**1. Data Retrieval Queries**

**1.1 Retrieve All Communities with No Access to Clean Water**

SELECT CommunityID, CommunityName, Region, Population

FROM Communities

WHERE AccessToWater = FALSE;

**1.2 Retrieve All Water Sources and Their Conditions in a Specific Community**

**For example, to retrieve data for the community named "Greenville":**

SELECT WaterSourceID, SourceName, SourceType, Conditions, Latitude, Longitude

FROM WaterSources

JOIN Communities ON WaterSources.CommunityID = Communities.CommunityID

WHERE Communities.CommunityName = 'Greenville';

**1.3 Retrieve Latest Water Quality Test Results for Each Water Source**

SELECT WaterSourceID, MAX(TestDate) AS LatestTestDate, TestResult

FROM WaterQualityTests

GROUP BY WaterSourceID;

**1.4 Retrieve Detailed Information on a Specific Water Source**

**For example, to get details for a water source with ID 2:**

SELECT WaterSources.SourceName, WaterSources.SourceType, WaterSources.Condition,

WaterQualityTests.TestDate, WaterQualityTests.Contaminants, WaterQualityTests.TestResult

FROM WaterSources

JOIN WaterQualityTests ON WaterSources.WaterSourceID = WaterQualityTests.WaterSourceID

WHERE WaterSources.WaterSourceID = 2;

### ****2. Data Analysis Queries****

**2.1 Analyze the Proportion of Polluted vs. Clean Water Sources**

SELECT Conditions, COUNT(\*) AS Count

FROM WaterSources

GROUP BY Conditions;

**2.2 Analyze Average Contamination Levels by Source Type**

**Assuming Contaminants is stored as a text description, this query might require a specific implementation depending on the actual format. For now, assume a simple analysis of the presence of contaminants:**

SELECT SourceType, AVG(CASE WHEN TestResult = 'Unsafe' THEN 1 ELSE 0 END) AS AverageUnsafeTests

FROM WaterSources

JOIN WaterQualityTests ON WaterSources.WaterSourceID = WaterQualityTests.WaterSourceID

GROUP BY SourceType;

**2.3 Find Communities with the Most Number of Polluted Water Sources**

SELECT Communities.CommunityName, COUNT(\*) AS PollutedWaterSources

FROM WaterSources

JOIN Communities ON WaterSources.CommunityID = Communities.CommunityID

WHERE WaterSources.Condition = 'Polluted'

GROUP BY Communities.CommunityName

ORDER BY PollutedWaterSources DESC;

**2.4 Track the Number of Interventions and Their Status**

SELECT InterventionType, Status, COUNT(\*) AS Count

FROM Interventions

GROUP BY InterventionType, Status;

**2.5 Trend Analysis: Number of Safe vs. Unsafe Tests Over Time**

SELECT TestDate,

SUM(CASE WHEN TestResult = 'Safe' THEN 1 ELSE 0 END) AS SafeTests,

SUM(CASE WHEN TestResult = 'Unsafe' THEN 1 ELSE 0 END) AS UnsafeTests

FROM WaterQualityTests

GROUP BY TestDate

ORDER BY TestDate;

### ****Explanation of the Queries****

1. **Data Retrieval Queries:**
   * **Communities with No Access**: Identifies communities lacking access to clean water.
   * **Water Sources in a Community**: Shows details of water sources in a specific community.
   * **Latest Test Results**: Retrieves the most recent water quality test result for each water source.
   * **Detailed Water Source Information**: Provides comprehensive data for a specified water source.
2. **Data Analysis Queries:**
   * **Proportion of Polluted vs. Clean Sources**: Analyzes the count of water sources categorized by their condition.
   * **Average Contamination Levels by Source Type**: Assesses the average rate of unsafe tests based on source type.
   * **Communities with Most Polluted Sources**: Identifies which communities have the highest number of polluted water sources.
   * **Number of Interventions and Status**: Tracks and categorizes the number of interventions based on their type and current status.
   * **Trend Analysis**: Analyzes the trends in water quality over time by comparing safe and unsafe test results.