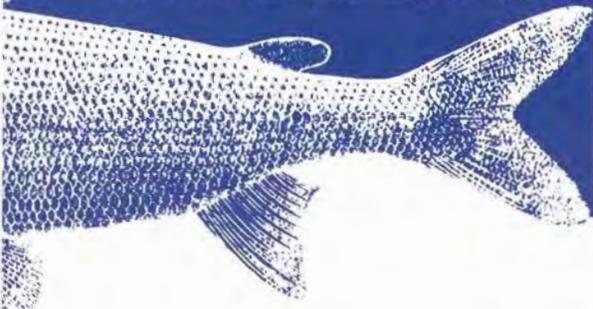
Concentrations of T-DDT are lowest (about 0.01 microgram of T-DDT per gram of whole fish, or an

estimated concentration of about 0.008 microgram of T-DDT per gram of fish file⁷) in species that reside in the near-pristine forested headwaters, such as rainbow trout from the Teanaway River. Consumption of one 5-ounce serving of rainbow trout per week over a 70-year lifetime corresponds to an incremental increase in cancer risk of about 1 per 1 million people (see inset, on human risks).

Concentrations of T-DDT are highest in species that reside in agricultural-return flows and in the lower 110 miles of the Yakima River, such as largescale suckers and mountain whitefish. Human-health risks associated with ingestion of T-DDT in fish in the lower 110 miles of the Yakima River are, therefore, higher than those associated with ingestion of T-DDT in

IN THE NATIONAL WATER-QUALITY ASSESSMENT STUDY AND RESULTS OF PRELIMINARY RISK-ASSESSMENT CALCULATIONS. THE WASHINGTON STATE DEPARTMENT OF HEALTH CURRENTLY (1993) IS WORKING ON THIS PROJECT AND WILL BE ISSUING A SEPARATE PUBLIC-HEALTH STATEMENT ON THE HEALTH EFFECTS THAT MAY RESULT FROM CONSUMPTION OF FISH IN THE YAKIMA RIVER BASIN.

GLEN PATRICK
WASHINGTON STATE DEPARTMENT OF HEALTH



TO PEOPLE WHO EAT THE FISH?

fish from the headwaters of the basin. The highest concentration of T-DDT in Yakima fish occurred in Sulphur Creek Wasteway (4.8 micrograms of T-DDT per gram of whole fish or an estimated 2.6 micrograms of T-DDT per gram of filet). The incremental increase in cancer risk associated with this concentration is 250 per 1 million people. Concentrations of T-DDT in mountain whitefish and large-scale suckers near the mouth of the Yakima River at Kiona ranged from 1.7 to 2.8 micrograms of T-DDT per gram of whole fish, or an estimated average concentration of 1.4 micrograms of T-DDT per gram of fish filet. Consumption of one 5-ounce serving of mountain whitefish or largescale sucker from the lower Yakima River per week over a 70-year lifetime corresponds to an

incremental increase in cancer risk of about 130 per 1 million people.

Human-health risks associated with ingestion of T-DDT in fish in the Naches River are higher than those associated with ingestion of treated Naches River water from the city of Yakima Treatment Plant. The concentration of T-DDT in mountain whitefish from the mouth of the Naches River was 0.75 microgram of T-DDT per gram of whole fish, or an estimated concentration of about 0.60 microgram of T-DDT per gram of fish filet. Consumption of one 5-ounce serving of mountain whitefish from the Naches River per week over a 70-year lifetime corresponds to an incremental increase in cancer risk of about 60 per 1 million people (see inset on human risks).

⁷Concentrations in fish filets are less than concentrations in whole fish because fat is less in filets than in whole fish and T-DDT is stored mostly in the fat. Relative concentrations in fish filets are estimated from data collected by the Washington State Department of Ecology in 1983. Analyses for fish filets collected in October 1991 by the U.S. Geological Survey are not expected to be complete until 1993.

ESTIMATED RISKS ASSOCIATED WITH SELECTED HUMAN ACTIVITIES

LIFETIME CHANCE OF DEATH (50 YEARS)⁸

Motor vehicle accident	17,000 in 1 million
Drowning	2,500 in 1 million
Fire	2,000 in 1 million
Electrocution	370 in 1 million
Lightning	35 in 1 million

LIFETIME CHANCE OF CONTRACTING CANCER (70 YEARS)

Cigarette smoking ⁸	80,000 in 1 million
Air pollution ⁸	1,000 in 1 million
Five ounces of largescale sucker from Sulphur Creek Wasteway per week	250 in 1 million ⁹
Five ounces of mountain whitefish from the Yakima River at Kiona per week	130 in 1 million ⁹
One-half gallon whole milk per week ⁸	100 in 1 million
Two ounces of peanut butter per week ⁸	80 in 1 million
Five ounces of mountain whitefish from the mouth of the Naches River per week	60 in 1 million ⁹
Five ounces of rainbow trout from the Teanaway River per week	1 in 1 million ⁹
Two quarts of city of Yakima drinking water per day	0.004 in 1 million ¹⁰

⁸Crouch, E. A., and Wilson, R., 1984, [in] Rodricks, J., and Tardiff, R., eds., Assessment and Management of Chemical Risks: American Chemical Society, Washington DC.

⁹Number represents risk associated with T-DDT only. Additional contaminants (such as other organic compounds or trace elements) might be associated with fish in the Yakima River Basin that increase human-health risks.

¹⁰Equal to 4 in 1 billion.



TROUT FISHERMAN IN THE YAKIMA RIVER.

DURING A STUDY IN 1986 AND 1987, THE U.S. FISH AND WILDLIFE SERVICE, IN COOPERATION WITH THE ARMY CORPS OF ENGINEERS, FOUND HIGH CONCENTRATIONS OF DDE



AND PCBs IN BALD EAGLE EGGS FROM NESTS ALONG THE COLUMBIA RIVER. THE HIGH CONCENTRATIONS OF DDE WERE FOUND TO BE ASSOCIATED WITH SIGNIFICANT EGGSHELL THINNING AND POOR REPRODUCTIVE SUCCESS OF BALD EAGLES NESTING ALONG THE RIVER. PRODUCTIVITY LEVELS OF EAGLES FROM THE COLUMBIA RIVER DURING 1987-91 WERE 30 TO MORE THAN 50 PERCENT LOWER THAN LEVELS FOUND IN STATEWIDE SURVEYS OF EAGLES NESTING IN OREGON AND WASHINGTON. WHILE PRODUCTIVITY LEVELS OF EAGLES ALONG THE COLUMBIA RIVER ARE VERY LOW, LEVELS OF NESTING POPULATIONS IN THE TWO

STATES ARE NEARING SOME OF THE RECOVERY GUIDELINES REQUIRED TO REMOVE THE SPECIES FROM THE ENDANGERED SPECIES LIST.

*MARVIN L. PLENERT, REGIONAL DIRECTOR, REGION 1,
U.S. FISH AND WILDLIFE SERVICE*

DOES T-DDT AFFECT FISH PREDATORS?



Concentrations of T-DDT in fish collected from agricultural-return flows and the main stem of the Yakima River, including near the mouth at Kiona, exceed guidelines (1 microgram of T-DDT per gram of whole fish) established by the National Academy of Sciences for the protection of fish predators, such as the bald eagle. Information is not available on concentrations of T-DDT in fish predators that reside

in the Yakima River Basin. Recent studies by the U.S. Fish and Wildlife Service, however, show elevated concentrations of DDE in bald eagle eggs from birds that nest near the mouth of the Columbia River. The Yakima River, which is located about 300 miles above the mouth of the Columbia River, is one of several sources in Washington and Oregon that are contributors of T-DDT to the Columbia River.



Water-quality improvement is a high priority goal of the USDA Soil Conservation Service. With the technical potential to achieve “zero” return flows from irrigated agriculture, we can significantly reduce both sediment-borne and in-solution contamination of surface water. This is especially true of DDT and its breakdown products, DDE and DDD.

*Lynn A. Brown, State Conservationist,
Soil Conservation Service*



EROSION CONTROL PROGRAMS, INCLUDING MULCHING FURROWS WITH STRAW, USING SPRINKLER AND DRIP IRRIGATION, AND PLANTING COVER CROPS OF GRASSES IN ORCHARDS, HAVE BEEN IMPLEMENTED BY FARMERS IN THE YAKIMA RIVER BASIN.

WILL T-DDT CONTAMINATION IN STREAMS AND FISH IN THE YAKIMA RIVER BASIN CONTINUE?

T-DDT contamination of streams and fish is an ongoing process, in part, because contaminated soils are eroded during the irrigation season and periods of heavy rainfall in agricultural areas. The presence of T-DDT in agricultural soils is attributed to historic applications and to the persistent chemical makeup of the compounds. Information to assess the environmental persistence and fate of DDT and its breakdown products in the agricultural soils in the Yakima River Basin is insufficient; the amount of time it takes for DDT compounds to break down in the soils

depends on environmental conditions, soil type, and many complex chemical processes.¹¹ It is, therefore, difficult to quantify when T-DDT contamination in the streams and fish in the Yakima River Basin will subside or end. Results of this study indicate, however, that chemical breakdown of T-DDT is slow because, despite the ban on the production and distribution of DDT in 1972, concentrations of T-DDT in the Yakima River near Kiona commonly exceeded the chronic-toxicity criterion for the protection of freshwater aquatic life between 1972 and 1990. The

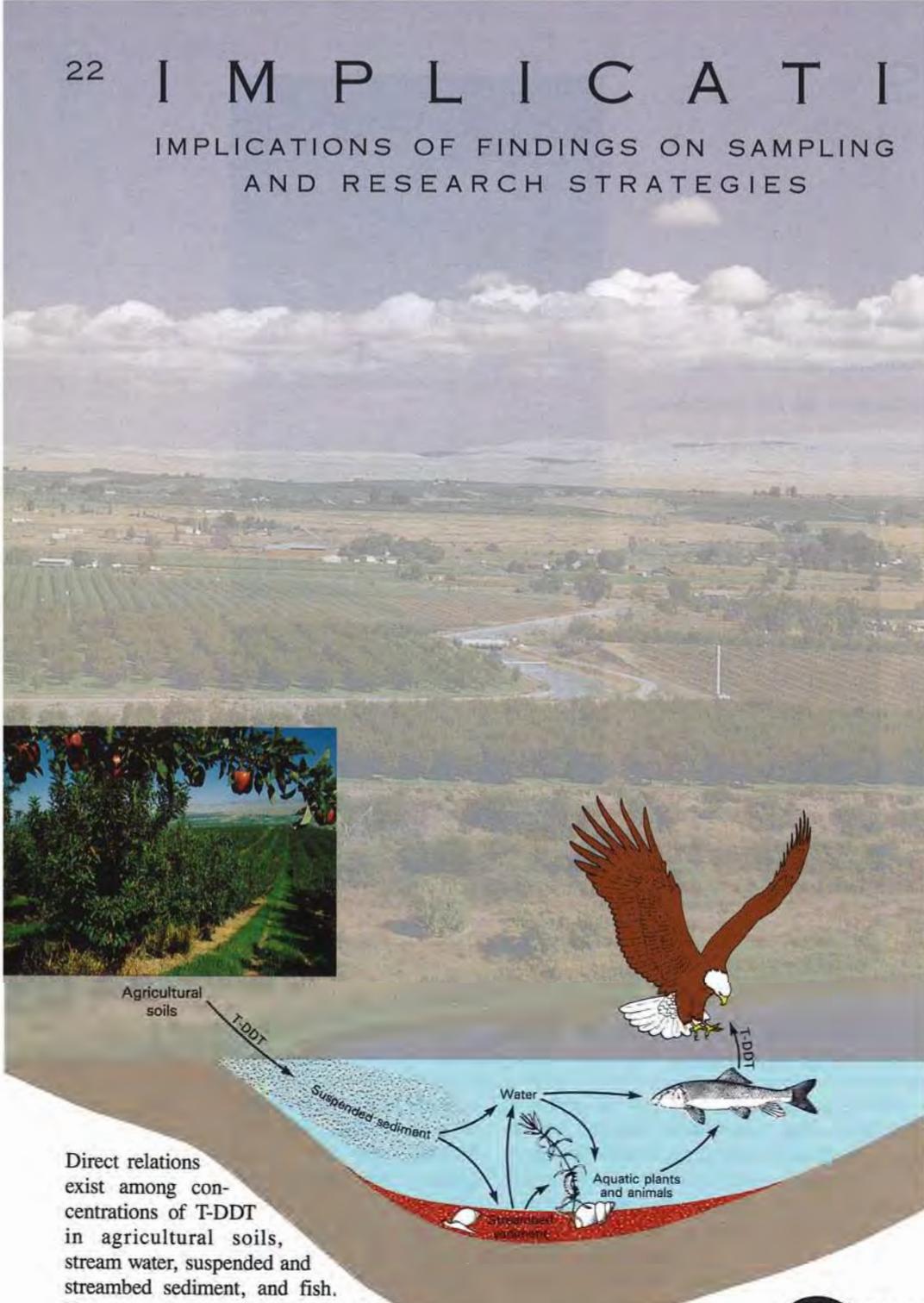
contaminated agricultural soils could, therefore, provide a large and long-term reservoir of T-DDT to streams and fish in the Yakima River Basin for decades to come.

Federal, State, Tribal, and local programs have been implemented in the basin to reduce erosion of contaminated soils, thereby reducing the amount of T-DDT that enters streams. Over the past 20–30 years, erosion has been reduced because irrigation practices and cropping patterns have changed and cover crops of grasses and grains have been planted in orchards and vineyards. Erosion-control programs implemen-

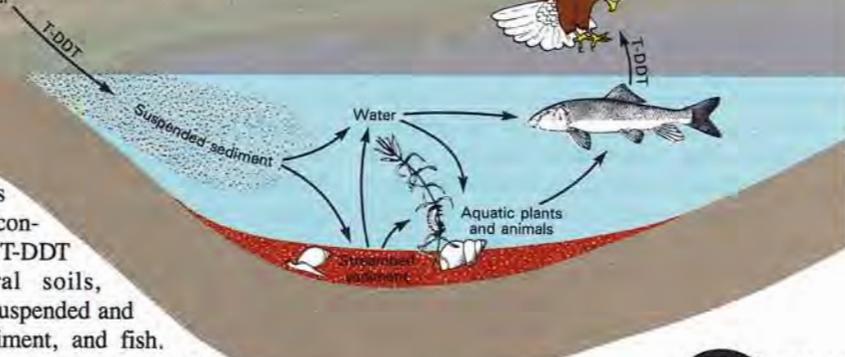
ted in the basin within the last 10 years include mulching furrows with straw and irrigating with underground drip units. These newest methods help maintain adequate soil moisture and help promote less tillage and surface runoff. The erosion-control programs, which have been provided with technical and cost assistance from local Conservation Districts, the Agricultural Stabilization and Conservation Service, and the Soil Conservation Service, have been implemented by farmers. Such programs will help reduce the amounts of suspended sediment and T-DDT that enter streams.

¹¹ Callahan, M. and others, Water-related environmental fate of 129 priority pollutants: U.S. Environmental Protection Agency Report 440/4-79-029a, v. 1.

IMPLICATIONS OF FINDINGS ON SAMPLING AND RESEARCH STRATEGIES



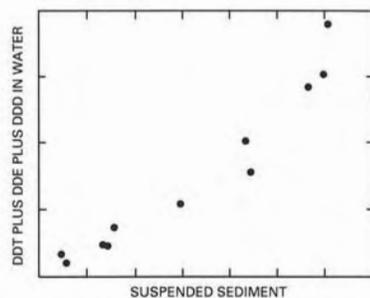
Agricultural soils



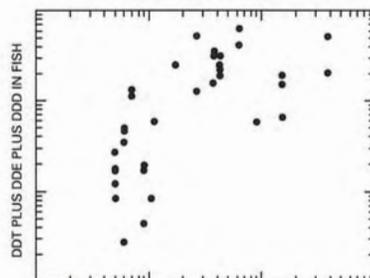
Direct relations exist among concentrations of T-DDT in agricultural soils, stream water, suspended and streambed sediment, and fish.

For example, concentrations of T-DDT in stream water are directly related to concentrations of suspended sediment in the water, and those in fish are correlated with concentrations in stream water and sediment. These relations imply that knowledge of concentrations of T-DDT in one medium provides an estimate of concentrations in other media. For example, analyses of streambed sediment might be used to estimate relative accumulation in fish. Such relations can be useful for optimizing resources required for monitoring T-DDT in the Yakima and other river basins.

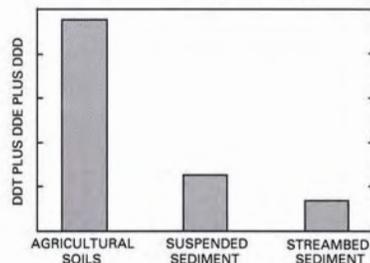
The continuous replenishment and widespread dispersal of T-DDT among different media in the Yakima River Basin has raised concern by researchers of many disciplines (fish biologists, health scientists, soil scientists, water-resource managers, and hydrologists). Coordination and cooperation among agencies and organizations at all levels are essential to implement and maintain an effective program to assess where T-DDT occurs and to determine the sources in the Yakima River Basin.



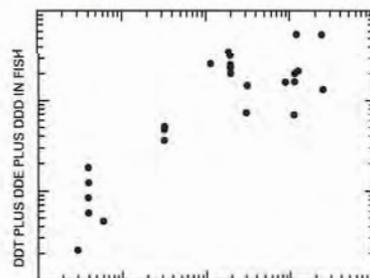
SUSPENDED SEDIMENT



DDT PLUS DDE PLUS DDD IN WATER



AGRICULTURAL SOILS SUSPENDED SEDIMENT STREAMBED SEDIMENT



DDT PLUS DDE PLUS DDD IN STREAMBED SEDIMENT

COMMUNICATION AND COORDINATION AMONG THE U.S. GEOLOGICAL SURVEY AND OTHER INTERESTED SCIENTISTS AND WATER-MANAGEMENT PERSONNEL ARE IMPORTANT COMPONENTS OF THE NATIONAL WATER-QUALITY ASSESSMENT PROGRAM. TO MAKE BEST USE OF THE RESOURCES AVAILABLE, WE ARE COMMITTED TO FOSTER INFORMATION EXCHANGE AND COOPERATION AMONG ALL RELEVANT AGENCIES THROUGH THE DURATION OF THIS LONG-TERM PROGRAM. EVERY LEVEL OF GOVERNMENT AND THE PRIVATE SECTOR HAS A ROLE TO PLAY.

PHILIP COHEN, CHIEF HYDROLOGIST, WATER RESOURCES DIVISION, U.S. GEOLOGICAL SURVEY

Coordination among agencies and organizations at all levels is essential to understanding the distribution and variability of TDDT in the Yakima River Basin. This publication was coordinated with the following Federal, State, Tribal, and local agencies and non-profit organizations. These organizations also provide reports on many aspects of the Yakima River Basin, including the distribution of surface water, chemical quality of the water, biological studies, and general water resources. General information on water resources can be obtained by writing to:

FEDERAL ORGANIZATIONS

U.S. Army Corps of Engineers North Pacific Division	P.O. Box 2870 Portland, OR 97208-2870	503-326-3736
U.S. Department of Agriculture Forest Service	301 Yakima St., P.O. Box 811 Wenatchee, WA 98807-0811	509-662-4335
Soil Conservation Service	1606 Perry St., Suite F Yakima, WA 98902	509-454-5736
U.S. Department of Energy Bonneville Power Administration Public Information Center	P.O. Box 12999 Portland, OR 97212	800-622-4519
U.S. Department of the Interior Bureau of Indian Affairs	P.O. Box 632, Fort R Toppenish, WA 98948	509-865-2255
Bureau of Reclamation	1150 N. Curtis Rd., Mail Code 140 Boise, ID 83706-1234	208-378-5020
Fish and Wildlife Service	3704 Griffin Lane, SE. Suite 102 Olympia, WA 98501	206-753-9440
Geological Survey	1201 Pacific Avenue Suite 600 Tacoma, WA 98402	206-593-6510
U.S. Environmental Protection Agency, Region 10 Water Division	1200 Sixth Avenue Seattle, WA 98101	206-553-8514
YAKIMA INDIAN NATION Environmental Protection Program	P.O. Box 151 Toppenish, WA 98948	509-865-5121
WASHINGTON STATE AGENCIES Department of Agriculture Pesticide Management	P.O. Box 42560 Olympia, WA 98504-2589	206-753-5064
Department of Ecology Public Disclosure	106 S. 6th Ave. Yakima, WA 98902-3387	509-454-7658
Department of Fisheries Habitat Management Div.	P.O. Box 43155 Olympia, WA 98504	206-753-6650
Department of Health Office of Toxic Substances	Airustrial Center, Bldg. 4 P.O. Box 47825 Olympia, WA 98504	206-753-1930
Department of Natural Resources Photo and Map Sales	P.O. Box 47031 Olympia, WA 98504-7031	206-753-5338
Department of Wildlife	2802 Fruitvale Blvd. Yakima, WA 98902	509-575-2740

Much appreciation is extended to U.S. Geological Survey employees for their expertise in the production of illustrations by Leslie J. Robinson and James O. Whitmer; type composition by Shirlye A. McManus; and photography by David F. Usher.

Appreciation is also extended to those individuals and agencies that contributed photographs:

Charlie Collins, U.S. Geological Survey	Bureau of Reclamation
Lynn Hatcher, Yakima Indian Nation, Fisheries Program	Central Washington Agricultural Museum
Gregory K. Scott, Nature Photos, Gilman, Wisconsin	Columbia River Inter-Tribal Fish Commission
	U.S. Fish and Wildlife Service
	Yakima Valley Museum and Historical Society

A COORDINATED EFFORT

LOCAL AND INTERSTATE AGENCIES, UNIVERSITIES, AND NONPROFIT ORGANIZATIONS

Benton Conservation District	618 8th St. Prosser, WA 99350	509-786-1923
Benton-Franklin Health District	800 W. Canal Dr. Kennewick, WA 99336	509-582-7761
Central Washington University	Chemistry Dept., Dean Hall Ellensburg, WA 98926	509-963-2811
Columbia River Intertribal Fish Commission	729 NE. Oregon, Suite 200 Portland, OR 97232	503-238-0667
Kittitas County Conservation District	P.O. Box 679 Ellensburg, WA 98926	509-925-5375
Kittitas County Health Department	507 N. Naneum Ellensburg, WA 98926	509-962-7515
Northwest Power Planning Council	851 6th Ave. SW., Suite 1100 Portland, OR 97204	503-222-5161
North Yakima Conservation District	1606 Perry St., Suite F Yakima, WA 98902	509-454-5736
South Yakima Conservation District	P.O. Box 230 Toppenish, WA 98948	509-865-4012
Washington State University at Prosser		
Irrigated Agricultural Research and Extension Center	Box 2953A Prosser, WA 99350	509-786-2226
Washington State University Cooperative Extension		
Benton County	1121 Dudley Ave. Prosser, WA 99350-1399	509-786-5609
Kittitas County	5th and Main, Room 217 Ellensburg, WA 98926-2887	509-962-7507
Yakima County	233 Courthouse Yakima, WA 98901	509-575-4242
Washington Water Research Center		
Washington State University	Pullman, WA 99164	509-335-5531
Yakima Health District	104 N. 1st St. Yakima, WA 98901	509-575-4265
Yakima River Basin Association of Irrigation Districts	P.O. Box 810 Sunnyside, WA 98944	509-837-5141
Yakima Valley Conference of Governments	6 S. 2nd St., Suite 605 Yakima, WA 98901	509-575-4372

Additional information on the National Water-Quality Assessment Program can be obtained by writing to:

Deputy Assistant Chief Hydrologist, NAWQA Program
U.S. Geological Survey
National Center, 12201 Sunrise Valley Drive, MS 413
Reston, Virginia 22092

Suggested Readings:

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- Johnson, Arthur, Norton, Dale, and Yake, William, 1986, Occurrence and significance of DDT compounds and other contaminants in fish, water, and sediment from the Yakima River Basin: Washington State Department of Ecology, Water Quality Investigations Section, Report 86-5, 89 p.
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- Rinella, J.F., McKenzie, S.W., and Fuhrer, G.J., 1991, Surface-water-quality assessment of the Yakima River Basin, Washington—Analysis of available water-quality data through 1985 water year: U.S. Geological Survey Open-File Report 91-453, 270 p.
- Schmitt, C.J., Zajicek, J.L., and Peterman, P.H., 1990, National contaminant biomonitoring program—Residues of organochlorine chemicals in U.S. freshwater fish, 1976-84: Archives of Environmental Contamination and Toxicology, v. 19, p. 748-781.
- Smith, J.A., Witkowski, P.J., and Fusillo, T.V., 1988, Manmade organic compounds in the surface waters of the United States—A review of current understanding: U.S. Geological Survey Circular 1007, 92 p.
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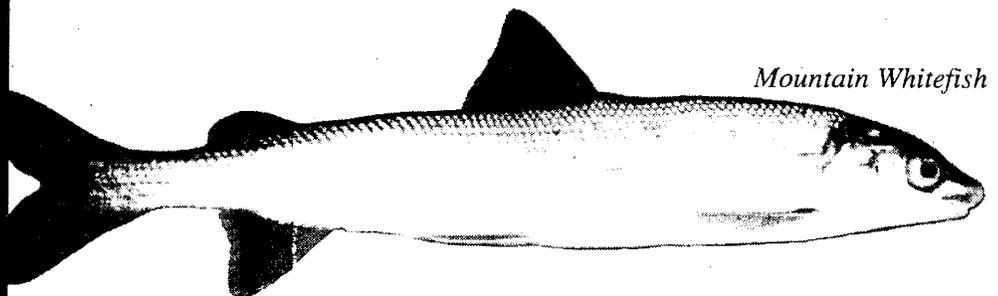
ABOUT DDT:

Starting in the 1940s, the pesticide DDT was widely used to control insects, especially in agriculture. DDT was banned in the United States in 1972. This toxic chemical is slow to breakdown and it persists in the environment today. People are exposed to DDT when they eat foods, such as fish, that have taken in DDT from the environment.

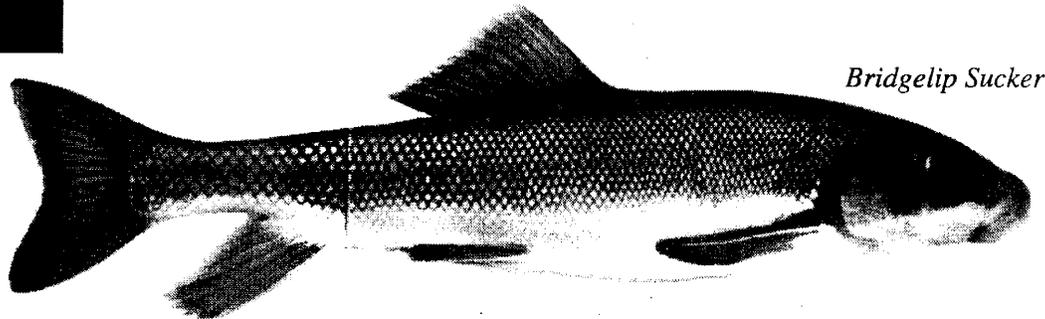
In this pamphlet the term DDT refers to the pesticide DDT plus its breakdown products DDE and DDD.

DDT

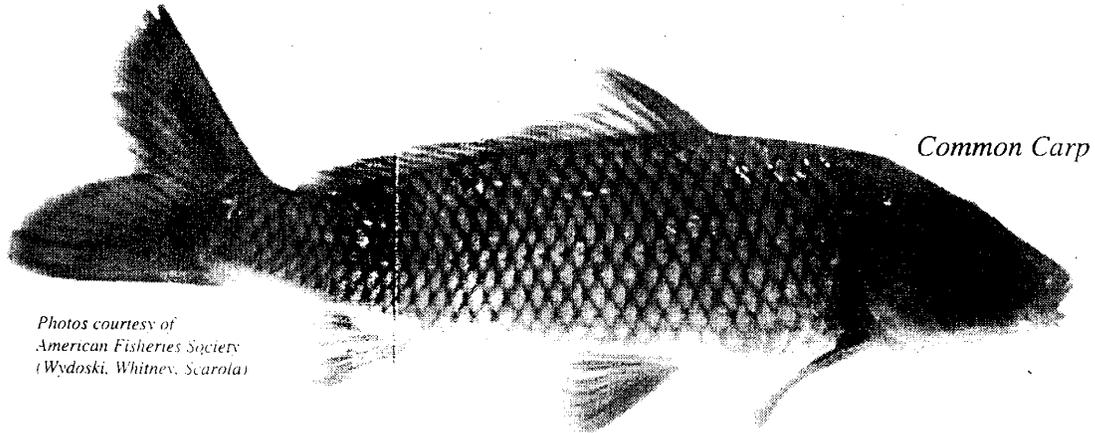
IN BOTTOM FISH FROM THE YAKIMA RIVER



Mountain Whitefish



Bridgelip Sucker



Common Carp

*Photos courtesy of
American Fisheries Society
(Wydoski, Whitnev, Scarola)*

FOR MORE INFORMATION CONTACT:

Yakima Health District
104 N. First Street
Yakima, WA 98901
1-800-535-5016

**Kittitas County
Health Department**
507 Nanum
Ellensburg, WA 98926
(509) 962-7698

**Benton-Franklin
Health District**
506 McKenzie
Richland, WA 99352
(509) 582-7761



Office of Toxic Substances
P.O. Box 47825
Olympia, WA 98504-7825
(360) 586-5403
1-800-525-0127 in Washington

RECOMMENDATION:

Eat fewer bottom fish.

DDT

is a pesticide that can be harmful to your health. DDT may be linked to breast cancer and problems with:

- the immune system
- the nervous system
- liver function.

A recent study found high levels of DDT in bottom fish in the Yakima River.

DDT builds up in fat tissue. Bottom fish have more fat than other types of fish, and they take in more DDT because of where they feed.

RECOMMENDATIONS:

To reduce your exposure to the pesticide DDT, Washington State Department of Health recommends that you:

- Limit the amount of bottom fish you eat to one meal per week.
- Eat fish such as trout, instead of bottom feeding fish.
- Eat other protein foods, such as beans and rice.

IF YOU EAT BOTTOM FISH:

- Remove the fat along the belly and back of the fish before cooking.
- Do not eat the fish skin.
- Allow the fat to drip off during cooking. Barbeque or broil on a rack—avoid frying.

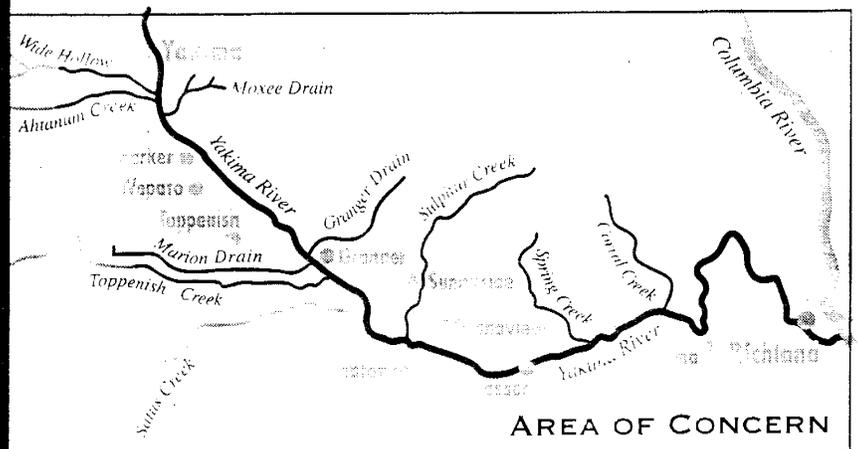
Background

The United States Geological Survey (USGS) studied the water quality in the Yakima River Basin between 1989 and 1991. A variety of fish from many locations along the river and its tributaries were collected as part of this project. Large scale sucker, bridgelip sucker, and mountain whitefish had the highest levels of the pesticide DDT.

USGS turned over the results of their study to the Washington State Department of Health. The Department evaluated how DDT might affect the health of people who eat these fish. It was determined that people who frequently eat bottom fish caught in Yakima River may suffer adverse health effects.

Area of Concern and Type of Fish

- **The lower Yakima River and agricultural drains, from the city of Yakima to the Columbia River.** Also, creeks and tributaries on the lower Yakima River near the area where they flow into the river.
- **Large scale sucker, bridgelip sucker, and mountain whitefish.** Other bottom fish, such as carp, channel catfish and squaw fish may also have high levels of DDT.



After careful study, the Department of Health makes these recommendations to ensure the safety of people who frequently eat bottom fish from the Yakima River. The Department plans to continue studying this issue by conducting a fish consumption survey in the lower Yakima River basin.

APPENDIX 15

SURFACE-WATER-QUALITY ASSESSMENT OF THE
YAKIMA RIVER BASIN, WASHINGTON:
PESTICIDE AND OTHER TRACE-ORGANIC-COMPOUND
DATA FOR WATER, SEDIMENT, SOIL, AND
AQUATIC BIOTA, 1987-91



U.S. GEOLOGICAL SURVEY
Open-File Report 92-644

APPENDIX 16

SURFACE-WATER-QUALITY ASSESSMENT OF THE YAKIMA RIVER BASIN, WASHINGTON: ANALYSIS OF AVAILABLE WATER-QUALITY DATA THROUGH 1985 WATER YEAR



U.S. GEOLOGICAL SURVEY
Open-File Report 91-453

APPENDIX 17

It runs through a river

Irrigators hope to clear up dirty water picture before drastic measures taken

By DAVID LESTER
Of the Herald-Republic

During the peak of each irrigation season, 200 tons of dirt wash into the Yakima River every day.

The sediment from irrigation drains and an accompanying cocktail of chemicals, bacteria and elevated temperatures continue to push endangered migratory fish closer to the brink. The river rarely approaches state standards for water quality.

Last week's proposed listing of mid-Columbia steelhead, including the Yakima run, as a threatened species adds to a growing drumbeat for dramatic change in the future use and protection of water. A re-allocation of water, with farmers taking a back seat in favor of instream flows for fish or strict limits on development, are two potential outcomes.

The questions are: Who will control the extent of change, and how it will come about? In an unprecedented move, irrigators hope they have come up with at least one answer to avoid what observers have called the economic train wreck that is an endangered species listing.

"There are a lot of things going on that have come to bear in the last year or two and our board has said, 'Let's try to control our own destiny.'" said Jim Trull, manager of the Sunnyside Valley Irrigation District.

An umbrella organization created by the Sunnyside and Roza divisions is trying to do just that. Their Board of Joint Control is launching the largest coordinated effort ever to dramatically improve the quality of water in the lower Yakima River.

The two districts, which deliver irrigation water to 175,000 acres between Moxee and Whitstran, have adopted an innovative and aggressive water-quality improvement plan to have water leaving farms bound for the river meet state quality standards in five years.

The plan focuses initially on the jointly operated drains and along irrigation canals, but pushes farmers to make on-farm improvements for better water quality.

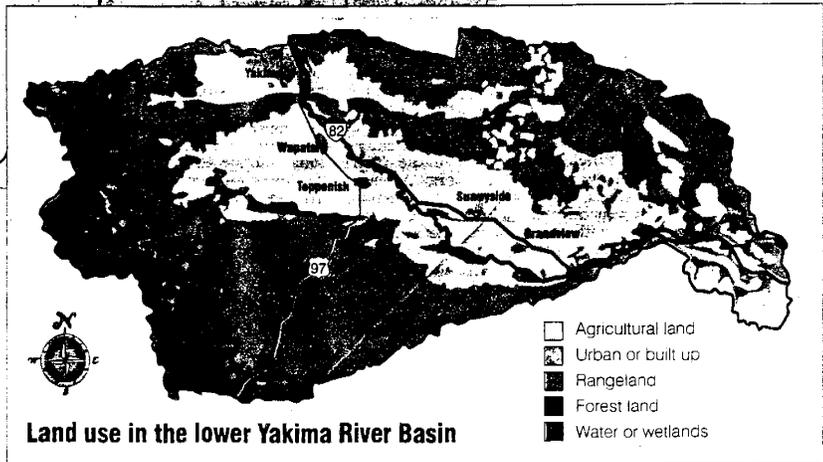
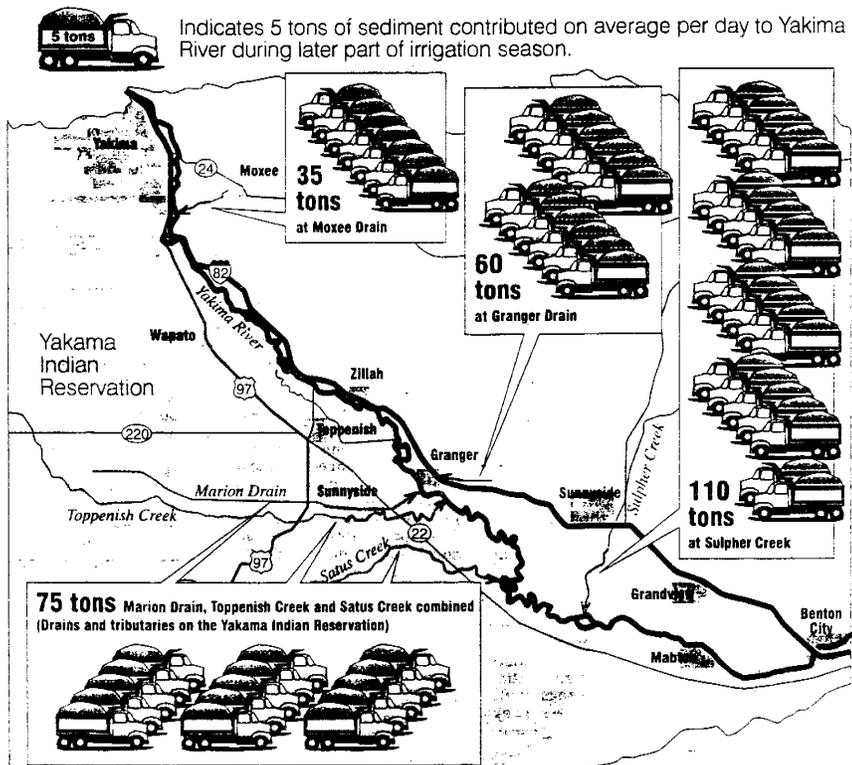
Deep in the policy, however, is the ultimate weapon for compliance — the "velvet hammer," as one manager calls it — the denial of water service.

■ See WATER, Page 11A



Sediment deposits

Total suspended sediment (TSS) loading balance at selected irrigation drains and tributaries in the lower Yakima River Basin during 1995 irrigation season.



Source: Washington State Department of Ecology

Yakima Herald-Republic

An average of 200 tons of suspended sediment is spewed into the Yakima River each day during the peak of the irrigation season. Pictured at left is an irrigation canal running parallel to Lateral A.

■ Staff file photo by Roy Mustelli
■ Graphic by Kathy Harestad

Deep in the Board of Joint Control's policy is the ultimate weapon for compliance — the 'velvet hammer,' as one manager calls it — **the denial of water service**

Water/

■ Continued from 1A

Cutting off the lifeblood of an agricultural producer won't happen this year, officials caution, since the focus will be on education and assistance. But the fact remains that sooner rather than later, farmers must clean up drain water or at least have a firm idea how they are going to do it.

Farmers identified as having dirty drain water must agree to a cleanup plan before the 1999 irrigation season. Persistent refusal to cooperate means no water.

THAT'S THE Sunnyside-Roza Board of Joint Control's response to looming requirements of the federal Clean Water Act, which is yet to be re-authorized by Congress, and the threat that more migratory fish populations will be listed under the Endangered Species Act.

The Clean Water Act requires states to establish quality standards and implement an improvement plan.

California has been a hotbed of dramatic changes in water allocation, all in the name of protecting migratory fish species. Regulations are on the books in both California and Oregon that prohibit pollution of waterways.

In addition to regulation, citizen and environmental groups are suing the states and irrigators for not having done enough to protect the public resource.

"Part of the reason our board is so aggressive is because we don't need a citizen lawsuit challenging Ecology for not moving rapidly," said Trull of the Sunnyside Valley Irrigation District. "We want to take care of the problem before a solution is forced on us that would be more draconian."

Ron Van Gundy, manager of the Roza Irrigation District, said the districts, not state and federal government, are the logical source to attack poor water quality.

"I don't think they would have the knowledge to deal with it that we do. It would be done more from an enforcement standpoint," he said. "We have been working with them on the best management practices for many years. There has been a lot accomplished, but not everyone's gotten there yet."

Katherine Ransel, co-director of American Rivers Northwest's regional office in Seattle, said the unprecedented move is a logical one given the threats to business-as-usual in irrigation.

"We have the entire Yakima River Basin listed under the Clean Water Act for pollution that violates water quality stand-

ards and low flows. There are several pending lawsuits under the Endangered Species Act. If there is any time to get serious about fixing the mess, this is it," she said.

AND QUITE A mess it is.

Recent water sampling in basin drains shows a veritable witches' brew of chemicals, ammonia, bacteria, sediment and high water temperatures that empty into the lower Yakima River every day of the irrigation season.

On average, the major drains on both sides of the Yakima River spew out 200 tons of suspended sediment daily into the river during the peak of the irrigation season. Sulphur Creek, which flows southward to the river east of Sunnyside, carried 110 tons of sediment during sampling in 1995.

DDT, a chemical banned more than 25 years ago, still is detected in all major drains that empty into the Yakima River. Numerous other chemicals also are found.

Washington water quality standards for the stretch of river allow a slight increase in the amount of sediment beyond that measured upstream at the Harrison Road bridge, east of Selah, and at the Nelson bridges over the Naches River. Most days, the lower river is nowhere close to the state standard. The state Ecology Department has reached an agreement with the Environmental Protection Agency to comply with the federal law through a process known as total maximum daily load — the largest amount of specific pollutants that can be present in a river system.

While sediment loads aren't in the state standard, Ecology officials have determined that the amount of sediment in the water is an indicator for the presence of DDT and turbidity or cloudiness of the water, two elements that are in the standard.

Chris Coffin, Ecology project coordinator, said meeting the state standard will require reductions in sediment load from the drains of anywhere from 75 percent to 95 percent.

While the amount of improvement needed is high, Coffin said farmers nearly met the standard during the water-short 1994 season when they were forced to be cautious with the water they used.

"If you pay attention and keep the soil on the ground, it won't end up in the river," he said.

One of the best ways is to modify irrigation systems to sprinkler or drip systems. Settling ponds, vegetative strips to filter water, and other techniques are available for farms where expensive sprinkler systems can't be justified economically.

THE IRRIGATION districts, Coffin said, are the key players in trying to improve water quality.

"This is really an important step for them to come on board and claim ownership of the clean waters," he said.

The two districts have been pointing toward this water quality project for some time. Settlement basins have been dug to hold runoff water so the dirt settles out before reaching the drains. District staff members sampled water twice each month last season at 29 sites at the mouths of drains, diversion points on the two canals and at other locations.

District personnel will be patrolling drains and other waterways as part of their regular duties to pinpoint problem areas and start working with farmers.

Livestock-grazing near drains will be prohibited and farmers will have to maintain buffer zones between cultivated fields and project waterways to reduce the potential for erosion.

"Next year we expect to be well on the road to having it corrected or to have figured out how," Van Gundy said. "We expect everything to be implemented and pretty well taken care of within the five-year period of the TMDL (total maximum daily load) process."

Individual farm plans to reduce pollution will be reviewed and signed off by the joint board.

The plans can be devised with the assistance of the districts and the Natural Resource Conservation Service.

The districts are seeking state and federal grants through the Ecology Department, the Bonneville Power Administration and other federal agencies to help finance water quality plans on the farm.

Another issue, in addition to cleaning up water leaving the farm, is keeping water in the river to reduce water temperatures, a problem that landed a number of state waterways on the noncompliance list. Ransel said she is urging state and federal regulators to make increases in instream flows a priority.

Reducing diversions, she argued, can help solve both pollution and high temperature problems.

But the prospect of reduced diversions poses a problem for irrigators.

"Our biggest fear is requiring us to reduce our diversions to dilute the water by having more for instream flows, or simply as a penalty for lack of compliance," Trull said. "We have worked for 30 years to increase the water supply. This would move us backward."

"We have too much at stake to hold our ground and wait until it comes," he added.

Wash. has a first for clean water

Judicial agreement directs the state to restore health of some 700 water segments

By COOKSON BEECHER
Capital Press Staff Writer

OLYMPIA — Clean water as soon as possible — no ifs, buts or ors about it.

That's the message coming in loud and clear now that a judicial agreement — the first of its kind in the nation — has been hammered out directing the state of Washington to restore the health of nearly 700 water segments, salt and freshwater alike, within the next 15 years.

For farmers and timber owners, the agreement, reached last week, will inject more immediacy into the challenge of tackling water quality issues.

Buffers, fencing to keep livestock from waterways, shade requirements, levels of dissolved oxygen, water temperature, manure-management practices, water quantity, and in some cas-

es, the use of fertilizers and pesticides will be part of the formula to improve water quality.

The agreement is a historical one in that it makes Washington the only state in the nation to embark on developing both TMDLs and an implementation plan.

"Usually states try to weasel out of implementing a plan," said Ecology official Dave Peeler, one of the chief negotiators of the agreement. "But we felt it didn't make sense to do the studies and make estimates about allocations and then not follow through. That would have been a lot of work for nothing."

Ecology officials are quick to point out that had this agreement not been reached, the courts would have ordered the Environmental Protection Agency to step in, thus opening up the state to increased federal control. In addition, the timeline for compliance probably would have been much shorter.

In Idaho and Georgia, for example, the courts have imposed timelines of five to seven years. Thanks to this agreement, Washington has 15 years to get its waterways back into healthy shape.

"Landowners such as farmers and timber growers are much better off than if the courts had rendered a decision," said Ecology official Steve Saunders. "Without the agreement, EPA would have taken a much broader swipe. We wanted to keep more state control and therefore more local control in coming up with watershed-based plans."

The recent agreement is the result of a lawsuit launched in 1991 by the Northwest Environmental Advocates and the Northwest Environmental Defense Center against the state's Ecology Department and the EPA. Nationally, there are about 30 states with sim-

Water

(Continued from Page 1)

ilar lawsuits pending.

In filing the suit, the plaintiffs said the environmental agencies had an inadequate program to assess the condition of its water bodies and to develop the required Total Maximum Daily Loads, referred to as TMDLs.

TMDLs are a measurable way to identify sources of pollution in waters that don't meet water quality standards and to determine how much the waters can receive and still remain healthy.

These standards are designed to make sure water can support such uses as swimming, fishing, drinking, habitat and agricultural and industrial supply.

Nina Bell, executive director of Northwest Environmental Advocates, said the agreement shows that the state recognizes how important clean water is to its residents.

"In making these changes," she said, "Ecology has the support of the public who wanted the Clean Water Act in 1972 and, over 25 years later, still want to meet its goals of water clean enough for fish, wildlife and people."

According to Ecology, the leading pollution problems in this state come from non-point sources — or the cumulative effects of many diffuse activities. Fecal coliform bacteria from failing septic systems and poor agricultural practices have been identified as two of the leading pollution problems in Washington's waters.

"The TMDLs will be used to clean up all the sources of water pollution, not just those that come out of an industrial outfall or sewage treatment plant," said Chuck Clarke, EPA's Northwest Regional administrator. He pointed out these standards will be developed through the EPA-

Ecology agreement.

In the past six years, Ecology has produced approximately 200 TMDLs. Under this agreement, potentially 1,700 TMDLs will need to be completed. That figure is based on the 666 water segments that do not meet water quality standards multiplied by the types of pollution problems in the waters.

In talking specifically about agriculture, Peeler was quick to recognize the value of the voluntary Best Management Practices that many farmers already have in place.

"We want to build on those," he said, pointing out that farmers will now have to go a step further and begin meeting the standards of the Clean Water Act.

And he was emphatic about the need for all landowners, farmers included, to take the state's commitment to cleaning up its waterways seriously.

"They need to make their plans with this in mind," he said. "This issue is not going to go away."

Jim Jesernig, director of the state's Agriculture Department, called the agreement an important step in improving the state's water quality. But he said state and federal agencies need to be working on the same page when developing watershed plans so that those plans will meet the requirements of both the Clean Water Act and the Endangered Species Act.

"It's important that we don't go off on one tangent or the other and end up with a case of the right hand not knowing what the left hand is doing," he said.

And he warns that citizens need to be actively involved in these watershed plans if they don't want to see federal agencies and the courts stepping in and calling all of the shots.

FRIDAY, JAN. 16, 1998



Rain likely. High of 47. Low of 34. Weather A5



CALENDAR

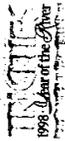
Strictly ballroom

Ballroom troupe performs in Richland. C1

SPORTS

Gary Payton scores 20 points to lead the SuperSonics past the Miami Heat for the 11th straight time in Seattle. B1

Tri-City Herald



Pasco, Kennewick, Richland, Wash.

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Rivers

Continued from Page A1

difficult task" but one that will help restore declining fish populations.

Almost 700 water bodies that fail to meet quality standards will be under review until 2014 as the agency figures out how to clean them up. Cleanup efforts will begin on the waters as the plans are completed.

"It is much faster and much more aggressive than what we have been doing previously," said Mary Gatchell, Ecology Department spokeswoman.

In the last six years the agency has completed about 200 studies designed to identify sources of pollution in subpar waters. But in the next 15 years, the Ecology Department will do as many as 1,700 of the so-called "Total Maximum Daily Load" or TMDL studies.

Most of the studies set to begin next year are on the west side of the state, but within five years, Ecology Department inspectors will descend on most regions.

"We do have considerable water quality problems in the Columbia Basin," Gatchell said. "We are going to be working on strategies to

improve the water quality there. These strategies may very well mean changes to current practices."

Gov. Gary Locke has requested \$905,000 from the Legislature to finance the initial phase of the work. That likely will mean 12 more employees making cleanup plans.

Improvements won't come easy, Bell said. "A lot of money is going to have to be spent by public and private entities to follow the requirements of the law."

Parties in the lawsuit reached a prior settlement in the early 90s, but the environmental groups went back to court saying the state didn't live up to its end of the bargain.

"I feel they have a real commitment to this program now that they didn't exhibit then," Bell said.

The settlement also will put increasing pressure on people who pollute by spilling their car oil, over-fertilizing their lawns and letting their pet's waste enter state waters. Bell said that by focusing its efforts on municipal systems over the last 20 years, the state has largely neglected to educate citizens about their roles in keeping water clean.

"It's very difficult to clean it up after it's gone into the storm water," she said. "It's much better to do pollution prevention."

Though specific costs and actions

have not been determined for many waters, the Yakima River is a good example of how TMDLs work. Last summer, the Ecology Department set up a schedule to reduce sediment and the pesticide DDT. During the next 20 years, it will force farmers to cut sediment-carrying runoff from their fields by 75 to 95 percent in certain river drainages.

For irrigators, this goal means more pressure to continue making changes in farming practices to reduce sediment. In the Yakima Valley, farmers already are being asked to convert from rill irrigation to more efficient methods.

The Sunnyside Valley Irrigation District and the South Yakima Conservation District have efforts under way to educate farmers about irrigation alternatives. SVID is planning workshops early this year to teach farmers about water conservation and new water rules. It also plans to monitor runoff from specific farms starting as soon as this year.

While costs and solutions will be developed along the way, Bell said, "It's quite clear that getting more water back into the streams is going to be necessary, that grazing cannot occur up to the stream bank, and

some farming practices are going to have to change."

The TMDL process will force other changes, as well. Cities, for instance, may not be allowed to expand their waste water systems until they complete detailed water quality studies about on how their discharge affects total amounts of pollution in the water.

The new plan also could cut back logging in areas where it would cause lack of shade that would let water temperatures become too hot for fish. Temperature problems are the second leading cause of problems in Washington waters.

The biggest water quality problem statewide is from fecal coliform, which comes from the feces of warm-blooded animals. It's of particular concern on the Yakima River, where some dairy farms have been under fire for allowing their wastes to enter the river.

Where fecal coliform is targeted, the Ecology Department could go from farm to farm making sure best management practices are being followed, Gatchell said.

Reporter Mike Lee can be reached at 582-1542 or via e-mail at mlee@tr-cityherald.com

State puts clean rivers on fast track

Columbia, Snake, Yakima in plan

By MIKE LEE
Her staff writer

Washington's fish advocates and water users got a big boost Thursday as plans to curb water pollution were unveiled in Olympia.

The plans should mean a dramatic speedup of efforts to clean up contaminated waters, including sections of the Yakima, Snake and Columbia rivers and their tributaries.

"Eventually, people won't have to worry about swimming in raw sewage, the risk of cancer from eating fish and whether fish are able to live in the streams," said Nina Bell, executive director of Northwest Environmental Advocates of Portland.

Thursday's announcement was the result of a lawsuit filed by Northwest Environmental Advocates and the Northwest Environmental Defense Center in 1991. The settlement includes a 15-year timeline, adopted by the state Department of Ecology and the U.S. Environmental Protection Agency to identify pollution sources and start cleanup efforts.

Plaintiffs in the suit said the agencies weren't doing enough to stop water pollution as directed by the federal Clean Water Act. Nationally, about 30 states have similar pending laws.

The plan calls for a "total maximum daily load" or TMDL study on most regions.

Washington is the first state to reach a comprehensive settlement that spells out how the goals will be implemented.

Chuck Clarke, EPA's Northwest regional administrator, praised the plan as the way to restore water sheds to their full potential. Ecology Department Director Tom Fitzsimmons called it a "large and

important step in restoring the health of our rivers."

Please see RIVERS, Page A2

DAIRIES: Legislators consider bill to keep closer eye on water pollution by cows. Page A3

Kennewick, WA
(Benton Co.)
Tri-City Herald
(Cir. D. 40,349)
(Cir. S. 43,866)

MAR - 3 1998

Allen's P. C. B. Est. 1888

Go after top polluters

I saw only a couple of the articles on the Yakima River — the junkyard on the island and the feedlot — and I was upset that neither Yakima and Benton counties nor the Washington Department of Ecology have done anything about it.

There are ways to prevent contamination of this pristine river as it leaves Naches, and going after the major polluters is the first step — those obvious violators shown so graphically in your pictures and farmers who account for major discharges to the river.

The practice of rill irrigation needs to have much more serious consequences because the runoff is worse in these cases and could be curbed greatly with better waste management practices. A task force could be appointed to assess all areas of contamination on the Yakima and make recommendations for cleanup yet this year. Then push our legislatures to enact the laws to stop the pollution of this river so the Lower Yakima is just as inviting as the Upper Yakima in the future.

I live above the Yakima River about two miles west of Benton City and envision lots of potential for rafting, canoeing and other recreational activities as the water flows through a series of low-key but fun rapids in this area. But the number of people I saw on this stretch of the river last year was very few. Many people don't get in the water because they are scared of having pesticides and other contaminants leach into their body (my daughters included) — not to mention the brown silt-laden state of the river in the summertime from all the irrigation return runoff.

Bob Swoboda

Kennewick, WA
(Benton Co.)
Tri-City Herald
(Cir. D. 40,349)
(Cir. S. 43,866)

MAR - 3 1998

Allen's P. C. B. Est. 1888

We all contribute

Really enjoyed the Yakima River presentation. It was balanced and extremely thorough in research, and I think it gives a good idea of what we need to do to keep our rivers clean and usable for everyone from fish all the way to those of us who use irrigation and the electricity that comes with it.

Especially like the posters the Ecology Department has out. That's a good touch to remind us of how everything we do ends up in our rivers.

Dan Osborn

[Front page](#) | [Sports](#) | [Internet guide](#) | [E-mail the Herald](#)

Tri-City Herald

The Yakima: A River Wasted

A special report by the Tri-City Herald



Part 1: Resource in Ruin



Part 2: Everyone Contributes



Part 3: Dairies Overload the Valley



Part 4: Solutions in Sight
Tell us what you think

This report on the Yakima River began in November as an investigation of charges that Lower Valley dairy farmers were polluting the river with cow manure.

It soon became clear dairy farms weren't the only ones soiling the river. And it became clear several people and agencies across the state have been seeking solutions for years.



During the last three months, Herald staff writer Mike Lee has spent hundreds of hours talking with representatives from almost every group that uses the river.

Most have gone out of their way to provide information, most notably the state Ecology Department, which runs on the strength of an overloaded but committed staff.

In all, about 60 people were interviewed, some several times. And the information collected - conservation service reports, Ecology Department studies, news clippings and assorted background information - makes a stack at least a foot high.

Some information came through two Freedom of Information Act requests, special petitions seeking access to government files.

Much of the information conflicts, and some of it is highly technical. Our goal was to provide a reader-friendly primer about the river's state and a look at what is being done to fix it.

It took much longer than expected. Every new person interviewed seemed to add a complexity or suggest a direction previously unexplored. And so the series grew in scope.

We invite your response to the articles by writing or calling. Send letters to A River Wasted, P.O. Box 2608, Tri-Cities, WA 99302-2608. Send electronic mail to yakima@tri-cityherald.com. Or voice your thoughts on the Herald's inTouch line. Call 736-7000, then press RIVR (7487).

[Front page](#) | [Tri-City Yakima River watershed](#) | [Sports](#) | [Internet guide](#) | [E-mail the Herald](#)

Tri-City Herald

The Yakima: A River Wasted

Once-clear 'Tapteal' has cloudy future



Herald/Bob Brawdy

A bright patchwork of crops covers most of the Yakima Valley, as does a 1,900-mile system of irrigation canals. Irrigation water that washes off the fields carries large amounts of dirt and chemicals into the river, endangering fish and their habitat.

From its source high in the Cascade Mountains, the Yakima River runs 150 miles to Richland, a sinew of life-giving water stretching through 450,000 acres of irrigated farmland.

Without the river, the farms would shrivel. It is their lifeblood and the reason the land yields a cornucopia of produce.

In the spring, the snow-swollen Yakima seems an eternal resource, a brown flood, often of breathtaking proportion.

The rush of water means food, jobs and prosperity. Yakima Valley farmers produce a variety of fruit and vegetables matched by few other regions nationwide. Their apples, wine grapes and hops are known worldwide.

And the Valley's wide open spaces have attracted enough dairy cows to transform it almost overnight into the state's dairy leader.

But by fall, creating this bounty reduces the freshets of spring to a dirty, polluted trickle over diversion dams, water weighted with fish-choking dirt and laden with chemicals from farms.

American Indians once called it Tapteal - the river that runs clean - because they drank from its banks and ate its abundant fish. The river was central to their culture and religion. It was life itself.

Today, the tribes aren't the only ones who worry what the next 10 years will bring to a watershed poisoned with multiple sources of pollution.

The Yakima River has been subject to just about every kind of evil humans inflict on nature - overuse, misunderstanding and carelessness chief among them.

Fish with toxic flesh and a river that sometimes more resembles an open sewer are the legacy.

Water quality is a question of competing values. Do we - the people who live here - care more about paying low sewer rates or about having a river that is safe for swimming? Do we value more rows of apple trees above more water for salmon? Do we desire cheap milk at the expense of clean water?

State and federal governments are pushing for answers in the form of legislation to limit what goes into the river. They are starting new programs to stop pollution. They are putting Yakima Valley cities and farms on notice to clean up their wastes.

But though the federal Clean Water Act was signed 25 years ago, many problems remain. The future of the Yakima River won't be determined by another bit of legislation.

It will take a concerted effort by the people of the Northwest to keep a river filled with waste from becoming forever a river ruined.

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Tri-City Herald

The Yakima: A River Wasted

For centuries, Yakima has been lifeblood of everything in its reach



Herald/André Ranieri

The Yakima River, at left in this aerial photo of its delta, flows 150 miles from the Cascades to its confluence with the Columbia River in Richland. Along the way, the Yakima provides water for many farms and homes but becomes laden with mud, dairy wastes and chemicals.

Bill Flower's connection to the Yakima River runs deep.

Ancestors of the Yakima County commissioner pioneered Central Washington and settled in the Yakima Valley to farm.

"Water was the hope that brought them to the Yakima Valley. Without water there was really nothing," he said, as a fire warmed his back at the Stone Mountain Brewery in Sunnyside.

Even today, Flower said. "It's our lifeblood. It's the foundation of our existence."

The diversity of farms that blossomed in the desert gives the 4-million-acre Yakima Basin a status like few other growing regions in America. Its 450,000 irrigated acres produce a cornucopia of crops: hops, apples, grapes, mint and dozens of other fruits and vegetables.

About 40 percent of the Yakima Basin is forested, and another 40 percent is range land. Only 15 percent is cropland, according to the Yakima River Watershed Council, a grass-roots group trying to come up with solutions to water shortages.

The U.S. Bureau of Reclamation "runs" the river by controlling flows from six reservoirs in the upper part of the basin. Annual precipitation in the Cascade Mountains - the north and west edge of the watershed - is about 140 inches, compared with about 8 inches a year in the Lower Valley.

The Yakima Indian Nation occupies about 800,000 acres of the Valley. Another 1.7 million acres are privately owned, and the U.S. government owns 1.5 million acres, or 38 percent of the land.

In its most recent draft of a proposed water-use policy, the Yakima River Watershed Council tells the condensed story of the basin:

Interest in the Yakima River for irrigation started in the mid-1800s when Catholic priests started pulling a bit of water from Ahtanum Creek near Yakima.

For the next 50 years, private canal companies popped up and started delivering water, a trend that peaked when the Northern Pacific Railroad built the Sunnyside diversion dam in 1891.

By 1902, the river was irrigating 121,000 acres in the basin. But without reservoirs, irrigators already were looking at water shortages. So the Bureau of Reclamation started the Yakima Project, building six dams and reservoirs, the last of which was Lake Cle Elum in 1933.

It still wasn't enough. More than 1 million acre-feet of storage capacity couldn't meet drought-year demand. That led to the landmark 1945 Consent Decree in "Kittitas Reclamation District vs. Sunnyside Valley Irrigation District." The ruling established junior - proratable -and senior - nonproratable - water rights holders and has controlled water delivery since.

About the start of World War II, the Roza irrigation canal crossed the Valley, more or less parallel to the river from northwest to southeast. That opened more land to farms. "It almost helped (create) a climatic change," Flower said.

The Yakima Valley became a destination for veterans seeking the rural life and the American dream. "It was their opportunity ... to create an estate for themselves and their families," Flower said.

From 1950 through the '70s, irrigation grew and Valley agriculture blossomed into a \$750 million industry.

And more fields meant more water use - and less water in the river. The state Ecology Department estimates irrigators divert 80 to 90 percent of the river's water, some of which returns to the river through drains after it washes off fields.

In 1977, competing uses came to a head in a court decision called Aquavella - just one of many court battles over water usage. The Yakama tribe asked to have its water rights quantified. That led to setting the minimum in-stream flows needed for fish survival.

Twenty years later, fish still are at the center of the questions about the Yakima River, as shown by Thursday's proposal to list Mid-Columbia steelhead as a federally protected species.

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Tri-City Herald

The Yakima: A River Wasted

Pollution widespread and far reaching

The Yakima River carries life to the people and farms of the Lower Valley, but during the past few decades, it's been choked nearly to death.

Sections of the river are potentially dangerous.

Swimming, boating and other water activities in parts of the lower river could lead to stomach illnesses, cautions a recent state Department of Ecology report.

That's because parts of the river are loaded with coliform bacteria from animal and human feces. The bacteria enter the river primarily from failing septic systems and dairy cow manure and indicate the possible presence of other disease-causing organisms.

"In general, we tell people, 'Don't drink that water.' " said Mary Jo Mengarelli, public health administrator for Yakima Neighborhood Health Services in Yakima. She said swimming in the river also is considered unhealthy.

"It's polluted water by its nature of flowing from one end of the Valley to the other," Mengarelli said. "There are dead animals in it, human waste, animal waste"

Water near Mabton is so full of fecal bacteria. "I wouldn't stick my big toe in there," said Steve Butkus, state Ecology Department water quality expert.

But fecal bacteria is hardly the river's only problem. Its lower half also is loaded with chemicals and pesticides, choked with mud and drying up from too many irrigation diversions.

The water that remains gets too hot for fish to thrive in the summer and lacks enough oxygen for much aquatic life.

Millions of dollars have been spent to clean the river - but its once-great salmon and steelhead runs remain precariously low.

Bill Yallup Sr., chairman of the tribal council for the Yakama Indian Nation, mourns how fish and clean water have been sacrificed for agriculture.

"In the songs our people sing to us today, ... we are told of many things the (salmon) has to go through to get back to its place of birth. You can imagine what they are now going through over and above what they had to go through 1,000 years ago - the pollution, the dams, the overharvesting."

And those fish that manage to cling to life have been shown to contain some of the highest levels in the nation of the long-banned toxic pesticide DDT.

"I don't eat them. No way - not out of the Yakima," said Pat Ruane, an avid fisherman and hunter along the Yakima. "You couldn't make me eat one."

There's plenty of blame to go around - inefficient irrigation systems, dairy farmers who allow cow manure to leak into drainage ditches, overloaded septic systems, runoff from Cascade Mountains mines, overfertilized lawns and stream-side junk piles leaching metals and chemicals.

American Rivers, a national environmental group, has listed the Yakima as one of the nation's 10 most endangered rivers a few times in the last decade, said Katherine Ransel, co-director of the group's Seattle office.

She calls it a "classic example of a degraded Western river" and often uses it to illustrate the problems facing water bodies. Ransel worries about the "poison soup" of chemicals that mix in the Yakima - but she's equally concerned that so much water is sucked from the river.

"There are places that the river is literally dry and the fish can't jump over that."

Scott Woodward, 47, a Richland High School teacher whose home overlooks the river delta, spent most of his summer days as a child in the river. "It became a junkyard," he said. "I think people just basically gave up on it ever being nice again."

But he believes the river is salvageable - if people stop dropping everything from couches to motor

oil into it. And he thinks it's not as nasty as it was when he was young.

Then, Woodward said, it was a sewer with thick, brown foam floating in places and a sulfurous smell. "When you breathed in, you could actually feel it - its thick air."

Thankfully, none of the Valley's cities takes drinking water from the Lower Yakima. All are on wells. However, some suspect the Valley's migrant workers use river water for drinking, bathing and washing cars.

While there has been no drastic turnaround in how people are damaging the river, there is a sense among those trying to restore it the problems may have hit a low point.

"I am not sure they are getting any worse," said Jim Trull, manager of the Sunnyside Valley Irrigation District. "We have kind of reached a point of equilibrium. We have kind of rolled up our sleeves and said, 'Let's see what we can do.'"

The road to clean water could seem more arduous next year when the National Marine Fisheries Service is likely to list Mid-Columbia steelhead as a federally protected species, following Thursday's proposal.

Like many others in the Valley, Mel Wagner, chairman of the Yakima River Watershed Council, fears the potential Endangered Species Act listing. The council believes a listing could double or triple the amount of water required in the river for fish, further complicating river management.

Gov. Gary Locke, in a recent speech about the sad state of Washington's fish runs, said endangered species listings can potentially limit how residents use their land and water - even whether they can use fertilizer on their lawns.

Ransel predicts rationing of irrigation water. "The courts are very clear that if there is not enough water in the river for anadromous fish, then you are in violation of water quality standards."

Compliance is a daunting task.

It's difficult and expensive to identify who's responsible for the poor water quality - and, therefore, who should pay to clean it up. That's because much of the pollution runs off with storm water or irrigation overflow and is all mixed in the river.

About 30 years ago, there was a big push to regulate industrial and municipal sources of dirty water, said Max Linden, Ecology Department water quality officer in Yakima.

As a result, for the last few decades, the major improvements in waste water treatment plants have been made, and fewer of the Yakima River's water quality problems have been caused by cities and industries.

Still, more than 200 cities, gravel pits, fruit processors and other industrial sources are permitted to dump their waste into the river.

While the majority of the discharges meet state standards, Ecology Department reports show a few chronic problems in the Lower Valley.

In the first half of 1997, Prosser repeatedly pumped water into the river that had sediment and fecal coliform bacteria levels well above state standards, Ecology Department records show. The city is working on plans for a new sewer treatment plant.

Mabton, West Richland and Benton City also failed to meet water quality standards in the past two years.

Now, the state is taking on the difficult job of identifying polluters who don't discharge water directly into the river. The work primarily means cracking down on agriculture, which accounts for the majority of the river's problems.

"The agricultural community was not looked at that closely," Linden said. "There's a long way to go."

Statewide, Ecology Department studies show agriculture accounts for one-third of water pollution - and it accounts for 57 percent of the water quality problems in the troubled streams that can't support things like swimming and fish migration.

In 1997, Ecology outlined a 20-year program in the Lower Yakima Basin to reduce sediment-carrying runoff, which muddies the water and carries pesticides, including DDT. Complying with that plan will cost millions - some of which will be paid by farmers who are forced to upgrade their irrigation systems.

And if farmers don't clean up their act, they'll lose irrigation water, says the board of joint control for the Roza and Sunnyside irrigation districts.

Fecal coliform is the biggest stream problem statewide, and it's a huge concern in the Yakima Basin.

At Mabton, the water exceeded state coliform standards in six out of seven tests, making it one of the six most polluted spots in the state for coliform.

Wide Hollow Creek feeds into the Yakima River at Union Gap. All of the water sampled there for the Ecology Department report failed to meet federal standards for fecal coliform. At nearby Parker, water failed to meet standards for fecal coliform in more than 25 percent of the tests.

Coliform tests don't show a direct correlation to disease, but the state uses them as a measure of potential problems. "It's the best indicator we have right now," said agency spokeswoman Mary Getchell.

Dairy cows are a major source of the fecal bacteria in the Yakima. And much of the dairy waste appears to come from a handful of dairies.

A Freedom of Information Act request by the Tri-City Herald turned up two Lower Valley dairy operators whose farms repeatedly have spilled manure into irrigation drains that return water to the river.

Though state enforcement actions against dairy farms have been lax, there are signs this may change. And citizens groups are showing a growing impatience with the mess.

In November, a group of Valley residents joined with an Oregon law firm and told 10 Sunnyside-area dairies they would be sued for violating the federal Clean Water Act.

The Community Association for Restoration of the Environment plans to file 10 complaints in federal court by March - though leaders say some of the dairies already are making improvements in managing their waste.

And the state Legislature is considering this session forcing improvements in dairy waste management.

Two similar bills introduced this winter would force regular inspections at dairy farms. At present, the state investigates dairy waste problems only when there are complaints.

Despite the Yakima River's chronic problems, there's guarded optimism. Several plans are afoot to increase the amount of water in the river and to reduce muddy runoff.

And farmers seem to be responding despite the high cost of change.

Environmental groups in the Tri-Cities are cleaning up the Yakima River Delta. And some of the Valley's municipal waste water treatment plants are being overhauled.

But clearly, salvaging the Yakima River is far from done. It will take decades of careful work to make up for the decades of carelessness.

"Even though we have a Clean Water Act, who lives by it?" Yallup asks. "Not too many people."

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The Yakima: A River Wasted

Salmon runs fail as Yakima River nurtures farms



Herald/Bob Brawdy

More than a dozen dams like this one at Prosser divert water from the Yakima River to irrigate one of the nation's most productive growing regions.

The Yakima River already was being dammed, drained and polluted when Bill Yallup Sr. first fished at Wanawish.

But in the early 1930s, the river was relatively young - it hadn't suffered the indignities that have come with another 60 years of sediment, pesticides and faulty sewage treatment plants.

And the salmon thrived, not to their historic levels, but enough to entice Yakama Indians like Yallup to set up a long house near present-day Horn Rapids.

Now chairman of the Yakama Indian Nation Tribal Council, Yallup still returns to Wanawish occasionally, but it's different.

"There are a lot less fish. You are fishing for about 5 percent or less of what it used to be. Sometimes, there are no fish there at all. ... It's getting worse every year."

So bad that, at traditional salmon ceremonies, Yakamas might get just one slice each of their ancestral food.

Still, they love the river more than ever, Yallup said. And they feel sorry for it.

In the early 1800s, the Yakima River brimmed each year with more than 900,000 salmon and steelhead, according to the Bonneville Power Administration.

But by 1994, the runs had dwindled to just 7,000 fish.

Summer chinook and sockeye salmon are gone.

And the spring chinook salmon run has declined from historic runs of 200,000 to just a few thousand.

Even the resident fish are more scarce, said longtime fisherman and Richland teacher Tim Ruane. As children, he and his brother Pat floated the Yakima and caught bass, catfish or bluegill with nearly every cast.

Now, "You really have to work hard to find the fish," Ruane said. "The places I used to fish, I just can't anymore. The river is clogged with weeds."

No longer can the brothers float the river in summer because the water is too low. And they rarely

eat fish they catch for fear of ingesting toxic chemicals that wash off upriver farms.

For anglers, the destitute river means less entertainment. For American Indians, it signifies the sickness of "progress" at the cost of nature.

"In the path of civilization, natural indigenous species have been made extinct," said Moses Squeochs, environmental program manager for the Yakamas. "We all say the Northwest is a beautiful country, but in reality, it has been severely scarred, degraded, abused."

This grim legacy has led the National Marine Fisheries Service to consider listing Mid-Columbia steelhead under the Endangered Species Act, as it did with upper Columbia steelhead in 1997. The agency also has proposed federal protection of several coastal chinook runs. Once plans are finalized next year, NMFS could force massive changes across the Northwest in everything from dam operations to urban growth in an effort to save the fish.

This spring, the agency also expects to announce whether it will propose Northwest coastal chinook salmon runs for threatened or endangered status. If chinook are proposed for listing, it would take another year of gathering data before a decision is made.

Endangered species listings could force more changes in recreational fishing, but Jim Cummins, district biologist for the state Fish and Wildlife Department, doesn't expect drastic measures - at least at first.

Steelhead fishing already is banned on the Yakima. But Cummins said it might be necessary to reduce trout fishing on upriver tributaries because small steelhead look just like their river-bound relatives.

The biggest concern with a federal endangered species listing for those who are trying to rebuild the Yakima River is it would take control of the river out of their hands.

Walt George, longtime Valley resident and chairman of the South Yakima Conservation District's board, said, "It will only complicate the issue. It doesn't give us much latitude to work on the problems."

Though the future of fish on the Yakima is uncertain, reasons for the declining runs are clear - and numerous.

Squeochs said white settlers "very haphazardly instituted 'progress' " in ways that were disrespectful to the native people "and the Earth itself."

Starting with the Pomona dam in 1880 and the Sunnyside dam about 10 years later, the river was made less and less fish-friendly. Many fish were trapped in irrigation canals before screens were erected to keep them out, and irrigation diversions left other fish high and dry.

"In the Yakima system, the dams kill fish, but pollution is the prime problem," Yallup said.

Cummins said the biggest hazard to fish today is lack of water. Low water makes it easier for predators to catch fish. And the Yakima's summer dribble warms up faster than it would with two or three times the water. This is especially bad for fall chinook.

Tests at Kiona dating back to 1989 show the river regularly reaches more than 70 degrees in July and August. Fish survival is poor much above 65 degrees.

Sediment also hurts fish. Dirt washed off fields can suffocate eggs that are laid in the gravel. And fecal coliform bacteria contamination, while not directly hurting fish, usually is associated with nutrients that cause high algae growth, sucking oxygen away from fish.

There are plenty of hazards for young salmon and steelhead once they leave the Yakima, said Kurt Beardslee of the conservation group Washington Trout. But conditions within the basin have a lot to do with how many fish will return and spawn.

Hatchery fish on the Yakima now have a poor life expectancy. Only 20 percent of the hatchery fish released in the upper reaches of the river and its tributaries make it as far downstream as Prosser - let alone complete the arduous journey to the ocean and back, Cummins said.

The Yakima River forms the northeast boundary of the Yakama Indian Nation reservation from near Union Gap to Mabton, and the tribe is deeply concerned. What remains of the once-abundant salmon runs continues to play an important part in the Yakamas' diet, culture and religion.

Squeochs said American Indians are worried about salmon in many Columbia River tributaries, but he said the Yakima is a major one the Yakamas are working hard to fortify.

"The Yakima River stands to be one of the best places to exert a very intense restoration plan," he said.

The Yakamas are concentrating efforts on Satus Creek, a major tributary in the Lower Valley. By reducing grazing and logging, they hope to make the Satus pristine again.

They also have a "plant a tree, save a fish" program in which school children planted some 200 cuttings along Toppenish Creek. The trees should provide shade to keep water temperatures down and potentially decrease the amount of sediment runoff, providing better fish habitat.

"We are attempting to set an example, to be a role model," Squeochs said. "Hopefully, we can convince others to respect our efforts and cooperate with us."

Squeochs said the tribes need help from dairy farmers and irrigators. "They have got to tidy up, clean up their act."

He's not the only one who believes the river can be nurtured back to life.

Jim Esget of the Bureau of Reclamation in Yakima said a lot of work could make the Lower Yakima another Hanford Reach - now the best spot on the Columbia River for spawning fall chinook salmon.

The bureau also is developing plans to keep more water in the river for fish.

The new Cle Elum Supplementation and Research Facility, a state-of-the-art fish hatchery, also provides hope. The Bonneville Power Administration paid for the 15-acre, \$15.8 million hatchery, which also was supported by the state Fish and Wildlife Department, the Yakamas and the Northwest Power Planning Council.

Between 1982 and 1996, said BPA spokeswoman Crystal Ball, almost \$64 million was spent on the Yakima-Klickitat fish production program.

At Cle Elum, eggs are hatched and raised in an environment that closely mirrors the river. Human contact is kept to a minimum, and just about everything possible is done to convince the fish they are in the wild. At full production, the facility will produce 810,000 salmon smolts a year - building hope for strong returns by 2003.

Sportsman Ruane is one of those who dreams of a healthy lower river - something like the upper reaches, which are known as one of the best fly fishing areas in the state.

"The potential of this river to produce fish is incredible."

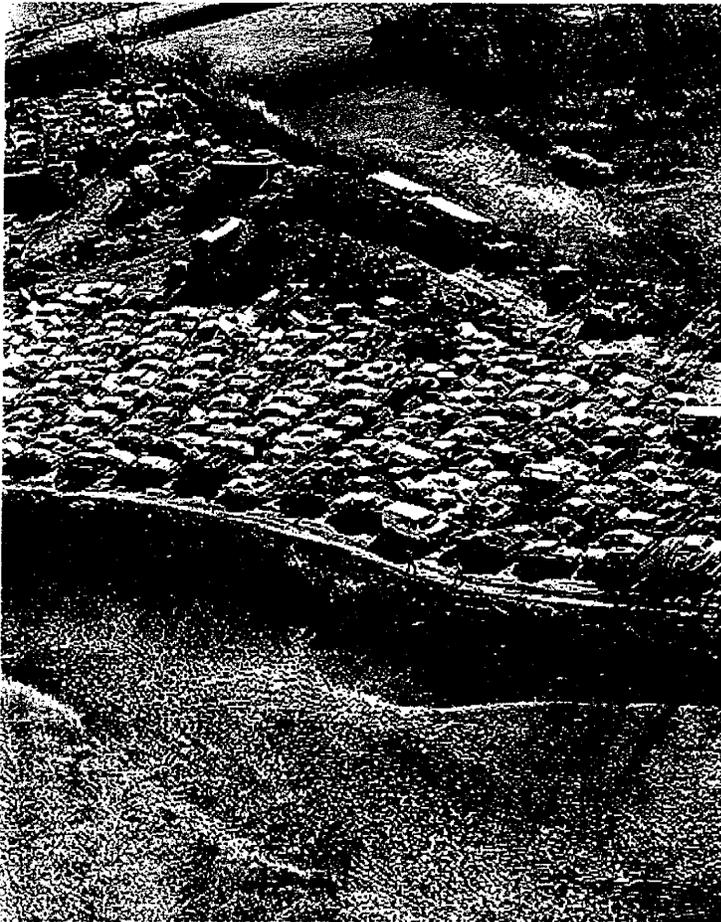
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The Yakima: A River Wasted

All share blame for Yakima's pollution



Herald/Bob Brawdy

This junkyard sits on an island between two forks of the Yakima River near the Wapato exit on Interstate 82. When the river rises, it collects metals and toxic liquids such as oil, radiator fluid and battery acid.

While it's easy to fault farmers for Yakima River water quality problems, they aren't the only ones making a mess of things.

Chances are, everyone who lives in the Valley deserves some of the blame.

Overfertilized lawns, failing septic systems, car washing, pet wastes and cars that drip oil also degrade the region's streams and rivers.

"Everybody is at fault," said Walt George, chairman of the South Yakima Conservation District Board. "We are all the problem. People are the problem with the environment."

While municipal and industrial systems have their challenges to meet new standards, lots of water used by humans never makes it to a waste water treatment plant.

One potentially big problem is failing septic systems that add fecal coliform bacteria counts to the Yakima River.

Bill Flower, Yakima County commissioner, said unincorporated areas without sewer service are being watched carefully. "We don't see the septic systems as failing at this point, but they are

All share blame for Yakima's pollution

systems we are monitoring," he said. "Nobody wants to have septic (waste) in the river. So far, we're OK, but we continue to watch."

He doesn't have to look far for such problems. It wasn't long ago when a Yakima-area water district extended its service because sewers in outlying areas were backing up and fouling drinking water.

And in the early 1990s, septic tank problems came to a head in Buena, just upstream from Zillah. A combination of shallow wells, a water table elevated by irrigation and faulty septic tanks led to widespread contamination of drinking water, said Larry Fenster, environmental health specialist at the Yakima Health District.

A waste water treatment plant was built with state money. "We rarely get a call about Buena anymore," Fenster said.

Parker, near Union Gap, faces similar problems, but Fenster said the health district hasn't had many complaints in the last few years. He said it's up to residents to test their own wells - though the agency is working on a tracking system.

Fenster said he doesn't see an obvious pattern with drinking water problems in the Lower Valley. "It's really sporadic where we get the bad samples."

And he said it's not easy to tell if septic waste is seeping to the river.

But George said the South Yakima Conservation District's tests in 1991 found elevated fecal coliform counts in the irrigation return drain that runs underground below Outlook.

He suspects waste from septic systems was leaking into the drain then, and that it's still leaking into the drain. The conservation district reported its test results to the county health district. "But they haven't done anything out at Outlook," George said. "I don't think anything has changed."

Gordon Kelly, environmental health manager for the Yakima Health District, said, "As far as we know, there is not any greater concern with Outlook than any other community."

There are other, less obvious ways that just about everyone fouls the water:

-- Putting more fertilizer on lawns than necessary.

Rainfall carries the extra nutrients to the river where they do the same thing they do in yards - make plants - in this case, algae - grow. Decaying algae uses oxygen fish need. And it can cover the water, forcing swimmers and anglers elsewhere.

-- Using phosphate soaps to wash cars.

The waste water flows into surface waters. And most soap contains phosphates that feed algae.

-- Not treating storm water runoff.

In Eastern Washington, most older developments don't have silt traps or sediment basins for storm water. Because the region is so dry, dust gathers on roads, cars and parking lots.

When it does rain, the concentrated dust washes into drains that often flow right into the river or a tributary. And sediment, whether from a cornfield or a mail parking lot, can suffocate fish eggs.

Often, the runoff also carries oil spilled from cars. According to the Ecology Department, one pint of oil can make a slick larger than a football field and destroy animal habitat.

But much more than a pint flows into the country's water bodies, the agency reports. Americans spill about 180 million gallons of used oil each year - 16 times the amount spilled by the Exxon Valdez in Alaska.

An especially bad threat to the Yakima River sits along Interstate 82 near Toppenish. A car junkyard straddles branches of the river on Yakama Indian Nation land.

Moses Squeochs, environmental program manager for the Yakamas, said the tribes have been trying to get the land cleaned up for quite a while, especially given their efforts to restore fish habitat.

The junkyard sits in a flood plain, meaning when the river rises enough, it washes car fluids into the river.

"We have received many complaints about that place from a lot of people," Squeochs said. "We're continuing to try to find a way to address it."

-- Not controlling pet wastes.

Just like dairy waste, waste from smaller animals carries bacteria that can make people sick. Of course, concern about pet waste is larger in cities such as Seattle, where it is estimated dogs and cats produce the same amount of waste as the people of Kennewick each year.

Unless people take care to clean up after their pets, that waste doesn't go through treatment - it washes into the rivers and streams along with everything else.

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The Yakima: A River Wasted

Cities sometimes pump soiled water into river



Herald/Bob Brawdy

Clear and murky water mix in a ditch at the Granger waste water treatment plant, showing the difference between water that has been treated once and water that has been treated twice.

Several Lower Yakima Valley cities are struggling - sometimes unsuccessfully - to clean their sewage properly before it spews into the Yakima River.

Mabton, Prosser, West Richland and Benton City pumped polluted water into the river last year, state Ecology Department records show. Some of the sewage treatment plants failed to kill enough fecal coliform bacteria, while others left too much sediment in their discharges.

And in some cases, the cities didn't do tests properly that would make it clear just what they were pumping into the river.

Lower Valley towns totaled about 200 waste water violations - most of which were minor - from July 1996 to June 1997, the most recent period records are available for.

In spite of the violations, polluters rarely are penalized. An overburdened state inspection program concentrates on seeking voluntary compliance rather than on assessing penalties.

The good news is Lower Valley towns and industrial processors have gotten much closer to meeting the ever-tougher clean water rules the state has adopted over the past two decades.

The state has issued permits for about 220 waste water discharges on the Lower Yakima River, most of which are fruit and vegetable processors.

State records show that while the industrial treatment plants didn't always completely clean their

Cities sometimes pump soiled water into river

discharges - called "effluent" - violations by any given company generally have been minor.

Taken as a group, however, the industries sometimes dump large amounts of sediment and chlorine into the river, which makes water less habitable for fish.

Also, the industries aren't always held accountable because the Ecology Department is stretched thin enforcing municipal and industrial waste water codes, said Robert Barwin, water quality program manager in Yakima.

The agency has just one person responsible for enforcing clean water laws for more than 500 waste water dischargers in a region that covers the central part of the state.

Barwin said because of the shortage of resources, the agency tries to make the best investment of energy and time. He likens it to a police officer stopping the worst speeders, not those who are going 5 mph over the limit.

Dan Wrye, Ecology Department waste water expert in Olympia, added that some dischargers - such as some fruit processors and small Lower Valley cities - put such a tiny volume into the river, their violations don't merit extensive measures to fix because they are "environmentally inconsequential."

When the agency does act, it usually tries to produce a change, not punish, he said. "We've found that an informal approach ... sets the stage for permittees to willingly comply with laws, rather than setting up a confrontation that can result in an appeal and delayed compliance."

Despite levying only a handful of minor penalties on the Yakima recently, the state has forced waste water treatment facilities to clean up their effluent rigorously, said Rick Frye of the Ecology Department's water quality program in Yakima.

"We've really done a bang-up job in the last 15 years on upgrading the municipal and industrial plants in all of Washington," he said.

Standards are getting so tight, in fact, some towns complain the water they return to the river must be several times cleaner than what's already flowing down river.

Not true, said Phelps Freeborn, who handles Lower Yakima sewage treatment plants for the Ecology Department. In most cases, he said, "The river is comparable with or, perhaps, a bit better than their effluent."

Sometimes, the soiled river is much better.

In Washington, sewage plant operators test their water and report the results monthly to the state. In 1996, 38 percent of waste water facilities reported at least one violation, Wrye said.

A 1996 Ecology Department report on the Valley's municipal sewer plants concluded, "several sites needed better maintenance practices, (and) several were understaffed."

And there have been accidents.

In Prosser, floodwaters in early 1996 broke two waste water lines across the Yakima River and released a reported 400,000 gallons of sewage. No fine was levied because the city couldn't have prevented the flood.

Two years before, more than 11,000 gallons of untreated sewage spewed into the river when a rope clogged Mabton's sewer line, a city memo shows.

But the biggest challenge for Lower Yakima Valley cities is handling ever-increasing loads with aging treatment systems. "The treatment plants have had trouble keeping up with the growth," Frye said. "They are adding pieces faster than they ever thought of adding pieces."

The state requires cities to start expanding their treatment plants once they hit 85 percent of capacity.

In the 1970s and 1980s, upgrades weren't as big of a deal as they are today because federal money often paid 90 percent of the costs. But now, about the best a city can hope for is getting a low-interest loan from the state.

"The free money is gone, and that's one of the things that is hard for the small towns," Frye said. "We are suddenly having people pay \$50 a month for their hookup to the sewer when they used to be paying \$10 to \$15."

Take Mabton, a town of about 1,400 people west of Prosser with a sewer plant that needs a \$2.2 million overhaul. The assessed valuation for the entire town is just \$15.4 million, according to the Yakima County Assessor's Office.

The city's aging sewer system frequently fails to clean the water properly. State records show that between July 1996 and July 1997, its discharge into the Yakima River didn't meet standards in at least one category every month.

Often, Mabton's effluent carried about twice the amount of fecal bacteria it's supposed to have. And rarely did the plant remove enough sediment.

"The equipment was getting old, getting worn out," said Wayne Beeman, public works superintendent, of a system that was upgraded in 1975 and designed to last 20 years.

The town has been working on its upgrade plan for six years, but even with a few hefty grants, it still needs more money. "It takes a long time to get the money together," Beeman said.

Beeman said plans are to start the plant overhaul this year. He said the cost to residents will be determined by whether the city gets more grants.

West Richland's sewer system also has struggled to keep up with population growth, but with more progress.

In 1994, the Ecology Department scolded West Richland for regularly allowing too much fecal coliform bacteria and sediment into the river, saying parts of the town's system were "severely overloaded."

Freeborn said his agency threatened West Richland with a growth moratorium if its effluent wasn't cleaned up. The city built a new sewage treatment plant that includes an ultraviolet light chamber, the latest technology to kill bacteria.

"They took the message, and they moved forward. They did it fast. They did it well," Freeborn said. "You pull a glass of water out of there and it looks clear."

However, there still are problems with the town's old south lagoon. Ecology Department records show that from July 1996 to July 1997, West Richland's effluent often carried about 10 times the permissible amount of fecal coliform bacteria.

Dennis Wright, public works director, said the city is planning to spend \$140,000 on new monitoring stations and chlorination treatment to address the problem.

Benton City also has struggled to keep its return water clean - and will continue to have trouble with its outdated lagoon system, Freeborn said.

Last year, the city completed a \$40,000 upgrade to monitor water coming into the plant, but Freeborn predicts more upgrades will be needed within the next five to 10 years. "It's not so much if there are problems, it's where they are."

Though some sewer plants are faulty by present standards, Frye said, they are far better than they were when the Clean Water Act was passed in the early 1970s.

Prosser, for instance, has seen the amount of sediment it can put into the river decrease from 900 milligrams per liter to 100 milligrams per liter in the last decade. In another three years, its effluent should contain just 10 milligrams per liter, Frye said.

"That has to have an impact in improving the river," he said. "The river gets better as you clean up the individual discharges going into it."

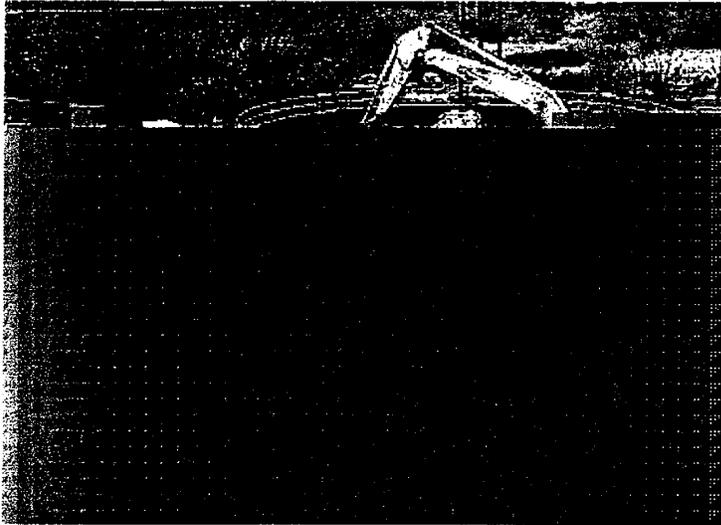
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Tri-City Herald

The Yakima: A River Wasted

Prosser struggles with pollution as state agency applies pressure



Herald/Andre Ranieri

Work began earlier this year on the primary clarifier at the beleaguered Prosser waste water treatment plant. This vital piece of equipment has been broken for almost a year and contributed to the city's continued trouble meeting state clean-water guidelines. City officials say work could be done in September.

A decrepit sewer plant choking on too much industrial waste water has put Prosser on notice to clean up its act - or else.

The state Ecology Department and the federal Environmental Protection Agency are pushing for costly improvements to the town's sewer plant, which has a chronic history of pouring polluted water into the Yakima River.

The message is coming through loud and clear in Prosser, where municipal sewage combines with millions of gallons of food processors' waste water to create a brew that is particularly tough to clean.

"It's probably the biggest issue facing this community," said City Administrator Ken Carter. "And it will continue to be."

During the next three years, the city expects to spend about \$4 million for a complete overhaul of the sewer plant, which treats about 1 million gallons a day.

The price depends on whether the town's huge potato processing plant, Twin City Foods, can take over treatment of its waste. The company now accounts for about one-third of the city's waste water.

If Twin City falters, Prosser's costs will balloon to design a plant that can accommodate sometimes-overwhelming industrial waste flows. And the community of 4,800 people just doesn't have that kind of money.

"Sewer bills for our citizens and commercial businesses are high already," Carter said. "It's going to be a tremendous burden on the community."

In the 1980s, an estimated 85 percent of Prosser's waste water came from industrial plants. That's dropped to about 55 percent through the years as the industries have built treatment systems and learned to conserve water.

But industrial waste water still puts the town in a tight spot.

Because of the food processors, Prosser needs sewer capacity for a town three or four times as large, Carter said. The wastes - which include water, dirt and pulp - also are difficult for the city to treat.

Not only can industry waste flows vary widely day to day, but they also contain varying amounts of solids at different times. And the chemical reaction of potato waste mixed with city sewage creates a product much more difficult to treat than the two products separately.

"The only way we have of controlling it is putting a plug in their line," Carter said. "You hate to do that with a business because that puts them out of business."

Until the early 1990s, industries cowed Prosser into taking their waste water - even if the city didn't have the ability to treat it well, said Phelps Freeborn of the Ecology Department in Yakima.

"With the industries driving the town the way they did, they dictated terms," he said. "A business says, 'We provide 500 jobs for your town. Treat us well or we will move.'"

Freeborn said Carter's staff is making progress on the problem. Still, "It's taken a long time to get the industries to work with the city," he said.

To hear waste management officials talk about Prosser's problems, it seems water quality violations are narrowly averted every few weeks.

Sometimes, they aren't.

A town memo shows that between July 1996 and March 1997, the sewer plant allowed too much sediment to pass through 83 times.

And in 1991, Prosser was fined \$18,250 for water quality problems - what Robert Barwin of the Ecology Department calls an extraordinary measure.

Violations were coming at the rate of several per quarter - and at least some of them weren't being reported, the state alleged.

In the last few years, the state could have fined Prosser again for dumping soiled water, said Barwin, the water quality program manager in Yakima.

"They have a noose around their necks," he said, noting late summer and fall 1997 reports showed significant improvements.

"It's pretty clear that if they have a relapse, ... they have got to deal with industrial users or we are going to have to deal with everybody in an enforcement (action)."

Usually, when the Ecology Department wants to play hardball, it takes away a town's ability to grow by stopping sewer expansions, Barwin said. But he said the state is being patient with Prosser because "everyone is doing their level best" to fix the system. Besides, he said, a fine would take away money the city needs for planned improvements.

But Prosser's poor track record caused concern at the EPA, which monitors the state's largest 90 waste water systems. EPA now requires the Ecology Department to submit quarterly reports to prove Prosser is cleaning its water enough.

The city's sewer system could get major relief by the end of 1998, when Twin City Foods is to begin operating a new multimillion dollar secondary treatment system. But so far, the company is struggling to meet strict state requirements for its effluent.

Cliff McGhan, Twin City Foods plant manager, said the system will allow the company to discharge its waste water directly to the river.

Currently, Twin City discharges about 500,000 gallons a day of waste water. It is treated first at what McGhan calls the company's "very fragile" primary system, which removes large solids before the water is sent to the city.

Carter said the city already is benefiting from Washington Frontier Juice, another of the largest waste water sources in town, which recently switched to its own treatment system.

Prosser's biggest other problem is its sewer treatment plant has been patched together during the last 50 years. In early 1997, the city lost its ancient clarifier - which skims the large muck from the top of the sewage treatment tank.

The breakdown caused repeated problems meeting state standards for sediment, fecal coliform bacteria and biochemical oxygen demand, which is an important measure of how good the water is for fish.

Ecology Department records show on several occasions the water Prosser returned to the river in

the first half of 1997 had more fecal bacteria than the state allows. In one seven-day period, the fecal count was 23 times what is allowable.

In late January, the city council agreed to spend almost \$300,000 for a new clarifier that is to be operating in September.

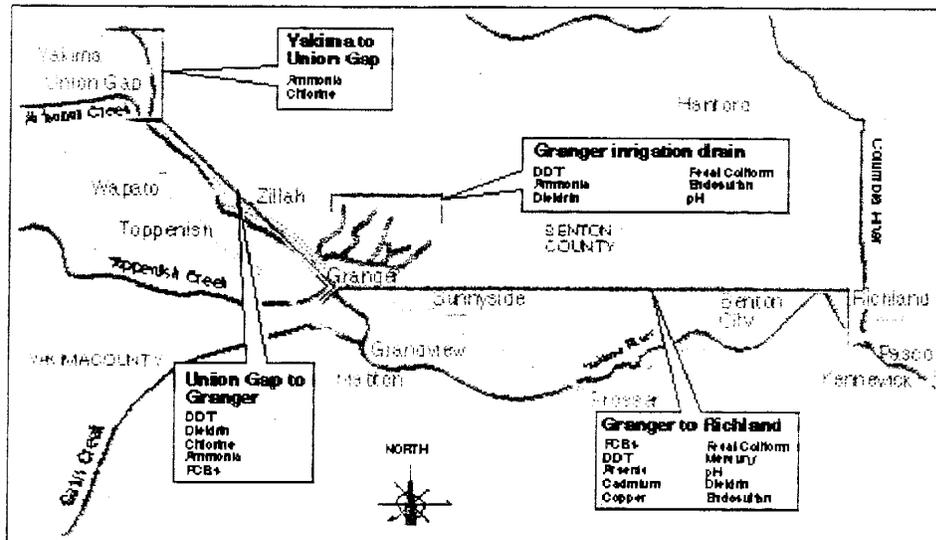
At least until then - and probably until the entire system is overhauled - Prosser will continue to struggle. "This has probably taken more of my time in five years than any other issue," Carter said. "For a small community, it's very difficult."

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Tri-City Herald

The Yakima: A River Wasted

Many pollutants added as Yakima River runs east



Herald/Sherry Emery

Herald/Sherry Emery

As the Yakima River winds through the Lower Valley, it's loaded with an increasing variety of pollutants.

The following pollutants were among those found on the Lower Yakima River during a 1997 state Ecology Department report.

Kim Sherwood, agency water quality engineer, helped with the layman's definitions:

- **Endosulfan** - A popular pesticide for apple crops since DDT was banned. It becomes concentrated through the food chain and can harm humans and aquatic insects.
- **Dieldrin** - A recently banned pesticide used on row crops. Same concerns as Endosulfan.
- **Mercury** - Closed cinnabar mines on the Naches River have open holes that water passes through on the way to the river. Water picks up mercuric sulfide, a heavy, bright red mineral, and carries it to the river. Mercury is a continuing problem because some mine holes still are open. But Sherwood said mercury is not a major source of concern because it hasn't showed up in fish. Fungicides with mercury also contribute to the amount in the river.
- **Copper** - Humans leave it everywhere. For instance, eroding copper tubing in old water coolers can load plenty of copper into the waste water system. It's toxic to plants and fish.
- **Cadmium** - Comes from impure zinc, often used in galvanizing metals. It's relatively toxic to plants - but a lot of it is caught in waste water treatment systems.
- **PCBs** - Polychlorinated biphenyls. These cancer-causing compounds come from an oil used in electrical transformers, many of which weren't disposed of properly. PCBs accumulate in fats and can become highly concentrated in the food chain.
- **DDT** - Banned in 1972, this cancer-causing chemical and its derivatives DDE and DDD also are heavily concentrated in the food chain. Tests have shown significant amounts in Yakima River whitefish and suckers.
- **Ammonia** - A natural byproduct of animal and human urine and also used in refrigerants. Highly toxic to fish. "Two gallons of it in the river will kill the fish for miles," Sherwood said.
- **Chlorine** - Used in waste water treatment to kill bacteria. Not a high-priority concern for state

ecology officials, but alternate ways of cleaning water are being developed. It is toxic to aquatic life even at low levels.

– **Fecal coliform bacteria** - Comes from manure, failing septic systems, pet waste and storm water. Its presence shows pathogens may be in the water, but high fecal counts don't necessarily mean a human health risk.

Other important barometers of water quality that are of concern in the Yakima River include:

– **Dissolved oxygen** - Fish need this to breathe, but they don't always have enough. Lots of bacteria - from storm water runoff, sewage or dairy waste, for instance - can use up oxygen and cause problems for fish.

– **pH** - The level of acidity or alkalinity. Eastern Washington waters tend to be alkaline, and the Yakima is no exception. Acidic water is a more notable hazard for suffocating fish, but alkaline water can disturb aquatic life.

– **Temperature** - Water normally cools quickly, but when stream banks are stripped of vegetation, water can heat above 68 degrees, which is about the maximum for most Northwest fish. The Yakima often exceeds this temperature. Low and slow water heats more quickly.

– **Sediment** - Cloudiness caused by suspended dirt. Keeps fish and aquatic insects from breathing properly and can suffocate fish eggs. It also absorbs heat from the sun, warming water. In the Yakima, sediment carrying many farm chemicals is washed off fields by irrigation water and into the river.

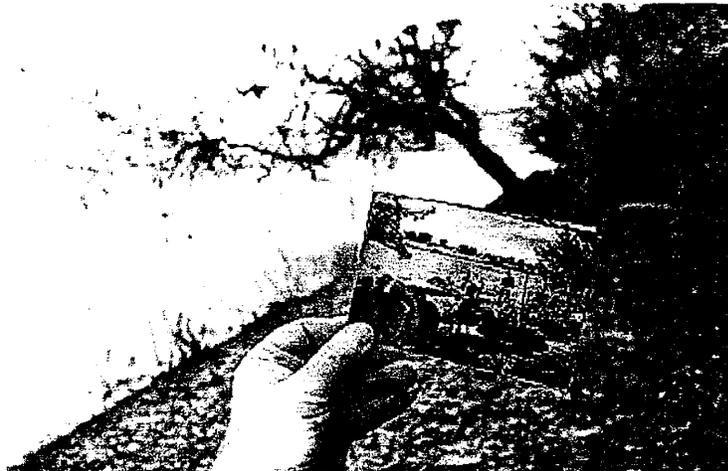
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Tri-City Herald

The Yakima: A River Wasted

Prosser residents love their river, rely on Yakima for recreation



Herald/Andre Ranieri

Prosser resident Duane Gerking holds up a photo of a summer boat party at his dock that washed away in the 1996 floods. Gerking is an avid river lover and says that in 40 years of water skiing and fishing on the Yakima, he's never heard of anyone getting sick from the polluted water.

PROSSER - The Yakima River is one of the state's most polluted waters, but don't tell that to people in Prosser.

Even if they believe you, chances are it won't keep them from enjoying their waterway.

"I have probably drunk gallons of that river," said Chris Gerking, 72, who lives on a steep bank overlooking the pool created by the Prosser diversion dam.

During the last 40 years, she and her husband, Duane, have become like grandparents to dozens of Prosser children - most of whom they met at their boat dock before it washed away in the 1996 flood.

The couple revel in those steaming summer days of boating, fishing and water skiing, days when children came from every corner of town to get towed a few miles upstream and back, then plopped onto the dock for one of Chris' sandwiches.

Duane, 72, said the green "crappy looking stuff" floating down the river in the summer is just moss that's lifted off rocks.

"It is dirty," he said. "but in 40 years, I haven't heard of anybody getting sick. ... You just don't put it in your mouth."

Health officials don't recommend regular contact with the river water or the irrigation return drains that flow into it, citing animal and human waste as health risks.

But at least one ear, nose and throat specialist in Sunnyside said the polluted river hasn't been linked to many "swimmers ear" infections in recent years.

Susan Price, office administrator for Dr. Dave Riley, said her office gets plenty of kids with summer ear infections, but they also come from swimming in hot tubs and pools, as well as the river.

Whatever the risks, kids often play in the river behind the dam on hot days, said Gordon Miller, a longtime Prosser resident.

Near a public boat ramp a mile or so upstream of the dam, a small herd of sheep has unrestricted

Prosser residents love their river. rely on Y...

access to the river - at least it did this winter.

As for the dead cow that occasionally floats by, "We just ski around it." Duane Gerking said.

In fact, the river's reputation has a benefit for the Gerking's. "Most people don't like to play here because it's too dirty. That gives us more room." Duane said.

Other neighbors along Seventh Street also aren't too worried about the health risks of the river - though they are happy about efforts to curb pollution.

A few doors away, Miller lives in a house with a sunset view across a mirrored pool - a serene scene in any season.

"There's something different every time you look out there," he said. "And the wildlife - we see lots of ducks and geese and occasionally a muskrat or a heron."

Of course, in the summer, residents sometimes also get whiffs of fertilizers or manure - it's hard to pin down exactly what - and algae blooms create scum on the river when the water gets too hot and slow.

But, "It's definitely made progress in the last 10 years," Miller said. "The river is getting cleaner all the time."

Prosser Mayor Herb Schmidt, another Seventh Street resident, also loves living on the river - though he said Prosser hasn't made the most of its waterway because it's been in such bad shape.

"Right now, we do very little to capitalize on a very beautiful river that flows through here," he said. "If we could just get it cleaned up, I am sure more and more people will use it."

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Tri-City Herald

The Yakima: A River Wasted

Sediment 'real enemy' of choked river system



Herald file

Heavy equipment removes tons of sediment from the intake of the Kennewick Irrigation District canal near the Prosser diversion dam. The work took place in the summer of 1997 after heavy flooding in 1996 clogged the canal with dirt.

Each day during irrigation season, at least 24 dump-truck loads of soil - 355 tons - are washed off farms and into the Lower Yakima River.

The sediment chokes aquatic life and carries farm chemicals, some of which are toxic to fish.

And dangerous to people.

"The real enemy of the Yakima River is mud," said Kim Sherwood, state Ecology Department water quality expert. "It just fills up the pores in the gravel and ... destroys the homes and habitat of the proper insects and bacteria."

He said dirty water also increases water temperature -sometimes drastically - because sediment soaks up light and heat. The hot dirt then heats the water above what fish can handle.

Dirt also cuts down the amount of light entering the river, which harms the ecosystem. And it makes it harder for fish to move about and find food.

A 1993 study showed Yakima River fish had one of the highest concentrations of the toxic pesticide DDT in the country, prompting the state Health Department to warn people not to eat many bottom fish from the Lower Yakima Basin.

By focusing on DDT, the Ecology Department hopes to galvanize the public against the irrigation practices and erosion that clog the river. The long-lived chemical was banned in 1972 but tenaciously remains in the soils of the Yakima basin and is washed into the river with irrigation runoff.

In an ongoing look at bad water in Washington, the Ecology Department declared in August that sediment in the Yakima must be reduced by 75 to 95 percent. The so-called Total Maximum Daily Load Study set steps for cleaning up river sediment and DDT during the next 20 years.

Unlike most modern pesticides, DDT doesn't break down quickly. Even 25 years after it was banned, it remains among the most-detected pesticides in the river.

More than one person at the Ecology Department admits it's possible people still are using stashes

of DDT, which could account for some of its persistence. But the state hasn't spent much effort trying to prove this theory because not much more can be done to regulate DDT, Sherwood said.

Walt George, board chairman for the South Yakima Conservation District, said the biggest culprit behind the sediment problem is rill irrigation, in which water is released at the top of a field and rolls down through the rows.

Excess water is collected at the bottom of the field and reused on other fields, but it also often runs into the river - full of sediment - via return drains.

That's not a big deal for one farm, but with about half of the basin's estimated 450,000 acres being watered that way, there's ample opportunity for trouble.

Typically, the Ecology Department leaves problems with runoff to conservation districts. These nonregulatory agencies assist farmers in creating farm plans that use "best management practices" to control runoff and erosion and provide money for farm improvements through matching grants.

Pat Daly, Benton Conservation District manager, said the Ecology Department rarely steps in and penalizes farmers. "If it's a major problem and I can't resolve it, or it's too big of an issue, then (the Ecology Department) will get involved. But that's unlikely."

She said it's important farmers don't fear her and it's an incentive for them to work with an agency that doesn't penalize. "I need grower trust to do what I need to do."

It's also increasingly important that progress is made, said George, whose South Yakima Conservation District works with about 300 farms.

"(Problems) have gotten more crucial," he said. "We were working on them, but there wasn't so much emphasis put on it as there is now."

And they are making a difference.

In the early 1990s, a study showed the Granger Drain was filled with 163 tons of sediment a day. The 1997 report showed total suspended sediments in the drain were down to 60 tons a day.

Even with matching grants, solutions aren't cheap.

Converting from rill to drip irrigation costs about \$1,100 an acre. "There are very few growers who have that kind of money," George said.

Daly estimates there still are 10,000 acres of rill-irrigated land in Benton County - though more farmers are changing to drip and sprinkler systems.

More progressive farmers also are using water monitoring probes to make sure exactly the right amount of water is used on each patch of land and computer systems that help regulate irrigation.

As part of a sediment cleanup program, the Ecology Department plans this year to have two people educating farmers about the best land conservation practices.

Also, the agency is providing irrigators a computer spreadsheet program - dripcost.xls - to figure the costs and benefits of installing and operating a drip irrigation system. The program calculates how profitable the investment will be and how long it will take to repay the loans.

The Benton Conservation District is continuing its irrigation training workshops - with plans to offer some in Spanish - and has an irrigation expert who consults with farmers. Most services are free.

Already this year, the board of joint control for the Roza and Sunnyside Valley irrigation districts held workshops for landowners to learn about erosion-reducing techniques.

District officials see such efforts as vital because farmers eventually could lose their irrigation water if they don't keep their dirt out of the river.

"We're trying to educate first on what we're really facing," said Jim Trull, Sunnyside Valley manager.

It won't be easy to make changes. At January meetings about the new rules, farmers complained the water they received already was loaded with dirt.

"It's a legitimate concern," Trull said, but "it's not a good enough argument for us not to do anything."

One problem in cracking down on farmers who don't control their runoff has been regulators have a hard time figuring out exactly where the pollution is coming from.

But that will change soon. The Roza and Sunnyside board of joint control set policies for 1998 that will force farmers to set plans to eliminate discharges into return drains and ensure their runoff meets the district's water quality standards.

The district also is going to monitor flows that leave each landowner's farm. Where there's too much dirt, farmers will have to put together a schedule to meet standards and start working on it by 1999.

Trull said farmers will face "substantial costs" keeping their dirt out of the water - but he said the biggest cost for farmers would be not doing the improvements they've planned.

In that case, "The penalty would be that we would not deliver irrigation water to them," Trull said. "That is the hammer."

Even without that, farmers are smart to keep their soil on their land. Said George: "We need to keep the soil on the land for future generations to raise crops on."

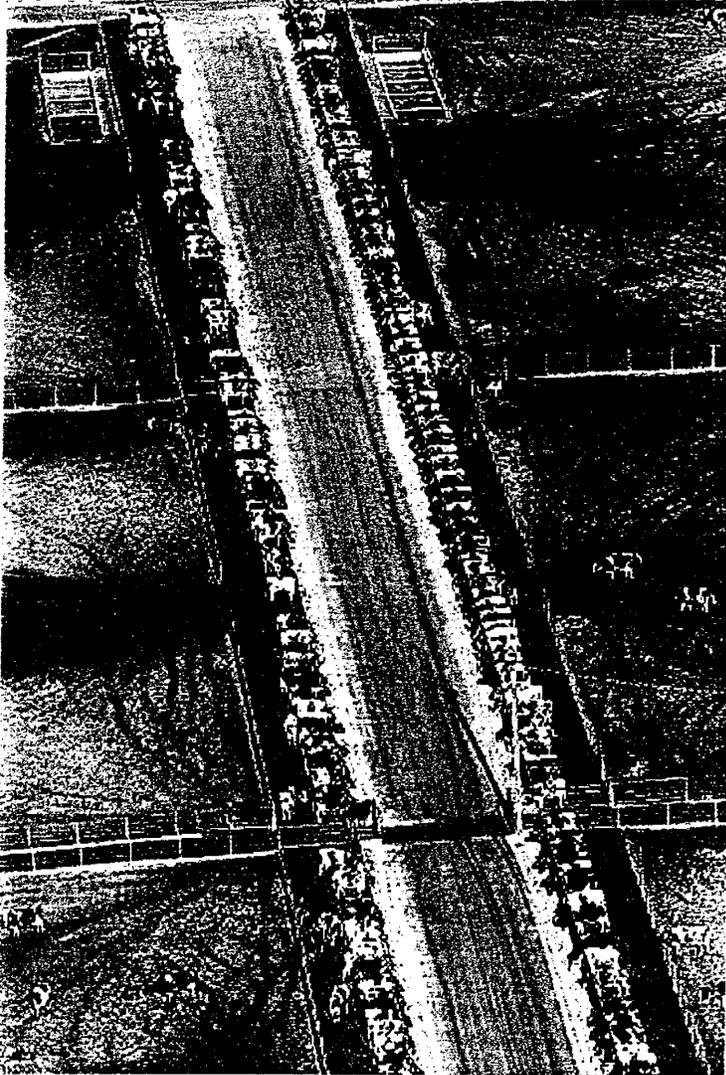
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Tri-City Herald

The Yakima: A River Wasted

Dairy waste sullies Yakima



Herald/Bob Brawdy

Hundreds of cows line up for feed at a mammoth dairy off Van Belle Road near Outlook. The Yakima Valley is the largest dairy area in the state.

Imagine Seattle and its suburbs plopped into the Lower Yakima Valley - roughly 1.5 million people.

And every time they flush a toilet, the waste flows into big pits along the Yakima River. Most of the time, the waste is taken from the pits and properly treated.

But sometimes, the ponds flood, spilling streams of feces into the river. Other times, lagoon managers simply pump the waste right into ditches that drain to the river.

That's essentially what's been happening in the Lower Yakima Valley for at least 20 years.

Only here, the largest dairy herd in the state and a few farmers are to blame, not a metropolis of people.

The problem has mind-numbing proportions:

A herd of 100 cows produces as much body waste as 2,200 people, according to the South Yakima Conservation District. One mature milking cow makes 265 cubic feet of solid waste a year - enough to fill 10 dump trucks.

And the Yakima Valley has 68,000 dairy cows in Benton and Yakima counties.

Take all of the solid wastes produced by those cows in a year, and you could fill Pasco's 2.7 million gallon water tower on Road 68 about 50 times. And that's not counting the millions of gallons of liquid waste, which is harder to control.

"A dairy with a thousand cows is like a small municipality," explained Max Linden of the state Department of Ecology in Yakima.

But cow manure and urine don't go through a city sewer treatment plant, so when the waste hits a waterway, it carries a full load of bacteria that can make people sick. The waste also is loaded with nutrients that feed oxygen-consuming algae, which, in turn, can suffocate fish.

That's if the wastes aren't handled correctly, of course. And Linden said all indications are most of the Valley's 80 dairies do a decent job of containing their wastes.

But there have been repeated accidents, and there are a few dairies whose waste management could at best be called sloppy. On top of that, state enforcement against those offenders has hardly been aggressive.

New state and federal inspection programs kicked in last year, but dairy farms historically haven't been investigated until there was a complaint. However, lack of penalties doesn't necessarily mean dairy wastes have been properly handled.

"There are so many animals and too few fields to spread the manure on," said Joe Joy, water quality specialist for the Ecology Department in Olympia. "You're bound to have problems."

Only a few waterways in Washington have fecal coliform bacteria contamination as bad as the Granger Drain. The irrigation return canal has about a dozen dairies along its length.

In 1991, tests on the Granger Drain showed a high of 166,000 fecal coliform bacteria colonies per 100 milliliters of water, a sample roughly the size of a glass of wine.

That level of fecal coliform - which indicates other dangerous pathogens also likely are present - grossly exceeds the state surface water standard of 100 colonies per 100 milliliters.

The drain dumps into the Yakima River at Granger, near a public park and a boat launch. "There is a high potential for illness, given these numbers," Joy said.

Ecology Department tests at the Granger Drain in 1995 showed the irrigation season average fecal coliform count was 1,968 colonies per 100 milliliters, well down from the average of 25,750 in 1991 but still far in excess of the standard.

"The drain is in very poor shape, but it's better than it was in 1991," Joy said, noting tests for other waste byproducts like ammonia - from cow urine - seem to show the drain's water at least did not get worse during the first half of the decade.

Scott Abbott, a Sunnyside veterinarian, sums up the attitude of many involved with the industry: "You have to realize there are 80 (dairy) farms in the Valley here. Everything varies from dairy to dairy. I am not going to say every dairy farmer is perfect, but if you look at how things were 30 years ago, I would say that, environmentally, every dairy in the Valley has made great strides to improve things."

But about a dozen Valley dairies keep the Ecology Department's attention because they generate complaints about manure handling, Linden said.

And between 1995 and 1997, two Lower Valley dairy farmers were fined by the state Ecology Department, a rare action the state uses only after gentler methods fail. Those fines capped state case files on the two dairies that are a few hundred pages thick and date back more than 20 years.

"We gave them a lot of chances," said the Department of Ecology's Linden. "Whether right or wrong, that's what we did."

Compliance with pollution laws is expensive for dairy operators. Some farmers have spent more than \$100,000 to store their waste, which commonly is held in large lagoons, then sprayed on fields as fertilizer.

Problems usually occur when lagoons overflow or when too much effluent is pumped onto fields.

and it runs off. In the spring, when manure lagoons are full from storing winter waste, a heavy rain or a rapid snowmelt can flood through the property and carry waste with it.

Floods in 1996 and 1997 scared Yakima Valley dairy farmers, said Laurie Crowe, dairy waste technician at the South Yakima Conservation District. And the publicized intentions of a Lower Valley citizens group to sue 10 area dairies for Clean Water Act violations spurred dairymen, too.

Crowe said she's busier than ever helping dairies create waste management plans. In the last three months, at least 30 dairies have come in for help. Through the years, the conservation district has worked with about 60 of the 80 Lower Valley dairies.

"What I've seen this year is, basically, they are adding extra (waste storage) because of last year's weather. I don't think anyone is in dire need of any structure - they are simply trying to get away from any type of discharge. They just don't want to end up like last year," Crowe said.

During the last 20 years, the Sunnyside Valley Irrigation District has regularly complained to the Ecology Department when its "ditch riders" spotted manure in drains.

Spurred by the Ecology Department's demands for less sediment in the water, the Sunnyside and Roza Board of Joint Control is implementing strict standards in 1998 to protect its waterways.

The board is testing some runoff water from dairies but is concentrating on sediment and pesticide contamination. Still, the board has established buffer zone and fencing guidelines to keep livestock out of the waterways.

"We're trying to be proactive and solve some problems. ... It's too late to be ahead of time," said Jim Trull, district manager.

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Tri-City Herald

The Yakima: A River Wasted

Climate, space put Valley at top of industry



Herald/Bob Brawdy

Darigold's \$60 million Dairy Fair processes more than a half-million gallons of milk a day. Its presence in Sunnyside has helped the region become the state's dairy leader. The factory offers public tours and lures travelers from Interstate 82 for hefty ice cream cones.

Lots of land, little rain, plenty of food and a huge processing plant have turned the Lower Yakima Valley into the state's top dairy area in the last seven years.

Since 1990, Yakima County's dairy cow population has jumped from almost 26,000 to 66,000, according to state Agriculture Department statistics. Add Benton County's 1,900 dairy cows, and the Yakima Valley tops rival Whatcom County, the state's traditional leader in dairy cattle.

Both regions now account for about one-fourth of the state's dairy cows. In 1996, milk was Washington's second leading agricultural commodity after apples, and the state is the eighth-largest dairy producer in the nation.

The best mark for the start of the Yakima Valley's dairy growth spurt is 1990, when Darigold announced its \$60 million processing plant in Sunnyside.

The 150,000-square-foot plant started production two years later and features a retail section known as the Dairy Fair. It's complete with cheese tasting, public tours and the biggest ice cream cones around.

It's not only a tourist attraction but also big business, processing more than a half-million gallons of milk a day.

"The cost of hauling (milk products) became sufficient to justify the production facility over there," said Doug Marshall, Darigold spokesman. "We saw a lot of growth prior to building, and we saw a lot of growth after."

There's no doubt that being close to market has spurred dairy growth in Central Washington. And Marshall expects even more dairies to come to the lower Columbia Basin and Northeastern Oregon.

Some dairy operators might come from the west side of Washington, where population pressure has squeezed out farms. Once-rural towns like Enumclaw are busting with residents who don't want to smell farm animals.

Besides, the east side of the state offers dairies plenty of benefits compared with the west side. Yakima and Lower Columbia Basin dairy farms have grown because they are a cheaper place to farm - they are closer to the food supply, there's more available land, and less rain means fewer problems with waste.

The region looks good enough that some California dairies have moved into the Yakima Valley to

escape creeping urbanization of the nation's largest dairy-producing state.

The Yakima Valley also has grown to depend on its dairies, in addition to the crops that have long been its sustenance. "Without agriculture, Sunnyside wouldn't be much of anything," said Scott Abbott, a longtime veterinarian in Sunnyside.

But the state's dairy census also tells another story. The number of dairies in Yakima County is about one-third the number in Whatcom. That's because the average farm in Yakima County is about 700 cows - two or three times the average size in the state. And Yakima County boasts five herds between 3,000 and 5,000 cows. Ecology Department statistics show.

"The typical dairy farmer has had to expand," Marshall said. "The way to operate an efficient dairy is to have a little larger size. You've got to milk more cows."

Debbie Becker, executive director of the state Dairy Federation, said, "It's a matter of increasing in size to stay in business. It's a fact of life."

Expansion also allows some to have more comprehensive animal care. Abbott said that when he started veterinary work more than 12 years ago, he mostly did emergency work. Now, he's virtually an assistant manager at some farms, helping owners develop ways to keep their cows healthy.

One Lower Valley farmer, for instance, equips his cows with bracelets that track movements and milkings. By analyzing the data, the farmer can spot unhealthy animals using a system small-time farmers probably could not afford.

"Unless you are more efficient as a dairy farmer, you are not going to make it in today's society," Marshall said.

While Washington's 1996 milk production was down slightly from 1995, its per-cow production has continued to rise. According to the Department of Agriculture, Washington ranks second in the country with 19,996 pounds of milk produced per cow per year, 3,481 pounds above the national average.

Efficient cows and efficient farmers mean more milk - which is part of the reason the price of milk today is about the same as it was in 1980.

"That's a tremendous success story if you are looking at it as an economist," Marshall said. "If you are looking at it as a dairy farmer, it's discouraging."

For some, the steady prices meant closing doors and looking for other work. In 1990, the state had 1,245 dairies. In December 1997, there were 819. Despite that drastic drop, farm gate receipts for dairy products jumped from \$468 million in 1986 to \$687 million in 1996.

Abbott, who grew up on a small dairy, said many farmers give up their farms because they offer little financial security. And many children of dairy farmers don't want to go into a career that demands seven-day-a-week attention.

"Let's face it, that's not the way people are interested in working anymore."

In Wisconsin, the nation's one-time dairy capital, farmers are falling like flies. The average age in the industry is nearly 60, and small farms close every week.

It's different in the Yakima Valley, Abbott said. Kids there are going off to college and coming back to the farm, sometimes getting their own farm when their family's herd gets too big.

The big farms have caused divisions in the industry. In Wisconsin, Marshall said, farmers used peer pressure to keep farms small, which led to the decline of the state's industry as farms grew in other states.

But big farms are derided as "factory farms" - as opposed to the quaint family operations that dominated the industry in the past.

"Consumers are demanding low milk prices," Marshall said. "There is kind of a Catch-22: Consumers complain, but if the answer is the so-called 'factory farm,' isn't that what the consumer is demanding?"

Becker defends the Yakima Valley's mega-farms as family farms: "I know the care and concern that goes into these facilities. These people still have their roots in the community, and they are still providing economic growth for the community."

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Tri-City Herald

The Yakima: A River Wasted

State doing little to ensure dairy animals aren't polluting river



Herald/Bob Brawdy

Farm animals, pets and wild animals that deposit feces in the river increase the human health risk from drinking the water. Best farm management techniques prevent livestock from reaching rivers. But these cows near Mabton roam the shallows just a few yards from the main stem of the Yakima River.

The state has done a poor job of making sure dairies aren't letting their manure pollute streams and rivers.

Nowhere is that more clear than in the Lower Yakima Valley, where one Ecology Department employee devotes just one-third of his time to inspecting the state's largest dairy herd.

Statewide, the department has had fewer than four people assigned to make sure 800 dairies comply with water quality laws.

Inspectors typically investigate only when someone complains. And fines have been issued only rarely, even when farms have had records of violations going back more than 20 years.

It's a program that is "broken," as the federal Environmental Protection Agency describes it. And the EPA has lost patience with the problem.

In August, the agency's deputy regional administrator came down hard on Washington state. EPA inspectors began doing unannounced checks on dairies in some regions, and they began handing out warnings and fines.

EPA's crackdown apparently has caught the state's attention. State legislators are debating tougher dairy laws. The governor has proposed a budget that would beef up the dairy inspector force. And dairy farmers themselves are working to clean up their waste management.

"It's our hope we don't have to carry out these inspections in perpetuity," said Dave Ragsdale, EPA dairy waste specialist. But he added, "Until they have implemented an effective program, we'll continue doing it."

Ragsdale said the Valley's dairy cow boom in the last decade has caught EPA's attention. But he added, "We really can't make a judgment on the level of compliance until we have done some inspections."

Phil KauzLoric, dairy program coordinator for the Ecology Department, agrees the state's current dairy waste management program "is in need of repair." He said his department believes regular inspections are needed at all dairy farms.

But to do this, the state said it needs more people to enforce the law. A September memo by Megan White, manager of the Ecology Department's water quality program, said, "The need for inspections is greater than the resources available to conduct them."

With its small staff, the Ecology Department has been able to do relatively few farm inspections. From 1995 through 1997, the department handed out just 10 fines for dairy waste violations. Two went to farms in the Yakima Valley.

Although the Ecology Department can impose fines of up to \$10,000 a day per violation, no dairy has ever been fined that much.

To date, the most severe penalty the state has imposed on a dairyman for polluting water was levied in December. Edward Koopmans, a former Skagit County farmer, was given a \$40,000 fine and four days in jail for repeated violations.

Max Linden of the state Department of Ecology in Yakima explained the state's intent behind efforts to enforce dairy waste management law is to fix problems, not to penalize. He said state code essentially states problems must be chronic to draw fines.

"It may seem in some cases that we're not doing stuff, but we have bigger and broader goals," Linden said.

The state also can require farms that have been a source of water problems to get a National Pollutant Discharge and Elimination System permit. In the Lower Yakima Valley, about eight dairies have been required to get permits, though several are in progress.

The permits are intended to make sure dairies have adequate waste management plans and facilities. They also require the dairies to report any waste spills to the state.

But a permit, Linden acknowledged, is only as good as the people who carry it out. "We put a lot of faith and responsibility on the permit holder," he said. "We can't be there all the time to make sure they are in compliance."

In 1997, the agency asked the Legislature for nine inspectors, which it did not get from budget-conscious lawmakers.

This year, the governor's proposed supplemental budget now before the Legislature includes \$771,000 that would pay for 10 more Ecology Department employees to tackle dairy problems and other programs. The number of new employees could change, depending on how many are needed to carry out legislation.

If the budget passes, inspectors would have a more realistic chance to visit each dairy annually. Instead of each inspector being responsible for 235 farms, each inspector would have about 70.

Last year, the Ecology Department started its own "watershed" inspection program for major dairy farm areas, where pollution problems were suspected. In March, the agency plans to finish its review of 50 farms on the Chehalis River in Western Washington. About half the Chehalis farms inspected so far are not handling their waste properly, the agency found.

But coming changes are bigger than any single watershed.

The EPA is calling for state legislation that includes routine compliance inspections, doesn't hinder the Ecology Department's ability to levy penalties and provides enough workers to run the program.

Right now, EPA is taking on that challenge. It started in Whatcom County, the state's longtime dairy leader and a place with known water quality problems.

EPA quickly handed out six fines to Whatcom dairies discharging manure wastes into surface waters. Fines ranged from \$11,000 to \$22,000. Another 42 of the 64 dairies inspected got warning letters, mostly for waste lagoons that were spilling over or nearly spilling over.

If Whatcom is indicative of the state, "There are probably hundreds of other dairies in Washington that are not doing all that the law requires to keep cow manure out of streams, rivers and other water bodies," said agency spokesman Bob Jacobson.

The Chehalis and Snoqualmie watersheds are targeted by EPA for review. The Yakima isn't on the list yet, but the agency isn't ruling out the possibility.

EPA's Ragsdale said a complaint-driven process like the state had provides little incentive for dairy operators to spend money on changes before problems start.

"If you don't come up with a program that's effective, those operators who made the investment ... are at an economic disadvantage," he said. "We owe it to them to make sure the laws are implemented."

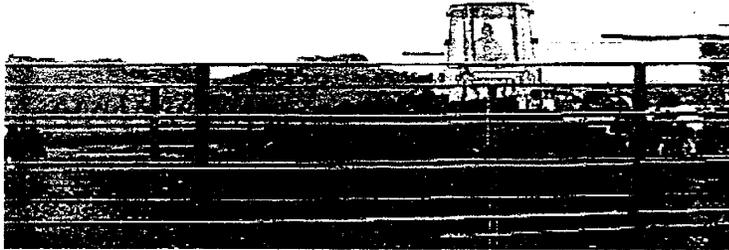
Ragsdale said EPA has been trying to educate Washington farmers about clean water for years - but with little success. "We've done everything we could to encourage voluntary compliance. Now we have taken the next step."

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Tri-City Herald

The Yakima: A River Wasted

State legislators wrestle to regulate dairy waste



Herald/Bob Brawdy

Managing manure is a full-time job, especially for large dairies like many in the Lower Valley. Some farmers have spent more than \$100,000 in the last year to beef up their waste management systems and keep cow feces from reaching the river. The Legislature, too, is trying to come up with solutions.

Washington needs a new dairy waste management law, many Washington politicians have said in recent months.

The question is what will work best to keep waters clean and dairy owners in business.

And the possibility is nothing will happen.

This session, the state Legislature is reviewing two bills designed to stop dairies from soiling state waters. Both proposed laws - one from the Senate and one from the House - would force regular inspections at dairies, something that isn't the case now.

But the bills could be at a stalemate - and late last week, substantive changes were made to the Senate bill by a House committee, further complicating the issue. Each has to pass the other house's agriculture committee, which developed its own bill. Last week, politicians were trying to find a compromise to pass in the few days remaining before the session ends.

Before it was altered, the Senate bill gave farmers several ways to show they are complying with clean water rules. The House version forces all farmers to create a waste management plan within two years. Both drew large crowds in legislative hearings.

Under the current rule, farmers only have to get a permit - designed to ensure they can handle their herd's wastes - when they are shown to be a water polluter. That hasn't happened often, and only a handful of the 80 Yakima Valley dairies have been forced to get permits.

Even with a permit, it's against federal law to dump animal waste into waters. Rules allow exceptions for "catastrophic" or "chronic" weather problems beyond dairies' ability to control.

"I am not sure the federal guidelines are necessarily achievable," said Sen. Dan Swecker, R-Rochester. "But I do know one thing, and that is we can dramatically improve what we're doing."

Last year, the House Agriculture and Ecology Committee worked on new dairy waste rules but never reached agreement.

So Swecker brought the ecology department and the state Dairy Federation together to create a new bill they called the Dairy Industry Compliance Initiative.

At present, polluting dairies generally are turned over to the state conservation commission and local conservation districts. Farms are given six months to complete a waste management plan and 18 months to implement it.

Many say that law doesn't force changes quick enough - and rarely does it result in fines for dairy operators.

Swecker's bill would make each commercial dairy register with the state, but farmers would have

choices about how they show their compliance with the law.

The Ecology Department would inspect dairies - starting with the ones that don't have a good waste plan or didn't register.

Swecker said the new rules will start to curb problems right away. "When you make people get permits, the onus is on them to take the initiative and get the job done. ... It is incentive for the farmers to take responsibility and use their own resources to find solutions to the problem. ... but it also has enough teeth to make sure they do that."

Swecker's bill proved to have good bipartisan support at a mid-January hearing where it was backed by environmentalists and farmers alike.

"We have put together a program that will allow us to show that dairy farmers are committed to the Clean Water Act," said Debbie Becker, Dairy Federation executive director.

The House legislation - sponsored by Rep. Gary Chandler, R-Moses Lake, and Rep. Jim Honeyford, R-Sunnyside, among others - also provides for regular farm inspection along with technical assistance to cut pollution.

It would force farms to register with the state by September and start the state inspections by October. And it makes every dairy farmer create a waste management plan by Dec. 1, 2000.

Chandler said last week that the Senate bill isn't tough enough - that the industry will remain mired in negative press as a huge source of water pollution unless it can prove to citizens dairies are clean neighbors.

To do that, he said, it's necessary for all farms to create waste management plans regardless of their pollution history.

The Dairy Federation is lobbying hard against the House bill, on the grounds that it "imposes new layers of regulatory requirements that are extremely costly for producers," according to a federation letter to the Senate in mid-February.

It's not clear what it will cost farmers to comply with new laws - though fines are up to \$10,000 a day per violation even under current rules.

"We're hoping (new legislation) will not ultimately put producers out of business," Becker said, noting several Valley dairies spent thousands of dollars in recent months to upgrade their systems.

The federation conducted a survey to determine the economic effect of stricter rules. About one-third of the farmers who returned surveys in late December said they expected to go out of business in the next five years largely because of low milk prices or environmental regulations.

"I knew we were going to see some substantial changes in the industry over the next five years," Becker said, "but I didn't realize it would be that level."

Environmental costs haven't been the reason for dairy consolidation to this point, said Dave Ragsdale, EPA dairy waste specialist in Washington state. But he acknowledged operators now will be faced with a decision to invest in new manure control systems or get out of the business.

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Tri-City Herald

The Yakima: A River Wasted

Legacy of dairy industry's waste problems stretches back 2 decades



Herald/Bob Brawdy

This aerial view of DeRuyter Brothers Dairy near Outlook shows how large some Lower Valley dairies have grown in the last decade. The farm has a long history of problems managing waste from about 3,000 cows, according to the state Ecology Department.

Dairy waste from at least two Lower Yakima Valley dairy farms has repeatedly leaked into irrigation drainage ditches since the mid-1970s.

Between August 1995 and June 1997, the state Ecology Department fined the two dairy operators - Henry Bosma and Jake DeRuyter - for substantial water quality violations. Fines totaled about \$42,000, three-fourths of which was levied for one violation.

The Tri-City Herald acquired the agency's files on both dairymen through a Freedom of Information Act request. Paperwork about their combined complaints, penalties and correspondence fills several hundred pages and details numerous problems with dairy waste management.

"These are the two that we've been working the hardest with," said Max Linden of the Ecology Department in Yakima.

The intense scrutiny has had an effect on at least one of the dairies.

Bosma said he's recently completed a \$125,000 waste management system - including three lagoons that hold more than 49 million gallons of wastes. He's hoping all that work and money will keep the agency - and Valley citizens groups filing Clean Water Act lawsuits - off his back.

He admitted dairies need to do a better job of taking care of their waste and said current state legislation to start a regular inspection program isn't a bad idea.

"Don't think for a moment we are out here trashing things. We live here," Bosma said. "I am as concerned about the environment as anybody else."

DeRuyter did not respond to repeated requests from the Herald to discuss the issue, other than to say his lawyers had directed him not to talk to the media.

In mid-February, the dairy released a statement in response a citizens lawsuit alleging Clean Water Act violations. "We care very much about the environment and about the community and are doing all we can to operate our dairy farm in an environmentally responsible manner."

Alan Fulk at the National Resource Conservation Service, which helps farms develop waste plans, said DeRuyter Brothers has spent "lots of money" improving its waste system in recent months. He

would not specify the amount or the projects.

Records show that since 1976, DeRuyter Brothers Dairy of Outlook has had at least 15 verified discharges of manure-contaminated water, according to an Ecology Department letter.

Agency records show the following recent violations for DeRuyter Brothers, which has a state and federal permit based on about 3,000 dairy cows.

-- In January 1995, the Sunnyside Valley Irrigation District reported manure waste from corrals being pumped into a ditch along Van Belle Road even though the dairy had lagoon space available. Drain water nearby had 700,000 colonies of fecal coliform bacteria per 100 milliliters of water - 7,000 times more than is acceptable in state waters.

Though the source of contamination was not proved, DeRuyter Brothers farm was fined \$3,000.

-- In 1997, a TV news crew filmed DeRuyter workers pumping manure into an irrigation drain along Chute Road. The dairy was fined \$30,000 after it was found it had two empty lagoons that could have taken the waste. DeRuyter agreed to pay but did not admit guilt.

-- A November 1997 Department of Ecology letter said there had been three verified incidents of manure being discharged off DeRuyter Brothers Dairy in the previous two months. In two cases, a machine that sprays effluent onto fields was stuck, and waste was running off the property.

The inspector also noted the fields DeRuyter Brothers was spraying with "significant amounts" of solid and liquid manure had been fallow for two years. No more waste is to be put on a field than can be used by the plants as fertilizer - and state officials said that didn't appear to be the case there.

Bosma, who started dairying in the Valley in 1973, operates H&S Dairy and North Liberty Dairy, which total about 5,500 cows.

His Ecology Department file includes these incidents:

-- In March 1993, the agency verified two complaints of manure discharged to an irrigation drain from North Liberty Dairy. State officials cited the dairy for applying too much waste on a field, and a \$6,000 penalty was issued in early 1994.

Bosma said the over-application happened when the man managing the manure spray guns was called off the job because his wife was in labor. The fine was reduced to \$3,000 on appeal.

-- Bosma was fined \$9,000 for discharging manure-contaminated water to an irrigation drain in April 1996. The penalty was deferred, however, pending completion of a waste management plan.

Because Bosma had more discharges, he was told to pay the fine early this year. He also was slapped with an additional \$3,000 fine for permit violations.

-- In January 1997, during a storm that caused problems for many dairies, the Ecology Department verified two cases of manure in drains near Bosma's farm. In September, the drain was "pure green" with manure. Fecal coliform counts reached 480 times the state standard.

"It was clean water going through a dirty ditch," Bosma said. "I am not the only one who uses that ditch."

As for his thick file, Bosma said, "A lot of this stuff isn't verified. And if it is, we address it immediately." He added he wishes people with complaints about his farm management would come to him before going to the Ecology Department.

Bosma said his recently completed waste management system includes three huge lagoons that give him four times the amount of storage required by his farm plan. He added that lots of dairies have made big changes - but they aren't getting the credit they deserve.

Now, all of Bosma's land is sloped toward the lagoons so waste water doesn't run off his land, and he's created a system to keep return water from other farms off his property.

That's the kind of thing the Ecology Department likes to see. "We worked and worked with him," Linden said. "Finally, he got the point."

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Tri-City Herald

The Yakima: A River Wasted

Concerned users search for answers

In the fall of 1993, a dozen Yakima Valley water users realized they didn't have enough water to do everything they wanted. And that was before the biggest drought in recent history, which dried up canals and shriveled crops the next year.

Concerned about their future, water users came up with a plan that included building two reservoirs on the upper reaches of the Yakima River - at a cost of at least a few hundred million dollars and undetermined environmental damage.

Meeting first at the Barn restaurant in Prosser, the impromptu committee started knocking about ideas to save irrigation. "We knew we had to do something," said Max Benitz Jr., a Benton County commissioner.

The group's self-imposed mandate: to maintain the Yakima Valley's reputation as one of the nation's best agricultural regions while providing enough clean water to rebuild salmon runs.

That's a lot of water. Irrigators alone divert an average of more than 2 million acre-feet of water each year - enough to cover most of the land in Yakima, Benton and Kittitas counties 6 inches deep.

Three years, countless meetings and almost 500 members later, the Yakima River Watershed Council has what Benitz calls the state's most sophisticated plan to date for dealing with water problems - both quantity and quality.

The plan includes proposals for several watershed restoration efforts, such as community education about water issues, creating a water transfer system that would encourage conservation and building smaller "reregulating reservoirs" along the river to improve the irrigation system's ability to save water.

But the big-ticket item in the council's plan is the addition of the mountain reservoirs at a total price tag likely pushing a half-billion dollars.

This year, the Bureau of Reclamation is to figure updated cost estimates for the reservoirs, study the environmental effects and evaluate how well such a system would meet water needs. After all the drafts and hearings, it will be up to counties to adopt the Watershed Council's recommendations into their comprehensive plans.

By June, the council hopes to have a new draft plan ready for public review. But it probably will be 15 years before irrigators are getting water from new Upper Yakima reservoirs.

That's if the projects are built. The storage idea isn't agreed to by all, said Katherine Ransel, co-director of American Rivers' office in Seattle. She opposes the idea of more Cascade Range reservoirs because of the environmental harm they would do.

"What we need to do is live within our means," said Ransel, who works for the nationwide environmental group that focuses on health of waterways.

And Ransel said the best place to start doing that is by cracking down on irrigators who take more water than they are supposed to. She said savings alone would be a huge step.

Nine irrigation districts now pull water from the upper Yakima and its tributaries, and there are 10 diversions on the lower river. They take between 50 and 100 percent of the water - leaving little for aquatic life.

"You can't separate quantity and quality," said Mel Wagner, chairman of the Watershed Council. "The quality goes down when you get such low flows full of nutrients."

Ray Hennekey, the state Department of Ecology's lead person working with community groups to improve the river, credits the Watershed Council for starting discussions about how to improve the river.

"This whole community is really starting to coalesce around some environmental goals," he said. "People have begun to realize that we ... have to do something different."

"I don't know of anywhere else, certainly not in the state, where all of the (players) are getting together to talk about what is going on."

The council's plans are being spurred by Congress, which budgeted about \$10 million in 1998 to finance the Bureau of Reclamation's conservation efforts. Two-thirds of the water saved will go back into the river for fish. The rest can be used by irrigators.

Wagner said federal plans and grass-roots efforts complement each other. Together, they represent the Yakima Valley's best chance at solving its water problems - despite the Watershed Council's hard luck with a \$150,000 state grant payment that was frozen by the courts.

Though solutions are years away from being implemented, there's no time to wait, Wagner said. "We're risking our economy, our fish and our health if we wait."

The council's vision was put together with lots of tension and competing ideas from tribes, environmentalists, farmers and county commissioners, among others.

The biggest conflict is over water allocation in low-water years. The plan calls for junior irrigation districts to take 70 percent of their allotment when water is low and leave the rest in the river. By law, senior irrigation districts get first take and their amount cannot be cut.

In addition, water users are required by the federal government to leave 200 cubic feet per second in the river for fish, which means junior irrigation districts sometimes don't get enough to water their crops. For fish, however, 200 cfs is not much - it's well below what Wagner calls the optimum level of about 1,100 cfs.

"Every year, we are playing Russian roulette," Wagner said. "Common sense tells us we need to store a little more."

The Watershed Council's draft plan shoots for a minimum of 700 cfs in the river by building a new reservoir on Squaw Creek and expanding another in the Cascades.

That translates to holding back 625,000 acre-feet of water - 60 percent of which would be diverted for irrigation and 40 percent of which would remain in the river. By saving more water during high-flow seasons, river operators could release it during the late summer and fall when flows usually are low.

According to the study, that much water would satisfy about two-thirds of agricultural and ecological needs. It's the kind of compromise Wagner said must happen to make the most of the river for all users.

Bumping Lake, a relatively small reservoir, was built by the Bureau of Reclamation in 1909 with a capacity of 33,700 acre-feet. The Watershed Council wants to increase the reservoir to 458,000 acre-feet. In 1983, when such a plan was last priced, the cost was \$150 million.

Accounting only for general inflation, such a plan could have cost closer to \$245 million in 1997. Wagner doesn't quarrel with that estimate and said a feasibility study is high on the priority list for 1998.

The proposed Squaw Creek reservoir would hold 142,000 acre-feet, at a cost of \$149 million in 1987. The 1997 inflation-adjusted price was roughly \$211 million.

Together, the reservoirs would cost at least \$1 million a year to operate, largely because river water would have to be pumped into the Squaw Creek reservoir.

The price tag for the Watershed Council's plans is daunting, but not as much as going without more water.

"People know they will have to ante up," Wagner said. "The government is not going to step up and write a check to solve all these problems."

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Tri-City Herald

The Yakima: A River Wasted

Keeping more water in river could solve problems



Herald Andre Ranieri

Scott Manley of the Benton Conservation District takes water samples from a creek near Prosser. Water testing is vital to nurturing the Yakima River Basin because it shows what pollutants are in the water and where they come from. Scientists, lawmakers and others are working together to clean up the water.

Jim Esget's goal is simple: Keep more water in the Yakima River.

Fish runs and farmers should benefit if he succeeds.

As manager of the Yakima River Basin Water Enhancement Project, Esget is coordinating water conservation efforts in the Lower Yakima Valley. Two-thirds of the water saved will go back into the river for fish; irrigators get the rest.

"Significant amounts of water could be saved," said Esget, who works for the U.S. Bureau of Reclamation in Yakima.

The program's goal is to leave another 200 cubic feet per second (cfs) of water in the river through conservation efforts in irrigation districts.

That amount of additional water would make a substantial difference during low-water years, when federal law allows the bureau to drop flows to as low as 200 cfs at Sunnyside, though the target is 300 cfs.

In high-water years, the bureau manages releases from its Cascade Mountain reservoirs to hold Yakima River flows to be no less than 600 cfs.

Few people dispute that 300 cfs is below what's best for fish. Mel Wagner of the Yakima River Watershed Council said fish show dramatic benefits from more water up to about 1,100 cfs, which is about the average winter flow in the lower Yakima.

More water in the river would increase the chances young salmon have to make it to the ocean. Water temperatures would be cooler, pollution would be more diluted, and predators would have a harder time catching the fish.

Jerry Jacoby, bureau conservationist, said his agency's scientists are nearly done with a report on how much water fish need.

The draft doesn't fully answer the question, which means more studies will be needed. Jacoby said it's clear adding up to 200 cfs in the river will help fish, but nobody yet knows if it will be enough to increase fish runs.

The Yakima River Basin Enhancement Project was passed by Congress in 1994 as a way to conserve water for fish and increase the reliability of irrigation systems in low-water years. It was authorized to get \$147 million over 10 years, though it's up to Congress to appropriate money each year.

The money is being used to make hardware fixes, evaluate and monitor water-saving plans and help irrigation districts implement them through matching grants.

In fiscal 1998, the Bureau of Reclamation has almost \$10 million for project work. President Clinton has requested \$11.9 million in his fiscal 1999 budget, said U.S. Rep. Doc Hastings, R-Wash.

Even with all that, "There isn't enough money in the legislation to solve all the problems in the Yakima River," Jacoby said. "But Congress wanted a program that would at least demonstrate what conservation could do."

The first phase of the river enhancement bill involved installing fish ladders at dams and adding fish screens at the mouth of canals to keep migrating salmon smolt from getting lost in them and dying there.

Step two, Esget's current focus, is water conservation and acquisition.

The third phase, already being studied by the citizen-led Yakima River Watershed Council, is developing more water storage in upriver reservoirs.

The bureau is reviewing conservation plans prepared by irrigation districts. But it expects to be hard-pressed to meet a 2002 goal set by the legislation.

Jacoby said the districts probably still are at least a year away from starting to make changes.

The board of joint control for the Roza and Sunnyside irrigation districts plans to have its conservation plan ready early this year, said Jim Trull, Sunnyside Valley Irrigation District manager.

The board's wish list could cost upward of \$35 million, with work spread over the next decade. Irrigators would pick up one-third of the tab because they get one-third of the saved water. The federal government would pay the rest.

The joint board is looking at building "equalizing reservoirs" along canals to help operators run the system more precisely. Without these small reservoirs, water that farmers can't use immediately is spilled back into the river.

Putting excess water into the equalizing ponds would allow the district to put it back into the canals as needed.

"If we had reservoirs, they would act like a giant shock absorber," Trull said. "They would provide a way to be more efficient in our water use. It's a very sizable opportunity for savings."

District also are looking at automating water flow through canals so there is a more rapid response to demand, which can change quickly as farmers turn irrigation systems on and off. "We could be diverting the amount of water from the river we need and not have to carry additional water through the system as a buffer," Trull said.

The Bureau of Reclamation's effort also includes an offer to buy water from irrigators who reduce or stop their water use. But so far, few have come forward.

"Farmers don't want to sell their water right," Jacoby said, though he said some have leased water from tributaries to the district. "If they want to stay farmers, there's no reason to sell. That's the only thing that makes their crops grow."

Another element of the bureau's plan is what Esget calls "hardware fixes" - altering dams and equipment that control water flows. In the next few years, for instance, the Cle Elum dam will be studied to see if raising it 3 feet would provide enough storage to substantially improve flow for fish spawning and migration.

Among the other proposals is reducing water use at the Chandler pumping station near Prosser and catching more water in Lake Kachess reservoir so there is more to release for irrigation in the summer.

Hastings, an ardent supporter of the enhancement project, calls it an "economically and environmentally sensible solution to meeting the growing water demands." He added, "Once fully implemented, it will be of extraordinary benefit to the Yakima Basin."

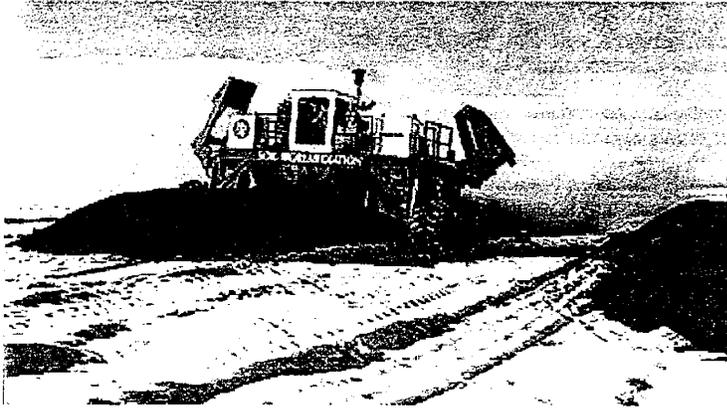
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Tri-City Herald

The Yakima: A River Wasted

Paterson's Watts Brothers farm turns organic to use waste, find niche



Herald/Mike Lee

A giant rototiller at Watts Brothers farm near Paterson turns over tons of dairy cow manure from the Yakima Valley that will be used to fertilize organic crops. This is one way dairy farmers can get rid of their manure in an environmentally friendly fashion.

The Watts Brothers 18,000-acre farm near Paterson is a typical spread of Mid-Columbia irrigated agriculture - typical except for a 20-acre manure composting operation and 2,000 acres of organically grown crops.

The farm's recent turn toward "sustainable agriculture" illustrates how some farmers are moving away from traditional farm chemicals. And it offers one solution for the Yakima Valley's growing dairy waste problem.

The company's budding organic farm has teamed up with the nation's largest all-organic food processor and a Yakima Valley dairy. And to keep growing, Watts needs lots of cow manure - 40,000 tons in 1997.

Organic farming started largely as a market for hippies and health nuts. But the market has ripened today into a relatively broad-based demand for foods not tainted by questions about chemicals.

Even to the Watts brothers, who are longtime conventional farmers, their infant organic operation seems odd. It's something they wouldn't have dreamed of before they started talking with Cascadian Farm about using nature's nutrients to nurture crops.

"Fourteen months ago, if you would have asked me about organic farming, I would have laughed," said Don Watts, who runs the company with his brother Doug. "Times are changing."

Some call the technique "sustainable agriculture" because it doesn't rely on herbicides, pesticides or fertilizers that often carry environmental concerns. Instead, the brothers use dairy manure, compost it on their land and spread it on crops.

The practice relies on the theory that the richer soil will make stronger, healthier plants that are more resistant to many of today's pests. Pest control, however, still is a battle, and a bad case of bugs can take a big bite out of a harvest and drive up the price.

Gene Kahn, president and CEO of Cascadian, said organic farming is "soil building" not "plant feeding." He calls the Watts Brothers' composting program an example of the best in organic practices because it produces high-quality fertilizer. "We do a lot more than just ... dump manure on the ground," he said.

It's a process the brothers are proud of.

"We have a tremendous amount of feedlots and dairies that are clearly having some environmental

problems." Don Watts said. "All of the dairies and feedlots are looking for places to get rid of their manure."

The brothers call their system "smart farming" - staying a bit ahead of the competition and trying to keep a sustainable bottom line.

"It's going to become a very important market," Watts said. "The farmers who can make the transition are the ones who are going to be successful in the future."

And the more who make the change, the more likely others will follow despite the high costs. "If there is an economic opportunity, there is going to be competition," Watts said. "It's the good old American way. We've got to become better than the potential competition."

The Watts farm's new look is not necessarily a popular one with farmers, who Don Watts says are slow to change, just like people in other industries. "There is a lot of resistance."

But what once was the territory of health food stores is becoming the land of mainstream food giants such as Albertson's and Fred Meyer, which carry Cascadian's organic frozen vegetables.

Kahn started organic farming in 1972 on a remote plot near North Cascades National Park in Northwest Washington. At the time, he also was making his own soap and burning kerosene lamps.

After a few years, "the real world set in" on the graduate school dropout - but the farm he started blossomed during the next two decades.

Now, Cascadian is growing at a rate of 50 percent a year, and 1997 sales were expected to be \$40 million. Kahn said the industry will continue to grow at 20 percent a year because costs of organic farming are coming down, retailers are getting more interested and financial investments in the industry are picking up.

In an effort to capitalize on the trend, Watts Brothers built a \$15 million vegetable processing plant last winter. Cascadian, based in Sedro Woolley, asked the brothers if they wanted to partner in a fast-growing market.

The Wattses started talking about growing 250 acres of organic corn, then they decided to grow about 1,300 acres of corn, peas and potatoes. They soon found they had only scratched the surface.

Organic farming standards require that products sold with an organic label be farmed on new land or land that has not been chemically treated for three years. The Wattses broke new ground for their first fields in 1997 and have marked more Southeast Washington land for conversion to organic ground - a huge commitment in an uncharted industry.

This year, Watts said, the company will farm nearly 2,000 acres organically - 800 of corn, 800 of peas and 300 of potatoes to be processed by Lamb-Weston.

Such big steps are necessary in an industry that has heretofore been largely mom-and-pop businesses. Because of what Watts calls the "unsophisticated" roots of organic farming, suppliers never knew what they would get from season to season and couldn't market effectively or stabilize prices.

Compared with standard farming, of course, organic farming is expensive - somewhere between two and five times greater depending on the product, said Steve Bannworth, vice president of sales for Watts. But customers don't oftenicker about price as long as they are assured the farming isn't causing environmental problems, he said.

His job is to sell the "earth-friendly" process, such as manure composting.

Dairy farmers commonly spread their manure on land adjacent to their cow pens, but it's hard to keep runoff contained on the land and stop it from contaminating neighbors' properties.

So Watts Brothers farm hauls in manure from the 6,800-cow Cow Palace Dairy in the Yakima Valley. Once on the Paterson land, the manure is composted in long, black rows that steam in the winter cold as they are turned over by a giant rototiller.

Temperatures build up to 140 degrees inside the piles, killing bacteria and weed seeds, reducing the smell and generally making the manure suitable to spread on cropland.

The Wattses - with 18,000 acres and a management plan - also don't face the same pressures as Yakima Valley dairies do with nearby neighbors.

The compost - high in nitrogen, phosphorous and potassium - is spread on fields that are watered with diluted "waste" water from the processing plant, which uses 350 gallons a minute at full speed.

It all adds up to fewer environmental problems - which is what Kahn said many people want. "Some consumers are saying, 'We're willing to pay a little more, and we want to see agriculture

that has a strong environmental benefit associated with it. "

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Tri-City Herald

The Yakima: A River Wasted

Groups work together to revive 'Tapteal'



Herald/Cary Best

Richland, Tapteal Greenway and the Confederated Tribes of the Umatilla Indian Reservation have big plans for this stretch of the Yakima River Delta near Richland. Dennis Rhodes, left, Richland planning manager, and Allen Childs, tribal wildlife biologist, see a bright future for the Chamna nature preserve that includes walking, biking and fishing.

If Lewis and Clark trekked through the Mid-Columbia today, there's little chance they would adopt the name American Indians gave the Yakima River - Tapteal.

The word means "the river that runs clean," so named because tribes drank from its banks, scooped out its freshwater clams and ate its fish, said Carol Craig, spokeswoman for the Yakama tribal fish and wildlife program.

Indeed, if the early white explorers could see the river's delta 190 years after their historic journey through the region, they more likely would call it "Waste-waters."

But that's just the image Richland, Tri-City environmentalists and the Confederated Tribes of the Umatilla Indian Reservation are bent on changing this year as they develop a unique urban wildlife habitat.

Efforts are being concentrated on the Chamna Natural Preserve - 2.5 miles of shoreline and about 275 acres on the north side of the river and within Richland's city limits. The land accounts for about one-fourth of the Yakima Delta, which the tribes and the city are attempting to lease and manage for the Army Corps of Engineers.

When work is done, the fertile flood plain will support fishing, walking, biking and bird watching - and be home to an array of wildlife.

Among the draft plans: picnic tables, restrooms, trails, handicap access trails, a parking area, garbage cans, interpretive signs and identification of cultural and natural resources.

To create those things, the Chamna work group is recommending closing some roads and trails, limiting development to protect wildlife and controlling noxious weeds.

"It's going to be somewhat unique, kind of an urban-wildlife interface," said Allen Childs, wildlife biologist for the Umatilla tribes. The corps, Tapteal Greenway and the state Fish and Wildlife Department also have been involved in the last year of planning.

While public access is limited at most of the tribes' wildlife mitigation areas, the Chamna reserve will remain open to many activities. Childs said. "It's not the type of area that is going to be shut off. People are going to be able to enjoy the area."

Planned uses aren't much different from what's gone on through the years - but they will be managed so human activities don't infringe so much on the ecosystem. Childs explained.

That hasn't been the case in recent history.

"It was really falling into disrepair," said Mike Lilga, president of Tapteal Greenway, a Tri-City conservation group dedicated to restoring the Chamna reserve. "The dumping was incredible."

Like much of the Yakima River, the delta has long suffered from pollution - motor oil, refrigerators, household trash and almost anything else people didn't want was left in the river or on its banks.

Tapteal members have removed several tons of trash, and the city closed the land to vehicles in February 1997 to cut dumping and keep plants from being torn up.

The closure upset off-road groups that used the site and made it hard for disabled people to get to the river. But it has greatly reduced the amount of trash left there - and the area eventually will be reopened, the Chamna planning group said.

Dennis Rhodes, comprehensive planning manager for Richland, said he's hoping to have public hearings on the land-use management plan by early March and complete the plan for the city council's review by April. How fast the plan is finished will be determined by how much it's revised by public feedback.

If things move quickly, vehicles could be allowed in certain areas by July.

"We certainly don't want to keep vehicles out of the area for this whole summer," Rhodes said.

Before cars and trucks can approach the river, however, Rhodes said there needs to be some kind of fencing to keep them on designated roads and parking areas.

Traffic control is his first priority - but within the next five years, he'd like to add a few rustic log amphitheaters and restrooms. The only paving planned is for handicap access trails at the west end of the park.

It's not clear yet how much the improvements will cost, though Rhodes is trying to pull together a budget to present to city boards and the council.

The Umatillas are especially concerned with maintaining wildlife habitat and are paying for upgrades with money from the Northwest Power Planning Council intended for restoring habitat destroyed by the McNary Dam pool, Childs said. That money isn't likely to cover the whole bill, and the city will apply for grants to pay for improvements.

Besides the wildlife, the Umatillas value the delta as an important cultural area and the site of a once-sizable American Indian village.

The area also holds a good deal of history for settlers. In the late 1800s, homesteaders lived on both sides of the river. Ben Rosencrance started operating a 30-foot-tall water wheel near the present Interstate 182 bridge to irrigate sections of what became south Richland.

For Tapteal Greenway, the delta represents a chance to save a swath of "the closest thing we have to natural habitat in the area," Lilga said. As such, it furthers the group's goals of environmental education and the creation of a recreational resource.

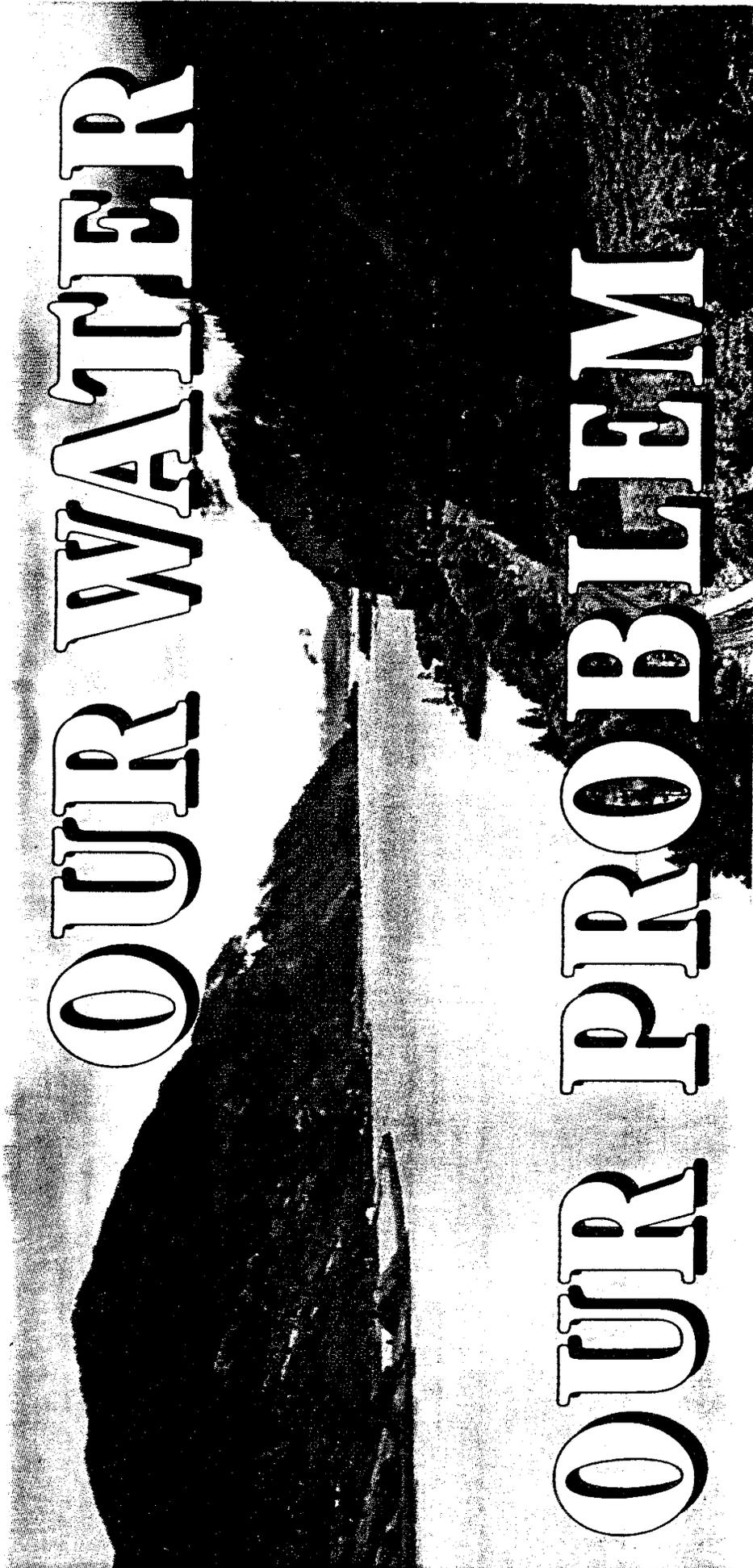
In the long run, of course, the groups want to improve the river's water quality - though they realize that will depend a lot on what happens upstream.

Being at the end of a long trough of waste water doesn't make it easy. "The water quality in the Yakima is a big concern," Lilga said. "Our problem, of course, is everything that is dumped in the river passes through Richland, right by Chamna. We get the worst of it, we get it all."

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OUR WATER

OUR PROBLEM

Growers, irrigators and others work to solve Lower Yakima River problems

Major progress is being made in the Yakima Valley to turn the tide on Lower Yakima River pollution problems. Recently, a Department of Ecology study identified turbidity and the pesticide DDT as the river's highest priority concerns.

"We're making terrific progress in getting people to recognize the problems," said Chris Coffin, with Ecology's central regional office in Yakima. "Many of the people who can do the most to solve the problem have already started working on solutions. We had a slow start, but conservation districts, irrigation districts and growers are picking up momentum. The Yakima River Watershed Council has been instrumental in getting the word out and bringing all the players together."

"Turbidity," or cloudiness, is an indicator of suspended sediment. While even pristine rivers carry sediment, too much can clog fish gills, smother eggs, fill in spawning gravels and alter the biology of the stream.

The Ecology study found the chief cause of high turbidity in the Yakima during irrigation season is soil running off irrigated farm fields. Many farmers irrigate with the "furrow" technique, sending free running water flowing by gravity from the high to the low end of a field. Often, much of the water runs off the field, and with it goes suspended soil particles that dirty irri-

gation water for downstream farmers and can eventually end up in tributaries and the Yakima River. During the 1995 irrigation season, the four principal irrigation drains delivered, on average, 251 tons of soil into the river every day.

The DDT problem is a result of the soil erosion. Although it was banned in 1972, DDT was used heavily in the Yakima Basin and is still attached to organic molecules in the soil. When contaminated farm soils wash into the river, the associated DDT can build up in the food chain and eventually be consumed by humans. A U.S. Geological Survey study found Yakima River bottom fish (such as whitefish, bass, and suckers) have some of the highest DDT concentrations in the U.S.

The Ecology study and cleanup project on the Lower Yakima River is essentially a watershed plan that addresses specific water quality problems. The federal Clean Water Act requires states to write these cleanup plans for bodies of water that don't meet water quality standards. Federal rules require each plan to 1) define and analyze the problem, 2) evaluate alternative solutions, and 3) describe how the problems will be solved. The rules require public involvement in the process.

Once pollution sources are identified, these plans must set target "loads" that will allow the river to meet water quality stan-

dards. The load is the amount of a specific pollutant that a body of water can handle without exceeding water quality standards. Ecology's final *Yakima River Evaluation* report, released in July '97, sets these target loads for sediment. Reducing the sediment will also reduce DDT.

The Yakima River Watershed Council and the irrigation districts are key players in developing and implementing the changes necessary to repair and sustain resources the Yakima River. Basin providers. These are local groups working with, not in response to, state and federal agencies in determining the future of the watershed.

Two of the major irrigation districts, Roza Irrigation District and the Sunnyside Valley Irrigation District, created a Joint Board of Control to address water quantity and quality issues. They hired a water quality specialist, began monitoring water quality, and are adopting new policies to change the way irrigation water is used and returned to the river.

"Roza and the Sunnyside District are doing an incredible job," said Coffin. "They are investing time and resources into real solutions that will benefit both agricultural and salmon interests in the watershed."

The districts understand that actions

they take to protect water quality can help stave off future listing of Endangered Species, Coffin said. Chinook and steelhead are already listed as "threatened," and more listings are looming on the horizon.

"Besides, cleaning up the silt helps the district's customers," said Coffin. "Most of the complaints we get about sediment pollution come from downstream farmers upset about silt clogging up canals, pumps, filters and sprinkler heads."

For their part, farmers are beginning to convert from furrow irrigation to water-conserving drip or sprinkler methods. This can be an expensive transition. However, not only do they save their soil, but with more precise water application, farmers can cut fertilizer and pesticide use significantly.

Ecology will be hiring two technical assistance and compliance educators ("ditchwalkers") to help farmers improve practices to reduce sediment. Ecology also has developed an electronic spreadsheet program that helps farmers analyze the costs for converting from furrow to drip irrigation.

For more information, contact Chris Coffin at 509/454-7860, e-mail ccof461@ecy.wa.gov.

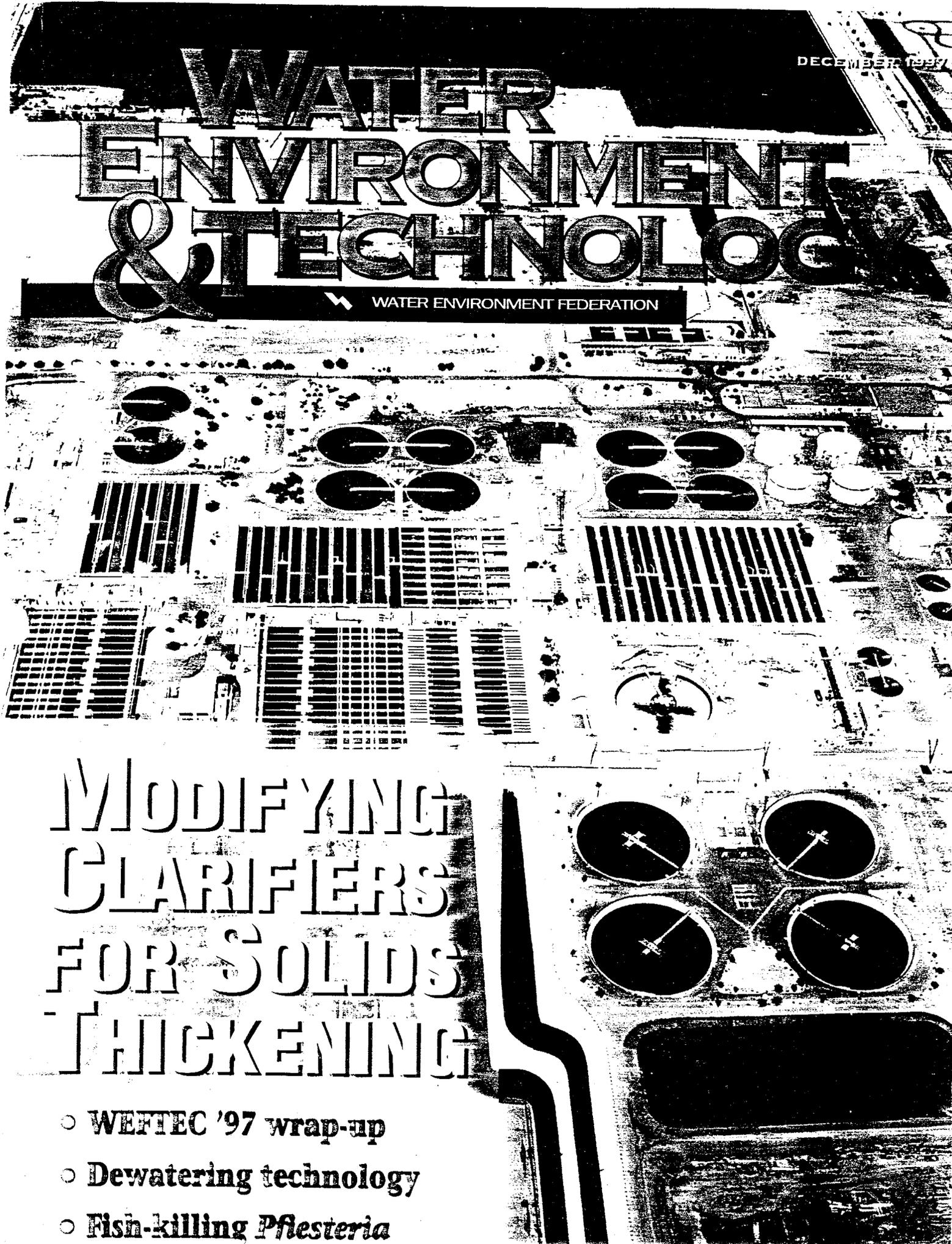
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hold point sources accountable only for their proportionate share of pollutant loadings and make other dischargers responsible for their pollutant loadings.

The second concern involved primacy of land use planning, or who determines the suitable uses for a property. According to Mancini, municipalities want the watershed alternative to include provisions ensuring that local authorities will maintain oversight in this

area. According to Hall, EPA has agreed to develop "strong language that will hopefully address the municipal caucus concerns."

Other issues that need to be resolved before a watershed alternative document can go forward include

- an environmental caucus request for more language about the benefit of addressing habitat restoration and flow impacts through a watershed approach.

- an environmental caucus concern about proposed language addressing temporary water quality standards, and
- an industrial caucus request to determine whether EPA has adequate legal authority and sufficient knowledge to regulate flow-related impacts.

According to Hall, states and EPA generally support the document in its current form.

—*Kellye Kratch, WE&T*

STATESIDE

Washington Encourages Farmers to Control Erosion to Yakima River

In an effort to reduce turbidity and dichloro diphenyl trichloroethane (DDT) concentrations in the Yakima River, the Washington State Department of Ecology is encouraging farmers to curb sediment runoff from their land by improving irrigation methods.

The action was prompted by *A Suspended Sediment and DDT Total Maximum Daily Load (TMDL) Evaluation Report for the Yakima River*, a Department of Ecology report that concluded the river's high turbidity level negatively affects fish habitats, and that river sediments contain high levels of pesticides, especially DDT. Samples of tissue from bottom-dwelling fish in the lower Yakima River indicate that DDT concentrations in the fish are among the highest in the nation, says Chris Coffin, coordinator for the Department of Ecology Yakima River water quality project. Although DDT was banned in 1972, the persistent pesticide is still present in high concentrations in soils of local farms.

According to the Department of Ecology, most pollution in the lower Yakima River comes from erosion of soil from farms. As a result, farm sediments and the pesticides that adhere to them must be reduced 75% to 95% in some major drains and tributaries to meet water quality improvement goals in Washington's TMDL evaluation report. Every 5 years, there is a different targeted goal for the river. The first goal

is to reduce river sediment so turbidity decreases to target levels at specified locations.

Tens of thousands of tons of topsoil erode from farms in the region during an average irrigation season, Coffin says. This erosion occurs, in part, because many farms still irrigate using an "ancient" rill-and-furrow method, which involves running water down plowed



The goal of the Washington Department of Ecology's Yakima River Suspended Sediment Project is to keep sediment-laden water from contaminating the river. Here, muddy water entering the river from the Granger Dam contrasts with cleaner river water.

channels between rows of crops. To fully saturate the soil, water is left running onto the upper end of the field and out the lower end for several hours, and sometimes days. Steep slopes, high volumes of water, and loose soils contribute to excessive erosion and sedimentation. "Much of this soil is contaminated with residual DDT and ends up in the river," he says.

One solution is to get farmers to switch to drip or sprinkler irrigation methods that are easier to control, use less water, and reduce or eliminate runoff, keeping DDT on the farms where it can undergo natural degradation, Coffin says.

Under Washington state standards, the lower Yakima River is designated a Class-A waterbody, meaning that it must meet or exceed the requirements for all or most uses including domestic, industrial, and agricultural water supply; stock watering; fish migration, rearing, spawning, and harvesting; wildlife habitat; recreation; sport fishing; boating; and aesthetics. Classified as an impaired waterbody, the river became subject to TMDL requirements.

"We are going to try to accomplish the cleanup goals without being prescriptive," Coffin says. "We are not being heavy-handed [or] imposing any requirements ... except that [farmers] not contribute to excessive sediment draining to the river." The Department of Ecology will help irrigation districts upgrade delivery systems, hold workshops to educate farmers about TMDL targets and goals, teach farmers about modern irrigation methods, and sponsor presentations by agriculture experts, researchers, and suppliers who will explain ways to improve irrigation, he says. Individual farmers can decide what changes to make in their irrigation and

water management practices to meet that requirement, he says.

"The Clean Water Act calls on [the Department of Ecology] to manage TMDLs with priority measures to point sources, when those point sources are identified as sources of the targeted pollutant, but we aren't doing this one that way because these pollutants are directly linked to agricultural runoff," Coffin says. Because this is a nonpoint source TMDL, he says, municipal and industrial wastewater treatment plant operators "should be relieved to know that they are not [affected] ... because we perceive them as having a fairly minor influence on the condition of the river."

The lower Yakima River TMDL plan is "a very important signal of the changing times, and shows that communities have more of an interest in water than just using it for irrigation," says Phil Shelton, communications director for the Yakima River Watershed Council, a

nonprofit organization comprising irrigators, industry representatives, environmentalists, and other stakeholders interested in water issues in the basin. However, he says, "it is just a plan [and] there is nothing to force irrigators to follow it." As such, the success of the TMDL depends on voluntary cooperation of landowners, because irrigation is "a private property issue," he says.

According to Coffin, the Department of Ecology has authority to enforce agriculture-related water quality complaints, and usually refers violators to their appropriate conservation district or Natural Resources Conservation Service (NRCS) office for technical assistance. "We may require a farm plan that follows NRCS specifications," he says. "If the offender is still recalcitrant, we can levy fines. We have in the recent past and we may have to again, but our goal is keeping water clean ... not adding to a farmer's woes."

Using enforcement as the primary tool to implement this TMDL would require addressing discharges from possibly thousands of farmers and hundreds of drains, one at a time, Coffin says. "This would require more resources than are now available, and would take more time than the river can afford," he says. "We'll take regulatory action where necessary, but we're confident that most growers will take the appropriate actions."

According to Shelton, most growers realize that they have a big financial stake in seeing water quality improve, and probably will cooperate with the TMDL limits. If the Department of Ecology is unsuccessful in generating improvements, he says, a federal court could step in and implement drastic measures that could be detrimental to farmers, such as requiring more water to stay in the river to protect beneficial uses, leaving less for irrigation.

—*Kellye Kratch, WE&T*



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Study Links DDT Contamination to Irrigation Runoff

The Washington State Department of Ecology (DEC) says that pollution in the lower Yakima River signals "major changes in water management for many farmers in the Yakima River basin."

The DEC made this conclusion in a report that identifies sediment and contamination from the banned pesticide DDT (dichlorodiphenyltrichloroethane). The report details the amount and sources of sediment and DDT released to the river during the irrigation season, and sets limits and a schedule for reducing those pollutants.

DEC said it will work with the Yakima Indian Nation and state, federal, and local agencies to identify the best and most cost-effective way to reduce soil erosion and runoff.

For a copy of the executive summary for the report, *A Suspended Sediment and DDT Total Maximum Daily Load Evaluation Report for the Yakima River*, call Chris Coffin, Yakima River water quality project coordinator, at 1-509-454-7860.

fund Project May

Protecting the Yakima River Valley

Conservation district and extension officials push harder for alternatives to rill irrigation in the valley

By TERRY DILLMAN

Capital Press Staff Writer

PROSSER, Wash. — Irrigated agriculture is the backbone of the Yakima River Valley economy. But 100 years of farming have taken a toll on the land and the river.

For the past decade, conservation district and extension officials have beaten the drums for change in the way farmers in the valley irrigate their crops. While the drum pattern remains familiar, its pace has quickened significantly.

Water quantity and quality will determine the future of agricultural practices — especially irrigation — along the river, said Bob Stevens, a soil scientist at Washington State University's Irrigated Agriculture Research and Extension Center near Prosser, Wash.

"Water supply and quality is becoming more and more critical, especially in the Yakima River Valley," Stevens said, referring to the Endangered Species Act and its fish listings, as well as the river's appearance on the nation's "most polluted" list.

"We must take steps to keep those fish species from telling us how to farm. And we must use better water and soil management to voluntarily clean up the river."

Growers and irrigation districts face serious challenges. Chief among them is soil erosion and the resulting sediment loads it adds to the river.

Soil disappears in seemingly small increments, said Pat Daly, manager of the Benton Conservation District. But those small increments — carried away in irrigation water — can add up to big losses. A foot or more of soil can erode from thousands of acres each year.

"It takes a few hundred thousand years to build soil," said Stevens. "But it took us just 50 years or so to lose two to three feet of it. It's amazing how much sediment brown water has in it."

He referred to an irrigation drain into the Yakima River near Granger, Wash. In 1995, the flow from the 17,000 acres the drain serves dumped 375 tons of sediment per day into the river. That sediment also carries chemical and fertilizer residues and manure from livestock operations.

To clean up the river and get it off the pollution list, that sediment load must drop to 37 tons per day — an 85 percent reduction. That's exactly what the Washington State Department of Ecology wants by 2017.

The main culprit is rill or furrow irrigation. Those little ditches between crop rows were the only means of getting water when irrigation projects first be-

gan to creep through the Yakima Valley. But they're much less efficient than sprinkler or drip irrigation methods.

"Drip irrigation is by far the most efficient," Daly said. "It's a way of spoon-feeding water to the crop. It uses less water and creates less runoff."

Stevens said rill irrigation at best is 40-60 percent efficient. Depending on wind effects, sprinklers are 85-90 percent efficient, while drip systems reach 90-95 percent.

"We have to change," said Stevens. "If we don't clean up the Yakima River voluntarily, the federal government will do it and send farmers the bill." Either way, farmers will pay.

An estimated 40 to 60 percent of the 400,000 irrigated acres in the U.S. Bureau of Reclamation's Yakima River Project is still under rill irrigation. Daly said farmers will pay up to \$1,000 per acre to convert to drip irrigation. And it's a management-intensive system.

"It takes a much more educated and well-trained labor force," said Daly. "But almost everything in agriculture demands intensive management these days."

Other solutions include holding/settling ponds and mixing polyacrylamides with the water.

PAMs are special polymers that bind around soil particles and hold them in the ditches or furrows. They also help keep soil pores open for better water infiltration. They can reduce erosion by as much as 90 percent. But they're only a stop-gap measure.

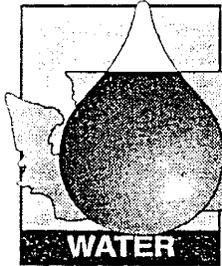
For some farmers, the economics simply don't justify switching from rill to sprinkler or drip irrigation systems. The federal government offers an incentive by providing some financial assistance to growers through the Environmental Quality Irrigation Program, which pays up to 70 percent of project costs.

Daly said the program had \$917,000 available for farmers in the Lower Yakima Valley this year. "It doesn't go very far," she said. "But it helps them put in that first system, try it out, learn it and find out what it can do."

Stevens said the time to act is now. "Furrow irrigation will continue for a while," he said. "But things will change sooner than you think. The pressures on agriculture will only get more severe."

He pointed to an Oregon law that says no water will leave farm fields beginning in 1998, and to California, where "water is going to the high bidder."

"It takes a certain amount of water to grow a crop, no matter what it is," said Stevens. "The big difference is in how we use the water. Changing to more efficient systems will use less water in wet years to store up for dry years, leave more clean water in the Yakima River and keep soil on the farm where it's making money for the farmer."



SVID rates increase

Earlier this month, the Sunnyside Valley Irrigation District (SVID) Board of Directors set 1998 assessments for beneficial use lands at \$54.50 per acre. This is a \$7.25 per acre increase from the 1997 total of \$47.25 per acre.

While this is the biggest rate increase for SVID customers in recent years, SVID District Manager Jim Trull feels it is a fair increase which is needed to help address water quality issues. "What we are trying to do is do something that will service [customers] well in future years," he explained.

The increase in cost is associated primarily with water quality planning and implementation.

"Water quality is going to be a big issue," commented Trull. Trull felt it was necessary for the SVID Board of Directors to take a proactive approach towards addressing water quality issues, especially involving the amount of sediment reaching the Lower Yakima River. "We got some significant challenges ahead," he said.

An assessment is the fee paid to an irrigation district to maintain the irrigation system and provide the opportunity to obtain irrigation water. Since an irrigation district is a not-for-profit entity, the assessment funds collected cover the cost of operation and maintenance as well as provide necessary reserve funds for future projects and emer-

gencies.

The annual assessments are set by projecting the cost of operation, maintenance, administration, together with capital projects and necessary reserves for the following year minus reserves from approved grants. The assessment charge for each parcel of land is then computed based on acreage.

SVID Board of Directors are taking a pro-active approach towards water quality in part due to the Endangered Species Act listings and the resultant recovery act programs which could reduce diversions for irrigation purposes. Under the Clean Water Act, the Washington State Department of Ecology has set the total maximum daily loading for the Lower Yakima River with goals to remove 90 percent of the sediment reaching the river within five years. This would include all drains and irrigation facilities which discharge into the river.

In order to address these concerns, SVID had to increase per acreage cost for the up-coming irrigation season.

The following is the breakdown of costs associated with the price increase:

- * SVID will hire a total of five additional employees, this will lead to an increase of \$3.25 per acre. Three employees will be working on drainage and water quality projects. One employee will be added for building and pump maintenance responsibilities and another employee will be added to work in the shop for metal fabrications which are related primarily to health and safety issues.

- * Funding of water quality programs and projects which include increased water quality monitoring, construction of settling basins, and habitat negotiations and restorations increased assessments by approximately \$2 per acre.

- * The need for such materials and supplies as chemicals, fuels, metals, rock and gravel increased assessment cost an additional \$1.25.

- * The Bureau of Reclamation has accelerated the storage operation and maintenance program which increased cost \$.75 per acre.

For further information on assessment rates for the 1998 irrigation season, customers are encouraged to contact the SVID office at (509) 837-6080

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Yakima irrigators must clean up act

By MIKE LEE
Herald staff writer

Yakima Valley irrigators better start cleaning up their river, the state Department of Ecology directed this week in a detailed report on water pollution.

Though fecal matter from dairy farms is disconcerting, the agency's investigation focused on DDT - a pesticide banned in the early 1970s - and sediment in the river.

It confirmed what earlier studies showed: The lower Yakima River is among the worst polluted stretches of river in the nation. High sediment levels and pesticides have long been endangering fish and threatening drinking water.

But the Ecology Department also called for what are being called major changes in how farmers irrigate land.

The report details how clean the river should be every five years until 2017.

As if that wasn't demanding enough, irrigators fear a handful of Yakima fish will make the federal endangered species list, thus intensifying efforts to keep the river clean - and costing a lot more money.

"We're living in a period of great uncertainty with the Endangered Species Act and the potential

listings hanging over our head," said Jim Trull, manager of the Sunnyside Valley Irrigation District.

"There is going to be a real strong focus on water quality like we haven't seen before. ... The irrigated agriculture community is going to have to step forward and make changes in the way we do our business."

A key area of change is rill irrigation, in which water is released at the top of a field to run down through the rows. The big problem in the Yakima Valley is the water returns to the river carrying loads of soil laced with long-lasting DDT.

Not all 340,000 acres of cropland in the Yakima Valley use rill irrigation - but enough farms use it that tens of thousands of tons of top soil are eroded from Valley farms each year, the Ecology Department reports.

"The soil is carried down the drains and ends up in the Yakima River. That's bad for agriculture, and it's bad for the fishery we're trying to restore," said Chris Coffin, Yakima River water quality project coordinator for the Ecology Department.

"There are irrigation practices being used that need to be seriously looked at. The farmer is throwing money down the drain, almost literally."

Years of study leave many convinced of serious problems in the Valley. Now agents like Coffin must convince irrigators it's their job to protect the river.

"I am hopeful that irrigators will be willing to look seriously at their methods of irrigation and consider changing," he said.

That won't always be easy. "Some of the cures will be relatively expensive." Coffin said.

But more efficient watering techniques can sometimes make up the cost of implementing them

in just one year, Coffin claimed. Besides, water return systems and other practices likely will allow careful rill irrigation to continue.

Phil Shelton, spokesman for the Yakima River Watershed Council, said improving the river will be done one irrigator at a time. "It's still the decision of the private landowner. He has to be in the position economically" to improve irrigation practices, or at least get grants to help make the change, he said.

Said Shelton, "The positive motivations are out there, but certainly the Endangered Species Act and the Clean Water Act listings are serious business and (irrigators) are well aware of that."

Well before the Ecology Department released its report, the Roza and Sunnyside Valley irrigation districts formed a joint panel to deal with water quality and quantity issues. "We recognize the need to be proactive," Trull said. "Our board has directed us ... not wait for some kind of enforcement action to take place."

Trull said the changes will mean increased rates for water users -though he doesn't think the additional expenses will be too bad. "There's no doubt it's going to cost us more money. ... That's going to be our challenge: to keep the cost from getting out of hand."

Irrigation districts are doing irrigator education campaigns, hiring people to monitor water quality and increasing the number of water samples they take. "We're doing some things we haven't done before, and that's obviously an additional expense," Trull said.

Coffin said the Ecology Department can issue fines for noncompliance - but it's hard to figure out who's at fault and just as hard to find known polluters. "We've got limited resources to track down every one of them."

Whatever happens, it will take quite awhile before the river recovers, Coffin said. "In 20 years, we hope to see very low levels of both DDT and turbidity, and hopefully (it will happen) very much sooner than that."

Trull calls the Ecology Department's sediment reduction goals "ambitious."

"And yet if you don't have the goals, you don't achieve a lot. ... It really will require some fundamental changes in the way we do business."

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Clean Water Act may be tough on Yakima, EPA official warns

By DAVID LESTER
Of the Herald-Republic

Compliance with the federal Clean Water Act could have substantial consequences on historic water use in the Yakima River Basin, an Environmental Protection Agency official said Wednesday.

Deputy Regional Director Chuck Findley said improving water quality in the lower Yakima River could mean, among other things, higher instream flows for fish and less water available for irrigation.

The lower stretch of the river below Sunnyside Dam at Parker has been included on a state Department of Ecology list of impaired and threatened waters because of high temperatures, suspended solids, low flows and fecal coliform bacteria.

The listing will require development of what is called a Total Maximum Daily Load plan to reduce pollutants to a level at which water-quality standards are met.

"It means that changes will have to be made to attain water quality standards and have fish," said Findley, a Valley native. "Because we have allowed the situation to deteriorate, the changes will be dramatic."

One possible element in a larger program to improve water quality could be adoption of newer irrigation technologies such as drip irrigation to

reduce the amount of runoff.

The lower river has long been a problem because of sediment loads from irrigation runoff and low flows resulting in increased water temperatures.

Also included on the state list of flow-impaired streams, a list that has been approved by EPA, are the tributaries to the Klickitat River, the Walla Walla River and the Wenatchee River.

Findley discussed water issues during an appearance before the Yakima River InterAgency Council, an organization of local, state and federal agencies formed to exchange information on policies and projects affecting the basin.

He said the federal agency has been under the gun to enforce the Clean Water Act as a result of citizen lawsuits in the federal courts challenging EPA's enforcement activities.

A federal judge in Seattle ordered the agency to prepare TMDL plans on 950 sections of water bodies within five years. The agency appealed the decision and now face completion of the task in eight years.

Findley said the initial spate of lawsuits filed under the Clean Water Act was filed in the four Northwest states. Since then, the litigation has expanded to 23 states across the country.

"The courts have been used effectively by citizens to get relief. I don't think that will stop," he said.

Irrigation blamed for poor Yakima River water quality

By TERRY DILLMAN
Capital Press Staff Writer

YAKIMA, Wash. — A Washington State Department of Ecology report on pollution in the lower Yakima River has called for major changes in methods Yakima Valley farmers use to irrigate their land.

The long-term goal is to restore the river's water quality so it meets state water quality standards.

"The lower Yakima River is among the most polluted stretches of river in the nation," said Chris Coffin, Yakima River water quality project coordinator. "The most obvious sign of pollution is the muddy water entering the river at the mouths of irrigation return drains and tributaries."

The agency's investigation focused on ways to reduce the threats to endangered fish and drinking water supplies. Rill or furrow irrigation, used on much of the lower Yakima Valley's 340,000 acres of cropland, is a key target.

During the irrigation season, Coffin said, such practices erode tens of thousands of tons of topsoil loaded with pesticide residues, and create unhealthy turbidity levels by choking the river with sediment.

"When that soil ends up in the Yakima River, it's bad for agriculture and for the fishery we're trying to restore in the river."

Sediments and particles can harm the respiratory systems of fish and aquatic insects, settle and clog spawning gravel or suffocate fish eggs and make it difficult for fish to migrate and find food. Farmland sediment also carries residual amounts of DDT and other pesticides.

"DDT was banned in 1972, but it was used so heavily that the soil has a lot of residue," Coffin said. "Tissue samples from bottom fish in the lower Yakima contain some of the highest concentrations of DDT in the nation."

The Clean Water Act requires the department to perform "total maximum daily load" analysis for contaminated waters like the lower Yakima that are on the 303(d), an "endangered species" list for rivers and streams.

TMDLs are estimates of the amounts of specific pollutants that a body of water can safely take in without threatening the water's beneficial uses such as swimming, fishing and irrigation.

The report — based on TMDL studies — blames poor irrigation water management for most of the sediment load. Eroded soils from farms that still use rill or furrow irrigation, especially on steep ground, move into the river via irrigation return drains.

Control of suspended sediment generation and transport during the irrigation season, the study con-

cluded, will result in far-reaching water quality and fish habitat improvements in the Yakima Basin.

"Eliminating or minimizing tail water runoff will reduce or eliminate both sediment transport and pollutants," Coffin said. "We hope that by finding a cure for these two problems, we will find a cure for others."

Recommended actions include switching to drip or sprinkle irrigation; adding on-farm retention ponds, sediment basins or pump-back basins; and more careful management of water flow onto and away from the farm.

A few short-term fixes are also under consideration. One of the most promising is the use of a polymer in irrigation water that binds the soil together and facilitates water absorption for greater efficiency.

"It's a little more labor-intensive, but a lot of farmers are trying it," Coffin said.

More labor usually means higher production costs, and most of the recommended remedies carry hefty price tags.

"Irrigation is a business," said Phil Shelton, spokesman for the Yakima Valley Watershed Council. "Farmers must be able to justify any changes economically."

The key is active involvement and participation in the process and cooperation among individuals and groups who often squabble over river use. According to Shelton, the Roza and Sunnyside Valley irrigation districts already have formed a joint panel to deal with water quality and quantity issues. Among other things, they're conducting irrigation education campaigns and hiring people to monitor water quality.

Such changes likely will mean higher rates for water users. But inaction could cost even more. Just a few Yakima fish on the endangered species list would intensify efforts to clean up the river and keep it clean.

Actions initiated under the Clean Water Act or Endangered Species Act give little or no choice to private landowners, regardless of the associated costs, officials said.

Under the Clean Water Act, the Department of Ecology already answers water quality complaints and follows up on them. They can require growers to set up a farm plan according to NRCS specifications and can levy fines for failure to comply. Voluntarily working to meet water quality goals can stave off what Coffin called additional "prescriptive measures."

Whatever methods are used, the river's recovery is a long-term project. The sediment reduction goals are on a 20-year timeline in five-year increments.

"Even if we cure the ills of ir-

rigation drainage, it will take that long just to flush all the sediment out of the river," said Coffin.

He said he's confident the valley's farmers can meet the challenge. In 1994 — a very low water year — some growers were unable to get water, while others were very careful with what they did get.

TMDL analyses during the irrigation season showed sediment reductions close to the target levels set for the first five-year phase of this new project.

"If they can do it in a low water year, they can do it now," Coffin added.

Shelton said the focus on water quality will only grow stronger. And water quality begins with on-farm practices.

"Topsoil is money," Coffin said. "Topsoil is the farmers' livelihood. It doesn't grow like a crop.... To waste it by washing it away is flushing away their future."

Water management ²³⁷³ changes signaled by report

A long-awaited report on pollution in the lower Yakima River has been released by the Washington State Department of Ecology, signaling major changes in water management for many farmers in the Yakima River basin.

The report identifies sediments and the associated pesticides and DDT released to the river during the irrigation season, and sets limits and a schedule for reducing these pollutants. The goal is to restore the quality of the lower Yakima River water so that it meets state water quality standards.

"The most obvious sign of pollution in the lower Yakima is the muddy water entering the river at the mouths of the irrigation return drains and tributaries," said Chris Coffin, Yakima River water quality project coordinator.

see "Water management" page 2

Sunnyside, WA
(Yakima Co.)
Daily Sun News
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□ Water management

continued from page 1

"Our sampling indicates tens of thousands of tons of top soil are eroded from Valley farms during the irrigation season. The soil is carried down the drain and ends up in the Yakima River. That's bad for agriculture and it's bad for the fish that we're trying to restore in the Yakima.

"Sediment from farmland also carries with it residual amounts of the banned pesticide DDT. Tissue samples of bottom fish in the lower Yakima have among the highest concentrations of DDT in the nation," Coffin said.

The new report is named "A Suspended Sediment and DDT Total Maximum Daily Load Evaluation Report for the Yakima River."

Total maximum daily loads are estimates of the amount of the specific pollutants that a body of water can safely take without threatening the beneficial uses of the water such as stock water, irrigation, fishing, swimming and aesthetic enjoy-

ment.

Sediments and "suspended solids" harm the respiratory systems of fish and aquatic insects.

Ecology, Yakama Indian Nation and several other state, federal and local agencies now will work together with growers to identify the best and most cost-efficient ways to

reduce soil erosion and runoff from farms.

According to the report, most of the sediment is eroded from farmland by poor irrigation water management and is carried back to the river through irrigation return drains.

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Editorials

River pollution still chronic woe

While attention often is focused on quantity of water in the Yakima River Basin — whether it be droughts or floods and how to deal with them — we were graphically reminded once again this week that water quality is also of paramount importance.

A state Department of Ecology report tells us something we've always known: The Yakima River is polluted to unacceptable levels, with a main culprit being soil erosion. Fortunately, the report also offers a blueprint for doing something about the problem: an ambitious, 20-year goal for meeting federally mandated water-quality standards.

Our hope is that this plan will be an action one. Water quality reports of one type or another have been routinely produced over the years, and pollution is a problem that still eludes satisfactory resolution.

The latest report concludes that major improvements in irrigation water-management practices will be required to meet standards in the federal Clean Water Act. Meeting the state goals, in some cases, will require as much as a 93 percent reduction in the amount of sediment entering the river from the larger drains.

With the sediments comes persistent pollution from the banned pesticide DDT, the report said, with fish samples having among the highest concentrations of DDT anywhere in the nation. The pesticide is still being detected 25 years after the federal Environmental Protection Agency banned the product because of adverse effects on birds. Here's a classic example of the fact that you don't get rid of a problem just because you ban it.

However, it would be unfair to imply that nothing has been done about Yakima River pollution problems in years past. The Natural Resources Conservation Service has been working with farmers for years on a voluntary basis to modify irrigation techniques to reduce runoff. Some of those techniques include installing drip irrigation in place of furrow irrigation to reduce runoff.

Despite improvements through voluntary actions by farmers using state and federal assistance programs, sediments and DDT remain the most significant pollutants in the Yakima River Basin. Obviously, more help is needed to take the search for a solution to a new level. To that end, state and federal officials will be working with the local agricultural community and irrigation districts on educational and technological programs, both on and off the farm.

Much has been done to address the pollution problems in the Yakima River, but even more remains to be done. The Yakima River is the lifeblood of this Valley. While this latest report is helpful, the future integrity of the river is best achieved and protected by not only a new awareness, but a new commitment that we can, and must, do better by it.

FOCUS



Quality of life

Members of the Yakima Herald-Republic editorial board are Charles C. Cochrane Jr., Bill Lee and Karen Troianello.

Safer water

Ecology plan sets goal for compliance with federal standards

By DAVID LESTER
Of the Herald-Republic

A state Ecology Department report on the causes of pollution in the lower Yakima River sets an ambitious, 20-year goal for meeting federally mandated water-quality standards.

The report, which irrigators and soil-conservation agencies have been awaiting, concludes that major improvements in irrigation water-management practices will be required to meet standards in the federal Clean Water Act.

Meeting the state goals, in some cases, will require as much as a 93 percent reduction in the amount of sediment entering the river from the larger drains.

So significant is the erosion of soil from irrigated agriculture that five major drains between Yakima and Prosser contributed 251 tons of sediments to the Yakima River on a daily basis during the 1995 irrigation season.

In fact, the report said, the Moxee drain contributes more sediment to the Yakima River than does the Naches River, even though water volumes in the Naches River are 14 times that of the Moxee drain.

Other major drains are the Granger, Sulpher Creek and the Spring and Snipes creeks.

With the sediments comes persistent pollution from the banned pesticide DDT, the report said, with fish samples having among the highest concentrations of DDT anywhere in the nation.

The pesticide is still being detected 25 years after the federal Environmental Protection Agency banned the product because of adverse effects on birds.

Despite improvements that have been achieved through voluntary actions by farmers using state and federal assistance programs, sediments and the presence of DDT remain the most significant pollutants in the Yakima River Basin, the report said.

These pollutants have landed several reaches of the Yakima River on the state's list of rivers that fail to meet numerous state and federal water-quality criteria. Because of that listing, Ecology is required under the Clean Water Act to establish what is called a Total Maximum Daily Load analysis for the river.

The TMDL is the maximum amount of specific pollutants that can be present in a river without threatening other uses such as fishing, swimming, irrigation, aesthetic enjoyment and stock water.

Chris Coffin, Ecology project coordinator, said the agency will be looking to local citi-

Water/ Complex problem

■ Continued from 1C
methods.

The complexity of the problem, Coffin said, is enormous.

"We are going to start having some workshops to get farmers and growers together to talk to them," he said. "We will look for funds to either fund technical assistance for farmers or funds to go directly to on-farm improvements."

"We are looking for ideas of how this can be implemented and a schedule in which we have to show improvement," he added.

Coffin said the agency hopes to build on work already under way by Valley conservation districts, with assistance from the Natural Resources Conservation Service and irrigation districts in the Lower Valley.

Chris Johnson, an NRCS nutrient management specialist, said the agency has been working with farmers for years on a voluntary basis to modify irrigation techniques to reduce runoff. Some of those techniques include installing drip irrigation in place of furrow irrigation to reduce runoff. The agency also is working with dairy farmers on their waste-application practices to reduce the amount of nitrates in drains and rivers.

Johnson said the agency's activities have made a difference in the amount of sediments entering drains.

"There is a lot of water going through them and a lot of sediment. We are making headway on contaminants," Johnson said. "Obviously, it's not enough to say the water is to the standard that TMDL wants us to."

Johnson said the NRCS offers a program under which farmers can obtain federal financial assistance for water-management improvements. Farmers must

submit bids to participate with the maximum federal participation being \$50,000 over a five-year period.

Jim Trull, manager of the Sunnyside Valley Irrigation District, said water quality is a priority for the recently created Board of Joint Control involving SVID and the neighboring Roza Irrigation District.

"Our board believes it is better to move cooperatively to solve the problem than wait until there is rigorous enforcement. It is in our best interests to be good stewards of the water resources," he said.

Both districts drain irrigation water into the Granger drain. Trull said the erosion problems are the result of the more-severe slopes in the area and the fine soil textures that result in greater erosion.

In response, the two districts are installing basins in drains to allow the sediment to settle and are monitoring water samples to pinpoint the sources of pollution.

"There is a whole array of things we can do. We are trying to develop that water-quality program as soon as possible so our contributions will mesh with the goals of the TMDL program. We know it is coming," Trull said.

Editorials

Steelhead listing poses new challenge

Now that Washington state has experienced its first endangered-species listing of a wild fish, the situation can be viewed as both a wake-up call and a chance to learn from history.

The National Marine Fisheries Service has listed as endangered the steelhead run in the upper Columbia River. The agency also listed as threatened the steelhead run in the Snake River, which flows through southeast Washington from east of the Tri-Cities to the Idaho border. Yakima River steelhead, for now, are not included. The basin run is considered to be part of the middle Columbia River stocks and a decision on listing them is being delayed for at least six months. There has been a state-imposed ban on steelhead fishing in the Yakima River for several years.

At a news conference with several other state officials, Gov. Gary Locke said the listings could hurt various industries, including Eastern Washington hydroelectric-power producers, farmers, loggers and developers. However, the governor and other state officials also provided some needed focus on the issue by calling for a coordinated state effort to come up with a plan to protect the runs. A comprehensive state management plan will do much to head off further, more restrictive federal actions in the future.

The endangered designation means a severely depressed run is at risk of becoming extinct if nothing is done to protect it. A listing of threatened means runs are likely to become endangered in the foreseeable future. In either case, the situation calls for action and cooperation. A replay of the standoff between competing interests during the spotted owl controversy over forests and logging simply will not be in the best interests of dealing with the steelhead runs.

And needed action is **under** way. Locke said his staff already was working with Oregon Gov. John Kitzhaber, Idaho Gov. Phil Batt and California Gov. Pete Wilson in a new effort to restore wild steelhead runs. The four states have begun to develop steelhead-restoration plans modeled on Oregon's recovery plan for coastal salmon. State officials rightly point out that it is imperative that affected states get together and write their own steelhead-recovery plan rather than wait for the federal government to do it for them. It is an effort that should be conducted watershed by watershed, rather than have the federal government and the courts respond every time a particular activity is believed to pose a threat to the runs.

The Yakima Basin already has a leg up on such planning, as part of an overall water-management plan being drafted by the Yakima River Watershed Council. The council is a broadly representative group that is looking at all water needs in the basin, including fisheries, as part of the long-range Yakima River Basin Enhancement Project.

Such efforts will be critical to balancing the need to address Endangered Species Act concerns with the myriad of other competing water uses in any river basin. However, the question is not if such balance can be achieved, but how it can be done.

Contriving a cleanup plan

New state study provides information to deal with Yakima River pollution

By CRAIG TROIANELLO
of the Herald-Republic

Researchers say a new two-year study provides the groundwork needed to help clean up the lower Yakima River, which is so contaminated that health authorities warn against eating more than one serving of Lower Valley bottom fish per week.

For years studies have shown unacceptably high levels of the banned farm chemical DDT, other pesticides and fertilizers entering the river, with irrigation returns. The question was where and how to stop it.

After analyzing hundreds of water samples taken between Ellensburg and the Tri-Cities, state Department of Ecology officials believe they at last have the baseline data needed to craft cleanup plans.

Armed with the data, the agency can set specific targets for cleaning up discharges entering the river.

"We filled in gaps that allowed us to set very specific standards," said Ray Hennekey, an Ecology Department spokesman in Yakima. "Our goal is to bring the river back to meeting state water quality standards."

To reach that goal, however, some farmers may have to change their irrigation practices and water and crop management plans, said Mary Getchell, an Ecology Department spokeswoman in Olympia.

No specific recommendations have been developed, but among the possibilities are more drip irrigation systems, which reduce the volume of

they (farmers) should use ... they know their business better than we do," Hennekey said.

State Rep. Barbara Lisk, whose 15th District includes Lower Valley farmers and the Yakima River, said she would reserve comment until she sees the Ecology Department proposals.

"If they come in with good suggestions, I'm sure everyone will be interested," she said. "I just hope they look at costs and what is practical."

Lisk found it promising that Ecology Department officials want to work with soil conservation districts and others generally accepted by the farming community.

"If that's what they are aiming at, that's very encouraging," she said.

"There are no easy answers," said Sen. Irv Newhouse, also of the 15th District.

"Farmers are generally environmentalists and most of them do a good job," he said.

In the last several years, about 10 percent of the Valley's hop fields have installed drip irrigation lines, he noted.

Ecology Department sampling in 1994 and 1995 measured the volume of sediment being carried into the river. Attached to the sediment was DDT, other pesticides and oxygen-robbing nutrients from fertilizer, manure and failed septic systems.

Water carried by returns from Moxee and Granger area farms showed some of the highest readings.

At the Granger drain, one sample recorded a DDT level of 0.357 micrograms per liter. Ecology Depart-

RIVER MEETING MAY 14

GRANGER — A public meeting to inform and involve people interested in improving water quality in the lower Yakima River will be held from 7 to 9 p.m. Tuesday at Roosevelt Elementary School in Granger.

The meeting is sponsored by Washington State University, the South Yakima Conservation District, the state Department of Ecology and others.

Ecology Department officials will outline the findings of a new report detailing river pollution, such as how much pollution is reaching the Yakima River, and recommendations on what to do about it.

waste water leaving farms.

Rather than tell farmers how to run their operations, the Ecology Department wants to work with local soil conservation districts, the Yakima River Watershed Council, Washington State University's Cooperative Extension Service and other agencies that have partnerships with farmers, Hennekey said.

"We don't have any specifics. We know what is available and are collecting more data all the time. We don't want to prescribe what kind of technology

ment water specialist Joe Joy called that "a huge hit," noting even a reading of 0.001 micrograms can pose a health hazard for aquatic life.

"If we get a hit like that in a routine sample it causes us alarm for what is happening when we are not there," he said.

While DDT has been banned for more than two decades, it is slow to decay and often attaches itself to soil carried back to the river via irrigation returns. In especially low years, as much as 80 percent of the water flowing in the lower Yakima River comes from irrigation return systems.

In 1993, the U.S. Geological Survey reported DDT concentrations in fish between Yakima and Benton City were among the highest in the nation. The study prompted local health authorities to warn against eating more than one meal of bottom fish per week and to entirely avoid ingesting fish skin or drippings, where the chemical concentrates.

According to the USGS, eating 5 ounces of a whitefish or largemouth sucker from the lower Yakima River each week over a lifetime of 70 years corresponds to an increase in cancer risk of about 130 per 1 million people.

That compares to similar servings of rainbow trout captured in the relatively clean waters of the Teanaway River, which the USGS said poses a one in 1 million lifetime chance of contracting cancer.

Hennekey said the Granger reading is an anomaly but added, "We have a long way to go."

Quality, supplies key water issues

Can it finally be that after so many years of being one of the most studied rivers in the state — studies which invariably came to the conclusion the lower stretches of the Yakima River are among the most polluted in the state — we are moving to an action plan to do something about it?

Let's hope so.

As we move slowly, but surely, into a comprehensive Yakima River Basin Enhancement Project to conserve and supplement current water supplies, certainly water quality should be a critical element.

But as is the case with the overall enhancement project, the action phase should be carefully implemented through the cooperative efforts of both water quality people and water users.

After analyzing hundreds of water samples taken between Ellensburg and the Tri-Cities during the latest two-year study, state Department of Ecology officials believe they at last have the baseline data needed to draft cleanup plans. We won't even get into why it has taken so long, since for years researchers have known the lower Yakima River was collecting too much of the banned pesticide DDT and other contaminants.

Armed with the new data, Ecology is now in a position to set specific cleanup goals and targets. The transition to those targets will include working out plans with a large number of interested agencies and growers, such as soil conservation districts, the Yakima River Watershed Council and Washington State University's Cooperative Extension Service.

It is an extremely complicated issue to be sure. While return flows — that water that crosses the farm or orchard and is then returned to the river — is obviously a major source of pollution, any switch to irrigation methods that cut down on the return flow creates new problems. In low-water years, up to 80 percent of the usable water depends on return flows. Cut that amount through new drip irrigation techniques, for example, and you exacerbate a low-water problem.

That, of course, is one reason all those agencies — the watershed council in particular — who are involved in the enhancement project must be plugged in to the water-quality effort, too. Water quality must be closely tied to water supplies, with the latter increased through conservation and added storage capacity.

It's going to take a while to clean up the river and realize adequate water supplies in the basin. But we're at least finally headed in the right direction on all fronts.



Ag and Business News

Muddy waters concern local residents

BY KELLY ADAMS

Self employed Prosser resident Dale Cherry is concerned about what he sees going in to the Yakima River at the irrigation return drain up the river in Granger.

He may be right to be concerned. According to a Department of Ecology Report published this month, the Yakima River is seriously threatened by pollution. High suspended solids, turbidity, DDT, and other pesticides, high temperatures, and other kinds of pollution have been documented for several decades in the lower Yakima River.

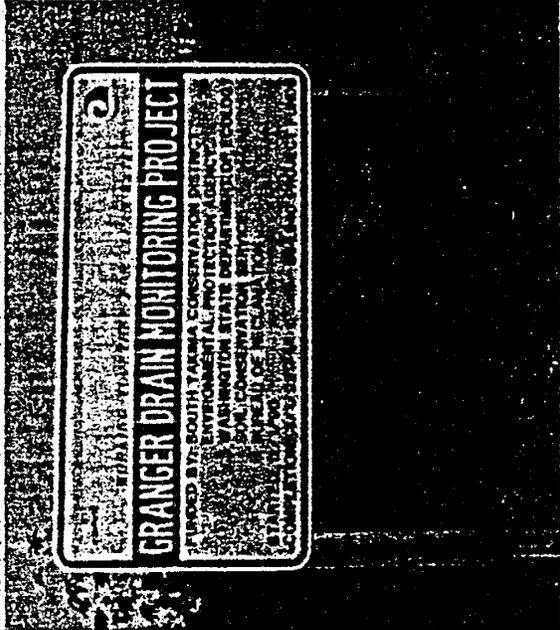
Rob Stevens is a soil scientist at the Washington State University Integrated Agriculture Research and Extension Center (IAREC) and a member of the Yakima River Watershed Council. He said the Granger Drain is one of many return flows that put water back into the Yakima River after it has been used for furrow field irrigation. Stevens said the reason the water looks muddy is because it contains clay and silt that has been eroded off of the fields.

"We do get a little bit of animal waste," he added. This usually occurs when manure is used to fertilize fields.

At the drainage site, there is muddy water entering the fairly clear water in the river. A definite distinction is visible between the water being pumped in and the river.

The Ecology report goes on to say the Washington State Department of Ecology is beginning a project to restore the water quality in the lower Yakima River.

"It shouldn't be that muddy," said Ray Henneke, coordinator for the lower Yakima River water quality project for Ecology. He said standards have been set for water quality called Total Maximum Daily Load (TMDL). These are estimates of the amount of pollutants a body



This sign marks the site in Granger where agricultural run off is being monitored by the Department of Ecology for the amount of pollution it contributes to the Yakima River. (Photo by Kelly Adams)

of water can safely take before the beneficial use is affected.

The Yakima River is classified as a Class A waterbody. The Ecology report said: "Class A waters must meet or exceed the requirements for all or substantially all uses. Class A uses include industrial and agricultural water supply; stock watering; salmonoids and other fish migration, rearing and spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and esthetic enjoyment." The report continues by saying because of pollution the Yakima River is currently not meeting those standards. Cherry said he first noticed a problem when he went to Granger to float down the river. The amount

both the mud at the bottom of the river and the soil on farmland. Turbidity is a term used to describe the clarity of the water. Mucky water is often caused by a high volume of suspended solids which are soil particles and other materials that are suspended in the water. In the Yakima River, those suspended solids are made up mostly of eroded soil. Turbidity can be harmful because the dark particles absorb sunlight which leads to higher water temperature. The higher water temperature prevents the migration of salmon and steelhead.

Even though Stevens has been working on the Yakima River project for three years he says, "I would drink the Yakima River Water anyway." Stevens continued by saying pollutants get into the water before the Granger site. Part of the work he is doing includes, "working with farmers to cut down on the amount of erosion."

Ecology is determining the TMDLs which they say will set the stage for controlling the pollution. The report said, "Since the pollutants of concern in the lower Yakima River are primarily from agricultural runoff, pollution control strategies for the Yakima will mostly involve identifying and scheduling best agricultural management practices that can be used to meet clean water goals for the Yakima River."

Ecology will be holding public events to provide information about what is being done in regards to Yakima River Water Quality. They will also provide speakers to address groups about water quality issues as well as helping to organize water quality projects for students and volunteers.

For more information, contact Ray Henneke at the Ecology Central Regional Office at 106 S. Sixth Street Yakima, Wash. 98901.

State designates \$11 million for 3 Mid-Columbia water quality projects

By JOHN STANG

Herald staff writer

The state has earmarked slightly more than \$11 million in water-quality-related grants and loans to Pasco, Royal City and the Benton County Conservation District this month.

Most of that money is expected to go to Pasco to help upgrade its sewage treatment system.

The rest is for preparing studies for a proposed Royal City sewage facility and to study some agricultural practices in northwestern Benton County.

Overall, the Washington Department of Ecology offered at least \$71.3 million in grants and loans to cities, counties and Indian nations this month for projects to protect and improve water quality.

The tribes, cities and counties must decide whether they want to accept the money on terms agreeable both to them and the state.

The state sorted through 209 applicants to award grants to 61 government agencies, and through 42 loan applicants to award 39 loans.

In the Mid-Columbia:

■ Pasco received a \$2.5 million grant and has been offered an \$8.4 million loan. The terms on the loan have not been settled, said Bob Alberts, Pasco's public works director.

So far, Pasco has received \$15.3 million in state loans at 3.5 percent interest to upgrade the sewage treatment plant and sewage systems. The \$8.4 million would bump the loan total to \$23.7 million, in addition to the \$2.5 million grant.

Pasco is trying to knock down the interest rates to 1 to 1.5 percent, arguing the city's low-median income and large sewer rate increases in recent years qualifies for the discounted rate.

The difference between the 3.5 percent rate and a 1 to 1.5 percent rate could be \$10 a month in a resident's sewer bill.

Overall, the city is tackling an estimated \$32 million worth of sewage system and sewage plant improvements, expected to be completed in 1997.

The city is seeking more grants to pay for that project, Alberts said.

■ The Benton County Conservation District has been offered a \$91,000 loan to study the relations

between farming practices and water quality either along Spring Creek or Snipes Creek. Both are north of Interstate 82 and west of Benton City.

The actual site is still being determined, said district manager Pat Daly. The site will be set when the loan's contract is nailed down within the next couple of weeks, Daly said.

The \$122,000 project is expected to begin in October and to last 18 months. The district will provide the remaining project costs with labor and equipment.

■ Royal City has accepted a \$174,000 loan to pay for designing a new sewage treatment plant. The town already has a \$75,000 state loan to study the area's ground water and geology.

Those studies will determine the design and scope of the new plant, which has a preliminary price tag of \$2 million to \$6 million, said John Lasen, Royal City's public works director.

The town has gradually increased its sewage rates in recent years in anticipation of this upgrade, he said. The project is expected to take three years.

FOR IMMEDIATE RELEASE

CONTACT: Ray Hennekey, (509) 454-7832
Mary Getchell, (206) 407-6157

April 6, 1995
95-46

WHAT'S THE POLLUTION IN THE YAKIMA RIVER, WHERE IS IT COMING FROM AND WHAT TO DO ABOUT IT?

YAKIMA, WA--Starting next week, the Washington State Department of Ecology will begin sampling lower Yakima River water quality, to begin answering questions about the source of pollutants that put the river on the state's "impaired waters" list. Ecology will also begin answering questions about what to do to prevent the pollution and improve the river's water quality. Ecology plans to take samples at 12 sites in the Yakima River bi-weekly from April to early October.

"This is a very important effort. The sampling will provide vital information that will help us better control the pollution that is going into the river," said Mike Llewelyn, Ecology's water quality program manager.

From April 10 through October, Ecology will be collecting samples from the Yakima River and selected tributaries and irrigation return drains. Sampling will start at the City of Yakima and end just upstream of Richland, where the Yakima meets the Columbia River.

Samples will be analyzed for the following pollutants:

- suspended sediments (particles in the water)
- turbidity (water clarity)
- pesticides
- dissolved oxygen
- pH (measure of acidity or alkalinity in water)
- nutrient levels and fecal coliform (bacteria in animal and human waste) temperature

All of these pollutants affect water supplies, fish and wildlife habitat, recreation and other important uses of the Yakima River. These pollutants have been found in excess of state water quality standards in previous state, federal and private studies. The standards provide a guideline establishing whether the water is safe for swimming, boating and fishing.

The results of the sampling will be compiled in a Total Maximum Daily Load Report. Total Maximum Daily Loads are the total amount of pollutants that a water body can take up from all sources and still meet state water quality standards. The report, which is expected to be completed in April 1996, will include information from the sampling about what and how much pollution is going into the lower Yakima River. It will also identify where the pollution is coming from and give recommendations about how to best control the pollution.

"We have evidence that the Yakima River has been polluted for decades. The results of the Total Maximum Daily Load process may mean that new technology, new management practices or other controls may have to be used to reduce the amount of pollution that is currently going into the river," said Llewelyn. "Protecting and improving the health of the river is critical because it is an important source of water for fish and wildlife, irrigated agriculture, fishing, boating, and other business and recreational uses."

- 30 -

NOTE: Opportunities to coordinate print photographs or broadcast taping of the sample collections can be coordinated by contacting Ray Hennekey (509) 454-7832 or Mary Getchell, (206) 407-6157.

Pollution Solutions?

*Yakima Herald-Examiner
4/11/93*

Yakima River study seeks ways to limit pollutants

By CRAIG TROIANELLO

Of the Herald-Examiner

Nationwide, there are few rivers as heavily altered by irrigation as the Yakima River.

Not only are copious volumes of water siphoned from the river to feed farms, but farm runoff also is returned to the river.

Carried along with the returning water are soils, pesticides and other pollutants. And on Monday, state Department of Ecology researchers fanned out across portions of the river, kicking off a new study aimed at eventually finding new ways to clean water returning to the river.

Study after study clearly has established the river is polluted. Waters that start crystalline in the Cascade Mountains degenerate in the Lower Yakima Valley to a murky condition that

falls far below state and federal standards.

"There is a lot of information out there. But it is fragmented," said Ray Hennekey, an Ecology Department spokesman.

"With this study we will have a bigger picture than we've ever had," Hennekey said.

A study released in 1993 by the U.S. Geological Survey showed concentrations of DDT in fish between Yakima and Benton City to be among the highest in the nation. The study prompted the Yakima Health District to issue warnings to limit the intake of Yakima River bottom fish to one meal per week and to avoid eating fish skin or drippings.

While DDT has been banned for more than 20 years, the pesticide takes long periods of time to decay. On farms, the chemical attaches

■ See RIVER, Page 2A



FAR LEFT: Department of Ecology employee Joe Joy measures the depth and flow rate of a drainage ditch in Granger. Some drainage ditches are being sampled because they could be significant sources of pollution in the Yakima River. **NEAR LEFT:** Barbara Patterson, an Ecology water-quality specialist, performs on-site testing with portable equipment.

(Staff photos by Gordon King)



Date 5/2/95
Paper Record-Bulletin
Topic Water Quality

Prosser, WA
(Benton County)
Record-Bulletin
(Cir. W.)

APR 12 1995

Yakima River pollution researched

2373
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swimming, boating, and fishing.

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River pollution is well-studied

Yakima Herald-Republic 4/12/75

If one single gallon of Yakima River water remains un-studied on its way to the Pacific Ocean, it is not because various agencies have not tried.

That is the problem the Yakima River Basin Citizens Committee hopes to begin to solve Saturday at a day-long meeting in the Yakima County Courthouse...

There are, the committee learned, in excess of 20 separate studies currently being undertaken in the Yakima River Basin by various local, state and federal agencies dealing with water-related problems.

—News item. *Yakima Herald-Republic*. April 17, 1975.

Nationwide, there are few rivers as heavily altered by irrigation as the Yakima River.

Carried along with the returning water are soils, pesticides and other pollutants. And on Monday, state Department of Ecology researchers fanned out across portions of the river, kicking off a new study aimed at eventually finding new ways to clean water returning to the river.

—News item. *Yakima Herald-Republic*. April 11, 1975.

Would we be judged skeptical if we said maybe researchers involved in this latest study of pollution in the Yakima River should just study the studies that have accumulated over the years? After all, we've known for years that the Yakima River is polluted. The question is, what do we do about it?

Ecology spokesmen say this study will be different, that the department acknowledges the many studies, but that the information is fragmented.

The Ecology Department wants to develop the most detailed data yet on what's entering the river, and results will be used to formulate recommendations on how to minimize pollutants.

Some groups, such as soil conservation districts, have long been active in programs to reduce soil runoff into the Yakima River. Working with farmers, dairy operators and others, the districts have helped implement drip irrigation and other systems that reduce waste and lower the rate of contaminants reaching the river.

The conservation districts have an action plan. Let's hope the Ecology Department does, too. Let this newest awareness result in something more than just another study that joins the accumulation of studies over these many years.

4-12-95
M. H. H. H. H. H.

State to examine sources of Yakima River pollution

By DONNA CAMPBELL
Lead Valley Bureau

YAKIMA — It's no secret the Yakima River is filthy. For years researchers have known about pesticides, rolls and other contaminants flowing through the river's dingy waters.

Now a state agency is working to pinpoint the sources of pollutants as a first step toward improving the river's water quality. The state Department of Ecology this week

licked off a six-month study of the lower Yakima River. Through October, water samples will be drawn every two weeks at 12 locations along the river's main stem and tributaries between Richland and Yakima.

"There are pollutants in the river and we're sampling to find out how much," said Mary Getchell, ecology spokeswoman. "For several years this has been a water body that has not met water-quality standards. The actual results of this study will

tell us how much (pollution) the river system can take." Specifically, the Yakima River is on the state's list of "impaired water bodies" — a condition mandating a test known as a "total maximum daily load report."

Similar studies of the Chehalis and Puyallup river systems prompted different recommendations for each community.

Getchell explained. In Chehalis — which was found to be high in pollutants — industries and municipalities were prohibited from discharging cer-

tain pollutants into the river during certain times of the year.

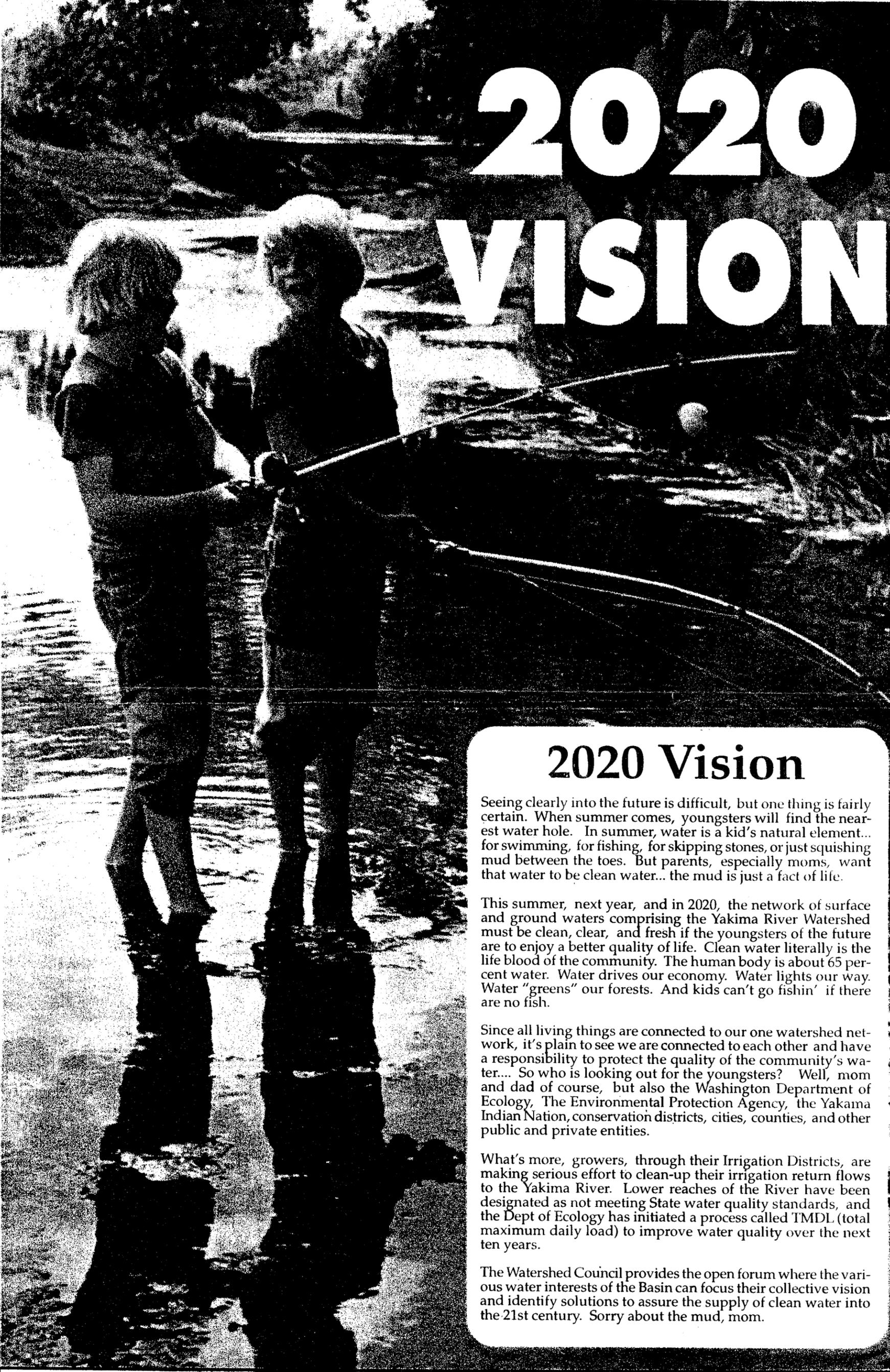
But in Puyallup, researchers reported the river had ample capacity for handling more pollutants, allowing the city to consider more residential and industrial development.

By next spring, ecology officials hope to have a draft report of similar recommendations for communities along the lower Yakima River. The \$302,000 study will identify where the pollution is coming from and offer suggestions about how to best control the pollution.

The Yakima River already is on the state's list of water systems failing to meet standards of the Clean Water Act. Farmers use the river to alternately draw and discharge water from oil from residential areas and effluent from industries, also impact the water quality, Fish and Wildlife.

Among the most common pollutants known in the river are a pool of sediments, pesticides, nutrients and dissolved oxygen.

Getchell said



2020 VISION

2020 Vision

Seeing clearly into the future is difficult, but one thing is fairly certain. When summer comes, youngsters will find the nearest water hole. In summer, water is a kid's natural element... for swimming, for fishing, for skipping stones, or just squishing mud between the toes. But parents, especially moms, want that water to be clean water... the mud is just a fact of life.

This summer, next year, and in 2020, the network of surface and ground waters comprising the Yakima River Watershed must be clean, clear, and fresh if the youngsters of the future are to enjoy a better quality of life. Clean water literally is the life blood of the community. The human body is about 65 percent water. Water drives our economy. Water lights our way. Water "greens" our forests. And kids can't go fishin' if there are no fish.

Since all living things are connected to our one watershed network, it's plain to see we are connected to each other and have a responsibility to protect the quality of the community's water.... So who is looking out for the youngsters? Well, mom and dad of course, but also the Washington Department of Ecology, The Environmental Protection Agency, the Yakama Indian Nation, conservation districts, cities, counties, and other public and private entities.

What's more, growers, through their Irrigation Districts, are making serious effort to clean-up their irrigation return flows to the Yakima River. Lower reaches of the River have been designated as not meeting State water quality standards, and the Dept of Ecology has initiated a process called TMDL (total maximum daily load) to improve water quality over the next ten years.

The Watershed Council provides the open forum where the various water interests of the Basin can focus their collective vision and identify solutions to assure the supply of clean water into the 21st century. Sorry about the mud, mom.

Connect With The Yakima River Watershed Council

402 E. Yakima Avenue, Suite 510

Yakima, Washington 98901

(509) 576-9042

Fax (509) 576-8666

APPENDIX 18

LOWER YAKIMA RIVER SUSPENDED SEDIMENT TMDL

Yakima River TSS & DDT TMDL Data Files

This CD contains the most essential water quality data used to evaluate the Yakima River TSS and DDT problem as discussed in the TMDL document, "A Suspended Sediment and DDT Total Maximum Daily Load Evaluation Report for the Yakima River". The data are in the original ACCESS Database and EXCEL file formats. The following is a brief description of the files and what they contain.

Data.mdb	ACCESS database Contains all the Ecology data collected in 1995 from the TMDL surveys. Included are USBR discharge and Yakama Indian Nation cooperative data. Tables and Queries are self-explanatory.
Rawdata.xls	EXCEL workbook Contains the 1994 Ecology data collected in the lower and upper Yakima basins in preparation for the 1995 sampling effort.
QAR.xls	EXCEL workbook Quality Assurance field replicate data for the 1994 surveys.
QAPairs.wk1	Lotus spreadsheet Quality Assurance field replicate data for the 1995 surveys.
GS-doe.xls	EXCEL workbook USGS and Ecology TSS methods data and comparisons.
Trbtssbr.xls	EXCEL workbook USBR and Ecology turbidimeter comparisons.
Yin94dat.xls	EXCEL workbook Yakama Indian Nation water quality data collected in 1994 by YIN Environmental Programs staff.
Flow.zip	Winzip Instantaneous discharge measurements taken at water quality monitoring sites in the lower Yakima basin in 1995.
xsection.xls	EXCEL workbook USGS field data from their discharge sites on the main stem Yakima River used to create discharge to velocity relationships.

Sedddat-n.xls	EXCEL workbook USGS historical TSS data for main stem Yakima River sites.
stps.xls	EXCEL workbook Ecology discharge monitoring report data for point sources discharging to the Yakima River.
usbr.xls	EXCEL workbook USBR discharge data for the 1994 and 1995 irrigation seasons.
Q_and_TS.xls	EXCEL workbook 1995 TSS loading calculations.
SMPTOX3.exe	Model executable SMPTOX3 model used in the Yakima River evaluation. Model files (30 runs) have an ST3 extension.

Yakima River TSS & DDT TMDL Files
 Compiled 9/2/98
 Washington Department of Ecology
 Environmental Investigations and Laboratory Services Program
 Watershed Assessments Section
 Project Leader: Joe Joy
 phone: (360)407-6486
 email: jjoy461@ecy.wa.gov

Abridged items from this section include:

- **Yakima River Basin Water Quality Plan, Vols. I-IV;
Yakima Valley Conference of Governments, 1995.**

