# HAZARDS ANALYSIS
# FEATHER RIVER AREA

**U.S. EPA Region IX**

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Submitted to:

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# 1.0 INTRODUCTION

This hazards analysis will assess the risk of the likelihood of an accidental release or spill of a hazardous substance or oil in the Feather River watershed area. The assessment will be accomplished by identifying hazards and sensitive populations in the area which may be vulnerable to the hazards. A risk assessment is given based on the hazards and vulnerabilities. The hazards analysis will assist in the development of an emergency preparedness and response plan for the Feather River area. The hazards analysis will become a resource document which will be annexed from the plan.

## 1.1 Feather River Boundaries

The Feather River Steering Committee established the following initial boundaries of the Feather River Planning Area (FRPA). Beginning at the eastern-most edge of Massack, the planning area follows State Routes (SR) 70 and 89 in a westerly direction through the town of Quincy and the American Valley, north through Keddie and east to Paxton, where SR 70 and 89 diverge. The northern boundary is south of Crescent Mills, along the Indian Creek SR 89 corridor. From Paxton, the planning area continues west, paralleling SR 70 and the East Branch of the North Fork of the Feather River, to its confluence with the North Fork of the Feather River. The remaining portion of the planning area includes the segment of the North Fork of the Feather River from the PG&E Caribou Power Station in Plumas County to Pentz Road in Butte County.

The hazards analysis will focus on potential threats of oil and hazardous material releases and the risks they pose to the FRPA. The hazards analysis consists of four components: (1) hazards identification, (2) vulnerability analysis, (3) risk analysis, and (4) mapping.

## 1.2 Hazards Identification

The hazards identification, the first component in the hazards analysis, is the process of collecting information on:

- The types and quantities of hazardous materials in the planning area;
- The locations and conditions of fixed facilities in the planning area which produce, use, or store hazardous materials;
- The transportation routes in the planning area which are used to transport hazardous materials; and

- The potential hazards associated with spills or releases of identified hazardous materials in the contingency plan area.

## 1.3 Vulnerability Analysis

The vulnerability analysis, the second component in the hazards analysis, utilizes information from the hazards identification component to accomplish the following:

- Using credible and worst-case scenarios, determine an estimation of the vulnerable zones for the hazardous materials identified;

- Identify the characteristics of human populations at risk in the vulnerable zones, including high density transient populations and sensitive populations (hospitals, schools, nursing homes, and day care centers);

- Identify critical response facilities such as hospitals, police and fire stations, and communications facilities; and

- Identify sensitive habitats such as lakes, rivers, streams, wetlands, and areas which are critical habitat to threatened or endangered species.

## 1.4 Risk Analysis

The risk analysis, the third component in the hazards analysis, provides planners with a qualitative or quantitative estimate of the likelihood of a release occurring in the contingency plan area. The risk analysis also allows planners to estimate the severity of a release in relation to its potential impact upon vulnerable zones. The risk analysis permits emergency planners to put each potential incident into perspective, resulting in a contingency plan which addresses the most likely hazardous materials incidents and those with the most severe potential consequences.

## 1.5 Mapping

The final component of the hazards analysis is the mapping phase. Fixed facilities, hazardous materials transportation routes, vulnerable areas, and population centers are mapped. By studying such maps, planners can readily identify the areas that are at highest risk and responders will have a visual tool to help in decision-making.

# 2.0 HAZARDS IDENTIFICATION

## 2.1 Methodology

The hazards identification process, which is the first phase of the hazards analysis, begins with identifying the types and quantities of extremely hazardous substances (EHSs). EHSs are chemicals identified by U.S. EPA, on the basis of toxicity and listed under Title III of the Superfund Amendment and Reauthorization Act (SARA), and oils present in the FRPA. This includes locating fixed facilities, transportation routes, and any pipelines in the area. The types, quantities, and locations of the hazardous materials and oils present, determine whether a given site or route poses a spill or release risk to the waters or populations in the planning area.

### 2.1.1 Fixed Facilities

Industrial development in the FRPA is minimal. Identifying the type, quantity, and location of EHSs at fixed facilities was accomplished by conducting visual inspections, and contacting the two administering agencies in the FRPA, Butte County Department of Public Health and Plumas County Department of Environmental Health.

The Butte County and Plumas County Administering Agencies were each asked to provide information concerning the type, quantity, storage area, manufacturing process, or use of EHSs handled by the reporting facilities under their jurisdiction. Under SARA Title III and 6.95 of the California Health and Safety Code, facilities are required to submit emergency and hazardous chemicals inventory forms (business plans). Also identified are facilities storing petroleum products subject to 40 CFR, Part 112 Spill Prevention, Control and Countermeasure (SPCC) regulations. Butte County identified 5 such fixed facilities in the planning area, while Plumas County identified 26 facilities. During this hazards identification process, it became apparent that there is no active Title III or business plan enforcement and compliance activities in the planning area. As a result, there may be many fixed facilities handling hazardous materials which have not been identified.

### 2.1.2 Federal Databases

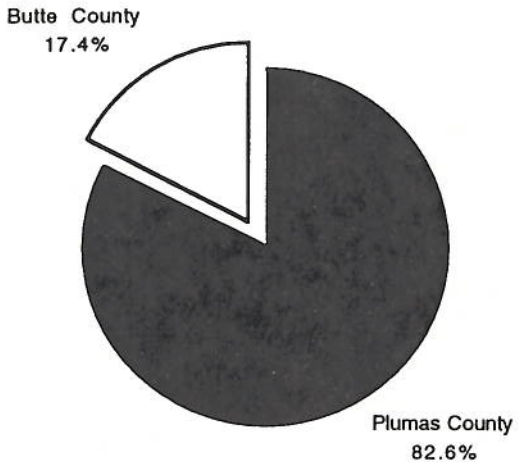
In addition to facility reporting data, information was obtained from the U.S. EPA Resource Conservation and Recovery Information System (RCRIS), which lists hazardous waste notifiers in Butte and Plumas Counties. A notifier listed on RCRIS is a reporting facility or operation that either generates; transports; treats, stores, or disposes of hazardous wastes; is a burner/blenders; or recycles hazardous wastes. No hazardous waste notifiers were identified in the Butte County portion of the planning area. Thirteen RCRIS facilities are listed in Plumas County. Eleven of these are located in Quincy. Of the 13 notifiers, 5 are large quantity generators, 7 are small quantity generators and 1 is a generator and transporter of hazardous wastes.

The U.S. EPA Toxic Release Inventory (TRI) data for California was examined. This TRI data was obtained through the annual reporting requirements of SARA Title III's Section 313, concerning releases of toxic materials into the environment. Unfortunately, the TRI data does not distinguish between accidental and permitted releases or emissions. The nearest reporting facilities in Butte County are all located in the City of Oroville and outside the planning area. Sierra Pacific Industries, located in the town of Quincy, was the only TRI reporter in the Plumas County portion of the planning area.

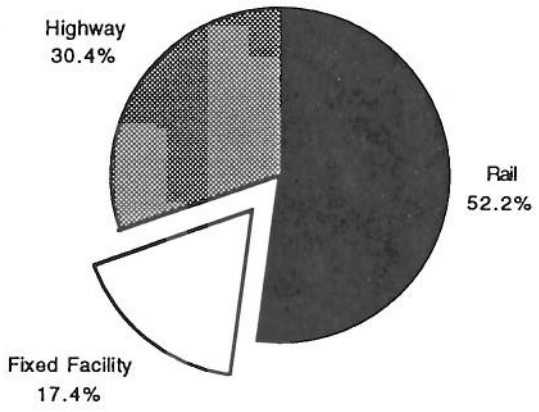
The U.S. EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database for Butte and Plumas Counties was examined. CERCLIS is a database that includes sites which are superfund sites or are potential superfund sites, and may have the potential to release hazardous substances into the environment. There are a number of mine sites listed in the CERCLIS data for Plumas County. However, only one site is located within the planning area. This site is administered by the National Forest Service in Plumas National Forest.

The U.S. EPA's Emergency Response Notification System (ERNS) database provides information on historical spills and releases. Examination of ERNS data from 1983-1993 revealed 4 spills for the Butte County planning area and 19 spills for the Plumas County area. Figure 1 depicts ERNS data for the study area. The ERNS data for spill locations in the FRPA reveal transportation-related incidents as the most significant.

**Figure 1**
**ERNS SPILL DATA 1983 - 1993**
**FEATHER RIVER PLANNING AREA**
**SPILLS PER COUNTY**




**ERNS SPILL DATA 1983 - 1993**
**FEATHER RIVER PLANNING AREA**
**SPILL LOCATIONS**



### 2.1.3 Transportation Routes

Routes used to transport hazardous materials were identified. The routes include highway, roads, rail lines, pipelines and water courses. Hazardous material shipments were categorized by type, amount and frequency. These categories help to rank routes of highest risk.

Spill logs for Butte and Plumas Counties were obtained from the California Office of Emergency Services (OES) and the California Department of Transportation (CalTrans). These logs often duplicated information found in the ERNS data.

The two main highways located in the Feather River Planning Area are State Routes (SR) 70 and 89. State Route 70 parallels the North Fork of the Feather River from north of Oroville in Butte County to its confluence with the East Branch of the North Fork at Gansner Bar in Plumas County. At the confluence, SR 70 turns to parallel the East Branch of the North Fork to its confluence with Spanish Creek and Indian Creek. SR 70 then merges with SR 89 and follows Spanish Creek southeast into the American Valley through Quincy, paralleling Greenhorn Creek, east to Massack; before SR 89 merges with SR 70, it parallels Indian Creek to Crescent Mills.

As the major rail transporter through the FRPA, the Union Pacific Railroad Company (UPRC) provided rail line information. The UPRC has a major line segment running from Nevada to Sacramento. The railroad parallels SR 70, the East Branch of the North Fork, and the North Fork of the Feather River. An additional UPRC Mainline parallels Indian Creek and SR 89 from Keddie North through Crescent Mills.

No major pipelines are located in the study area.

### 2.1.4 Seismic Activity, Floods and Erosional Landslides

When identifying potential hazards, it is important to consider natural hazards which may indirectly cause spills or releases of hazardous materials. In the FRPA, natural hazards include seismic activity and flash floods.

#### 2.1.4.1 Major Faults

There are a number of faults crossing the FRPA. The region lies in what the U.S. Geological Survey (USGS) describes as Zone Two for seismic risk. Zone Two is defined as an area being at risk for moderate damage corresponding to intensity VII of the Modified Mercalli Intensity Scale. The major faults of the area include the Indian Valley Fault, the Meadow Valley Fault and the Rich Bar Fault at Meadow Valley.

#### 2.1.4.2 Feather River Drainage

Flash floods in the narrow canyons could be triggered by the failure of the Canyon Dam at Lake Almanor, failure of any of the many PG&E hydroelectric dams, or by a period of sudden, localized, torrential rainfall in the canyon area. A major flash flood could quickly place the communities downstream, the PG&E power generating stations and any traffic transporting hazardous materials in the canyon on SR 70 or the Union Pacific Railroad, at great risk.

#### 2.1.4.3 Erosional Landslides

Landslides are a common occurrence in the canyon of the FRPA. When there is an increase in precipitation, the area is subject to numerous landslides due to the steep natural slope of the canyon and the undercutting of the canyon walls by the river. Landslide activity in the canyon has caused numerous transportation-related oil spills and hazardous material release incidents.

## 2.2 Data Analysis

### 2.2.1 Fixed Facility Data

#### 2.2.1.1 Reported Extremely Hazardous Substances

Butte County Department of Public Health identified five fixed facilities in the Feather River Planning Area which submitted Hazardous Materials Registration Forms (HMRF). The Plumas County Department of Environmental Health identified 26 HMRF reporting facilities.

In selecting fixed facilities of concern, limited amounts of hazardous materials reported by the small businesses in the area were not considered to have large enough quantities to include the facilities in this hazards analysis. Several sites have sulfuric acid contained in lead storage batteries. These sites were disregarded, because a sulfuric acid release from such containers is not likely to effect local populations. The acid is encased in sealed batteries and kept on secured, earthquake resistant racks.

Propane storage tanks were only considered if they had a capacity greater then 500 gallons. Oil and gas storage tanks were only considered if the facility had enough overall storage capacity to be subject to the SPCC regulations found in 40 CFR Part 112 (more than 660 gallons in a single tank or aggregate storage exceeding 1320 gallons). Underground storage tanks (UST) were not included in the hazards analysis because it is unlikely that a leaking UST would cause a large scale instantaneous release to surface water. Of the 31 reporting facilities, 22 facilities had sufficient petroleum storage capacity to meet this criteria. Table 1 lists the 31 fixed facilities of concern in the FRPA. The locations of these facilities will be plotted on the maps accompanying the FRPA Contingency Plan.

## Table 1:
## SUMMARY OF FIXED FACILITIES

| FACILITY NUMBER | FACILITY NAME | STREET ADDRESS OR LOCATION | HAZARDOUS SUBSTANCES ON-SITE |
|---|---|---|---|
| 1 | CDF Fire Station - Jarbo Gap | 11972 Hwy 70 Oroville | AST Gasoline |
| 2 | Shell Station - Jarbo Gap | 11975 Hwy 70 Oroville | AST Propane |
| 3 | CalTrans Pulga Highway Maintenance Station | 1356 Hwy 70 Storrie | AST Gasoline, AST Propane |
| 4 | Pacific Gas & Electric Cresta Powerhouse | Hwy 70 nine miles west of Storrie | Sulfuric Acid and Oil Storage |
| 5 | Pacific Gas & Electric Poe Powerhouse | 20 miles southwest of Storrie on the Feather River | Sulfuric Acid and Oil Storage |
| 6 | Allied Petroleum | 280 Crescent Rd. Quincy | Bulk Storage |
| 7 | Amerigas | E. Main & Mill St. Quincy | 10,000 gal AST Propane |
| 8 | CalTrans Quincy Maintenance Station | Quincy | AST Diesel Storage |
| 9 | Clover Logging | Bresciani Lane Quincy | 5,000 gal AST Fuel Oil |
| 10 | Coast Gas | 2085 East Main Quincy | Large Propane Storage |
| 11 | Feather River Community College | 570 Golden River Ave Quincy | 1,000 gal AST Heating Oil |
| 12 | Pacific Bell | North Mill Creek Rd. Quincy | 2,500 gal AST Nitrogen Dioxide |
| 13 | Pacific Gas & Electric Caribou Camp | 21 miles northeast of Storrie | AST Oil Storage<br>Various Hazardous Materials |
| 14 | Pacific Gas & Electric Caribou #1 & #2 Hydro Powerhouses | Approximately 21 miles northeast of Storrie | AST Oil Storage<br>Various Hazardous Materials |
| 15 | Pacific Gas & Electric Quincy Service Center | 205 Railway Ave., Quincy | AST Oil Storage<br>Various Hazardous Materials |
| 16 | Pacific Gas & Electric Rock Creek Hydro Powerhouse | SR 70, 35 miles east of Oroville | AST Oil Storage<br>Various Hazardous Materials |
| 17 | Pacific Gas & Electric Rogers Flat Service Center | SR 70, 5 miles east of Storrie | AST Oil Storage<br>Various Hazardous Materials |
| 18 | Pacific Gas & Electric Belden, Bucks Creek Powerhouse | Belden | AST Oil Storage<br>Various Hazardous Materials |
| 19 | Plumas County Road Department | 1834 East Main St. Quincy | AST Fuel Storage |
| 20 | Plumas County Courthouse | 520 West Main St. Quincy | AST Heating Oil Storage |
| 21 | Gansner Airport | Hwy 70 | AST 5,000 gal Aviation Fuel |
| 22 | Plumas Sierra Rural Electric COOP | HWY 70 East Quincy | Transformer PCBs |
| 23 | Quincy High School | HWY 70 Junction Rd. | AST 10,000 gal Heating Oil |
| 24 | Quincy Sanitary District | 900 Spanish Creek Road Quincy | 4 One Ton Chlorine Cylinders<br>4 One Ton Sulfur Dioxide Cylinders |
| 25 | Sierra Pacific Industries | 1538 Lee Rd. Quincy | AST Oil Storage<br>10,000 gal HCL<br>10,000 gal Sodium Hydroxide<br>Various Hazardous Materials |
| 26 | Suburban Propane | 132 Crescent Street Quincy | Bulk Propane Storage |
| 27 | Toms Sierra Co. Quincy Bulk Plant | 188 Crescent St. Quincy | Bulk AST Oil Storage |
| 28 | Toms Sierra Co. | 165 Plumas Quincy | Bulk AST Oil Storage |
| 29 | Plumas Unified School District | | 2000 gal AST Heating Oil Storage |
| 30 | Trilogy Magnetic | | Electro Plating Chemical Storage |
| 31 | Quincy Parks & Recreation Swimming Pool | Fairgrounds Road Quincy | 4 150 lb Cylinders Chlorine |

### 2.2.2 Transportation Data

#### 2.2.2.1 California Department of Transportation Hazardous Spill Log Data for January, 1991 through May, 1994

Information from the CalTrans Hazardous Spill Logs indicates that there were six spills in Butte County, four of which occurred along SR 70, and nine spills in Plumas County, eight of which involved petroleum products along SR 70.

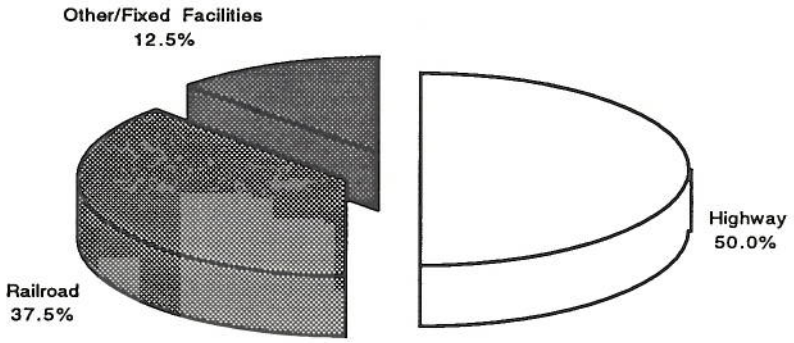
#### 2.2.2.2 California Hazardous Materials Incident Reporting System-Reported Spill Data for 1989-1991

The California Office of Emergency Services maintains the California Hazardous Materials Incident Reporting System (CHMIRS), a compilation and analysis of spill data collected from several state agencies. Spill information is provided by the California State Fire Marshal, California Highway Patrol and the Department of Health Services. CHMIRS reporting for the FRPA from 1988 through 1991 includes three spills in Butte County, all involving petroleum and occurring along SR 70. Of the four spill reports for the Plumas County portion of the planning area, one involved a diesel spill on SR 70 and the remaining three reports involved railroad spills of petroleum products. CHMIRS data also includes the causes of spills. With the exception of one negligent act, all of the incidents were related to collisions or overturning of transport vehicles. CHMIRS data depicted in Figure 2 demonstrates that transportation-related incidents are the most common hazardous material incidents for the area.

#### 2.2.2.3 Plumas County Department of Environmental Health Spill Data

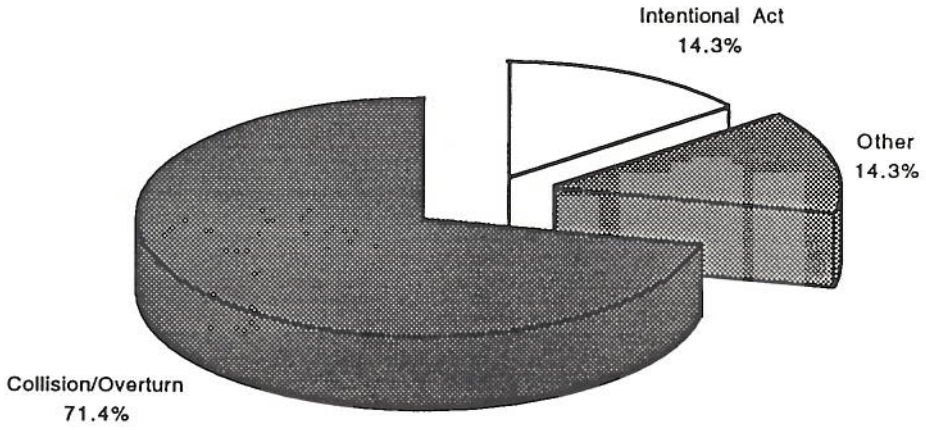
The Plumas County Department of Environmental Health provided a listing of hazardous material incidents that have occurred in Plumas County since 1990. In the past four years, 63 incidents were reported. Of these, 33 required emergency response and 22 were transportation related. Sixty-six percent of the emergency response events were associated with transportation-related incidents.

**Figure 2**
**CALIFORNIA HAZARDOUS MATERIAL INCIDENT REPORTING**
**SPILL DATA FOR THE FEATHER RIVER**
**SPILL LOCATIONS**




**Total Number of Spills 15**

**CALIFORNIA HAZARDOUS MATERIAL INCIDENT REPORTING**
**SPILL CAUSES**



## 2.3 Identified Hazardous Materials

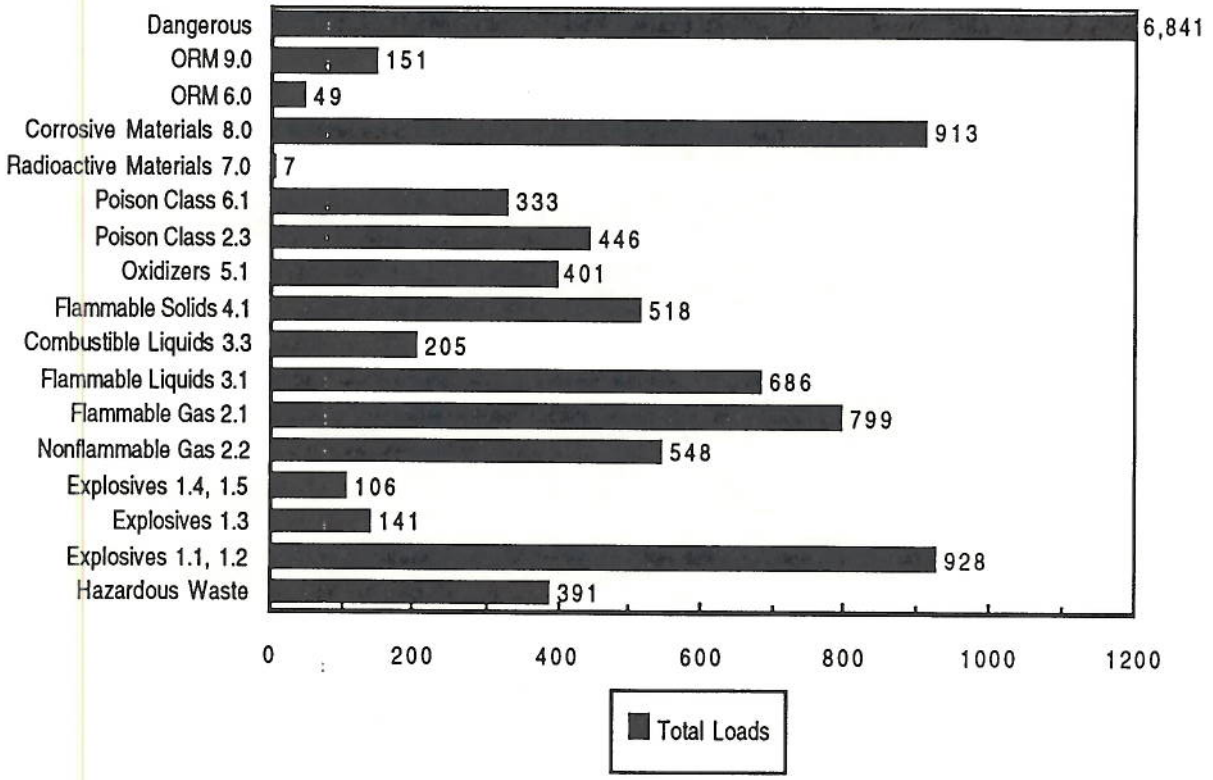
### 2.3.1 Fixed Facilities

The location of chlorine and flammable liquids have been identified in the Feather River area by visual inspections and reviewing business plans. The Quincy Sanitary District water treatment plant, located near Gansner Airport, stores on average, two tons of chlorine gas and two tons of sulfur dioxide gas. On Fairground Road, the Quincy Department of Parks and Recreation also stores chlorine in 150-pound cylinders at the town swimming pool. Flammable liquids are stored at several fixed facilities in the area. Table 1 lists Fixed Facilities located in the planning area.

### 2.3.2 Transportation

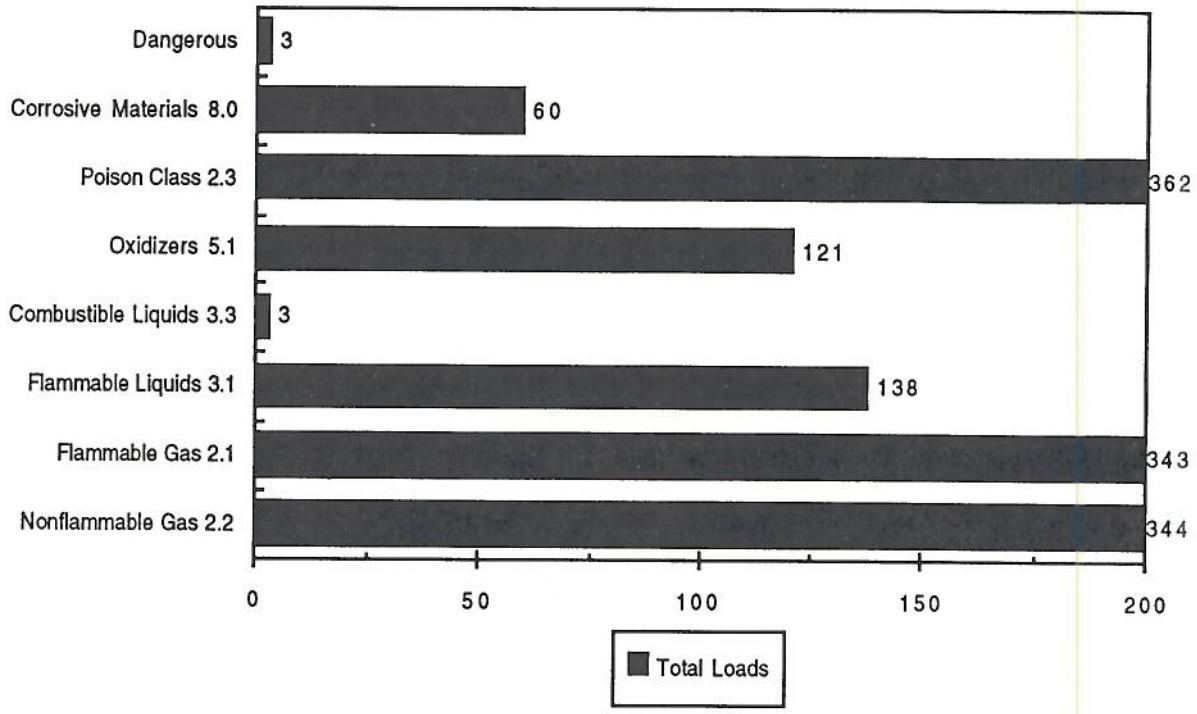
Flammable liquids and corrosives are transported through the area in tanker trucks in quantities up to 9,000 gallons. Large quantities of hazardous materials are known to be transported through the area on the Union Pacific Railroad. The Union Pacific representative to the FRPA Steering Committee provided specific information concerning hazardous materials. For the year 1993, a total of 1,374 loads of hazardous materials were transported through the FRPA. Figure 3 depicts the listing of hazardous materials shipped in 1993 on the Keddie/Sacramento line segment. The largest volume of materials transported through the area is mixed loads, followed by explosives, corrosives, flammable gasses and liquids. In the Standard Transportation Commodity Code (STCC) classifications, mixed loads are considered to be a combination of products shipped in one container or rail car. Mixed loads STCC classification numbers are 4950110 through 4150170. Examples of mixed loads may be petroleum oil and oil products, or acids, chemicals, and other materials transported in a single container. Figure 4 lists the hazardous materials shipped along the UPRR Bieber/Keddie line segment. Along this line segment, nonflammable and flammable compressed gasses, and poisons Class 2.3 are the most common hazardous materials shipped.

**Figure 3**
**UNION PACIFIC**
**HAZARDOUS MATERIALS SHIPPED ON THE LINE SEGMENT**
**KEDDIE TO/FROM SACRAMENTO**
**1993**



## Figure 4

## UNION PACIFIC
## HAZARDOUS MATERIALS SHIPPED ON THE LINE SEGMENT
## KEDDIE TO/FROM BIEBER
## 1993



## 2.4 Hazards Identification Summary

From a human health standpoint, the Quincy Water Treatment Plant, which handles chlorine and sulfur dioxide in one-ton cylinders, should be considered as a low risk/high consequence potential hazard. This means the chance for a release from the facility is low due to facility safety features, however, the consequences of a chlorine release would be extremely dangerous to the surrounding community. The twenty-two identified fixed facilities, which store petroleum, have risks of fires, explosions, or spills, which may impact waterways.

State Route 70/89 and the Union Pacific Railroad lines passing through the FRPA pose the most likely environmental hazards. Besides the large transient population traveling through the area on SR 70/89, the populations of Quincy and the resorts located in the canyon are at risk from such hazardous materials incidents because of their close proximity to the highway and the railroad. Additionally, highway transportation risk increases dramatically when truck traffic is diverted from Interstate 80 to SR 70/89 during bad weather in the winter.

The historical record of reported releases indicates that transportation-related releases of hazard materials requiring emergency response have occurred twice as frequently as those involving fixed facilities.

In addition, hazardous material spills could negatively impact the rivers and tributaries of the FRPA. Spills into the water may be transported downstream for a considerable distance before response teams could arrive to mitigate the incident.

# 3.0 VULNERABILITY ANALYSIS

## 3.1 Goals of the Vulnerability Analysis

The vulnerability analysis, which is the second phase of the hazards analysis, identifies vulnerable zones near each hazard in the FRPA. The vulnerability analysis focuses on the major hazards in the area which are located in the highway and rail transportation corridors and will accomplish the following:

- Using credible-case and worst-case scenarios, estimate the potential extent of the vulnerable zones for a chlorine release from the water treatment plant and the swimming pool in Quincy;
- Estimate the extent of the vulnerable zones for potential hazardous materials spills or releases along SR 70/89 and the Union Pacific Railroad;
- Identify the characteristics of human populations within the vulnerable zones, including high density transient populations and sensitive populations (hospitals, schools, nursing homes, detention centers and day care centers);
- Identify critical facilities such as hospitals, police and fire stations, and communications facilities; and
- Identify sensitive habitats such as lakes, rivers, streams, wetlands, and other habitats critical to threatened or endangered species.

## 3.2 Vulnerable Zones

### 3.2.1 Fixed Facility Vulnerable Zones

Currently, there are a number of fixed facilities identified in the FRPA which store significant quantities of EHSs. The waste water treatment plant in Quincy routinely stores 2 to 4, 1-ton cylinders of chlorine and 2 to 4, one-ton cylinders of sulfur dioxide on-site. The Quincy Department of Parks and Recreation stores chlorine in 4, 150-pound cylinders at the municipal swimming pool on Fairground Road.

Vulnerable zones have been calculated for releases from these facilities using the Areal Locations of Hazardous Atmospheres (ALOHA) program within Computer Aided Management of Emergency Operations (CAMEO) computer software. These vulnerable zones have been plotted on maps as shown in Figures 5 and 6. The parameters entered into ALOHA are based on the following worst-case assumptions defined in the U.S. EPA document Technical Guidance for Hazards Analysis:

- The maximum amount of each substance in a single container is released;
- The total quantity of material; gas, solid as a powder, or solid in solution, is released in 10 minutes;
- Temperature does not affect the release rate of gases, solids in powder form or solids in solution. The rate of release of liquids is affected by whether storage conditions are above, at, or below ambient temperature;
- Wind speed is 3.4 miles per hour and atmospheric stability class is "F" (most stable);
- Terrain is flat, level, and unobstructed; and
- The level of concern is one-tenth the Immediately Dangerous to Life or Health (IDLE) value.

Using this worst-case screening approach, the only information necessary to estimate the vulnerable zone is the identity and physical state of the chemical, the maximum potential quantity stored or handled (that could be released by a single event) and the storage temperature.

Calculations and methods used to determine the values in the worst-case assumptions are explained in detail in the Technical Guidance. ALOHA is not accurate beyond a ten-mile radius.

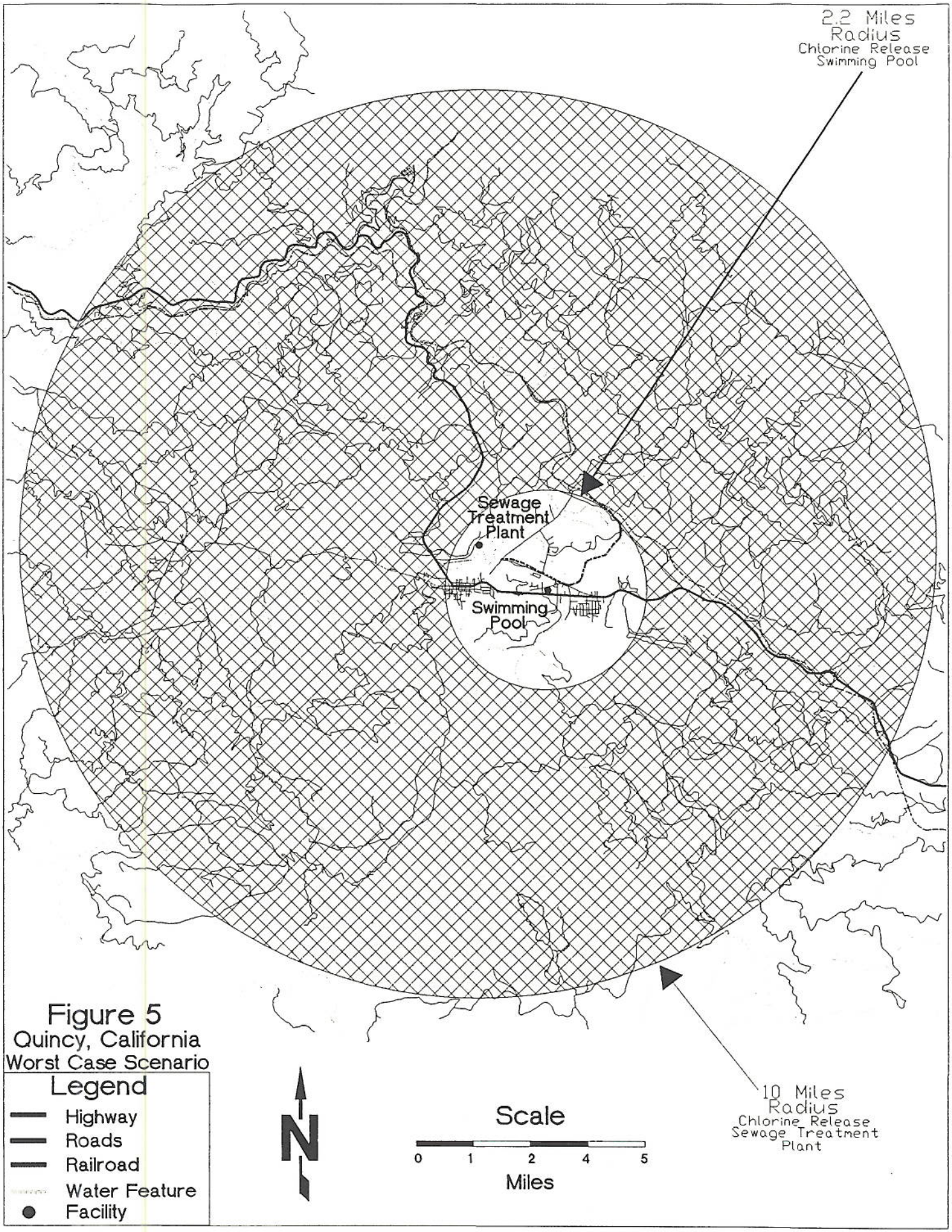



Figure 5
Quincy, California
Worst Case Scenario

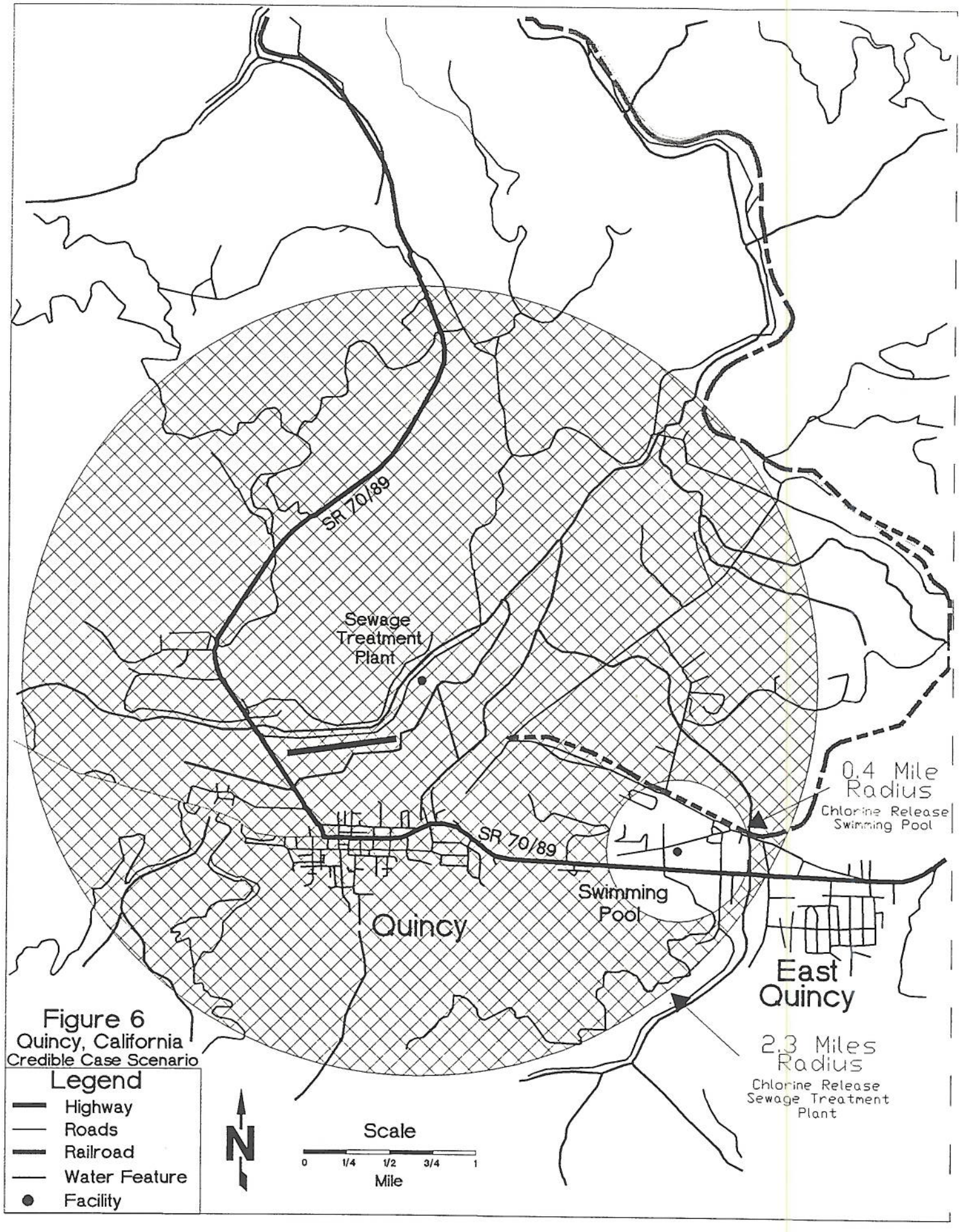

SR 70/89
Sewage Treatment Plant
0.4 Mile Radius
Chlorine Release
Swimming Pool
SR 70/89
Swimming Pool
Quincy
East Quincy
2.3 Miles Radius
Chlorine Release
Sewage Treatment Plant
Figure 6
Quincy, California
Credible Case Scenario
Legend
Highway
Roads
Railroad
Water Feature
Facility
N
Scale
0 1/4 1/2 3/4 1
Mile

Figure 5 depicts worst-case vulnerable zones for the Quincy municipal swimming pool and waste water treatment plant. The scenario is supported by Climatology data, as the mean annual wind speed for the area is 0 to 5 miles per hour and the predominate wind direction is from the west and northwest. The vulnerable zone radius for a release of 150 pounds (one, 150-cylinder) of chlorine for the swimming pool over 10 minutes is 2.2 miles. For the waste water plant, a release of 2,000 pounds (one, one-ton cylinder) over 10 minutes created a 10 mile vulnerable zone radius.

More plausible are the credible-case scenarios shown in Figure 6. Using predominant wind speed and wind direction data from the Northern Sierra Air Quality Control Board, the calculated 2.3 mile long and 0.4 mile long vapor plumes constitute the likely vulnerable zones for any chlorine releases from the waste water treatment plant or the municipal swimming pool.

### 3.2.2 Transportation Route Vulnerable Zones

The environmentally vulnerable zones along these two transportation routes are defined as any place where a spill or release could conceivably reach the river. Although many of the area's tributaries, streams and creeks are intermittent and dry much of the year, their steep gradients make them ideal pathways for hazardous materials to reach the main waterways of the planning area.

Using U.S. Geological Survey topographical maps, it was determined that there are 79 places where SRS 70 or 89 cross the rivers or one of the river tributaries within the boundaries of the planning area. Similarly, 82 places were identified where the Union Pacific Railroad crosses the rivers or one of the river tributaries between Massack and the Poe Powerhouse. Table 2 lists the SR 70/89 river crossing locations. Table 3 lists UPRR River crossings. Both tables list the crossing by a reference number and locate the crossing by section in Township and Range. The tables also identify the water body being crossed and the nearest landmark.

## Table 2:
## STATE ROUTE 70/89 RIVER CROSSINGS

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude Longitude |
|---|---|---|---|---|---|
| 1 | T 22 N | R 4 E | 23 | Intermittent Creek | 3000 ft North of Jarbo Gap<br>39°44'51" 121°29'14.2" |
| 2 | T 22 N | R 4 E | 24 | Intermittent Creek | 6200 ft North of Jarbo Gap<br>39°45'13" 121°28'54" |
| 3 | T 22 N | R 4 E | 13 | Intermittent Creek | 8200 ft North of Jarbo Gap<br>39°45'30" 121°28'49" |
| 4 | T 22 N | R 4 E | 13 | Intermittent Creek | 9200 ft North of Jarbo Gap<br>39°45'38" 121°28'44" |
| 5 | T 22 N | R 5 E | 7 | Intermittent Creek | opposite Bardees Bar<br>39°46'14" 121°27'53" |
| 6 | T 22 N | R 5 E | 7 | Intermittent Creek | 3000 ft North of Pervious Creek<br>39°46'30" 121°27'39" |
| 7 | T 22 N | R 5 E | 7 | Intermittent Creek | Creek Opposite Tunnel 10<br>39°46'37" 121°27'16" |
| 8 | T 22 N | R 5 E | 6 | Intermittent Creek | 5000 ft South of Pulga<br>39°47'20" 121°27'6" |
| 9 | T 22 N | R 5 E | 6 | Intermittent Creek | 3800 ft South of Pulga<br>39°47'35" 121°27'9" |
| 10 | T 22 N | R 5 E | 6 | North Fork Feather River | 2800 ft South of Pulga<br>39°47'42" 121°27'3" |
| 11 | T 23 N | R 5 E | 32 | Mill Creek | 2500 ft North of Pulga<br>39°48'17" 121°26'19" |
| 12 | T 23 N | R 5 E | 32 | Intermittent Creek | 2000 ft South of Poe Dam<br>39°48'22" 121°26'10" |
| 13 | T 23 N | R 5 E | 28 | Heinz Creek | 2800 ft North of Poe Dam<br>39°48'51" 121°25'31" |
| 14 | T 23 N | R 5 E | 27 | Intermittent Creek | 500 ft South of Cresta Powerhouse<br>39°49'27" 121°24'36" |
| 15 | T 23 N | R 5 E | 27 | Intermittent Creek | at Penstock<br>39°49'34" 121°24'24" |
| 16 | T 23 N | R 5 E | 22 | Intermittent Creek | 800 ft North of Penstock<br>39°49'44" 121°24'27" |
| 17 | T 23 N | R 5 E | 22 | Intermittent Creek | 2600 ft North of Penstock<br>39°49'57" 121°24'33" |
| 18 | T 23 N | R 5 E | 15 | Intermittent Creek | 5000 ft South of Arch Rock Tunnel<br>39°50'33" 121°23'55" |
| 19 | T 23 N | R 5 E | 14 | Bear Ranch Creek | 4000 ft South of Arch Rock Tunnel<br>39°50'36" 121°23'45" |
| 20 | T 23 N | R 5 E | 14 | Intermittent Creek | Rest Area South of Arch Rock<br>39°50'55" 121°23'33" |

## Table 2:
## STATE ROUTE 70/89 RIVER CROSSINGS
## (Continued)

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude | Longitude |
|---|---|---|---|---|---|---|
| 21 | T 23 N | R 5 E | 14 | Intermittent Creek | 300 ft North of Rest Area<br>39°50'57" | 121°23'32" |
| 22 | T 23 N | R 5 E | 1 | Grizzly Creek | South of Grizzly Dome Tunnel<br>39°52'7" | 121°22'1" |
| 23 | T 24 N | R 6 E | 40 | Intermittent Creek | 5000 ft North of Cresta Dam<br>39°53'18" | 121°21'39" |
| 24 | T 24 N | R 6 E | 40 | Intermittent Creek | 6000 ft North of Cresta Dam<br>39°53'24" | 121°21'35" |
| 25 | T 24 N | R 6 E | 40 | Intermittent Creek | 6050 ft North of Cresta Dam<br>39°53'25" | 121°21'34" |
| 26 | T 24 N | R 6 E | 30 | North Fork Feather River | at Rock Creek<br>39°54'0" | 121°21'29" |
| 27 | T 24 N | R 6 E | 30 | Intermittent Creek | at Rock Creek Powerhouse<br>39°54'20" | 121°20'42" |
| 28 | T 24 N | R 6 E | 29 | Intermittent Creek | 2500 ft North Rock Creek Powerhouse<br>39°54'20" | 121°20'40" |
| 29 | T 24 N | R 6 E | 20 | Intermittent Creek | 100 ft North of Bucks Creek Powerhouse<br>39°54'45" | 121°19'37" |
| 30 | T 24 N | R 6 E | 21 | North Fork Feather River | at Storrie<br>39°55'6" | 121°19'12" |
| 31 | T 24 N | R 6 E | 21 | Intermittent Creek | at Rock Crest<br>39°55'29" | 121°18'52" |
| 32 | T 24 N | R 6 E | 37 | North Fork Feather River | 1200 ft North of Tobin<br>39°56'11" | 121°18'53" |
| 33 | T 24 N | R 6 E | 37 | Intermittent Creek | 2600 ft North of Tobin<br>39°56'18" | 121°18'44" |
| 34 | T 24 N | R 6 E | 10 | Granite Creek | 1000 ft North of Injun Jim School<br>39°57'11" | 121°18'2" |
| 35 | T 24 N | R 6 E | 3 | Chambers Creek | 4000 ft North of Injun Jim School<br>39°57'22" | 121°17'33" |
| 36 | T 24 N | R 6 E | 3 | Intermittent Creek | 3600 ft South of Rogers Flat<br>39°67'22" | 121°17'20" |
| 37 | T 24 N | R 6 E | 2 | Intermittent Creek | at Rogers Flat<br>39°57'45" | 121°16'43" |
| 38 | T 25 N | R 6 E | 35 | Intermittent Creek | 5000 ft South of Rock Creek Dam<br>39°58'31" | 121°16'37" |
| 39 | T 25 N | R 6 E | 35 | Intermittent Creek | 2500 ft South of Rock Creek Dam<br>39°58'53" | 121°16'49" |

## Table 2:
## STATE ROUTE 70/89 RIVER CROSSINGS
## (Continued)

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude Longitude |
|---|---|---|---|---|---|
| 40 | T 25 N | R 6 E | 35 | Opapee Creek | 1200 ft South of Rock Creek Dam<br>39°59'6" 121°16'54" |
| 41 | T 25 N | R 6 E | 26 | Intermittent Creek | 1400 ft North of Rock Creek Dam<br>39°59'23" 121°17'1" |
| 42 | T 25 N | R 6 E | 26 | Murphy Creek | 2800 ft North of Rock Creek Dam<br>39°59'32" 121°16'46" |
| 43 | T 25 N | R 6 E | 26 | Pauls Creek | South of Belden<br>39°59'52" 121°16'24" |
| 44 | T 25 N | R 6 E | 23 | Chips Creek | South of Belden<br>40°0'6" 121°16'18" |
| 45 | T 25 N | R 6 E | 24 | Indian Creek | at Belden<br>40°0'20" 121°16'00" |
| 46 | T 25 N | R 6 E | 24 | Yellow Creek | at Belden<br>40°0'26" 121°14'57" |
| 47 | T 25 N | R 7 E | 20 | North Fork Feather River | at Confluence Of North Fork & East Branch<br>40°0'52" 121°13'29" |
| 48 | T 25 N | R 7 E | 21 | Unnamed Creek | Near Indian Bar<br>40°0'46" 121°12'15" |
| 49 | T 25 N | R 7 E | 22 | Intermittent Creek | at Rich Bar<br>40°0'47" 121°11'35" |
| 50 | T 25 N | R 7 E | 14 | Unnamed Creek | In Serpentine Canyon<br>40°1'5" 121°10'8" |
| 51 | T 25 N | R 7 E | 14 | Unnamed Creek | In Serpentine Canyon<br>40°1'24" 121°9'46" |
| 52 | T 25 N | R 7 E | 13 | Intermittent Creek | In Serpentine Canyon<br>40°1'27" 121°8'53" |
| 53 | T 25 N | R 7 E | 13 | Intermittent Creek | In Serpentine Canyon<br>40°1'32" 121°8'36" |
| 54 | T 25 N | R 8 E | 18 | Intermittent Creek | Opposite 12 Mile Bar<br>40°1'46" 121°7'37" |
| 55 | T 25 N | R 8 E | 18 | Rush Creek | East of Virgilia Mine<br>40°1'30" 121°7'18" |
| 56 | T 25 N | R 8 E | 17 | Intermittent Creek | 3500 ft East of Virgilia<br>40°1'31" 121°6'57" |
| 57 | T 25 N | R 8 E | 22 | Intermittent Creek | at Hallsted Flat<br>40°1'9" 121°4'43" |
| 58 | T 25 N | R 8 E | 22 | Intermittent Creek | at Twain<br>40°1'14" 121°4'15" |
| 59 | T 25 N | R 9 E | 24 | Hot Springs Ravine | West of Hot Springs<br>40°1'11" 121°2'7" |

## Table 2:
## STATE ROUTE 70/89 RIVER CROSSINGS
## (Continued)

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude Longitude |
|---|---|---|---|---|---|
| 60 | T 25 N | R 9 E | 18 | Intermittent Creek | 4000 ft Northeast of Hot Springs<br>40°11'37" 121°1'22" |
| 61 | T 25 N | R 9 E | 8 | Soda Creek | at Paxton<br>40°2'20" 120°59'55" |
| 62 | T 25 N | R 9 E | 9 | East Branch North Fork | at Confluence of Spanish Creek<br>40°2'20" 120°58'56" |
| 63 | T 25 N | R 9 E | 10 | Intermittent Creek | at Railroad MP 275<br>40°6'46" 120°57'44" |
| 64 | T 25 N | R 9 E | 15 | Spanish Creek | 5000 ft North of Keddie<br>40°1'33" 120°57'45" |
| 65 | T 25 N | R 9 E | 27 | Butterfly Creek | 3000 ft South of Keddie<br>40°0'25" 120°57'40" |
| 66 | T 25 N | R 9 E | 27 | Big Blackhawk Creek | 1.7 Miles South of Keddie<br>40°0'1" 120°57'17" |
| 67 | T 25 N | R 9 E | 35 | Little Blackhawk Creek | 4.4 Miles North of Quincy<br>39°59'37" 120°56'46" |
| 68 | T 24 N | R 9 E | 15 | Spanish Creek | East of Gansner Airport<br>39°56'43" 120°57'17" |
| 69 | T 24 N | R 10 E | 14 | Clear Stream | South of Gansner Airport<br>39°56'26" 120°57'3" |
| 70 | T 24 N | R 10 E | 19 | Mill Creek | East Quincy<br>39°56'3" 120°54'19" |
| 71 | T 24 N | R 10 E | 21 | Thompson Creek | West of East Quincy<br>39°56'4" 120°52'1" |
| 72 | T 24 N | R 10 E | 21 | Greenhorn Creek | West of East Quincy<br>39°56''8" 120°51'54" |
| 73 | T 24 N | R 10 E | 16 | Greenhorn Creek | West of East Quincy<br>39°56'11" 120°51'39" |
| 74 | T 24 N | R 10 E | 22 | Sockum Creek | West of East Quincy<br>39°55'58" 120°51'7" |
| 75 | T 24 N | R 10 E | 23 | Massack Creek | at Massack<br>39°55'37" 120°50'16" |
| 76 | T 24 N | R 10 E | 26 | Intermittent Creek | East of Massack<br>39°55'14" 120°49'53" |
| 77 | T 24 N | R 10 E | 26 | Intermittent Creek | East of Massack<br>39°54'56" 120°49'14" |
| 78 | T 24 N | R 10 E | 25 | Intermittent Creek | West of Williams Loop<br>39°54'47" 120°48'56" |
| 79 | T 24 N | R 10 E | 25 | Squirrel Creek | West of Williams Loop<br>39°54'42" 120°48'40" |

**Table 3:**
**UNION PACIFIC RIVER CROSSINGS**

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude Longitude |
|---|---|---|---|---|---|
| 1 | T 22 N | R 4 E | 36 | North Fork Feather River | South of Poe Powerhouse<br>39°42'60" 121°28'10" |
| 2 | T 22 N | R 5 E | 30 | Intermittent/Creek | North of Poe Powerhouse<br>39°43'58" 121°27'52" |
| 3 | T 22 N | R 4 E | 24 | Intermittent Creek | 7000 ft North of Poe Powerhouse<br>39°44'49" 121°28'10" |
| 4 | T 22 N | R 5 E | 18 | Intermittent Creek | South of Bardees Bar<br>39°45'19" 121°27'54" |
| 5 | T 22.N | R 5 E | 18 | Intermittent Creek | South of Bardees Bar<br>39°45'26" 121°27'28" |
| 6 | T 22.N | R 5 E | 18 | Intermittent Creek | South of Bardees Bar<br>39°45'45" 121°27'26" |
| 7 | T 22 N | R 5 E | 18 | Intermittent Creek | South of Bardees Bar<br>39°45'48" 121°27'25" |
| 8 | T 22 N | R 5 E | 7 | Intermittent Creek | South of Tunnel 10<br>39°46'22" 121°27'7" |
| 9 | T 22 N | R 5 E | 7 | Intermittent Creek | North of Tunnel 10<br>39°46'37" 121°26'55" |
| 10 | T 22 N | R 5 E | 8 | Intermittent Creek | North of Tunnel 11<br>39°46'46" 121°26'49" |
| 11 | T 22 N | R 5 E | 8 | Intermittent Creek | North of Tunnel 11<br>39°46'54" 121°26'46" |
| 12 | T 22 N | R 5 E | 5 | Intermittent Creek | West of Fish Camp Flat<br>39°47'14" 121°26'46" |
| 13 | T 22 N | R 5 E | 6 | North Fork Feather River | South of Pulga GS<br>39°47'42" 121°27'3" |
| 14 | T 22 N | R 5 E | 6 | Intermittent Creek | South of Pulga<br>39°47'53" 121°26'58" |
| 15 | T 23 N | R 5 E | 32 | Valley Creek | at Pulga<br>39°48'9" 121°26'46" |
| 16 | T 23 N | R 5 E | 32 | Intermittent Creek | South of Poe Dam<br>39°48'25" 121°26'15" |
| 17 | T 23 N | R 5 E | 32 | Intermittent Creek | South of Poe Dam<br>39°48'35" 121°26'0" |
| 18 | T 23 N | R 5 E | 28 | Dogwood Creek | North of Poe Dam<br>39°48'54" 121°25'36" |
| 19 | T 23 N | R 5 E | 28 | Camp Creek | at Mayaro<br>39°49'21" 121°25'18" |
| 20 | T 23 N | R 5 E | 22 | Intermittent Creek | North of Cresta Powerhouse<br>39°50'12" 121°24'55" |
| | T 23 N | R 5 E | 15 | Unnamed Creek | West of Cresta<br>39°50'35" 121°24'31" |

## Table 3:
## UNION PACIFIC RIVER CROSSINGS
## (CONTINUED)

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude Longitude |
|---|---|---|---|---|---|
| 22 | T 23 N | R 5 E | 15 | Cedar Creek | West of Cresta<br>39°50'36" 121°24'18" |
| 23 | T 23 N | R 5 E | 14 | Unnamed Creek | Opposite Arch Rock<br>39°51'23" 121°23'27" |
| 24 | T 23 N | R 5 E | 11 | Intermittent Creek | West of Butte/Plumas Line<br>39°51'54" 121°23'3" |
| 25 | T 23 N | R 5 E | 1 | Swamp Creek | North of Cresta Dam<br>39°52'46" 121°22'21" |
| 26 | T 24 N | R 5 E | 36 | Cedar Creek | 4200 ft North of Cresta Dam<br>39°53'9" 121°22'9" |
| 27 | T 24 N | R 6 E | 30 | Rock Creek | South of Rock Creek Powerhouse<br>39°54'3" 121°21'33" |
| 28 | T 24 N | R 6 E | 30 | Intermittent Creek | at Rock Creek Powerhouse<br>39°54'22" 121°21'40" |
| 29 | T 24 N | R 6 E | 29 | Intermittent Creek | South of Tunnel 15<br>39°54'29" 121°21'14" |
| 30 | T 24 N | R 6 E | 20 | Intermittent Creek | at Storrie<br>39°54'36" 121°19'20" |
| 31 | T 24 N | R 6 E | 37 | Intermittent Creek | 1000 ft South of Tobin<br>39°55'50" 121°18'59" |
| 32 | T 24 N | R 6 E | 37 | Jackass Creek | North of Tobin<br>39°56'7" 121°18'57" |
| 33 | T 24 N | R 6 E | 37 | North Fork Feather River | 1500 ft North of Tobin<br>39°56'13" 121°18'51" |
| 34 | T 24 N | R 6 E | 37 | Intermittent Creek | 3500 ft Northeast of Tobin<br>39°56'18" 121°18'27" |
| 35 | T 24 N | R 6 E | 37 | Intermittent Creek | 4500 ft Northeast of Tobin<br>39°56'26" 121°18'21" |
| 36 | T 24 N | R 6 E | 9 | Intermittent Creek | 5000 ft Northeast of Tobin<br>39°56'37" 121°18'19" |
| 37 | T 24 N | R 6 E | 10 | Intermittent Creek | Opposite Indian Jim School<br>39°56'54" 121°17'59" |
| 38 | T 24 N | R 6 E | 10 | Intermittent Creek | 5000 ft Southwest of Rogers Flat<br>39°57'12" 121°17'40" |
| 39 | T 24 N | R 6 E | 2 | Intermittent Creek | 1500 ft South of Rogers Flat<br>39°57'28" 121°16'50" |
| 40 | T 24 N | R 6 E | 2 | Milk Ranch Creek | 1000 ft North of Rogers Flat<br>39°57'44" 121°16'22" |
| 41 | T 24 N | R 6 E | 2 | Intermittent Creek | 3200 ft Northeast of Rogers Flat<br>39°57'56" 121°16'14" |

## Table 3:
## UNION PACIFIC RIVER CROSSINGS
## (Continued)

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude Longitude |
|---|---|---|---|---|---|
| 42 | T 24 N | R 6 E | 2 | Intermittent Creek | 4700 ft Northeast of Rogers Flat<br>39°58'9" 121°16'21" |
| 43 | T 25 N | R 6 E | 35 | Intermittent Creek | 3000 ft South of Rock Creek Dam<br>39°58'48" 121°16'31" |
| 44 | T 25 N | R 6 E | 35 | Intermittent Creek | 1500 ft South of Rock Creek Dam<br>39°59'7" 121°16'43" |
| 45 | T 25 N | R 6 E | 26 | Intermittent Creek | 5280 ft Northeast of Rock Creek Dam<br>39°59'58" 121°16'6" |
| 46 | T 25 N | R 6 E | 24 | Belden Ravine | at Belden<br>40°0'18" 121°14'57" |
| 47 | T 25 N | R 7 E | 30 | Fern Canyon | East of Belden<br>40°0'15" 121°14'36" |
| 48 | T 25 N | R 7 E | 20 | Oak Ravine | East of the confluence of the North Fork and East Branch<br>40°0'47" 121°13'20" |
| 49 | T 25 N | R 7 E | 20 | Cold Spring | at Gauging Station<br>40°0'34" 121°13'5" |
| 50 | T 25 N | R 7 E | 21 | Kellogg Ravine | at Richs Bar<br>40°0'31" 121°11'38" |
| 51 | T 25 N | R 7 E | 22 | French Ravine | 2000 ft East of Richs Bar<br>40°0'27" 121°11'17" |
| 52 | T 25 N | R 7 E | 22 | Mill Creek | East of Tunnel 25<br>40°0'43" 121°10'58" |
| 53 | T 25 N | R 7 E | 22 | Intermittent Creek | Serpentine Canyon<br>40°0'45" 121°10'26" |
| 54 | T 25 N | R 7 E | 23 | Intermittent Creek | Serpentine Canyon<br>40°0'55" 121°10'15" |
| 55 | T 25 N | R 7 E | 13 | Intermittent Creek | Serpentine Canyon<br>40°1'27'" 121°9'12" |
| 56 | T 25 N | R 7 E | 13 | Rattlesnake Gulch | Serpentine Canyon<br>40°1'24" 121°8'45" |
| 57 | T 25 N | R 8 E | 18 | Twelve mile Ravine | 2 Miles West of Virgilia<br>40°1'31" 121°7'25" |
| 58 | T 25 N | R 8 E | 20 | York Creek | at Virgilia<br>40°1'17" 121°6'21" |
| 59 | T 25 N | R 8 E | 21 | Berry Creek | East Tunnel 26<br>40°0'55" 121°5'38" |
| 60 | T 25 N | R 8 E | 22 | Mill Creek | at Halsted Flat<br>40°0'54" 121°4'47" |
| 61 | T 25 N | R 8 E | 24 | Intermittent Creek | at Twain Siding<br>40°1'0" 121°2'16" |

## Table 3:
## UNION PACIFIC RIVER CROSSINGS
## (Continued)

| Ref. No. | Tnshp | Range | Sec | River/Creek | Landmark<br>Latitude Longitude |
|---|---|---|---|---|---|
| 62 | T 25 N | R 8 E | 24 | Intermittent Creek | Opposite Hot Springs Ravine<br>40°1'3" 121°2'11" |
| 63 | T 25 N | R 9 E | 19 | Dutch Creek | 2000 ft East of Hot Springs<br>40°1'19" 121°1'34" |
| 64 | T 25 N | R 9 E | 18 | Intermittent Creek | 6300 ft East of Hot Springs<br>40°1'42" 121°1'4" |
| 65 | T 25 N | R 9 E | 17 | Intermittent Creek | at Paxton Siding<br>40°2'2" 121°0'11" |
| 66 | T 25 N | R 9 E | 16 | Intermittent Creek | West of Tunnel 26<br>40°2'9" 121°58'58" |
| 67 | T 25 N | R 9 E | 22 | Spanish Creek | at Tunnel 32<br>40°1'10" 120°57'27" |
| 68 | T 25 N | R 9 E | 26 | Intermittent Creek | West of Tunnel 33<br>40°0'23" 120°56'28" |
| 69 | T 25 N | R 9 E | 26 | Cashman Creek | West of Tunnel 33<br>40°0'14" 120°56'25" |
| 70 | T 25 N | R 9 E | 36 | Gilson Creek | 4000 ft South of Tunnel 34<br>39°59'37" 120°55'4" |
| 71 | T 25 N | R 10 E | 31 | Tollgate Creek | 2 Miles South of Tunnel 34<br>39°59'1" 121°54'15" |
| 72 | T 24 N | R 10 E | 8 | Chandler Creek | 1.2 Miles Southeast of Quincy Junction<br>39°57'14" 120°52'51" |
| 73 | T 24 N | R 10 E | 16 | Taylor Creek | East of Johnson Hill<br>39°56'54" 120°52'4" |
| 74 | T 24 N | R 10 E | 15 | Sockum Creek | West of Massick<br>39°56'8" 120°51'5" |
| 75 | T 24 N | R 10 E | 23 | Massack Creek | West of Williams Loop<br>39°55'38" 120°49'59" |
| 76 | T 24 N | R 10 E | 25 | Intermittent Creek | Near Williams Loop<br>39°55'44" 121°49'18" |
| 77 | T 24 N | R 10 E | 25 | Intermittent Creek | Near Williams Loop<br>39°54'44" 120°48'44" |
| 78 | T 25 N | R 9 E | 23 | Intermittent Creek | Northeast of Tunnel 32<br>40°1'10" 120°57'4" |
| 79 | | R 9 E | 15 | Clear Creek | North of Tunnel 30<br>40°1'37" 120°57'39" |
| 80 | T 25 N | R 9 E | 10 | Intermittent Creek | South of Tunnel 3489<br>40°2'14" 120°57'50" |
| 81 | T 25 N | R 9 E | 3 | Intermittent Creek | Southeast of Indian Falls<br>40°3'19" 120°57'28" |
| 82 | T 26 N | R 9 E | 35 | Indian Creek | 9000 ft South of Crescent Mills<br>40°4'38" 120°55'50" |

## 3.3 Sensitive Populations

A large portion of the human population in the FRPA is represented by tourists traveling through the area along SR 70/89.

The largest town in the FRPA is Quincy. The population demographics of Quincy are detailed in Table 4.

**Table 4:**
**QUINCY POPULATION DEMOGRAPHICS**

| AGE RANGE | NUMBER OF PERSONS |
|---|---|
| Under 5 years | 306 |
| 55 to 15 | 841 |
| 16 years and over | 3,124 |
| 18 to 20 years | 150 |
| 21 to 24 years | 139 |
| 25 to 44 years | 1,384 |
| 45 to 54 years | 466 |
| 55 to 59 years | 187 |
| 60 to 64 years | 184 |
| 65 years and over | 597 |
| 75 years and over | 294 |
| 85 years and over | 74 |
| Total Population | 4,271 |

The median age of the population is 35.5 years.

Table 5 presents a list of the various sensitive populations which are located in the identified vulnerable transportation corridors. There is one school in the Butte County portion of the planning area. Plumas County has four elementary schools, one high school, one hospital, one nursing home, a Head Start program location, two preschools, one community college, a child development center, and a Christian school within the planning area. All of these sensitive facilities are located within one mile of SR 70/89, the Union Pacific rail lines, and 12 of the identified fixed facilities in the area. Actual distances have been calculated and are published in "Part III, Hazard Assessment Data" of the Region III Hazardous Materials Response Plan.

**Table 5:**
**SENSITIVE POPULATIONS**

| Type of Sensitive Population | City | Name of Facility | Street Address | Phone Number |
|---|---|---|---|---|
| **Hospitals** | Quincy | Plumas District Hospital | 1065 Bucks Lake Rd. | (916) 283-2121 |
| | Quincy | Plumas Community Clinic | 210 Main | (916) 284-6926 |
| **Schools** | Quincy | Quincy Elementary School | 246 Alder St. | (916) 283-6550 |
| | Quincy | Quincy High School | 520 West Main | (916) 283-6529 |
| | Quincy | Pioneer Elementary School | 520 West Main | (916) 283-6529 |
| | Storrie | Indian Jim School | Feather River Canyon | (916) 283-6529 |
| | Oroville | Spring Valley School | Cherokee Rd. | (916) 533 3258 |
| | Quincy | Plumas Christian School | 43 S. Lindan Ave. | (916) 283-0415 |
| | Quincy | Feather River Community College | SR 70 & Golden Feather Drive | (916) 283-0202 |
| **Nursing Homes** | Quincy | Carewest Nursing Center | 50 Central Ave. | (916) 283-2110 |
| **Day Care Centers** | Quincy | Head Start | 204 Fairgrounds Rd | (916) 283-0592 |
| | Quincy | Care-A-Lot Preschool | 2704 Ridgerun Rd. | (916) 283- 3504 |
| | East Quincy | Osh-Kosh-B-Gosh Preschool | 711 E Main | (916) 283-2224 |
| | East Quincy | Mountain Child Development Center | 15 Reese St. | (916) 283-3879 |

## 3.4 Critical Facilities

Critical facilities are shown in Table 6. These include hospitals, law enforcement agencies, coroners, fire and rescue agencies, and communications facilities in the planning area. Any of these critical facilities may be called upon to provide assistance in the event of a hazardous materials spill or release within the FRPA.

## Table 6:
## CRITICAL FACILITIES

| Type of Critical Facility | City | Name of Facility | Street Address | Phone Number |
|---|---|---|---|---|
| **Hospitals** | Quincy | Plumas District Hospital | 1065 Bucks Lake Rd. | (916) 283-2121 |
| | Quincy | Plumas Community Clinic | 210 Main | (916) 284-6926 |
| | Greenville | Indian Valley Hospital | Hot Springs Road | (916) 284-7191 |
| | Oroville | Oroville Hospital | 2767 Olive Hwy | (916) 533-8500 |
| | Paradise | Feather River Hospital | 5974 Pentz Rd. | (916) 877-9361 |
| **Law Enforcement** | Oroville | Butte County Sheriff | 33 County Center Drive | (916) 538-7401 |
| | Quincy | Plumas County Sheriff | 1400 East Main | (916) 283-6300 |
| **Police** | Oroville | Oroville Police Dept. | 2055 Lincoln | (916) 538-2448 |
| | Paradise | Paradise Police Dept. | 5595 Black Olive Drive | (916) 872-6241 |
| **California Highway Patrol** | Oroville | CHP | 2072 Third St. | (916) 533-3822 |
| | Quincy | CHP | 86 West Main | (916) 283-1100 |
| **Coroners** | Quincy | Plumas County Sheriff | 1400 East Main | (916) 283-6300 |
| | Oroville | Butte County Coroner | 33 County Center Drive | (916) 891-2711 |
| **Fire and Rescue** | Quincy | Quincy Fire Department | 505 Lawrence St. | Emergency (916) 283-2121 (916) 283-0870 |
| | Oroville | Oroville Fire Department | 2055 Lincoln | (916) 538-2448 |
| | Paradise | Butte County Hazmat Paradise Fire Dept. | 767 Birch St. | (916) 872-6264 |
| **County Fire Coord.** | Oroville | Butte County Fire Coordinator | 176 Nelson Ave. | (916) 743-1553 |
| | Quincy | Plumas County Fire Coordinator | PO Box 916 | (916) 225-2418 |
| | Oroville | CA Dept. of Forestry Butte Ranger Unit | 176 Nelson Ave. | (916) 538-7111 |
| **Government Agencies** | Redding | Central Valley Regional Water Control Board | 415 Knollcrest Dr | (916) 224-4854 |
| | Marysville | CalTrans | 703 B Street | (916) 741-4314 |
| | Sacramento | Cal EPA | 400 P Street | (916) 225-2073 |
| | Oroville | Butte County Public Works | 7 County Center Drive | (916) 538-7681 |
| | Quincy | Plumas County Public Works | 520 West Main | (916) 283-6268 |

Table 6:
CRITICAL FACILITIES
(Continued)

| Type of Critical Facility | City | Name of Facility | Street Address | Phone Number |
|---|---|---|---|---|
| Government Agencies | Quincy | Plumas National Forest | 159 Lawrence Rd. | (916) 283-6272 |
| | Quincy | Plumas County Department of Environmental Health | 270 County Hospital Road | (916) 283-6355 |
| | Oroville | Butte County Health Department | 18-B County Center Drive | (916) 538-7283 |
| | Chico | Butte County Red Cross | 270 E 7th St. | (916) 891-0885 |
| | Quincy | Plumas County Red Cross | 210 Carol Lane East | (916)283-0503 |
| Communications | Oroville | KEWE FM 98 | 2854 Olive | (916) 533-3700 |
| Radio | Chico | KCHH FM 103 | 3460 Silverbell | (916) 872-9270 |
| | Chico | KCEZ FM 101 | 555 E Lindo | (916) 342-2200 |
| | Chico | KFMF FM | 1459 Humbolt Rd | (916) 343-8461 |
| | Chico | KHSL FM | 3490 Silverbell | (916) 893-8926 |
| | Paradise | KKXX AM 93 | Box 2020 | (916) 872-5599 |
| | Oroville | KORV FM | 2854 Olive | (916)533-1340 |
| | Chico | KPAY FM 95 | 2654 Cramer Ln | (916) 354-0021 |
| | Chico | KVGS FM | 1475 East Ave. | (916) 343-5847 |
| | Chico | KZFR FM 90 | East 20th | (916)895-0706 |
| | Chester | KCMT 98.5 | 529 Main St. | 1-800-244-5268 |
| | Quincy | KPCO-AM 1370 | 395 Main Street | (916) 283-1370 |
| | Chester | KSUE FM 94.3 | 262 Main St. | (916) 258-2211 |
| Television | Chico | KBCP | | (916) 872-3030 |
| | Chico | KCPM | 180 E 4th St. | (916) 893-2424 |
| | Chico | KHSL | 3460 Silverbelle Rd. | (916) 342-0141 |
| | Chico | KIXE | 319 Main | (916) 891-5497 |
| | Redding | KRCRR 7R | 755 Autorium Drive | (916)-243-7777 |

## 3.5 Sensitive Habitats

Data provided by the United States Fish and Wildlife Service describes two endangered and three threatened species of fauna present in the FRPA area. These are the winter-run Chinook salmon, American Peregrine falcon, bald eagle, shortnose sucker, Aleutian Canada goose and the Valley longhorn beetle.

The California Department of Fish and Game (CDFG) provided a more detailed list of state-recognized threatened and endangered species and their habitats. The CDFG list also includes flora which the state of California considers to be at risk. The Federal list is presented in Table 7. According to the CDFG, the planning area provides suitable and potential habitat for sensitive riparian dependent species such as the red-legged frog (Rana aurora), the Western pond turtle (Clemmeys marmorata) and the foothill yellow-legged frog (Rana boylei). While none of these species are currently listed as threatened or endangered with the USFWS, they are considered sensitive and will probably soon be listed. These species are highly sensitive to any chemical change in either their aquatic or terrestrial habitat. Of concern are the reproduction riparian areas for the turtle, and the stream margins for the frogs.

The area provides fish habitat for rainbow trout, brown trout, smallmouth bass, Sacramento squawfish, western sucker, speckled dace, and the riffle sculpin.

**Table 7:**
**FEDERAL THREATENED AND ENDANGERED SPECIES**

| Common Name | Scientific Name | County | Federal Status |
|---|---|---|---|
| Bald Eagle | *Haliaeetus leucocephalus* | Plumas and Butte | Endangered |
| American Peregrine Falcon | *Flaco peregrinus anatum* | Plumas and Butte | Endangered |
| Winter Run Chinook Salmon | *Oncorhynchus tshawytscha* | Butte County | Threatened |
| Giant Garter Snake | *Thamnophis gigas* | Butte County | Proposed Endangered |
| Aleutian Canada Goose | *Branta canadensis leucopareia* | Butte County | Threatened |
| Valley Elderberry Longhorn Beetle | *democerus californicus dimorphus* | Butte County | Threatened |
| Butte County Meadowfoam | *limnanthes floccosa subsp. californica* | Butte County | Proposed Endangered |
| Spotted Owl | *.Strix Occidetalis Caurina* | Plumas County | Endangered |
| Northern Goshawk | *Accipter facsiatus Natalis* | Plumas County | Threatened |

## 3.6 Vulnerability Analysis Summary

The most obvious pathways for spills to enter the river are at any of the 161 places where SR 70/89 or the Union Pacific Railroad cross the river or one of its tributaries. These crossings and the areas immediately downstream from them represent the crucial environmentally vulnerable zones around which the Feather River Area Contingency Plan should be structured. There are also numerous areas where the major transportation routes closely parallel the river or its tributaries, providing additional locations where hazardous materials may enter the waterway.

The 22 petroleum handling fixed facilities of concern primarily present fire and explosion hazards. Some of these facilities have great potential to impact the waters of the FRPA with oil spills. The two identified chlorine handling fixed facilities at Quincy pose potential hazards for airborne releases.

# 4.0 RISK ANALYSIS

## 4.1 Goals of the Risk Analysis

The risk analysis will provide an estimate of the likely locations for a spill or release to occur in the FRPA. The vulnerability analysis section concluded that the FRPA is especially at risk for hazardous materials spills occurring along the two major transportation routes passing through the area, SR 70/89 and the Union Pacific Railroad. The vulnerability analysis also identified 161 places where SR 70/89 or the Union Pacific Railroad cross the rivers and tributaries of the area. These crossings were determined to represent the pathways by which hazardous materials spills could enter the river system. There is a higher occurrence of traffic-related incidents during inclement weather. During periods of snow melt and big run-off, the threat of hazardous materials spills entering surface water increases dramatically.

While the 31 fixed facilities identified in the hazards identification section may pose risks for hazardous materials incidents, SR 70/89 and the Union Pacific Railroad pose the greatest risks. Considered together, the large volumes of flammable liquids and corrosives transported along SR 70/89, its high volume of vehicle traffic, its close proximity to populated areas, and the identified river crossings, make the highway a focal point in the risk analysis. Similarly, the Union Pacific Railroad's history of derailments, the large quantities of hazardous substances the railroad ships through the region, the railroad's close proximity to populated areas, and its 82 identified crossings of the rivers and tributaries of the planning area make the rail line the other major focal point in the risk analysis.

## 4.2 State Route 70/89

A spill or release of hazardous materials along SR 70/89 could eventually enter the North Fork of the Feather River at any of the identified crossings; however, there are 15 places where the highway directly crosses the main streams of the planning area. These streams include: the North Fork of the Feather River, the East Branch of the North Fork of the Feather River, Spanish Creek, Indian Creek, Mill Creek, Thompson Creek, and Greenhorn Creek. Any spill or release at these locations would likely reach the river before any response actions could be initiated. These locations have been determined to represent a very high environmental risk. The SR 70/89 river crossings are listed in Table 8.

**Table 8:**
**SR 70/89 MAIN STREAM CROSSINGS**

| Township | Range | Section | Crossing<br>Latitude | Longitude |
|---|---|---|---|---|
| T 21 N | R 4 E | 21 | West Branch Bridge<br>39°40'00" | 121°31'00" |
| T 22 N | R 5 E | 6 | North Fork of the Feather River South of Pulga<br>39°47'20" | 121°27'6" |
| T 24 N | R 6 E | 30 | North Fork of the Feather River at Rock Creek<br>39°54'0" | 121°21'29" |
| T 24 N | R 6 E | 21 | North Fork of the Feather River at Storrie<br>39°55'6" | 121°19'12" |
| T 24 N | R 6 E | 37 | North Fork of the Feather River at River Bend North of Pulga<br>39°55'11" | 121°18'53" |
| T 25 N | R 6 E | 24 | Indian Creek at Belden<br>40°0''26" | 121°14'57" |
| T 25 N | R 7 E | 20 | North Fork of the Feather River at the confluence of the East Branch and the North Fork<br>40°0'46" | 121°13'29" |
| T 25 N | R 9 E | 9 | Indian Creek at Confluence of Indian Creek and Spanish Creek<br>40°2'20" | 120°58'56" |
| T 25 N | R 9 E | 14 | Spanish Creek East of the Clear Creek<br>39°56'27" | 120°57'3" |
| T 25 N | R 9 E | 35 | Little Black Hawk Creek<br>39°59'37" | 120°57'46" |
| T 25 N | R 9 E | 15 | Spanish Creek East of Gansner Airport<br>30°56'43" | 120°57'288" |
| T 25 N | R 9 E | 15 | Spanish Creek Northeast of Downtown Quincy<br>39°56'43" | 120°57'17" |
| T 24 N | R 9 E | 15 | Mill Creek East of East Quincy<br>39°45'3" | 120°54'119" |
| T 24 N | R 9 E | 21 | Thompson Creek West of East Quincy<br>39°45'4" | 120°52'1" |
| T 24 N | R 10 E | 16 | Greenhorn Creek West of East Quincy<br>39°56'11" | 120°51'34" |

The bridges crossing the rivers and tributaries of the planning area pose a significant risk for spills entering the waterways. However, SR 70/89 parallels the rivers so closely within much of the canyon area that almost any overturn or accident involving hazardous material transport would, in all likelihood, present a spill threat to the river.

## 4.3 Union Pacific Railroad

There are 12 locations where the railroad crosses directly over the main streams in the FRPA. Since any spill or release at these areas would likely reach the river before any response actions could be initiated, these locations have been determined to represent the highest environmental risk for a railroad accident. Table 9 lists the 12 highest risk Union Pacific Railroad river crossings.

**Table 9:**
**UNION PACIFIC MAIN STREAM CROSSINGS**

| Township | Range | Section | Crossing<br>Latitude Longitude |
|---|---|---|---|
| T 21 N | R 4 E | 21 | North Fork of the Feather River West at Branch Bridge<br>39°40'00" 121°31'00" |
| T 22 N | R 4 E | 36 | North Fork of the Feather River South of Poe Powerhouse<br>39°43'58" 121°27'52" |
| T 22 N | R 5 E | 6 | North Fork of the Feather River South of Pulga<br>39°47'42" 121°27'3" |
| T 24 N | R 6 E | 37 | North Fork of the Feather River at river bend North of Tobin<br>39°56'13" 121°18'51" |
| T 25 N | R 9 E | 22 | Spanish Creek Between tunnel 31 & 32<br>40°1'10" 120°57'27" |
| T 24 N | R 10 E | 16 | Taylor Creek<br>39°56'54" 120°52'4" |
| T 25 N | R 9 E | 36 | Gilson Creek<br>39°59'37" 120°55'4" |
| T 25 N | R 10 E | 31 | Tollgate Creek<br>39°59'1" 120°54'15" |
| T 24 N | R 10 E | 23 | Massack Creek<br>39°55'30" 120°50'00" |
| T 24 N | R 10 E | 8 | Chandler Creek<br>39°57'14" 120°52'51" |

The Union Pacific Rail line, within the canyon area, travels along numerous curves and steep grades. The track through much of its course lies in close proximity to the rivers. As with SR 70/89, a spill along most portions of the rail line would most probably enter one of the area's waterways.

In response to Senate Bill 48, the California Public Utilities Commission (PUC) has identified several local safety hazards along California's railroads. The Union Pacific track segment on its Feather River Division Canyon Subdivision from Milepost 132.1 to Milepost 319.2 has been identified as one of seven sites of most concern to the PUC. This particular sub division is very susceptible to derailments, as is demonstrated by over 90 accidents that have occurred in the last 20 years.

In Phase II of the PUC's rail safety investigation, the PUC has proposed a series of new regulations to mitigate or eliminate the hazards at the seven identified sites. Union Pacific and other major railroads in California are working with the California PUC to implement safety measures which include:

- reclassification of certain chemical compounds as hazardous substances;
- use of stronger tank cars for hazardous materials;
- more detailed train manifests which are easily understandable by first responders and contain information on environmental hazards;
- more stringent dynamic brake standards;
- improved early detection of defective equipment through the use of trackside detectors;
- special end-of-train braking devices for mountain grades;
- freight car weight and loading standards;
- testing of wheel bearing assemblies;
- improved regulations for accident and injury reporting; and
- an amendment to the Hours of Service Act, so that it better addresses the problem of sleep deprivation.

## 4.4 Risk Analysis Summary

The locations where SR 70/89 and the Union Pacific Railroad directly cross the rivers of the planning area represent the areas at highest risk for an environmentally damaging hazardous materials spill or release. The highest risk are four locations where the highway and rail line both cross the river in close proximity to each other (see Table 10).

**Table 10:**
**COMBINED UNION PACIFIC AND**
**SR 70/89 MAINSTREAM RIVER CROSSINGS**

| Township | Range | Section | Crossing<br>Latitude Longitude |
|---|---|---|---|
| T 21 N | R 4 E | 21 | North Fork of the Feather River at West Branch Bridge<br>39°40'00" 121°31'00" |
| T 22 N | R 5 E | 6 | North Fork of the Feather River South of Pulga<br>39°47'20" 121°27'6" |
| T 24 N | R 6 E | 37 | North Fork of the Feather River at river bend north of Tobin<br>39°56'13" 121°18'51" |
| T 24 N | R 10 E | 25 | Estray Creek east of Williams Loop<br>39°54'47" 120°48'56" |

The close proximity of SR 70/89 and the Union Pacific Railroad to the population centers in the FRPA, creates a significant human health risk when hazardous materials traffic travels through the area. This is especially apparent in Quincy, where SR 70/89 and the Union Pacific Railroad pass through town within blocks of the fire departments, police departments, hospital, schools, and day care centers.

Based on the information available concerning the common types of hazardous materials transported along highway and railroad routes, some inferences can be made as to the hazardous materials most likely to be spilled or released. The CHMIRS, ERNS and CalTrans data indicates that the hazardous materials most likely to be involved in a spill or release along SR 70/89 are flammable liquids (gasoline and diesel fuel).

The Union Pacific Railroad data suggests that the hazardous materials most likely to be involved in a spill or release along the railroad are: explosive materials, corrosive materials, non-flammable gases (anhydrous ammonia), flammable gases (liquefied petroleum gas), flammable liquids (gasoline and diesel fuel), combustible liquids (paint), and class "A" poisons.

A spill or release along the highway would probably involve a single substance. A derailment along the railroad route could generate concurrent spills of several different hazardous materials.

## 5.0 MAPPING

The final component of the hazards analysis involves mapping of identified fixed facilities, population centers, vulnerable waterways, and hazardous materials transportation routes in the FRPA. High risk areas identified from the maps can be used in the development of worst-case scenarios for planning purposes.

A base map will be developed and included in the Feather River Area Contingency Plan. The base map will index the 11 United States Geological Survey (USGS) 7.5 minute topographic maps that comprise the planning area. The base map will show rivers, lakes, streams, primary and secondary roads, railroads, access points, and response staging areas. Fixed facilities will also be plotted and digitized onto the map.

In the event of a hazardous materials incident, responders can use the base maps to obtain an overview of the event.

# 6.0 WORST-CASE SCENARIOS

An important part of contingency planning is anticipating the effects of a spill and preparing, in advance, the responses to spills that are likely to occur in the area. This section will outline the responses to a spill and hazmat release on SR 70/89 in the town of Quincy, and a spill along the Union Pacific Railroad into the North Fork of the Feather River.

## 6.1 Worst-Case Scenario for State Route 70/89

Interstate 80 is closed due to a snow storm. An ammonia tanker truck en-route to Sacramento from Reno takes the alternate route of SR 70 through Quincy. The driver has decided to drive through the night, the tanker truck enters Quincy around 2:00 AM. The driver is tired and becoming drowsy. As the driver turns right on Crescent Street and begins to accelerate away from downtown, she falls asleep and the truck veers off the road. The tanker truck crashes through the block containment wall of Tom's Sierra Fuel depot and into one of the fuel oil storage tanks. The impact ruptures the storage tank and Number 2 fuel oil begins to pour onto the ground. Upon impact, the driver awakens and descends from the cab only to find that she is knee-deep in oil that had collected within the containment. She begins to cough and smells the distinct odor of ammonia, the material she is transporting. Uncertain of the extent of the leak, she finds her way clear of the incident area and runs to look for help.

A trucker that was following the tanker truck witnesses the accident and notifies the authorities using his CB radio. The CHP office in Quincy dispatches a unit which quickly arrives at the accident scene. As the State Agency Coordinator for on-highway incidents, CHP assumes the role of Incident Commander.

The local 911 system has also been activated by a nearby resident who heard the impact of the crash and made the call. The Plumas County Sheriff's office dispatches a unit to the accident scene. Upon arrival, the County Sheriff, the local volunteer fire department, and the IC establish a Unified Command and set up a command post upwind of the scene and at a safe distance. The IC asks the Sheriff and fire department responders to provide traffic control around the incident. Personnel from the Plumas County Environmental Health Department (notified through 911) also arrive at the scene and join the Unified Command.

The fire department attempts to knock down the ammonia vapors with a water spray. As the pungent odor of ammonia begins to permeate the area, the IC decides local responders do not have the trained personnel needed to stop the release. The runoff from water spray is increasing the speed at which the fuel oil from the ruptured fuel tank is flowing from the containment area. Realizing the flow has begun to enter Clear Creek, the IC directs the firefighters to divert and contain the flow of fuel oil. Because of the toxic, rapidly expanding ammonia vapor cloud, the decision is made to have local responders evacuate the downwind portion of the Town of Quincy.

The Unified Command staff quickly realizes that the incident is beyond the capabilities of the local jurisdictions. The IC initiates a state response by calling the California OES. OES proceeds to notify and coordinate the various state agencies responding to the incident. The OES places a call to the National Response Center to request Federal assistance. The U.S. EPA On-Scene Coordinator joins the Unified Command Staff and remains involved until the incident response is terminated.

## 6.2 Worst-Case Scenario for Union Pacific

The walls of the Feather River Canyon are unstable and susceptible to rock slides during bad weather. Because of rainy weather, the Bronco Patrol leads a Union Pacific freight train traveling from Keddie to Sacramento through the Feather River Canyon. The Bronco Patrol is an on-track vehicle that travels ahead of the train looking for obstructions on the tracks. The patrol will warn the train engineer of any hazards that may be in the train's path.

South of the Pulga, near Fish Camp Flat, a rock slide occurs after the Bronco Patrol passes by. The crew of the freight train is aware that such an event can happen and are on the look-out. The train is transporting the usual cargo of various materials, many of which are hazardous. As the train passes through tunnel number 11, a member of the crew spots debris on the tracks ahead. The engineer radios the patrol to inform them of the situation and begins to bring the train to a stop. As the train is drawing to a halt, another slide occurs. This time, debris strikes the engine and the following two cars. The impact causes the second car to derail pulling the engine off the tracks and onto its side. The engine and the second car slide twenty feet down the bank coming to rest precariously on some boulders a few yards above the North Fork of the Feather River.

The members of the crew are unhurt; they extract themselves from the toppled engine and begin to assess the situation. The belly tank of the engine has been damaged and is leaking diesel fuel. The second car is also on its side and the intermodal container that it was carrying is in the river. The STCC number stenciled on the container identifies its contents as sodium cyanide solid. The crew members notice a white syrupy fluid leaking from a dent in the container. As the Bronco Patrol arrives at the scene, it immediately contacts the Union Pacific Harriman Dispatch Center which, in turn, begins the notification of emergency contacts in the Union Pacific Feather River Emergency Response Plan.

The location of the incident is reported to the local Administering Agencies by the railroad milepost marker. Locating the incident by railroad milepost marker causes some confusion. Emergency responders are unfamiliar with milepost markers and are unsure in which county the incident has occurred. There is confusion as to which agencies should respond. Both counties decide to respond, but local responding agencies, once dispatched, are having difficulty locating the scene. A PG&E employee en-route from the Poe Powerhouse to Cresta Dam witnesses the incident and radios the location to the powerhouse. The powerhouse then contacts local responders, and notifies the PG&E emergency response team. PG&E and UPRR have an informal mutual aid agreement in the canyon.

The powerhouse dispatches containment boom and spill control equipment stored on-site to Bardees Bar, the only river access down stream of the incident. Meanwhile, a Unified Command is established along SR 70 above the scene. The estimated quantity of diesel released has exceeded the Federal reportable quantity, so the Union Pacific Harriman Dispatch Center makes the required notifications to the National Response Center and the California Office of Emergency Services. A Union Pacific Hazmat Team is on its way to the incident scene, as is a team from the Railroad Accident Prevention and Immediate Deployment (RAPID) Force, but it will be several hours before either can arrive.

Because of the toxicity of the sodium cyanide to aquatic life and the potential for water pollution, the Unified Command sends the Butte County Hazmat Team in to plug the intermodal container. The PG&E response team booms off the river at Bardees Bar, while the train crew and local responders attempt to contain the diesel flow.

The U.S. EPA, as an ad hoc member of the state's RAPID Force, becomes involved in the response. Upon arrival, the U.S. EPA On-Scene Coordinator joins the Unified Command Staff and remains involved until the incident response is terminated.

## 7.0 CONCLUSIONS

The hazards identification section determined that hazardous material spills or releases along the two major transportation routes passing through the FRPA represent the primary hazards. The UPRR and SR 70/89 transport significant amounts of oil and hazardous materials. Historical spill records indicate that transportation incidents are the most common origins of spills.

The vulnerability analysis centers around potential hazardous materials spills or releases along SR 70/89 and the Union Pacific Railroad routes through the FRPA. Especially vulnerable, are those locations where the railroad and highway cross over the waterways and pass directly through Quincy. The most obvious pathways for spills to enter the rivers are at any of the 161 places where SR 70/89 or the Union Pacific Railroad cross the river or one of its tributaries. These crossings and the areas immediately downstream from them represent the crucial environmental vulnerable zones.

The two identified chlorine handling fixed facilities at Quincy, pose low risk/high consequence airborne release hazards. The 22 fixed facilities handling petroleum products primarily present fire and explosion hazards. Spills into the river from any of these facilities would adversely affect the ecology of the FRPA.

The risk assessment identified 4 locations where the highway and the railroad cross directly over the river in close proximity to each other. These four areas are at risk for a combined highway and railroad incident and represent the areas at highest risk for an environmentally damaging hazardous materials spill, or release because a spill at these locations would likely enter the river long before response actions could be initiated.

The local emergency response capabilities to hazardous materials incidents in most parts of the sparsely populated FRPA are limited. The exception to this is in the Butte County portion of the planning area. Incidents occurring in Plumas County must rely on hazmat response from teams located hours away from the area. Local resources cannot provide rapid initial response to incidents. The local first responders have limited training and very little equipment available to respond to an incident. At present, the local agencies are limited to providing security and traffic control until assistance arrives from state, Federal, and private resources.

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