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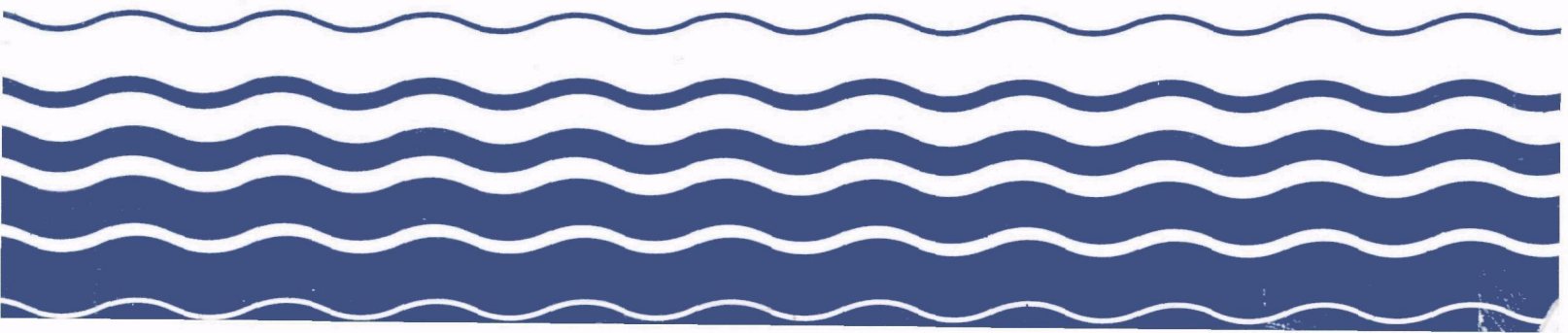
# Indian Drinking Water Supply Study



# INDIAN DRINKING WATER SUPPLY STUDY

Conducted By:

Office of Water
Office of Drinking Water
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

In Cooperation With:

U.S. Department of Health & Human Services
Indian Health Service
Office of Environmental Health and Engineering
Rockville, Maryland 20857

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- Tribal officials, council members and system operators of the 24 tribes visited by the Study Team

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# EXECUTIVE SUMMARY

Under Section 302(e) of the 1986 Amendments to the Safe Drinking Water Act (SDWA), the Environmental Protection Agency (EPA), in cooperation with the Indian Health Service (IHS), is required to conduct a survey of drinking water on Indian reservations, identifying drinking water problems and the need, if any, for alternative drinking water supplies. In accordance with this mandate, EPA defined the scope of the study to include only public water systems (which serve 25 or more persons or have at least 15 service connections) due to the fact that the SDWA Amendments define EPA's role in regulation development as one which applies to public, not individual water systems. In addition to addressing these requirements, EPA used the study as an opportunity to assess tribal awareness of the proposed Indian primacy regulations and to identify how existing information and technical assistance programs can be used more effectively to meet the drinking water needs of American Indians living on reservations.

As a foundation for this study, EPA integrated data from the Federal Reporting Data System (FRDS), IHS' Sanitation Facility Data System (SFDS) and selected information from an IHS survey of Indian drinking water systems in order to characterize the conditions of community drinking water systems on Indian reservations. These three information sources were originally developed to accommodate information which would reflect the status of the systems, but in and of themselves do not reflect all the problems that exist. Consequently, the data bases were supplemented with information collected during site visits to

24 tribes in 6 IHS Areas located throughout the United States. This first-hand information provided a further understanding of a portion of community drinking water quality and supply problems and pointed out several difficulties which were not made apparent from the data search.

Data Analysis

An analysis of the information in EPA's and IHS' information systems identified 836 public water systems existing on 190 reservations. Community systems represent 701 of the public water systems which are defined in the SDWA as systems serving 15 or more homes or 25 or more persons. Based on the data managed in these systems (e.g., frequency and duration of maximum contaminant level (MCL) and monitoring violations), it appears that most tribes are able to consistently supply safe drinking water. Only 6 percent of the 836 systems known to be on reservations reported MCL violations during 1986 for microbiological contamination. However, not all systems monitor consistently; 37 percent reported at least one monitoring violation, while almost 13 percent reported 10 or more during 1986. Virtually all the systems within the Billings and Portland IHS Areas recorded at least one monitoring violation, while 67 of the 80 systems in the Aberdeen IHS Area recorded 10 or more. Nearly a quarter of the systems in the California IHS Area recorded at least one microbiological MCL violation.

The study's assessment of the quality of community drinking water systems is based solely on the frequency of reported microbiological contamination problems due to the fact that these are often the most serious and most frequent violations. In addition, on a national basis, little information is available concerning the extent to which Indian community drinking water systems are contaminated with organic chemicals, pesticides, or metals. Reservations having the capabilities and the initiative to provide routine operation and maintenance services seem to be better prepared to provide good quality water than those not conducting routine operation and maintenance activities. IHS who is, jurisdictionally, more familiar with operation and maintenance in most cases, measures the success of operation and maintenance in terms of "adequacy" ratings. IHS data indicates that water systems funded exclusively through user fees have the highest adequacy ratings and the best water quality. By contrast, systems which are financed entirely by tribal funds have the lowest adequacy ratings and poorest water quality. These systems, which depend on the tribal government for all or part of their operating budgets, typically compete for funding with other tribal concerns and preventive maintenance frequently tends to be underfunded when resources go to higher tribal priorities.

Site Visit Analyses

The ability of Indian tribes to provide clean, safe drinking water (characterized by an absence of reported waterborne disease outbreaks and minimal microbiological contamination among the tribes visited) is a function of the tribes' economic status, the degree of oversight by qualified water system managers and operators, the raw water quality, and adherence to routine preventive maintenance schedules. All the tribes visited face some combination of water quality, water supply, and administrative problems; the severity of these problems depends upon a variety of factors, although the level of financial support and/or support for collecting user fees provided by the tribal governments appears to be the most significant.

Some problems exist among Indian water systems which are not unique to Indian tribes. Small non-Indian community water systems (defined as systems serving 25 to 3,300 persons on a regular basis) typically experience many of the same problems that are documented in this study and share a number of characteristics common to Indian community systems, including the inability to adequately finance their systems, lack of trained operators, and lack of routine preventive operation and maintenance procedures.

The capabilities of the tribes to perform the required operation and maintenance depends on three factors: 1) the skills, knowledge, and personal interest of the manager of the

water system; 2) the level of operator training; and 3) the financial resources available to fund water system operation and maintenance and to retain qualified personnel. When one or more of these factors is lacking, preventive maintenance is typically neglected, resulting in a gradual deterioration of the water system, a proliferation of operation and maintenance problems, and an increase in SDWA monitoring and MCL violations. In most cases, the technical assistance provided by IHS is a significant factor in keeping the community drinking water systems functioning adequately.

The methods by which SDWA and technical information is provided to the tribes vary by IHS Area. For the most part, SDWA information is provided primarily by the EPA Regional offices, and IHS provides most of the technical assistance and technical information. Several tribes also obtain assistance from various other sources, including independent consultants, equipment manufacturers, Rural Water Associations, State agencies, and Indian organizations.

Although all of the tribes visited are aware of the existence of SDWA, many do not have a thorough understanding of the specific requirements of the Act, and have not developed plans to implement the 1986 Amendments.

Of the reservations visited, it was observed that the majority of the population obtains its drinking water from centralized systems. Individuals not served by these community

systems typically live in isolated rural housing and are served by individual wells. Ground water is the most prevalent source of drinking water on all of the reservations visited, accounting for over 95% of the raw water sources.

In cases where bacteriological contamination occurs, it can most often be attributed to problems in distribution systems rather than the quality of the raw water supply. Among surface water systems, the potential for contamination by pathogenic organisms (i.e., protozoa, viruses) is also substantial. Problems typically result from cross-contamination from sewage lines or septic drainfields, service disruptions due to flooding, and improper operation and maintenance of the system.

Except for tribes on the Colorado River and the mountainous regions of Arizona, most of the tribes visited experience seasonal water shortages and few have alternative water supplies. Regional summer droughts in Washington State, for example, result from increased water usage by summer resorts and the seasonal fish-processing business. Summer shortages in Southern California can be attributed to year-round distribution problems that are exacerbated by increased summer demand, water loss, and a lack of awareness of the need to conserve water. Water loss is attributed to poor household plumbing and leaking distribution systems and accounts for a substantial amount of water shortage.

Most of the tribes recognize the need to develop alternative sources and many are devising plans to search for new sources with the assistance of IHS and the Bureau of Indian Affairs (BIA).

## FINDINGS AND CONCLUSIONS

### Organizational Structure of Tribal Governments

- Tribes may wish to re-organize their water system operations by assigning a manager who is responsible for overall operation of a system (financial operations and water delivery). Tribes may also wish to establish an environmental management office that oversees the water systems, monitors compliance with federal and state regulations, and reports results to EPA and IHS.

- Smaller tribes might consider working together and employing one operator who would be responsible for operation and maintenance for several tribes in the same general area. This individual would visit the water systems on a regular basis and ensure adequate and preventive water system services to the tribes.

### Sources of SDWA and Technical Information

- With the cooperation of IHS and various Indian organizations, EPA could develop materials and training programs concerning SDWA, the Amendments, and the regulations which present, in simple terms, what tribes need to do in order to comply with the Federal regulations, and why it is important to do so.

### Role of EPA

- Tribal compliance with SDWA could be improved if tribes were visited by the EPA drinking water coordinator on a regular basis to assess compliance, address tribal concerns/inquiries, and provide the most current regulatory information.

- o EPA should ensure that the individual(s) in each Region who serve as a point of contact for tribes are recognized by the tribe as the one who can supply information on a variety of environmental programs.

- o EPA Regional offices may wish to emphasize the importance of protocol when dealing with the Indians. An understanding of tribal environmental concerns, a familiarity with the conditions of the water systems, and a sensitivity to tribal customs and lifestyles could improve working relations between the tribes and the coordinators.

Adequacy of Water Systems and Operation and Maintenance

- o The financial status of the tribal community drinking water systems could be improved if tribes considered implementing an independent mechanism such as the collection of monthly utility fees, separate from the demands on tribal resources, to cover operation and maintenance expenses.

- o EPA and IHS need to continually emphasize the importance of routine and preventive maintenance in order to reduce the risk of equipment failures and potential contamination incidents.

Need for Alternative Water Supplies

- o Tribes and IHS may be able to conduct studies to identify the availability of alternative supplies and methods by which the sources may be developed.

- o Where feasible, tribes should be encouraged to negotiate with municipalities or local utilities to obtain water in emergency situations.

# CHAPTER ONE

# INTRODUCTION

# I. INTRODUCTION

Section 302(e) of the 1986 Amendments to the Safe Drinking Water Act (SDWA), required the Environmental Protection Agency (EPA), in cooperation with the Indian Health Service (IHS), to conduct a survey of drinking water on Indian reservations, identifying drinking water problems and the need, if any, for alternative drinking water supplies. The purpose of this report is to address these requirements and to identify how existing information and technical assistance programs can be used more effectively to meet the drinking water needs of American Indians living on reservations. In addition, the Study Team and EPA Regional Office personnel provided tribes with additional information on current efforts to implement the 1986 SDWA Amendments. Also, they were able to gather current information on the tribes' intent to apply for primacy. The Study Team visited 24 reservations located throughout 6 IHS Areas (see Appendix A).

## Objectives

The specific objectives of the study were to:

- Assess the rate of non-compliance with the National Primary Drinking Water Standards on Indian reservations;
- Describe Indian drinking water systems and evaluate the adequacy of associated operation and maintenance practices;
- Identify tribal actions designed to improve compliance and address water quality problems;
- Characterize the need for and the availability of alternative drinking water supplies.

- o In addition to the above objectives, EPA used this opportunity to discuss the SDWA and its Amendments, tribal eligibility for primacy as well as tribal interest in applying for primacy.

The IHS assisted in establishing the appropriate protocol for the study, provided the Study Team with access to the IHS Sanitation Facility Data System (SFDS), and collected detailed information on all drinking water systems which was used to supplement SFDS information.

The study involved two phases. In Phase I, the Study Team integrated the EPA and IHS data bases to develop information on the compliance status and condition of community drinking water systems on Indian reservations. In Phase II, a field study was conducted to review and confirm information in the data bases, to obtain information on drinking water quality problems and alternative sources, to discuss tribal government structure and water system operations, to characterize the relationship between tribes and the Federal government, and to communicate information on the new SDWA requirements.

Phase I - Data Base Integration

A significant aspect of this study involved analyzing and compiling the information in the EPA and IHS automated data base systems which differ in several aspects.

FRDS contains information on the characteristics of each public water system (e.g., population served, capacity, source, and type of treatment) and the SDWA compliance rates for Indian community water systems located on reservations in eight EPA Regions. The two remaining EPA Regions do not contain Indian systems. SFDS contains information concerning the operation and maintenance adequacy, population, water utility rates, SDWA compliance, and "unmet needs." "Unmet needs" are defined as the total identifiable need for sanitation facilities for a community in terms of dollar volume and number of homes to bring that community/existing sanitation facility up to a level of feasible and desired service commensurate with accepted public health standards and EPA regulations. Although this information was reviewed throughout the site visits, it should be noted that these figures had not been updated in anticipation of the additional costs which would be incurred by systems in order to comply with the 1986 SDWA Amendment requirements and therefore were not used to a large extent in the data analysis.

The Study Team integrated these two data bases to develop a comprehensive data base of drinking water systems on Indian reservations. Water systems from FRDS were matched with water systems in SFDS based on a unique identification number, the public water system identification number (PWS ID), assigned by EPA to each water system. IHS has adopted the EPA PWS ID

number as its unique sanitation facility code number. In addition, information on each drinking water system that was collected by IHS was used to verify the integrated data base and to supplement the information managed in FRDS and SFDS.

The integration of these two information systems provided for the characterization of compliance problems and the adequacy of system operation and maintenance programs.

Phase II - Field Studies

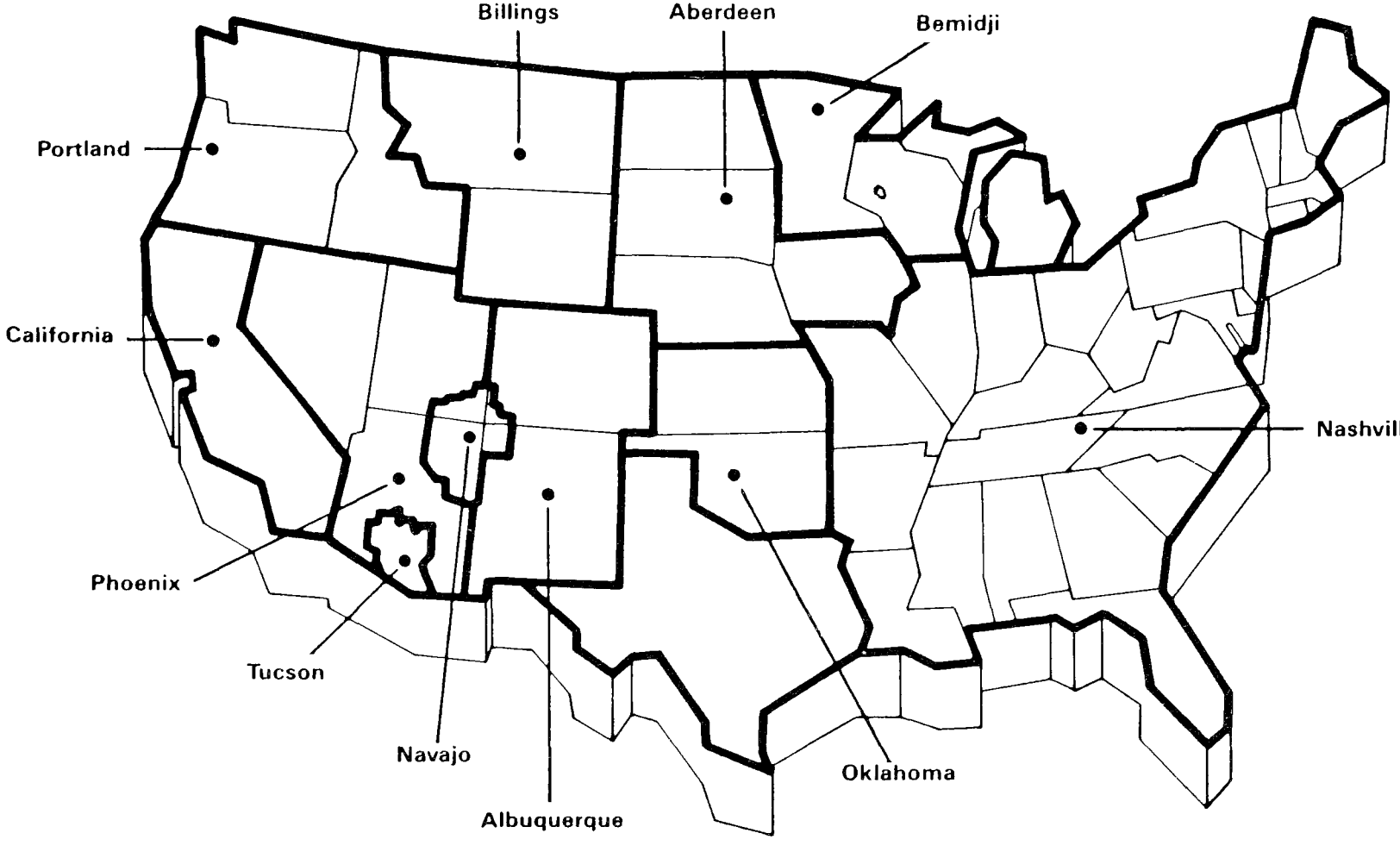
Neither FRDS nor SFDS provides information related to the cause or nature of drinking water system problems, or tribal strategies for obtaining SDWA information. In order to obtain this information, the Study Team visited 24 reservations and rancherias located in various parts of the U.S. The purpose of these visits was to obtain information; to identify the procedures tribes have implemented to provide an adequate supply of potable water and to determine the source of training and technical assistance for each tribe. In addition to offering first-hand observations of the operation of drinking water systems on reservations, the field visits also served to verify the technical data obtained from FRDS and SFDS.

Methodology

The methodology involved the following tasks:

- FRDS and SFDS data were obtained for each water system located on an Indian reservation.
- An integrated data file was developed using the FRDS and SFDS data supplemented with information obtained directly from the tribes.

FIGURE 1-1: IHS AREA DESIGNATIONS



- A candidate list of reservations for site visits was developed using information from the integrated data file, input from two Area offices, and input from the EPA Regional offices. In addition, all tribes responding to the letter were included in the list of candidates.

- A group of reservations was selected for site visits according to a set of selection criteria including geographical location, willingness to participate, and characteristics of the water systems.

- The selected reservations were contacted by EPA Regional office staff, IHS Area staff, and by EPA Headquarters to obtain their permission for the site visit and to encourage their cooperation. Only tribes electing to participate were visited.

The site visits to six states were conducted during August 1987 and enabled the Study Team to acquire a firsthand perspective of water system facilities and discuss relevant topics related to drinking water quality. Each site visit consisted of a series of meetings or discussions with the IHS field staff, the EPA Drinking Water Coordinator, a representative of the tribal leadership, a representative of the tribal utility authority if one existed, and at least one system operator. The IHS field staff and EPA Regional staff met with the Study Team prior to the meetings with tribal representatives to verify the existence of systems identified in the data base and to obtain additional information on these systems. Information pertaining to water systems in the area and the IHS' and EPA's perspective on the conditions and needs of the water systems were also discussed. In cases where representatives from the tribal council were unavailable, the information was collected

from utility authority personnel and the water system operators. A summary of the information obtained during each site visit was sent to the appropriate tribe for validation and the submission of additional information was encouraged. Both IHS field staff and EPA Regional staff were also given an opportunity to comment on these summaries.

Remainder of the Report

Data Analysis Section: presents a summary of the demographics of the reservations, characteristics of the water systems, compliance information, adequacy of the operation and maintenance, and the interrelationships among these factors.

Site Visit Analysis Section: presents an overview of the demographics and organizational structure of the tribal governments, identifies the source of regulatory and technical information, discusses tribal relationships with EPA and IHS, describes sources and adequacy of water systems, the need for alternative water supplies, and adequacy of operation and maintenance practices. This section also includes suggested improvements based on the Study Team's observations and findings.

Findings and Conclusions Section: presents the findings which the tribes, EPA, and IHS may consider to help lead to improved quality of drinking water on Indian reservations.

# CHAPTER TWO

# DATA ANALYSIS

# II. DATA ANALYSIS

This chapter presents the results of an analysis of the data regarding drinking water supplies on Indian reservations, collected on a nationwide basis by EPA and IHS, respectively. These data form the basis of most of the study's general findings about the number, characteristics and problems of drinking water systems on Indian reservations.

Two national data systems exist with information on the number, characteristics and problems of Indian water systems: EPA's Federal Reporting Data System (FRDS) and IHS' Sanitation Facility Data System (SFDS). Ostensibly, either or both represent a comprehensive inventory of such systems; however, this study has found inconsistencies between the records contained in the EPA and IHS data bases, and between the records of EPA at the national and regional levels. Consequently, the number of systems this study could establish as "known to be located on Indian reservations" is considerably fewer than either agency's national data system indicates. Compounding this problem is the fact that system records are found to be incomplete in both data bases. All of these shortcomings limit the ability to describe and generalize the conditions of Indian water systems on a national basis (see Appendix C for further discussion of these shortcomings, as well as the study's methodology for trying to standardize the information available).

However, the fact that this study cannot satisfactorily accomplish its objectives using the national data bases is not necessarily the fault of those data systems, which are designed and maintained for purposes entirely different than the goals of the study.

The FRDS consists of an inventory of water supplies (encompassing both community and non-community water systems) meeting the SDWA definition of a "public water system": serving 15 or more homes or 25 or more persons.

FRDS is designed to maintain data related to five areas:

- Inventory of water systems including location, owner, operator, and type of service connections;
- Summary statistics related to population served, capacity of each system, sources of water, treatment processes, and monitoring requirements;
- Violation data including maximum contaminant level violations (MCLs), monitoring/reporting violations, and duration of these violations;
- Variance and exemption data; and
- Enforcement actions pertaining to water systems.

The IHS' SFDS contains information on water systems serving Indian tribes living on or near reservations in 32 States and is designed to maintain information on:

- Inventory of water systems[1/] serving Indian tribes including such data as IHS Area, State, County, community, tribe, reservation, type of service, and whether the water system is community, non-community or individual;

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1/ The SFDS maintains information on wastewater and solid waste sanitation facilities in addition to water systems.

- Summary statistics concerning system reliability and compliance with EPA and applicable State regulations (SDWA); the adequacy of the operation and maintenance including who is responsible for providing the operation and maintenance; cost of improvements to meet the mandatory regulations under SDWA or State regulations; and method by which the water system is financed;

- Unmet needs[2/] related to system improvements or expansions required to ensure the availability of an adequate supply of drinking water and the cost of the most feasible means to meet mandatory SDWA/State regulations (waste-water treatment and solid waste management needs are also included in their respective records).

The IHS, given its broad responsibility to improve Indian health in all respects, is interested in more than just the water supplies meeting the SDWA definition of "public water system". Consequently, the IHS inventory is considerably larger and may include individual household supplies, systems serving Oklahoma Indians and Alaskan native villagers residing outside of reservation boundaries and systems with sources off-reservation but delivering water to residents of the reservation.

The first step in the data analysis involved the integration of FRDS and SFDS information relating to public water sytems on Indian reservations. Because the Congressionally-mandated scope of this study was "drinking water on Indian

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2/ "Unmet Needs" defined as the total identifiable need for sanitation facilities for a community in terms of dollar amount and number of homes to bring that community/existing sanitation facility up to a level of feasible and desired service commensurate with accepted public health standards and EPA regulations.

reservations", data from SFDS pertaining to public water systems for non-reservation Indians and individual wells were excluded from the analysis.

Each water system in FRDS is identified by a public water system identification number (PWS ID), a unique code assigned to each public water system, both community and non-community, tracked in FRDS.3/ IHS adopted this ID number for water systems tracked in SFDS. In SFDS, the PWS ID is referred to as the sanitation facility code number. The two data bases were then integrated on the basis of this specific water system identification in order to create a standardized data base of drinking water systems located on and serving the residents of reservations.

Numerous problems were encountered with both FRDS and SFDS in attempting to integrate the data based on the PWS ID (see Appendix C for a complete discussion). The name of the reservation on which the water system is located as well as the owner/operator name was used to verify and ensure the accuracy of the matches. In some cases SFDS lacked records for systems inventoried in FRDS: water systems in FRDS which were known to

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3/ A discrete "data record" in FRDS (i.e., a single set of information regarding system location, characteristics, and treatment exists per each source used by a PWS, so that a single PWS (with a discrete PWS ID) encompasses as many data records as sources (surface, ground or both).

be on reservations were used even if a corresponding SFDS record could not be identified. More common were the cases where systems were inventoried in SFDS, but not FRDS. Because of the more limited scope of this study, water systems in SFDS without corresponding data in FRDS, or without independent confirmation by EPA or IHS field staff as to their known existence on reservations, were not included in this standardized data base. It should be noted, for example, that water systems in Oklahoma were not included because drinking water is typically obtained from non-Indian rural water districts. In all, approximately one quarter of the systems inventoried in SFDS (or 456 of 1805) were excluded, largely because the Study Team was unable to establish that these were on reservations (see Appendix C). Table 2-1 describes the categories of data captured by integrating SFDS and FRDS.

The last step in establishing a standardized data base regarding water systems on reservations was review of the standardized inventory. This was done through discussions with the EPA Regional and IHS Area staff during the field visit portion of the study (See Chapter 3) and by other EPA Regions through phone conversations.

System Location and Characteristics

The result of the data analysis described above and in Appendix C is the identification of 836 public water systems known to be on reservations in all 12 IHS Area jurisdictions.

Seven hundred and one of these are community water systems and 135 are non-community water systems. These 836 systems are on 190 reservations.

For the purposes of this discussion, the reservations and water systems have been characterized on an IHS Area-specific basis. Table 2-2 presents demographic and water system data for each IHS Area. Figures 2-1 through 2-4 provide an overview of the water system characteristics by IHS Area. Appendix E presents a summary of the data on which this analysis is based, summarized on the basis of the 190 reservations.

Figure 2-1 illustrates the most salient fact regarding the location and characteristics of Indian systems on Indian reservations: in terms of sheer numbers, these systems are concentrated in the southwest, with significant clusters in the Dakotas and the upper Great Lakes regions. Four of the 12 IHS Areas -- covering the Navajo and Tohono O'Odham reservations (Areas 80 and 00, the Window Rock and Tucson Area offices, respectively), the rest of Arizona, Nevada and Utah (Area 60, the Phoenix office) and California (Area 61, the Sacramento office) -- together contain 424 systems, just over one-half of the 836 systems known to be on reservations. The geographic boundaries of these four areas conform to that of one EPA region, Region IX (San Francisco). 4/

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4/ EPA FRDS data indicates 422 of 748 community systems within Region IX's jurisdiction for FY 1986, or 56%. This universe of community water systems, however, is known to contain "double counted" or inactive systems and is larger than the actual number of systems confirmed to be on reservations.

TABLE 2-1

OVERVIEW OF DATA INCLUDED IN THE ANALYSIS

| TYPE OF DATA | SOURCE | DEFINITION/EXPLANATION |
|---|---|---|
| Number of Water Systems | FRDS | Total number of water systems located on a reservation. Includes community and community water systems. Based on count of FRDS PWS identification numbers associated with an Indian reservation. Individual wells were omitted from the analysis. |
| Population Served | FRDS | Total number of individuals served by the public water systems. Includes community and non-community water systems based on the population served by each public water system located on an Indian reservation. Individual wells were omitted from the analysis.<br><br>Population served divided into four categories based on total number of individuals served by each public water system on an Indian reservation. Categories are 0 < 100; 101 < 500; 501 < 1000; > 1001. |
| Source of Water | FRDS | Four sources of water are identified in FRDS: Ground Water, Surface Water, Purchased Ground Water, and Purchased Surface Water. Only three categories analyzed: Ground Water, Surface Water, and Purchased Ground Water. Total number of public water systems on each reservation using each type of source. |
| Water System Capacity | FRDS | Annual average of daily production in gallons per day. Divided into four categories 0 -< 10,000; 10,001 < 100,000; 100,001 < 300,000; and > 300,001. Total number of public water systems on an Indian reservation in each category presented. |
| Type of Service | FRDS/ SFDS | Total number of public water systems on an Indian reservation providing service to: residential areas, native American homes, company towns; mobile home parks; institutions or schools; recreational areas, campgrounds, picnic areas, marinas, ski resorts, bathing areas, visitor centers, highway rest areas; motels, restaurants, gas stations, lodges, commercial buildings; other. |
| Operation and Maintenance Organization | SFDS | There is a formal operation and maintenance organization that operates under some type of written authority, other than that specified in the Memorandum of Agreement between the Tribe and IHS under which the sanitation facility was constructed, or if there is a de facto organization. |
| Authority of Operation and Maintenance Organization | SFDS | Identifies the operation and maintenance organization by authority under which it operates: Tribe - tribal government, tribally chartered organization, housing authority; Other - private corporation, incorporated municipality, community or village, rural water district, BIA, other. |

TABLE 2-1

OVERVIEW OF DATA INCLUDED IN THE ANALYSIS
CONTINUED

| TYPE OF DATA | SOURCE | DEFINITION/EXPLANATION |
|---|---|---|
| Adequacy of Operation and Maintenance Organization | SFDS | Numeric rating of three important areas that reflect how well the organization is running its business:<br>Administration:<br>1 Program organization shown on operational diagram, and written program objectives specify organization responsibility; all policies and procedures written and followed<br>2 - Program organization shown on operational diagram, and written program objectives specify organization responsibility; one-half of policies and procedures written and followed<br>3 - Program organization shown on operational diagram, or written program objectives specify organization responsibility; one-half of policies and procedures written and followed<br>4 - Program organization and objectives are not written but are understood; some of the policies and procedures written and followed<br>5 - Program organization and objectives are neglected; some of the policies and procedures written and followed<br><br>Operation:<br>1 - Preventive maintenance and inspection schedules exist; maintenance and monitoring performed as required; records maintained<br>2 Preventive maintenance and inspection schedules exist; maintenance and monitoring performed as required; records minimal<br>3 Preventive maintenance and inspection schedules needs improvement; most of the maintenance and monitoring performed as required; records minimal<br>4 No preventive maintenance and inspection schedules; minimal maintenance and monitoring performed; no records kept<br>5 - No preventive maintenance and inspection schedules; minimal maintenance and monitoring rarely done; no records kept<br><br>Equipment and Supplies:<br>1 Preventive maintenance and daily checks performed; maintenance shop organized with proper inventory; inventory of supplies is adequate<br>2 Preventive maintenance and daily checks performed; maintenance shop organized with proper inventory; supplies are minimal<br>3 - Preventive maintenance and daily checks need improvement; maintenance shop has an adequate organization and inventory; supplies are minimal<br>4 - No preventive maintenance and daily checks; maintenance shop poorly organized with minimal inventory; no supplies kept<br>5 No preventive maintenance and daily checks; maintenance shop inadequate; no supplies |

TABLE 2-1

OVERVIEW OF DATA INCLUDED IN THE ANALYSIS
*CONTINUED*

| TYPE OF DATA | SOURCE | DEFINITION/EXPLANATION |
|---|---|---|
| Operation and Maintenance Service | SFDS | There is no formal or de facto operation and maintenance organization or if operation and maintenance is performed by someone in addition to that provided by the operation and maintenance organization. Operation and maintenance performed by: Individual one or more people take care of the community or central system without any formal authority or responsibility; Community the community takes care of system on an ad-hoc basis, short of formal or de facto operation and maintenance organization; Tribe the tribe takes care of the system on an ad-hoc basis; BIA - the system is operated and maintained by BIA; Housing the system is operated and maintained by a housing authority but no formal operation and maintenance organization has been established; other if a city or rural water district owns and operates the system and supplies water to Indian and non-Indian homes. |
| Adequacy of Operation and Maintenance | SFDS | Subjective numeric rating from 1.0 5.0 that reflects the adequacy of the operation and maintenance.<br>1.0 - Significant components of the facility have failed and are inoperable and/or the system presents an actual health hazard due to inadequate operation and maintenance.<br>2.0 Some major components of the facility have failed or are about to fail and/or potentially serious health hazard exists due to inadequate operation and maintenance.<br>3.0 The system is badly in need of maintenance but all major components are operational.<br>4.0 The system needs some maintenance (painting, cleaning, weed cutting, etc.) but is fully operational.<br>5.0 The system is in excellent condition. Maintenance is good and the system is fully operational.<br>Average for all sanitation facilities on the reservation. |
| Reliability | SFDS | The percentage of time during the past 12 months that the system provided bacteriologically safe water. Based on the amount of time the system was not producing water, the quality was known to be unacceptable or the quality was suspect due to flooding, equipment failure, etc. A reliability rating of 100 % - facility down less than 2 days; 99% facility was down 2-5 days, etc. Average for all commmunity water systems on reservation. |
| Violations | FRDS | Total number of times each type of MCL for bacteriological contamination was violated and the duration of each violation in months. Total number of monitoring violations for turbidity, organic, chemical, bacteriological, and radiological. Total for all public water systems on reservation. |

TABLE 2 1

OVERVIEW OF DATA INCLUDED IN THE ANALYSIS
CONTINUED

| TYPE OF DATA | SOURCE | DEFINITION/EXPLANATION |
|---|---|---|
| Cost to Comply with SDWA | SFDS | Total cost of the most feasible way to meet the mandatory regulations for the water systems within the jurisdiction of the operation and maintenenace organization on the reservation of the most feasible way to meet the mandatory regulations promulgated under SDWA or State regulations where applicable. Cost is based on requirements prior to 1986 SDWA Amendments. |
| Water System Funding | SFDS | Defines whether the tribe charges members for water - flat rate charge or metered rate charge; whether the tribe contributes funds to the operation of the water system; or whether the tribes fund the entire operation of the water system. |

TABLE 2-2. CHARACTERISTICS OF WATER SYSTEMS ON INDIAN RESERVATIONS IN ALL IHS AREAS

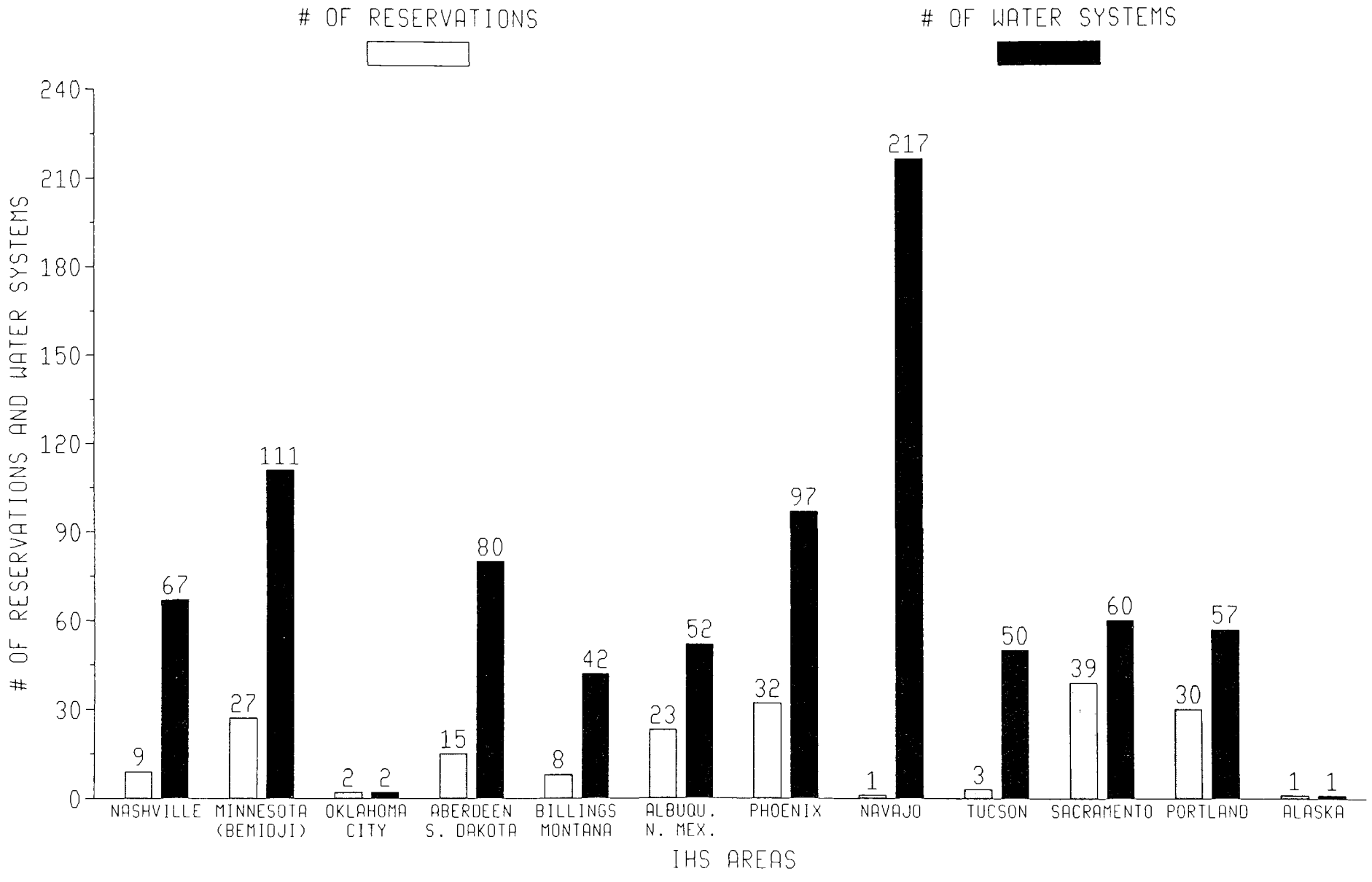
| IHS Area | Number of Reservations* | Number of Water Systems* | Type of System | | Avg. Population Served | Number of Waters Systems By Population Categories | | | | Ground Water Systems | Surface Water Systems | Purchased Water Systems | Number of Water Systems by Facility Category Flow (Gallons/Day) | | | | Average Reservation Population |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Community | Non-Community | | 0-100 | 101-500 | 501-1000 | >1001 | | | | 0-10 | 11-100 | 101-300 | >301 | |
| Nashville | 9 | 67 | 34 | 33 | 190 | 48 | 9 | 9 | 1 | 65 | 2 | 0 | 61 | 3 | 0 | 2 | 1,415 |
| Bemidji | 27 | 111 | 77 | 34 | 185 | 74 | 30 | 5 | 2 | 111 | 0 | 0 | 108 | 0 | 1 | 1 | 760 |
| Oklahoma | 2 | 2 | 2 | 0 | 375 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 200 |
| Aberdeen | 15 | 80 | 73 | 7 | 414 | 27 | 39 | 2 | 12 | 72 | 8 | 0 | 39 | 4 | 8 | 0 | 2,253 |
| Billings | 8 | 42 | 41 | 1 | 287 | 12 | 23 | 4 | 3 | 38 | 4 | 0 | 41 | 0 | 0 | 0 | 1,588 |
| Albuque. | 23 | 52 | 34 | 18 | 619 | 21 | 18 | 5 | 8 | 48 | 4 | 0 | 28 | 12 | 6 | 1 | 1,399 |
| Phoenix | 32 | 97 | 90 | 7 | 378 | 28 | 47 | 10 | 12 | 95 | 2 | 0 | 60 | 6 | 8 | 3 | 1,147 |
| Navajo | 1 | 217 | 194 | 23 | 436 | 72 | 96 | 33 | 16 | 212 | 5 | 0 | 188 | 4 | 3 | 2 | 94,573 |
| Tucson | 3 | 50 | 48 | 2 | 251 | 27 | 17 | 4 | 2 | 50 | 0 | 0 | 43 | 2 | 1 | 0 | 4,182 |
| Calif. | 39 | 60 | 56 | 4 | 118 | 36 | 22 | 2 | 0 | 48 | 12 | 0 | 55 | 3 | 0 | 0 | 178 |
| Portland | 30 | 57 | 52 | 5 | 186 | 19 | 30 | 4 | 4 | 51 | 4 | 2 | 32 | 7 | 7 | 0 | 543 |
| Alaska | 1 | 1 | 1 | 0 | 1,056 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | -- | -- | -- | -- | 1,056 |

* - Based on EPA's data base of Indian drinking water systems located on reservations.

Adding one more IHS Area to these four -- the Albuquerque office, covering New Mexico and Colorado, brings the total systems within the Southwest to 476, or 57% of the 836 systems known to be on reservations. This Area office covers portions of EPA Regions VI and VIII.

Figure 2-2 displays the breakdown of community and non-community public water systems known to be on reservations. Community systems are defined in EPA's National Primary Drinking Water Regulations as those public systems that serve residents year-round, while non-community systems are those systems that fit the definition of "public" (i.e., providing water for human consumption with at least 15 service connections or serving 25 or more persons daily at least 60 days out of the year). Non-community systems are also largely exempted from compliance with most of the primary drinking water regulations, subject only to the interim coliform and nitrate MCLs by Federal regulation. Among Indians and non-Indians nationwide, there are far more non-community systems (143,000, approximately) in existence than community systems (59,000): more than 2 out of every 3 PWSs in the country are non-community. On reservations, the trend appears to be reversed: (based on the Study's compilation of systems) there are more than 5 community systems for every non-community system among the 836 public systems inventoried.

# FIGURE 2-1
## NUMBER OF RESERVATIONS AND WATER SYSTEMS IN ALL IHS AREAS



# FIGURE 2-2

NUMBER OF COMMUNITY AND NON-COMMUNITY WATER SYSTEMS ON INDIAN RESERVATIONS IN ALL IHS AREAS

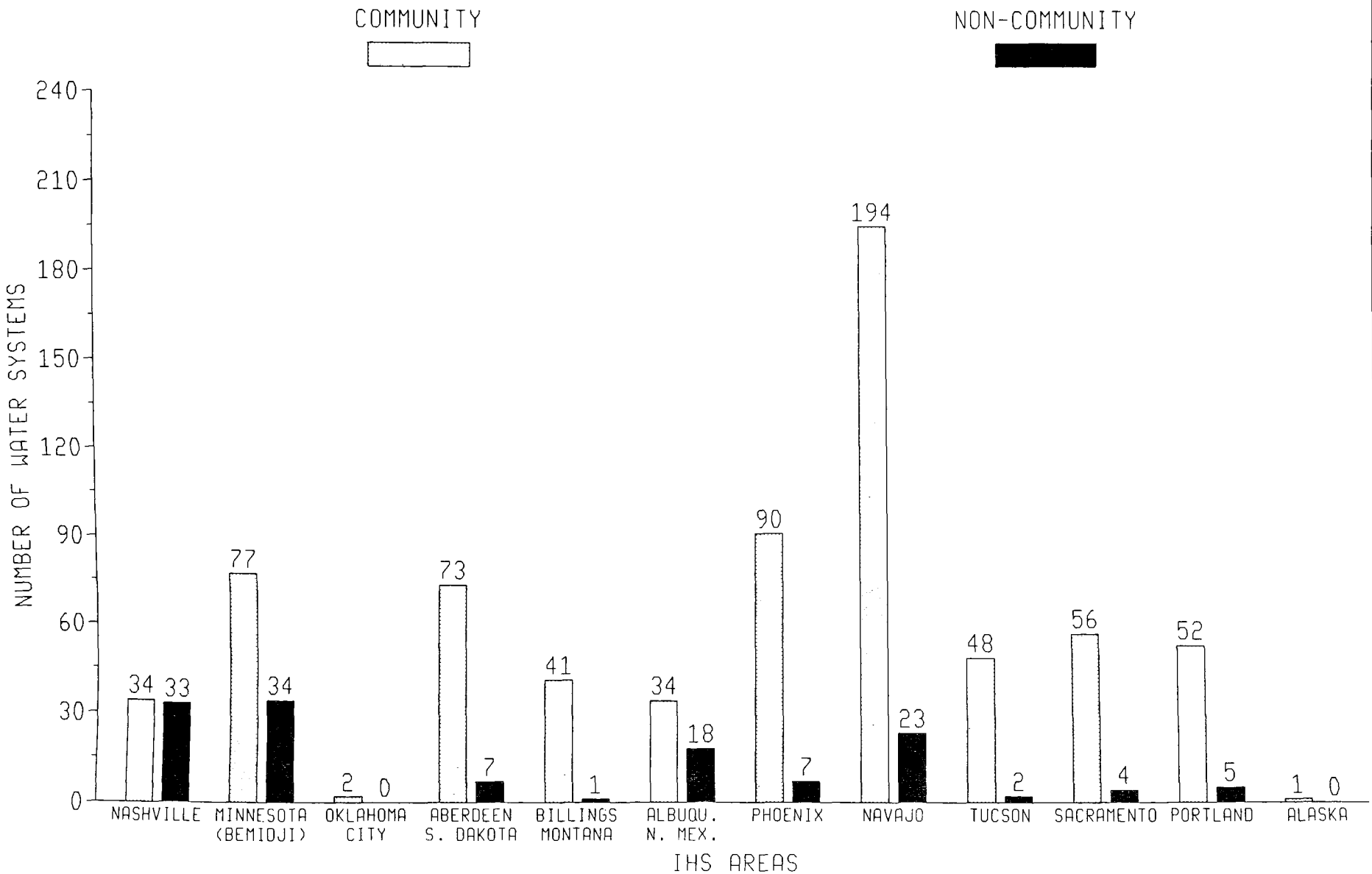


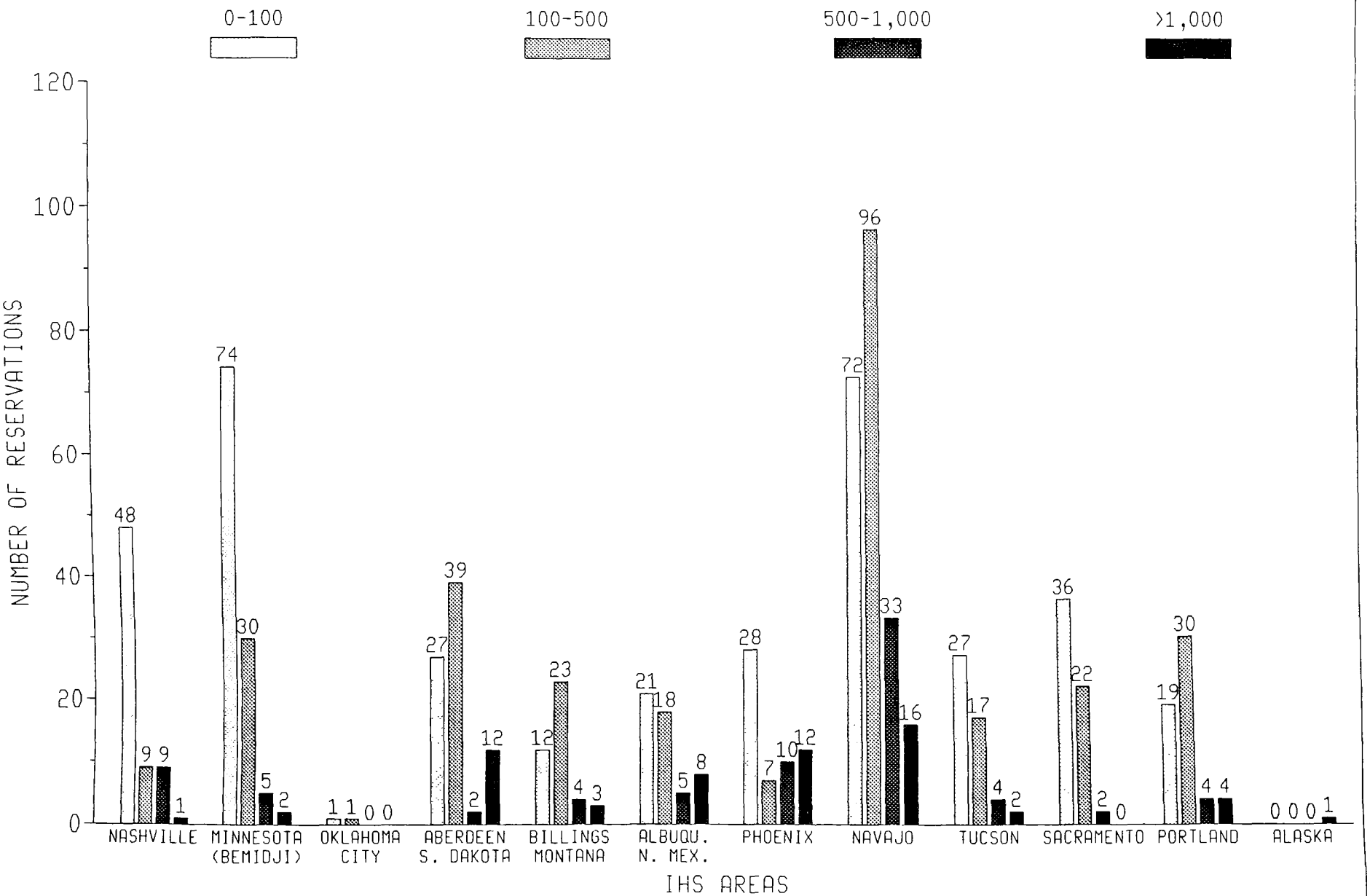
Figure 2-3 displays the relative sizes of the water systems with respect to population served. As is the case nationally, the vast majority of community systems are very small to small; that is, they serve less than 500 people, or less than 3300 people. However, this trend is even more marked on Indian reservations. Nationwide, about 33% of all community systems serve no more than 100 people: on reservations, 44% of community systems do. Nationwide, 60% of community systems serve less than 500 people: on reservations, 83%. Virtually no systems on Indian reservations serve more than 3300 people, the conventional boundary between small and medium-to-large systems.

The fact that systems on reservations are predominantly very small is important with respect to the problems with these systems, for small community water systems as a whole experience the preponderance of problems in complying with primary regulations. A report conducted by Wade Miller and Associates, Inc., (The Nation's Public Works: Report on Water Supply, May 1987) described the typical characteristics of small community water systems as follows:

- Systems have part-time or no water system operators;
- Operators have little or no knowledge of water system finances;
- Water fees do not support the full cost of service delivery;
- Systems often serve low income/fixed income populations; and
- Operators have little or no access to capital.

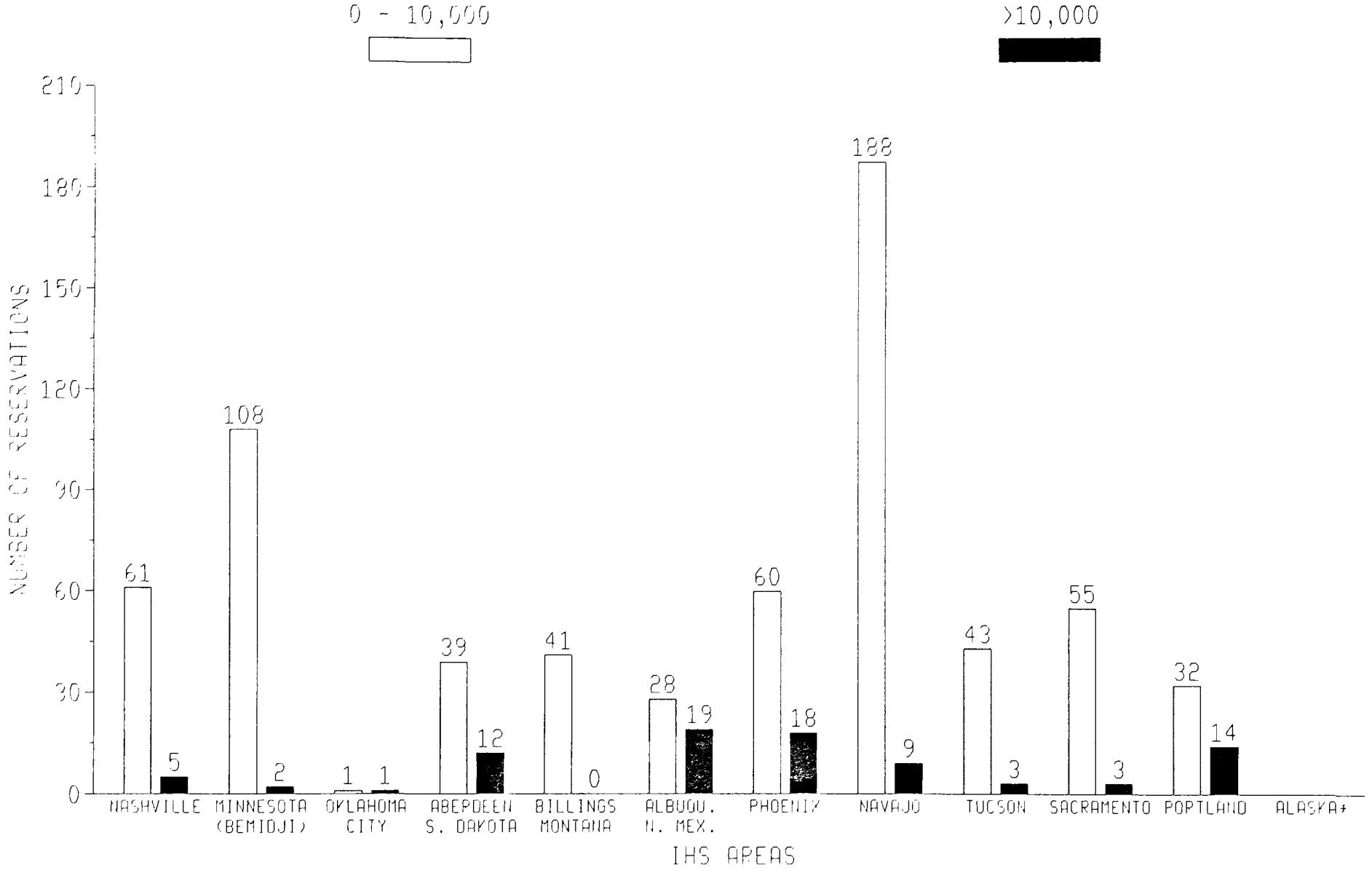
# FIGURE 2-3

## POPULATIONS SERVED BY WATER SYSTEMS IN ALL IHS AREAS



# FIGURE 2-4

## DESIGN FLOWS OF WATER SYSTEMS IN ALL IHS AREAS



The Wade Miller study further observes that small water systems operate on a marginal basis, with inadequate operational and managerial resources to correct deficiencies. Owners/operators of these systems are often unable to respond effectively to emergencies or the need for unplanned improvements and yet are expected to deliver safe and dependable supplies of water to consumers consistently. These problems are also common to systems on the reservations.

According to the data contained in the National data bases, these 701 community systems positively identified as being on reservations serve 264,600 people. What proportion of the total Indian population residing on Indian reservations does that represent? The answer cannot be determined with certainty, as estimates of that population are in dispute.5/ But assuming some consensus figure of 800-900,000 to be correct, it appears that of the systems identified for the study, only a minority of reservation residents receive their drinking water from public sources.6/

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5/ Various authorities (IHS, BIA) have estimates of Federally-recognized tribal populations, the subset residing on reservations and service populations that vary widely and/or are considerably inconsistent. IHS, for example, estimates total Federally-recognized Indians at nearly 1.5 million, while the BIA estimate is nearly one-half that (861,600).

6/ This appears to conflict with the evidence from the field visits that virtually all reservation residents are connected to public water system; however, the field visits did not include the largest, most populous reservations (e.g., the Navajo) where the population is known to be more dispersed. Also, there are serious questions regarding the accuracy of the service population data (see Appendix C).

In contrast, IHS data from its 1986 Annual Status Report indicates that the majority of the Indian population is served by community water systems. According to this source, 1,709 community systems serve 96,381 Indian homes, while individual water systems only serve 27,659 homes.

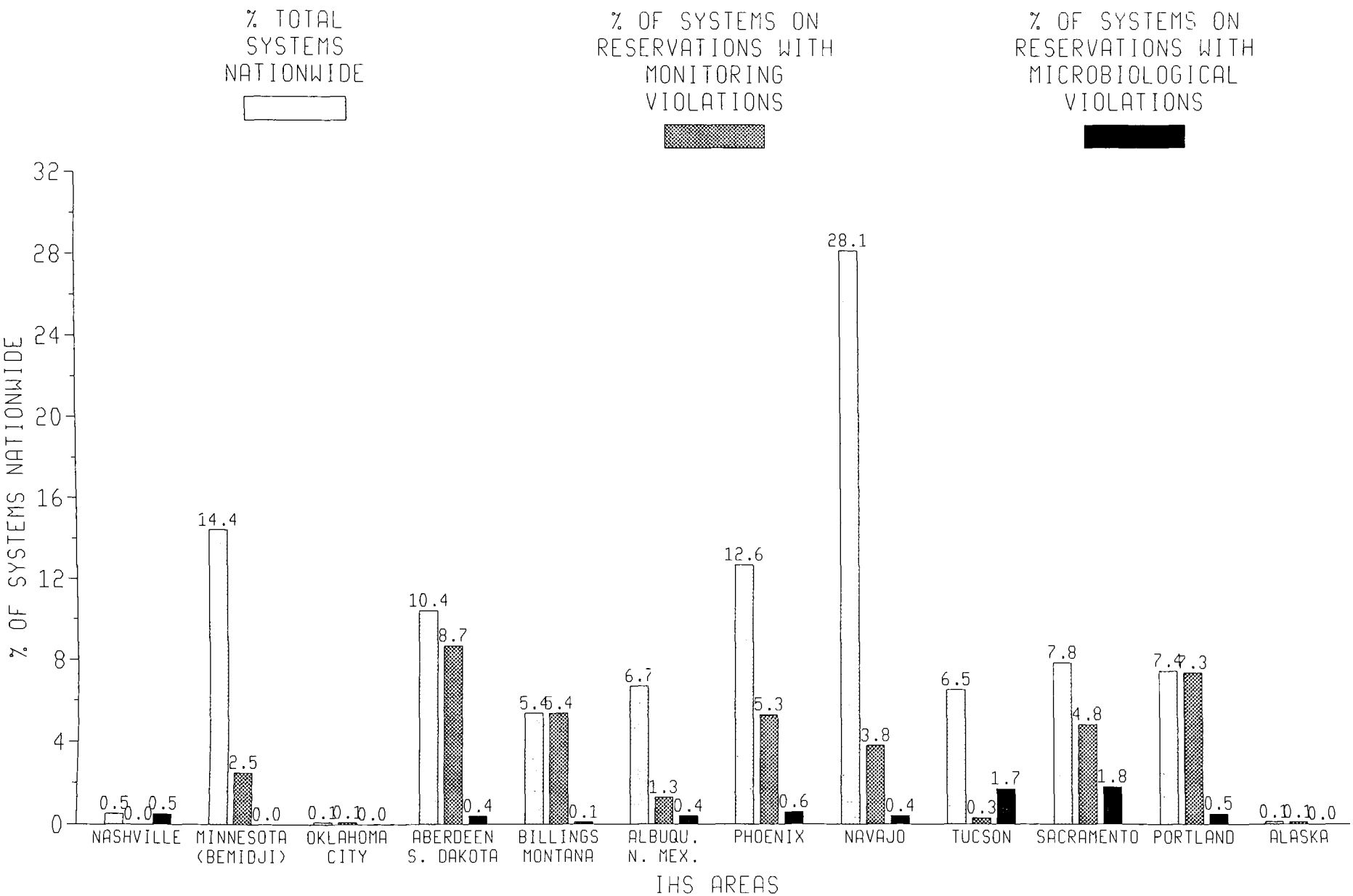
Drinking Water Quality and SDWA Compliance

The only available, nationwide information directly relevant to the quality of water furnished to Indian reservations is the incidence of violations of National Primary Drinking Water Regulations (NPDWR) among Public Water Systems located on those reservations. Contaminants of surface and ground water sources of public systems (both naturally occurring and occurring as a result of pollution, sanitary wastes, agricultural practices, etc.) are covered by these regulations as are contaminants within the distribution system itself (occurring from treatment, e.g., trihalomethanes, or from lack of system integrity and/or deficient operations and maintenance). Regardless of their point of entry to the system, however, the standards are applied to the point where consumers drink the water -- at the tap. It is the system owners' responsibility to see that the water delivered to the ultimate consumer is free from dangerous contamination.

Figure 2-5 shows the percentage of all reported microbiological and monitoring violations for systems on reservations by each IHS Area. Cumulative data for MCL and monitoring violations for IHS Areas are presented in Table 2-3.

# FIGURE 2-5

## REPORTED VIOLATIONS FOR ALL IHS AREAS



No MCL violations were reported for public systems on Indian reservations in the FRDS data base for inorganic, organic, radionuclide or secondary chemical groups in FY 1986. Six percent of all systems on Indian reservations (50 of 836) have reported at least one MCL violation for microbiological contamination, which compares favorably to the national noncompliance rate of 10% in 1986. The average number of these MCL violations for each system was 1.32 per year: only 9 systems had more than one such violation, only two were in violation for 3 months and another two for 4 months.

IHS maintains data on the "reliability" of these systems, defined as the percentage of the time over the last 12 months that the system was operating and providing bacteriologically safe water. The national average reliability is between 97 and 98 percent; however three IHS areas and 14.5% of all Indian system averaged less than 95% reliability: this means that for 18 days or more in 1986, those systems were unable to deliver drinking water or bacteriologically safe water.

The relative lack of MCL violations and the high percentage of overall reliability are signs that drinking water quality on reservations is satisfactory. However, data on the reliability with which the water quality of these systems is tested and reported to EPA is questionable. Similar concerns exist for small non-Indian public water systems as well. The overall

TABLE 2-3. ADEQUACY OF WATER SYSTEMS, ADEQUACY OF OPERATION AND MAINTENANCE AND REPORTED VIOLATIONS

| IHS Area | Number of Reservations | Number of Water Systems | Adequacy* of Water System | Relia-bility | Violations** | | |
|---|---|---|---|---|---|---|---|
| | | | | | Violations** Micro-MCL | Total Monitoring | Total Violations |
| Nashville | 9 | 67 | 3.87 | 99.3 | 4 | 0 | 4 |
| Bemidji | 27 | 111 | 3.98 | 99.4 | 0 | 31 | 31 |
| Oklahoma | 2 | 2 | 3.00 | 90.0 | 0 | 2 | 2 |
| Aberdeen | 15 | 80 | 3.06 | 97.4 | 6 | 938 | 944 |
| Billings | 8 | 42 | 3.54 | 91.5 | 1 | 302 | 303 |
| Albuque. | 23 | 52 | 3.57 | 97.0 | 4 | 77 | 81 |
| Phoenix | 32 | 97 | 3.34 | 98.3 | 5 | 126 | 131 |
| Navajo | 1 | 217 | 4.11 | 97.6 | 3 | 47 | 50 |
| Tucson | 3 | 50 | 4.15 | 96.5 | 16 | 4 | 20 |
| Calif. | 39 | 60 | 3.16 | 84.5 | 22 | 193 | 215 |
| Portland | 30 | 57 | 3.49 | 98.0 | 4 | 400 | 404 |
| Alaska | 1 | 1 | 3.00 | 100.0 | 0 | 24 | 24 |

*Average for all reservations within each IHS Area. See Table 2-1 for definitions of adequacy ratings.

**Total number of violations for all reservations in each IHS Area.

rate of non-compliance with both MCL and monitoring/reporting requirements appears comparable for small Indian and non-Indian systems. NPDWRs embody specific monitoring and reporting requirements, specifying the location, number and frequency of sampling and analyzing water supplies, in order to reliably detect the presence of contamination which exceeds acceptable levels. The implication is that failures to monitor and report have the clear potential to mask or understate the true degree of contamination present among these systems.

Thirty-seven percent of systems on Indian reservations (or 309 of 836) incurred at least one monitoring violation during the fiscal year 1986; 12.7 percent (or 106 of 836) incurred 10 or more monitoring violations per year. The average number of monitoring violations for the systems in violations is just under 7 per year: the comparative figure for all non-reservation systems nationwide was just 1.4 per year. Ninety-one percent of these monitoring violations were microbiological. Every system in the Billings and Portland IHS Areas (that this study was able to confirm exists on a reservation) recorded a monitoring violation. Sixty-seven of the 80 systems within the Aberdeen, IHS Area recorded 10 or more violations per year. Sixty-two percent (37 of 60) of systems within the California IHS Area recorded a monitoring violation. In contrast, no system in the Nashville IHS Area reported monitoring violations.

Where surface water sources are used, the number of MCL and monitoring violations are higher. Table 2-4 presents violation data for ground water and surface water sources. Nationwide, 33 percent of the systems with surface water sources report MCL violations, where reliability averages 95 percent, while only 16 percent of systems with ground water sources report MCL violations and reliability averages 98 percent.

Adequacy of Operations and Maintenance

IHS evaluates one key factor that influences the overall adequacy of the water system and its capability to deliver safe water for human consumption, and that is the adequacy of the systems' operation and maintenance. For purposes of the data analysis, this factor is used to represent the general adequacy of the water systems.

Table 2-1 displays IHS' evaluation system for a facility's operation and maintenance (O&M) adequacy. IHS field staff assign a numeric, ordinal-scale ranking of the facility's O&M, with lower values representing inferior performance on a scale of 1 to 5. A score of 1 indicates significant failures and the presence of an actual health hazard; a score of 3 indicates a minimally operational system in need of improvement. Table 2-5 presents data describing the O&M of water systems on reservations in each IHS Area.

TABLE 2-4. DRINKING WATER SOURCES FOR INDIAN RESERVATIONS, REPORTED VIOLATIONS AND SOURCE RELIABILITY

| Drinking Water Source | Total Number of Reservations | Percent Reporting Microbiological Violations | Reliability |
|---|---|---|---|
| Ground Water | 183 | 16% | 98% |
| Surface Water | 30 | 33% | 95% |

TABLE 2-5. OPERATION AND MAINTENANCE OF WATER SYTEMS ON INDIAN RESERVATIONS

| IHS Area | Number of Reservations | Number of Water Systems | Number of Water Systems With O&M Authority | | Number of Reservations Where O&M is Performed by | | | | | Type of Service Connections on Reservations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tribe | Other | Tribe | Community | Housing Authority | Individual | Other | Native American Homes | Inst. & Schools | Mobile Homes | Commercial | Recreational | User Fees: Flat | User Fees: Metered | Tribal Contribution |
| Nashville | 9 | 67 | 5 | 0 | 6 | 0 | 2 | 1 | 1 | 8 | 6 | 3 | 2 | 4 | 5 | 4 | 4 |
| Bemidji | 27 | 111 | 10 | 0 | 16 | 0 | 8 | 0 | 1 | 25 | 0 | 0 | 0 | 0 | 19 | 2 | 12 |
| Oklahoma | 2 | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 2 | 1 | 1 | 1 |
| Aberdeen | 15 | 80 | 12 | 2 | 11 | 2 | 2 | 1 | 9 | 14 | 9 | 3 | 4 | 4 | 13 | 5 | 4 |
| Billings | 8 | 42 | 5 | 2 | 8 | 1 | 1 | 1 | 3 | 8 | 3 | 0 | 0 | 0 | 6 | 1 | 3 |
| Albuque. | 23 | 52 | 19 | 0 | 22 | 0 | 2 | 2 | 2 | 22 | 2 | 1 | 1 | 6 | 9 | 1 | 12 |
| Phoenix | 32 | 97 | 13 | 2 | 27 | 4 | 3 | 7 | 10 | 31 | 0 | 1 | 3 | 3 | 20 | 9 | 11 |
| Navajo | 1 | 217 | 110 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| Tucson | 3 | 50 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 2 | 1 |
| Calif. | 39 | 60 | -- | -- | 30 | 3 | 0 | 4 | 1 | 38 | 0 | 0 | 0 | 0 | 16 | 6 | 0 |
| Portland | 30 | 57 | 11 | 0 | 23 | 1 | 4 | 4 | 6 | 30 | 2 | 0 | 0 | 2 | 22 | 0 | 7 |
| Alaska | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |

The adequacy of water system operation and maintenance has a definite impact on the number of violations reported by system operations. In the California IHS Area, where most water systems have very low adequacy rates for operation and maintenance, reliability is the lowest in the nation with 23% of the systems reporting microbiological contamination violations. In the Aberdeen IHS Area, the adequacy rating of 3.1 for operation and maintenance is the lowest in the country. This Area reports 45 percent of all monitoring violations. In the Bemidji and Nashville IHS Areas where overall adequacy is approximately 4.0 and reliability exceeds 99 percent, monitoring violations are relatively rare among the systems. The correlation between operation and maintenance and violations is further illustrated in the Portland IHS Area, where the reliability of the 13 reservations with adequacies of 4.0 or higher, average 99.9 percent and report 19 percent of the total Area violations. Meanwhile, the 13 reservations with adequacies of 3.0 or less have a reliability average of 96.9 percent and report 56 percent of the total Area monitoring violations.

Small, less-populated reservations with 1 or 2 water systems commonly have systems with lower adequacy of operation and maintenance. Table 2-5 illustrates the number of water systems with operation and maintenance authority in comparison with the party responsible for performing operation and maintenance activities and Table 2-6 illustrates the average

population served by water systems in comparison to system adequacy in each IHS Area. These reservations typically are hampered by resource limitations caused by diseconomies of scale; they do not have the requisite tools or supplies with which to operate their systems effectively and they do not maintain accurate records. The California IHS Area features very small systems serving an average population of 180 individuals. This Area reports an average rating of 3.16 for operation and maintenance adequacy. Because many systems in this Area score lower than 3.0, this indicates that there are major system problems and potentially serious threats to human health. Similar problems exist in the Phoenix IHS Area (which has an operation and maintenance adequacy average of 3.34) which is composed of small reservations with a single water system each. By contrast, the Tucson and Navajo IHS Areas, each dominated by a single large reservation, have operation and maintenance adequacy ratings of 4.2 and 4.1, respectively. The high adequacy ratings of the Navajo and Tohono O'Odham reservations apparently reflect the availability of adequate resources with which the tribes maintain formal operation and maintenance organizations to manage the community water systems. The number and size of the water systems on a reservation appear to be related to the operation and maintenance adequacy as does the method of financing the operation and maintenance. Reservations such as Colorado River

TABLE 2-6. DEMOGRAPHICS AND ADEQUACY OF WATER SYSTEMS BY IHS AREA

| IHS Area | Average Number of Water Systems Per Reservation | Average Number of People Per Reservation | Average Adequacy of Water System |
|---|---|---|---|
| Nashville, TN | 7 | 1,415 | 3.87 |
| Bemidji | 4 | 760 | 3.98 |
| Oklahoma | 2 | 200 | 3.00 |
| Aberdeen | 5 | 2,253 | 3.06 |
| Billings | 5 | 1,588 | 3.54 |
| Albuquerque | 2 | 1,399 | 3.57 |
| Phoenix, AZ | 3 | 1,147 | 3.34 |
| Navajo (Window Rock) | 217 | 94,573 | 4.11 |
| Tucson (Tohono O'Odham) | 17 | 4,182 | 4.15 |
| Sacramento, Calif. | 2 | 178 | 3.16 |
| Portland, OR | 2 | 543 | 3.49 |
| Alaska | 1 | 1,056 | 3.00 |

*Adequacy Rating Definitions

1.0 - Significant components of the facility have failed and are inoperable and/or the system presents an actual health hazard due to inadequate O & M.

2.0 - Some major components of the facility have failed or are about to fail and/or potentially serious health hazard exists due to inadequate O & M.

3.0 - The system is badly in need for maintenance but all major components are operational

4.0 - The system needs some maintanance (painting, cleaning, weed cutting, etc) but is fully operational.

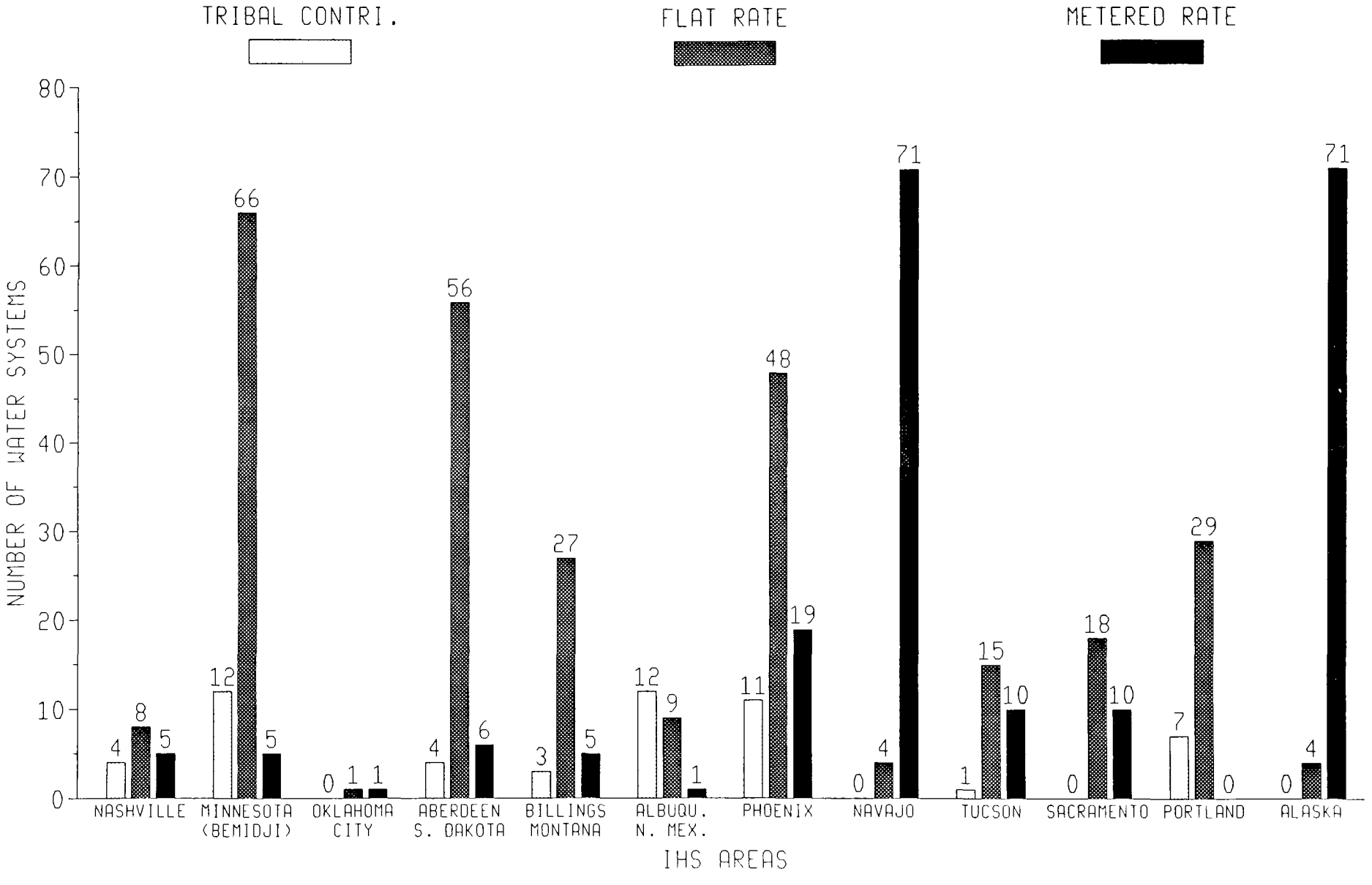
5.0 - The system is in excellent condition. Maintenance is good and the system is fully operational.

and Salt River in the Phoenix IHS Area, with single large regional water systems serving the majority of the population have better operation and maintenance ratings than do reservations such as Pine Ridge, where several systems serve a small population.

Figure 2-6 presents the number of water systems in each IHS Area financed by tribal contributions, flat user rates, and metered user rates. Systems financed by tribal contribution together scored an O&M adequacy rating of 3.3; systems financed by flat fees in the aggregate scored higher, 3.5. Systems financed by metered user rates scored highest in O&M adequacy with 3.8. This relationship is confirmed by information collected during the site visits and discussed in the following chapter. The highest operation and maintenance ratings are generally earned by the water systems and reservations which fund operation and maintenance exclusively through the collection of user fees. When tribal government contributions are required, the adequacy of the operation and maintenance may be low because of competing priorities for tribal funds. Furthermore, reservations that fund operation and maintenance exclusively from tribal government contributions have the lowest overall maintenance rating. Systems with fee structures based on metered flow appear to be better maintained than those that charge flat rates. Metering emphasizes customers accountability

# FIGURE 2-6

## METHODS OF FINANCING WATER SYSTEM OPERATION AND MAINTENANCE IN ALL IHS AREAS



and thereby provides an incentive to prevent water loss and waste. A comparison of data from the Aberdeen, Bemidji, and Billings IHS Areas which include charges based on both meters and flat rates, shows that the adequacy ratings for reservations with metered systems are higher than those which have flat-rate fees and higher than those reservations with water systems that do not charge for drinking water.

Responsibility for operation and maintenance does not have a significant affect on adequacy of the system's service. Table 2-7 presents the average adequacy rating of operation and maintenance for the different groups responsible for water system operation and maintenance. On several reservations, operation and maintenance is provided by individuals or by the community, and on other reservations by private corporations. When systems are operated by individuals, water systems are typically small, the available resources are limited; consequently, the systems receive lower adequacy ratings than those run by communities.

A number of other factors, which cannot all be identified using the available data, affect the quality of operation and maintenance provided on individual reservations. Reservations in the same Area, which are similar in size, population, and number and operation of water systems, often have differing levels of operation and maintenance adequacy. The reasons may

TABLE 2-7. AVERAGE ADEQUACY RATINGS OF WATER SYSTEMS BY GROUP RESPONSIBLE FOR OPERATION AND MAINTENANCE ON INDIAN RESERVATIONS

| Responsibility for Operation and Maintenance | Adequacy of Water Systems* |
|---|---|
| Tribe | 3.3 |
| Individual | 3.4 |
| Community | 3.7 |
| Housing Authority | 3.7 |
| Other | 3.1 |

*Average for all water systems nationwide. See Table 2-1 for definitions of adequacy ratings.

involve tribal politics, assistance from outside groups, reservation-specific geography, hydrogeology and climate. Some major factors influencing system adequacy were identified by the Study Team during the site visits and are discussed in Chapter Three.

Summary

Ninety-four percent of the 836 drinking water systems found to be on Indian reservations reported no MCL violations during 1986 and of the systems reporting MCL violations, only microbiological contamination violations were reported, with an average of 1.3 violations annually per system. However, 37 percent of the systems reported at least one monitoring violation and almost 13 percent reported at least 10 monitoring violations over fiscal year 1986. Forty-five percent of the monitoring violations occurred in the Aberdeen IHS Area, which also had the lowest overall adequacy rating of operation and maintenance. By contrast, the Nashville IHS Area, which had the highest adequacy rating of operation and maintenance, reported no monitoring violations. Drinking water quality can, therefore, be related to the adequacy of the operation and maintenance of the water system, where reservations providing routine maintenance are better prepared to provide good quality water.

Adequacy of operation and maintenance seems to be related to the way in which the water system is funded. Water systems

which are funded exclusively through user fees have the highest adequacy and water quality, while systems which are funded entirely by the tribal government have the lowest adequacy rating and consequently lower water quality. Systems which depend on the tribal government for all or part of their operating funds typically must compete with other tribal concerns for funding in order to perform all of the required preventive maintenance. These systems typically function at lower adequacy levels. In addition, water systems that cannot support a full-time operator have lower drinking water quality in comparison to systems that have formal operation and maintenance organizations. A comparison of the Phoenix IHS Area to the Tucson or Navajo Areas further supports this finding (see Table 2-3).

The general quality of drinking water supplies and the adequacy of operation and maintenance are contingent on a variety of other factors that are not apparent in the data. These factors, which were borne out during the site visits, include the economic condition of the reservation, tribal politics, geography, and the availability of training and technical assistance. Based on the information collected during the site visits, all of the tribes visited considered the provision of safe drinking water a priority, although they could not always afford to operate and maintain their systems properly. The tribes continue, however, to take advantage of the opportunities provided by IHS to improve their operation and maintenance capabilities.

# CHAPTER THREE

# SITE VISIT ANALYSIS

# III. SITE VISIT ANALYSIS

This chapter presents an analysis of site visit information collected during trips to Indian reservations and rancherias in six IHS Areas.[1/] Tribal officials and water system operators discussed problems confronting Indian tribal efforts to provide safe drinking water, the need for alternative supplies and the usefulness and adequacy of technical and regulatory information.

EPA wrote to each of the 274 Indian tribes identified in the EPA data base to provide an overview of the study objectives and to request that tribes interested in participating in the study contact the Study Team.

Concurrent with this effort, the Study Team solicited input on the site selection process from each of the EPA Regional offices and some IHS Area offices. Based upon the comments, EPA developed the following criteria for selecting the site visits:

- Geographic representativeness across the 12 IHS Areas. (Figure 1-1 presents a map showing the 12 IHS Areas);
- Willingness of the tribes to participate;
- Uniqueness of drinking water system operation and maintenance or supply problems;
- Effectiveness of demonstrated efforts to treat contaminated water or to provide adequate potable water;

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1/ Throughout this chapter, the term "reservation" will be used to include reservations and rancherias.

TABLE 3-1. SUMMARY OF SITE VISIT INFORMATION

| | IHS AREA | | |
|---|---|---|---|
| | Phoenix | California | Portland |
| Reservations visited | 2 in Arizona | 6 in California | 8 in Washington |
| Rancherias visited | | 2 in California | |
| Population per reservation | 2,500-10,000 | 60-800 | 80-2,000 |
| Authority over water systems | Utility Board or Environmental Director<br>\|<br>Utility Director<br>\|<br>Operators | Tribal Council<br>\|<br>Operator | Planning or Utility Department<br>\|<br>Operators |
| Systems per reservation | 1 and 10 | 1-3 | 1-2 |
| Source and type of assistance | | | |
| SDWA info. | IHS/ITCA[1/] | EPA[2/] | IHS |
| Tech. assistance | IHS | IHS/IHC, Contractors | IHS |
| Special studies | EPA | | IHS |
| Sanitary surveys | EPA | EPA | IHS |
| Inspections | IHS | EPA | IHS |
| Monitoring | EPA/Tribes | IHC | IHS |
| Training | IHS | IHS | IHS |
| Interested in primacy | Yes | Not aware | 2 Yes, 6 No |
| Source of water | Ground water | Ground water, some surface water | Ground water, some surface water |
| Availability of alternative supplies | Yes | Yes | No |
| Operation and maintenance | Varies<br>Frequent disruptions due to lack of preventive maintenance | As needed only<br>Problems with floods, lack of tools, need for upgrades | Frequent disruptions due to lack of preventive maintenance |
| Improvements* Needed | Preventive maintenance | Training | Preventive maintenance, training, rate study |

TABLE 3-1. SUMMARY OF SITE VISIT INFORMATION (Continued)

| | IHS AREA | | |
|---|---|---|---|
| | Nashville | Oklahoma City | Aberdeen |
| Reservations visited | 4 in Florida | 2 in Kansas | 2 in South Dakota |
| Population per reservation | 100 - 6,000 | 200 - 500 | 12,000 - 15,000 |
| Authority over water systems | Health Director<br>\|<br>Environmental Health Director<br>\|<br>Operators | Tribal Chairman<br>\|<br>Operators | Water & Sewer Co.<br>\|<br>Operators |
| Systems per reservation | 1 | 1 | 13 and 16 |
| Source and type of assistance | | | |
| SDWA info. | EPA | EPA | EPA |
| Tech. assistance | EPA/IHS | IHS | IHS |
| Special studies | | IHS/BIA | NA |
| Sanitary surveys | IHS | IHS | IHS |
| Inspections | EPA | EPA/IHS | EPA |
| Monitoring | EPA | Tribes | Tribes |
| Training | EPA/IHS | EPA/IHS/KRWA[3] | EPA* |
| Interest in Primacy | Unsure, need details | 1 Yes, 1 No | 1 Yes, 1 No |
| Source of water | Ground water and some purchased | Surface water and ground water | Ground water, some surface water |
| Availability of alternative supplies | No | 1 Yes, 1 No | No |
| Operation and maintenance | High priority for system operators<br>Few problems; vary by age and design | Good at ground water system<br>Lack of preventive maintenance | Poor in rural areas<br>Vandalism<br>Equipment in disrepair |
| Improvements* needed | Leak detection study | Training<br>Soil Erosion Control | Rate study<br>Distribution system upgrade |

NA = Not applicable
*Based on Study Teams assessment
1/ Inter-tribal Council of Arizona
2/ Limited
3/ Kansas Rural Water Association

- Compatibility with scheduling of EPA and IHS sanitary surveys; and
- Proximity of reservations.

Tribes were contacted to confirm their willingness to participate in the study and to schedule the site visits. Twenty-four reservations in six IHS Areas (Nashville, Aberdeen, Oklahoma City, Phoenix, California, and Portland) were visited. Appendix A presents a list of the tribes visited.

The analyses of the site visits are categorized into eight major sections, the results of which are presented in the remainder of this chapter. Additional information concerning tribes that were not visited was incorporated into the report to provide a better understanding of the problems confronting tribes within the IHS Area under review. (Table 3-1 summarizes the information collected from the six IHS areas visited). Detailed reports of each of the six areas visited are presented in Appendix B.

Background and Demographics

The tribes visited as part of this study are extremely diverse. Tribal populations residing on the reservations vary from 60 residents to greater than 10,000 residents and the reservations include both rural and urban environments. The tribes are located in a variety of physical settings including coastal, desert, and mountainous; they experience a wide range

of climatic conditions. The reservations vary in size from several hundred acres to nearly three million acres. Drinking water sources include surface and ground water, and water availability ranges from severely limited during periods of high demand to year-round abundance.

All of the reservations visited operate central community water systems which serve the majority of a reservation's population. Most of the community water systems were constructed by either BIA or IHS. Since 1983, HUD also has financed, through IHS, the development of community water and wastewater systems. Individuals not served by the community systems typically live in isolated rural housing and are served by individual wells or transport water. Several reservations purchase water from rural water districts or other local suppliers to supplement existing sources. The majority of the reservations visited operate a single community drinking water system, although several operate ten or more community systems.

On several reservations, particularly in Arizona and South Dakota, a significant number of Indian and non-Indian homes do not receive their drinking water from tribally operated systems. Instead, their drinking water is supplied by systems operated and maintained by either tribal businesses or by lessees.

The economic conditions of the reservations differ depending on factors such as geography, climate, and employment opportunities available in local industry. Revenues are generated from

a diverse array of sources including leasing of land for mineral development, timber harvesting, tourism, fishing, crop production, ski resort operation, bingo, and participation in Federal grant programs. Reservations which have been successful in developing a broad economic base have the lowest unemployment rates (ranging from 20 to 40 percent), while reservations which have not successfully established solid economic foundations have very high unemployment rates (in the range of 60 to 90 percent).

The successful operation of the water systems is closely related to the economic stability of the reservations. Prosperous reservations have sufficient revenues to fund on-going operation and maintenance projects, while other reservations struggle to maintain a basic water system. This was observed on one reservation where water system employees performed odd jobs in order to generate sufficient revenue to keep the system operational.

In most cases, tribes attempt to charge those living on reservation for water. Rates vary from a flat fee of several dollars per month to a metered rate of more than 20 dollars for the first 10,000 gallons. Most reservations supporting commercial development charge their commercial users for water. The delinquency rate for user fee payment on most reservations is high, ranging from 30 to 60 percent or more. Three reservations, however, have a very low delinquency rate which can be

attributed to strong tribal support and the use of enforcement strategies. The strategies occasionally involve shutting off water for nonpayment and subsequent charges for reconnection.

The high delinquency rate for fee payment can be attributed to the belief that water is a natural resource that should be available free of charge; the lack of understanding by tribal members of the costs of water delivery and the importance of a safe water supply; and the familial relationships on small reservations which make fee collection difficult at best.

Only five (one each in Kansas, Arizona and South Dakota, and 2 in Washington) of the 24 reservations visited generate sufficient revenues to cover the full cost of operating and maintaining their water systems. Several tribes have instituted innovative programs to fund the water systems and achieve financial self-sufficiency. For example, one tribe in Florida has been able to deduct the overdue monies directly from the quarterly dividends tribal members receive from oil and gas leases. A second tribe has started a public awareness campaign intended to point out that while the water is free, tribal members must pay for its treatment and for having it pumped directly to their homes.

For those tribes not imposing user fees, the justification is two-fold. First, several tribes decided to forego cash payments from natural resource development (timber, oil, or gas) in exchange for free provision of public services, including

water and sewer services. Second, the poor economic conditions under which some tribes live, coupled with high unemployment rates, make imposition of a user fee impractical. In these cases, and when the user fee does not cover the entire cost of operating and maintaining the water systems, the tribe contributes money from the general operating fund.

Reliance on tribal government funds for routine operation and maintenance forces the water systems to compete with other tribal programs for preventive maintenance, however, funds are typically available to make emergency repairs for service disruptions.

Organizational Structure of Tribal Governments

Nearly all of the tribes visited are governed by some form of elected tribal council. The councils are typically comprised of three to ten members, headed by a tribal chairman or a president, and often form subcommittees to handle specific concerns. Several tribes have executive directors or administrators who manage the day-to-day tribal operations. Management of the drinking water system varies among tribes, although three basic models were observed and are described below.

The smaller tribes (fewer than 250 members) typically employ one individual who is responsible for performing general maintenance throughout the reservation. This individual is usually responsible for operating and maintaining the water system in addition to other duties.

The medium to large reservations (250 residents and larger) have established utility or maintenance departments which are responsible for operating and maintaining the drinking and waste water systems and the solid waste management facilities. These departments, headed by a director, have their own budgets and hire their own employees. Many of these reservations have also established planning, health, or engineering departments which are responsible for ensuring that sufficient water and waste water treatment capacity exist to meet the needs of the tribe. On several reservations, including those in Florida and one in Washington, the drinking water systems are managed by such departments.

The largest reservations visited (greater than 2,000 residents) have independent water utility departments which operate and maintain most, but not all of the drinking water systems. These departments are responsible for generating revenue to meet their operating expenses and for hiring employees and are managed by utility boards composed of tribal members appointed by the whole tribal council or members of the tribal council. The boards are responsible for establishing policies, setting water rates, and ensuring the smooth operation of the water system. In most cases, the tribes have established either planning, health, or engineering departments which monitor the utility department, evaluate its performance, and ensure that the utilities are providing clean, safe drinking water.

Reservations with utility or maintenance departments appear to be more successful than others in ensuring the adequacy of the drinking water systems due to the fact that the tribal government provides greater financial support which creates a sound basis for preventive operation and maintenance.

Sources of SDWA and Technical Information

The sources of the SDWA and technical information vary by IHS Area and by tribes within an IHS Area. Although all of the tribes rely on IHS for most of their technical assistance and information, several of them obtain information and assistance from other sources. For example, the Florida tribes regularly contact the EPA Regional office for technical assistance and turn to independent consultants and equipment manufacturers for information. Some tribes in South Dakota, California, and Arizona also use consultants and equipment representatives as sources of information. In California, the State Department of Water Resources helped the Morongo tribe conduct a leak detection study; the Tulare County Health Department regularly reviews plans from the Tule River Reservation and provides technical assistance.

Tribes that have established working relationships with the State obtain additional assistance from them. For example, the tribal water system operators in Florida regularly attend training classes sponsored by the State. The Kansas Rural Water Association (KRWA) also sponsors training classes which

the Kansas tribes attended. In South Dakota, EPA provides for circuit rider training through a grant to the local chapter of the American Water Works Association (AWWA). Training needs and assessments are coordinated among EPA, IHS and the circuit rider.

Tribes in Arizona also utilize the training and technical assistance provided by the Inter-Tribal Council of Arizona (ITCA). ITCA sponsors training for tribal water system operators with funds furnished by IHS and EPA. Monthly meetings for water system operators are conducted to share information and discuss problems. ITCA also provides the tribes with information concerning the SDWA, the 1986 Amendments, and primacy.

Although most of the tribes visited are aware of the SDWA, many are not aware of the specifics, and are not currently developing any plans to implement the 1986 Amendments. Most of the tribes prefer that EPA take a more active role in familiarizing them with the statute. Specifically, they requested basic information on the SDWA and the 1986 Amendments. While most of the tribes are familiar with the SDWA, many indicated that they need a more simplified explanation of the legislation and of the regulations. Secondly, they asked for financial and technical assistance in establishing an environmental planning office within the tribal government. The tribes view primacy development grants as one way to obtain

funding assistance to create this office, however, they expressed the need for technical assistance to ensure that both the office and the individual hired for it are productive.

Roles of EPA and IHS

The level of service provided by EPA and IHS varies depending on the skill level of the water system operators, the expertise of the EPA Indian Drinking Water Coordinators, the criteria in the Memoranda of Understanding (MOU) between the EPA Regional and IHS Area offices and the availability of resources. The levels of interaction between the tribes, EPA and IHS fall into three categories:

1) limited or no direct interaction between EPA and the tribes;

2) separate assistance to tribes by both EPA and IHS; and

3) close coordination between EPA and IHS in assisting the tribes.

In the first case, all communication, information, and technical assistance is provided by IHS. This is typified in the Washington area through a MOU between IHS and EPA, in which IHS assists EPA in all aspects except for enforcement and regulatory activities. EPA provides IHS with information on the SDWA, the 1986 Amendments, and primacy, and provides funding support for training classes. IHS, in turn, presents this information to the tribes on behalf of EPA, addresses the training needs of the tribes, and provides all of the technical assistance. EPA's role is therefore limited to monitoring

compliance based on reports received from the tribes and on sanitary surveys conducted by IHS. This arrangement makes full use of IHS field personnel living and working on or in close proximity to the reservations.

The second category involves EPA providing the tribes with information concerning the SDWA, the 1986 Amendments, and primacy; participating with IHS in conducting sanitary surveys; and undertaking special studies such as surveys of pesticide contamination of ground water wells. The level of support provided by EPA varies by regional office, depending on the background and experience of the Indian Drinking Water Coordinator and the effectiveness of the working relationship with the tribes. EPA Regional offices in California and Colorado are particularly strained by the large number of tribes under their jurisdiction, the geographical distribution of the tribes, and their large populations. In most cases, EPA has difficulty visiting each tribe yearly and participating in the sanitary survey. This is particularly acute in California, Arizona, and Nevada.

IHS provides the majority of training and technical assistance to the reservations located throughout the Oklahoma, Aberdeen, and Phoenix IHS Areas, and the northern portion of the IHS California Area. This assistance, often jointly sponsored by IHS, EPA and the tribes, consists of training classes and workshops, funding traveling technicians and

operation/maintenance coordinators to assist tribes in establishing utility districts and improving laboratory capabilities.

The third type of interaction consists of EPA and IHS working closely together and coordinating their efforts to provide the tribes with the necessary technical assistance to maintain their water systems on a more independent basis. A good example of this interaction was observed in Florida where EPA and IHS Nashville Area work under an informal arrangement, whereby IHS conducts sanitary surveys concurrently with EPA's routine inspections of water treatment facilities. Similar to the relationship in the California Area, both parties are aware of each other's findings and concur on recommendations. This coordinated approach assists the tribes by providing a single set of suggested improvements and guidance for implementation. The active preventive operation and maintenance efforts of the tribes in the Florida Area can be partly attributed to the unique qualifications of the Regional Indian Drinking Water Coordinator. This individual, a former water system operator with a Class III license and over 20 years of experience, has earned the respect and trust of the tribes to provide technical assistance and accurate information.

In southern California neither form of EPA and IHS interaction exists. Much of the technical assistance and training is provided by Rural Indian Health Projects which

include Indian Health Councils. They employ Indian environmental health professionals who work directly with the reservations to address water concerns and other environmental health problems and are funded by IHS.

Source and Adequacy of Water Systems

Ground water is the most prevalent source of drinking water on all of the reservations visited, with some locations having as many as 16 ground water systems, but none with more than 3 surface water systems. Most ground water systems are comprised of 1 to 3 wells, a treatment station, and a storage reservoir. Each system serves anywhere from 60 to 1,000 or more residents. The surface water systems pump water through infiltration galleries or directly from rivers or small ponds, and some have fairly extensive treatment prior to distribution. Of the 15 surface water systems in the California Area, only four are filtered, and none of these pre-treat the water before it is filtered. Only seven disinfect the water and none of the 15 surface water systems meet the requirements in the proposed surface water treatment rule. The surface water systems capable of producing water that meets the National Primary Drinking Water Regulation (NPDWR) are generally more sophisticated than the ground water systems and require an extensive operation and maintenance regimen.

For example, surface water systems often require filtration and chemical addition, as well as fluoridation and chlorination procedures which are considered to be standard

treatment for ground water and surface water systems. On several reservations, however, the ground water is not chlorinated because the tribes do not feel it is necessary to spend the money and resources if there are no microbiological contamination problems associated with the water system.

Not all tribally supplied water is derived from ground water or surface water sources on the reservations. Some reservations in Florida, for example, purchase water from local municipalities and private water companies. These sources are not always economical but they help to alleviate seasonal or regional water shortages and conserve tribally owned natural resources.

Except in Arizona, where the quality of some raw water supplies is adequate, raw water on the reservations generally requires treatment. In general, ground water sources have fewer contaminants that pose a risk to public health than do surface water sources, but even they present problems. Various sources are affected by natural and synthetic contamination from hydrocarbons, lead, manganese, copper, iron, nitrates and sulfur as well as from coliform bacteria and iron bacteria slime. In some instances ground water on Indian reservations has unacceptable color, taste and odor and some may be vulnerable to salt water intrusion and/or infiltration from septic fields. While not all of these are health concerns, they degrade the quality of available water and have justified the installation of treatment.

Chlorination is commonly used in systems with ground water sources and supplemented by aeration and filtration when necessary. Special treatment methods are followed by some systems to deal with particular water quality problems. For example, one tribe on the Olympic Peninsula uses a treatment method of manganese green sand to reduce the iron content. Likewise, a system on a Florida reservation uses aeration linked to Granulated Activated Carbon (GAC) pressure filters to remove source water impurities. A tribal concern in both these cases is that these treatment techniques are sophisticated or costly and are difficult to maintain.

Apart from source-water quality, contamination pursuant to problems in the distribution systems is a possibility among these systems. The release of pathogenic microorganisms into the water is a particular concern among any systems which, in general, are insufficiently designed, upgraded or maintained. In these instances, excessive demand and/or leakage can lead to negative pressure within the system that may create cross-contamination (e.g., ground water). Excessive water loss is a strong indication of a lack of system integrity.

Microbiological contamination is a primary concern with surface water sources, but these may also contain high mineral and organic matter with the potential to form trihalomethanes and may also contain foul taste and odor. Pathogenic bacteria,

viruses and protozoa can be present in these sources. High turbidity is also a concern for at least two reasons: first, where treatment is in place, it may neutralize by "masking" pathogens from its effects. Second, where it doesn't interfere with treatment, it may still interfere with analytic measurement, preventing the detection of potentially serious bacteria levels.

The surface water quality problems require more extensive attention than do the ground water systems. Drinking water industry practices strongly encourage surface water systems to be filtered and disinfected. EPA is presently in the process of promulgating regulations that will require these treatment practices of surface water systems. Most systems also include some combination of coagulation, flocculation, sedimentation, and pH adjustment. Tribes operating surface water systems in Kansas and Washington State describe the systems as being overdesigned and requiring considerable financial and manpower resources to keep the systems operational (each of the surface water systems visited in these two states required two full-time operators).

Monitoring is the responsibility of the tribes and operators. Most operators monitor for microbiological indicators and send samples to an EPA/State approved certified laboratory for analysis. However, as evidenced by the site visits, tribes throughout the country fall short of complying with all of the

SDWA monitoring requirements. Turbidity testing, which is required for surface water systems, is not consistently performed for all surface water systems because most tribes do not own turbidimeters.

Need for Alternative Water Supplies

Except for Arizona tribes on the Colorado River and in the mountains, most of the tribes visited experience seasonal water shortages. Summer demands often exceed supplies, causing regional droughts. Reservations on the Olympic Peninsula and Puget Sound areas of Washington experience severe summer water shortages due to lack of rainfall compounded by increased water usage by summer resorts and the seasonal fish-processing businesses. In Southern California, the summer shortages are due to year-round distribution problems that are exacerbated by increased summer demand and water loss. Water loss is attributed to poor household plumbing and leaking distribution systems, and accounts for a significant amount of the water shortfall. Distribution system problems result from limited system capacity, mechanical problems with pumps, and inadequate storage capacities. In South Dakota, regional water shortages exist due to shallow wells that are susceptible to summer drought, and poorly maintained distribution systems servicing isolated rural communities. Residents of these isolated communities must often carry water in jugs and drums from schools,

irrigation sources, or other homes when summer droughts occur.

Alternative water supplies are not abundant on any of the reservations visited, and many tribes have no alternative other than to purchase bottled water in emergencies if connection to a non-Indian system is not available or politically feasible. Some alternative wells are no longer useful because they have been abandoned and capped to protect the aquifers; other alternative ground water sources require treatment in order to upgrade poorer raw water quality. One tribe in Washington State is developing a cooperative agreement with the local county water and sewer company in which the county will supply drinking water in exchange for sewage treatment services supplied by the tribe. Other tribes are hesitant to form agreements with municipalities for fear of losing their independence.

Capability and Adequacy of Operations and Maintenance

To obtain funds from IHS for the construction or rehabilitation of a water system, the tribe must agree that an appropriate entity will assume responsibility for operating the system once construction is completed. The entity must demonstrate its capability for self-monitoring as well as an understanding of the public health significance of delivering safe drinking water. Typically, the capabilities of the tribes to perform the required operation and maintenance depends on four factors: the skills, knowledge and personal interest of the manager of the water system and the competence level of the

operators. When any one or more of these factors is lacking, preventive maintenance is typically neglected. This neglect results in a gradual deterioration of the water system and contributes substantially to the proliferation of operation and maintenance problems.

The Study Team observed two reservations in Florida and one in Arizona that operate well-maintained systems. Each of these reservations employs a manager with at least 15 years of experience or is a certified operator. The managers have the skills and experience necessary to solve most operational problems, have developed and instituted a preventive maintenance plan, work to ensure all of the water system employees receive training, and have the financial resources to accomplish these objectives. Furthermore, the managers have developed incentive plans that encourage the employees to take training classes by offering higher salaries to employees who complete training programs and become certified operators.

By contrast, the Study Team observed poor operation and maintenance practices, poor recordkeeping, a lack of regular inspections, and insufficient preventive maintenance in South Dakota, Washington, and California. On many reservations, water system operators do not maintain accurate and up-to-date records of water use rates, treatment history, or sampling activities. Often the only records kept consist of a notebook in the pump house, many of which are out of date and unreadable due to water damage. In some areas of South Dakota, even though the water system managers are certified, the quality of the

operation and maintenance is poor due to the lack of trained operators. For example, on a South Dakota reservation, vandalism to the pump houses and storage reservoirs is not always corrected in time to prevent contamination of the reservoirs or the supply lines. The goal of the operator on this reservation is to visit each water system once a week, but repairs on the equipment and buildings are not always accomplished because of the time the operator must dedicate to odd jobs in order to increase operating funds for the system.

Although the lack of operation and maintenance activities on most other reservations is not as severe as the problems mentioned above, the lack of training opportunities and funding has hampered the ability of operators to perform routine preventive maintenance. In Washington, the isolation of the tribes located on the Olympic Peninsula makes attendance at training classes difficult and expensive. Most of these tribes have difficulty financing training and many of the operators are unwilling to travel. Because of the SDWA requirements, IHS and others had to build treatment plants capable of removing iron, eliminating taste and odor problems, and reducing the turbidity of the water. The systems are complicated and require a high level of skill to operate efficiently. These tribes feel that the treatment plants are too complex and believe that a simpler system would be easier to operate and less costly to maintain.

Operation and maintenance problems in California are similar to those in Washington and South Dakota, however, the causes of these problems differ. The primary factor restricting the potential effectiveness of the systems in California is the labor force; many systems in California do not have any operators; the majority of operator positions are filled by part-time volunteers who lack the time to attend formal training classes, do not stay in their jobs long enough to become experienced, and are not supported by financial resources to maintain the system.

Areas for Improvements

Many of the tribes visited expressed the need for improvements to their community water systems. Improvements ranged from conducting rate studies which would help determine the appropriate user fee structure to acquiring financial support for multi-million dollar water delivery systems. The list of improvements varies according to the financial status of the tribe and the tribe's perspective on long-term water resource development. Tribes with natural resources and planning departments have formulated strategies for meeting drinking water needs resulting from anticipated population growth. Tribes without these departments are more concerned with improvements that maintain day-to-day operations rather than long-term improvements.

The most elaborate improvement strategy the Study Team encountered while on site involved a $6.5 million water delivery

system to improve the availability of water supplies in rural communities on one South Dakota reservation. The four-phase project is 25% completed, but is dependent upon procurement of manpower, vehicles, and financial support for over $5 million to accomplish the remaining three phases. Improvement strategies are also being planned by some tribes in California attempting to develop ground water systems to replace existing surface water supplies of poor quality.

The utility departments or tribal council representatives did express the need for equipment repairs, treatment system modifications, and the replacement of aging parts and equipment in order to conduct essential preventive maintenance. Since most tribes do not have reserve funds for these improvements, the tribes are concerned that their systems cannot be operated efficiently or effectively in the interim. Some tribes rely on the ability of experienced, trained operators to improvise by using the damaged equipment and cumbersome treatment systems to the extent possible.

The lack of reserve funds and the limited operating budgets were most often blamed for the ailing systems. For many tribes, fees collected for water services did not provide enough income to meet operating expenses. For these tribes, revised accounting systems, rate studies, and strategies for improved collection rates are needed. Accounting for preventive

maintenance expenses in the utilities' budgets will allow the tribes operating these water systems to be in a better position to finance major repairs and purchase parts and equipment.

Other needed improvements include developing routine schedules for operation and maintenance for better supervision and preventive maintenance of the water systems and consistent recordkeeping for the system. In those instances where an accurate accounting for water consumption cannot be made and leaks are suspected, leak detection studies need to be conducted.

Finally, more emphasis on formal operator training is necessary and incentive programs to improve retention of operators should be considered. Given the independent nature of most of the tribes, improvements that increase self-sufficiency, such as operator training, are likely to provide the greatest return for the tribes' or the Federal government's investment.

In conclusion, based on the Study Team's assessment, the ability of Indian tribes to provide clean, safe drinking water to tribal members living on reservations is a function of the tribes' financial status, the degree of oversight of the water systems by qualified managers and operators, the raw water quality, and the adherence to routine preventive maintenance schedules. All tribes face some combination of water quality, supply, and administrative challenges. The level of support provided by the tribal government to a large extent determines how well the system operators can overcome these obstacles. In

all cases, the daily guidance and technical assistance provided by IHS keeps most water systems functioning adequately, but preventive operation and maintenance are vital elements to assuring good water quality.

Primacy and its ramifications are not well understood by many tribes. The smaller tribes may not seek primacy simply because they generally lack the personnel necessary to successfully manage the required programs. For some of the larger, more established tribes, primacy is appealing and may provide them with the incentive to take greater responsibility for their adherence to the Safe Drinking Water Act.

# CHAPTER FOUR

# FINDINGS AND CONCLUSIONS

# IV. FINDINGS AND CONCLUSIONS

This chapter presents the Study Team's conclusions concerning drinking water quality on Indian reservations, the need for alternative supplies, and actions that tribes, IHS, and EPA may undertake to improve and ensure quality drinking water supplies on Indian reservations. Based on the absence of reported waterborne diseases on the reservations visited, and limited MCL violations reported in FRDS and confirmed by the site visits, the overall quality of drinking water supplied by community systems owned and operated by Indian tribes and located on Indian reservations across the nation generally compiles with Federal drinking water regulations. There are four Areas which deviate from this generalization due to the high number of violation incidents. The Aberdeen, Billings, and Portland IHS Areas all recorded a significant percentage of systems with monitoring violations (see Figure 2-5). The importance of monitoring for contaminants is the cornerstone of detecting health threats posed by drinking water. The California and Tucson Areas have more serious problems with the high percentage of systems with microbiological violations. Because this percentage is so substantial, it also indicates that these Areas are more susceptible to outbreaks of waterborne diseases and other related health threats. In general, the

fact that Indian systems appear to pose no particular risk to health, on the basis of the compliance data, does not mean that these systems are without problems. In fact, these systems have many of the problems typical of small Indian and non-Indian water systems overall. These conclusions are supported by the information gathered during the site visits to 24 reservations located in 6 IHS Areas.

On a national basis, very little information is available concerning the extent to which Indian community drinking water systems are contaminated with organic chemicals, pesticides, or metals. Information in FRDS is incomplete for these contaminants. During the site visits, the Study Team was presented with information concerning sampling and analysis that was conducted for organic chemicals, inorganic chemicals, and radionuclides. Due to the fact that this violation information in FRDS is not current, the water quality assessment was based solely on the frequency of reported microbiological contamination problems.

Based on the information which was accessed, the Study Team concluded that among ground water systems, which were the most prominent source for the Indian systems, microbiological contamination can most often be attributed to problems in distribution systems, rather than problems with the raw water supplies. The lack of preventive operation and maintenance procedures is often a major contributing factor to microbiological contamination, as

are problems resulting from cross-connection from sewage lines or septic drainfields, service disruptions due to flooding, and improper operation and maintenance of the systems.

Tribal Organization and Leadership

General observations made during site visits and conclusions drawn from discussions with tribes, IHS and EPA Regional office staff indicate that the attitude of the tribal government has a substantial influence on the operation of tribal water systems.

Tribes investing a noticeable amount of effort and funding into their water systems generally maintain a system which will deliver a satisfactory supply of drinking water, even though the resources, equipment and trained operators available may be minimal. More often than not, if the tribal leadership demonstrates a concern for the operation and maintenance of the system, this attitude will be carried through to other tribal members and proper attention will be given to the upkeep of the water system. In addition, it was observed that tribes that have formal operation and maintenance organizations and good tribal support appear to have a high SDWA compliance rate because the water system receives a concentrated amount of attention on a regular basis.

Although it is apparent that a number of factors influence the quality of drinking water supplies, the single most significant one is the economic stability of the tribe. A stable, well

established budget allows the tribes to devote the resources to fully maintain and repair the systems, rather than funding short-term solutions to problems that may recur later and increase in severity.

A second, and perhaps more difficult issue affecting the water system operations is the attitude of tribal members concerning the provision of water and the way it affects the method of funding for the water system. Throughout the site visits, several references were made to the fact that there is often an unwillingness to pay for drinking water on reservations, a belief which is based on the idea that water is a natural resource and should be provided free of charge. It is often the case that tribal members do not understand that there are costs associated with system maintenance and the delivery of potable water; consequently, any fees which are imposed to help support the water system are not well received by tribal members. This difficulty is enhanced by the fact that because of familial relationships, most tribes are not willing to stop the delivery of water to tribal members who do not pay the fees.

Because the attitude and organization of the tribal government often has a substantial influence on water system operations, several strategies related to the organizational structure of the tribal utilities or tribal oversight offices, and sources of funding could be considered which would improve the tribes'

ability to provide safe drinking water. One approach would be to appoint a manager who is responsible for overall operation of the water systems (including both financial operations and water delivery) and all other utilities. Depending on the number of homes and businesses receiving water, the manager could have two deputies, one in charge of finances and one in charge of operation and maintenance. Smaller systems might consider employing one operator capable of performing operation and maintenance for several tribes located near one another. This would ensure the detection of problems tht may arise before they become more severe.

Finally, tribes could consider developing a stringent preventive maintenance program to ensure the integrity of the water system, reduce water shortages through periodic equipment checks and leak detection, and realize long-term savings of capital outlays. Tribes that have the financial capabilities may want to consider establishing environmental manager positions or tasking the planner with the job of overseeing the water department.

It should be noted that the problems that exist with drinking water systems on Indian reservations are not unique to Indian tribes. Small non-Indian community water systems (defined as systems serving 25 to 3,300 persons on a regular basis) as a whole experience many of the same problems that are documented in this study and share a number of characteristics common to Indian community systems.

The Wade Miller study (The Nation's Public Works: Report on Water Supply - May 1987), observes that small water systems operate on a marginal basis, with inadequate operational and managerial resources to correct deficiencies. Owners/operators of these systems are often unable to respond effectively to emergencies or the need for unplanned improvements and yet are expected to deliver safe and dependable supplies of water to consumers consistently. These problems are identical to those observed on the reservations. Despite the deficiencies encountered by Indian community water systems, most tribes are able to deliver drinking water that meets drinking water standards.

While similarities exist between the conditions of Indian and non-Indian small water systems, there is one important distinction. Indian land is held in trust by the Federal government for the benefit of Indian Tribes, and within Indian Reservation boundaries, such land may be subject to tribal government jurisdiction. The unique status of Indian lands is recognized in the SDWA and other public health programs. The effect is that many State and county regulations are not enforceable on Indian lands. In particular, regulations governing construction and location of solid waste disposal facilities or septic tank/drainfield systems are the responsibility of State and local governments. These facilities can have adverse affects on water systems through ground water contamination. In addition, EPA is not responsible for approving construction plans for public water systems on Indian lands (as

States do within their jurisdictions) nor for enforcing recommendations made in sanitary survey reports which would help alleviate operation and maintenance problems. While it is evident that a substantial amount of technical assistance from IHS has a positive impact on system performance, IHS does not have enforcement or regulatory authority. Without external pressure on Indian tribes to comply with such regulations, Indian Tribes bear a greater responsibility for ensuring adequate and safe drinking water.

Treatment of Water Systems

Based on the absence of reported disease outbreaks and the number of reported microbiological MCL violations in FRDS, the overall quality of community drinking water supplies on Indian reservations does not appear to pose a substantial human health threat. Again, it should be noted that violations may have occurred which were not reported, and therefore not accounted for in this analysis. Information derived from the site visits and an analysis of the data in FRDS and SFDS however, indicates that reported/investigated incidents of waterborne diseases are few and are mostly limited to the IHS Aberdeen and California Areas. In California's case, additional factors such as system size, structural deficiencies, and lack of preventive operation and maintenance also have an impact on the quality of finished water.

In order to ensure the delivery of safe drinking water, treatment is required for all surface water sources and some ground water sources. Because the tribes have limited financial resources and training opportunities, treatment systems are often difficult for them to operate and maintain.

There are methods which might be considered to overcome difficulties with implementing treatment techniques, particularly for tribes with drinking water systems that require treatment beyond chlorination. These water system operations would benefit from additional operator training, technical assistance, and funding to assist them in effectively and efficiently operating their systems. In cases where it is not already done, EPA and IHS should encourage the tribes to perform routine and preventive system maintenance to help alleviate recurring problems and reduce the risk of serious equipment failures and potential contamination incidents.

A second approach is to provide additional resources for training and educational programs tht emphasize the importance of routine monitoring and recordkeeping and encourage them to develop monitoring schedules according to the SDWA requirements. Similar to the status of compliance rates among all small systems, the overall rate of compliance among Indian drinking water systems could be improved. Recordkeeping would serve both as a reminder to the tribes to conduct monitoring and as

a tracking mechanism for EPA and IHS.

Adequacy of Operation and Maintenance/Financing

The adequacy of operation and maintenance activities varies considerably from tribe to tribe as a result of varying degrees of tribal emphasis, system size, economic status, operator training, and design of the system, among other factors. It was observed that larger reservations having one large system which serves the majority of the population tended to have a higher adequacy rating than smaller, less-populated reservations with a few, smaller water systems. It seems obvious that of all the factors affecting adequacy ratings, the most important is the method used to finance water system operation and maintenance.

There is a definite relationship between adequacy ratings and the method of financing, a conclusion confirmed through discussions with various representatives during the site visits. Water systems supported through the collection of user fees exhibited the highest adequacy ratings on the whole; however, user charges are not easily administered by all tribes.

Tribal governments often cite tribal members' resistance to fee payment as the cause for the lack of established fee charges or collection actions. This opposition might be overcome through the use of tribal public awareness campaigns aimed at educating the tribal members as to the reason they need to pay for the delivery of safe water. One tribe in the Phoenix

area has published advertisements in the local newspaper that inform tribal members that the water in the local river is free, but if they want safe drinking water piped to their homes they need to pay for that service.

To ensure an equitable charge for potable water, tribes that have metered water systems would benefit from routine meter repair and maintenance at all service connections. For those tribes having financial capabilities to maintain meters and the operator to monitor them, metering can be helpful in detecting water loss or leakage that is a significant problem for many of the systems covered during the site visits.

In cases where the water systems must rely, to some degree, on general tribal funds, tribes should consider establishing a mechanism independent of reliance on other tribal resources, to fund the water systems. Monthly utility fees would be an appropriate mechanism for generating revenues. Utilizing IHS assistance, tribes could conduct rate studies of the water systems to determine what fees should be charged for water usage. Fee structures, if enforced, would ensure that collections cover all operation and maintenance expenses. Tribal government enforcement of fee payments has proven to be effective for many tribes and should be considered by others.

Tribes could further encourage operators to seek training and gain more knowledge of their systems by allowing utility

directors to provide financial incentives to operators who meet specified training and certification milestones.

In areas such as California, where operators are part-time volunteers, tribes might consider pooling their resources in order to hire a full-time salaried operator who can serve several tribes. Because the majority of tribes are small and do not maintain complicated systems, a full-time operator serving several tribes would be more likely to have the time and expertise to maintain the water systems than a part-time volunteer who is likely to have many other obligations.

Need for Alternative Water Supplies

It was evidenced throughout several site visits that summer water shortages and limited storage capacity are common problems on many Indian reservations. Many tribes have already investigated and identified future drinking water needs based on planned or anticipated population growth and development. In order to ensure an adequate supply of drinking water to accompany this expansion, it is important that the tribes and IHS continue conducting studies to assess the actual need for additional capacity and storage and the methods by which they may be able to develop these necessary sources. Although several tribes visited had conducted similar studies with IHS assistance, tribes that have not pursued these options would benefit from this information. If existing water resources are not sufficient to meet future needs, plans could be developed to identify

additional water supplies and increase storage and distribution capabilities.

If no alternative sources of drinking water can be identified on tribal lands, tribes might consider alternatives such as cooperating with local municipalities or water districts to acquire additional sources of water. One of the Puget Sound tribes resolved this problem by trading sewage treatment services for drinking water supplies. Where sovereignty issues can be negotiated, tribes which have an abundant water supply might consider selling it as a way of generating revenues to operate and maintain their systems.

SDWA Information/Technical Assistance

Based on the information collected during the site visits, Indian tribes have received some information concerning the Safe Drinking Water Act (SDWA) and the Amendments. While most tribes are aware of the statutory requirements, very few have a thorough understanding of the existing regulations or are aware of the specific provisions of the Amendments. At the time the site visits were conducted, a majority of the tribes indicated that they were not taking steps to implement the requirements of the Amendments by making plans to upgrade their systems.

EPA Regional offices are the primary source of the SDWA information, although, the information provided often does not reach the person or persons directly responsible for the

drinking water system. This is a result of the information being sent to the tribal office and not always being forwarded to the system planners or to the water system operators. Although most tribes are committed to providing an adequate supply of drinking water, they expressed a need for a clearer, more simplified explanation of the SDWA legislation and regulations as it applies to their operations.

In accordance with the terms of the Interagency Agreement (IAG) between IHS and EPA, EPA could consider two approaches to help the tribes gain a better understanding of the SDWA, the 1986 Amendments, and the National Primary Drinking Water Regulations. One approach entails developing materials in cooperation with IHS and Indian organizations (e.g., Intertribal Council of Arizona (ITCA)). These would present in simple terms what tribes need to do to comply with the Federal regulations and the reasons why it is important to comply. Involving IHS and organizations like ITCA in the preparation of these materials could enhance the effectiveness of the presentation by tailoring it to the concerns of tribal leaders and water system operators.

A second approach might involve the development of training programs offered by EPA and/or IHS to tribal leaders and water system operators explaining the SDWA, the regulations, and the need for monitoring to ensure the quality of the drinking water. If the training is designed such that tribal leaders and water

system operators could help train and educate their tribal members, problems with low fee collection rates, loss of water due to leakage, and lack of preventive maintenance could be overcome.

The IAG, which was developed to coordinate agency efforts to provide assistance to the Indian communities, stipulates that IHS will provide the tribes with technical assistance and training while EPA provides information on the SDWA, monitors compliance, and enforces the SDWA (see Appendix D). In some cases, EPA provides technical assistance or consults with circuit riders or state field office personnel. Several other organizations provide assistance, including independent contractors, equipment manufacturers, state agencies, Inter-Tribal organizations, and rural water associations. Generally, the available technical assistance seems to be adequate to meet the needs of the tribes, although a greater amount of training classes, workshops and technical assistance would prove beneficial in areas such as California. Similar to the kind of assistance offered to all small non-Indian community water systems under state jurisdiction, technical assistance is provided to Indian tribes through routine inspections and sanitary surveys or in response to specific problems. In the same way as EPA and IHS are responsible for a comprehensive approach to delivering technical assistance to Indian community

water systems, primacy States are likewise responsible for developing similar programs to support the small non-Indian public water systems under their jurisdiction.

IHS has taken a very active role in providing tribes with technical assistance. Service unit sanitarians, utility consultants, and engineers work directly with the tribes on operation and maintenance problems and in many cases are able to provide assistance on a daily basis. Some IHS Areas also employ Operation and Maintenance Coordinators whose sole responsibility is to work with the tribes to solve problems and help the tribes develop the capabilities necessary to manage their systems independently.

Roles of EPA and IHS

The respective roles of EPA and IHS have been defined under the IAG and the Memorandum of Understanding (MOU) which was developed in 1986 (see Appendix D). Each EPA Regional office has been encouraged to develop a supplemental agreement with its local IHS Area office to further define the roles of each Agency in ensuring environmental health on Indian reservations.

EPA and IHS levels of involvement with Indian tribes vary according to the MOU's developed and the needs and status of the tribes under their respective jurisdictions. Although the level of interaction and coordination between EPA and IHS differs among the EPA Regions, compliance with the SDWA appears to be better in Regions where EPA has a strong, technical presence.

While this level of EPA involvement is clearly desirable, limited resources, staff ability, and EPA/IHS agreements limit the amount of EPA presence nationwide.

In Regions where EPA cannot maintain a strong technical presence or a steady line of communication due to geographic limitations, technical assistance is primarily provided by the IHS individuals stationed on or near each reservation on a routine basis.

As suggested in the MOU, EPA may wish to designate one or more individuals within each Region to serve full time as a point of contact for tribes seeking information on eanvironmental programs. It might be most effective if these individuals have experience working with Indian tribes and are familiar with a wide range of Agency programs and are recognized by the tribe as a source of information and assistance.

The credibility of the Indian Drinking Water Coordinators contributes to EPA's success in working with the tribes. One way to improve the credibility of the coordinator's position is to appoint an individual who has background in or is familiar with drinking water supply technology, has a basic understanding of the analytical requirements of the SDWA, and a thorough knowledge of the SDWA, the Amendments, and the regulations. Credibility would be further enhanced if the coordinator demonstrated a familiarity with other relevant environmental regulations and was able to refer the tribes to EPA, State, or local

government representatives who can also assist them with these issues.

The Regional offices may wish to emphasize the importance of protocol when dealing with the Indians. As suggested in the IAG, the relationship between EPA and the tribes could be more positive if EPA solicited IHS input regarding communications with the tribes. An understanding of the tribal history with regard to environmental issues, a familiarity with the present condition and construction of the water system, and a sensitivity to tribal customs and lifestyles could improve tribal acceptance of the coordinator.

The IAG also stipulates that one of EPA's major objectives is to coordinate training and ensure that tribes are offered ample training opportunities. EPA and IHS should coordinate with other organizations to develop training programs specifically designed to enhance tribal water system operators' familiarity with their systems, specific treatment methods, and to point out the benefits to acquiring state certification. Training targeted to the type of water systems operated by a tribe is more effective than standardized training programs dealing with general system operations because it would address specific problems experienced by the tribe. To the extent possible, training should be conducted on reservations with the equipment the tribal operators use.

Technical assistance is available from sources outside

of EPA and IHS, as well. For instance, in several States, including New Mexico and Minnesota, the State rural water associations have hired circuit riders who travel to the reservations and work directly with Indian tribes. The circuit riders provide the necessary technical assistance and help train the water system operators in the proper operation of the equipment existing on the reservation. The National Rural Water Association is encouraged to work with the states and IHS to expand the Circuit Rider Program to other states in order to provide additional assistance to tribes with specific problems and to provide additional training on the equipment used by the tribes.

Summary

The provision of technical assistance and SDWA information by IHS and EPA and the degree to which each agency interacts with the tribes greatly impacts tribal attitudes toward their water system. Consistent emphasis on routine maintenance and attention to water quality definitely has a positive impact on system performance when combined with other factors. For instance, the way in which each EPA region has structured and supported the Indian Drinking Water Coordinator position has a noticeable influence on the drinking water quality and system operation on each reservation. Where the level of EPA involvement is minimal or where additional assistance is requested by

the tribes, EPA might consider developing new mechanisms to assist the tribes and improve its outreach.

The EPA FRDS data base, on which a large portion of the assessment of drinking water quality problems was based, does not contain enough current information on compliance data and inventory. For example, there are cases where the inventory is out of date, data for Indian water systems is missing, and information on systems which have merged or are no longer in operation is not current. An understanding of the nature and magnitude of drinking water quality problems on Indian reservations could be enhanced by the maintenance of an up to date inventory of Indian community drinking water systems.

In order to overcome some of the EPA FRDS data limitations, IHS Headquarters requested that its Area offices provide additional information on all drinking water systems serving Indian tribes. This additional information was used to verify the FRDS and SFDS data, identify data gaps, and supplement information that was missing from FRDS. In addition, the Study Team identified other sources of information on Indian drinking water systems Several Regions maintain independent information systems that track data on Indian drinking water systems. Based on an analysis of FRDS data for the Indian drinking water systems, it does not appear that these systems are used to update FRDS on a regular basis. Operation of independent information systems is appropriate for day-to-day operations, but the EPA

Regional offices need to update FRDS on a quarterly basis, just as primacy States routinely do.

In order to develop a single comprehensive data base of Indian drinking water systems, the information managed by the Regions, FRDS, SFDS, and the IHS survey should be completely integrated. This would provide a thorough data base that could be a valuable tool in monitoring the changes in drinking water quality on Indian reservations as the 1986 SDWA Amendment regulations are promulgated and implemented. IHS could also use the data base to reevaluate the unmet needs of Indian community drinking water systems in light of the 1986 SDWA Amendments.

Many of the tribes visited as part of this study expressed interest in primacy. Most did not have a clear understanding of primacy, nor of the requirements to obtain primacy. While there are a variety of reasons why tribes may be interested in obtaining primary enforcement responsibilities for their water systems, most tribes believed that it was a way to maintain sovereignty over their water systems and obtain financial assistance in developing environmental planning capabilities, which are high priorities among many tribes. Although they lack the resources to establish a strong environmental planning organization, many tribes are currently active in planning activities and maintain a strong desire to expand their

capabilities. While EPA has provided incentive for improvements through development grants in the primacy regulations, Indian tribes can be encouraged to further develop their self-sufficiency and emphasize the importance of overall environmental protection whether or not they are interested in primacy or able to qualify for it. The net result will be better operation and maintenance of their water, sewer, and solid waste facilities and better overall quality drinking water on a consistent basis.

It is apparent that there is not one single factor which, if emphasized, would improve the status of Indian community drinking water supplies in and of itself. On the contrary, a combination and coordination of factors involving tribal perspectives on water quality, economic status of tribal communities, concise and up to date regulatory information, and a stable relationship among tribal authorities, EPA, and IHS are necessary. While the overall conclusions of this analysis indicate that the quality of finished water is in compliance with Federal drinking water standards in most cases, there is substantial room for improvement and enhancement to other aspects of Indian drinking water systems.

A variety of programs are currently being developed and implemented by EPA to address some of the existing problems with water systems and provide assistance to tribes in preparation for the new regulations. IHS continues to pursue methods

of improvement which would be most beneficial to the Indian community's sanitation facilities. The degree of each agency's efforts within their respective jurisdictions indicates the level of concern and importance for the elimination of health threats posed by contamination of Indian drinking water systems.

# APPENDIX A

## LIST OF INDIAN TRIBES VISITED

APPENDIX A

INDIAN TRIBES VISITED DURING
SITE VIST AND PRIMARY CONTACT

Mr. Scott Canty
White Mountain Apache
Tribal Council
P.O. Box 700
Whiteriver, AZ 85941

Ms. Wanda Lafoon
Colorado River Tribal Council
Route 1, Box 23-B
Parker, AZ 85344

Mr. Leon Campbell, Chairman
Iowa Tribe of Kansas and Nebraska
Route 1, Box 58A
White Cloud, KS 66094

Mr. David Neilson
Hoh Tribal Business Council
HC 80, Box 917
Forks, WA 98331

Mr. George C. Bowechop, Chairman
Makah Tribal Council
P.O. Box 115
Neah Bay, WA 98387

Mr. Wally Jackson
Quileute Tribal Council
P.O. Box 279
La Push, WA 98350

Mr. Fred Thomas, Chairman
Kickapoo Tribe of Kansas
Route 1, Box 157A
Horton, KS 66349

Mr. Lawrence Joseph
Chairman
5318 Chief Brown Lane
Darrington, WA 98241

Mr. Philip J. Dorn
Planning Director
Port Gamble Klallam Tribe
P.O. Box 280
Kingston, WA 98346

Mr. William Jones
Chairman & General Manager
2616 Kwina Road
Bellingham, WA 98226

Mr. Paul Schissler
Assistant Planner
Swinomish Indian Tribal
Community
P.O. Box 817
La Conner, WA 98257

Mr. Robert McColgan
Director of Environmental
Health
Seminole Tribe of Florida
3006 Jacsbily Avenue
Hollywood, FL 33024

Mr. Ron Logan
Director of Environmental
Health
Miccosukee Tribe of Indians
P.O. Box 440021
Tamiami Station
Miami, FL 33144

Mr. Bob Hillman
OST Water & Sewer Company
Pine Ridge Reservation
Pine Ridge, SD 57770

Mr. Syed Y. Huq, Director
Rosebud Sioux Water Resources
Box 430
Rosebud, SD 57570

APPENDIX A (cont.)

Mr. Harold Pierce
Operator and Treasurer
Stillaguamish Board of Directors
2439 Stillaguamish Lane
Arlington, WA 98223

Ms. Susan Osuna
Tribal Administrator
Barona Indian Reservation
1095 Barona Road
Lakeside, CA 92040

Mr. Jerry Boisclair, Chairman
Pala Band of Mission Indians
P.O. Box 43
Pala, CA 92059-0043

Mr. Norman Ball
Tribal Treasurer
Point Arena/Manchester,
Band of Pomo Indians
P.O. Box 623
Point Arena, CA 95468

Ms. Doris Magante
Chairperson
La Jolla Indian Reservation
Star Rt. 158
Valley Center, CA 92082

Mr. Roderick Linton
Tribal Council Member
Morongo Indian Reservation
11581 Potrero Road
Bannino, CA 92220

Mr. Calvin Smith
Stewarts Point Indian
Reservation
P.O. Box 623
Point Arena, CA 95468

Mr. Rick Mezzetti
Administrator
Rincon Indian Reservation
P.O. Box 68
Valley Center, CA 92082

Mr. Rudy Ruis
Water Operator
Sycuan Indian Reservation
5441 Dehesa Road
El Cajon, CA 92021

# APPENDIX B

# SITE VISIT REPORTS

# SITE VISIT REPORT - FLORIDA

## IHS Nashville Area Office

### Background and Demographics

The Nashville area office is responsible for a much wider geographic area than other IHS area offices. The Nashville office services Indian tribes located in the eastern half of the country. States served include Maine, New York, Massachusetts, Rhode Island, Connecticut, Mississippi, Alabama, Louisiana, and Florida. The tribes in this area are extremely diverse. The IHS service populations range from relatively small (100 residents) to moderately large (near 6,000). The reservations include both rural and urban environments and the tribes are located in a variety of physical settings ranging from coastal to mountainous and represent a wide range of climatic conditions. Both surface water and ground water are sources for drinking water. Many tribes are serviced by central community water systems while others receive water from rural water districts or individual wells. As such, valid generalizations about tribes across the Nashville IHS area are difficult, if not impossible, to make. Assessments of this IHS area are based primarily on the study team's visits to two tribes in Florida and thus represent the water supply conditions only in this immediate area.

There are seven reservations in the State of Florida and they are inhabited by two tribes. One tribe has a total population of approximately 1,800 and resides on a land base of 107,258 acres comprising five reservations. The other tribe has a population of approximately 500 and inhabits only one of the two reservations it has. Revenues are generated through participation in Federal programs, leasing of lands for oil and gas rights, and cattle grazing. Additional sources of tribal income include tourism, restaurants, and bingo.

Organizational Structure of the Tribal Government

Tribal government structure in Florida closely resembles that on reservations in other areas of the country, where elected tribal council members manage tribal affairs.

Both Florida tribes have structured their tribal governments so that oversight of the water supply facilities is under the jurisdiction of an Environmental Health Director, who is supervised by the Health Director. The Health Director reports directly to the Tribal Administrator and to the Tribal Council. The Environmental Health Director's position on one reservation is funded by IHS even though he is a tribal employee. This person performs a wide range of duties including supervision of drinking water, wastewater, vector control, and solid waste management. The Environmental Health Director on the other reservation in Florida is employed and paid by the tribe and performs both sanitation and other environmental health related

services. The Directors are technically trained in these areas as well as in water supply techniques. They supervise the water treatment plant operators and provide operators with technical assistance and training. This organizational configuration seems successful in terms of water treatment facility operations in Florida. The success of this arrangement is further heightened by the dedication and commitment of the Environmental Health Directors.

The six inhabited reservations in Florida are supplied with water from several sources. Four reservations have tribally owned and operated drinking water systems which serve the majority of the Indian population in Florida. The other two reservations purchase water from a nearby municipal water system and from a private water company.

The two tribes visited finance their water supply system operations differently and neither is financially independent. All of the Indian owned and operated systems receive varying amounts of financial support or subsidies from the tribes. In cases where no user fees are charged, the entire operation of the water system is supported by tribal funds.

One tribe charges water fees to residential, institutional, and commercial users. The fees are based on a flat rate ranging from $7.50 to $10.50 for the first one thousand gallons and a graduated rate for each additional increment of one thousand gallons. Revenues generated from the collection of fees amount

to less than the total operating costs. Because user fees are often difficult to collect due to a general attitude that water is a collective resource, the Environmental Health Department has tried several collection methods which include taxing the non-paying tribal members' quarterly dividends received from oil and gas leases. Although this strategy has helped to reduce delinquency rates, collection continues to be a problem. The tribe's Sewer Use Ordinance gives it the authority to halt service for non-payment of user fees; however, this option has not been exercised.

The tribal water departments are generally in favor of increasing fees to cover operating expenses or implementing user fees where they do not exist. However, the water departments cannot implement or increase fees without the approval and support of their tribal councils, which is difficult to obtain if the general population does not support the concept.

Reliance on tribal dollars for routine operation forces the water department to compete with other tribal programs for funding. As long as the tribal government is subsidizing the water department, all expenditures on the water supply system are at the discretion of the Tribal Council just as major capital improvements are at the discretion of IHS due to the fact that the tribe is not likely to be able to afford to make these improvements itself.

Sources of SDWA and Technical Information

The tribes obtain information on SDWA, primacy, and other drinking water issues from Regional EPA staff. IHS and EPA Regional staff provide both high quality and comparatively frequent technical assistance. Other sources of technical assistance include non-tribal personnel hired by the tribes to provide services not otherwise available on the reservations. The Florida tribes are self-reliant. The Environmental Health Directors are certified water treatment operators and continue to pursue training in the water treatment area. In addition, these individuals each have more than 15 years of experience in water treatment plant operations.

The tribes are aware of primacy in a general sense based on information provided to them by EPA, but they are unaware of the specific requirements. They are interested in obtaining primacy if, upon further investigation, it promises to be economically feasible and beneficial.

Roles of EPA and IHS

The Florida tribes maintain an excellent rapport with EPA Regional staff and IHS area representatives. The tribes respect the expertise of the EPA Regional personnel and accept assistance willingly. EPA personnel can make constructive suggestions for water system operational improvements even though these changes may not be required by SDWA provisions. This positive relationship is attributable largely to the dedication of the primary

EPA staff person representing the Atlanta region. Knowledgeable of technical aspects of drinking water systems, this person also has an understanding of water supply facility operations. Having worked previously in a water treatment facility, his knowledge of drinking water facilities gives him credibility and earns him the respect of the tribes that rely on him for technical assistance.

IHS personnel are also well-received by the tribes in this area although the personnel turnover rate in the IHS area office and the large number of systems for which IHS personnel are responsible increases the challenge of the assignment.

The study team observed a unique relationship between EPA and IHS personnel in Florida. EPA and IHS work closely together with regard to the Indian jurisdiction in EPA Region IV. Their working relationship is one whereby both parties feel that the most efficient use of resources occurs when EPA and IHS coordinate their efforts. As a result, IHS conducts sanitary surveys concurrently with EPA's regular inspections of water treatment facilities. Both parties are aware of the other's conclusions and concur on recommendations made to the tribes, which promotes technical guidance consistency from the tribes' point of view. In addition to conducting regular inspections of the water systems, EPA conducts periodic monitoring and is planning to conduct the first round of organic-chemical testing required by the SDWA Amendments.

Both EPA and IHS provide hands-on training for system operators. They take care not to duplicate the training provided by the State. For example, in the last several years, IHS has discontinued corrosion control and chlorination training because it was undertaken by the State. The need for formal operator training by EPA and IHS is not as critical in Florida as in other states since the Environmental Health Directors are highly skilled and the states fund training courses that the tribal operators attend on a regular basis.

Sources and Adequacy of Water Systems

Ground water is the existing source of water for the tribes visited by the study team. Although ground water usually requires minimal treatment, more extensive treatment including aeration and filtration is required on the Florida reservations. Highly productive wells with good quality water are difficult to locate and maintain in Florida. Although the quality of the raw water is poor and thus additional water treatment is necessary, in general, the finished water quality has consistently complied with applicable standards. There have been no recent reported outbreaks of waterborne diseases or other major problems with water contamination or quality on the Florida reservations.

Water quality monitoring necessary to maintain SDWA compliance is performed in accordance with a specific routine worked out between EPA, IHS, and the tribes by the operators of the systems. Additional monitoring is conducted by the tribes when necessary.

Tribal personnel recognize that the quality of ground water and surface water in the State of Florida is deteriorating; consequently, an adequate supply of safe drinking water is an ostensibly high priority. The tribes expressed concern over the potential for pesticide contamination of their water resources as a result of the expanding citrus and sugar cane industry in the State. The tribes are more immediately concerned with water rights in general, including their ability to draw water for irrigation purposes. They are currently negotiating their water rights with the State of Florida and the South Florida Water District.

Need for Alternative Water Supplies

Alternative sources of water also exist. Existing wells were previously used to supply water to the system and then were abandoned for new wells of better yield or improved quality. Several abandoned wells have been capped to protect the aquifer and therefore are no longer available as alternative sources. There appears to be little or no problem of availability, as both tribes are either considering or being advised to develop new source wells.

Capability and Adequacy of Operation and Maintenance

Operation and maintenance is performed primarily by the water treatment plant operators with assistance from the Director of Environmental Health. Rarely do operation and maintenance problems occur that cannot be handled by the water treatment

staff. When assistance is required, an outside consultant is usually contacted. The system operators view full funding for operation and maintenance of the water system as a high priority; however, it is not necessarily one of the tribal priorities. When the operators are available and adequate funds exist, routine system operation and maintenance is performed. There is an established preventive maintenance schedule but since water treatment personnel are often busy with other tribal responsibilities it is not always followed. The overall condition of systems vary. Some of the newer systems are in very good condition while some of the older systems have deteriorated. The simpler systems tend to be in better condition regardless of their age.

Need for Improvements

The water systems in Florida are in need of additional resources to fund general operation and preventive maintenance. While these activities receive priority from the water system operators, the fees and tribal contributions limit the ability of the operators to perform the necessary maintenance. In addition, the water systems have experienced a substantial, but unaccounted for, amount of water lost. A leak detection study is being proposed by IHS to identify sources of water loss in one case.

# SITE VISIT REPORT - KANSAS

## IHS Oklahoma City Area Office

### Background and Demographics

The Indian Health Service (IHS) Oklahoma City Area Office is characterized by two diverse situations in the States of Oklahoma and Kansas. While the Indian population in Oklahoma is interspersed in the local communities, Indians in Kansas reside in both the local communities and on reservations. Indians in Oklahoma and Kansas living in local communities obtain their drinking water from municipal water systems or from individual wells. Indians living on reservations in Kansas obtain their drinking water from the tribally supported sources, including tribally owned and operated water systems and tribally operated distribution systems in which water is purchased from local rural water districts. In addition, some Indians on the reservations obtain their drinking water from individual wells. This assessment of drinking water quality in the IHS Oklahoma City Area will concentrate on tribally owned and operated systems providing water to Indians living on reservations.

In order to prepare this assessment, two Indian tribes on two reservations in Kansas were studied. This assessment is based on information provided by the two tribes, IHS Service Area staff, and EPA Regional staff. Since Oklahoma Indians do not live on reservations, these findings can not be applied to the State of Oklahoma.

The economic base of the reservations is limited to agriculture, Bingo, and Federal Grant programs such as road construction or education. Since these grants are earmarked for specific programs, the tribes usually have to finance water systems from the general tribal operating accounts. When funds are scarce, the water systems budgets are often the first ones cut.

The reservations visited as part of this study range in population from 150 to 600 residents. Most tribal members live and work on the reservations, although some live and work in surrounding communities. The tribal population lives in several centralized communities on the reservations, which range in size from 250 to 1,000 acres. This centralization is a result of the scarcity of water in this section of the country, the expense of drilling deep wells, and the fact that most of the homes were built with Housing and Urban Development (HUD) funds. IHS has constructed centralized water systems which are operated and maintained by the tribes to serve these communities.

Organizational Structure of the Tribal Governments

The political environment and structure of the tribal governments are relatively stable. The tribal councils are elected to manage the affairs of the tribes and the tribal chairmen assume overall responsibility for the water systems.

The water system operators work directly for the tribal councils, but due to the limited tribal financial resources, the operators also perform a variety of tribal functions ranging from road construction to building maintenance in addition to operating and maintaining the water systems. In spite of this; however, one tribe does have two full-time certified operators who manage the water system regularly. As long as potable water is available, system maintenance is performed only when specific problems demand attention or when there are few other pressing matters to which the operators must attend.

One of the reasons system maintenance is a low priority is that the water system must compete with other tribal programs for financing. While the tribes either charge fees for water or are in the process of establishing a user fee system, the revenues do not cover the costs of operating and maintaining the water systems. The tribes, therefore, must allocate funds to operate and maintain the systems. From the tribal perspective, if the system is operating and providing an adequate supply of potable water, any surplus funds will be spent on other programs. In reality, the available funds to operate and maintain the water systems often fall short of the real need to correct problems and maintain the system properly. No efforts have been made to create a reserve fund to replace major equipment.

The water systems are not simple to operate. The surface water system is especially complicated due to a highly sophisticated treatment process. A number of factors impede the tribe's ability to manage the system properly, including resources to perform all of the operation, maintenance, and monitoring functions; limited knowledge of the requirements for compliance with SDWA; and limited access to sources of information and assistance.

Sources of SDWA and Technical Information

The IHS is the major source of technical and regulatory information for the tribes. Although the EPA Region sends the tribes information on SDWA, the 1986 Amendments, and primacy, the appropriate tribal employees do not always receive the information. EPA directs the information to the tribal leaders who, in many cases, do not understand the technicalities of the literature or how to apply the information to the operation of the water system. The tribes indicated that most of the information sent to the tribal office is not passed on to the water system operators who are in the best position to read and evaluate the information. The Regional EPA office has started to send duplicate copies of the material to the water system operators, a practice which has helped to keep the operators informed of the latest SDWA requirements. Two water operators are State certified, but limited resources have hindered training and State certification for the tribes overall.

Although EPA and IHS jointly fund training programs and finance the operators' participation in training offered by local organizations, such as the Kansas Rural Water Association (KRWA), several factors work against tribal participation. The training often takes place off site, requiring the operators to travel. While travel expenses are often paid by IHS, the tribes are reimbursed after travel is completed. In addition, the tribes must pay salaries to the operators participating in training as well as to temporary replacements hired during their absence. Since many operators perform a wide variety of essential maintenance functions on the reservations, the tribes may have difficulty finding suitable replacements. Furthermore, the tribal administration may not recognize the importance of training and may not inform the operators of training opportunities. Finally, the training in many cases does not apply to the type of system operated by the tribes. For example, the training may be directed toward groundwater systems and therefore be of minimal use to a tribe using a surface water system.

Roles of EPA and IHS

IHS has a much greater role in tribal assistance than does EPA. IHS Sanitarians provide continuous training and technical assistance, IHS staff supplies technical information on the water systems, and provides practical information concerning the requirements of the SDWA. Close contact between IHS and the tribes has sensitized IHS staff to the communication patterns

which are successful in providing the tribes with necessary SDWA information. The communication between the tribes and EPA tends to be more formal and written, while the communication between IHS and the tribes tends to be conducted through personal visits. Because IHS has established more personal communication channels, they are able to present the tribes with a more general overview of the SDWA requirements and regulations.

EPA's major interaction with the tribes involves providing them with information on SDWA and monitoring their compliance rates. Although the EPA Regional Office has not taken enforcement actions when tribes have been out of compliance, they inform the tribes when samples exceed MCLs and sponsor monitoring for organics, inorganics, and radionuclides. The level of interaction between the Region and the tribes has been limited in Nebraska, usually consisting of yearly sanitary inspections in conjunction with IHS sanitary surveys.

The tribes do not appear to have a thorough understanding of the information provided to them on SDWA and the Amendments. For example, the tribes know that they must perform microbiological sampling on a monthly basis. While they are committed to ensuring the safety of their drinking water supplies, they do not appear to appreciate EPA's role in enforcement and implementation of the SDWA. EPA has funded sampling and analysis of organic and inorganic constituents over the past

several years as required under the SDWA. While the tribes know that the sampling was conducted and are informed of the results, they do not know that EPA conducted the sampling under the authority of the SDWA.

It appears that without EPA and IHS assistance the majority of the SDWA requirements would not be met by the tribes. This is not because the tribes are ignoring the requirements, but because they do not understand their legal requirements and are unwilling to invest in the water system unless there is a specific problem that must be addressed.

In terms of the 1986 Amendments, only one tribe is in the process of formulating plans to implement the requirements while the other is not planning to do so in the near future. This lack of response is due primarily to limited funds and a lack of familiarity with new requirements. The tribes, however, are aware of Section 1451, the provision for Indian tribal primacy. Based on information provided by IHS and the Region, it appears that one tribe in Kansas may be interested in applying for primacy, but the general level of knowledge concerning the qualification requirements of primacy is limited.

The tribes expressed an interest in obtaining primacy not only for the systems they operated, but also for any systems located on their land. Each of the reservations visited had a single small water system. The systems serve between 33 and

110 homes, several commercial buildings (tribal offices and small service businesses), and several farms including those operated by the tribes and those operated by private individuals.

Each of the water systems visited treats its drinking water according to the water source. Groundwater is chlorinated and fluoridation is to be installed this year, while surface water is softened, filtered, chlorinated, and fluoridated.

Source and Adequacy of Water Systems

The groundwater system visited is new and requires limited operator input. By contrast, the surface water system is older, in need of rehabilitation and requires more intensive operator input. At the surface water plant the operators are required to backwash the filters on a periodic basis and adjust the doses of alum and other chemicals.

The treatment technology used on each reservation differs based on the source of the water, the size of the reservation, the age of the treatment plant, operator training and familiarity, and the design features of the plant. The most basic system involves chlorinating and fluoridating the water pumped from two wells. Even in this case, operational problems exist. One tribe claimed that the amount of effort necessary to continually repair a faulty fluoridator outweighed the benefits of fluoridation. The tribe is attempting to have the fluoridator removed so that they can save the time and expense associated

with its maintenance. All fluoridation installation and repairs are performed by an IHS Fluoridation specialist.

The surface water plant uses more sophisticated treatment methods such as coagulation, settling, softening, filtration, and chlorination. The system requires a significant commitment on the part of the tribe to ensure effective operation. In many cases, recordkeeping is erratic and access to the daily data is difficult to maintain. The operators are assisted by the local IHS staff, KRWA, and the Kansas Department of Health and the Environment (KDHE) in developing a basic knowledge of how to operate their systems.

The tribes have established a schedule for collecting water samples for bacteriological analysis. The water is obtained from locations throughout the reservation, which are alternated monthly. Samples collected are sent to the State laboratory for analysis and the results are sent to the Tribal Chairman and to EPA. Based on the information reported by the tribe, there was a contaminated bacteriological sample collected during 1987 from the surface water system, which resulted in orders to boil the water in three homes at the end of the distribution line. The problem was related to the flushing of water after flooding. The limited number of incidents of contamination have been attributed to the continuous chlorination of the finished water. However, there have been unconfirmed reports of upstream fish kills and contamination from

agricultural practices which could increase the potential for contamination and threaten the quality of the surface water source. There have been no incidents of contamination from the ground water system.

EPA has sponsored additional testing of the raw and finished water for the surface water system to determine if the drinking water has been affected by upstream activities. Although the testing has provided no evidence of contamination, the tribe remains concerned and has started looking for an alternative supply.

Need for Alternative Water Supplies

The long-term availability of an adequate supply of drinking water is a primary concern of tribes in this area. The tribe (surface water system) is able to hook into the nearest municipal PWS in emergency situations. Several tribes are working with IHS and Bureau of Indian Affairs (BIA) to identify and tap alternative sources of water. The Missouri River is a potential source of water for tribes nearby. While the river would seem to assure these tribes a long-term stable supply, the tribes would prefer developing a groundwater source, due to the better quality water and the lower cost associated with operating a groundwater treatment system versus a surface water treatment plant. The tribe currently depending on a surface water source would like to develop a groundwater supply, because during periods of low flow and high demand the surface source may not

provide an adequate supply of water. Furthermore, without a ground water source, a contamination incident up-stream of the surface water intake point could have serious impacts on the quality of the tribe's drinking water.

IHS usually funds the development and construction of treatment plants while the tribe assumes responsibility for operation of the facility. Therefore, the tribe typically supports developments that result in lower operating costs at the expense of initial development costs.

Capability and Adequacy of Operations and Maintenance

Prior to the development and construction of water systems, IHS and the tribe normally enter into an agreement that stipulates that the tribe will assume responsibility for operating the system once construction is completed. Based on the reservations visited, the tribes have assumed this responsibility and are operating and maintaining the systems as agreed. While the systems are reasonably well-operated, there is concern on the part of IHS that the tribes are not applying sufficient resources to perform all of the required preventive maintenance. The groundwater system visited was new and required little maintenance. Based on the study team's assessment, the required maintenance appeared to be performed on a routine basis. The pump house was clean, clear of weeds and trash, and except for the fluoridator, the water system was in good working condition. The operator has been working with the system since it was

placed in operation in January 1986, and had attended training classes sponsored by the IHS, EPA and the Kansas Rural Water Association (KRWA). The utility fees collected generated sufficient revenue to pay for costs of operation and maintenance of the system, but the operator's salary was paid from other tribal accounts.

The surface water system appeared to be in fair working condition. The operators understood the operations of the plant, knew what tests needed to be performed, and knew how often and how to perform some of the required tests. However, there are several capital improvements needed which the tribe is not in a position to provide. These improvements include rebuilding the dam which forms the water intake, rehabilitating the intake pump house, and replacing the alum feeders. One reason these repairs are required is that a schedule for routine preventive maintenance has not been established and that only necessary repairs have been made to the system. These repairs keep the system operational, but based on evidence from several sanitary surveys, there is a high likelihood that the system will continue to have operational problems due to the poor condition of the equipment. It should be pointed out that the tribe is not deliberately refusing to make the repairs and undertake the difficult to fund repairs that are not directly related to the operation of the system.

Need for Improvements

Increasing user fee rates and collection thereof to meet operating expenses, as well as establishing a fund for equipment replacement, would greatly improve the long-term reliability of the water systems. Concurrently, by concentrating on retaining the present experienced and trained operators, the tribes will be in a better position to consistently provide safe drinking water with proper water treatment techniques.

As discussed in the Conclusions and Recommendations section of this report, the tribes in Kansas would also benefit from ongoing communication between EPA and the system operators to keep the operators informed of regulations and training opportunities.

# SITE VISIT REPORT - SOUTH DAKOTA

## IHS Aberdeen Area Office

### Background and Demographics

The IHS Aberdeen Area Office serves the Midwestern States of South Dakota, North Dakota, Nebraska, and Iowa. The study team focused its efforts on the State of South Dakota, in which two tribes residing on two large reservations were visited. The majority of the tribal members live on the reservations and obtain their drinking water from BIA, tribally supported sources on the reservations, and individual wells. This assessment of drinking water quality in the IHS Aberdeen Area will concentrate on BIA or tribally owned and operated systems in South Dakota.

The reservations in South Dakota are located on prairie land studded with rock outcroppings or buttes. Large tribal populations are dispersed in small communities spread over relatively large land areas. Most of the communities were constructed with Housing and Urban Development (HUD) funds. One reservation consists of 15,000 people residing on 2.7 million acres; the other reservation has a population of 12,000 people residing on 957,000 acres. On both reservations, roughly half of the land is tribally owned and half is allotted.

The economic base of the reservations is limited to agriculture and Federal government subsidies. Unemployment among tribal members is high, estimated at 90 percent by some tribal members. Most of those who are employed work for the tribal government. The tribes make an effort to finance the water systems through user fees, but at one of the reservations the employees of the Water and Sewer Company perform odd jobs in order to generate sufficient revenue to operate the water system.

Organizational Structure of the Tribal Governments

The organizational structure of the tribal governments is similar to that of the other reservations included in this study. There is an elected tribal council responsible for the affairs of the tribes and the water and sewer systems are operated by independent companies that are responsible for financial and technical management of the systems. One tribe has a Natural Resources Department that is involved in water resource development and water quality monitoring, but this department does not supervise the Water and Sewer Company. Instead, these two entities communicate openly about water supply and quality issues. The other reservation has a Natural Resources Department, but this office manages land operations, realty, roads, and credit rather than water supply or quality issues. The study team did not have an opportunity to meet tribal council members on either reservation, but did meet

with the Natural Resources Department personnel, who play a role in water resource development and water quality monitoring. Most of the information presented below is from this meeting and from meetings with the water and sewer companies on the reservations and with the local IHS Engineers.

The differences in government structure and communication on the two reservations parallel differences in the condition of the water systems, the level of operation and maintenance, and the financial health of the two water and sewer companies. Employees at the larger tribe's water and sewer company have approximately four years of experience with the company and had received a new manager 30 days prior to the study team's visit. This company has no history of turning off water of non-paying customers, despite delinquency periods of up to 60 months for some tribal members and offices. When the company attempted to turn off the water to these customers at the time of the study team's visit, the tribal council obtained a court order requiring the company to turn the water back on immediately and meet the council in court. The general tribal attitude reflects that of many of the tribes visited; that is, water is a natural resource and should be provided at no charge. The company did try to encourage people to pay fees by sending letters and publishing notices in the newspaper, but these efforts have not been effective in changing the tribal attitudes

In order to meet operating expenses, the operators perform odd jobs including testing private wells and firefighting. The time spent on these jobs rather than on the operation and maintenance of the water systems is reflected in the condition of the water systems on this reservation.

The Water and Sewer Company on the other reservation has retained its manager and one of its operators for 17 years. The manager enforces the collection of user fees by charging fines for nonpayment after 10 days and shutting off water to customers who are more than 50 days late in paying their fees. As an additional deterrent to non-compliance, the company charges a twelve dollar fee for reconnection. This company claims to be financially independent of both the tribal government and the outside communities.

Sources of SDWA and Technical Information

Both tribes receive technical assistance on a routine basis from the local IHS Field Office staff. When the Natural Resources Office or the water and sewer companies have technical questions about water quality or supply issues, they call the IHS Sanitarians and Engineers for assistance. Operators also obtain information from manufacturers' technical representatives. The tribes receive literature on SDWA and primacy from EPA, and in turn share the information with the operators. The larger tribe's water and sewer company had not reviewed the regulatory literature on SDWA or primacy prior to the site visit.

They also did not express a particular interest in obtaining primacy. The smaller tribe's water and sewer company deferred all responsibility for interpreting environmental regulations to the Natural Resources Office. This office expressed an interest in applying for primacy but recognized a need for training associated with assuming such a large responsibility.

Roles of EPA and IHS

The IHS field office is involved in the day to day operations of water systems on the reservations. At the larger of the two reservations, IHS provides equipment, chemicals, and daily assistance in supervising operation and maintenance and in troubleshooting. Before EPA's recent funding of training courses, IHS provided training for water and sewer system operators and for homeowners needing information on well and septic tank maintenance. On the other reservation, IHS, the Bureau of Indian Affairs, and the Natural Resources Office work together on special projects.

EPA and IHS conduct inspections on the reserva ions and provide training to system operators. EPA supports routine water system operation and management to a lesser extent than IHS. EPA currently funds an independent consultant who is contracted through the American Water Works Association (South Dakota Chapter) to provide hands-on training to the operators and appeared to be well received by the tribes. The tribes explained that EPA had recently been sending more technical

and regulatory literature than in the past. The Natural Resources Office claimed that communication channels with EPA were just beginning to open, and the tribe would prefer that EPA become more involved in assisting the tribe in setting up their own environmental programs.

Source and Adequacy of Water Systems

Both tribes depend largely on groundwater systems for their drinking water supply, and the systems they operate are not complicated. They consist of wells, pumphouses with chlorination and fluoridation equipment, storage reservoirs, and water distribution systems. The smaller reservation depends on a small number of surface water sources via infiltration galleries.

The majority of the systems on both reservations are owned by the tribes and operated by the water and sewer companies. On the larger reservation, 16 groundwater systems supply 780 homes and five schools, serving approximately 4,000 people. Except for one system in the center of town, the systems are scattered throughout the reservation and serve the small, localized communities. Communities range from 8 to 80 homes, and are generally isolated from one another by 20 or more miles of uninhabited prairie. A lack of regular maintenance and widespread vandalism can be attributed in large part to geographic isolation. Most of the systems have chlorination and fluoridation equipment, but the chlorination equipment is up to 20 years old and often nonfunctional.

Due to frequent water shortages in the summer months when demand exceeds supply, approximately 10 to 15 percent of the population hauls water in five gallon jugs from fire hydrants, schools or other homes. This practice continues during other seasons when contamination incidents occur. According to EPA Region VIII, during the 1987 government fiscal year, at least five systems had microbiological MCL violations during at least one sampling period. One system also continues to experience high mineral and iron content in the raw water supply. The IHS Environmental Health Profile for 1985 listed infectious hepatitis, bacillary dysentary, gastro enteritis/diarrhea, and ecto-parasitic illnesses for the area population, but no direct correlation has been made between these waterborne diseases and the water supplies on the reservation.

On the smaller reservation, 13 systems serve 1,650 homes. The systems include ground water and surface water sources. The surface water sources in most cases involve pumping through infiltration galleries to a storage reservoir. One surface water source consisted of a shallow well near a small pond. The water quality in the pond was the poorest of all sources on the reservation, and in the summer months it could not meet the demand of the eight homes it served. The majority of the water systems on this reservation had functioning chlorination and fluoridation systems.

When IHS first installs a new water system for the tribes, it also conducts monitoring for the Primary chemicals and radioactivity. Thereafter, the responsibility of monitoring for these parameters is placed upon the water and sewer companies. EPA Region VIII finds that most water systems are delinquent in completing the required chemical and radionuclide sampling and analysis. The system operators on the larger reservation conduct weekly sampling for fluoride and monthly sampling for coliform bacteria. Samples are sent to the State Health Laboratory. An on-site Community Health Representative maintains a file of results. If samples show contamination, IHS informs the Water and Sewer Company by letter, and offers them suggestions for remedying the problem.

The Natural Resources Department, assisted by Community Health Representatives, recently began monitoring the systems on the smaller reservation annually for inorganics, pesticides, and trihalomethanes and the system operators monitor for coliform on a monthly basis. Fluoride testing is conducted by the Public Health Service. Bacteriological samples are sent to the State Health Laboratory for analysis and all other samples are sent to an out of state laboratory.

The Natural Resources Department reported that their monitoring of the aquifer that supplies their reservation with drinking water indicated a potential hydrocarbon contamination problem in one area. In addition, the tribe indicated they

were experiencing lead contamination in an artesian well and bacteriological contamination of water serving 8 communities. The Natural Resources Department reported that 50 percent of all diseases in these eight communities could be attributed to the drinking water. They also reported that 50 percent of all water-borne diseases in the State of South Dakota occur on the reservation, however this information has not been verified by IHS.

Need for Alternative Water Supplies

The larger tribe requires back-up systems for at least two of its rural water systems particularly subject to supply shortages in the summer months. In addition, they will need at least one new well to serve a hospital and a community of 130 new homes, both of which are planned for construction in December, 1987.

The other tribe wants to investigate new aquifers to serve the needs of the drier Northern areas of the reservation. They also need an improved delivery system to serve the needs of the numerous small rural communities on the reservation.

Capability and Adequacy of Operation and Maintenance

Poor operation and maintenance of many of the systems cannot be attributed to a lack of operator knowledge on either of the reservations. Operators on the larger reservation have an average of two certifications each, including Wastewater Collection Works, Water Treatment Works, and Water Distribution.

On the smaller reservation one operator was trained in Water Distribution and the Natural Resources Department staff members who conduct sampling are trained in groundwater monitoring and wellhead protection. Poor operation and maintenance appeared to be due to a lack of regular inspections and a lack of preventive maintenance. This problem was particularly evident on the larger reservation where vandalism to the pumphouses and reservoirs was left unrepaired.

Equipment on this reservation was in need of repair or replacement, since no capital improvements had been made here in recent years. Few of the chlorination pumps were functioning and many of the heaters were burned out. The water meters at the pump houses were not functioning. Damaged altitude valves caused some pumps to run continuously when the reservoirs were full. The operators' goal was to visit each water system once per week, but repairs on the equipment and buildings were not accomplished in a timely fashion. Many expensive vehicles and pieces of heavy equipment furnished by IHS had been mortgaged by the tribe to finance general government operations, only to become bank property when the mortgage payments were not made.

More attention was given to routine operation and maintenance at the smaller reservation. The chlorination and fluoridation equipment was cleaned weekly and repaired as necessary. Most of the pumphouses were free of trash and weeds, and fences and locks were in good repair.

Need for Improvements

The larger reservation needs to implement a new accounting and collection system to account for water usage more accurately and to improve revenues. A new rate study is needed to determine an appropriate fee structure. The need for new equipment and vehicles is not as great as the need for better operation and maintenance of the equipment provided to the tribe by IHS.

The smaller reservation needs vehicles, manpower, and financial support for completion of phases II, III, and IV of their Rural Water System project. The project is an ambitious water distribution effort designed to eliminate regional water shortages. The tribe has already received some funds from HUD and IHS, but these funds amount to less than ten percent of the estimated cost to complete the system.

# SITE VISIT REPORT - CALIFORNIA

## IHS Sacramento Area Office

### Background and Demographics

A diverse array of Indian tribes live on 75 reservations or rancherias within California's borders. The State of California comprises a single IHS Program Area. In preparation of this assessment, two rancherias and six reservations were studied. In addition, information was gathered from IHS staff and Regional EPA representatives. The six reservations are located in the southern portion of the state while the rancherias are located north of San Francisco.

Tribes in California have very small populations, ranging from fewer than 50 to approximately 800. The number of homes per reservation ranges from fewer than 20 to 250, and the land allotted the various reservations ranges from approximately 600 acres to 32,250. Generally, few commercial establishments are located on Indian lands, although several tribes utilize various types of leases (e.g., sand and gravel, roadside advertising) to produce income. Residents of these reservations are employed both on and off the reservations, depending on their proximity to towns or cities and the opportunities offered by the local economy.

The economic condition of the various tribes differs considerably. Some of the tribes have sufficient funding to meet their basic needs, while others do not. The tribes generally

rely on bingo, small businesses, assorted land leases and government grants to support themselves financially. Despite these sources of income most of the tribes require additional funding to manage their drinking water systems. The lack of funding directly impacts the tribes' abilities to operate and maintain effective drinking water systems. Increased funding could help the tribes obtain equipment, conduct routine maintenance, repair equipment, upgrade existing systems, and develop alternative supplies of drinking water.

Organizational Structure of Tribal Governments

Nearly all of these tribes are governed by some form of tribal council. The councils are comprised of 3 to 10 members, and often organize sub-committees to handle specific concerns. Several of the tribes have created committees to address drinking water matters. None of the tribes currently have utility or water departments, although one tribe plans to establish such a department. Issues such as land leases or matters requiring the expenditure of large sums of money are generally subject to tribal vote. While most of the tribal governments lack police and judicial powers, most retain the authority to enact ordinances, and several have enacted ordinances pertaining to drinking water matters. The councils generally perform an oversight function with respect to operations of the drinking water systems, usually delegating authority for day to day

operations to the system operators. Problems and requests for funds are often presented to the councils for resolution.

Some of the tribes charge Indian users a fee for the drinking water. In almost all cases, however, this fee, ranging from $3 to $15 a month, does not pay for the operation of the drinking water systems. In these cases the tribes depend on tribal funds to subsidize the water systems. Those who do not charge a fee rely entirely on tribal funds and grants to finance system operations.

Several of the tribes indicated they would like to charge user fees or increase their fees but did not know how such proposals would be received by the tribe. Because no police or judicial powers are employed, collection of fees is a problem for many of the tribes. None of the tribes cut off drinking water service for non-payment of fees.

Sources of SDWA and Technical Information

The tribes generally maintained little information concerning drinking water regulatory programs, requirements, and developments. None were aware of new regulatory developments under the SDWA Amendments, and only one was familiar with the concept of primacy under the SDWA. The study team found that the majority of information was provided to the tribes by IHS and the Indian Health Clinic (IHC). Limited information was provided by the regional EPA office, although this office did respond to specific requests for information.

Roles of EPA and IHS

Other than occasional correspondence, the tribes receive little information from the EPA Regional office. While the regional EPA staff is capable of providing technical assistance, the tribes seek other sources for technical assistance, most often employing contractors. IHS provides assistance to most of the tribes in the areas of system design, installation, and technical guidance. Those tribes not soliciting IHS assistance cited reasons including dissatisfaction with the paperwork, the amount of time required to respond to a problem, and a perceived negative attitude of IHS with regard to providing assistance. On the other hand, some tribes are satisfied with the services provided by IHS and are willing to approach IHS with their problems. The study team found that, of the tribes visited in the northern part of the state, more were satisfied with the IHS relationship than the tribes in the southern part of the state.

Sources and Adequacy of Water Systems

All of the tribes emphasize the importance of good quality drinking water, but adequacy of these supplies remains a problem for several tribes. The lack of available ground water does not seem to be the primary problem, rather, difficulties with the existing distribution capability seems to be more at fault. Several tribes have capacity problems in the summer when demand is highest. Typical causes for this include limited

capacity of the system, pumps operating at below capacity due to mechanical problems, and heavy water use, due in part to irrigation. Some of the tribes are aware that excessive or uncontrolled use is a problem. Also, several tribes indicated that they have inadequate storage capacity at present, and that future population growth will be limited by the available drinking water supplies. One tribe is in the process of building 40 HUD homes. These homes will be served by a new groundwater well being installed by IHS.

The reservations visited in this area have no more than three drinking water systems, and each system consists of no more than three active wells. A majority of the systems rely on groundwater wells, although two rely on surface water. Most of the systems do not treat the water on a routine basis. If an impurity is detected, chlorination is used. A few systems regularly utilize chlorination and/or some sort of filtration as treatment and some currently fluoridate, or plan to do so in the near future.

IHC performs sampling for microbiological contamination on a monthly basis. In some instances, the tribe or county employees perform this sampling. More comprehensive monitoring is performed by EPA at extended intervals.

Although the quality of the groundwater sources of drinking water for these tribes is good, problems of water quality do exist. Reported problems include: contamination by nitrates;

sand in the system; microbiological contamination (remedied through chlorination); and sulfur odor. The tribes that rely on surface water sources have recurring problems with microbiological contamination. Treatment, usually chlorination, helps to mitigate this problem but these surface water systems do not consistently produce good quality water. For these tribes, projects are underway to develop new groundwater sources.

There are no documented occurrences of waterborne diseases; however, several of the tribes suspect that occasional cases of hepatitis are caused by the drinking water. Detailed health records are not kept on every illness, and therefore it is difficult to document waterborne diseases.

Need for Alternative Water Supplies

Where additional drinking water is needed the tribes have not identified alternative supply sources. Common alternatives are obtaining bottled water and using water from irrigation water systems. Only one tribe has existing wells in reserve, and these are not free of contamination problems.

Capability and Adequacy of Operations and Maintenance

Operation and maintenance services are performed on an as needed basis by the system operators. Although IHS has distributed operation and maintenance manuals to each tribe, these manuals do not appear to be used extensively. The operators as a group have had little formal training, although IHS does

provide individual training to new operators. Formal training has been requested by several of the tribes and is being planned in the near future by IHS in conjunction with EPA. Some of the operators have extensive experience while others are quite new to the job. Turnover seems to be generally high, except in a few instances, and in most cases the operator is a volunteer performing the job part-time.

Operational problems vary according to the individual system. These problems range from lack of basic tools, to the need for constant repair, to problems with floods destroying surface water systems. Generally, problems were observed in the areas of design, maintenance, operation, durability, and capacity. Most of the systems suffered from one or more of these problems.

Need for Improvements

The overall condition of the systems is good, but many require upgrades or repairs. Several of the pumps need to be repaired or replaced, because they are either not functioning or pumping well below rated capacity. Other systems need meters and valves installed so that use can be monitored and the water flow can be managed when problems arise. Several systems also have problems with leaks. One system has a problem with cross-contamination between the drinking water system and the irrigation water system due to backflow. Some systems need additional storage capacity. Although a few systems are

in the process of being upgraded or improved by IHS, many systems need to be upgraded to deal adequately with population demands.

The major needs for these systems vary in both type and amount. For example, one system does not appear to need any significant improvement, while other systems require repair, various system modifications, better financial management, improved operation and maintenance, and formal training of operators. Also, the tribes need to become aware that excessive or uncontrolled water usage, especially for secondary purposes such as irrigation, places a severe strain on the drinking water system's ability to meet normal demands. Finally, groundwater sources should be developed and utilized in lieu of surface water sources to eliminate the recurring microbiological problem.

# SITE VISIT REPORT - WASHINGTON

## IHS Portland Area Office

### Background and Demographics

The IHS Portland Office serves three states in the Pacific Northwest: Idaho, Oregon, and Washington. The State of Washington maintains the greatest number of tribes; there are 26 Federally recognized tribes in Washington compared to four in Idaho and eight in Oregon. Since the study team did not visit the States of Idaho and Oregon, this assessment of drinking water quality in the IHS Portland Area Office will concentrate on tribally owned and operated systems providing water to Indians living on reservations in the State of Washington only. The two areas of the state surveyed were the Olympic Peninsula on the Pacific Coast and the Puget Sound shoreline and neighboring mountains. Information for this assessment was provided by eight Washington tribes, IHS Service Area staff, and EPA regional staff.

Three tribes were visited on the Olympic Peninsula and five tribes were visited near Puget Sound. They range in size from small (2,000 residents) to very small (80 residents). The economic base of the reservations centers around logging, fishing, agriculture, mineral extraction, light industry, tourism, and Federal grants. Logging has been the major source of revenue for these tribes. The down-turn in the timber economy has constrained the ability of these tribes to

finance public services including drinking water, sewer systems and solid waste management. In order to compensate for the loss of timber revenues, many of these tribes have concentrated on expanding their economic activities into the tourism, recreation, and fishing industries.

The tribes on the Olympic Peninsula are located on the edge of the Olympic forest and along the Pacific Coast. Commercial development consists of hotels, resorts, restaurants, and fish processing plants. These businesses are seasonal and use a large volume of water during the summer months. Although there is abundant rainfall throughout most of the year, summer droughts are common. This is the height of both the tourist and fishing season and, therefore, water is in short supply when the tribes are experiencing the greatest demand.

The tribes near Puget Sound are located on forested peninsulas in the Sound, in Bellingham Bay, and in the mountains east of the Sound. Water is in short supply on two of the five reservations, especially in the summer months when demand is high. Efforts of one tribe on the Sound to expand its business base are hampered by the critical water shortage in summer. The majority of water users in the area are tribal residents; however, two of the reservations have developed a limited number of commercial and industrial businesses which also consume significant water resources.

Reservation housing in both the Olympic Peninsula and the Puget Sound area consists primarily of centralized HUD housing developments and a limited number of unplanned housing tracks. The homes in the developments are connected to the tribal water and sewer systems. Interspersed among the HUD housing are homes rented to non-tribal members and Federal government employees (IHS and BIA). These homes are also served by the tribal water and sewer system. There are no individual wells located on the reservations.

Organizational Structure of the Tribal Government

The tribal governments have been stable over the last several years. Although the tribal councils are elected every one to three years, there is very low turnover among the elected officials. Two of the eight tribes have executive directors who are responsible for the day to day management of the tribal government. These individuals are responsible for running the governments and for implementing the decisions of the tribal councils. The Councils have essentially the same authority and responsibilities as those of most state governments; specifically, development of legislation, long-term planning, execution of the laws, public safety, ensuring the health and welfare of the tribal members, and judicial responsibilities.

Three of the eight tribes have planning departments which are directly concerned with environmental planning issues. One tribe has a business council that develops water and sewer

codes and ordinances. The remaining two tribes have senate or council chairmen who carry out most of the planning functions. Two reservations have planning departments which oversee the water, sewer, and solid waste operations. Each of the tribes on these reservations have a separate, independent utility department that operates the water and sewer systems and manages the solid waste facility. A third tribe has a planning department which operates its water system. Several of the tribes are extremely active in comprehensive environmental planning. For example, one tribe is in the process of developing a coastal zone plan to prevent the over-development of its fisheries, and to protect the waters from pollution from fish processing plants and boaters. The tribe has also designated the surrounding watershed as a no-logging zone to ensure the long-term quality of the stream. A second tribe, in cooperation with the University of Washington, has initiated several studies to assess the impact of coastal development on its fisheries resource.

Four of the eight tribes have utility departments which are responsible for providing water and sewer services. The remaining tribes are smaller and only need a single maintenance individual to operate the water system.

Five of the eight tribes are currently charging fees for water. The fees range from a flat rate of a few dollars a month to a metered rate of up to $50/month. On at least three reservations, the money collected does not cover the full cost

of operating and maintaining the water system. The difference must be met from the general tribal operating funds. For two of these tribes, several years elapsed from the time the tribe implemented a user fee system until the members complied with it. Only one of the tribes shuts water off to members who do not pay, but several tribes are considering this policy if collections do not improve. Commercial and non-tribal customers pay higher rates than do tribal members, and their services are cut off if they do not pay their bills.

For one tribe, the low number of hook-ups to the system do not generate sufficient revenues to meet operating expenses without causing user fees to be beyond the reach of most tribal members. For this reason, a community decision was made to use tribal funds to cover operational and maintenance costs of the system. The tribe foregoes spending tribal funds on other projects in order to provide free water and sewer services to tribal members. Nevertheless, the water system, like other tribal programs, still tends to be under-funded due to limited tribal funds.

None of the reservations visited on the Olympic Peninsula had sufficient funds to provide the required operations and maintenance support. The tribes spent the necessary funds to keep the water systems functioning, but preventive maintenance was neglected partly because of the high cost associated with operating and maintaining the sophisticated treatment plants.

A Puget Sound tribe has recently turned responsibility for financing the water system over to the Utility Commission. An ordinance was passed that will allow the Utility Commission to charge penalties and shut off water for delinquent payments. A Tribal Utility Assistance Program will be set up to subsidize the residents with the greatest need.

Despite their financial limitations, the tribes utilize the necessary resources to keep the water systems operational, consistent with their commitment to protect the health of their members. Having an adequate supply of safe drinking water was identified as a high priority by each of the tribes visited. When the systems failed or when improvements were required, the tribes typically either found the funds to purchase or repair the required equipment or worked with IHS to identify a funding source.

Sources of SDWA and Technical Information

IHS provides the tribes with information on SDWA and other regulations and gives technical assistance as requested. EPA provides regulatory literature to the tribes on occasion.

One of the major sources of technical assistance for one of the tribes on the Olympic Peninsula has been the Air Force base. The Air Force operates its own water system and employs its own water system operator. The tribe has worked very closely with the Air Force operator, trading equipment, supplies, and expertise on a routine basis. With the Air Force's scheduled

departure in 1988, one of the major sources of information for the tribe will no longer be available.

Four of the eight tribes had a general understanding of SDWA and six were aware of the new primacy provisions. None of the tribes expressed a clear understanding of the 1986 Amendments or an understanding of what they would be required to do in order to comply with the new regulations. Only two tribes expressed an interest in primacy, and this interest was qualified by a need to gather more information, to understand fully the implications of primacy and the benefits and costs to the tribe if primacy was granted. One of the larger tribes expressed concern that primacy would fragment the tribe's resources at a time when they were just beginning to work well as a team. Two of the tribes said they were too small to be interested in primacy.

Roles of EPA and IHS

Five of the tribes indicated an awareness of EPA's role in drinking water protection and said that they have received information from EPA in the past in the form of Federal Register notices, copies of legislation, or letters, but had established no direct contact with EPA. Two tribes indicated that they had recently attended a meeting sponsored by EPA concerning water programs, but commented that the information was aimed at tribes who had more experience working with environmental issues than they had. Four of the tribes strongly endorsed the prospect of

EPA taking a more active role in working with them. Solid waste and wastewater were identified as the two highest priority areas. Most of the tribes operate solid waste dumps and seek alternative management methods.

The IHS provides all of the training and technical assistance to the tribes on both the Olympic Peninsula and the Puget Sound area. One reason for the strength of their role is that EPA has developed a Memorandum of Understanding with IHS stating that IHS will provide the tribes with information concerning SDWA and other drinking water legislation and regulations on behalf of EPA. This assistance is provided in part with EPA funds. Most of the assistance is provided directly to the utility department and to the operators, although some is provided to the planning departments or business council who, in turn, assist the operators. The assistance includes improving the efficiency of system operation, informing the tribes of new standards and sampling requirements, training in equipment repair, installation of new equipment, and guidance for optimizing the performance of surface water filters. IHS is also working with the tribal leaders on such issues as developing user fee structures to finance the systems. Under this agreement EPA provides IHS with the necessary information and IHS transmits this information to the tribes on behalf of EPA.

Source and Adequacy of Water Systems

The quality of the surface water and some of the groundwater is poor, requiring the utilization of sophisticated treatment technologies. The surface water has high turbidity and iron levels as well as taste and odor problems. The groundwater has a high iron and sulfur content, resulting in color, taste, and odor problems. Treatment methods are targeted at eliminating these problems.

The surface water treatment system consists of coagulation/flocculation, pH adjustment, sedimentation and filtration with the addition of chlorine and fluoride. The treatment plant was originally built in 1970 and has been upgraded several times. A dam built in 1986 to alleviate seasonal water shortages has not yet been put on line due to poor water quality, a problem typically associated with new dams.

The water system operators perform routine testing of the water for microbiological contamination. The turbidimeter has been out of service for several months so this condition was not being monitored on a routine basis. IHS and EPA test the water on a periodic basis for organic and inorganic constituents and for radiological contamination. The tribe is informed of the results of the microbiological testing by the county health lab. The tribe is participating in the IHS Fluoride Incentive Program. Under this program, tribes which maintain a .9 - 1.2 mg/l fluoride level receive reimbursement

for testing and fluoride costs. All of the tribes visited were participating in the program.

The ground water system on the Olympic Peninsula reservation with the iron and sulfur problems routinely treats the water by adding magnesium peroxide and filtering the water through green magnesium sand to remove the high levels of iron and color. The water is also chlorinated and fluoridated. The filter needs to be backwashed twice a day due to high iron and color content of the water. Although sample results show that the water produced by the plant is of good quality, tribal members disagree and think that the level of treatment and the sophistication of the treatment plant are more advanced than necessary. They believe that a simpler, less complex plant would be easier to operate, require less funding, and produce better quality water. Nevertheless, there have been no reported health effects associated with the water and all monitoring of the finished water indicates that it meets EPA SDWA requirements.

These two treatment plants require constant attention and adjustment to ensure their proper operation. Although the quality of the finished water is acceptable, both tribes feel that the plants were over-designed. They feel that if the plants were simpler to operate the quality of the water could be improved.

The third tribe visited in the Olympic Peninsula treats the ground water by chlorination and fluoridation. The system is relatively simple to operate but is in need of repairs due to system age and a lack of preventive maintenance. For example, the automatic control valve on the stand pipe which is used to turn the groundwater pumps on and off is not operational. Local police were given the responsibility of checking the stand pipe daily, turning on the pumps when the water level dropped below a certain level, and turning off the pumps when the water level exceeded a certain level. There is no evidence that any monitoring other than that conducted under the IHS Fluoride Incentive Program is taking place on this reservation. The EPA Regional Office has not received any bacteriological monitoring reports from the county health department and the tribe has a record of only a single sample being tested. No disease outbreaks have been reported that have been associated with the water system.

The quality of the groundwater in the Puget Sound area is also poor. Infiltration from septic fields and/or landfills threatens groundwater quality on three reservations, while salt water intrusion, failure to meet secondary standards, high iron content, iron bacteria slime, high copper levels, and coliform bacteria are among other problems experienced in the area. Treatment by chlorination has eliminated the

microbiological problem and no reports of waterborne disease have been filed by any of these tribes. IHS reported that treatment to eliminate the iron bacteria slime and reduce the iron levels is ongoing.

The routine testing performed by water system operators in the Puget Sound area varies considerably from reservation to reservation. All tribes do some form of monitoring, but few of the tribes are completely in compliance with SDWA monitoring requirements. For example, two tribes sample for microbiological contamination on a monthly basis. Three tribes monitor fluoride either on a weekly or daily basis. Two tribes have monitored for the primary chemicals once every three years. Three tribes monitor for radiological contaminants in intervals ranging from quarterly to once every four years. In most cases, the system operators conduct the monitoring/sampling and send the samples to a county or state lab for analysis. On one small reservation, the State Department of Social Health Services provides free monthly microbiological analysis.

Need for Alternative Water Supplies

Tribes in Washington State are not only recognizing the water shortages on their reservations but are taking action to resolve them by formulating plans to develop alternative supplies. For example, one tribe, in cooperation with IHS, is in the process of developing a storage reservoir.

Water supplies near the Puget Sound vary with the terrain and location of the reservation. All tribes depend on groundwater, yet the aquifers serving the three largest tribes cannot meet the demand. One tribe can supplement its supply by purchasing water from a local municipality but prefers to be independent of outside communities. A second tribe has a critical water shortage every summer with no existing outside water source. This tribe plans to drill down to a depth of 1,000 feet to search for an additional aquifer. They are also considering developing a cooperative agreement with the county sewer district to ensure the availability of a backup source. In exchange for accepting sewage from two adjacent county shoreline communities the reservation will receive drinking water from the sewer district.

Capability and Adequacy of Operations and Maintenance

Limited financial resources, sophisticated treatment plants, and limited operator training severely restrict the ability of the tribes on the Olympic Peninsula to operate the treatment plants. The commitment of the new operators and directors of the maintenance departments and of the tribal council has been significant in improving the operational quality of the systems in recent years.

This commitment, however, does not make up for a lack of resources, which adversely affects preventive maintenance, operator training, and salaries. The sophistication of the

treatment facilities requires that operators receive substantial training in order to operate them effectively. Due to lack of travel funds and lack of replacement personnel to operate the systems while the operators are being trained, this necessary training does not take place. Of the operators who have participated in a training program, several expressed the view that the classes are not directly relevant to their particular systems. In addition, the tribes experience high operator turnover which may be the result of low pay and competing demands resulting from a multitude of responsibilities.

Training opportunities are not a limiting factor in the operation and maintenance capabilities of Puget Sound tribes. Operators at four of the five tribes have participated in IHS training courses, and operators at two of the tribes have Class I and/or Class II operator certification. This training opportunity, coupled with the relative simplicity of the water systems, allows these tribes to perform operation and maintenance activities with few problems.

The factors limiting the satisfactory performance of operation and maintenance in the Puget Sound area include system age, state of repair and lack of resources to finance the necessary repairs. Equipment failures include malfunctioning of electrical controls at the pumps, fluoridation dosing controls, and a sudden drop in the performance of pumping equipment. Inappropriate or aging equipment requiring replacement

include asbestos-concrete mains, a 1,000 foot supply line, copper pipes, and a storage reservoir.

The tribes assisted by IHS have made some progress in replacing equipment. For example, IHS recently repaired electrical controls that had caused three pumps to fail. One tribe replaced malfunctioning fluoride controls with an older set of equipment from a closed water station. New control equipment was installed at one of the smaller reservations. Given the limited resources of the tribes, these repair measures demonstrate the tribes' willingness to improve their systems. None of the limitations listed for the Olympic Peninsula tribes were observed in Puget Sound except for the lack of revenues to fund operation and maintenance.

Need for Improvements

The priority the tribes have placed on ensuring an adequate supply of drinking water is the major factor responsible for the relative success of the water systems visited. This, coupled with the willingness of the tribes to fix the water systems when there are problems and the commitment of the individual operators, has resulted in the successful management of water systems. However, without upgrading aging equipment and investing in operator training and the development of new water sources, the tribes will continue to experience significant water supply and quality problems.

# SITE VISIT REPORT - ARIZONA

## IHS Phoenix Area Office

### Background and Demographics

The IHS Phoenix Area Office serves most of the Arizona reservations and several reservations in California, Nevada and Utah. The two reservations visited by the study team are typical of most reservations located in this area in terms of size and population. The water systems on most of the reservations in this area are managed by a Utility Department operated within the tribal governments. On one reservation, each community owns and operates its own system. The Utility Departments manage a variety of systems ranging from regional systems serving the entire reservation to small community systems. In addition to these water systems, a significant number of other systems exist on these reservations that do not fall within the jurisdiction of the Utility Departments and are managed independently by tribal businesses or by the lessee.

The study team visited reservations in eastern and western Arizona. Based on the information IHS provided, most reservations in this area supply high quality water to their residents Although it is possible to characterize the Phoenix area based on the information collected during the site visit, several limitations should be noted. This area includes a number of

small reservations with unique drinking water problems. For example, one reservation is located at the base of the Grand Canyon; limiting the tribe's ability to participate in most IHS/EPA sponsored activities and IHS' ability to provide on-site training and technical assistance. Also, the two reservations visited are more prosperous than most other reservations in Arizona, due to tribal business interests in agriculture, timber, and tourism.

The reservations in the Phoenix Area vary widely in their geographic characteristics from fertile agricultural land, to mountainous terrain, to desert. The tribal populations are generally concentrated near rivers. The climate ranges from hot and dry in western Arizona to cool and wet in the mountains in the eastern part of the state. Both reservations have an abundant supply of water due to their location along the Colorado River and in the mountains of eastern Arizona. Reservations located in desert regions of Arizona were not visited as part of this study so no assessment of the need for alternative supplies can be made. However, information provided by IHS and EPA indicates that the supply problems these reservations face may be similar to the problems in southern California.

The populations of the reservations are generally greater than 1,000 inhabitants. The two reservations visited have populations of 2,500 and 10,000, respectively. Most of the Indian homes on each of these reservations are served by

community water systems operated by a tribal Utility Department. However, a limited number of homes are not connected to the system and obtain their water from individual wells. Several residents continue to drink bottled water even though they have recently been connected to the water system. Bottled water was the primary source of drinking water prior to the development of the community system. On other reservations, a limited number of Indian homes are connected to water systems operated by tribal businesses. These systems do not come under the jurisdiction of the Utility Department, request no operation and maintenance funds from the tribe, and seek no assistance from IHS.

Organizational Structure of the Tribal Governments

The Utility Departments generally operate under the supervision of the tribal governments, suggesting that drinking water supply is an issue of high priority to the tribes in the Phoenix IHS Area. At one of the reservations visited, most tribal members are concentrated in a relatively small area and are served by a large regional water system operated by the tribal government's Utility Department. A Utility Board comprised of tribal officers oversees water system operations. A separate Environmental Department within the tribal government is responsible for monitoring and ensuring compliance with water quality standards. The Utility, through strong management by the Utility Director, is completely self-supporting, generating all necessary

revenues through a fee structure which is strictly enforced. The water rates are $20 for the first 10,000 gallons and $.32 for each additional increment of one thousand gallons.

The Utility has been able to fund major capital improvements (e.g., filtration equipment) which makes it unique among other tribes in the nation. Currently, the Utility is attempting to expand its user base to include all of the Indian homes on the reservation as well as other non-Indian communities in the area. Because of the high quality of the water provided by the regional system, the tribal government has completely supported the Director's efforts, including termination of service for nonpayment of fees.

The tribal government's commitment to good water quality is further emphasized by the method in which funds were originally obtained to construct this sophisticated regional system. The tribe was able to put a unique grant package together which combined tribal funds with grants from the Farmer's Home Administration (FmHA), BIA, IHS, and EPA. A portion of the original grant monies are still being used to finance capital improvements.

The reservation visited in eastern Arizona also has a Utility Department within the tribal government. The Utility operates and maintains 10 small community water systems which serve most of the Indian population and are geographically dispersed throughout the reservation. The ages and conditions

of these systems vary widely. The tribal utility is not self-supporting and does not control its own budget. The delinquency rate for the payment of water fees is nearly 30 percent. The Utility Director and IHS personnel on the reservation indicate that the Utility could be self-supporting if more fees were collected; however, the tribe is not supportive of shutting off water to encourage payment. One tribe in the area has developed a publicity campaign which explains why it is necessary to pay for drinking water. Customers who are unable to pay their water bills on time are being encouraged to sign a contract which states that they will pay in installments over an extended period of time.

Expenses that cannot be met by fees are subsidized by general tribal funds. Any requests for funding must be approved by the tribe's financial department. Major funding authorizations require the approval of the Tribal Council. In general, the tribe is usually willing to fund maintenance and repairs when emergencies occur (i.e, system disruptions), but is reluctant to fund preventive maintenance and staffing improvements.

Sources of SDWA and Technical Information

The tribes in the Phoenix Area are independent and are interested in managing all aspects of life on their reservations. The tribes visited illustrate contrasting levels of interaction with outside agencies. Specifically, the tribe in western Arizona actively solicits and values the assistance available

from IHS, BIA, EPA, Farmers Home Administration (FmHA), and State and local governments. It lobbied these agencies for funds and other resources to build and maintain the reservation's regional water system. The tribe welcomes visits from personnel from outside agencies and readily accepts advice. In contrast, the tribe visited in eastern Arizona desires funding but believes that outside involvement in tribal affairs limits its independence.

As an additional source of information and assistance, the Intertribal Council of Arizona (ITCA), a unique non-profit organization funded by Indian tribes throughout the State, offers support in a variety of ways and represents tribal collective interests. ITCA provides information to reservations on Federal regulations, lobbies for Indian rights, sponsors training, and brings Indian representatives together for training and the exchange of ideas. ITCA plays an active role in supporting drinking water programs by providing SDWA and primacy information, conducting water system operator training, and organizing intertribal forums to share technical expertise. Both of the Arizona tribes visited in this study mentioned that they had received some limited assistance from ITCA, although other tribes have used their services more extensively.

Roles of EPA and IHS

Throughout this IHS Area, EPA has had a limited role in monitoring drinking water systems. Approximately 75 reservations

are overseen by the Regional EPA Indian Drinking Water Coordinator in San Francisco. Logistically, it is difficult for EPA to take an active role. EPA's role has been limited to yearly sanitary surveys and sending information packages to the tribes although EPA has participated in special studies conducted by several tribes. For example, EPA is currently working with the tribe and the State of Arizona to monitor and evaluate the extent to which pesticides have contaminated the groundwater. This tribe would like to see EPA become more active in supporting training for Indian water system operators. At the reservation visited in eastern Arizona, EPA's presence has almost been non-existent. The Regional Office did send the Tribal Chairman a letter indicating that drinking water quality has been maintained, however only one recent site visit was documented. Information about new regulations is normally obtained independently by the tribal attorney's office. The tribe appears to prefer limited EPA involvement although it is interested in primacy and has contacted the EPA Regional Office for information about requirements and associated funding.

IHS is present on or near most of the reservations in the Phoenix Area. Due to the sophistication of these tribes on the reservations visited and their independence, IHS has concentrated its efforts on other reservations where supply and contamination problems are more frequent and the tribes are less able to handle them. As discussed earlier, both of

these tribes have the financial, administrative and technical resources to administer all aspects of a drinking water program and the reservation visited in western Arizona has a strong cooperative relationship with IHS personnel. IHS primarily provides support to the tribe's Environmental Committee and its Administrator in the form of providing technical guidance and information about water quality standards. The Utility Director also utilizes IHS as a technical consultant to provide limited operation and maintenance assistance. The tribe welcomes IHS support and seeks its advice and the two work together on a variety of environmental matters.

By contrast, the tribe visited in eastern Arizona is attempting to remain independent of outside assistance, particularly from IHS. While the tribal government would like to obtain primacy and thus manage all aspects of their drinking water program, they do not currently have the financial ability to do so. IHS agrees that the tribe is capable of managing its own drinking water program, particularly due to the high quality of the water sources, which require little treatment before distribution. With IHS support, the tribe is currently trying to assume responsibility for planning construction projects. Although the tribe would prefer to be independent of outside assistance, the Utility Director recognizes that IHS is the best source of technical assistance and training and routinely works with IHS to solve operation and maintenance problems. Because

of the age of the systems and the operators' limited knowledge of them, the Utility Department is in constant need of operation and management support. The IHS District Office serving eastern Arizona is unique in that it recognizes that in this region most drinking water system problems are associated with operation and maintenance and it employs a full-time Operation and Maintenance Advisor to serve the District's reservations. The Operation and Maintenance Advisor works most closely with the tribal utility directors.

Sources and Adequacy of Water Systems

Overall, the drinking water systems in the Phoenix Area provide high quality water, with few instances of contamination or disease outbreaks. This is particularly true in eastern Arizona where the reservations have good sources of water which often do not require chlorination or other treatment. On the reservation visited in western Arizona, the system is relatively sophisticated; including filtration, chlorination, and fluoridation of ground water and surface water sources. The operation of the treatment plant is monitored by an automated system. The distribution piping system is well-maintained, there is adequate storage capacity, an emergency source (two river intakes have been installed), and a regular operation and maintenance schedule is followed.

Each of the two reservations the study team visited in the Phoenix Area had a number of water systems that serve Indian and non-Indian populations but which are not directly under the control of a tribal Utility. Difficulties arise with respect to monitoring these systems and identifying enforcement jurisdiction. In Arizona, both tribes had limited knowledge of these systems and the adequacy of the drinking water they were providing. A western Arizona reservation is employing a unique approach whereby the tribe's environmental department, in cooperation with IHS, EPA and the States of California and Arizona, will regulate the non-Indian water systems on the reservation. The reservation in the eastern part of Arizona has a number of systems which are operated by the tribal business interests that serve some Indian homes. Although no incidents of contamination have been documented, there appears to be limited tribal knowledge concerning the quality and adequacy of these supplies of drinking water.

Need for Alternative Water Supplies

The tribes visited in Arizona do not appear to need alternative sources of water. The western Arizona tribe has installed intakes in the river in order to augment their ground water wells. Currently, the river intakes are used only to backflush the filters. Several homes currently on individual wells which are using bottled water for drinking purposes will be connected to the tribe's system within the next several years. The tribes

in eastern Arizona have an adequate supply of water. All of the communities have developed existing sources, typically near rivers, and use ground water wells located next to these rivers. In several isolated cases, the tribe in cooperation with IHS is exploring and drilling new wells, but this is the exception rather than the rule.

Capability and Adequacy of Operations and Maintenance

The tribes in the Phoenix Area place a high priority on providing safe drinking water, and with outside assistance (generally from IHS), fund and perform necessary maintenance. In eastern Arizona, problems lie with operation of distribution systems and the lack of preventive maintenance. In western Arizona, disruptions in the drinking water supply are rare. While operating costs are higher than on most other reservations, extensive savings are realized through preventive maintenance. Additional savings are realized by the reductions in water loss, which are accomplished by careful monitoring of the water flow and regular maintenance. As a result, the system is financially self-supporting. By contrast, reservations which do not provide for adequate operation and maintenance are likely to suffer frequent system disruptions.

Each of the 28 wells managed by the utility in eastern Arizonia is in disrepair, and frequent pump failures occur due to damage by electrical storms. In addition, water loss both in the homes and the distribution system is extensive, due

to a lack of monitoring, common cross connection problems, and poor pipe condition. One community system which has had frequent microbiological contamination caused by leakage from the nearby community sewage system, is very old and in immediate need of extensive repairs or replacement. Disruptions in service to this community occur on a regular basis.

The performance of the tribal Utility Departments correlates with the personnel and their level of training. Different tribes in the Phoenix Area provide varying levels of support to their utilities. On the reservation in western Arizona the Utility Director skillfully manages his staff and resources. The tribe fully supports his efforts to train all of his operators (all of whom are certified or are in the process of receiving certification) by allowing him to provide financial incentives to his employees. The staff has a sense of pride, a low turnover rate, and handles most of the operational problems which occur. Other tribes in the Area have similar programs and, consequently, low turnover rates as well. This program is an ideal model for other reservations to use in managing their water systems.

The director of the Utility Department of the eastern Arizona reservation has extensive experience in water system operation and is committed to providing a consistent supply of high quality water to his customers. However, his efforts are limited by competing demands and the lack of tribal support.

The Utility is under-staffed and the water system operators are largely untrained and uncertified. The tribe does not fund training or provide the necessary incentives to retain operators. The Director has extensive plans to modernize the Utility's systems and thereby improve water systems. Unfortunately, very little of his time is available for future planning since his duties include all aspects of managing the department, overseeing the operation of the system, and assisting in the correction of the frequent operation and maintenance problems.

Need for Improvements

The study team could not identify any additional areas in which the tribes had not already recognized and planned programs to meet the needs for increased water availability. The reservation in western Arizona is in the process of expanding its system to provide water to the few homes still on individual wells. This expansion is being financed by the Utility Department. The reservation in eastern Arizona is in the process of planning the renovation of several water systems. This work is being financed with Housing and Urban Development (HUD) and IHS grants and tribal funds. The tribal Engineering Department is preparing the master plan for these systems. In addition, the tribe in cooperation with IHS, is upgrading the electrical control panels at all of the pumphouses.

# APPENDIX C

# DATA METHODOLOGY

## METHODOLOGY

In order to develop a standardized data base of drinking water systems located on reservations, EPA's FRDS data was combined with IHS' SFDS and with information from a self-conducted survey of all water systems receiving IHS assistance. To ensure that the data base was compiled from the most comprehensive and up-to-date information from these two sources, only data concerning Indian community and non-community water systems for the 1986 fiscal year was used.

Due to structural and coding problems inherent with the FRDS, information specific to Indian water systems could not be easily extracted because FRDS contains data for all water systems nationwide. Therefore, information specific to systems located on Indian reservations had to be isolated and verified. After identifying the systems coded by reservation indicator, additional systems were located using the PWS ID number. The results of the data generation included 1,478 wells in 907 active public water systems.

The IHS SFDS reports information for all drinking water, wastewater, and solid waste facilities. Consequently, to obtain the relevant information to be matched with FRDS, only data for the drinking water systems was used and individual well information was deleted. In addition, the IHS facilities reported as being either a Central Water Facility (CF) or a

Community Water Facility (CW) were selected, because these facilities are comparable to FRDS community and non-community water systems. This resulted in the capture of 1,805 water systems tracked by the IHS.

Water system-specific data from FRDS and SFDS were merged by matching water system identification numbers. For SFDS this is the IHS's seven-character alphanumeric ID Sanitation Facility Code, and for FRDS, this is the nine-character alphanumeric PWS ID Facility Code. Conversations with EPA and IHS staff revealed that IHS uses the last seven digits of the FRDS PWS ID as the basis for developing its sanitation facility code, so that the two identification numbers could be used to identify SFDS systems corresponding to those tracked in the FRDS.

A number of methods were used to match the systems in FRDS with those in SFDS. To create consistent matches meant amending one of the data bases since FRDS uses a nine-character code and SFDS uses a seven-character code. In some cases, the sanitation facility code was converted to nine characters by converting the IHS State variable to a postal code and adding it to the facility code. If non-matched systems still existed after this attempt, the postal code was then converted to an EPA region code and added to the facility code in an attempt to match these remaining systems. This method resulted in 454 matched water systems.

A second method employed to match the systems converted the IHS numeric state code (STATE) to the State name, and compared it and the remainder of the sanitation facility code with the FRDS state variable (C0149) and the last three characters of the FRDS PWS ID. This step resulted in an additional 208 matched water systems.

Subsequent to the above attempts, 1,143 IHS facilities remained unmatched. The water system in FRDS that were not selected using the original criteria (i.e., the system either did not report a reservation code, or did not have a numeric region code in the first two characters of PWS ID) were then compared directly against these 1143 systems using the entire Sanitation Facility Code against the last seven digits of the FRDS PWS ID. This comparison identified an additional 224 water systems.

A final attempt to merge the remaining 919 IHS facilities took the Sanitation Facility Code plus the IHS state code and compared it to the last 5 characters in the PWS ID. This produced 463 water system matches, bringing the total number of matched water systems in the FRDS and SFDS data bases to 1,349.

This data total was combined with 407 non-matched FRDS records remaining from the total Indian water systems located on reservations. For the purpose of analysis, those water systems which were either in the SFDS only, or were in a State that did not have recognized Indian reservations, were deleted

from the data set used to perform the analysis. The data were further refined based on information received through conversations with tribal leaders as well as EPA Regional and IHS Area staff.

Caveats and Limitations of the Data

The data analysis used for this study is based on only those public water systems that are located on Indian reservations. Within FRDS, these systems are either assigned an unique code or identified within the primacy jurisdiction by a PWS ID starting with the two-digit EPA Region number. Water systems which are within a State's primacy jurisdiction are assigned a PWS ID beginning with the two-letter State abbreviation. Therefore, in order to obtain a list of public water systems located on Indian reservations, all public water systems with a reservation code were extracted from FRDS as well as those water systems with the first two digits of the Regional PWS ID. The total number of systems identified was 742 community water systems on approximately 250 reservations. These water systems were matched with water systems in SFDS and were reviewed with the IHS drinking water survey forms to ensure their accuracy.

Extracting data from FRDS for water systems with a reservation code yielded an incomplete and inaccurate data set due to the fact that the data element in FRDS used to identify whether or not the system is on a reservation is not accurate.

In order to ensure the accuracy of the data, only those water systems in FRDS that could positively be identified as being on a reservation (determined from a manual review of the data and from the IHS drinking water survey forms) were included in the analysis. The consequence of these limitations was a revised data set including 701 community water systems on 190 reservations.

There are two major limitations to the data extracted from FRDS which need to be considered in order to accurately evaluate the problems with drinking water systems and supplies on Indian reservations. First, based on discussions with EPA Regional staff, it appears that the FRDS data for many water systems located on reservations are not current. Several Regions (e.g., Regions 7, 8, 9 and 10) operate independent information systems that track data for drinking water systems located on reservations which, with the exception of Region 7, is not always used to update FRDS. Therefore, violation data or the inventory and characteristics of the water systems on the reservations are often not current. For example, in the past several years, the Colorado River Reservation has built a large regional water system and phased out several smaller systems. FRDS reports the total number of individuals served on this reservation to be 515, while the Colorado River Reservation water utility reports serving more than 2,000 individuals.

Similarly, in Region 7, there are two separate PWS ID's for each water system located on reservations in Kansas, Nebraska, and Iowa. The Regional Indian Drinking Water coordinator maintains one set of records while the State maintains records which contain State regulations which are different from the Federal regulations. In order to obtain accurate information for any of these systems, both sets of records need to be reviewed.

Second, data for many of the water systems are incomplete. For example, there is no water system capacity data (flow in gallons per day) reported for California. In addition, data from 1986 show that none of the Regions have reported any MCL violation for turbidity, organic chemicals, inorganic chemicals, or radionuclides and only 62 microbiological MCL violations have been reported for 836 Indian water systems.

In evaluating the data provided by IHS, several caveats also need to be identified. Many of the items tracked by IHS are subjective evaluations of the conditions of the drinking water systems and of the adequacy of the operation and maintenance organizations. The fields that describe Adequacy of Operation and Maintenance Organization, Reliability of Drinking Water Quality, and Adequacy of Operation and Maintenance, are numeric scores assigned to each water system or operation and maintenance organization by the local IHS official, typically

the Service Unit Sanitarian and Engineer assigned to the reservation. Although IHS has established criteria for assigning scores for each variable (see Table 2-1) the scores will vary according to the evaluation of the individuals charged with developing the data.

With the exception of California, which now includes cost data for disinfection and filtration, IHS estimates of costs to bring water systems into compliance with the SDWA requirements may not be comprehensive for several reasons. First, these costs are based on the SDWA requirements established prior to the enactment of the 1986 Amendments and, therefore, do not reflect the new requirements. Second, IHS local officials, with input from the tribe, usually assign a cost figure based on their assessment of the project costs. Third, many existing reservation water systems originally built by IHS may have to be redesigned in order to comply with the new requirements (e.g., disinfection). Fourth, most of the reservations visited as part of the field portion of this study (see Chapter 3) have not developed plans to meet the new requirements of the SDWA. Many of these reservations, for example, are not disinfecting their water and have no plans to do so unless evidence of adverse health effects arise.

# APPENDIX D

# INTERAGENCY AGREEMENT AND MEMORANDUM OF UNDERSTANDING BETWEEN THE INDIAN HEALTH SERVICE AND THE ENVIRONMENTAL PROTECTION AGENCY

Interagency Agreement

Between

The Indian Health Service

and the

Environmental Protection Agency

I. PURPOSE: To establish procedures to coordinate the activities of the two agencies in a manner that will continue to promote safe drinking water on Indian lands* and which will further the intent and purpose of the Safe Drinking Water Act (SDWA), as amended (42 U.S.C. 300f et seq.), taking into account the needs of the Indian people.

II. SCOPE OF COVERAGE: The Safe Drinking Water Act, as amended, provides that the Environmental Protection Agency (EPA) shall have primary responsibility for enforcement of the Act where a State does not assume primacy. Because in most instances States do not have jurisdiction over Indian lands, EPA retains primary enforcement responsibility (primacy) on such lands. It is the responsibility of each public water system located on Indian lands to comply with the maximum contaminant levels, monitoring and reporting, and other administrative requirements of the National Interim Primary Drinking Water Regulations. Failure by the system to comply may result in an enforcement action by EPA.

This Interagency Agreement provides for coordination with the Indian Health Service (IHS) and EPA, where EPA has primacy.

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*For the purpose of this Interagency Agreement, the term "Indian lands" includes American Indian and Alaskan Native lands over which EPA has primary enforcement responsibility. In Alaska, this only includes the Annette Island Reserve because the State has jurisdiction over all other Indian areas.

In addition, EPA will assist IHS in any way possible to initiate and carry out programs for public water system improvements when necessary and where states have primacy.

The Indian Health Service provides a wide range of environmental health services to Indians, including the construction and/or provision of essential sanitation facilities under the Indian Health Transfer Act, as amended (42 U.S.C. 2001 through 2004a), the Indian Health Care Improvement Act, (25 U.S.C. 1631 through 1633), and the Indian Self Determination Act (25 U.S.C. 450 et seq.). To the extent possible, EPA and IHS will provide a coordinated approach and eliminate unnecessary duplication of programs in order to promote and provide safe drinking water for Indians within the authority of each agency.

III. PROVISIONS: The following conditions are agreed to:

1. The IHS will maintain its position as an advocate of, and technical advisor to, the Indians. The IHS will not have any responsibilities in EPA enforcement activities.

2. The IHS will, upon request, provide EPA personnel with orientation to acquaint them with special situations and needs of Indians.

3. EPA will upon request provide training and technical assistance in various aspects of the SDWA to IHS personnel.

4. Based upon the availability of resources, the IHS will financially and technically assist Indians to meet the requirements of the SDWA by the following activities:

a. construction and renovation of public water systems, and

b. training and technical assistance to operation and maintenance (O&M) organizations. The IHS will assist O&M organizations to establish appropriate facility operations, monitoring, and surveillance activities in keeping with good standards of practice to ensure the provision of quality drinking water, and

c. make a special effort to provide assistance to those systems identified by EPA as priority violators.

5. The IHS and EPA will cooperate in the identification of public water supply systems on Indian lands and in the collection of inventory data. The IHS will inform EPA of new systems which will be constructed and following the completion of a new system, the IHS will prepare an initial inventory form and forward it to the appropriate EPA Regional Office. The IHS will also notify EPA when it learns of any other systems on Indian lands that are constructed or substantially modified, and when a change of ownership occurs. By May of each year, each Agency will exchange copies of annual compliance data.

6. EPA is responsible for special field visits and sampling and will assure the completion of analysis whenever necessary. The EPA will provide to system owner/operators lists of certified laboratories qualified to perform required analysis. Upon request, and when resources allow, EPA will provide sampling containers to owner/operators and will perform

required chemical analysis.

7. Whenever EPA finds that a public water system located on Indian lands is not meeting the National Interim Primary Drinking Water Regulations, the informal and formal notifications of violations to the owner/operator of such a system will be designed considering the Indian culture and experiences and will refrain where appropriate from following the prepared format used for standard enforcement actions. The EPA regional office will contact the IHS area office to assure it has all necessary information and to assure that available technical assistance has been or will be provided. The IHS and EPA will assist public water systems on Indian lands in any way the agencies can to achieve voluntary compliance. Mutual exchange of information and coordination of actions by both agencies are necessary in this effort. The EPA will advise IHS if efforts to achieve voluntary compliance have not been effective and formal enforcement actions are required. IHS will not have involvement in EPA enforcement activities, and the enforcement discretion of EPA will not be precluded.

8. Without interfering with legal or jurisdictional relationships, EPA will encourage States to offer laboratory services, training, technical and other assistance as appropriate and in agreement with the desires of the Indian people.

9. In any situation where Section 1431 (Emergency Actions) of the SDWA may be invoked, EPA and IHS will notify each other

and any other agencies involved of the problem and potential action, according to the standard emergency notification procedures of the EPA regional office or IHS area office. Such coordination between the agencies will not preclude either agency from taking action required under the respective mandates dealing with emergency situations.

10. In order to avoid multiplicity and excessive activities relating to EPA studies and surveys, whenever the EPA plans to undertake any studies or surveys (except for studies relating to enforement actions) under the authority of the SDWA, the EPA will consult with the IHS; for studies relating to enforcement the EPA will inform the IHS, as appropriate. The IHS will provide the EPA with any pertinent information it has available and provide other appropriate assistance within available resources.

11. The IHS area offices and the EPA regional offices will be encouraged to meet and negotiate Memoranda of Understanding (MOU), Interagency Agreements (IAG), and/or an Implementation Plan at the Regional/IHS Area Office level. The MOU, IAG, and/or Implementation Plan will not contradict the terms of this Interagency Agreement, but may include State agencies and/or tribes where applicable.

IV. Special Conditions: Both EPA and IHS agree to continue their efforts to improve the present compliance of systems with the Safe Drinking Water Act. Based upon the availability of funds and resources, EPA and IHS will cooperate to address

Indian system noncompliance by taking the following short and long term actions:

A. Short Term Actions To Ensure Safe Drinking Water

1. Resolve Differences In IHS And EPA System Compliance:

System compliance as reported in the Federal Reporting and Sanitary Facility data systems vary. Though inventories for each agency differ, EPA and IHS will cooperate to resolve compliance discrepancies. The IHS will work to ensure that all sampling results reported to it are reported to EPA; likewise, EPA will work to ensure that all results of EPA required sampling are reported to the IHS.

2. Assist Indian Water Supply Operating Organizations:

EPA regions and IHS area offices will cooperate to develop a systematic approach to assist each Indian public water supply to reach and maintain acceptable compliance levels. This approach will be designed to ensure system self-monitoring, determine drinking water quality, and address underlying causes of noncompliance. Strategies can utilize a number of actions to meet this goal such as monitoring/reporting assistance, training and education, technical assistance, and/or assumption by the tribe of specific programmatic responsibilities.

3) Monitoring/Reporting Assistance:

EPA will work to ensure that all public water systems are

continuously monitored by owner/operators. The EPA may financially and administratively arrange with appropriate entities to temporarily perform monitoring and reporting for those systems in need of assistance. It is understood that the IHS can not assume the sampling responsibility of the owner or operating organization to comply with the SDWA. Monitoring assistance will be periodically reviewed for ability by the operating organization to assume its SDWA responsibilities.

4. Technical Assistance:

EPA will immediately inform IHS and appropriate tribal authorities of all maximum contaminant level violations. All systems with maximum contaminant level violations will be given immediate technical assistance by IHS. Systems with continuing MCL violations (persistent violators) will be candidates for joint comprehensive sanitary surveys by EPA and IHS (with tribal input encouraged) to pinpoint the cause(s) of continuing MCL violations. Systems which need capital improvements to address non-compliance will be given priority consideration on the IHS sanitation facilities unmet needs list.

5. Surveillance Monitoring:

By the 45th day of each quarter, EPA regions will supply the appropriate IHS area office a list of all Indian community water systems which did not sample and report microbiological

quality at least one time during the previous quarter. Within 45 days after receipt of the EPA list, the appropriate IHS area office will contact the system operator and urge them to comply with the sampling and reporting requirements and inform EPA of the results. The IHS will also offer technical assistance to the system operator to encourage more reliable monitoring practices. If surveillance monitoring by IHS indicates that a public health threat may exist, the IHS will immediately give technical assistance to the public water system and contact the appropriate EPA regional office. Surveillance monitoring by IHS does not relieve the owner/ operator of its responsibilities under the SDWA.

6. Education/Training:

EPA and IHS will cooperate with system owners/operators to develop operating organization specific training plans, where applicable, to ensure that each organization's training needs are identified. Training plans should cover 1-3 years. Specific training plans may address technical operator training; community education of water supply functions; and the operation, maintenance, and management of water systems.

7) Operation and Maintenance Organizations:

During the construction of new water systems on Indian reservations, EPA will offer assistance to IHS efforts to promote the establishment of Indian O&M organizations which effectively operate and maintain completed water systems.

At the time these systems are transferred by IHS, the responsible owner or operating organization should have the capacity for self-monitoring as well as an understanding of the public health significance of delivering safe drinking water.

B. Longterm Actions to Ensure Safe Drinking Water

1. Fellowships/Scholarships:

EPA will consider a water supply fellowship/scholarship program for Indian operators and tribal leaders. Students will be offered a combination of technical training to develop specific skills leading to operator certification and non-technical training to address underlying causes of non-compliance. EPA fully expects that upon completion of this type of training, all students will have a working knowledge of approaches which can be used to address underlying causes of noncompliance with drinking water regulations. Fellowships/ scholarships will be competitively determined by a committee of IHS, EPA, and Indian community representatives as appropriate.

2. EPA/IHS Workgroup

To address the continuing problems encountered by operators of public water systems, EPA and IHS will convene a workgroup which will periodically meet to review actions by both agencies to address the underlying causes of such problems. This workgroup will focus on methods and actions to improve the

compliance, management, and finances of Indian O&M organizations.

V. DURATION OF AGREEMENT: This agreement shall continue until IHS or EPA provide written notice of termination. Notice will be given (30) days in advance of the termination date.

VI. REPORTS: No routine reports are required. Information will be supplied as required in the provisions of the agreement.

VII. LIAISON OFFICERS: The IHS and EPA assign the following liaison officers as central contact personnel responsible for maintaining communications on the procedures and activities of their respective agencies.

IHS: Assistant Chief
Environmental Health Branch
Indian Health Service, HHS
Rockville, Maryland 20857

EPA: Chief
Drinking Water Branch
Office of Drinking Water
Environmental Protection Agency
Washington, D.C. 20460

The liaison officers accompanied by appropriate staff will hold meetings from time to time, but not less than annually, to discuss matters of concern.

VIII. FUNDS: This Interagency Agreement does not preclude transfer of funds between agencies. Supplemental agreements may allow transfer of funds for specific tasks.

IX. AUTHORITY: Indian Health Transfer Act, as amended (42 U.S.C. 2001 through 2004a); the Indian Health Care Improvement Act (25 U.S.C. 1631 through 1633); the Indian Self-Determination Act (25 U.S.C. 450 et seq.) and the Safe Drinking Water Act, as amended (42 U.S.C. 300f et seq.).

Environmental Protection Agency

Date: 12/3/84

Victor J. Kimm,
Director
Office of Drinking Water
Environmental Protection Agency

Indian Health Service

Date: DEC 21

Everett R. Rhoades, M.D.,
Assistant Surgeon General
Director, Indian Health Service
Health Resources & Services
Administration
Public Health Service
Department of Health and
Human Services

# MEMORANDUM OF UNDERSTANDING BETWEEN THE INDIAN HEALTH SERVICE AND THE ENVIRONMENTAL PROTECTION AGENCY

## I. STATEMENT OF PURPOSE

The Environmental Protection Agency (EPA) and the Indian Health Service (IHS) both have responsibilities and interests pertaining to the environment and human health on American Indian Reservations. It is the purpose of this Memorandum of Understanding (MOU) to identify areas of mutual interest and overlapping responsibilities of the two agencies and to establish a means for coordinating the agencies' respective activities.

## II. FINDINGS

### A. Scope of Respective Authorities

The two agencies have common interests in a broad range of activities involving the effects on human health of pollutants in the environment. Both agencies conduct environmental health activities in the following areas:

air quality
water quality, including surface water and ground water
drinking water supplies
toxic substances
wastewater treatment
disposal of solid and hazardous wastes, and
pesticide use, among others.

The role of the EPA is primarily that of a regulatory agency. With a few exceptions, (notably providing grants for building wastewater treatment facilities and for cleaning up hazardous waste disposal sites), the EPA does not fund facilities and/or activities that directly clean or preserve the environment. The EPA sets and enforces pollution standards, or oversees State, Tribal, and local governments to carry out these regulatory program activities. Examples of EPA regulatory programs are: (a) for water quality, the National Pollutant Discharge Elimination System (NPDES) program, which issues and enforces permits to certain types of pollution sources on navigable waters; and (b) for air quality, the State Implementation Plan (SIP) program, which enforces limits on releases of certain types of pollution sources into the air.

An objective of the IHS is to protect the health of and prevent disease among the American Indian and Alaska Native population through the development and implementation of a comprehensive environmental health program. The Environmental Health Branch (EHB) of the IHS has the responsibility for activities dealing with air pollution, community injury control (CIC), emergency operations, epidemiology, food protection, hazardous materials, home and community health, institutional environmental health, occupational health, operation and maintenance assistance, radiation, recreational sanitation, safety, vector control, waste disposal, and water supply. The EHB may carry out these activities directly, or the tribes may undertake these responsibilities, with the assistance of IHS, under the Indian Self-Determination Act, P.L. 93-638. An emphasis of the IHS Sanitation Facilities Construction Program is to take direct action (or to fund tribal action under the Indian Sanitation Facilities Act, P.L. 86-121, or P.L. 93-638) to provide sanitation facilities (water, sewerage, solid waste, and O&M organizations) that improve the health status of Native Americans. Annual IHS appropriations for the construction of sanitation facilities may be restricted to specific types of assistance. The IHS does not operate community water and sewerage facilities. The IHS participates in activities that clean or protect the environment only when these activities are related directly to human health problems. Other than for direct health related activities, the IHS has no funds to clean or protect the environment. The IHS is not a regulatory or enforcement agency.

The EPA's authority and responsibilities are highly specific and focus on the media programs mandated by the Agency's statutory authorities.[1] The IHS has broad authority and responsibilities, including both specific program activities described in its authorizing legislation and a general authority to respond to virtually any environmental health problem or threat that may affect Indian health[2], subject to the constraints of its annual budget and competing priorities.

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1 The primary statutory authorities establishing the EPA programs germane to this MOU are: Clean Air Act as amended (CAA), 42 U.S.C. 7401-7642; Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 (CWA), 33 U.S.C. 1251-1376; Federal Insecticide, Fungicide and Rodentcide Act, as amended (FIFRA), 7 U.S.C. S136-136y; Safe Drinking Water Act, as amended (SDWA), 42 U.S.C. 300F-300J-10; Resource Conservation and Recovery Act, as amended (RCRA), 42 U.S.C. 6901-6987; the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 42 U.S.C. 9601-9607; and, the Toxic Substances Control Act (TSCA), 15 U.S.C. 2601-2629.

2 The primary statutory authorities delineating IHS responsibilities relevant to this MOU are: Indian Health Transfer Act, as amended, 42 U.S.C. 2001-2004a; Indian Health Care Improvement Act, 25 U.S.C. 1631-1633; Indian Self-Determination Act, 25 U.S.C. 250 et seq.; and the Indian Sanitation Facilities Act, 42 U.S.C. 2001-2004.

B. Areas of Primary Mutual Interest

For the purpose of this MOU, there are seven specific program areas of special interest to both the EPA and the IHS. Under each of these areas, the basic responsibilities* of EPA and IHS are:

1. Wastewater treatment facilities to prevent unlawful releases of pollution into public waters:

   a) EPA: construction, monitoring, training, permitting, enforcement, identification

   b) IHS: construction, monitoring, inspection, training, identification

   c) Potential Overlap: construction, monitoring, training, identification

2. Drinking water supply systems to ensure safe drinking water:

   a) EPA: monitoring, training, enforcement, sanitary surveys

   b) IHS: monitoring, construction, inspection, training, sanitary surveys

   c) Potential Overlap: monitoring, training, sanitary surveys

3. Air quality:

   a) EPA: monitoring, evaluation, enforcement

   b) IHS: monitoring, evaluation

   c) Potential Overlap: monitoring, evaluation

4. Solid Waste Management:

   a) EPA: technology transfer and training, waste management standards

   b) IHS: construction, inspection, monitoring, training, identification

   c) Potential Overlap: training

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* For the purpose of this MOU, the following definitions apply:

Identification: survey and define scope of problem
Evaluation: non-routine study and report
Monitoring: routine close observation and/or systematic collection of data
Inspection: construction review of facilities in this program area

5. Hazardous wastes: generation, transportation, treatment, storage, and disposal:

   a) EPA: waste management standards, listing and manifest requirements, recordkeeping, corrective action, permitting, technology transfer, compliance, enforcement, remedial response.

   b) IHS: identification, evaluation, training

   c) Potential Overlap: training (technology transfer)

6. Hazardous waste disposal sites (CERCLA)

   a) EPA: discovery and notification; preliminary assessment and site evaluation; National Priorities Listing; community relations; removal and remedial action

   b) IHS: identification, evaluation, training

   c) Potential Overlap: identification (discovery and notification)

7. Pesticides .

   a) EPA: pesticide applicator certification and training program

   b) IHS: identification, evaluation, training

   c) Potenitial Overlap: training

C. Organizational Structure and Capability

The IHS headquarters office is located in Rockville, Maryland, near Washington, D.C. The IHS has 12 offices at the Area level and field offices on or near many Indian reservations. The EPA headquarters office is in Washington, D.C. The EPA has 10 offices at the Regional level and other offices in several States. The EPA has no offices at the reservation level. Most of the IHS environmental health staff, which consists of engineers, sanitarians, and technicians, are located in the field offices. Because most IHS staff are located close to Indian lands, the IHS is able to respond quickly to emergencies at the local level.

D. Existing EPA/IHS Interagency Agreement

The EPA and the IHS previously have entered into an agreement[4] to establish procedures to coordinate the activities of the two agencies in a manner that will continue to promote safe drinking water on Indian lands and which will further the intent and purpose of the Safe Drinking Water Act, taking into account the needs of the Indian people. This agreement was signed by the EPA on December 3, 1984, and by the IHS on December 21, 1984. This MOU herein does not amend the IHS/EPA Interagency Agreement.

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4 An Interagency Agreement [EPA-79-P-079] has already been developed by EPA and IHS specific to program coordination in providing safe drinking water on Indian reservations.

## III. INTERAGENCY ACTIONS

The following actions are agreed to:

1. EPA and IHS will work cooperatively with each other and in close consultation with Tribal Governments in the coordination of EPA and IHS programs affecting Indian lands, with special emphasis on the areas of identified potential overlap in responsibilities or authorities. Where applicable, and within the constraints of available resources, each agency will:

   a. Participate in local and national level information exchanges to keep abreast of the other agency's program activities and regulations.

   b. Cooperate in conducting needs assessments in the seven areas of primary interest (drinking water, wastewater treatment, air pollution, solid waste, hazardous wastes, hazardous waste site cleanup, pesticides).

   c. Provide training and technical assistance in the areas of each agency's special expertise.

   d. Consult directly with the other agency in planning activities, especially in the areas of overlapping responsibilities and authorities. Planning activities include policy development, budget planning, and proposals for statutes and regulations.

   e. Coordinate to the best extent possible the provision of funding assistance to Tribal Governments where the funding authorities of the two agencies overlap or are complementary.

2. The EPA and IHS will continue to identify and develop coordination activities between the two agencies. Supplemental MOU's specific to program coordination in each of the above joint five actions will be prepared as appropriate.

3. The EPA and IHS will encourage their Regional and Area Offices to meet and negotiate Memorandums of Understanding and/or Implementation Plans at the EPA Regional/IHS Area Office level to implement the terms of this MOU. Where applicable, Tribal and/or State agencies may be included as signatories.

## IV. ADDITIONAL AGENCY ACTIONS

The EPA and the IHS further agree to the following additional actions:

1. The EPA retains primary enforcement authority on Indian reservations under the CAA, CWA, FIFRA, RCRA, SDWA, CERCLA, and the TSCA except where a State has been granted express regulatory authority by Congress or EPA has delegated the program to a Tribal Government. EPA will exercise its enforcement authority on Indian reservations with consideration for the special needs of Tribal Governments and in a manner consistent with the enforcement provisions of the EPA Indian Policy[5] and Implementation Guidance.

2. The IHS will maintain its position as technical advisor to Native Americans. The IHS will not have any responsibilities in EPA enforcement activities.

3. Based upon the availability of funds and resources, and within the scope of IHS authority, the IHS will assist Indian Tribes financially and technically in complying with the requirements of EPA statutes and in assuming program responsibilities under those statutes.

## V. DURATION OF AGREEMENT

This MOU shall continue in effect until IHS or EPA provides written notice of termination. Notice shall be given to the other party at least thirty (30) days in advance of the termination date.

## VI. REPORTS

No routine reports are required. Information will be supplied as required under the provisions of the agreement.

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5 The Administrator of EPA issued the EPA Policy for Administration of Environmental Programs on Indian Reservations on November 8, 1984. The policy was supplemented with an Implementation Guidance, signed by the Deputy Administrator on the same date.

## VII. LIAISON OFFICERS

Upon the execution of this MOU, the IHS and the EPA will select one liaison from each of the IHS Area Offices and from each of the EPA Regional Offices to serve as a focal point for all activities within their respective geographical jurisdictions related to this agreement. It is important that these liaisons be able to represent all of their respective media programs. In addition, the following liaison officers are assigned as headquarters level contacts and will be responsible for maintaining communications with the other agency on the procedures and activities of their respective agencies.

IHS: Director, Division of Environmental Health
Indian Health Service, HRSA, PHS, DHHS
5600 Fishers Lane, Room 6A-54
Rockville, Maryland 20857

EPA: Director, Special Programs & Analysis Division
Office of Federal Activities (A-104)
Environmental Protection Agency
Washington, D.C. 20460

When necessary, the liaison officers, accompanied by appropriate staff, will meet to review progress in carrying out the terms of this MOU and to develop recommendations for its improved implementation.

## VIII. APPROVALS

FOR THE INDIAN HEALTH SERVICE:

B. W-Tarsis — 8/15/86

Director, Indian Health Service, — Date
for Health Resources and Services Administration
Public Health Service
Department of Health and Human Services

FOR THE ENVIRONMENTAL PROTECTION AGENCY:

Allen Hirsch — 8/22/86

Director — Date
Office of Federal Activities
Environmental Protection Agency

# APPENDIX E

# THE INDIAN HEALTH SERVICE SANITATION FACILITY CONSTRUCTION PROGRAM

# THE INDIAN HEALTH SERVICE
# SANITATION FACILITIES CONSTRUCTION PROGRAM

## Introduction:

The Indian Health Service (IHS) is a bureau level agency in the Health Resources and Services Administration (HRSA). HRSA is one of five agencies in the United States Public Health Service (PHS), including the National Institutes of Health (NIH) and the Centers for Disease Control (CDC). PHS is within the Department of Health and Human Services (DHHS).

This report is a description of the the sanitation facilities construction (SFC) program within the IHS Division of Environmental Health (DEH) In addition, the sanitation facilities Unmet Needs Data Inventory maintained by the DEH also will be described.

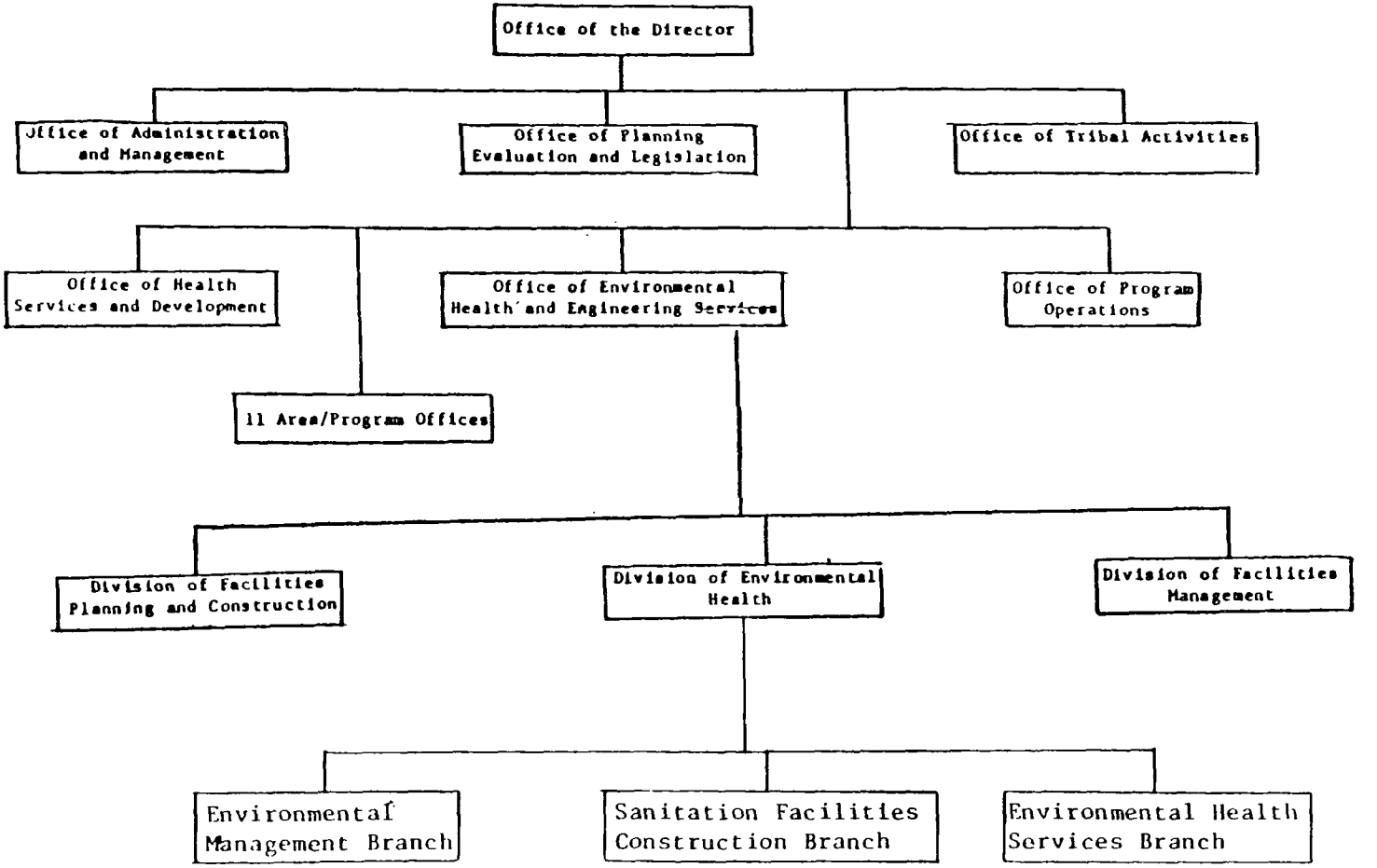
## Organizational Structure of the Division of Environmental Health:

The sanitation facilities construction program is administered by the Sanitation Facilities Construction Branch (SFCB), which is one of three branches in the Division of Environmental Health. The second branch is the Environmental Health Services Branch (EHSB), which is responsible for a wide range of environmental health activities on Indian reservations such as infection control in health facilities, rabies and plague control, food sanitation, hazardous waste surveillance, and injury control. The third branch, the Environmental Management Branch (EMB), is primarily responsible for data systems, consultative services, internal management review, and technical and management training of IHS staff and Tribal personnel in subjects dealing with environmental health. The DEH is one of three divisions within the Office of Engineering and Environmental Health (OEHE) which, besides environmental health, is responsible for hospital planning and construction, and hospital facilities management.

The Headquarters office of the Indian Health Service is located in the Parklawn Building in Rockville, Maryland. There also are headquarters components located in Albuquerque and Tucson. Albuquerque is the site of most of the training provided by EMB. Most of the 11,000 IHS employees are located within the 11 IHS Areas. There are approximately 200 IHS employees located at Parklawn Building. Each Area has a central Area Office and many sub-offices, usually located at IHS hospitals and clinics on or near Indian reservations The 11 IHS Area offices are located at Aberdeen (South Dakota), Albuquerque, Anchorage, Bemidji (Minnesota), Billings, Sacramento, Nashville, Window Rock (Arizona), Oklahoma City, Phoenix, and Portland. There is an Area component of the DEH also in Tucson.

Within the DEH, there are approximately 160 sanitarians, 200 engineers, 250 para-professionals (e.g., technicians, construction inspectors), and 150 temporary construction workers. These people are located in the Headquarters offices, the 11 Area offices, and approximately 44 other District and field offices located on or near Indian reservations.

THE INDIAN HEALTH SERVICE*




* Not all Divisions and Branches shown for clarity (1987)

The Sanitation Facilities Construction Branch (SFCB)

The IHS SFCB provides essential sanitation facilities and services to Indian and Alaska Native homes, communities, and lands under and pursuant to Public Law 86-121 and delegations of authority issued by the Secretary of Health and Human Services. The goal of the sanitation facilities construction program is to improve the health of American Indian and Alaska Native people by improving the environment in which they live. This is to be accomplished by (1) providing safe water supplies and adequate means of liquid and solid waste disposal; (2) by encouraging and developing the desire and capability of the Indian people to operate and maintain the facilities provided in a safe and effective manner so as to assure continued health protection and benefits into the future; (3) by providing engineering consultation regarding environmentally related public health problems; and (4) and by providing technical liaison with other governmental agencies, foundations, and groups relative to public health engineering and environmental health. These activities are considered to be an integral component of the comprehensive preventive health effort by the Indian Health Service for the Indian people

From 1959 through 1986 approximately 4,000 sanitation facilities projects have been undertaken with a commitment of over $752 million. It is estimated that with the completion of all the above projects approximately 1,300 American Indian and Alaska Native communities and over 26,000 scattered rural homes (a total of 154,000 Indian homes) will have been provided water supply and sewage disposal facilities. Although much has been done in terms of providing sanitation facilities, an **unmet need in excess of $572 million still existed at the end of FY 1986.** This unmet need includes over 22,000 existing Indian homes that have never received first service water and sewer facilities from IHS.

Almost all of the 200 engineers in DEH are located within the SFCB Area and field offices. Sixty percent of the SFCB engineers have professional registration and nearly fifty percent have graduate degrees. Most of their time and effort is in the planning, design, construction, and start-up (including training) of water, wastewater, and solid waste facilities to serve Indian homes. These facilities range from simple individual home systems to complex community systems in arctic environments.

Legislation and Guidance:

Public Law 86-121 (42 USC 2004a) approved July 31, 1959, is the basic enabling legislation for the Indian sanitation facilities construction program. This legislation amended the Indian Health Transfer Act of August 5, 1954 (P.L. 83-568) in which the health responsibility for American Indians and Alaska Natives was transferred from the Bureau of Indian Affairs to the Public Health Service. This Act substantially expanded the scope of the IHS programs by authorizing it to provide sanitation facilities to Indians, including domestic and community water supplies and facilities, drainage facilities, and wastedisposal facilities for Indian homes, communities and lands

Public Law 86-121, Section 7(c), requires the IHS to consult with and to encourage the participation of Indian and Alaska Native leaders and people in the planning, development, construction, and final acceptance of SFC projects. Public Law 93-638 and Public Law 94-437 complement this requirement

Public Law 93-638, "The Indian Self-Determination and Education Assistance Act", January 4, 1975, includes provisions which will allow the Secretary HHS to contract with Indians to carry out any or all of the responsibilities of the Transfer Act of 1955.

Public Law 94-437, "Indian Health Care Improvement Act, September 30, 1976", under Title III, Section 302, continues to authorize the construction of safe water and sanitary waste disposal facilities for Indians.

P.L. 86-121 projects are considered to be discretionary and not an entitlement. Highest priority is given to Federal Indian Housing projects. Projects to serve tribal and individually financed homes are prioritized by the IHS for the remaining limited available funds. In addition, Federal Acquisition Regulations apply to all federal procurement contracts, with some minor differences for "638-contracts". OMB Circulars regarding cost principles and administrative standards may apply to tribes and other organizations with respect to Cooperative Agreements.

**IHS is not a regulatory agency and has no enforcement authority.**

Sanitation Facilities Projects:

As with the other activities of the IHS, sanitation facilities projects are carried out as a cooperative effort with the people to be served by the completed facilities. **Once completed, community facilities are transferred to the tribe or other appropriate authority for operation and maintenance.** Individual home facilities are transferred to the homeowner. The IHS does not operate and maintain sanitation facilities.

IHS can serve both existing Indian homes and new/renovated homes. However, in recent years funds for IHS sanitation projects have been appropriated in support of new and renovated Indian housing only. This joint effort in water, sewer, solid waste, and housing is coordinated by the IHS in accordance with an interdepartmental agreement among the Department of Housing and Urban Development (HUD), the BIA , and the IHS. The IHS, tribal governments, and Indian housing authorities are full partners in the planning and implementation of this preventive health endeavor. The tribes and the Indian housing authorities rely on IHS because of the IHS emphasis and efforts in serving the "total community," including existing homes when funded, by combining and coordinating the efforts of various programs whenever it is feasible, along with serving the homes sponsored by the various Federal and State agencies and tribes.

The sanitation facilities construction program, since its inception in the late 1950's has, and continues to use, many different mechanisms for planning, design, construction, and training. These mechanisms include, (a) government contracts (638, Buy-Indian, open market); (b) utilization of government employees (including those for construction); or, (c) monetary contributions to a tribe under a cooperative agreement whereby the tribe provides the facilities. Each IHS Area utilizes a different mix of these three mechanisms based on the strengths and weaknesses of the Tribes and the IHS Area offices

EXHIBIT 1. P L. 86-121

# Public Law 86-121
## 86th Congress, S. 56
## July 31, 1959

## AN ACT

73 Stat., 267.

To amend the Act of August 5, 1954 (68 Stat. 674), and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Act of August 5, 1954 (68 Stat. 674), is amended by adding at the end thereof the following new section:

Indians, sanitation facilities.
42 USC 2001-2004.

"SEC. 7. (a) In carrying out his functions under this Act with respect to the provision of sanitation facilities and services, the Surgeon General is authorized—

Surgeon General. Powers.

"(1) to construct, improve, extend, or otherwise provide and maintain, by contract or otherwise, essential sanitation facilities, including domestic and community water supplies and facilities, drainage facilities, and sewage- and waste-disposal facilities, together with necessary appurtenances and fixtures, for Indian homes, communities, and lands;

"(2) to acquire lands, or rights or interests therein, including sites, rights-of-way, and easements, and to acquire rights to the use of water, by purchase, lease, gift, exchange, or otherwise, when necessary for the purposes of this section, except that no lands or rights or interests therein may be acquired from an Indian tribe, band, group, community, or individual other than by gift or for nominal consideration, if the facility for which such lands or rights or interests therein are acquired is for the exclusive benefit of such tribe, band, group, community, or individual, respectively;

Acquisition of lands.

"(3) to make such arrangements and agreements with appropriate public authorities and nonprofit organizations or agencies and with the Indians to be served by such sanitation facilities (and any other person so served) regarding contributions toward the construction, improvement, extension and provision thereof, and responsibilities for maintenance thereof, as in his judgment are equitable and will best assure the future maintenance of facilities in an effective and operating condition; and

Construction and maintenance.

"(4) to transfer any facilities provided under this section, together with appurtenant interests in land, with or without a money consideration, and under such terms and conditions as in his judgment are appropriate, having regard to the contributions made and the maintenance responsibilities undertaken, and the special health needs of the Indians concerned, to any State or Territory or subdivision or public authority thereof, or to any Indian tribe, group, band, or community or, in the case of domestic appurtenances and fixtures, to any one or more of the occupants of the Indian home served thereby.

Transfer of facilities.

"(b) The Secretary of the Interior is authorized to transfer to the Surgeon General for use in carrying out the purposes of this section such interest and rights in federally owned lands under the jurisdiction of the Department of the Interior, and in Indian-owned lands that either are held by the United States in trust for Indians or are subject to a restriction against alienation imposed by the United States, including appurtenances and improvements thereto, as may be requested by the Surgeon General. Any land or interest therein, including appurtenances and improvements to such land, so transferred shall be subject to disposition by the Surgeon General in accordance with paragraph (4) of subsection (a): *Provided*, That, in any case where a beneficial interest in such land is in any Indian, or Indian tribe, band, or group, the consent of such beneficial owner to any such transfer or disposition shall first be obtained: *Provided further*, That where deemed appropriate by the Secretary of the Interior provisions shall be made for a reversion of title to such land if it ceases to be used for the purpose for which it is transferred or disposed.

Transfer of U. S. land.

"(c) The Surgeon General shall consult with, and encourage the participation of, the Indians concerned, States and political subdivisions thereof, in carrying out the provisions of this section."

42 USC 2001 note.

SEC. 2. Section 6 of such Act is amended by striking out the word "This" and inserting in lieu thereof the words "Sections 1 to 5, inclusive, of this".

Approved July 31, 1959.

For example, government construction contracts tend to be used more in areas where there are enough contractors and IHS contracting personnel capable of handling the workload.

All facilities and services are provided pursuant to a Memorandum of Agreement (MOA) with the tribe and other project participants. The MOA describes the project, the project costs, and the responsibilities of all parties directly participating in the project. Specific authority for the MOA is set forth in Section 7(a)(3) of P.L. 86-121 (42 U.S.C. 2004a). Because the MOA is a very flexible mechanism, there can be a wide range of participation by each party. Essentially the IHS can construct all or part of the facilities either by Federal procurement or by the government's own employees, or, the Indian tribes or a third party can provide all or any part of the facilities with an IHS contribution. For example, the Government can provide the engineering plans and specifications, and the facilities can be constructed by tribal personnel or under a contract administered by the tribe using IHS contributed funds. For all projects, regardless of the degree of participation by other parties, it is the IHS's intention to have a substantial ongoing involvement in the project.

The IHS Area Directors decide the cooperative nature of each project based upon the desires of the parties to the agreement, the amount of contributions to the project by each party, and by the abilities of the tribe and/or third party to carry out the provisions of the agreement. A contribution can be made to the tribe or third party for services and/or facilities outlined in the Project Summary. The contribution is not a grant, but is given through the MOA instrument. The key difference between a grant and the MOA, which is a form of cooperative agreement, is that there is substantial Federal involvement, a "partnership", in a project funded under a cooperative agreement. This cooperative involvement is the basis for quality control for facilities construction and for training of tribal personnel to operate the facilities. The SFC program does not fund projects using grants.

Projects built under open market contracts or Buy-Indian contracts follow the Federal Acquisition Regulations. If there are no qualified Indian contractors interested in bidding on a project, then the project can be bid open-market.

Under P.L. 93-638, a tribe has the option of requesting that they be awarded a "638" contract to construct a project or program of projects. As prescribed by a set of regulations, the tribe submits a formal request, which is evaluated by the IHS. The IHS can accept or deny the request depending upon the tribe's demonstrated capability for achieving satisfactory completion of the scope of work. If the request is denied, the IHS is responsible, in cooperation with the tribe, for training and developing the necessary capabilities within the tribe to perform the work.

## IHS Relationship With the Indian People

The Indian Health Service is proud of having an excellent working relationship with the Indian people. This relationship has been built upon 30 years of successfully providing health services. IHS has a long standing policy of Indian self determination and a government-to-government relationship. The program has experience dealing with Indian leaders and understanding tribal government, and is sensitive to Indian cultures and values. Many of the IHS

managers and professional staff at all levels are Indian. In addition, the SFCB has intentionally hired and trained many Indian technicians, construction inspectors, and other Indian employees, which greatly enhances the ability of the sanitation facilities construction program to provide services. These Indian employees, most of whom work and live on or near their reservation, have a valuable knowledge of the tribe, Indian people, tribal needs and issues, and the land. For example, they are able to provide quality individual instruction to homeowners in their native tongue. Because of their position, they provide a vital link between the program and the people served. This is important in the development of projects because it is a vehicle for local input. In addition, they have been instrumental in eventually managing many of the facilities built.

Because IHS has a network of professional staff on and near Indian land, the DEH is able to be responsive to the Indian tribes. DEH can act in a timely manner at all levels, from emergencies to carefully planned projects. IHS staff are able to provide technical assistance and training on an ongoing basis.

## Existing Relationship With the EPA

The IHS and EPA have two agreements at the headquarters level and several agreements exist between the IHS Area offices and the EPA Regional offices.

The purpose of the "Interagency Agreement Between the Indian Health Service and the Environmental Protection Agency", dated December 1984, is to coordinate the activities of the two agencies in a manner that will continue to promote safe drinking water on Indian lands and which will further the intent and purpose of the Safe Drinking Water Act taking into account the needs of the Indian people.

The purpose of the "Memorandum of Understanding between the Indian Health Service and the Environmental Protection Agency" (PW 75931988-01-0), dated August 1986, is to identify areas of mutual interest and overlapping responsibilities of the two agencies and to establish a means for coordinating the agencies respective activities.

Most of the MOU's or MOA's between the IHS Areas and the EPA Regions are for training and sampling/testing programs.

Project Funding and Funds Administration:

In 1987, IHS was appropriated funds directly from Congress to fund new or rehabilitation housing projects, including BIA and tribal housing projects. In recent years, funds to support sanitation facilities for HUD housing projects come from HUD to the IHS through a transfer mechanism. Since 1983, HUD has transferred over $56 million to the IHS for water and sewer facilities for HUD homes. IHS has provided these facilities to HUD houses using the same mechanisms (open market, Buy-Indian, and 638 contracts; and cooperative agreements) available for projects funded with IHS appropriated funds. Besides HUD funds, the IHS has received funds from many other sources to administer for sanitation projects. In FY 1986, the IHS received $7.36 million from the tribes, state and local governments, and housing authorities. The IHS often coordinates multi-agency funded sanitation facilities projects and has a wide variety of experience in construction of facilities under different arrangements with funds from many different sources

# APPENDIX F

## SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | | No. OF WATER SYSTEMS | No. COMMUNITY WATER SYSTEMS | NO. NON-COMM WATER SYSTEMS | TOTAL POPULATION | AVERAGE POPULATION | No. OF WATER SYSTEMS BY POPULATION CATEGORIES 0 - 100 | 100 - 500 | 500 - 1,000 | ) 1,000 | No. GROUND-WATER SYSTEMS | No. SURFACE WATER SYSTEMS | No. PURCHASED WATER SYSTEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 00 | | | | | | | | | | | | | |
| LA POSTA | | 1 | 1 | | 55 | 55 | 1 | | | | 1 | | |
| PAPAGO | | 48 | 46 | 2 | 11734 | 244 | 26 | 17 | 3 | 2 | 48 | | |
| SAN XAVIER | | 1 | 1 | | 756 | 756 | | | 1 | | 1 | | |
| | AREA TOTAL | 50 | 48 | 2 | 12545 | | | | | | | | |
| IHS AREA: 10 | | | | | | | | | | | | | |
| CROW CREEK | | 5 | 4 | 1 | 1445 | 289 | 3 | 1 | | 1 | 4 | 1 | |
| DEVILS LAKE | | 4 | 4 | | 1250 | 313 | 1 | 2 | 1 | | 4 | | |
| FLANDREAU | | 1 | 1 | | 450 | 450 | | 1 | | | 1 | | |
| FORT BERTHOLD | | 3 | 3 | | 1060 | 353 | | 3 | | | 1 | 2 | |
| OMAHA | | 3 | 3 | | 3260 | 1630 | | | | 3 | 3 | | |
| LOWER BRULE | | 1 | 1 | | 1020 | 1020 | | | | 1 | | 1 | |
| CHEYENNE RIVER | | 2 | | 2 | 98 | 49 | 2 | | | | 1 | 1 | |
| PINE RIDGE | | 22 | 20 | 2 | 8551 | 389 | 7 | 14 | | 1 | 22 | | |
| YANKTON | | 6 | 4 | 2 | 781 | 130 | 5 | 1 | | | 5 | 1 | |
| ROSEBUD | | 14 | 14 | | 4935 | 353 | 5 | 7 | | 2 | 14 | | |
| SAC & FOX | | 3 | 2 | 1 | 450 | 400 | | 3 | | | 3 | | |
| SANTEE | | 2 | 2 | | 548 | 548 | | | 2 | | 1 | | |
| SISSETON-WAHPETON | | 6 | 6 | | 720 | 120 | 4 | 2 | | | 6 | | |
| STANDING ROCK | | 6 | 6 | | 2978 | 496 | | 5 | | 1 | 4 | 2 | |
| TURTLE MOUNTAIN | | 4 | 4 | | 5525 | 1381 | | 2 | | 2 | 4 | | |
| WINNEBAGO | | 5 | 4 | 1 | 1225 | 1000 | | 1 | 4 | | 5 | | |
| | AREA TOTAL | 87 | 78 | 9 | 34296 | | | | | | | | |

| IHS AREA/ RESERVATION | | MAINTENANCE (OPERATIONS AND MAINTENANCE PERFORMED BY) | | | | | | RELIABILITY OF WATER SYSTEM | ADEQUACY OF WATER SYSTEM | ADEQUACY OF OPERATIONS AND MAINTENANCE ORGANIZATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | USER | INDIVIDUAL | COMMUNITY | TRIBE | HOUSING AUTHORITY | OTHER | | | BOOKS | TOOLS | INVENTORY |
| IHS AREA: 00 | | | | | | | | | | | | |
| LA POSTA | | | | | | | | | | | | |
| PAPAGO | 43 | | | 24 | 44 | | | 96.6 | 4.14 | 2.6 | 2.6 | 3 |
| SAN XAVIER | 1 | | | | 1 | | | 100 | 4.6 | 5 | 5 | 4 |
| AREA TOTAL | | | | | | | | | | | | |
| IHS AREA: 10 | | | | | | | | | | | | |
| CROW CREEK | 1 | | | | 4 | | 1 | 97.5 | 3 | 1 | 2 | 1 |
| DEVILS LAKE | 4 | | | | 4 | | | 99.5 | 3 | 3 | 3 | 3 |
| FLANDREAU | | | | | | | 1 | 100 | 4 | | | |
| FORT BERTHOLD | 2 | | | | 2 | | 1 | 82.7 | 1.7 | 2 | 2 | 3 |
| OMAHA | 1 | | | | | | | 100 | 4 | 3 | 2 | 3 |
| LOWER BRULE | 1 | | | | 1 | | | 98 | 3 | 1 | 3 | 2 |
| CHEYENNE RIVER | 2 | | | | 1 | | 1 | | | 3 | 3 | 3 |
| PINE RIDGE | 14 | | | | 14 | | 8 | 97.8 | 2.9 | 2 | 2 | 2 |
| YANKTON | 2 | | | | 3 | | 2 | 99 | 2.75 | 2.5 | 2.7 | 3 |
| ROSEBUD | 9 | 5 | | | 13 | 1 | | 97.8 | 3.1 | 2.7 | 3 | 2.4 |
| SAC & FOX | 1 | | | | 1 | | | 85 | 2 | 3 | 3 | 2 |
| SANTEE | 1 | | | | | | | 97 | 2 | 4 | | |
| SISSETON-WAHPETON | 6 | | 1 | 2 | 3 | | 1 | 100 | 4 | 3 | 3 | 4 |
| STANDING ROCK | 6 | | | 1 | 4 | | 1 | 97.2 | 2.5 | 2 | 3 | 3 |
| TURTLE MOUNTAIN | 3 | | | | 2 | 2 | | 100 | 4.5 | 5 | 5 | 5 |
| WINNEBAGO | | 2 | | | | | 1 | 97.6 | 3.1 | 4 | 3 | 3 |
| AREA TOTAL | | | | | | | | | | | | |

| IHS AREA/ RESERVATION | | SDWA REQUIREMENT VIOLATIONS: MCL BAC-T | DURATION BAC-T | AVERAGE BAC-T DURATION | TOTAL MONITORING VIOLATIONS | IHS SDWA COMPLIANCE COST | WATER SYSTEM FUNDING SOURCE: TRIBAL CONTRIBUTION | FLAT FEE | METERED FEE | No. OF WATER SYSTEMS BY FLOW CATEGORIES (1,000 OF GALLONS PER DAY): 0 - 10 | 10 - 100 | 100 - 300 | ) 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 00 | | | | | | | | | | | | | |
| LA POSTA | | | | | | | | | | 1 | | | |
| PAPAGO | | 16 | 45 | 2.8125 | 4 | 265000 | 1 | 15 | 9 | 42 | 1 | 1 | |
| SAN XAVIER | | | | | | | | | 1 | | 1 | | |
| | AREA TOTAL | 16 | 45 | 2.8125 | 4 | 265000 | 1 | 15 | 10 | 43 | 2 | 1 | 0 |
| IHS AREA: 10 | | | | | | | | | | | | | |
| CROW CREEK | | 1 | 3 | 3 | 87 | 250000 | | 3 | | 1 | | 1 | |
| DEVILS LAKE | | | | | 68 | | | 4 | | 3 | | | |
| FLANDREAU | | | | | | | | | | | 1 | | |
| FORT BERTHOLD | | | | | 55 | | | 3 | | | 2 | 2 | |
| OMAHA | | | | | | | | 1 | 1 | 1 | | 1 | |
| LOWER BRULE | | | | | 18 | 2000 | 1 | 1 | | 1 | | | |
| CHEYENNE RIVER | | | | | | | 1 | | 1 | 2 | | | |
| PINE RIDGE | | | | | 235 | 69000 | | 15 | | 10 | 1 | 1 | |
| YANKTON | | | | | 84 | 5000 | | 2 | 1 | 2 | | | |
| ROSEBUD | | 5 | 14 | 2.8 | 177 | 16000 | 1 | 12 | 1 | 9 | | 1 | |
| SAC & FOX | | 1 | 1 | 1 | | | | | | | | 1 | |
| SANTEE | | | | | | | | 1 | | 1 | | | |
| SISSETON-WAHPETON | | | | | 66 | | | 6 | | 3 | | 1 | |
| STANDING ROCK | | | | | 88 | | | 6 | | 1 | | | |
| TURTLE MOUNTAIN | | | | | 41 | | | 1 | 2 | 2 | | 1 | |
| WINNEBAGO | | | | | 2 | | 1 | 1 | | 3 | | | |
| | AREA TOTAL | 7 | 18 | 6.8 | 938 | 344000 | 4 | 56 | 6 | 39 | 4 | 9 | 0 |

| IHS AREA/ RESERVATION | | TYPE OF SERVICE CONNECTIONS | | | | |
|---|---|---|---|---|---|---|
| | | SINGLE FAM. HOMES | MOBILE HOMES | INSTITUTIONS SCHOOLS | RECREATION AREAS | COMMERCIAL MOTELS |
| IHS AREA: 00 | | | | | | |
| LA POSTA | | 1 | | | | |
| PAPAGO | | 42 | | | | |
| SAN XAVIER | | 1 | | | | |
| | AREA TOTAL | 44 | 0 | 0 | 0 | 0 |
| IHS AREA: 10 | | | | | | |
| CROW CREEK | | 5 | 1 | | | |
| DEVILS LAKE | | 4 | | | | |
| FLANDREAU | | 3 | | 1 | | |
| FORT BERTHOLD | | 3 | | 2 | | 1 |
| OMAHA | | 2 | 1 | 2 | 2 | 2 |
| LOWER BRULE | | 1 | | | | |
| CHEYENNE RIVER | | | | 2 | | |
| PINE RIDGE | | 18 | | 7 | | |
| YANKTON | | 4 | | 2 | 1 | |
| ROSEBUD | | 13 | | | | 1 |
| SAC & FOX | | 3 | | 1 | | |
| SANTEE | | 1 | | 1 | 1 | |
| SISSETON-WAHPETON | | 6 | | | | |
| STANDING ROCK | | 6 | | | | 1 |
| TURTLE MOUNTAIN | | 4 | | 1 | | |
| WINNEBAGO | | 1 | 2 | 2 | 2 | |
| | AREA TOTAL | 74 | 4 | 21 | 6 | 5 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | NO. OF WATER SYSTEMS | No. COMMUNITY WATER SYSTEMS | NO. NON-COMM WATER SYSTEMS | TOTAL POPULATION | AVERAGE POPULATION | No. OF WATER SYSTEMS BY POPULATION CATEGORIES 0 - 100 | 100 - 500 | 500 - 1,000 | 1,000 | No. GROUND-WATER SYSTEMS | No. SURFACE WATER SYSTEMS | No. PURCHASED WATER SYSTEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 11 | | | | | | | | | | | | |
| BAD RIVER, LA POINTE | 2 | 2 | | 577 | 289 | 1 | | 1 | | | | 2 |
| BAY MILLS | 4 | 1 | 3 | 392 | 98 | 4 | | | | | | 4 |
| BOIS FORT, NETT LAKE | 3 | 3 | | 611 | 204 | 1 | 2 | | | | | 3 |
| FOND DU LAC | 7 | 1 | 6 | 714 | 102 | 6 | 1 | | | | | 7 |
| FOREST COUNTY POTOWATOMIE | 2 | | 2 | 198 | 99 | 2 | | | | | | 2 |
| GRANITE FALLS | 2 | | 2 | 198 | 99 | 2 | | | | | | 2 |
| GRAND PORTAGE, PIGEON RIVER | 1 | 1 | | 338 | 338 | | 1 | | | | | 1 |
| GREATER LEECH LAKE | 10 | 10 | | 994 | 99 | 7 | 3 | | | | | 10 |
| ISABELLA | 1 | 1 | | 270 | 270 | | 1 | | | | | 1 |
| L ANSE | 2 | 2 | | 437 | 219 | 1 | 1 | | | | | 2 |
| LA COURTE OREILLES | 10 | 10 | | 946 | 95 | 7 | 3 | | | | | 10 |
| LAC DU FLAMBEAU | 4 | 4 | | 1460 | 365 | 3 | | | | 1 | | 4 |
| LOWER SIOUX, MORTON | 1 | 1 | | 225 | 225 | | 1 | | | | | 1 |
| MDEWAKANTON, PRAIRIE IS., RED | 1 | 1 | | 100 | 100 | | 1 | | | | | 1 |
| MENOMINEE | 5 | 4 | 1 | 1025 | 205 | 3 | 1 | 1 | | | | 5 |
| MILLE LACS | 7 | 2 | 5 | 923 | 132 | 6 | 1 | | | | | 7 |
| MOLE LAKE, SAKOAGON | 1 | 1 | | 72 | 72 | 1 | | | | | | 1 |
| ONEIDA | 6 | 6 | | 870 | 145 | 3 | 3 | | | | | 6 |
| PRIOR LAKE | 2 | 2 | | 173 | 87 | 1 | 1 | | | | | 2 |
| RED CLIFF | 3 | 3 | | 653 | 218 | 2 | | 1 | | | | 3 |
| RED LAKE | 3 | 3 | | 1525 | 508 | | 2 | 2 | | | | 3 |
| BLANK | 4 | 4 | | 460 | 115 | 1 | 3 | | | | | 4 |
| SAULT STE. MARIE | 3 | | 3 | 297 | 99 | 3 | | | | | | 3 |
| ST. CROIX | 7 | 2 | 5 | 4663 | 666 | 6 | | | | 1 | | 7 |
| STOCKBRIDGE-MUNSEE | 5 | | 5 | 495 | 99 | 5 | | | | | | 5 |
| WHITE EARTH | 8 | 7 | 1 | 1196 | 150 | 5 | 3 | | | | | 8 |
| WISCONSIN-WINNEBAGO | 7 | 6 | 1 | 702 | 100 | 5 | 2 | | | | | 7 |
| AREA TOTAL | 111 | 77 | 34 | 20522 | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | OPERATIONS AND MAINTENANCE PERFORMED BY --- | | | | | | | RELIABILITY OF WATER SYSTEM | ADEQUACY OF WATER SYSTEM | ADEQUACY OF OPERATIONS AND MAINTENANCE ORGANIZATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TRIBE | AUTHORITY OTHER | INDIVIDUAL | COMMUNITY | TRIBE | HOUSING AUTHORITY | OTHER | | | BOOKS | TOOLS | INVENTORY |
| IHS AREA: 11 | | | | | | | | | | | | |
| | | | | | | | | | | | 3 | 3 |
| BAD RIVER, LA POINTE | 2 | | | | 2 | | | 100 | 3.5 | 3 | 2 | 2 |
| BAY MILLS | 2 | | | | 1 | | | 100 | 3 | 3 | 2 | 2 |
| BOIS FORT, NETT LAKE | 3 | | | | 3 | | | 100 | 3.5 | 2 | 3 | 3 |
| FOND DU LAC | 1 | | | | | 1 | | 100 | 5 | 4 | | |
| FOREST COUNTY POTOWATOMIE | | | | | | 2 | | | | | | |
| GRANITE FALLS | | | | | | | | | | | 5 | 4 |
| GRAND PORTAGE, PIGEON RIVER | 1 | | | | 1 | | | 100 | 4 | 4 | 2 | 2 |
| GREATER LEECH LAKE | 10 | | | | 10 | | | 100 | 4 | 2 | | |
| ISABELLA | | | | | | 1 | | 100 | 3 | | | |
| L ANSE | | | | | 1 | | | 90 | 4 | | 4 | 4 |
| LA COURTE OREILLES | 10 | | | | 2 | 10 | | 100 | 4.1 | 5 | | |
| LAC DU FLAMBEAU | | | | | 4 | | | 100 | 4 | | 4 | 4 |
| LOWER SIOUX, MORTON | 1 | | | | 1 | | | 100 | 5 | 3 | | |
| MDEWAKANTON, PRAIRIE IS., RED | | | | | 1 | | | 100 | 5 | | 3 | 4 |
| MENOMINEE | 4 | | | | 4 | | | 100 | 4.3 | 4 | 2 | 1 |
| MILLE LACS | 2 | | | | 2 | | | 100 | 2.75 | 1 | | |
| MOLE LAKE, SAKOAGON | | | | | | 1 | | 100 | 4 | | 3 | 4 |
| ONEIDA | 5 | | | | 5 | | | 100 | 4.1 | 4 | 4 | 4 |
| PRIOR LAKE | 2 | | | | | | 2 | 99.5 | 3.3 | 3 | 3 | 3 |
| RED CLIFF | 3 | | | | 3 | | | 100 | 3.6 | 4 | 2 | 3 |
| RED LAKE | 3 | | | | 2 | | | 100 | 4 | 2 | 3 | 3 |
| BLANK | | | | | | | | 100 | 5 | 3 | | |
| SAULT STE. MARIE | | | | | | | | | | | | |
| ST. CROIX | 2 | | | | | 2 | | 100 | 4 | 3 | 3 | 3 |
| STOCKBRIDGE-MUNSEE | | | | | | 1 | | | | | | |
| WHITE EARTH | 7 | | | | 7 | | | 99.3 | 3.9 | 3 | 4 | 3 |
| WISCONSIN-WINNEBAGO | | | | | | 2 | | 99.6 | 4 | | | |
| AREA TOTAL | | | | | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | SDWA REQUIREMENT VIOLATIONS: MCL BAC-T | DURATION BAC-T | AVERAGE BAC-T DURATION | TOTAL MONITORING VIOLATIONS | IHS SDWA COMPLIANCE COST | WATER SYSTEM FUNDING SOURCE: TRIBAL CONTRIBUTION | FLAT FEE | METERED FEE | NO. OF WATER SYSTEMS BY FLOW CATEGORIES (1,000 OF GALLONS PER DAY): 0 - 10 | 10 - 100 | 100 - 300 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 11 | | | | | | | | | | | | |
| BAD RIVER, LA POINTE | | | | | | 1 | 2 | | 2 | | | |
| BAY MILLS | | | | 3 | | 1 | 2 | | 4 | | | |
| BOIS FORT, NETT LAKE | | | | | | 1 | 3 | | 3 | | | |
| FOND DU LAC | | | | | | | | 1 | 7 | | | |
| FOREST COUNTY POTOWATOMIE | | | | | | | | | 2 | | | |
| GRANITE FALLS | | | | | | | | | 2 | | | |
| GRAND PORTAGE, PIGEON RIVER | | | | | | 1 | 1 | | 1 | | | |
| GREATER LEECH LAKE | | | | | | | 10 | | 10 | | | |
| ISABELLA | | | | | | | | | 1 | | | |
| L ANSE | | | | | 427000 | | 2 | | 1 | | | |
| LA COURTE OREILLES | | | | | | | 10 | | 9 | | | 1 |
| LAC DU FLAMBEAU | | | | | | | 4 | 4 | 3 | | 1 | |
| LOWER SIOUX, MORTON | | | | 1 | | 1 | | | 1 | | | |
| MDEWAKANTON, PRAIRIE IS., RED | | | | 3 | | | 1 | | 1 | | | |
| MENOMINEE | | | | | | 1 | 4 | | 5 | | | |
| MILLE LACS | | | | | | | 2 | | 7 | | | |
| MOLE LAKE, SAKOAGON | | | | 1 | | | 1 | | 1 | | | |
| ONEIDA | | | | | | | 6 | | 5 | | | |
| PRIOR LAKE | | | | 1 | | 1 | 2 | | 2 | | | |
| RED CLIFF | | | | | | 1 | 3 | | 3 | | | |
| RED LAKE | | | | | | 1 | 2 | | 4 | | | |
| BLANK | | | | 2 | | 1 | 4 | | 4 | | | |
| SAULT STE. MARIE | | | | | | | | | 3 | | | |
| ST. CROIX | | | | | | 1 | | | 7 | | | |
| STOCKBRIDGE-MUNSEE | | | | | | | 1 | | 5 | | | |
| WHITE EARTH | | | | 6 | | 1 | 6 | | 8 | | | |
| WISCONSIN-WINNEBAGO | | | | 14 | | | | | 7 | | | |
| AREA TOTAL | 0 | 0 | 0 | 31 | 427000 | 12 | 66 | 5 | 100 | 0 | 1 | 1 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | TYPE OF SERVICE CONNECTIONS: NATIVE AM. HOME | MOBILE HOMES | INSTITUTIONS SCHOOLS | RECREATION AREAS | COMMERCIAL MOTELS |
|---|---|---|---|---|---|
| IHS AREA: 11 | | | | | |
| BAD RIVER, LA POINTE | 2 | | | | |
| BAY MILLS | 1 | | | | |
| BOIS FORT, NETT LAKE | 3 | | | | |
| FOND DU LAC | 1 | | | | |
| FOREST COUNTY POTOWATOMIE | 1 | | | | |
| GRANITE FALLS | 1 | | | | |
| GRAND PORTAGE, PIGEON RIVER | 1 | | | | |
| GREATER LEECH LAKE | 10 | | | | |
| ISABELLA | 1 | | | | |
| L ANSE | 2 | | | | |
| LA COURTE OREILLES | 10 | | | | |
| LAC DU FLAMBEAU | 4 | | | | |
| LOWER SIOUX, MORTON | 1 | | | | |
| MDEWAKANTON, PRAIRIE IS., RED | 1 | | | | |
| MENOMINEE | 4 | | | | |
| MILLE LACS | 2 | | | | |
| MOLE LAKE, SAKOAGON | 1 | | | | |
| ONEIDA | 6 | | | | |
| PRIOR LAKE | 2 | | | | |
| RED CLIFF | 3 | | | | |
| RED LAKE | 3 | | | | |
| BLANK | 4 | | | | |
| SAULT STE. MARIE | | | | | |
| ST. CROIX | 2 | | | | |
| STOCKBRIDGE-MUNSEE | | | | | |
| WHITE EARTH | 7 | | | | |
| WISCONSIN-WINNEBAGO | 3 | | | | |
| AREA TOTAL | 76 | 0 | 0 | 0 | 0 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | No. OF WATER SYSTEMS | No. COMMUNITY WATER SYSTEMS | NO. NON-COMM WATER SYSTEMS | TOTAL POPULATION | AVERAGE POPULATION | No. OF WATER SYSTEMS BY POPULATION CATEGORIES 0 - 100 | 100 - 500 | 500 - 1,000 | ) 1,000 | No. GROUND-WATER SYSTEMS | No. SURFACE WATER SYSTEMS | No. PURCHASED WATER SYSTEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 20 | | | | | | | | | | | | |
| ACOMA | 1 | 1 | | 1999 | 1,999 | | | | 1 | 1 | | |
| ALLEN CANYON, UTE MOUNTAIN | 2 | 2 | | 500 | 250 | | 2 | | | 2 | | |
| APPACHE, MESCALERO, JITCARTLLA | 7 | 4 | 3 | 4062 | 580 | 3 | 3 | | 1 | 5 | 2 | |
| CHEROKEE | 1 | 1 | | 130 | 130 | | 1 | | | 1 | | |
| COCHITI PUEBLO | 1 | 1 | | 424 | 424 | | 1 | | | 1 | | |
| ISLETA PUEBLO | 4 | 3 | 1 | 2490 | 623 | 2 | | 1 | 1 | 4 | | |
| JEMEZ PUEBLO | 1 | 1 | | 1389 | 1,389 | | | | 1 | 1 | | |
| LAGUNA | 3 | 3 | | 5849 | 1,950 | | 1 | 1 | 1 | 3 | | |
| NAMBE PUEBLO | 3 | 1 | 2 | 190 | 63 | 2 | 1 | | | 2 | 1 | |
| PICURIS PUEBLO | 1 | 1 | | 100 | 100 | | 1 | | | 1 | | |
| POJOAQUE PUEBLO | 2 | 2 | | 182 | 91 | 1 | 1 | | | 2 | | |
| SAN FLEIPE PUEBLO | 1 | 1 | | 1387 | 1,387 | | | | 1 | 1 | | |
| SAN ILDEFONSO PUEBLO | 1 | 1 | | 264 | 264 | | 1 | | | 1 | | |
| SAN JUAN PUEBLO | 2 | 2 | | 798 | 399 | | 1 | 1 | | 2 | | |
| SANDIA PUEBLO | 1 | 1 | | 210 | 210 | | 1 | | | 1 | | |
| SANTA ANA PUEBLO | 1 | 1 | | 341 | 341 | | 1 | | | 1 | | |
| SANTA CLARA PUEBLO | 8 | 1 | 7 | 783 | 88 | 7 | | 1 | | 8 | | |
| SANTA DOMINGO PUEBLO | 1 | 1 | | 1891 | 1,891 | | | | 1 | 1 | | |
| SOUTHERN UTE | 1 | 1 | | 800 | 800 | | | 1 | | | 1 | |
| TAOS PUEBLO | 3 | 1 | 2 | 50 | 17 | 3 | | | | 3 | | |
| TESUQUE PUEBLO | 4 | 1 | 3 | 466 | 117 | 3 | 1 | | | 4 | | |
| ZIA PUEBLO | 1 | 1 | | 455 | 455 | | 1 | | | 1 | | |
| ZUNI PUEBLO | 2 | 2 | | 7654 | 3,827 | | 1 | | 2 | 2 | | |
| AREA TOTAL | 52 | 34 | 18 | 32174 | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | OPERATIONS AND MAINTENANCE AUTHORITY | | OPERATIONS AND MAINTENANCE PERFORMED BY | | | | RELIABILITY OF WATER SYSTEM | ADEQUACY OF | | ADEQUACY OF OPERATIONS AND MAINTENANCE ORGANIZATION | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | TRIBE | OTHER | INDIVIDUAL | COMMUNITY | TRIBE | AUTHORITY | OTHER | | | BOOKS | TOOLS | INVENTORY |
| IHS AREA: 20 | | | | | | | | | | | | |
| ACOMA | 1 | | | | 1 | | | 100 | 3.5 | 3 | 3 | 3 |
| ALLEN CANYON, UTE MOUNTAIN | 1 | | | | 1 | 1 | | 90 | 1 | 2 | 2 | 2 |
| APPACHE, MESCALERO, JITCARTLLA | 3 | | | | 4 | 1 | 1 | 96.7 | 2.8 | 1 | 2 | 2 |
| CHEROKEE | | | | | | | | | | | | |
| COCHITI PUEBLO | 1 | | | | 1 | | | 100 | 4 | 4 | 4 | 4 |
| ISLETA PUEBLO | 3 | | | | 3 | | | 95 | 3.3 | 2 | 3 | 3 |
| JEMEZ PUEBLO | 1 | | | | 1 | | | 90 | 2 | 1 | 2 | 2 |
| LAGUNA | 3 | | | | 3 | | | 98 | 3.5 | 4 | 3 | 4 |
| NAMBE PUEBLO | 1 | | | | 1 | | | | | 3 | 3 | 3 |
| PICURIS PUEBLO | | | 1 | | 1 | | | 100 | 2.5 | | | |
| POJOAQUE PUEBLO | 1 | | | | 1 | | | 100 | 5 | 3 | 3 | 3 |
| SAN FLEIPE PUEBLO | 1 | | | | 1 | | | 100 | 5 | 4 | 4 | 4 |
| SAN ILDEFONSO PUEBLO | 1 | | | | 1 | | | 100 | 4 | 2 | 2 | 3 |
| SAN JUAN PUEBLO | 2 | | | | 2 | | | 100 | 5 | 3 | 4 | 3 |
| SANDIA PUEBLO | 1 | | | | 1 | | | 98 | 4 | 4 | 4 | 4 |
| SANTA ANA PUEBLO | 1 | | | | 1 | | | 97 | 3.5 | 3 | 3 | 3 |
| SANTA CLARA PUEBLO | 1 | | | | 1 | | | 100 | 4 | 3 | 3 | 4 |
| SANTA DOMINGO PUEBLO | 1 | | | | 1 | | | 100 | 4.5 | 3 | 3 | 3 |
| SOUTHERN UTE | 1 | | | | 1 | | 1 | 100 | 5 | 4 | 4 | 4 |
| TAOS PUEBLO | | | 1 | | 1 | | | 99 | 3.5 | | | |
| TESUQUE PUEBLO | | | | | 1 | | | | | | | |
| ZIA PUEBLO | 1 | | | | 1 | | | 99 | 4 | 5 | 4 | 5 |
| ZUNI PUEBLO | 1 | | | | 1 | | | 97.5 | 3.6 | 1 | 1 | 1 |
| AREA TOTAL | | | | | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | MCL EXC-T | DURATION EXC-T | AVERAGE EXC-T DURATION | TOTAL MONITORING VIOLATIONS | IHS SDWA COMPLIANCE COST | WATER SYSTEM FUNDING SOURCE: TRIBAL CONSTRUCTION | FLAT FEE | METERED FEE | NO. OF WATER SYSTEMS BY FLOW CATEGORIES: 0 | 10 | 10 - 100 | 100 - 300 | > 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 20 | | | | | | | | | | | | | |
| ACOMA | | | | | 38000 | 1 | | | | | | 1 | |
| ALLEN CANYON, UTE MOUNTAIN | | | | 46 | | 1 | | | 1 | | | | |
| APPACHE, MESCALERO, JICARTILLA | 1 | 1 | 1 | 24 | | 1 | 1 | | 6 | | | | 1 |
| CHEROKEE | | | | 3 | | | | | 1 | | | | |
| COCHITI PUEBLO | | | | | | 1 | | | | | | 1 | |
| ISLETA PUEBLO | 1 | 1 | 1 | | | 1 | | | 3 | | 1 | 2 | |
| JEMEZ PUEBLO | | | | | | 1 | 1 | | | | 1 | | |
| LAGUNA | 2 | 4 | 2 | 1 | | 1 | | | | | 1 | 1 | |
| NAMBE PUEBLO | | | | | | | 1 | | | | 2 | | |
| PICURIS PUEBLO | | | | | | | | | | | | | |
| POJOAQUE PUEBLO | | | | | | | | | | | 1 | | |
| SAN FLEIPE PUEBLO | | | | | | | 1 | | | | 1 | | |
| SAN ILDEFONSO PUEBLO | | | | | | | | | | | | | |
| SAN JUAN PUEBLO | | | | | | | 1 | | 1 | | 1 | | |
| SANDIA PUEBLO | | | | | | 1 | | | | | 1 | | |
| SANTA ANA PUEBLO | | | | | | 1 | 1 | | | | 1 | | |
| SANTA CLARA PUEBLO | | | | | | | 1 | | 7 | | 1 | | |
| SANTA DOMINGO PUEBLO | | | | | | | 1 | | | | | 1 | |
| SOUTHERN UTE | | | | 2 | | 1 | | 1 | 1 | | | | |
| TAOS PUEBLO | | | | | | | | | 3 | | | | |
| TESUQUE PUEBLO | | | | | | | | | 3 | | | | |
| ZIA PUEBLO | | | | | | 1 | | | | | 1 | | |
| ZUNI PUEBLO | | | | 1 | | 1 | 1 | | 2 | | | | |
| AREA TOTAL | 4 | 6 | 4 | 77 | 38000 | 12 | 9 | 1 | 28 | | 12 | 6 | 1 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | TYPE OF SERVICE CONNECTIONS: NATIVE AM. HOMES | MOBILE HOMES | INSTITUTIONS SCHOOLS | RECREATION AREAS | COMMERCIAL MOTELS |
|---|---|---|---|---|---|
| IHS AREA: 20 | | | | | |
| ACOMA | 1 | | | | |
| ALLEN CANYON, UTE MOUNTAIN | 2 | | | | |
| APPACHE, MESCALERO, JICARILLA | 5 | | | 2 | 1 |
| CHEROKEE | | 1 | | | |
| COCHITI PUEBLO | 1 | | | | |
| ISLETA PUEBLO | 4 | | | 1 | |
| JEMEZ PUEBLO | 1 | | | | |
| LAGUNA | 3 | | | | |
| NAMBE PUEBLO | 3 | | | 2 | |
| PICURIS PUEBLO | 1 | | | | |
| POJOAQUE PUEBLO | 2 | | | | |
| SAN FLEIPE PUEBLO | 1 | | | | |
| SAN ILDEFONSO PUEBLO | 1 | | | | |
| SAN JUAN PUEBLO | 2 | | | | |
| SANDIA PUEBLO | 1 | | | | |
| SANTA ANA PUEBLO | 1 | | | | |
| SANTA CLARA PUEBLO | 7 | | | 8 | |
| SANTA DOMINGO PUEBLO | 1 | | | | |
| SOUTHERN UTE | 1 | | | | |
| TAOS PUEBLO | 3 | | 2 | 1 | |
| TESUQUE PUEBLO | 3 | | 1 | 2 | |
| ZIA PUEBLO | 1 | | | | |
| ZUNI PUEBLO | 2 | | | | |
| AREA TOTAL | 47 | 1 | 3 | 16 | 1 |

| [illegible] | [illegible] SYSTEMS | No. COMMUNITY WATER SYSTEMS | No. NON-COMM WATER SYSTEMS | TOTAL POPULATION | AVERAGE POPULATION | No. OF WATER SYSTEMS BY POPULATION CATEGORIES 0 - 100 | 101 - 500 | 501 - 1,000 | > 1,000 | No. GROUND WATER SYSTEMS | No. SURFACE WATER SYSTEMS | No. PURCHASED WATER SYSTEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 30 | | | | | | | | | | | | |
| MEDICINE ALA | 1 | 1 | | 1056 | 1,056 | | | | 1 | | 1 | |
| IHS AREA: 40 | | | | | | | | | | | | |
| BLACKFEET | 5 | 5 | | 863 | 173 | 2 | 3 | | | 5 | | |
| CROW | 2 | 2 | | 1100 | 550 | | 1 | 1 | | 1 | 1 | |
| FLATHEAD | 12 | 12 | | 1814 | 151 | 4 | 8 | | | 12 | | |
| FORT BELKNAP | 5 | 4 | 1 | 1792 | 358 | 2 | 2 | | 1 | 4 | 1 | |
| FORT PECK | 1 | 1 | | 138 | 138 | | 1 | | | 1 | | |
| FORT WASHAKIE, WIND RIVER | 4 | 4 | | 2818 | 705 | | 1 | 2 | 1 | 2 | 2 | |
| NORTHERN CHEYENNE | 5 | 5 | | 2817 | 563 | 2 | 1 | 1 | 1 | 5 | | |
| ROCKY BOY | 8 | 8 | | 1360 | 170 | 2 | 6 | | | 8 | | |
| AREA TOTAL | 42 | 41 | 1 | 12782 | | | | | | | | |
| IHS AREA: 50 | | | | | | | | | | | | |
| KICKAPOO | 1 | 1 | | 600 | 300 | | | 1 | | | 1 | |
| IOWA | 2 | 2 | | 150 | 100 | | 1 | | | 2 | | |
| AREA TOTAL | 3 | 3 | 0 | 750 | | | | | | | | |
| IHS AREA: 58 | | | | | | | | | | | | |
| ALLEGANY | 8 | 6 | 2 | 2189 | 274 | 2 | 4 | 2 | | 8 | | |
| BIG CYPRESS | 1 | 1 | | 500 | 500 | | | 1 | | 1 | | |
| BRIGHTON | 1 | 1 | | 500 | 500 | | | 1 | | 1 | | |
| CATTARAUGUS | 3 | 1 | 2 | 190 | 63 | 2 | 1 | | | 3 | | |
| CHEROKEE | 46 | 17 | 29 | 3018 | 66 | 44 | | 2 | | 44 | 2 | |
| CHOCTAW | 5 | 5 | | 2082 | 416 | | 4 | 1 | | 5 | | |
| DANIA | 1 | 1 | | 2660 | 2,660 | | | | 1 | 1 | | |
| MICCOSUKEE | 1 | 1 | | 800 | 800 | | | 1 | | 1 | | |
| ST REGIS | 1 | 1 | | 800 | 800 | | | 1 | | 1 | | |
| AREA TOTAL | 67 | 34 | 33 | 12739 | | | | | | | | |

| IHS AREA/ RESERVATION | OPERATIONS AND MAINTENANCE AUTHORITY | | OPERATIONS AND MAINTENANCE PERFORMED BY | | | | | RELIABILITY OF WATER SYSTEM | ADEQUACY OF WATER SYSTEM | ADEQUACY OF OPERATIONS AND MAINTENANCE ORGANIZATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TRIBE | OTHER | INDIVIDUAL | COMMUNITY | TRIBE | HOUSING AUTHORITY | OTHER | | | BOOKS | TOOLS | INVENTORY |
| IHS AREA: 30 | | | | | | | | | | | | |
| METLAKATLA | 1 | | | 1 | | | | 100 | 3 | 3 | 3 | 4 |
| IHS AREA: 40 | | | | | | | | | | | | |
| BLACKFEET | 1 | 1 | | | 3 | | 2 | 84.6 | 3.1 | 1 | 2 | 1 |
| CROW | | | | | 1 | | 1 | 100 | 3 | | | |
| FLATHEAD | 12 | | | | 12 | | | 95.4 | 3.8 | 5 | 5 | 5 |
| FORT BELKNAP | 4 | | | | 4 | | | 83.5 | 3.1 | 3 | 2 | 3 |
| FORT PECK | | | | | 1 | | | 75 | 2 | | | |
| FORT WASHAKIE, WIND RIVER | 3 | 1 | | 1 | 3 | | | 100 | 4 | 5 | 3 | 3.5 |
| NORTHERN CHEYENNE | 5 | | | | 5 | | | 95.8 | 3.5 | 5 | 3 | 3 |
| ROCKY BOY | | | 6 | | 6 | 5 | 2 | 93.4 | 3.5 | | | |
| AREA TOTAL | | | | | | | | | | | | |
| IHS AREA: 50 | | | | | | | | | | | | |
| KICKAPOO | 1 | | | | 1 | | | 90 | 3 | 4 | 3 | 3 |
| IOWA | 1 | | | | 1 | | | 100 | 4.5 | 2 | 3 | 3 |
| AREA TOTAL | | | | | | | | | | | | |
| IHS AREA: 58 | | | | | | | | | | | | |
| ALLEGANY | 2 | | | | 2 | | | 100 | 3 | 2 | 2 | 4 |
| BIG CYPRESS | | | | | 1 | | | 96 | 3 | | | |
| BRIGHTON | | | | | 1 | | | 99 | 3 | | | |
| CATTARAUGUS | 2 | | | | 1 | | | | | 2 | 2 | 4 |
| CHEROKEE | 27 | | 24 | | 26 | 1 | | 99.2 | 4 | 4 | 4 | 4 |
| CHOCTAW | 3 | | | | | 3 | | 99 | 4 | 5 | 3 | 5 |
| DANIA | | | | | | | 1 | 100 | 4 | | | |
| MICCOSUKEE | | | | | 1 | | | 100 | 4 | | | |
| ST REGIS | 1 | | | | | | | 99.2 | 3.9 | 4 | 4 | 5 |
| AREA TOTAL | | | | | | | | | | | | |

| IHS AREA/ RESERVATION | MCL FAC T | DURATION BAC T | AVERAGE [illegible] | TOTAL MONITORIN VIOLATIONS | IHS SDWA COMPLIANCE COST | WATER SYSTEM FUNDING SOURCE TRIBAL CONTRIBUTION | FLAT FEE | METERED FEE | No. OF WATER SYSTEMS BY FLOW CATEGORIES (1,000 OF GALLONS PER DAY) 0 - 10 | 10 - 100 | 100 - 300 | ) 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 30 | | | | | | | | | | | | |
| METLAKATLA | | | | 24 | | 1 | 1 | | | | | |
| IHS AREA: 40 | | | | | | | | | | | | |
| BLACKFEET | | | | 49 | | | 1 | | 5 | | | |
| CROW | | | | 22 | | | 1 | | 1 | | | |
| FLATHEAD | | | | 72 | | 1 | 12 | | 12 | | | |
| FORT BELKNAP | | | | 30 | | | 4 | | 5 | | | |
| FORT PECK | | | | 6 | | | | | 1 | | | |
| FORT WASHAKIE, WIND RIVER | 1 | 3 | 3 | 45 | | 1 | 4 | | 4 | | | |
| NORTHERN CHEYENNE | | | | 30 | | 1 | 5 | 5 | 5 | | | |
| ROCKY BOY | | | | 48 | | | | | 8 | | | |
| AREA TOTAL | 1 | 3 | 3 | 302 | 0 | 3 | 27 | 5 | 41 | 0 | 0 | 0 |
| IHS AREA: 50 | | | | | | | | | | | | |
| KICKAPOO | 1 | 1 | 1 | | 60000 | | 1 | 1 | | | 1 | |
| IOWA | | | | | | | | | 1 | 1 | | |
| AREA TOTAL | 1 | 1 | 1 | | 60000 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| IHS AREA: 58 | | | | | | | | | | | | |
| ALLEGANY | | | | | | 1 | 2 | | 6 | 1 | | |
| BIG CYPRESS | | | | | | | 1 | 1 | 1 | | | |
| BRIGHTON | | | | | | | 1 | 1 | 1 | | | |
| CATTARAUGUS | | | | | | 1 | | | 3 | | | |
| CHEROKEE | 2 | 2 | 1 | | 81000 | 1 | | 2 | 44 | | | 2 |
| CHOCTAW | 2 | 2 | 1 | | | | 3 | | 5 | | | |
| DANIA | | | | | | | | 1 | 1 | | | |
| MICCOSUKEE | | | | | | | | | | 1 | | |
| ST REGIS | | | | | | 1 | 1 | | | 1 | | |
| AREA TOTAL | 4 | 4 | 2 | 0 | 81000 | 4 | 8 | 5 | 61 | 3 | 0 | 2 |

| IHS AREA/ RESERVATION | TYPE OF SERVICE CONNECTIONS: NATIVE AM. HOMES | MOBILE HOMES | INSTITUTIONS SCHOOLS | RECREATION AREAS | COMMERCIAL MOTELS |
|---|---|---|---|---|---|
| IHS AREA: 30 | | | | | |
| METLAKATLA | 1 | | | | |
| IHS AREA: 40 | | | | | |
| BLACKFEET | 4 | | 2 | | |
| CROW | 2 | | | | |
| FLATHEAD | 12 | | | | |
| FORT BELKNAP | 4 | | | | |
| FORT PECK | 1 | | | | |
| FORT WASHAKIE, WIND RIVER | 4 | | | | |
| NORTHERN CHEYENNE | 5 | | 1 | | |
| ROCKY BOY | 7 | | 1 | | |
| AREA TOTAL | 39 | 0 | 4 | 0 | 0 |
| IHS AREA: 50 | | | | | |
| KICKAPOO | 1 | | 1 | 1 | 1 |
| IOWA | 1 | | | 1 | |
| AREA TOTAL | 2 | 0 | 1 | 2 | 1 |
| IHS AREA: 58 | | | | | |
| ALLEGANY | 2 | 3 | 2 | 3 | |
| BIG CYPRESS | 1 | | | | |
| BRIGHTON | 1 | | 1 | | |
| CATTARAUGUS | 2 | | 1 | 2 | |
| CHEROKEE | 12 | 2 | 3 | 3 | 2 |
| CHOCTAW | 5 | | 1 | | |
| DANIA | | 1 | | | |
| MICCOSUKEE | 1 | | 1 | 1 | 1 |
| ST REGIS | 1 | | | | |
| AREA TOTAL | 25 | 6 | 9 | 9 | 3 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | No. OF WATER SYSTEMS | No. COMMUNITY WATER SYSTEMS | NO. NON-COMM WATER SYSTEMS | TOTAL POPULATION | AVERAGE POPULATION | No. OF WATER SYSTEMS BY POPULATION CATEGORIES | | | | No. GROUND-WATER SYSTEMS | No. SURFACE WATER SYSTEMS | No. PURCHASED WATER SYSTEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 - 100 | 100 - 500 | 500 - 1,000 | ) 1,000 | | | |
| IHS AREA: 60 | | | | | | | | | | | | |
| AK-CHIN, MARICOPA | 2 | 2 | | 250 | 125 | 1 | 1 | | | 2 | | |
| BATTLE MOUNTAIN | 1 | 1 | | 135 | 135 | | 1 | | | 1 | | |
| CAMP VERDE-MIDDLE VERDE | 1 | 1 | | 115 | 115 | | 1 | | | 1 | | |
| CARSON | 2 | 2 | | 291 | 146 | | 2 | | | 2 | | |
| CHEMEHUEVI | 2 | 2 | | 275 | 138 | | 2 | | | 1 | | 1 |
| COCOPAH | 3 | 3 | | 515 | 172 | | 3 | | | 3 | | |
| CRIT | 2 | 2 | | 175 | 88 | 1 | 1 | | | 2 | | |
| DUCK VALLEY | 1 | 1 | | 550 | 550 | | | 1 | | 1 | | |
| DUCK WATER | 1 | 1 | | 42 | 42 | 1 | | | | 1 | | |
| FALLON | 1 | 1 | | 200 | 200 | | 1 | | | 1 | | |
| FORT APACHE | 17 | 16 | 1 | 5594 | 329 | 7 | 6 | 2 | 2 | 16 | | 1 |
| FORT MCDERMITT | 1 | 1 | | 260 | 260 | | 1 | | | 1 | | |
| FORT MCDOWELL | 2 | 2 | | 350 | 175 | 1 | 1 | | | 2 | | |
| FORT MOHAVE | 1 | 1 | | 250 | 250 | | 1 | | | 1 | | |
| GILA RIVER | 14 | 10 | 4 | 7365 | 526 | 3 | 4 | 4 | 3 | 14 | | |
| GOSHUTE | 1 | 1 | | 25 | 25 | 1 | | | | 1 | | |
| HAVASUPAI | 1 | 1 | | 300 | 300 | | 1 | | | 1 | | |
| HOPI | 11 | 9 | 2 | 2942 | 267 | 2 | 7 | 1 | | 10 | | |
| HUALAPAI | 2 | 2 | | 85 | 43 | 2 | | | | 2 | | |
| KAIBAB | 1 | 1 | | 100 | 100 | | 1 | | | 1 | | |
| MOAPA | 1 | 1 | | 76 | 76 | 1 | | | | 1 | | |
| PYRAMID LAKE | 3 | 3 | | 590 | 197 | | 3 | | | 3 | | |
| FORT YUMA | 1 | 1 | | 1200 | 1,200 | | | | 1 | 1 | | |
| BISHOP | 5 | 5 | | 1735 | 347 | 1 | 3 | | 1 | 5 | | |
| HAVASU LANDING | 1 | 1 | | 50 | 50 | | 1 | | | 1 | | |
| SALT RIVER | 1 | 1 | | 2950 | 2,950 | | | | 1 | 1 | | |
| SAN CARLOS | 11 | 11 | | 7037 | 640 | 4 | 2 | 2 | 3 | 11 | | |
| UINTAH & OURAY | 3 | 3 | | 2922 | 974 | 1 | 1 | | 1 | 3 | | |
| WALKER RIVER | 1 | 1 | | 100 | 100 | | 1 | | | 1 | | |
| WASHOE & DRESSLERVILE | 1 | 1 | | 126 | 126 | | 1 | | | 1 | | |
| YERINGTON | 1 | 1 | | 42 | 42 | 1 | | | | 1 | | |
| YOMBA | 1 | 1 | | 46 | 46 | 1 | | | | 1 | | |
| AREA TOTAL | 97 | 90 | 7 | 36701 | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | OPERATIONS AND MAINTENANCE AUTHORITY | | OPERATIONS AND MAINTENANCE PERFORMED BY | | | | | RELIABILITY OF WATER SYSTEM | ADEQUACY OF WATER SYSTEM | ADEQUACY OF OPERATIONS AND MAINTENANCE ORGANIZATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TRIBE | OTHER | INDIVIDUAL | COMMUNITY | TRIBE | HOUSING AUTHORITY | U.S. | | | BOOKS | TOOLS | INVENTORY |
| IHS AREA: 60 | | | | | | | | | | | | |
| AK-CHIN, MARICOPA | | | | | | | 2 | 99 | 3.7 | | | |
| BATTLE MOUNTAIN | | | 1 | | 1 | | 2 | 99 | 3 | | | |
| CAMP VERDE-MIDDLE VERDE | | | | | 1 | | | 100 | 4 | | | |
| CARSON | 2 | | | | 1 | | 1 | 95 | 3 | 3 | 4 | 4 |
| CHEMEHUEVI | | | | | 2 | | | 99.5 | 4 | | | |
| COCOPAH | 3 | | | | 3 | 2 | | 99.7 | 3 | 1 | 2 | 2 |
| CRIT | | | | | 1 | | | 100 | 4.5 | | | |
| DUCK VALLEY | | | | | 1 | | | 99 | 4.6 | | | |
| DUCK WATER | | | 1 | | 1 | | | 100 | 4 | | | |
| FALLON | 1 | | 1 | | 1 | | | 99 | 4 | 2 | 1 | 1 |
| FORT APACHE | 10 | | | | 12 | | 3 | 95.7 | 3.3 | 4 | 3 | 3 |
| FORT MCDERMITT | | | 1 | | 1 | | | 95 | 3 | | | |
| FORT MCDOWELL | | | | | 2 | | | 99.5 | 3.5 | | | |
| FORT MOHAVE | | | | | 1 | | | 99 | 4 | | | |
| GILA RIVER | 8 | | | 1 | 7 | | | 99.2 | 4 | 4.7 | 2.9 | 3.7 |
| GOSHUTE | | | | | 1 | | | 99 | 4 | | | |
| HAVASUPAI | | | | | 1 | | | 90 | 2 | | | |
| HOPI | 3 | 7 | | 6 | 2 | | 3 | 99.3 | 3.1 | 2.8 | 2.4 | 2.1 |
| HUALAPAI | | | | | 1 | | 1 | 98 | 2.8 | | | |
| KAIBAB | 1 | | | | 1 | | | 100 | 3 | 2 | 2 | 2 |
| MOAPA | | | | | 1 | | 1 | 100 | 4 | | | |
| PYRAMID LAKE | 3 | | 3 | 2 | 3 | 2 | 1 | 93.3 | 3 | 2 | 2 | 2 |
| FORT YUMA | | | | | | | | 100 | 3.5 | 3 | 3 | 3 |
| BISHOP | | | | | | | | 99.4 | 3.3 | 2.5 | 2 | 2 |
| HAVASU LANDING | | | | | | | | 100 | 4 | | | |
| SALT RIVER | 1 | | | | 1 | | | 100 | 4 | 4 | 3 | 3 |
| SAN CARLOS | 4 | 2 | | 2 | 9 | | 1 | 97 | 2.5 | 2.7 | 1.7 | 1.8 |
| UINTAH & OURAY | 3 | | | | 2 | | | 100 | 3.3 | 4 | 3 | 4 |
| WALKER RIVER | | | 1 | | 1 | | 1 | 100 | 3.5 | | | |
| WASHOE & DRESSLERVILE | 1 | | | | 1 | | | 99 | 4 | 3 | 4 | 4 |
| YERINGTON | 1 | | 1 | | 1 | | | 100 | 4 | 3 | 2 | 2 |
| YOMBA | | | | | | 1 | | 90 | 3.3 | | | |
| AREA TOTAL | | | | | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | SDWA REQUIREMENT VIOLATIONS: MCL BAC-T | DURATION BAC-T | AVERAGE BAC-T DURATION | TOTAL MONITORING VIOLATIONS | IHS SDWA COMPLIANCE COST | WATER SYSTEM FUNDING SOURCE: TRIBAL CONTRIBUTION | FLAT FEE | METERED FEE | No. OF WATER SYSTEMS BY FLOW CATEGORIES (1,000 OF GALLONS PER DAY): 0 - 10 | 10 - 100 | 100 - 300 | ) 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 60 | | | | | | | | | | | | |
| AK-CHIN, MARICOPA | | | | 7 | 150000 | | | | 1 | | | |
| BATTLE MOUNTAIN | | | | 1 | 3000 | | 1 | | 1 | | | |
| CAMP VERDE-MIDDLE VERDE | | | | 5 | | | 1 | | 1 | | | |
| CARSON | | | | 3 | | 1 | 2 | | 2 | | | |
| CHEMEHUEVI | | | | 1 | 15000 | | 2 | | 1 | | | |
| COCOPAH | 1 | 3 | 3 | 3 | 100000 | | 3 | | 1 | | | |
| CRIT | | | | | | | | 1 | 1 | | 1 | |
| DUCK VALLEY | | | | 3 | | | | | | | 1 | |
| DUCK WATER | | | | 1 | | | 1 | | 1 | | | |
| FALLON | | | | 3 | 350000 | 1 | 1 | | 1 | | | |
| FORT APACHE | 1 | 3 | 3 | 13 | 740000 | | 10 | 1 | 12 | 1 | 1 | |
| FORT MCDERMITT | | | | 2 | | | 1 | | 1 | | | |
| FORT MCDOWELL | | | | | 4000 | | | | 1 | | | |
| FORT MOHAVE | 1 | 3 | 3 | 2 | | | | | 1 | | | |
| GILA RIVER | 1 | 3 | 3 | 6 | 90000 | | 1 | 8 | 6 | 1 | 2 | 1 |
| GOSHUTE | | | | 6 | | | | | 1 | | | |
| HAVASUPAI | | | | | | | | | 1 | | | |
| HOPI | | | | | | 1 | 6 | 2 | 3 | 1 | 1 | |
| HUALAPAI | | | | 1 | 3000 | | | | 2 | | | |
| KAIBAB | | | | 6 | | 1 | 1 | | 1 | | | |
| MOAPA | | | | 1 | | | | 1 | 1 | | | |
| PYRAMID LAKE | | | | 9 | | 1 | 3 | | 1 | | | |
| FORT YUMA | | | | 2 | | 1 | 1 | 1 | 1 | | | |
| BISHOP | | | | 12 | | 1 | 4 | | 4 | | | |
| HAVASU LANDING | | | | | | | 1 | | 1 | | | |
| SALT RIVER | | | | 2 | | 1 | | 1 | | | | 1 |
| SAN CARLOS | | | | | 131000 | 1 | 6 | | 7 | 2 | 2 | 1 |
| UINTAH & OURAY | 1 | 3 | 3 | 25 | | 1 | | 3 | 3 | | | |
| WALKER RIVER | | | | 3 | | 1 | 1 | | | 1 | | |
| WASHOE & DRESSLERVILE | | | | | | | 1 | | 1 | | | |
| YERINGTON | | | | 3 | | | 1 | 1 | 1 | | | |
| YOMBA | | | | 6 | 5000 | | | | 1 | | | |
| AREA TOTAL | 5 | 15 | 15 | 126 | 1591000 | 11 | 48 | 19 | 60 | 6 | 8 | 3 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | TYPE OF SERVICE CONNECTIONS: NATIVE AM. HOMES | MOBILE HOMES | INSTITUTIONS SCHOOLS | RECREATION AREAS | COMMERCIAL MOTELS |
|---|---|---|---|---|---|
| IHS AREA: 60 | | | | | |
| AK-CHIN, MARICOPA | 2 | | | | |
| BATTLE MOUNTAIN | 1 | | | | |
| CAMP VERDE-MIDDLE VERDE | 1 | | | | |
| CARSON | 2 | | | | |
| CHEMEHUEVI | 2 | | | | |
| COCOPAH | 3 | | | | |
| CRIT | 1 | 1 | | | |
| DUCK VALLEY | 1 | | | | |
| DUCK WATER | 1 | | | | |
| FALLON | 1 | | | | |
| FORT APACHE | 11 | | | | 1 |
| FORT MCDERMITT | 1 | | | | |
| FORT MCDOWELL | 2 | | | | |
| FORT MOHAVE | 1 | | | | |
| GILA RIVER | 9 | | | | |
| GOSHUTE | 1 | | | | |
| HAVASUPAI | 1 | | | | |
| HOPI | 6 | | | 1 | 1 |
| HUALAPAI | 1 | | | 1 | |
| KAIBAB | 1 | | | | |
| MOAPA | 1 | | | | |
| PYRAMID LAKE | 3 | | | | |
| FORT YUMA | 1 | | | | |
| BISHOP | 5 | | | | |
| HAVASU LANDING | | | | 1 | |
| SALT RIVER | 1 | | | | |
| SAN CARLOS | 9 | | | | 2 |
| UINTAH & OURAY | 3 | | | | |
| WALKER RIVER | 1 | | | | |
| WASHOE & DRESSLERVILE | 1 | | | | |
| YERINGTON | 1 | | | | |
| YOMBA | 1 | | | | |
| AREA TOTAL | 76 | 1 | 0 | 3 | 4 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | No. OF WATER SYSTEMS | No. COMMUNITY WATER SYSTEMS | NO. NON-COMM WATER SYSTEMS | TOTAL POPULATION | AVERAGE POPULATION | No. OF WATER SYSTEMS BY POPULATION CATEGORIES | | | | No. GROUND-WATER SYSTEMS | No. SURFACE WATER SYSTEMS | No. PURCHASED WATER SYSTEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | < 100 | 100 - 500 | 500 - 1,000 | > 1,000 | | | |
| IHS AREA: 61 | | | | | | | | | | | | |
| VIEJAS | 2 | 1 | 1 | 225 | 113 | 1 | 1 | | | 2 | | |
| BARONA | 1 | 1 | | 320 | 320 | | 1 | | | 1 | | |
| BIG SANDY | 1 | 1 | | 65 | 65 | 1 | | | | 1 | | |
| CACHIL DEHE, COLUSA RANCHERIA | 2 | 2 | | 50 | 25 | 2 | | | | | 2 | |
| CHICKEN RANCH RANCHERIA | 1 | | 1 | 100 | 100 | | 1 | | | 1 | | |
| COLD SPRINGS | 2 | 2 | | 70 | 35 | 2 | | | | 2 | | |
| DRY CREEK | 1 | 1 | | 26 | 26 | 1 | | | | 1 | | |
| FORT BIDWELL | 1 | 1 | | 160 | 160 | | 1 | | | 1 | | |
| GRINDSTONE CREEK | 1 | 1 | | 92 | 92 | 1 | | | | 1 | | |
| HOOPA EXTENSION | 6 | 6 | | 616 | 103 | 3 | 4 | | | 3 | 4 | |
| HOOPA VALLEY | 2 | 2 | | 1010 | 505 | | 1 | 1 | | 1 | 1 | |
| HOPLAND | 1 | 1 | | 75 | 75 | 1 | | | | 1 | | |
| LA JOLLA | 3 | 3 | | 190 | 63 | 2 | 1 | | | 2 | 1 | |
| MANCHESTER-PT. ARENA | 2 | 2 | | 78 | 39 | 2 | | | | 2 | | |
| MESA GRANDE | 1 | 1 | | 50 | 50 | 1 | | | | 1 | | |
| MONTGOMERY CREEK | 1 | 1 | | 25 | 25 | 1 | | | | 1 | | |
| MORONGO | 1 | 1 | | 550 | 550 | | | 1 | | 1 | | |
| PALA | 1 | 1 | | 310 | 310 | | 1 | | | 1 | | |
| PAUMA | 1 | 1 | | 80 | 80 | 1 | | | | 1 | | |
| PECHANGA | 1 | 1 | | 200 | 200 | | 1 | | | 1 | | |
| RINCON | 2 | 2 | | 440 | 220 | | 2 | | | 2 | | |
| TABLE BLUFF | 1 | 1 | | 40 | 40 | 1 | | | | 1 | | |
| BIG LAGOON | 1 | 1 | | 25 | 25 | 1 | | | | 1 | | |
| SOUTH CLEAR CREEK | 1 | 1 | | 40 | 40 | 1 | | | | 1 | | |
| HOWONQUET | 1 | 1 | | 160 | 160 | | 1 | | | | 1 | |
| SHERWOOD VALLEY | 1 | 1 | | 25 | 25 | 1 | | | | | 1 | |
| RESIGHINI | 1 | | 1 | 40 | 40 | 1 | | | | 1 | | |
| ROUND VALLEY | 3 | 3 | | 230 | 77 | 2 | 1 | | | 2 | 1 | |
| RUMSEY | 2 | 1 | 1 | 130 | 65 | 1 | 1 | | | 2 | | |
| SAN PASQUAL | 2 | 2 | | 125 | 63 | 1 | 1 | | | 2 | | |
| SANTA ROSA | 1 | 1 | | 30 | 30 | 1 | | | | 1 | | |
| SANTA ROSA RANCHERIA | 1 | 1 | | 170 | 170 | | 1 | | | 1 | | |
| SANTA YSABEL | 2 | 2 | | 174 | 87 | 1 | 1 | | | 2 | | |
| SOBOBA | 1 | 1 | | 270 | 270 | | 1 | | | 1 | | |
| STWARTS POINT | 1 | 1 | | 80 | 80 | 1 | | | | 1 | | |
| SYCUAN | 1 | 1 | | 40 | 40 | 1 | | | | 1 | | |
| TABLE MOUNTAIN | 1 | 1 | | 57 | 57 | 1 | | | | 1 | | |
| TULE RIVER | 2 | 2 | | 500 | 250 | 1 | 1 | | | 1 | 1 | |
| UPPER LAKE | 2 | 2 | | 90 | 45 | 2 | | | | 2 | | |
| AREA TOTAL | 59 | 55 | 4 | 6958 | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | OPERATIONS AND MAINTENANCE AUTHORITY | | OPERATIONS AND MAINTENANCE PERFORMED BY | | | | | RELIABILITY OF WATER SYSTEM | ADEQUACY OF WATER SYSTEM | ADEQUACY OF OPERATIONS AND MAINTENANCE ORGANIZATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TRIBE | OTHER | INDIVIDUAL | COMMUNITY | TRIBE | HOUSING AUTHORITY | OTHER | | | BOOKS | TOOLS | INVENTORY |
| IHS AREA: 61 | | | | | | | | | | | | |
| VIEJAS | | | | | 2 | | | 100 | 3.5 | | | |
| BARONA | | | | | 1 | | | 100 | 4 | | | |
| BIG SANDY | | | | | 1 | | | 100 | 3.5 | | | |
| CACHIL DEHE, COLUSA RANCHERIA | | | 1 | 1 | 1 | | | 92.5 | 3.5 | | | |
| CHICKEN RANCH RANCHERIA | | | | | | | | | | | | |
| COLD SPRINGS | | | | | 2 | | | 97.5 | 4.3 | | | |
| DRY CREEK | | | | | 1 | | | 80 | 2.5 | | | |
| FORT BIDWELL | | | | | 1 | | | 100 | 4 | | | |
| GRINDSTONE CREEK | | | | | 1 | | | 70 | 2 | | | |
| HOOPA EXTENSION | | | 1 | 6 | | | 5 | 34.2 | 1.8 | | | |
| HOOPA VALLEY | | | | | | | | 99.5 | 4 | | | |
| HOPLAND | | | | | 1 | | | 75 | 3.2 | | | |
| LA JOLLA | | | | | 3 | | | 90 | 3.2 | | | |
| MANCHESTER-PT. ARENA | | | | | 2 | | | 77.5 | 3.2 | | | |
| MESA GRANDE | | | 1 | | 1 | | | 100 | 3 | | | |
| MONTGOMERY CREEK | | | | | 1 | | | 20 | 1 | | | |
| MORONGO | | | | | 1 | | | 80 | 3.1 | | | |
| PALA | | | | | 1 | | | 100 | 3.5 | | | |
| PAUMA | | | | | 1 | | | 100 | 3.5 | | | |
| PECHANGA | | | | | 1 | | | 100 | 3.7 | | | |
| RINCON | | | | | | | | 99 | 3.5 | | | |
| TABLE BLUFF | | | | | | | | 50 | 3 | | | |
| BIG LAGOON | | | | | | | | 95 | 3.5 | | | |
| SOUTH CLEAR CREEK | | | | | | | | 70 | 2 | | | |
| HOWONQUET | | | | | | | | 95 | 4 | | | |
| SHERWOOD VALLEY | | | | | | | | 70 | 2.5 | | | |
| RESIGHINI | | | | | 1 | | | | | | | |
| ROUND VALLEY | | | 1 | | 3 | | | 96.7 | 3.8 | | | |
| RUMSEY | | | | | 2 | | | 100 | 4 | | | |
| SAN PASQUAL | | | | | 2 | | | 100 | 3.5 | | | |
| SANTA ROSA | | | | | 1 | | | 100 | 4 | | | |
| SANTA ROSA RANCHERIA | | | | | 1 | | | 90 | 3 | | | |
| SANTA YSABEL | | | | 1 | 2 | | | 100 | 3.3 | | | |
| SOBOBA | | | | | 1 | | | 95 | 3 | | | |
| STWARTS POINT | | | | | 1 | | | 80 | 2 | | | |
| SYCUAN | | | | | 1 | | | 100 | 3 | | | |
| TABLE MOUNTAIN | | | | | 1 | | | 100 | 4 | | | |
| TULE RIVER | | | | | 2 | | | 90 | 3.3 | | | |
| UPPER LAKE | | | | | 2 | | | 84 | 3.1 | | | |
| AREA TOTAL | | | | | | | | | | | | |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | SDWA REQUIREMENT VIOLATIONS | | | | IHS SDWA COMPLIANCE COST | WATER SYSTEM FUNDING SOURCE | | | No. OF WATER SYSTEMS BY FLOW CATEGORIES (1,000 OF GALLONS PER DAY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MCL EAC-T | DURATION BAC-T | AVERAGE BAC-T DURATION | TOTAL MONITORING VIOLATIONS | | TRIBAL CONTRIBUTION | FLAT FEE | METERED FEE | 0 - 10 | 10 - 100 | 100 - 300 | ) 300 |
| IHS AREA: 61 | | | | | | | | | | | | |
| VIEJAS | | | | | | | | | 2 | | | |
| BARONA | | | | | | | | | 1 | | | |
| BIG SANDY | | | | 2 | 10000 | | 1 | | 1 | | | |
| CACHIL DEHE, COLUSA RANCHERIA | 1 | 3 | 3 | 2 | 16000 | | | | 2 | | | |
| CHICKEN RANCH RANCHERIA | | | | | | | | | 2 | | | |
| COLD SPRINGS | | | | 2 | 20000 | | 2 | | 2 | | | |
| DRY CREEK | | | | 3 | | | | 1 | 1 | | | |
| FORT BIDWELL | | | | 1 | | | | | 1 | | | |
| GRINDSTONE CREEK | 3 | 9 | 3 | | | | 1 | | 1 | | | |
| HOOPA EXTENSION | | | | 69 | 479000 | | | | 6 | 1 | | |
| HOOPA VALLEY | | | | | | | | 2 | 1 | 1 | | |
| HOPLAND | | | | | | | 1 | | 1 | | | |
| LA JOLLA | 5 | 15 | 3 | 3 | 5000 | | | | 3 | | | |
| MANCHESTER-PT. ARENA | 1 | 3 | 3 | 9 | | | | 1 | 2 | | | |
| MESA GRANDE | 1 | 3 | 3 | 2 | | | | | 1 | | | |
| MONTGOMERY CREEK | | | | 14 | | | | | 1 | | | |
| MORONGO | 2 | 6 | 3 | | | | 1 | | 1 | | | |
| PALA | 1 | 3 | 3 | | | | 1 | | 1 | | | |
| PAUMA | | | | | | | 1 | | 1 | | | |
| PECHANGA | | | | | | | | | 1 | | | |
| RINCON | | | | 3 | | | | | 1 | | | |
| TABLE BLUFF | | | | 12 | | | | | 1 | | | |
| BIG LAGOON | | | | 11 | | | | | 1 | | | |
| SOUTH CLEAR CREEK | 3 | 9 | 3 | | | | 1 | | 1 | | | |
| HOWONQUET | | | | 2 | | | 1 | | 1 | | | |
| SHERWOOD VALLEY | | | | 12 | | | | | 1 | | | |
| RESIGHINI | | | | 3 | | | | | 1 | | | |
| ROUND VALLEY | 1 | 3 | 3 | 22 | | | | 3 | 2 | | | |
| RUMSEY | | | | | | | 1 | | 2 | | | |
| SAN PASQUAL | 1 | 3 | 3 | | | | 1 | 1 | 1 | | | |
| SANTA ROSA | | | | | | | | | 1 | | | |
| SANTA ROSA RANCHERIA | 1 | 3 | 3 | 2 | 2000 | | 1 | | 1 | | | |
| SANTA YSABEL | | | | 4 | | | 2 | | 2 | | | |
| SOBOBA | | | | 1 | | | | | 1 | | | |
| STWARTS POINT | | | | 2 | | | 1 | | 1 | | | |
| SYCUAN | | | | | | | 1 | | 1 | | | |
| TABLE MOUNTAIN | | | | | 5000 | | 1 | | 1 | | | |
| TULE RIVER | 2 | 6 | 3 | 1 | 35000 | | | | 1 | 1 | | |
| UPPER LAKE | | | | 11 | | | | 2 | 2 | | | |
| AREA TOTAL | 22 | 66 | 36 | 193 | 572000 | 0 | 18 | 10 | 55 | 3 | 0 | 0 |

# SUMMARY DATA FOR WATER SYSTEMS ON RESERVATIONS IN ALL IHS AREAS

| IHS AREA/ RESERVATION | TYPE OF SERVICE CONNECTIONS: NATIVE AM. HOMES | MOBILE HOMES | INSTITUTIONAL SCHOOLS | RECREATION AREAS | COMMERCIAL MOTELS |
|---|---|---|---|---|---|
| IHS AREA: 61 | | | | | |
| VIEJAS | 1 | | | | |
| BARONA | 1 | | | | |
| BIG SANDY | 1 | | | | |
| CACHIL DEHE, COLUSA RANCHERIA | 2 | | | | |
| CHICKEN RANCH RANCHERIA | | | | | |
| COLD SPRINGS | 2 | | | | |
| DRY CREEK | 1 | | | | |
| FORT BIDWELL | 1 | | | | |
| GRINDSTONE CREEK | 1 | | | | |
| HOOPA EXTENSION | 6 | | | | |
| HOOPA VALLEY | 2 | | | | |
| HOPLAND | 1 | | | | |
| LA JOLLA | 3 | | | | |
| MANCHESTER-PT. ARENA | 2 | | | | |
| MESA GRANDE | 1 | | | | |
| MONTGOMERY CREEK | 1 | | | | |
| MORONGO | 1 | | | | |
| PALA | 1 | | | | |
| PAUMA | 1 | | | | |
| PECHANGA | 1 | | | | |
| RINCON | 2 | | | | |
| TABLE BLUFF | 1 | | | | |
| BIG LAGOON | 1 | | | | |
| SOUTH CLEAR CREEK | 1 | | | | |
| HOWONQUET | 1 | | | | |
| SHERWOOD VALLEY | 1 | | | | |
| RESIGHINI | 1 | | | | |
| ROUND VALLEY | 3 | | | | |
| RUMSEY | 1 | | | | |
| SAN PASQUAL | 2 | | | | |
| SANTA ROSA | 1 | | | | |
| SANTA ROSA RANCHERIA | 1 | | | | |
| SANTA YSABEL | 2 | | | | |
| SOBOBA | 1 | | | | |
| STWARTS POINT | 1 | | | | |
| SYCUAN | 1 | | | | |
| TABLE MOUNTAIN | 1 | | | | |
| TULE RIVER | 2 | | | | |
| UPPER LAKE | 2 | | | | |
| AREA TOTAL | 56 | 0 | 0 | 0 | 0 |

| [illegible] Area/Tribe | No. OF WATER SYSTEMS | No. COMMUNITY WATER SYSTEMS | NO. NON-COMM WATER SYSTEMS | TOTAL POPULATION | AVERAGE POPULATION | No. OF WATER SYSTEMS BY POPULATION CATEGORIES 0 - 100 | 100 - 500 | 500 - 1,000 | ) 1,000 | No. GROUND-WATER SYSTEMS | No. SURFACE WATER SYSTEMS | No. PURCHASED WATER SYSTEMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 70 | | | | | | | | | | | | |
| BURNS-PAIUTE COLONY | 1 | 1 | | 170 | 170 | | 1 | | | 1 | | |
| CHEHALIS | 1 | 1 | | 100 | 100 | | 1 | | | 1 | | |
| COEUR D ALENE | 2 | 2 | | 206 | 103 | 1 | 1 | | | 2 | | |
| COLEVILE | 10 | 9 | 1 | 1879 | 188 | 4 | 5 | 1 | | 10 | | |
| FORT HALL, WASHAKIE | 1 | 1 | | 400 | 400 | | 1 | | | 1 | | |
| HOH | 1 | 1 | | 120 | 120 | | 1 | | | 1 | | |
| KALISPEL | 1 | | 1 | 25 | 25 | 1 | | | | 1 | | |
| LOWER ELWHA | 1 | 1 | | 160 | 160 | | 1 | | | 1 | | |
| LUMMI | 4 | 4 | | 880 | 220 | 2 | 2 | | | 2 | | 2 |
| MAKAH | 1 | 1 | | 1500 | 1,500 | | | | 1 | | 1 | |
| MUCKLESHOOT | 1 | 1 | | 275 | 275 | | 1 | | | 1 | | |
| NEZ PERCE | 3 | 3 | | 695 | 232 | 2 | | 1 | | 3 | | |
| NISQUALY | 2 | 2 | | 215 | 108 | 1 | 1 | | | 2 | | |
| NOOKSACK | 1 | 1 | | 150 | 150 | | 1 | | | 1 | | |
| PORT GAMBLE | 1 | 1 | | 300 | 300 | | 1 | | | 1 | | |
| PORT MADISON | 1 | 1 | | 40 | 40 | 1 | | | | 1 | | |
| QUILLEUTE | 1 | 1 | | 350 | 350 | | 1 | | | 1 | | |
| QUINAULT | 2 | 2 | | 1250 | 625 | | 1 | | 1 | 1 | 1 | |
| SKAGIT | 1 | 1 | | 215 | 215 | | 1 | | | 1 | | |
| SAUK-SUIATTTLE | 1 | 1 | | 80 | 80 | 1 | | | | 1 | | |
| SPOKANE | 4 | 3 | 1 | 990 | 248 | | 4 | | | 3 | 1 | |
| STILLAGUAMISH | 1 | 1 | | 120 | 120 | | 1 | | | 1 | | |
| YAKIMA | 5 | 4 | 1 | 1015 | 203 | 3 | 1 | 1 | | 5 | | |
| SHOALWATER | 1 | 1 | | 30 | 30 | 1 | | | | 1 | | |
| SKOKOMISH | 1 | 1 | | 120 | 120 | | 1 | | | 1 | | |
| SQUAXIN ISLAND | 1 | 1 | | 140 | 140 | | 1 | | | 1 | | |
| SWINOMISH | 1 | 1 | | 350 | 350 | | 1 | | | 1 | | |
| TULALIP | 1 | 1 | | 2000 | 2,000 | | | | 1 | 1 | | |
| UMATILLA | 2 | 1 | 1 | 730 | 365 | 1 | | 1 | | 2 | | |
| WARM SPRINGS | 3 | 3 | | 1785 | 595 | 1 | 1 | | 1 | 2 | 1 | |
| AREA TOTAL | 7 | 52 | 5 | 16290 | | | | | | | | |
| IHS AREA: 80 | | | | | | | | | | | | |
| NAVAJO | 217 | 194 | 23 | 94573 | 436 | 13 | 8 | 2 | | 212 | 5 | |
| NATIONAL TOTAL | 843 | 707 | 136 | 201386 | | | | | | | | |

| IHS AREA/ RESERVATION | OPERATIONS AND MAINTENANCE AUTHORITY | | OPERATIONS AND MAINTENANCE PERFORMED BY | | | | | RELIABILITY OF WATER SYSTEM | ADEQUACY OF WATER SYSTEM | ADEQUACY OF OPERATIONS AND MAINTENANCE ORGANIZATION | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TRIBE | OTHER | INDIVIDUAL | COMMUNITY | TRIBE | HOUSING AUTHORITY | OTHER | | | BOOKS | TOOLS | INVENTORY |
| IHS AREA: 70 | | | | | | | | | | | | |
| BURNS-PAIUTE COLONY | 3 | | | | 1 | | | 98 | 2.5 | | | |
| CHEHALIS | | | | | 1 | | | 95 | 4 | | | |
| COEUR D ALENE | 3 | | | | 2 | | 3 | 99 | 2 | | | |
| COLEVILE | 8 | | | | 4 | | 2 | 98.8 | 3.3 | 2 | 2 | 2 |
| FORT HALL, WASHAKIE | | | 1 | 1 | 1 | 1 | 1 | 99 | 4 | | | |
| HOH | | | | | 1 | | | 98 | 3 | | | |
| KALISPEL | | | | | 1 | | | | | | | |
| LOWER ELWHA | | | | | 1 | | | 100 | 4 | | | |
| LUMMI | 3 | | | | | | | 97 | 3.7 | 4 | 5 | 5 |
| MAKAH | 1 | | 1 | | 1 | | | 99 | 3 | 3 | 3 | 3 |
| MUCKLESHOOT | | | | | 1 | | | 100 | 3 | | | |
| NEZ PERCE | | | | | | 2 | 1 | 95.7 | 3 | | | |
| NISQUALY | 1 | | 1 | | 1 | | | 97 | 3.2 | 1 | 2 | 1 |
| NOOKSACK | | | | | 1 | | | 100 | 4.5 | | | |
| PORT GAMBLE | | | | | 1 | | | 100 | 3 | | | |
| PORT MADISON | | | | | 1 | | | 100 | 4 | | | |
| QUILLEUTE | 1 | | | | 1 | | | 95 | 3 | 1 | 2 | 2 |
| QUINAULT | 2 | | | | 2 | | | 92.5 | 2.5 | 1 | 2 | 3 |
| SKAGIT | | | | | | | | 100 | 4 | 3 | 4 | 5 |
| SAUK-SUIATTTLE | | | | | | | | 100 | 5 | | | |
| SPOKANE | 2 | | 1 | | | 1 | 2 | 96.3 | 3 | 1 | 1 | 1 |
| STILLAGUAMISH | | | | | | | | 100 | 4 | | | |
| YAKIMA | | | | | 2 | | | 98.8 | 4.3 | | | |
| SHOALWATER | | | | | 1 | | | 100 | 3 | | | |
| SKOKOMISH | | | | | 1 | | | 99 | 3 | | | |
| SQUAXIN ISLAND | | | | | 1 | | | 100 | 3.5 | | | |
| SWINOMISH | | | | | 1 | | | 100 | 4 | | | |
| TULALIP | 1 | | | | | | | 100 | 4 | 4 | 3 | 3 |
| UMATILLA | 1 | | | | 1 | 1 | 2 | 100 | 3 | | 3 | 2 |
| WARM SPRINGS | 3 | | | | 3 | | | 100 | 5 | 4 | 5 | 5 |
| AREA TOTAL | | | | | | | | | | | | |
| IHS AREA: 80 | | | | | | | | | | | | |
| NAVAJO | 110 | 2 | 1 | 5 | 45 | 1 | 11 | 97.6 | 4.1 | 3.9 | 4.5 | 4.9 |
| NATIONAL TOTAL | | | | | | | | | | | | |

| IHS AREA/ RESERVATION | SDWA REQUIREMENT VIOLATIONS --- MCL BAC-T | DURATION BAC-T | AVERAGE BAC-T DURATION | TOTAL MONITORING VIOLATIONS | IHS SDWA COMPLIANCE COST | WATER SYSTEM FUNDING SOURCE --- TRIBAL CONTRIBUTION | FLAT FEE | METERED FEE | No. OF WATER SYSTEMS By FLOW CATEGORIES (1,000 OF GALLONS PER DAY) --- 0 - 10 | 10 - 100 | 100 - 300 | ) 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IHS AREA: 70 | | | | | | | | | | | | |
| BURNS-PAIUTE COLONY | 1 | 3 | 3 | 9 | | | 1 | | 1 | | | |
| CHEHALIS | | | | 12 | | | 1 | | 1 | | | |
| COEUR D ALENE | 3 | | | 20 | | | | | 1 | | | |
| COLEVILE | 1 | 3 | 3 | 44 | | 1 | 1 | | 8 | | 1 | |
| FORT HALL, WASHAKIE | | | | 1 | | | 1 | | | | | |
| HOH | | | | 12 | | | 1 | | 1 | | | |
| KALISPEL | | | | 4 | | | | | 1 | | | |
| LOWER ELWHA | | | | 7 | | | 1 | | 1 | | | |
| LUMMI | 1 | 3 | 3 | 24 | | | 4 | | 4 | | | |
| MAKAH | | | | 9 | | 1 | | | | | 1 | |
| MUCKLESHOOT | | | | 11 | | | 1 | | | | | |
| NEZ PERCE | | | | 25 | | | | | 1 | 2 | | |
| NISQUALY | | | | 24 | | 1 | 1 | | 1 | | | |
| NOOKSACK | | | | 1 | | | 1 | | | 1 | | |
| PORT GAMBLE | 1 | 3 | 3 | 9 | 65000 | | | | | | 1 | |
| PORT MADISON | | | | 5 | | | 1 | | 1 | | | |
| QUILLEUTE | | | | 7 | | 1 | | | | | 1 | |
| QUINAULT | | | | 33 | | 1 | 2 | | | | 1 | |
| SKAGIT | | | | 8 | | | 1 | | | 1 | | |
| SAUK-SUIATTTLE | | | | 3 | | | 1 | | 1 | | | |
| SPOKANE | | | | 48 | | 1 | 1 | | 2 | | | |
| STILLAGUAMISH | | | | 6 | | | 1 | | 1 | | | |
| YAKIMA | | | | 16 | | | 3 | | 2 | | 1 | |
| SHOALWATER | | | | 12 | | | | | 1 | | | |
| SKOKOMISH | | | | 12 | | | | | 1 | | | |
| SQUAXIN ISLAND | | | | 6 | | | 1 | | | 1 | | |
| SWINOMISH | | | | 7 | | | 1 | | | 1 | | |
| TULALIP | | | | 7 | | 1 | 1 | | | | 1 | |
| UMATILLA | | | | 14 | | | 1 | | 1 | 1 | | |
| WARM SPRINGS | | | | 4 | | | 2 | | 2 | | | |
| AREA TOTAL | 4 | 12 | 12 | 400 | 65000 | 7 | 29 | 0 | 32 | 7 | 7 | 0 |
| IHS AREA: 80 | | | | | | | | | | | | |
| NAVAJO | 3 | 9 | 3 | 47 | 365000 | | 4 | 71 | 188 | 4 | 3 | 2 |
| NATIONAL TOTAL | 64 | 170 | 82.6125 | 2095 | 3800000 | 55 | 282 | 133 | 656 | 44 | 36 | 9 |

| IHS AREA/ RESERVATION | | TYPE OF SERVICE CONNECTIONS | | | | |
|---|---|---|---|---|---|---|
| | | NATIVE AM. HOMES | MOBILE HOMES | INSTITUTIONS SCHOOLS | RECREATION AREAS | COMMERCIAL MOTELS |
| IHS AREA: 70 | | | | | | |
| BURNS-PAIUTE COLONY | | 1 | | | | |
| CHEHALIS | | 1 | | | | |
| COEUR D ALENE | | 1 | | | | |
| COLEVILE | | 9 | | 1 | 2 | |
| FORT HALL, WASHAKIE | | 1 | | | | |
| HOH | | 1 | | | | |
| KALISPEL | | 1 | | | | |
| LOWER ELWHA | | 1 | | | | |
| LUMMI | | 4 | | | | |
| MAKAH | | 1 | | | | |
| MUCKLESHOOT | | 1 | | | | |
| NEZ PERCE | | 3 | | 1 | | |
| NISQUALY | | 1 | | 1 | | |
| NOOKSACK | | 1 | | | | |
| PORT GAMBLE | | 1 | | | | |
| PORT MADISON | | 1 | | | | |
| QUILLEUTE | | 1 | | | | |
| QUINAULT | | 2 | | | | |
| SKAGIT | | 1 | | | | |
| SAUK-SUIATTTLE | | 1 | | | | |
| SPOKANE | | 3 | | | | |
| STILLAGUAMISH | | 1 | | | | |
| YAKIMA | | 4 | | | | |
| SHOALWATER | | 1 | | | | |
| SKOKOMISH | | 1 | | | | |
| SQUAXIN ISLAND | | 1 | | | | |
| SWINOMISH | | 1 | | | | |
| TULALIP | | 1 | | | | |
| UMATILLA | | 1 | | | 1 | |
| WARM SPRINGS | | 3 | | | 1 | |
| | AREA TOTAL | 51 | 0 | 3 | 4 | 0 |
| IHS AREA: 80 | | | | | | |
| NAVAJO | | 1 | | | 2 | 1 |
| NATIONAL TOTAL | | 492 | 12 | 41 | 42 | 15 |

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