

**AN ANALYSIS OF TWO WATER QUALITY PROBLEMS IN
THE JACOBY CREEK WATERSHED, CALIFORNIA**

by

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PREFACE

Two factors have encouraged Humboldt State University students to study the Jacoby Creek watershed. First, the watershed is relatively small and compact, yet exhibits a diverse range of topographic features and land uses. As a result, Jacoby Creek provides a small-scale example of many of the features and problems associated with larger river systems. This allows the problems to be studied on a more manageable scale. Secondly, Jacoby Creek is conveniently close to Humboldt State University, providing a field study site within minutes of the campus. Several master's theses and research papers have been written about the watershed. This paper will attempt to build upon the prior research and, hopefully, serve to provide inspiration for further studies centering upon Jacoby Creek.

This paper could not have been completed without the contribution of several key people, and they deserve mention here. Mr. Eric Schimps, Humboldt State University librarian, provided an extremely useful index to the Arcata Union newspaper. Mr. Mark Leonard, former planning director for the city of Arcata, provided advice and guidance for compiling the list of interviewees. All of the persons who consented to interviews are thanked for their time and candid comments. Professors Haston, Harper and Daniels showed exceptional patience. And, of course, this paper would never have been possible without the support of my family, Randy, Nina and Cindy.

I. INTRODUCTION

This case study examines and compares two water quality problems in Jacoby Creek, a watershed situated in Humboldt County, northwestern California (see Figure 1). During the 1970's and early 1980's urban development expanded from the metropolitan Arcata area into the unincorporated Bayside and rural Jacoby Creek communities. Two water quality problems arose; bacterial contamination from leaking septic tanks and stream sedimentation from land development and commercial logging activities.

The first problem, bacterial contamination from failing septic tanks, was the object of local controversy. This was due, at least in part, to the direct intervention of a state administrative agency, the North Coast Regional Water Quality Control Board (RWQCB).

The second problem, the degradation and loss of salmonid habitat in Jacoby Creek due to excessive sedimentation, received considerably less public attention. Despite the apparent lack of public interest in this problem, stream surveys and studies by various researchers during the same period noted a continuing deterioration of the ecological values of the creek. The state administrative agency empowered to preserve and protect streams and fisheries in California, the Department of Fish and Game (Fish and Game), recognized the problem but did not act to correct it.

The two problems will be examined from an interdisciplinary perspective. Studies of natural systems apply scientific research methods to test stated hypotheses, sometimes with the intention of "separating out" human influences. An example of this kind of analysis is the appraisal of the contamination of a water supply. In contrast, the management of natural systems places a value upon them as

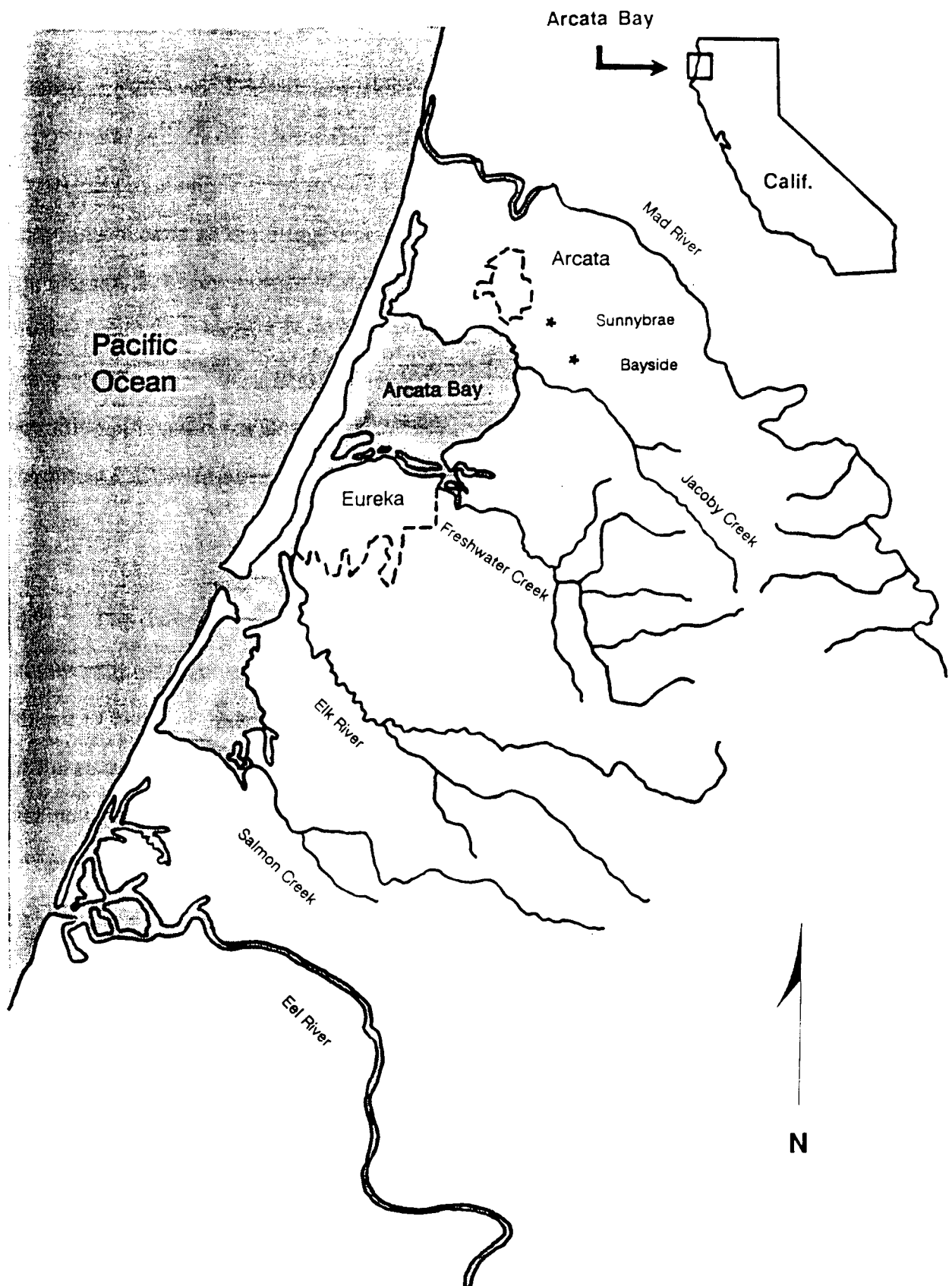


Figure 1: Location of Arcata Bay

natural resources. The values placed upon these resources are derived from economic, geographic, social and political factors. As a result, the study of natural resources management includes, by definition, the study of human activities such as conflicts between competing interests, conflict resolution and decision making processes. A basic premise of this paper is that an analysis of the management of water quality in Jacoby Creek must examine these interactions. Concepts from diverse subject areas such as land use planning, public administration and water quality management will be applied to compare and contrast the two water quality problems. This, in turn, will illustrate the similarities and differences between the two state administrative agencies.

Purpose

The fundamental question raised in this study is, "How do the contrasting levels of intervention in, or management of, these two water quality problems in the Jacoby Creek watershed reflect the roles, objectives and effectiveness of the two administrative agencies." The purpose of this case study is to answer this question by examining, comparing and contrasting the two water quality problems in Jacoby Creek.

Methodology

A case study format is used in this investigation to allow for the broad research scope needed to integrate the diverse subject areas mentioned above. This study can be characterized as applied, descriptive and chronological research for the following reasons respectively:

1. It is relevant to action or policy needs;
2. It provides answers to who, what, where, when and how questions; and

3. It involves situations in which the time sequence relationship is clearly a critical factor.¹

The research methodology for this case study consisted of a literature search supplemented by elite interviewing. A chronology of events, facts, issues, individuals and organizations pertaining to the case was developed from archives of the Arcata Union and Eureka Times-Standard newspapers at the Humboldt State University Library. Information from these news sources was supported and verified by additional sources, such as Master's theses and senior projects of Humboldt State University students, environmental impact reports, and administrative agency reports, publications and files.

Elite (or specialized) interviewing is a research method in which key individuals directly involved with or important to a case are interviewed personally. This interviewing method was used to clarify issues and viewpoints important to the case, and to explain the reasons for the actions and decisions undertaken by the parties involved in the case. A list of eight interviewers was compiled which represented each principal government agency and interest group (see Appendix A). Interviews were conducted as prearranged, informal meetings. For each interview a unique set of interview questions was prepared in advance. These questions were used throughout an interview to keep the topic from straying off the subject, and as an outline reference when interview notes were written up immediately following an interview. Interviewees were told at the beginning of an interview their comments were for inclusion in a Master's thesis.²

¹C. William Emory, Business Research Methods, (Homewood, Illinois: Richard D. Irwin Inc., 1980), pp. 7, 462.

²Lewis Anthony Dexter, Elite And Specialized Interviewing, (Evanston, Illinois: Northwestern University Press, 1970).

One perceived limitation of descriptive research is a failure to apply the scientific method of testing a stated hypothesis. Dubin has answered this criticism as follows:

Descriptive research ... develops the units that compose theories... The very essence of description is to name things... The more adequate the description, the greater is the likelihood that the units derived from the description will be useful in subsequent theory building.³

One strength of elite interviewing is that it ensures direct input by key individuals, but its use presents potential problems with accuracy. Statements made by interviewees concerning past events can reflect changes in judgment and viewpoint developed subsequent to the events in question. There are also problems with attempting to generalize the behavior of an organization, such as an administrative agency, by extrapolating from the behavior of individuals within the organization. The general behavior of an organization can be described, but the organization is a composite of many individuals, policies and levels of interaction. Within the organization, political and social relationships are in a state of constant change. Characterizations of past relationships and behaviors may not accurately describe the status quo. This study will handle these various problems by giving precedence to information documented consistently by independent, written sources. The theoretical framework used to analyze this case is introduced in the following section.

Literature Review

One purpose of this section is to introduce basic concepts from water quality management, community planning and public administration which will be useful in analyzing the Jacoby Creek case. A second purpose is to show that other

³Robert Dubin, Theory Building, rev. ed., (The Macmillan Co., 1978), quoted in Emery, Business Research Methods, pp. 7, 8.

communities have experienced water quality management problems similar to those experienced in Jacoby Creek.

Water Quality Management

Water quality is defined as the physical and biological properties of a water resource. The commonly used parameters of water quality, which are of importance here, are fecal coliform, suspended sediments, dissolved oxygen, and temperature. These are measures of the potential for contamination by disease carrying bacteria, clarity, oxygen content, and heat of the water, respectively. Fecal coliform is useful in estimating the extent to which waters are contaminated by human or animal wastes. Similarly, suspended sediment is used to indicate the degree to which a stream is disturbed by inputs of silt and sediment. Dissolved oxygen and temperature are used to measure the ability of a stream to support fish life, especially salmonid species such as trout and salmon.

Water quality management is the endeavor in which society seeks to allow consumptive uses of a water resource at an acceptable price level while at the same time ensuring a similarly acceptable level of protection for the physical and biological qualities of those waters. The consumptive use may be to provide drinking water or to discharge a wastewater. The limiting conditions of acceptable price and acceptable protection of water quality force water quality managers to deal with values which are economic, geographic, social and political in nature. In addition, water quality managers must seek to balance the perceived risk to public health presented by a contaminated water resource with the cost of mitigating that risk.⁴ The likelihood that a society will treat its water supplies to remove contamination is dependent upon the ability of the society to pay for the removal of

⁴Robert Gearhart, Professor of Engineering, Humboldt State University. In lecture notes from Engineering 152: Introduction To Water Quality, January 1982. Personal files of Charles Frakes, Monterey, California.

the contaminant and the public perception that an acute health risk is presented by the contaminant. A threat to public health tends to outweigh a threat to the natural environment in terms of importance. When a society's ability to pay for treatment decreases, those contaminants perceived to present the greater acute health risk will be treated first. Protection of the public health, protection of the environment and ability to pay were all important factors in the controversy surrounding water quality problems in Jacoby Creek. The fecal coliform problem was primarily a public health problem, and the sedimentation problem was and continues to be primarily an environmental one.

Land Use Planning

Geographers recognize that cities and towns develop as urban centers which tend to expand outward into surrounding rural areas. The zone where urban development encroaches onto previously rural land is called the urban fringe. Tabors et al. cite three technological infrastructures which are prerequisite for urban development in the United States. These are, in order of importance, roads, water supply, and sewerage.⁵ One of their fundamental observations is that roads and water supply are developed well enough in most parts of the country that sewerage has become the prime determinant for new development. The significance of this is that as communities attempt to develop plans for future growth in General Plans, the placement of sewer pipes tends to determine the actual location of subsequent development. The high fixed costs and long design-life of sewer systems encourage local governments to reduce costs by preventing extensions of sewers into rural areas with low density population or a low tax base.

⁵Richard D. Tabors, Michael H. Shapiro, and Peter P. Rogers, Land Use And The Pipe, (Lexington, Mass.: D. C. Heath and Company, Lexington Books, 1976), p. 4.

In a study in Newcastle County, Delaware, Goehring and Carr found individual septic systems to be characteristic of subdivisions around the urban fringe. The use of septic systems was found to encourage larger lot sizes and scattered, low density occupancy. In areas where failing septic systems tended to create ground and surface water pollution problems, costly relief sewer projects were necessary.⁶ Local communities were faced with the following problem. Sewers are costly and tend to fix patterns of development in localized areas, and septic systems tend to scatter and limit development. Yet, failing septic systems create a need for costly sewer projects. Goehring and Carr also noted that in high income areas on the urban fringe public sentiment was in favor of septic systems since sewerage charges were perceived to represent an unwanted government intrusion into private life. In addition, a feeling was expressed by the public that local government would assume the cost of sewerage should it prove to be necessary. Whereas Goehring and Carr focused upon geographic relationships and land use patterns associated with the placement of sewers and septic tanks on the urban fringe, the Jacoby Creek case provides an opportunity to examine how these relationships influence political, economic and social interactions within a particular community. Within Jacoby Creek the fecal coliform problem polarized the community into a choice between sewers and septic tanks, between development and exclusivity.

⁶Darryl R. Goehring and F. Robert Carr. "Septic System Problems On An Urban Fringe," Journal Of The Water Resources Planning And Management Division, American Society Of Civil Engineers, 106 (March 1980): 89-103.

Public Administration

Kramer defines politics as "the conflict resolution process by which power is employed to affect whether and how the government will act on any given matter."⁷ In order to influence government actions effectively, groups of people with common interests organize into interest groups and establish themselves as the clientele of an agency regulating specific policy areas. This creates a network of political relationships between administrative agencies, interest groups, and their elected governmental representatives.

Five factors which influence the strength and intensity of these relationships are:

1. Arenas of interaction
2. Issue visibility
3. Policy types
4. Agency maturity
5. Agency mission

Kramer identified five basic arenas of political interaction and ranked them in terms of their level of visibility to the public.⁸ In descending order, they are the constitutional, judicial, electoral, legislative and administrative arenas. It is important to note the administrative arena is considered to be the lowest arena of interaction with the least visibility. This is the arena of interaction within which most of the Jacoby Creek case was played out.

Ripley and Franklin classified policies implemented by administrative agencies into general types. For instance, a "distributive" policy is:

aimed at promoting private activities that are thought by their supporters to be desirable and beneficial to society as a whole, and, at least in theory, to be activities that would not be undertaken without governmental intervention in the form of assistance. The assistance is provided in the form of subsidies, which are payments of some kind

⁷Fred A. Kramer, Dynamics Of Public Bureaucracy, 2nd edition. (Cambridge, Mass.: Winthrop Publishers, 1981), p. 27.

⁸Ibid., p. 28.

(not necessarily just straight cash) that induce individuals and groups to undertake the desired activity.⁹

In contrast "protective regulatory" policy is:

designed to protect the public by setting the conditions under which various private activities can occur... The objects of protective regulation usually perceive themselves to be in an adversary relationship with those proposing the regulation... Protective regulatory policy can both prevent certain types of activity and require others in explicit terms... There is a large element of instability in the political coalitions involved as policy positions change.¹⁰

By analogy, distributive policy and protective regulatory policy can be thought of as the "carrot and stick."

Another factor which may influence these relationships is the agency's relative state of maturity. Kramer characterized the four stages in the organizational life of an agency as gestation, youth, maturity and old age.¹¹ During the gestation period the political forces favoring an agency build up in response to some initial, defined need. This is often supported by a broadly based coalition of potential beneficiaries. During the youth stage the agency attracts active people who are interested in carrying out the mandate of the new agency. This is a period of aggressive regulation. The attitude of the personnel becomes less confrontational during the maturity phase, and the regulated parties begin to develop clientele relationships with the agency. By the old age phase the agency actually becomes protective of the groups they are supposed to regulate. It is not suggested that all agencies do, in fact, pass through all of these phases in sequential order. The scheme does provide another useful means of describing the relationships between interest groups and administrative agencies.

⁹Randall B. Ripley and Grace A. Franklin, Bureaucracy And Policy Implementation, (Homewood, Ill.: The Dorsey Press, 1982), p. 70.

¹⁰Ibid., pp. 73-74, 132-133.

¹¹Kramer, Dynamics Of Public Bureaucracy, pp. 41-43.

In the Jacoby Creek case the Regional Water Quality Control Board represented a young, aggressive agency with a well defined mission to protect water quality, and a large fund of sewer grant monies to entice the regulated parties into compliance. The Department of Fish and Game represented an older, less aggressive agency faced with a relative lack of funds for correcting water quality problems.

Section 208 Planning

The relationship between water quality management, community planning and public administration was demonstrated by Wehbring, who examined institutional problems in the water quality planning process in urbanizing areas in the Pacific Northwest, encompassing twelve cities in four states.¹² Wehbring's study focused upon planning processes which were mandated by section 208 of the Federal Water Pollution Control Act. The law emphasized water quality management on a regional level, with the intention of drawing together the communities surrounding urban centers to reduce the number of treatment facilities built using federal funds. Obstacles to wastewater management efforts identified by Wehbring were:

1. Public opposition to increased water quality costs;
2. Land use and urban growth controversies;
3. Political aspects of annexation and incorporation;
4. An existing multiplicity of small sewerage districts;
5. Lack of public understanding of water quality problems;
6. Fragmentation of authority for land use and facility planning;
and
7. An absence of adequate codes and enforcement for protecting water quality.

The Jacoby Creek fecal coliform problem arose from the failure of a section 208 regional sewerage plan proposed for the Humboldt Bay area during the late

¹²K. Wehbring, Institutional Problems Of Water Quality Planning In Urbanizing Areas In The Pacific Northwest. (San Francisco: Dornbusch and Company, Inc. [1980]), p. 2.

1970's. Institutional obstacles such as those noted by Wehbring contributed to the failure of the Humboldt Bay regional plan, leaving communities such as Jacoby Creek to deal with wastewater problems on their own. This study will demonstrate how these institutional problems worked to create administrative and political problems within the Jacoby Creek community. Before applying these concepts to the Jacoby Creek case, it is first necessary to provide some geographical and environmental background.

Physical Description

Jacoby Creek is a small stream which has its headwaters on the northwest flank of Kneeland Ridge. The creek drains a watershed of 17.4 square miles, while flowing into the northeastern portion of Arcata Bay (see Figure 2). Watershed elevations range from sea level at Arcata Bay to 2,388 feet above sea level at Kneeland, resulting in an average stream gradient of 3.7 percent.¹³ The creek and its tributaries have a characteristic dendritic drainage pattern, with steeper gradients in the upper portion of the watershed and a less steeply inclined mainstem flowing through the lower portion. There are 26.5 miles of perennially flowing channels and 49.8 miles of intermittent tributaries.¹⁴

Overall, Jacoby Creek is a small watershed in which the steep upper portion is characterized by a number of very small, short, subparallel tributaries. This type of watershed geography allows runoff from rainfall to be collected and transported down the main channel of the stream very quickly.

¹³Norman H. Pillsbury, "Sediment Transport And Stream Flow Characteristics For Jacoby Creek, CA". (unpublished Master's thesis, Humboldt State University, 1972), p. 9.

¹⁴Allison Murray and Robert Wunner, A Study Of The Jacoby Creek Watershed, Humboldt County, California. (Arcata: Jacoby Creek Canyon Community, Inc., 1980), p. 11.

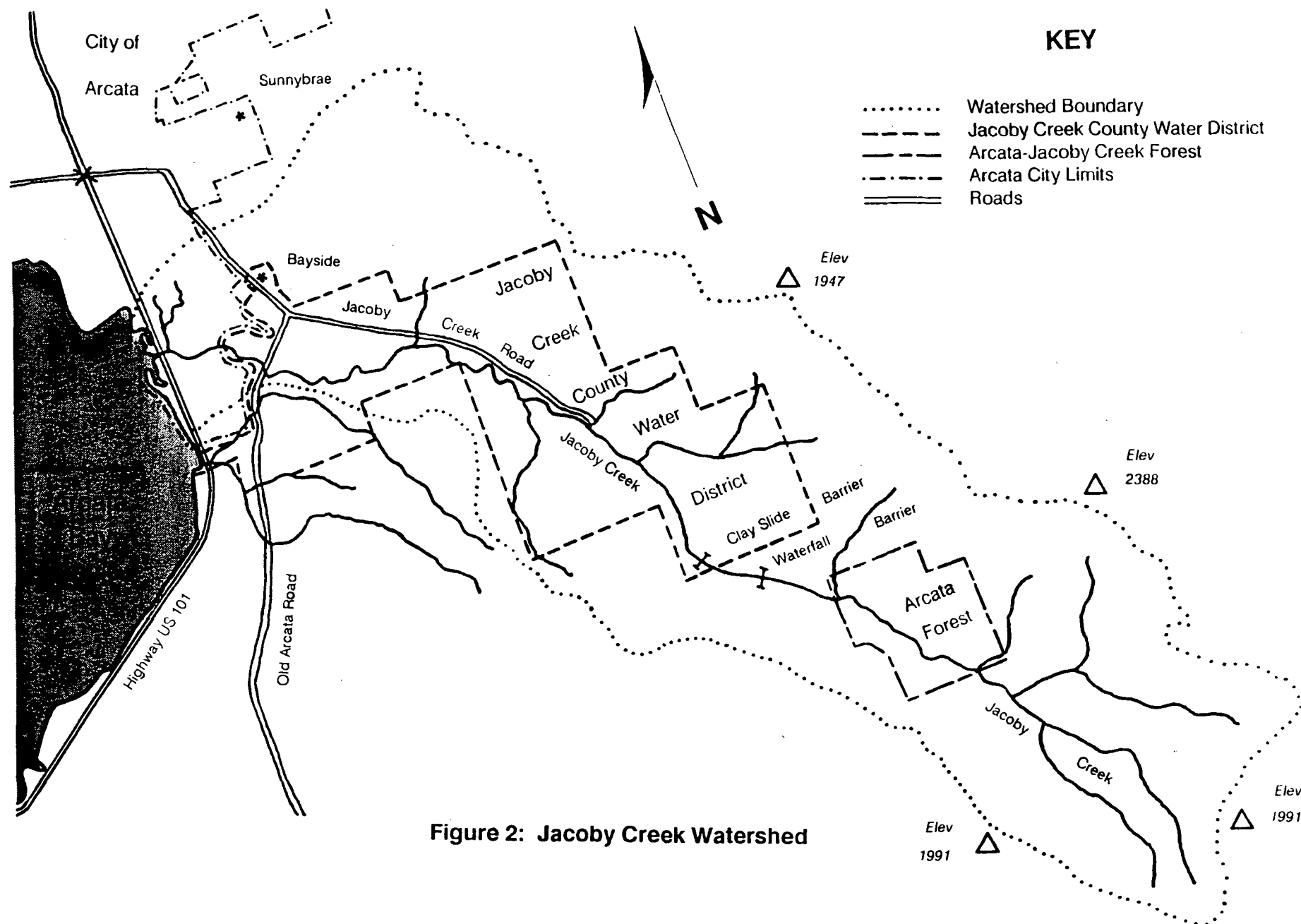


Figure 2: Jacoby Creek Watershed

Data from the U.S. Geological Survey (USGS) collected during the period 1954-1965 indicate the following:

1. A mean annual precipitation of 60.75 inches, 90 percent of which falls from October through May;
2. An average flow of 15.6 cubic feet per second (cfs) and 11,290 acre feet per year (af/y), for the upper 6.1 square miles of the watershed; and
3. High flows of 1,670 cfs in December 1954 and low flows of 0.6 cfs in September 1957.¹⁵

They indicate that the small watershed yields relatively large volumes of water during the rainy season, yet slows to a trickle during the summer months. Since 85 percent of the freshwater flows into Arcata Bay come from small streams such as Jacoby Creek, these extreme seasonal fluctuations in precipitation and runoff can greatly affect the water quality of not only the stream but also the bay itself.

Although the Jacoby Creek watershed is relatively small, it exhibits a variety of land uses which lie within distinguishable zones. The steep upper portion of the watershed was logged for its primary growth of redwood and Douglas fir by 1946. Commercial harvesting of second growth stands continues. The middle portion of the watershed exhibits light rural residential land use, mostly along the main stem of Jacoby Creek. The lower portion of the watershed is characterized by pasturelands interspersed with clusters of residential development.

Vehicular access to the upper portion of the watershed is limited to dirt roads on privately owned timberlands. Jacoby Creek Road, the primary connecting route with Arcata, runs generally west to east in the middle and lower portions of

¹⁵U.S. Geological Survey. Compilation Of Records Of Surface Waters Of The United States, October 1950 To September 1960: Part II, Pacific Slope Basins In California. Geological Survey Water Supply Paper No. 1735 (1964), p. 642; U.S. Geological Survey. Floods Of December 1964 And January 1965 In The Far Western States: Part 2, Streamflow And Sediment Data. Geological Survey Water Supply Paper no. 1866-8 (1970), p. 400.

the watershed. The lower part of the watershed is dissected by U.S. Highway 101, which runs north to south along the eastern edge of Arcata Bay, connecting the cities of Eureka and Arcata (see Figure 2). It is the lower part of the watershed which is situated on the urban fringe of the city of Arcata, an incorporated town with a population of about 12,000. Suburban development from the neighborhood of Arcata known as Sunnybrae extends into the Jacoby Creek watershed in the adjacent community of Bayside Heights (see Figure 3).

The contrast between the upper and lower portions of the Jacoby Creek watershed is significant in explaining the difference between the two water quality problems discussed in the following chapter. The upper portion of the watershed, with its steeper slopes, privately-held timberlands, and lack of public access is less visible and accessible to the general public. This is probably a contributing factor to the apparent lack of public interest in the stream sedimentation problem. The lower portion of the watershed has level, buildable terrain which is accessible by paved, public roads. Suburban development there supports a modest residential population. It is this area where the fecal coliform problem is paramount.

The Jacoby Creek case is a complex one, involving economic, political and social relationships between community residents, local government and state government. Water quality problems in the watershed are caused by the interaction of geographical and hydrological factors with human land use activities. It is a case in which changing national and state priorities are the cause of conflict and controversy at the community level. The two water quality problems comprising this case will be documented in the next chapter. An analysis of the case using the theoretical concepts introduced in this chapter will follow in Chapter III.

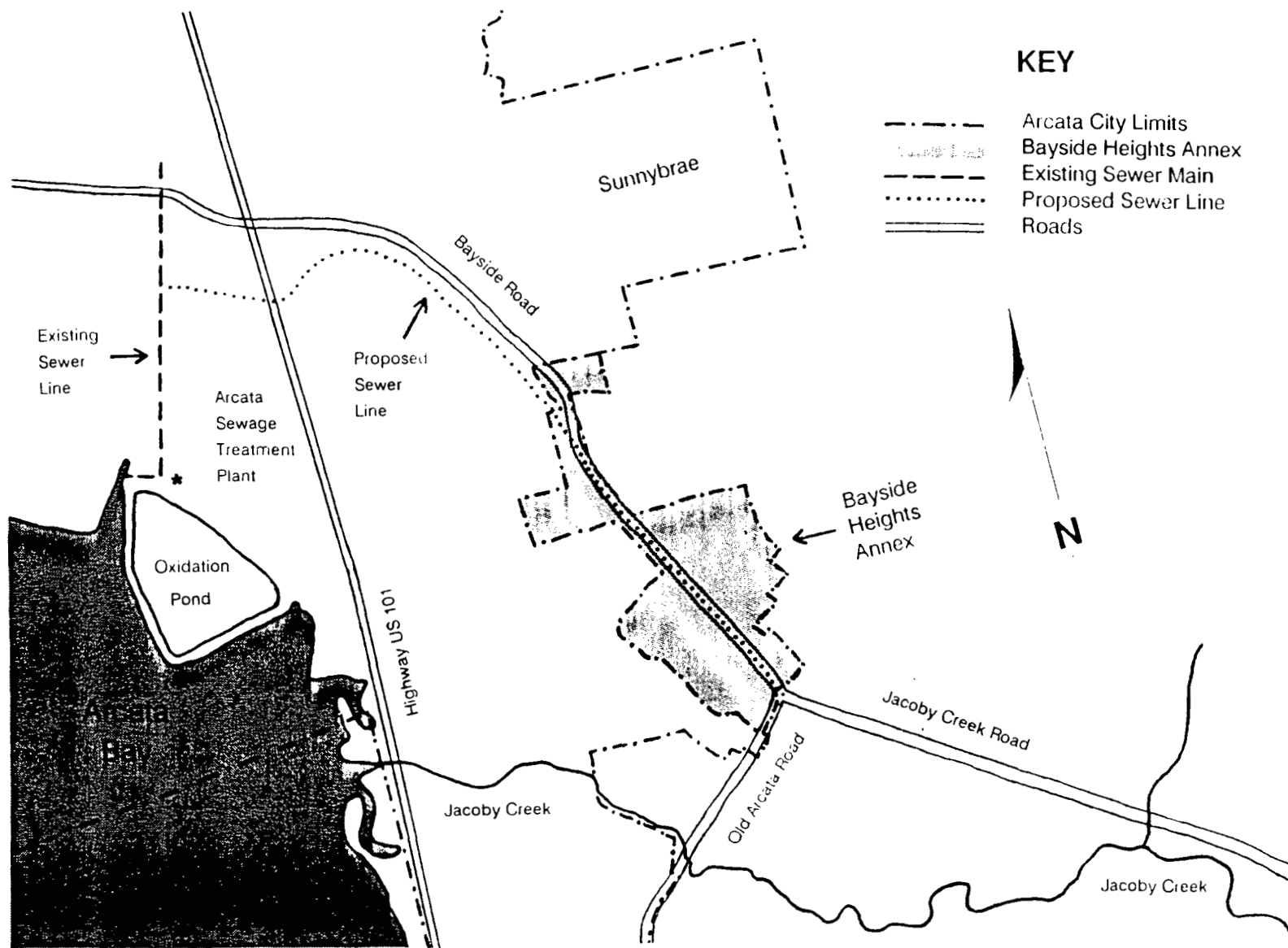


Figure 3: Lower Jacoby Creek Watershed

II. TWO WATER QUALITY PROBLEMS

The fecal coliform and stream sedimentation problems in the Jacoby Creek watershed were documented extensively during the 1970's and early 1980's. For organizational purposes the two will be addressed separately in this chapter.

Fecal Coliform Problem

The historic roots of the fecal coliform problem reach back to the 1960's when the Humboldt County Planning Department made certain assumptions about the unincorporated areas adjacent to Arcata. It was assumed the Bayside Heights and Jacoby Creek areas could support a moderately high density of rural-residential development utilizing septic tanks. It was also assumed Arcata would eventually act to annex the area and provide sewerage.¹⁶ Arcata grew to question these assumptions as it developed its own concepts of community planning and growth. In a July 1974 interview, City Manager Roger Storey outlined the city's position:

1. Residential areas require more funding for services than they pay back in taxes and fees.
2. Areas seeking services from Arcata must agree to annexation so that property taxes might be levied to ease at least some of the cost.¹⁷

This set the tone for future disagreements between the city and the county. The tone for disagreements between residents within the Jacoby Creek community was established by June 1970 when a group of community residents proposed to form a community services district to provide a water distribution system, sewer system, street lights and fire protection. This plan was opposed by the League Of Women Voters, among others, who expressed concerns over the desirability of

¹⁶Interview with Mr. Mark Leonard, Director, Arcata Planning Department, 10 March 1983.

¹⁷"Annex Policy Discussed," Arcata Union, 25 July 1974, pp. 1, 12.

increased growth and taxes. In August 1970 the Jacoby Creek County Water District (JCCWD) was formed to acquire a Davis-Grunsky Act loan to provide water service only. The new district encompassed about 3,000 acres and about 1,000 residents. Much of the Bayside Heights area was left out of the district (see Figure 2).¹⁸

Events at the national level provided additional complications. The passage of the Federal Water Pollution Control Act (FWPCA) in 1972 created a special fund called the Clean Water Grants Program, through which states could attain money to license and build sewage treatment facilities. Section 208 of the Act also established a process by which regional wastewater treatment programs could be planned for construction. Through this program the Humboldt Bay Wastewater Authority (HBWA) was formed. HBWA was to design a regional treatment system for the Humboldt Bay area. Under this plan small communities, such as Bayside and Jacoby Creek, were to tie into sewer interceptors provided by the regional system. After years of political conflict, HBWA dissolved without implementing a regional plan, leaving the small communities to solve wastewater problems on their own. The HBWA affair provides enough material for a separate study, perhaps along the same lines as the Wehbring study discussed in Chapter I. This paper will leave that case to another researcher.

Disagreements between Humboldt County and Arcata, and between residents in the community, arose again in July 1974. Many Bayside residents who were left out of the JCCWD petitioned Arcata to provide water hookups to its distribution system. Arcata agreed to provide connections on the condition the residents allow annexation so their property taxes could be used to reduce the cost

¹⁸Humboldt County, California. Local Agency Formation Commission. Jacoby Creek County Water District Sphere Of Influence Report (1979), pp. 5, 6.

to the city. Recognizing many Bayside residents would not support an annexation move, Arcata drew up a plan to annex a limited area in which public sentiment was considered favorable. This plan was opposed by the Local Agency Formation Commission (LAFCO), an agency of the State of California. Statewide, LAFCO's are empowered to review and rule upon the boundaries of public entities which provide community services, and are funded from county budgets. Humboldt County's LAFCO ruled Arcata should annex a much larger area so that ultimately the JCCWD could be dissolved. This was consistent with a statewide policy to reduce the number of small community service districts. LAFCO continued to hold this position throughout the subsequent controversies over fecal coliform contamination in Jacoby Creek. Arcata balked at LAFCO's requirements and cancelled the Bayside Heights annexation plan in December 1974.¹⁹

The disputes between Arcata and Humboldt County continued in October 1975. Arcata accused the County of performing inadequate planning and development work in the Sunnybrae area, leaving Arcata to inherit problems with water lines, sewers, and street maintenance.²⁰

Fecal coliform contamination problems in Humboldt Bay gained prominence with the publishing of the RWQCB's North Coastal Basin Plan in 1975. RWQCB cited a 1973 California Department of Health Services (DOHS) study which reported contamination of Humboldt Bay waters with fecal coliform bacteria, posing a threat to the oyster industry, recreational clamming, and swimming by the

¹⁹"Arcata In A Quandary Over Bayside Annex," Arcata Union, 28 November 1974, p. 1; "Bayside Annexation Scrapped By Arcata," Arcata Union, 12 December 1974, pp. 1, 12.

²⁰"Arcata Mistrusts County To Do Land Use Planning," Arcata Union, 10 September 1975, p. 1.

public. Attention was drawn to the streams feeding Humboldt Bay as a possible source of the contamination.²¹

Most of the septic tanks in the Jacoby Creek watershed were installed by 1974. Problems with poor soil percolation, a shallow groundwater table, and failing septic systems were apparent by then. By early 1976 the JCCWD, concerned with failing septic systems within the district, approached the RWQCB about Clean Water Grant funding to sewer the district. In response the RWQCB organized a septic tank-sanitary survey and conducted bacteriological sampling of surface waters in the Bayside and Jacoby Creek areas in March 1976. To accomplish this, RWQCB enlisted the aid of the Humboldt County Health Department. The Health Department survey and analysis established that a hazard to public health existed in the Bayside area.²²

Documentation of the fecal coliform problem continued to accumulate. An undergraduate engineering student from Humboldt State University performed a bacteriological study of Jacoby Creek in July 1976. The study indicated the total fecal coliform count in the stream increased in a downstream direction, with levels highest where it crosses Highway 101 and enters Humboldt Bay. This demonstrated the contamination was entering the stream from the lower portions of the watershed.²³ By August 1976 the RWQCB approved a plan for JCCWD to study and identify solutions to the problem of failing septic tanks. A \$35,875 grant from the federal Environmental Protection Agency (EPA) was awarded, through the

²¹California, State Water Resources Control Board. Water Quality Control Plan Report, North Coastal Basin (1B): Part 1 (1975), p. II-14-8.

²²California, North Coast Regional Water Quality Control Board. Executive Officer's Summary Report, Bayside and Curtis Heights Areawide Prohibition (1981), pp. 1-5.

²³Bessie Lee, "A Study Of The Total Coliform Concentration In Jacoby Creek, California." (Special Report, Engineering Department, Humboldt State University, 1976), p. i.

Regional Water Quality Control Board, for two studies. The first, called a Step I, Phase I study was to identify the nature and extent of the problem and recommend alternative solutions. The Step I, Phase II study was to follow with an environmental impact report (EIR) to evaluate the alternatives. Later, a Step II facilities plan and revenue program would be finalized after one of the alternatives was selected for construction.²⁴

Drought-like conditions prevailed during the winter of 1976-77, postponing the Step I, Phase I study until the winter of 1977-78. This marked a period of relative inactivity during which little was said or done about the fecal coliform problem in Jacoby Creek. The quiet period was interrupted in early 1978 when the U.S. Food and Drug Administration (FDA) published a study which documented fecal coliform pollution of human and animal origins in the streams, sloughs, estuary and shellfish of Humboldt Bay. The report made comparisons with the 1973 DOHS study and concluded that fecal coliform contamination of the bay had increased in just five years time.²⁵

The JCCWD's Step I, Phase I study proceeded slowly. A consulting engineering firm, Winzler and Kelly, was hired in the spring of 1978. The firm conducted a second septic tank-sanitary survey and bacteriological sampling study for the Clean Water Grants program during June 1978. Their findings, presented in August 1978, showed 25% of the septic tanks surveyed were found to be failing. Their report characterized the Jacoby Creek problem as follows:

1. High fecal coliform bacteria counts in surface water samples;
2. High groundwater levels;

²⁴Step I Wastewater Management Plan, And Draft Environmental Impact Report, Jacoby Creek County Water District (Eureka: Winzler And Kelly [1980]), pp. 1-1, 1-2.

²⁵California, North Coast Regional Water Quality Control Board. Humboldt Bay Nonpoint Source Investigations, Prior Studies and Literature Review (1982), p. B-7.

3. Soil saturation from high rainfall;
4. Poor soil permeability;
5. Shallow soil profiles;
6. Effluent surfacing over septic tank leach fields; and
7. Pervasive odors near septic tank systems.²⁶

JCCWD's Step I, Phase I draft environmental impact report (DEIR) was presented to the RWQCB in October 1978. The RWQCB then conducted its own, and third total, confirmation soil survey, septic tank-sanitary survey and bacteriological sampling studies in February 1979, before it finally accepted the DEIR.

As the studies progressed slowly, a new organization, called the Bayside Neighborhood Association (BNA), was formed among Bayside residents. The BNA appeared before County Planning Commission hearings to advocate large lot sizes for zonings in the rural portions of the Jacoby Creek watershed. Other residents of those areas desired smaller lot sizes so they could subdivide and develop their property. The view of the pro-development residents was summed up by Mr. Bill Bartlett who stated, "I bought the land with the understanding that I would be able to develop it if I wanted to." Mr. Mark Leonard, Director of the Arcata Planning Department, characterized the BNA as "residents of the urbanized portions of the Bayside Heights area, who actively sought annexation to Arcata to solve their own septic tank problems, but who also wanted to control growth in the surrounding Jacoby Creek area."²⁷

Another political development influencing the Jacoby Creek case occurred during 1978-1979. The passage of two new California laws, called Proposition 13 and Assembly Bill 8, reduced property taxes and placed restrictions on the manner

²⁶Step I Wastewater Management Plan, And Draft Environmental Impact Report, Jacoby Creek County Water District, pp. 1-1, 1-2.

²⁷"Planner's Zoning Vote Upsets Resident Group," Arcata Union, 23 February 1978, pp. 1, 2; Interview with Mr. Mark Leonard, Director, Arcata Planning Department, 10 March 1983.

in which cities and counties could raise additional revenues. These new fiscal restraints caused Arcata to look upon potential annexations such as Bayside Heights in an even more unfavorable light. City Engineer Frank Klopp explained the problem succinctly when he stated, "Arcata could go broke trying to provide city services to an annexed area in the wake of Prop 13 reduced funding."²⁸

With the approval of the Step I, Phase I report in February 1979 there existed thorough documentation that failing septic tanks in Jacoby Creek constituted a hazard to public health. JCCWD then moved ahead with the Step I, Phase II EIR, initiating public hearings in May and June. During this time the BNA began advocating the formation of a septic tank maintenance district, known as an On-site Wastewater Management Zone (OSWMZ), for Jacoby Creek. A questionnaire circulated by the BNA to area residents in September 1979 showed 33% favored the concept of the OSWMZ, 27% favored a centralized sewer project, and 34% favored no project at all.²⁹ This demonstrated the community as a whole was divided over the issue, and that there existed a large element within the community who felt nothing should be done about the problem.

As debate within the community continued, RWQCB moved to emphasize the seriousness of the problem by placing a waiver prohibition on part of the Bayside area in September 1979.³⁰ RWQCB Order No. 79-7 prohibited all waivers to the standards required for siting of septic tanks in Bayside by the Humboldt

²⁸Lindsey McWilliams, "Jacoby Creek Sewage Opens Up Can Of Worms," Arcata Union, 24 May 1979, pp. 1, 2.

²⁹Step I Wastewater Management Plan, And Draft Environmental Impact Report, Jacoby Creek County Water District, pp. 1, 2.

³⁰California, North Coast Regional Water Quality Control Board. Amending The Water Quality Control Plan For The North Coastal Basin Plan To Prohibit The Discharge Of Waste From Individual Disposal Systems In The Curtis Heights Area Of Arcata And The Community Of Bayside In Humboldt County. Resolution No. 81-13 (1981), p. 2.

County Health Department. This constituted a de-facto building moratorium for the Bayside area.

BNA also became actively involved in supporting candidates for election of the JCCWD board of directors. In the first contested elections since the JCCWD was formed, the BNA backed two candidates to run against the pro-development incumbents Roy Guthridge and Jerry Hartwell. Both BNA-backed candidates, Michael Volen and Donna Acosta, won the December 1979 election. This reorganization of the JCCWD board moved the district away from a pro-development, pro-sewering position toward a fiscally conservative, controlled growth position. In its January 1980 meeting the new board voted to request funding from the state for its Step II facilities plan, which would emphasize limited sewerage and the formation of an OSWMZ, despite the fact that the Step I, Phase II EIR was not yet completed.³¹ The decision to back the OSWMZ concept was encouraged by the knowledge that whereas a centralized sewer project could receive up to 87.5% state and federal funding, any proposal determined to be "innovative" could receive up to 97.5% funding, substantially reducing the local share.

In mid-1980 Humboldt County moved to revise its planning assumptions for the Jacoby Creek watershed by initiating the development of a new Jacoby Creek Community Plan (JCCP). A questionnaire, circulated by the County Planning Department to 500 area residents in August and September, indicated a strong split in the community. The 194 responses showed that residents of the rural Jacoby Creek area desired to maintain the rural flavor of the area and strongly opposed

³¹"Jacoby Creek Opts For Halt To Water Extensions," Arcata Union, 24 January 1980, p. 1; "Jacoby Creek Sewage Plan Recommends On-Site System," Arcata Union, 11 December 1980, pp. 1, 2.

annexation to Arcata, while residents of the more urbanized Bayside Heights area expressed a desire for the continued development of urban services.³²

By October 1980 RWQCB gave its approval for JCCWD to proceed with the Step II facilities plan along with funding to finish the Step I, Phase II environmental impact report (EIR). Both plans were to progress with the inclusion of the OSWMZ concept. In addition, the Step II plan was to include a fourth septic tank-sanitary survey. The survey was completed by the RWQCB staff in March 1981, finding a 24% failure rate in 70 homes in the Bayside area and a 9% failure rate in homes in the Jacoby Creek area. The JCCWD then published an addendum to its Step I, Phase I Draft EIR recommending construction of a sewer line in the Bayside area and the formation of an OSWMZ for the rural portions of Jacoby Creek. The proposed On-Site Wastewater Management Zone would be synonymous with the Jacoby Creek County Water District and would be empowered to collect fees for the following:

1. Upgrade existing septic systems with long-term, publicly managed septic systems;
2. Provide for permitting and inspections of the systems;
3. Evaluate and permit installations of new systems; and
4. Handle future failures.³³

While work by the JCCWD on its Step I Draft EIR continued well into October 1981 the RWQCB's patience wore thin. The regional board placed a septic tank discharge prohibition on the Bayside Heights area to provide some further incentive for action. RWQCB Resolution No. 81-13, dated July 1981, effectively placed a ban on new construction in Bayside Heights by banning approvals for the installation of any and all new septic tanks. In a dramatic response to this decision,

³²Lindsey McWilliams, "Survey Indicates Jacoby Creek Residents Favor Rural Character, Less Development," Arcata Union, 2 October 1980, pp. 1, 2.

³³Addendum To Draft Wastewater Management Plan, Jacoby Creek County Water District (Eureka: Winzler and Kelly, [1981]), pp. 1, 2.

120 Bayside residents owning 73% of the land in the area petitioned the city of Arcata to annex Bayside Heights in October 1981.³⁴

The Final Step I, Phase II EIR, published by the JCCWD in March 1982, contained letters from community resident Roy Guthridge and others expressing concern the OSMWZ project would reduce the development potential of their property, reduce property values, and dictate the type of lifestyle by which they must live. Despite these objections, JCCWD adopted the Step I, Phase II EIR officially in April 1982. The preferred alternative recommended annexation to Arcata and sewerage for Bayside Heights, and an OSMWZ for the remainder of the Jacoby Creek area. The EIR indicated the new sewer line to Bayside Heights would cost an estimated \$197,000 to build with Bayside residents paying \$1,867 per connection.³⁵ By June 1982 Arcata's City Council passed a resolution to move ahead with the annexation of Bayside Heights. By September 1982 LAFCO gave its approval to the annexation plan, and RWQCB worked with the State Water Resources Control Board to have the Bayside sewer project placed on the state's priority list for matching Clean Water Grant funds. The hastened pace of activity was due, at least in part, to the fact that Clean Water Grant funds were quickly drying up under the Reagan administration in Washington.³⁶

A route for the Bayside sewer was selected in January 1983. Arcata acted to annex Bayside Heights in March 1983 and the annexation was effective in April of that year. At that time officials of the RWQCB and the JCCWD expressed doubt

³⁴California, North Coast Regional Water Quality Control Board. Executive Officer's Summary Report..., p. 6.

³⁵Final Environmental Impact Report For Wastewater Management Plan For Jacoby Creek County Water District (Eureka: Winzler and Kelly, [1982]), p. 3.

³⁶"Bayside Heights Comes Closer To Becoming Part Of The City," Arcata Union, 30 September 1982, p. 2; Bill Regan, "Arcata Council Hears No Protests On Proposed Bayside Annexation," Eureka Times-Standard, 17 February 1983, p. 2.

that the OSWMZ project would receive funding from the federal or state government because it ranked too low on the state's priority list. Federal funding authority under the Clean Water Grant program expired in July 1983 with little certainty it would be reauthorized.³⁷

The resolution of the fecal coliform contamination problem in Bayside Heights was accomplished only after years of investigation and political conflict. The process included two studies of fecal contamination in Humboldt Bay by the California Department of Health Services and the U.S. Food and Drug Administration. Four septic tank-sanitary surveys and bacteriological sampling were conducted by the Humboldt County Health Department, the engineering firm Winzler and Kelly, and the RWQCB. The RWQCB, JCCWD, LAFCO, the city of Arcata and Humboldt County were enmeshed in jurisdictional disputes which lasted for several years. The Bayside/Jacoby Creek community was polarized over issues of growth, taxes, annexation and the right to develop private property. Despite this, a solution was implemented and positive steps were taken to abate the contamination.

In contrast to the fecal coliform problem in Jacoby Creek, the problem with stream sedimentation and the destruction of fish habitat in Jacoby Creek has yet to be resolved. This problem will be presented in the following section.

Stream Sedimentation Problem

The fecal coliform problem in Jacoby Creek was characterized by a high degree of public interest and political interaction between state and local agencies. In contrast, the stream sedimentation problem has been documented in scientific

³⁷Interview with Ms. Donna Acosta, an Official of the Jacoby Creek County Water District, 17 March 1983; Interview with Ms. Andrea Tuttle, an Official of the North Coast Regional Water Quality Control Board, 31 March 1983.

research by government and university investigators, with little public interest or involvement.

Although most studies of the hydrology and fishery of Jacoby Creek date from the 1960's and 1970's, records from the California Department of Fish and Game (Fish and Game) go back much further. Fish and Game records show the stream was stocked with cutthroat trout and steelhead at least 11 times dating back as far as 1938.³⁸ This indicates not only a longstanding recognition of the value of the fishery, but also a determination to enhance those values. In fact, a 1973 Fish and Game publication states,

Jacoby Creek is an important silver salmon and steelhead stream, in addition to providing a summer trout fishery. Both rainbow and cutthroat trout are present. In the past the stream has been stocked with steelhead and cutthroat trout.³⁹

Silver salmon and steelhead are both anadromous species, meaning they spend their adult life in the ocean and return to freshwater streams to spawn. The two water quality factors most important to the freshwater cycle of silver salmon and steelhead are temperature and dissolved oxygen. Research indicates these fish fare best in water temperatures ranging from 42-58 degrees Fahrenheit and when dissolved oxygen in the water is at levels above 7 parts per million (ppm).⁴⁰ When stream conditions are beyond these parameters, salmonids such as these will experience difficulty surviving and reproducing. Salmonids depend on freshwater

³⁸California, Department of Fish and Game, Eureka Office, Fisheries Department. "Jacoby Creek File: Including Stocking Records and Stream Surveys of 1964, 1975, 1983."

³⁹California, Department of Fish and Game. The Natural Resources Of Humboldt Bay, by Gary Monroe et. al., Coastal Wetland Series No. 6 (Sacramento: Department of Fish and Game, 1973), p. 87.

⁴⁰California, Department of Water Resources, Water Management For Fishery Enhancement On North Coastal Streams (1974), p. 5.

streams for spawning habitat where eggs can hatch, and nursery habitat where fry can develop into juvenile fish or smolts.

In addition to temperature and dissolved oxygen, sedimentation plays a key role in the freshwater environment of anadromous fish. Sediment in the water depletes available oxygen in two ways. First, suspended sediment and dissolved solids use up some of the oxygen by chemical reactions. Second, sediment can settle out, filling in the stream, making it shallower, causing water temperatures to rise, and thus lowering oxygen levels.

A California Department of Water Resources study, released in 1974, describes the effects of logging operations on these water quality parameters in north coastal California streams as follows:

1. The removal of riparian vegetation, which decreases food and shade cover for fish, and protective cover for the soil;
2. High wintertime turbidity, causing cemented spawning gravels, smothered eggs, and gill damage;
3. The accumulation of organic slash and slide debris, creating physical barriers, filling pools, and making stream channels elevated, shallow and flat; and
4. Increased summertime water temperatures, reducing dissolved oxygen levels in the water.⁴¹

Most of the Jacoby Creek watershed was logged for the first time by the late 1940's. Stream surveys done after that date describe a watershed already disturbed by the effects of road building and the removal of protective vegetation characteristic of logging operations. Despite this, a 1964 Fish and Game stream survey of Jacoby Creek noted "suitable habitat and good spawning areas throughout the stream." A second Fish and Game stream survey, conducted in 1972, revealed that in just six years conditions in the stream had deteriorated visibly. The survey

⁴¹Ibid., p. 11.

noted an accumulation of sediment and organic debris, presumably caused by a new round of logging of the second-growth timber.⁴²

In 1972 two Humboldt State University graduate students focused upon the problem of sedimentation in Jacoby Creek. In the first study, Pillsbury collected data on the amount of sediment transported in the creek. He estimated that during a 54-hour storm with 1.61 inches of rain the stream carried about 1,400 tons (800.6 cubic yards) of sediment into Humboldt Bay. Pillsbury concluded the sources of the sediment were:

1. Logging road failures from tractor logging on slopes greater than 30%;
2. Quarry sites dating from 1926 causing slope failures near the stream;
3. Logging landings built too close to stream courses; and
4. Failure to remove logging debris which then found its way into the stream to form debris barriers.⁴³

In the second study, Johnson focused on measuring water quality parameters in the upper watershed. Temperature, dissolved oxygen and turbidity were compared in sections of the stream passing through clearcut areas and adjacent uncut areas. The data was collected in May 1972, and showed higher turbidity, higher temperature, and lower dissolved oxygen levels in the cut areas. Johnson concluded that problems in the stream were due to mass movement and erosion of soils caused by the following:

1. Shallow soils, steep slopes, and unstable underlying geology;
2. High seasonal fluctuations in precipitation;
3. Removal of protective vegetation by logging operations; and
4. Road building.⁴⁴

⁴²California, Department of Fish and Game, Eureka Office, Fisheries Department. "Jacoby Creek File..."

⁴³Norman Pillsbury, "Sediment Transport and Stream Flow Characteristics for Jacoby Creek, California.", pp. 2, 100.

⁴⁴William N. Johnson, "A Study of Some Water Quality Characteristics and Possible Logging Influences On a Small Stream On The North Coast of California." (unpublished Master's thesis, Humboldt State University, 1972), pp. v, vi, 40.

The findings of these two studies mirror the characterizations of the effects of logging on north coastal streams described by the Department of Water Resources. By 1972 Jacoby Creek exhibited all of the signs of a stream system disturbed by logging operations to the extent that sedimentation in the stream had begun to fill in pools and remove fish habitat. A third Fish and Game stream survey, conducted in 1975, noted that organic debris barriers needed to be removed from the stream. The survey report also recommended the removal (by dynamiting) of a rock waterfall-barrier to open the upper portion of the stream to trout and salmon.⁴⁵

The conclusions of the previous researchers were supported by the Regional Water Quality Control Board in 1975. RWQCB's North Coastal Basin Plan noted that in watersheds surrounding Humboldt Bay, logging activities had caused a number of problems such as:

1. Removal of vegetation;
2. Increased organic debris in the water;
3. Increased silt and sediment in the water;
4. Increased water temperature;
5. Decreased dissolved oxygen levels in the water;
6. Removal of spawning and rearing habitat; and
7. Obstruction of upstream fish migration.⁴⁶

In ranking the severity of water quality problems in the north coastal basin, the RWQCB placed problems with water quality standards which maintain fish and wildlife second in importance behind problems involving bacteriological standards for maintaining drinking water supplies and water contact recreation.

During 1977 two additional studies were done by Humboldt State University graduate students. In the first study, Harper documented the use of Jacoby Creek

⁴⁵California, Department of Fish and Game, Eureka Office, Fisheries Department, "Jacoby Creek File..."

⁴⁶California, State Water Resources Control Board. Water Quality Control Plan Report, North Coastal Basin..., pp. II-14-8, II 14-9, II-15-3.

by silver salmon and steelhead. He estimated about 5,000 silver salmon smolts passed downstream to Humboldt Bay during the migration period from April through June 1977. The steelhead smolt downstream migration occurred earlier, from March through May. An estimated 123 adult salmon entered Jacoby Creek during the spawning period from October 1977 through January 1978, with peak activity occurring in December. During the steelhead spawning period from December 1977 through April 1978, 217 adult steelhead entered Jacoby Creek, with peak activity during January through March 1978. Harper also noted the silver salmon, as a group, tended to spawn lower in the watershed than the steelhead.

Additional findings included:

1. Almost no tributary spawning by salmon or steelhead was observed;
2. Most of the suitable spawning habitat in use was between 2.5 and 5.2 miles upstream from the mouth;
3. Historical use of the stream was up to a rock waterfall barrier 6.0 miles upstream; and
4. Present use of the stream was blocked by a clay slide barrier 5.2 miles upstream.

Harper's two main conclusions were:

1. Native stocks of silver salmon and steelhead in Jacoby Creek were at a lower level of abundance than they were historically; and
2. Since 1964 improper logging and road construction practices have caused damage to the watershed and heavy silt deposition in the stream.⁴⁷

The second study, by Miyamoto, investigated the rate at which silver salmon planted in nearby Jolly Giant Creek returned to spawn in Jacoby Creek. In 1974 approximately 12,000 brood silver salmon were released into the estuary of Jolly Giant Creek as part of a pilot wastewater-aquaculture program undertaken by the city of Arcata and Humboldt State University professor, George Allen. During the

⁴⁷Wayne G. Harper, "Age, Growth, and Migration of Coho Salmon and Steelhead Trout in Jacoby Creek, California." (unpublished Master's thesis, Humboldt State University, 1979), pp. iii, 1, 6, 39, 50, 85.

winter of 1977 spawning run, Miyamoto recovered "stray" returning adult salmon in traps at the mouth of Jacoby Creek. He estimated as many as 39-48 percent of the returning planter stock had strayed to Jacoby Creek rather than returning to Jolly Giant Creek. This established that not only did Jacoby Creek continue to provide habitat for anadromous fish, but also that efforts to enhance the use of Jolly Giant Creek would enhance the use of Jacoby Creek as well.⁴⁸

A group called the Jacoby Creek Canyon Community organized to study the watershed in 1978. The principal parties, Murray and Wunner, performed a habitat survey of Jacoby Creek during May and June of 1978. They covered the first 5.8 miles of stream and scored the anadromous fish habitat in Jacoby Creek at 32 to 48 percent of optimum. They attributed the low scores to shallow, silted-in pools and a lack of protective vegetative cover. In their report on the history and current use of the Jacoby Creek watershed, Murray and Wunner identified the following sources for the sedimentation problem:

1. Sloughing of dirt from levees in the lower stretch of the creek;
2. Removal of protective vegetation by agricultural and residential users in the lower watershed;
3. Removal of protective vegetation by logging activities in the upper watershed;
4. Mass movement of soils aggravated by logging activities in the upper watershed;
5. Flow obstructions by debris from logging activities, causing bank undercutting and sloughing; and
6. Road and culvert failures near the creek.⁴⁹

An EIR prepared by the City of Arcata in 1980 for its proposal to harvest city-owned timber in the watershed suggested activities to remove barriers to fish

⁴⁸Joseph Miyamoto, "Homing of Pond-Reared Coho Salmon To A Small Urban Stream, Humboldt County California." (unpublished Master's thesis, Humboldt State University, 1979), pp iii, 44, 51.

⁴⁹Allison Murray and Robert Wunner, A Study Of The Jacoby Creek Watershed, Humboldt County, California, pp. 43-47, 50-60.

migration in Jacoby Creek might be undertaken in cooperation with other agencies as partial mitigation for impacts caused by the logging.⁵⁰

The Jacoby Creek Community Plan, prepared by Humboldt County in 1982, established requirements for streamside buffer zones in the Jacoby Creek watershed to protect streamside or riparian vegetation. The buffers were set at 100 feet on either side of perennial channels and 50 feet on either side of ephemeral channels in timberland, agricultural and rural residential zones. These requirements focused some of the responsibility for the sedimentation problem upon those property owners whose land-use practices were contributing to it.⁵¹

The fourth and final Fish and Game stream survey of Jacoby Creek was performed in 1983. At that time the Fish and Game biologist recommended the department work with the Jacoby Creek Canyon Community organization to remove debris barriers in the stream below the rock waterfall 6.0 miles upstream. The report also recommended finding a way to modify the rock waterfall to allow fish passage around it.⁵²

In total, Jacoby Creek has been the focus of four stream surveys conducted by the Department of Fish and Game, four Master's theses by Humboldt State University graduate students, and a private study by the Jacoby Creek Canyon Community. Despite this, little has been done to implement the numerous recommendations of the various investigations. This can be explained in part by comparing the public's concern over a hazard to public health versus a threat to the

⁵⁰Arcata Community Forest/Jacoby Creek Forest Multiple Use Management Plan And Environmental Impact Report (Berkeley: Larry Seeman and Associates, [1980]), p. 16.

⁵¹Humboldt County, California. Planning Department. Jacoby Creek Community Plan, Humboldt County, California (1982), pp. 3-5.

⁵²California, Department of Fish and Game, Eureka Office, Fisheries Department, "Jacoby Creek File..."

environment. Partial explanation can also be provided by examining the primary administrative agency involved, the Department of Fish and Game. However, the key factor in explaining the matter may be that the primary role should belong to a different state agency, the California Division of Forestry (CDF). Most investigations into the matter have targeted commercial logging in the upper watershed as the primary factor causing numerous and cumulative impacts to Jacoby Creek. Consequently, many of the recommendations for corrective action address the need for improved logging practices in the upper watershed. The regulation of commercial logging practices has historically been the responsibility of CDF. These issues surrounding the stream sedimentation problem, and those involving the fecal coliform problem, will be discussed in the following chapter.

III. SUMMARY

In the previous chapter the case histories of two water quality problems in the Jacoby Creek watershed were presented. The first involved leaking septic tanks in the lower and middle portions of the watershed which caused surface waters in the Bayside and Jacoby Creek communities to be contaminated with fecal coliform bacteria. The second involved damage to the protective vegetation and topsoil of the middle and upper portions of the watershed from quarrying, residential development, road building and logging activities, which in turn caused the waters of Jacoby Creek to carry increasing loads of sediment. In this chapter the two problems and the two state administrative agencies involved in them will be examined using a comparison and contrast approach. First, a review of the context within which the events occurred is necessary.

The pattern of development in the lower Jacoby Creek watershed is the result of expansion from Arcata's urban center eastward into Arcata's Sunnybrae district. From there, the residential development extends into the lower portion of the watershed in the Bayside area. The zone where urban development encroaches onto previously rural land, the urban fringe, lies just east of the Bayside area in the direction of the middle part of the watershed. The community in the middle portion of the watershed is known simply as Jacoby Creek. East of this is the upper portion of the watershed, an area of privately-held commercial timberlands characterized by steep slopes.

The Jacoby Creek case supports the assertion of Tabors *et al.* that sewerage is the prime determinant for development in the United States.⁵³ Paved roads needed to access the lower and middle portions of the watershed were established

⁵³Richard D. Tabors, *et al.*, Land Use And The Pipe, p. 4.

years ago. Water supplies for the lower watershed were improved with the formation of the JCCWD in the 1970's. Limited development of water supplies in the middle portion of the watershed has proceeded using wells. The use of septic tanks to develop the lower and middle portions of the watershed was standard practice until the 1970's when evidence of septic tank and leach field failures began to accumulate. With the intervention of the RWQCB, sewerage became the primary determinant for growth in the lower and middle portions of the watershed. A sewer line was extended from Arcata to provide service to the Bayside area, but the Jacoby Creek area continues to rely on the use of septic systems for limited development.

In the upper watershed residential development is inhibited by the predominance of privately held commercial timberlands. This land use is reinforced by county zonings which favor timber preserve zones for commercial operations and the important role these operations have on the overall economy of Humboldt County. Even should these zoning restrictions be eased or removed, the development of the upper watershed would be severely constrained by the steep slopes which characterize the area. It is within this context, residential development expanding into a rural area limited in its ability to accommodate further growth, that the fecal coliform and stream sedimentation problems occurred.

Comparison of Two Water Quality Problems

The general purpose of this case-study is to compare and contrast the two water quality problems in Jacoby Creek. One element common to both problems was the involvement of state administrative agencies whose missions include regulating water quality. Administrative agencies operate, by definition, primarily within the administrative arena of political interaction. As mentioned previously, within Kramer's hierarchy this was determined to be the lowest level of visibility at

which political interactions can occur.⁵⁴ In order for either the fecal coliform or stream sedimentation problem to gain the attention of the public, other factors would have to be introduced to raise the level of political interaction and hence the level of visibility. These factors will be discussed in the following sections.

Fecal Coliform Problem

This first problem, concerning failing septic tanks and leach fields and the contamination of surface waters in the Bayside and Jacoby Creek areas with fecal coliform bacteria, has been documented extensively by the RWQCB and others.

One key factor in this problem is the perception of risk to public health. In the water quality management field, contamination of a water supply with fecal coliform bacteria is an indicator of potential contamination of a water supply with human feces or sewage. This, in turn, suggests a risk for the spread of waterborne diseases such as dysentery, typhoid, hepatitis, and cholera. There were no documented cases of such illnesses in the Jacoby Creek watershed, but even a perceived threat to human health is usually cause for great public concern. There also was a potential for contamination of the commercial oyster beds in Humboldt Bay. The important point here is that a relatively high level of perceived risk was established with the public.

The second key factor in the problem was the identification of a solution with an acceptable price. This was made possible by the involvement of the RWQCB. The agency was able to promise, and deliver, Clean Water Act Grant funds from both federal and state sources. This brought the sewerage solution within a price range which was acceptable to the city of Arcata and to the residents of the Bayside community. With 87.5% of the sewerage project paid for by government grants, the share to be paid by local residents was 12.5% of the cost of the project. This

⁵⁴Fred A. Kramer, Dynamics Of Public Bureaucracy, p. 28.

resulted in an average assessment of \$2,800 levied by Arcata on each parcel within the annexed Bayside area.

It is important to note that the community residents did pay their fair share of the costs for cleaning up their problem. The Bayside Neighborhood Association was only politically powerful enough to influence local politics. The BNA was not powerful enough to prevent Bayside residents from paying their share of the sewerage costs, nor was it BNA's intention to do so. In terms of environmental-economic theory, the parties responsible for the discharge of contaminants into the Jacoby Creek water system could not avoid paying a share of the cost of mitigating the effects of their discharges.

The third key factor in this problem was visibility, both physical and political (or issue) visibility. Despite the natural tendency for the RWQCB and the JCCWD to operate within the weakly visible administrative arena, several factors contributed to bring the problem into a more open, public arena. Physically, the focus of the fecal coliform problem was the area around the urban fringe. Due to the new development and capital investment occurring there, it was a dynamic, changing geographical area toward which much public attention was already focused. In addition, good access by paved, public roads and a moderate resident population contributed to give the problem a relatively high degree of physical visibility, meaning residents in the area could see and smell the results of their own failing septic systems.

In terms of issue visibility, the fecal coliform problem was characterized by a very high level of public interest and involvement. One key reason for this was that state and federal laws required extensive public hearings and the preparation of publicly reviewed environmental impact reports (EIR's) for an annexation and facilities project such as the one involved in Bayside. During this process the fecal

coliform problem raised heated debates within the community over development related issues. One point stressed by many Bayside and Jacoby Creek residents was that the rural portion of Jacoby Creek should retain its rural flavor. In essence they advocated a halt or slowdown to development in the rural portions of the watershed.

For others, including the city of Arcata, the desirability of further development in Jacoby Creek was not so much in question as was the timing of the development. Annexations undertaken at a too hasty pace could over-extend Arcata's budgetary and municipal resources. The Bayside Neighborhood Association advocated maintaining the rural flavor of Jacoby Creek by restricting development to that achievable with septic tanks, and continuing the urbanization of the Bayside area by extending a sewer line there. In contrast, a smaller group of individual property owners in the Jacoby Creek area raised concerns over the limitations which continued use of septic tanks would place upon their ability to subdivide and develop their property. They argued correctly that lot size restrictions based upon septic tank service would limit the development potential of their land. In addition, they pointed out that septic tanks force homeowners to adopt "rural" lifestyle patterns due to the need for large lots, and maintenance and upkeep needs. An important issue to many residents opposed to the sewerage proposals was the assessment fee to be placed upon them for sewerage costs. These proposed assessments represented an unwanted intrusion of government into their lives.

Of these various viewpoints expressed by the residents of the watershed, the viewpoint which had the greatest impact upon the outcome of the fecal coliform problem was the one represented by the Bayside Neighborhood Association. The BNA effectively backed candidates for election to the JCCWD, and advocated their solutions to the fecal coliform problem before the government agencies at public hearings. In terms of political winners and losers at the local level, the BNA clearly

came out as a winner. On the losing side were those residents who supported a pro-growth, pro-sewering solution for the rural portions of Jacoby Creek, and those Bayside residents who opposed annexation of the Bayside area in Arcata.

The local press was also instrumental in raising the level of visibility of the fecal coliform problem. Articles published in the Arcata Union and the Eureka Times-Standard emphasized not only the conflicts within the community, but also the conflicts between the Arcata and Humboldt County governments over planning issues, development costs, and revenue shares from property taxes. These conflicts had begun with the controversy over the development of the Sunnybrae area, continued with the formation and subsequent dissolution of the regional sewerage plan (HBWA) and carried over into the problems in Jacoby Creek.

All of these factors - the strong public perception of a threat to human health, the government funds available to clean up the problem, and the high level of physical visibility and issue visibility - contributed to the successful outcome for the problem.

The fecal coliform problem in Jacoby Creek reflects Goehring and Carr's study of septic tank use in Newcastle County, Delaware.⁵⁵ In Jacoby Creek septic systems were found to be characteristic of residential development around the urban fringe, and reliance upon them had promoted large lot sizes and limited development. The fecal coliform problem in Jacoby Creek also illustrates the degree to which growth related issues raised by the choice between sewers and septic tanks can stimulate political conflicts within a community. In the Humboldt Bay region conflicts over growth and development issues led to the dissolution of the HBWA project in the 1970's when cities and communities in the area attempted

⁵⁵Darryl R. Goehring and F. Robert Carr. "Septic Systems On An Urban Fringe," p. 89.

to identify the need for and siting of sewer interceptors for a regional wastewater system. Conflicts of this type also were cited by Wehbring in his study of regional projects throughout the Pacific Northwest.⁵⁶ Of the seven institutional obstacles to such regional projects listed by Wehbring, four were evident at the community level in Jacoby Creek. These were:

1. Public opposition to increased water quality costs;
2. Land-use and urban growth controversies;
3. Political aspects of annexation and incorporation; and
4. Fragmentation of authority for land-use and facility planning.

In discussing the stream sedimentation problem in the following section, it will become apparent that institutionalized obstacles of a similar sort play a key role in the outcome of that problem.

Stream Sedimentation Problem

One key area in which the stream sedimentation problem differs from the previous one is that the problem is not as easily defined. Increasing levels of sedimentation in Jacoby Creek are a symptom of the problem, just as fecal coliform contamination of surface waters is a symptom of failing septic systems. Other closely related symptoms of the problem are also evident in the watershed. These include:

1. The loss of protective vegetative cover and the disturbance of topsoils in the upper watershed;
2. The silting in of pools, the shallowing of the stream cross-section, and the widening of the stream channel; and
3. The loss of riparian vegetation in the lower watershed.

By extension, the actual problem is the accumulation of impacts from road building and logging activities in the upper watershed; quarrying, roadbuilding and residential development activities in the middle watershed; and livestock grazing, flood control and residential development activities in the lower watershed. There

⁵⁶K. Wehbring, Institutional Problems Of Water Quality Planning In Urbanizing Areas In The Pacific Northwest, p. 2.

is a documented loss and degradation of salmonid habitat in Jacoby Creek, which many researchers have directly attributed to commercial timber harvesting on privately held lands in the upper watershed.

The significance of this is that a threat to the environment has been well documented. Despite this, the environmental threat has not been perceived by the public to be as serious as the threat to human health, even though the environmental impacts are watershed-wide and ecosystem-wide in their effects. As a result, the generally low level of visibility the stream sedimentation problem has received from Fish and Game in the administrative arena has not been increased.

Other factors contribute to keep the level of visibility of this problem at a low level. The physical visibility and accessibility of the upper portion of the watershed is low. Minimal access to the area is available by paved, public roads due to the steep, unbuildable slopes and the land-use pattern of private ownership for commercial timber harvesting. In addition, the residential population of the upper watershed is very small.

Institutional obstacles keep the political visibility of this problem at a low level. For instance, if one accepts that the forest products industry is primarily responsible for the impacts to Jacoby Creek discussed in Chapter II, then in environmental-economic terms the industry should have to pay for the costs of its use of environmental services (i.e., the cost of its environmental impacts). It is doubtful that the forest products industry could be pressured into paying for the cost of the impacts researchers say its logging practices have caused. The industry is too powerful and influential on the local and state levels to be held accountable for paying for the costs of its environmental impacts. Contrast this to the BNA which organized effectively at the grass-roots level to work for the resolution of the fecal coliform problem. The BNA and other Bayside residents wielded comparatively

little political power beyond the local level of government, and, as a result, had to pay a share of the costs of mitigating their impacts on public health, city services and the environment.

Officials of the RWQCB and Fish and Game indicated both agencies have encountered political obstacles when attempting to regulate environmental impacts from commercial timber harvesting operations.⁵⁷ The RWQCB has a primary mission to protect water quality. Its original focus was upon sewage treatment during the 1960's and 1970's. On a statewide level, during the 1980's, the trend has been for the agency to move toward regulating discharges of toxic and industrial wastes. Over the years RWQCB's parent organization, the State Water Resources Control Board (SWRCB), has had jurisdictional battles with private interests and the California Department of Forestry (CDF) over the RWQCB's ability to regulate commercial timber harvesting activities. Politically, the SWRCB has been forced to leave the job of regulating these activities to the Forestry Department. CDF is mandated by the Forest Practices Act to review and approve Timber Harvest Plans (THP's) for commercial timber operations.

Fish and Game has only a secondary mission to protect water quality, to the extent that water quality affects the productivity of fish and wildlife. Jurisdictional disputes between Fish and Game and CDF over timber harvest practices have also been common statewide. Fish and Game's experience has been that it lacks the funds and the political clout to succeed in its disputes with CDF. As a result, Fish and Game does little more than review and comment upon THP's and EIR's, leaving CDF to do the job of regulating timber operations. These factors have contributed greatly to the lack of action on the stream sedimentation problem in

⁵⁷Interview with Andrea Tuttle, an official of the North Coast Regional Water Quality Control Board, 31 March 1983; Interview with Dave McLeod, fisheries biologist, California Department Of Fish And Game, 6 April 1983.

Jacoby Creek. A major area of research needing attention is the relationship between the CDF, the California Forest Practices Act, the forest products industry and THP's, which could be accomplished within the context of Jacoby Creek as a specific example. This is beyond the scope of this paper.

The major difference between the two water quality problems in Jacoby Creek may be that the stream sedimentation problem involves institutional obstacles exceeding those identified by Wehbring for regional wastewater planning and management. Of the obstacles cited by Wehbring the following also apply to the stream sedimentation problem in Jacoby Creek:

1. Public opposition to increased water quality costs;
2. Land use controversies;
3. Lack of public understanding of water quality problems;
4. Fragmentation of authority for land use and facility planning;
and
5. An absence of adequate enforcement for protecting water quality.

The fecal coliform problem in Jacoby Creek and Wehbring's study of regional wastewater planning efforts are characterized by a lack of interest groups or lobbies as influential as the forest products industry. In contrast, the stream sedimentation problem in Jacoby Creek is heavily influenced by the activities of this powerful industry which effectively lobbies against efforts to regulate it's activities. The only interest group advocating solutions to the stream sedimentation problem in Jacoby Creek is the Jacoby Creek Canyon Community (JCCC), an organization which consists of a small group of Humboldt State University alumni who study the Jacoby Creek watershed. The JCCC has not captured any large degree of public interest, local government interest, or state government interest. Positive sentiments have been expressed by both Arcata and Fish and Game to work with JCCC at a grass-roots level to implement small-scale stream restoration projects in Jacoby Creek.

Summary

In summary, the two water quality problems in Jacoby Creek compare and contrast as follows:

Coliform Problem	Stream Sedimentation Problem
<ul style="list-style-type: none"> - Problem occurring primarily in lower watershed - Human health concern, high level of perceived risk to public - Government grant funds available - Dischargers pay fair share of costs - High physical visibility - High issue visibility - Activist approach by administrative agency - Public EIR's and hearings involved due to public works project - Lack of influential interest group except at local level - Successful outcome 	<ul style="list-style-type: none"> - Problem occurring primarily in upper watershed - Threat to environment, low level of perceived risk to public - No government grant funds available - Dischargers don't pay costs - Low physical visibility - Low issue visibility - Lack of action by administrative agency - THP's, but no public works project involved - Extremely influential interest group effective at state and local level - No successful outcome

This examination of the two water quality problems provides the basis for an analysis of the two state administrative agencies. The actions of the agencies with respect to the two problems in Jacoby Creek reveals much about them.

A Comparison of Two Administrative Agencies

The specific purpose of this case-study is to answer the question "How do the contrasting levels of intervention in, or management of, the two water quality problems in the Jacoby Creek watershed reflect the roles, objectives and effectiveness of the two administrative agencies?"

Regional Water Quality Control Board

From the discussion and examination of the fecal coliform problem in the previous sections, several observations and conclusions about the RWQCB are possible. Before covering these points, a brief background of the agency is

necessary. The North Coast Regional Water Quality Control Board is one of nine regional boards under the jurisdiction of the State Water Resources Control Board (SWRCB). The SWRCB was formed in the Resources Agency during the period 1967-1969 to combine water rights, water quality and water pollution control functions of the State of California. The agency's budget began with around 3.7 million dollars in fiscal year 1969.⁵⁸ With the passage of California's Porter-Cologne Water Quality Control Act in 1969 and the Federal Water Pollution Control Act in 1972, the new agency's role shifted toward drawing federal Clean Water Grant funds into the state. By fiscal year 1981 the SWRCB's budget had risen to 107 million dollars, 75 million dollars of this being targeted to fund the nine regional water quality control boards. In other words, from 1969 through 1982 the main purpose of the SWRCB was to assist the nine regional boards and local entities with the planning and construction of wastewater facilities under the Clean Water Grants Program.

The North Coast Regional Water Quality Control Board (RWQCB) is a young agency, both in actual years and in terms of Kramer's maturity scheme of classification. This relatively new agency has a clear mandate to protect water quality. The agency works in a mode of aggressive regulation, using legislatively granted powers to make regulations and such enforcement tools as discharge orders, cleanup and abatement orders, cease and desist orders, fines and other legal actions. These tools allow the RWQCB to function within the role of protective regulatory politics, a role characterized by adversary relationships and the setting of prohibitive conditions under which activities must take place.

⁵⁸California, Office Of The Governor. The Governor's Budget, for 1969-1983.

This aggressive regulatory posture is balanced by the RWQCB's authority to manage and set priorities for the distribution of Clean Water Grant funds. With grant money available to construct a sewer project in the Bayside area, for instance, the RWQCB was able to work within the more positive role of distributive politics and balance its image in the eyes of the public. Armed with both of the proverbial incentives, "the carrot and the stick," the agency was able to maintain an influential, proactive, problem solving approach to the fecal coliform problem in Jacoby Creek.

The agency presents itself to all clientele, such as municipal governments and local citizenry, as both ally and adversary. In this case BNA represented the most organized citizen group involved in the fecal coliform problem and was strictly local in its influence. The strongest political powers confronting the RWQCB were the City of Arcata and Humboldt County, and these entities lacked the strong political ties to state government enjoyed by the RWQCB.

California Department Of Fish And Game

Fish and Game is an older department within California's Resources Agency, whose primary mission is to manage fish and wildlife for recreational uses, economic contributions, scientific and educational values and species diversity.⁵⁹ Fish and Game has a secondary mandate to protect water quality in the sense that water quality affects fish and wildlife. The agency's budget averages around 60-70 million dollars per year, and is derived from revenues from the sale of hunting and fishing licenses, court fines, and commercial fishing taxes. This is important since it establishes the agency's interdependency with the interests which it regulates. This interdependency, and the older actual age of the agency tend to place it within Kramer's age classification scheme as a mature agency. Fish and Game's stable,

⁵⁹California, Office Of The Governor. The Governor's Budget, 1983-1984 (1983).

almost static, tendency to maintain the status quo in the Jacoby Creek case supports this characterization.

The mission of the agency is to maintain a protective regulatory approach to managing the state's fish and wildlife resources. This has been tempered over the years by jurisdictional conflicts with federal agencies over dam-building projects and with CDF over regulating silvicultural activities. In terms of political viability, Fish and Game seems to lack the aggressive posture of the RWQCB, and seems to be hampered by its inability to resolve jurisdictional problems with CDF over land management issues. Without large amounts of grant funds to expend on fish and wildlife projects, the agency's potential role in distributive political interactions is diminished.

As a result, the agency is able to focus only upon large scale problems with high visibility for which it can expect to receive both political and fiscal support. This leaves water quality problems in a small north-coastal stream such as Jacoby Creek low on the agency's list of priorities.

Summary

The differences and similarities between the RWQCB and Fish and Game as evidenced in the Jacoby Creek case can be summarized as follows:

RWQCB

- Primary water quality mandate
- Young agency, aggressive, active approach
- Strong protective regulatory role
- Strong distributive role, grant money available
- Lack of well organized interest groups or clientele
- No political obstacles with possible exception of CDF

Fish and Game

- Secondary water quality mandate
- Mature agency, stable, static approach
- Weak protective regulatory role on water quality issues
- Weak distributive role, lack of grant money
- Close relationship with recreational and commercial users of fish and wildlife
- Clearly impeded by jurisdictional conflicts with CDF

There remains a great deal which could be said about the relationship between the California Department of Forestry, the California Department of Fish and Game, and the Regional Water Quality Control Boards, with respect to the regulation of water quality in timber harvesting operations. Such a discussion is beyond the scope of this paper. This case-study, having served its stated purpose, is concluded, leaving recommendations for further study to other researchers.

Recommendations

Fecal Coliform Problem

With the successful completion of the annexation and sewerage of the Bayside area, evidence remains of septic system failures in the rural areas of Jacoby Creek. The concept of an On-Site Wastewater Management Zone (OSWMZ) or septic tank maintenance district should be implemented, with or without matching grant funds. The OSWMZ should be synonymous with and managed by the Jacoby Creek County Water District, to prevent the creation of another administrative agency. As Arcata expands its boundaries up the Jacoby Creek watershed and annexes residential areas, the JCCWD-OSWMZ should be dissolved.

Stream Sedimentation Problem

The Jacoby Creek Canyon Community organization and Fish and Game should begin a cooperative venture to perform stream rehabilitation projects in Jacoby Creek. The assistance of Humboldt State University and local environmental groups should be solicited. The City of Arcata may have some interest in projects which could mitigate impacts from timber harvesting activities in its Jacoby Creek Community Forest parcel, or which have a secondary impact of enhancing its wastewater-ocean ranching project at the mouth of nearby Jolly Giant Creek. Some of the recommended measures identified by previous researchers include:

1. Continue periodic stocking of the stream with native species such as steelhead and silver salmon as needed until habitat restoration measures are effective;
2. Rehabilitate abandoned quarry sites in the middle watershed;
3. Investigate whether the tidal gate at the Highway 101 bridge operates to the detriment of migrating fish, and if it does, take measures to mitigate;
4. Remove organic debris barriers from the stream course;
5. Remove the clay slide barrier located 5.2 miles upstream;
6. Remove the rock-waterfall barrier 6.0 miles upstream or build a fish ladder around it;
7. Initiate a campaign to educate residents of the lower watershed about the importance of measures to protect riparian vegetation; and
8. Approach the private companies in the upper watershed about efforts to stabilize failing slopes, replant vegetation, and reclaim failed roads and logging landings.

Future Research

There are three primary areas of research which relate to this case-study and Jacoby Creek which are worth mentioning. First, the events surrounding the formation, and subsequent dissolution of, the Humboldt Bay Wastewater Authority should be documented and analyzed.

Second, the relationship between the California Department of Forestry, the Forest Practices Act, Timber Harvest Plans, and the forest products industry should be examined in the context of Jacoby Creek as a specific case. This might also involve a discussion of the political relationship between CDF, Fish and Game, and the RWQCB's.

Third, the controversy of 1983-84 over the use of herbicides in the upper Jacoby Creek watershed for timber stand management should be investigated as a specific example of the overall controversy about the use of herbicides for timber stand management throughout the Pacific Northwest.

Hopefully this case-study of two water quality problems in Jacoby Creek will prove useful to or inspire additional research into the Jacoby Creek watershed.

APPENDIX A

LIST OF INTERVIEWEES

Name	Title	Date Interviewed
Ms. Donna Acosta	Board Member, Jacoby Creek County Water District and Member, Bayside Neighborhood Association	17 March 1983
Mr. Steven De Camp	Director, Humboldt County Local Agency Formation Commission	18 March 1983
Mr. Pete Hess	Committee Member, Jacoby Creek Community Plan Citizen's Advisory Committee	6 April 1983
Mr. Mark Leonard	Director, Arcata Planning Department	10 March 1983
Mr. Tom Lisle	Research Hydrologist, Pacific Southwest Forest And Range Experimental Station, USFS	23 March 1983
Mr. Dave McLeod	Fisheries Biologist, California Department Of Fish And Game	6 April 1983
Mr. James Test	Committee Member, Jacoby Creek Community Plan Advisory Committee and Planner, Humboldt County Planning Department	14 March 1983
Ms. Andrea Tuttle	Board Member, Northcoast Regional Water Quality Control Board	31 March 1983

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