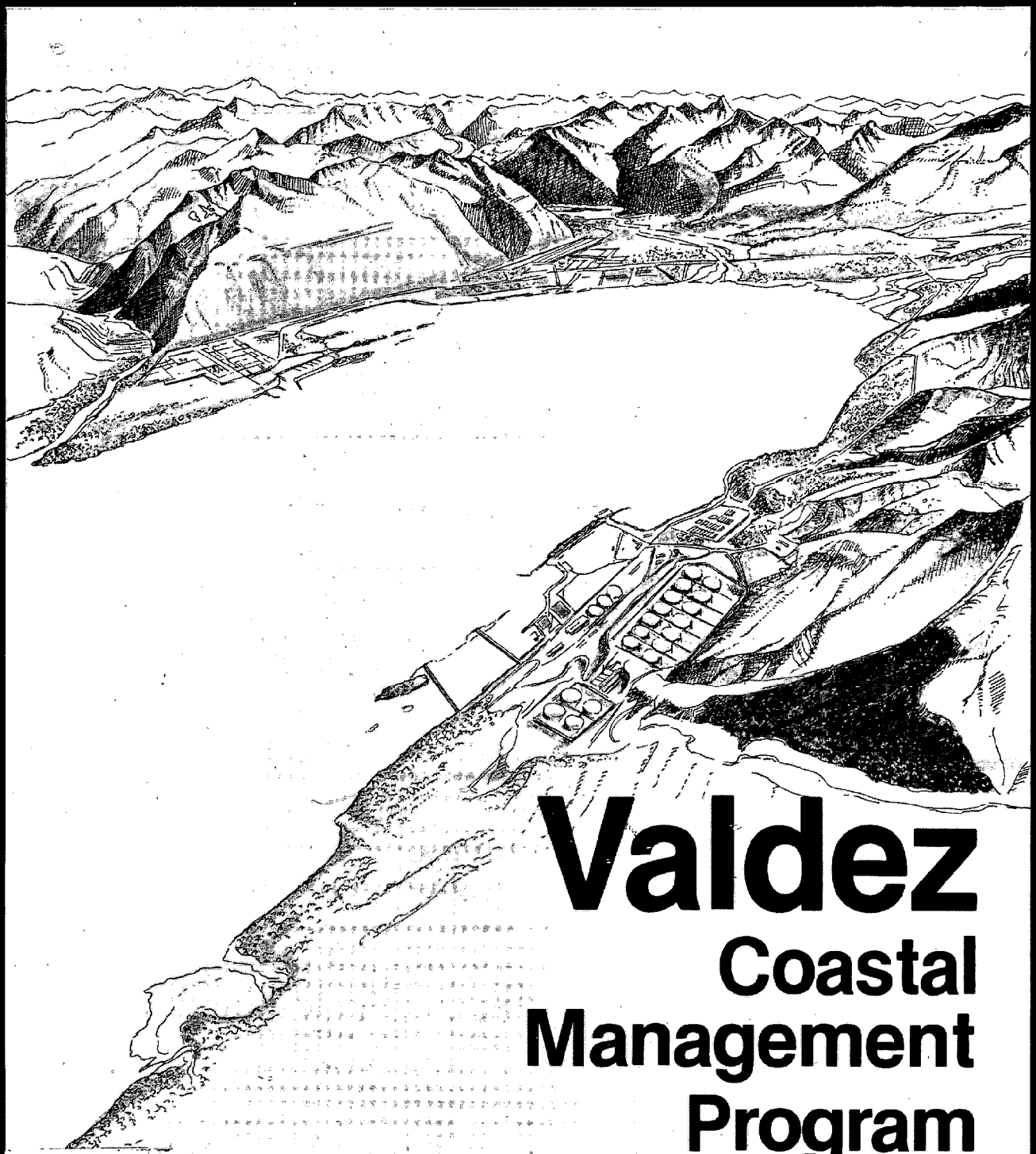

Valdez Coastal Management Program

Public Hearing Draft
February 1982

Valdez Community Development Department
Valdez Coastal Management Citizens Committee
Woodward-Clyde Consultants

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Valdez Coastal Management Program

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1.0 ISSUES, GOALS, AND OBJECTIVES

1.0
ISSUES, GOALS, AND OBJECTIVES

1.1 INTRODUCTION

The citizens of Valdez are both resource users and resource managers, and in these roles they make many decisions about what types of land and water development are desirable, where the developments will take place, and what, in general terms, they will look like.

The Valdez Coastal Management Program set forth in the following pages establishes an agenda and provides the tools to direct development and to manage the resources of the coastal zone. The program emphasizes management tools that are explicit yet flexible enough to provide guidance in a changing physical, economic, and regulatory environment.

1.2 GOALS

The goals for the District Plan reflect a wide spectrum of issues pertaining to coastal management and the economic well-being of Valdez. They are:

1. To enhance the economic productivity and diversification of the region;

2. To provide for public safety and the economic welfare of the community when siting future industrial, commercial, and residential development;

3. To protect and enhance all coastal habitats and air and water quality in accordance with federal and state statutes and in concert with desired industrial expansion;

4. To enhance the scenic beauty, uniqueness, and historical significance of the Valdez area;

5. To sensibly open up new land for residential and industrial use;

6. To strive for compatible use of coastal lands and waters for residential, industrial, commercial, recreation, fish and wildlife needs, and open space activities;

7. To seek, through appropriate channels, continued navigational safety and recreational opportunities in Prince William Sound; and,

8. To expedite and simplify permit procedures and governmental agency project review and implementation of the district program.

Underlying these goals is the recognition that the City of Valdez fully strives to enjoy continued economic prosperity and development. While coastal management cannot by itself ensure this outcome, it can help to make the unfolding of economic events orderly and sensible within the constraints of limited land, potential geologic hazards, and sensitive habitats.

It is to this end that the goals reflect a set of concerns expressed by the citizens of Valdez and form the basis for selected objectives to be achieved under this program.

1.3 ISSUES AND OBJECTIVES

1.3.1 Economic Productivity/Diversification

Because of its strategic location, Valdez historically was the port of entry for a number of resource development activities in Interior Alaska and, most recently, has become the tidewater port for the trans-Alaska pipeline. As resource developments are most often single events with lingering spinoff activities, Valdez has benefited from large construction projects and, at the same time, gone wanting for sustained economic activity. Dependence on seasonal employment opportunities continues to be a major issue, and thus the citizens of Valdez wish to develop stable, year-round sources of income and employment. Four existing industries in Valdez hold promise for future industrial expansion:

Transportation. Commodities port facility, supply and pipe shipping station for gas and oil pipeline, runway and airport expansion, and highway improvements;

Fisheries. Fish processing plant, fish hatcheries, and rehabilitation and enhancement of Robe Lake and other historic salmon runs, boat repair and construction facilities, and cold storage facilities;

Tourism/Recreation. Waterfront improvements program and expansion of recreational and tourist activities (both seasonally and as to type); and

Petroleum. Fuels refineries and petrochemical plants.

The Valdez Coastal Management program seeks to positively influence the development pattern of these industries in the following ways:

Transportation

1. Maximize use of waterfront land zoned for commercial and industrial purposes dependent on water-based transportation;

2. Upgrade transportation corridors both between the port and the airport and between the port and Interior Alaska;

3. Identify future land requirements for port and airport expansion and reserve appropriate land; and

4. Maintain coordination with the U.S. Coast Guard to ensure navigational safety in Prince William Sound.

Fisheries

1. Maintain and enhance biological productivity of Port Valdez;

2. Rehabilitate Robe Lake to improve its productive capacity;

3. Monitor and evaluate salmon enhancement program and proposed fish hatchery sites in the district;

4. Plan for expansion of recreational boat harbor and construction of a commercial boat harbor; and

5. Determine siting requirements/feasibility of Valdez as a bottomfish and onshore support base and for high-value fish processing.

Tourism/Recreation

1. Site industrial facilities and industrial parks to minimize damage to natural setting;

2. Encourage enforcement of building codes and land use controls to improve the aesthetics of the downtown area and to reduce conflicts between incompatible land uses;

3. Improve attractiveness of commercial waterfront;

4. Support establishment of city and state marine park facilities;

5. Encourage boating safety through improved navigation and communication aids and search and rescue capability;

6. Encourage expanded ferry service for Prince William Sound;

7. Encourage municipal development of diversified recreational facilities; and

8. Implement a municipal parks and recreation program that identifies areas of coastal recreation and tourist interest and provides access to these locations.

Petroleum

1. Determine siting requirements for petroleum industry expansion; and

2. Reserve sufficient land for residential and other uses without preempting lands suitable for petroleum-related expansion.

Power Generation

1. Identify and promote the development of all potential sources of power generation such as Allison Lake and the Pressure Reducing Turbine.

2. Investigate power grid interties with the City of Cordova and the railbelt intertie system.

General Industrial Expansion

1. Determine the nature and siting requirements of general industrial expansion that will accompany growth in the transportation, fisheries, tourism/recreation, and petroleum industries; and

2. Identify and reserve appropriate land for future industrial expansion.

1.3.2 Public Safety

It is an accepted fact that Valdez, like other areas of Alaska, may be subject to future earthquakes, marine landslides, seiche activity, and certainly flooding and avalanches.

To provide for public safety and to minimize uncertainty when developing coastal areas, the Valdez Coastal Management Program will pursue the following objectives:

1. Evaluate seismic avalanche and flood hazards, and specify development criteria;

2. Site industrial, commercial, and residential development in areas that minimize risk to life and property;

3. Require sound engineering practices to ensure the safe design and construction of public and private facilities;

4. Determine the best use of hazard-prone lands; and,

5. Recommend further studies to evaluate the magnitude of potential hazards, identify mitigation measures, and suggest ways to use hazardous land.

1.3.3 Resource Enhancement and Protection

Valdez will seek to ensure the compatibility of new development with the resource values expressed in this plan. To do this, the program will:

1. Identify important coastal and upland habitats that should be protected and enhanced;

2. Continue to promote and enhance renewable resources;

3. Protect resource values through siting, design, and appropriate construction measures;

4. Require maintenance of current air and water quality in Valdez.

1.3.4 Land and Water Uses

Land and water uses are inextricably connected to economic development, public safety, and resource protection. However, because of steep terrain and seismic and flood-prone areas, suitable land for industrial, commercial, and residential use is limited and thus deserves special attention in the coastal management program.

1. Determine future land and water use needs;

2. Reserve waterfront land for industrial and other uses requiring direct access to water;

3. Encourage innovative development to maximize use of available land;

4. Work closely with the State of Alaska to coordinate and expedite the land disposal program and other state land management programs; and

5. Maximize compatible, multiple use of land and water resources through siting and design measures.

1.3.5 Regional Interests

Valdez is linked economically to Interior Alaska and the Prince William Sound region.

Valdez is keenly interested in how regional resource and land management decisions and development projects will affect its own economy and growth. Land conveyances, increased vessel traffic, implementation of fisheries management plans, and establishment of state parks are, in fact, local issues and thus the coastal management program has incorporated regional interests as a part of its program agenda.

1. Coordinate future land use decisions with Prince William Sound and Interior communities and concerned federal and state agencies;

2. Support improved transportation and communications systems for Prince William Sound and Interior communities; and

3. Cooperate with the State of Alaska in the identification and design of marine parks.

1.3.6 Permits and Government Control

Increasingly, all levels of government are participating in decisions to alter the natural and man-made environment. Through the consistency provision of the Coastal Management Act, Valdez intends to expedite and simplify permit procedures and to make certain that state and federal actions are consistent with the district program.

The matter of consistency is important to Valdez, since approximately half of the land within city limits is state-owned and nearly 20 percent is federally-owned. Consistency will require that state and federal agencies comply with the local district program to the extent that the district program is consistent with existing regulations. Thus it is important that the district program adopt policies and an implementation scheme that streamlines decision-making and consistency review. In the course of program development, Valdez will:

1. Specify policies that ensure that state and federal activities are consistent with the local district program;

2. Consider mechanisms to coordinate local permitting and consistency review; and

3. Maximize use of existing ordinances and regulations to implement the district program.

2.0 COASTAL MANAGEMENT DISTRICT BOUNDARIES

2.0
COASTAL MANAGEMENT DISTRICT BOUNDARIES

The Phase One Valdez District Coastal Management Program set its boundaries to include all areas within municipal boundaries up to 1500 feet in elevation. These boundaries were based on the zones of direct interaction and influence as identified in the Alaska Department of Fish and Game Biophysical Boundaries.

The Phase Two Resource Inventory included all areas within the municipal boundaries, to examine resource uses and activities that might directly or indirectly influence the coastal areas of Valdez. After completion of the resource inventory and analysis, it was determined that the 1500-foot elevation includes all of the level and developable lands within municipal boundaries. It was also felt that resource use or activities above the 1500-foot elevation were unlikely to have a direct or indirect influence on coastal resources. Valdez Coastal Management District Boundaries are shown in Map 1.

3.0 RESOURCE INVENTORY

3.0
RESOURCE INVENTORY

3.1 NATURAL RESOURCES

3.1.1 General Description of Port Valdez

Port Valdez and Valdez Arm form a 46 km northeasterly extension of Prince William Sound in southcentral Alaska. Connection with the north Pacific Ocean is via Hinchenbrook Entrance, which opens on the Gulf of Alaska about 110 km from the town of Valdez. Port Valdez is a relatively deep, narrow, east-west oriented, glaciated formation that is properly termed a fjord, extending about 23 km eastward from Valdez Narrows. The latter, a nearly right-angle constriction, is a narrows silled entrance that is regarded as the demarcation between Port Valdez and Valdez Arm. The town of Valdez lies near the northeast corner of the fjord, while the Alyeska Marine Terminal is on the south shore at Jackson Point (Map 2).

Port Valdez is about 5 km wide by 18 km long and is shaped somewhat like a bathtub, with steep sides on the north and south and a remarkably flat horizontal bottom at a depth of about 240 m over three-quarters of its length. In the easternmost quarter of the fjord the bottom rises rather uniformly to the eastern shore at the former townsite of Valdez. The maximum depth of Port Valdez is 247 m (in the southwestern corner), while the overall mean depth of the fjord is about 180 m.

Port Valdez has an oceanographic regime that is strongly stratified (vertically) both in temperature and salinity during the summer, but is virtually unstratified during the winter months (Muench and Nebert 1973; Colonell 1979). The fjord would be classified as a "positive" estuary since it receives more fresh water by runoff and precipitation than is lost through evaporation. This implies that the classical estuarine circulation, with seaward movement of a brackish layer and landward movement of deeper waters, would prevail in Port Valdez, at least during periods of maximum runoff. Hydrographic data suggest that such flow does occur during the summer months, but that it is confined to the top 15 m of the water column (Muench and Nebert 1973; Colonell 1979). While a fairly vigorous current structure exists in Valdez Narrows due to tidal and weather-induced flows (Colonell 1979), current measurements at the eastern end of Port Valdez have suggested water movements there to be rather sluggish at best, and virtually stagnant much of the time (Colonell, personal communication).

Tides in Port Valdez are the mixed, semidiurnal (two highs and two lows per day) type with a maximum range of 5.3 m and a mean height of 3.0 m. The tidal prism (volume of water that comes in on a high tide) is about 1.6 percent of the total volume of the fjord. Recent estimates (Colonell 1979) of freshwater inputs to the fjord during maximum runoff (July) suggest a mean value of about 7 percent of the tidal prism with extreme values of 2 to 15 percent. The major portion of freshwater input is from the Lowe River, Valdez Glacier Stream, and Mineral Creek. Especially notable are the large amounts of glacial silt and sediment deposited in Port Valdez by the Lowe River and Valdez Glacier Stream. Rates of sediment deposition range from 4.3 to 13.5 cm/yr in the eastern end of the fjord (Sharma and Burbank 1973) to as little as 1 cm/yr in the western end.

Most of the Port Valdez shoreline is steep and rocky, except where major streams and rivers discharge into the fjord. At the eastern end, the Lowe and Robe Rivers, and the Valdez Glacier Stream, have formed the extensive Valdez outwash delta upon which the town of Valdez was

formerly located. The present site of Valdez is an alluvial fan deposited by Mineral Creek. Both the Valdez outwash delta and the Mineral Creek alluvial fan consist of poorly consolidated alluvial and glacial deposits of silt, sand, and gravel. Large tidal flats have formed at the seaward edge of these deltas because of the high tidal range and the large amounts of fine sediments provided by the streams and rivers (Sharma and Burbank 1973).

3.1.2 Habitats and Biological Resources

The Alaska Coastal Policy Council recognizes six marine and two inland habitats subject to the Alaska Coastal Management Program (ACMP):

- o Offshore areas
- o Estuaries
- o Wetlands and tideflats
- o Rocky islands and sea cliffs
- o Barrier islands and lagoons
- o Exposed high energy coasts
- o Rivers, streams, and lakes
- o Important upland habitat

Other habitat terms are commonly used to describe eight habitat types or portions of them. Table 3.1 relates those terms to the habitat designations used by the ACMO.

Habitat Descriptions

Offshore Areas. Offshore areas are defined as submerged lands and waters seaward of the coastline, presumably at mean lower low water (MLLW). Offshore areas within the Valdez city limits include Port Valdez, Valdez Narrows, and portions of Valdez Arm and Jack Bay.

The high rate of sedimentation in the eastern Port Valdez offshore area has resulted in a deep-water benthic population that shows a low

Table 3.1. Common habitat terms and their relationship to Alaska Coastal Management Program (ACMP) habitat descriptions.

Habitat Terms	Alaska Coastal Management Program (ACMP) Habitats Occurring Within the City of Valdez							
	Offshore areas	Estuaries	Wetlands and tideflats	Rocky islands and seacliffs	Barrier islands and lagoons	Exposed high energy coasts	Rivers, lakes, and streams	Important upland habitat
Alpine tundra								X
Benthic or benthos	X	X	X				X	
Bog			X					X
Braided streams							X	
Clam and worm flats		X	X					
Cut-bank		X	X				X	
Eelgrass Bed		X	X					
Epifauna	X	X	X				X	
Estuary		X	X					
Exposed outer coast				X		X		
Floodplain		X	X				X	
Grass-sedge meadows			X					
Gravel beach					X	X		
Infauna	X	X	X		X		X	
Intertidal zone		X	X	X	X	X		
Islets and seastacks				X				
Kelp bed				X		X		
Mudflat			X					
Muskeg			X			X	X	
Old-growth forest (climax forest)								X
Offshore bar					X			
Pelagic	X	X						
Productive shallows		X	X				X	
Protected embayment		X	X		X			
Riparian community		X	X				X	
Saltchuck		X	X					
Scrub forest								X
Spit					X			
Spruce-hardwood (broadleaf) forest							X	X
Stream-influence zone		X	X				X	
Subtidal zone	X			X		X		
Watershed							X	X
Wetland		X	X				X	

Source: Woodward-Clyde Consultants, 1981

number of species and organisms compared with the western area (Feder and Matheke 1979). The benthic infauna (animals living within sediments) is dominated by deposit-feeding organisms typically found in soft substrates. Dominant groups are polychaete worms and small bivalves. Epibenthic invertebrates (animals living on top of the sediments) are also present in low numbers and include five species of pandalid shrimp, Tanner crab, king crab, and Dungeness crab, with juvenile Tanner crab the only species taken in abundance.

Marine fish species in the deep Port Valdez offshore area have been captured in low numbers, but the gear used in recent studies was a small otter trawl (3-4 m) that was not efficient at capturing larger, more mobile fishes (Smith and Stoker 1969, Feder et al. 1973, Feder and Matheke 1979). The species list, however, indicates a reasonably diverse fauna, considering the gear used. Twenty-three species were reported from these surveys. Many of the fish captured are typically found on soft substrates, including five species of flounder, one species of skate, and members of the cod and sculpin families. The presence of Pacific ocean perch and yelloweye rockfish, however, indicates that deep hard-bottom areas are present in some parts of the fjord. Exploratory drags made by the National Marine Fisheries Service (NMFS) in 1954 and 1970 with commercial-sized trawls indicated a low biomass of catchable fish; eleven trawls yielded an average of 115 pounds per hour (lb/hr) of tow (NMFS 1975). In contrast, a single tow in Jack Bay in 1970 yielded 1500 lb/hr, primarily pollock and herring.

Shallow regions of the offshore area are more diverse, with both rocky and soft subtidal habitats. The shallow rocky areas around Seal Rocks contain a rich kelp bed community with an abundant and diverse group of invertebrates (Rosenthal 1977). The group of fish present in this area is considerably different from that in the deeper regions, with many of the species dependent on the rocky habitat. In contrast, the shallow clay or sandy areas, such as below Island Flats, contain low algal densities and the invertebrates are dominated by an echiurid

worm (spoonworm) and a tube worm, with a number of other small worms and snails also present (Lees et al. 1979). These shallow soft-bottom habitats do contain a fair number of juvenile and breeding adult Tanner crabs, however, and may be important in the life cycle of this species. There is a recreational fishery for Dungeness crab in the shallow eastern portion of Port Valdez, although this species has not been detected during scientific sampling. The fish fauna is relatively impoverished during the day, with starry flounders dominating; however, since many of the deep water fish and mobile invertebrate species move into these shallow waters at night to feed, daytime observations of apparent densities or distributional patterns can be misleading.

Herring utilize the shallow subtidal algal beds of Jack Bay and Valdez Arm for spawning, primarily in April and May. These spawning aggregations are followed by a host of predators, including chinook salmon and a variety of fish-eating birds (including murres, cormorants, and gulls) and mammals (including porpoise, seals, and sea lions).

Whales are the only marine mammals that use the offshore habitats exclusively; other marine mammals are associated with various shoreline features. Seven species of whales or porpoises have been sighted within Port Valdez, including three species with an endangered classification under the Endangered Species Act: the humpback whale, finback whale, and sei whale (J. Nickles, USFWS, personal communication).

Estuaries. Estuaries are defined as semienclosed coastal bodies of water that have a free connection with the sea and within which seawater is measurably diluted with fresh water derived from land drainage. Under this definition, all of Port Valdez can be considered an estuary, since the freshwater input from the various streams and glaciers measurably dilutes the surface layer during the summer. On a smaller scale, the mouths of all streams that are under the influence of tidal action and the various bays receiving freshwater run-off would be considered estuaries. In streams, the estuarine portion extends upstream to the limit of

saltwater intrusion. The downstream extent of the estuary is less well-defined and, as indicated in the definition, is generally considered to be where the freshwater input can no longer be detected. Major estuaries in the Valdez area include the Lowe River estuary, the many creeks entering the bay through Old Town and Island Flats, Mineral Creek, Shoup Bay, and Jack Bay. As indicated, the lower reaches of all streams are part of the estuarine system.

Estuaries are characterized by high productivity due to the deposition of land-derived nutrients. The rivers deliver dissolved nutrients that stimulate production of algae, which in turn are utilized by herbivores such as copepods. An additional significant nutrient source is the decaying carcasses of spent salmon. McRoy and Stoker (1969) believe that the organic matter derived from salmon is as important a nutrient source as phytoplankton production. Organic detritus is another important nutrient source and can be directly utilized by bacteria and detrivores, such as mysids and amphipods. These primary consumers form the basis for a complex food web typically found in estuaries. The rich feeding grounds are critical feeding areas for chum and pink salmon fry. For example, salmon fry (primarily chum salmon during a studying period in 1979) feed in and around Island Flats for at least a month (late April to early May) before moving to the marine environment (Morsell and Perkins 1979). These estuarine areas are also used by crabs, shrimp and a large number of deposit and filter-feeding invertebrates, such as clams and polychaete worms, for both feeding and spawning. Marine fish and birds are attracted by the high populations of prey organisms and are often concentrated around estuaries at certain times of the year. For example, maximum or high numbers of Arctic terns, mergansers, and horned grebes, all fish eaters, occurred at Island Flats during the period of salmon fry out-migration (late April to late May) (Hemming and Erickson 1979, Hogan and Colgate 1980).

The estuaries are also critical migratory pathways for anadromous fish during juvenile out-migration and return of mature adults. Up to an estimated 143,000 adult salmon per year passed through the eastern Port Valdez estuarine system in recent years (Table 3.2).

Table 3.2. Total estimated adult salmon escapement by species for the eastern Port Valdez area, 1971-1979.

Year	Pink Salmon	Chum Salmon	Coho Salmon	Sockeye Salmon	Total
1971	56,850	3,273	9,990	6,000	76,113
1972	725	3,512	1,627	5,027	10,891
1973	68,620	11,271	4,093	1,300	85,284
1974	2,079	2,470	1,740	3,000	9,289
1975	139,048	800	3,075	12	142,935
1976	102	1,922	2,427	4	4,455
1977	79,027	0	2,916	9,188	91,131
1978	78	180	6,734	1,005	7,997
1979	62,028	1,417	5,037	2,236	70,718

Estimates from Dames and Moore (1979a) and Williams (1979 and unpubished data).

Wetlands and Tideflats. The Coastal Zone Management (CZM) wetlands and tideflats classification is a mix of fresh and saltwater habitats with and without vegetation. Wetlands are considered to be vegetated areas that are partially submerged either continuously or periodically. Saltwater wetlands are coastal areas along sheltered shorelines characterized by halophytic hydrophytes (moisture-tolerant plants growing in a saline soil) and macroalgae extending from extreme low tide to an area above extreme high tide that is influenced by sea spray or tidally influenced water table changes. Fresh water wetlands contain water of less than 0.5 parts per thousand salt content and do not exceed 9 feet (3 meters) in depth. Tideflats are defined as primarily unvegetated areas that are alternately exposed and inundated by the falling and rising of the tide.

Saltwater wetlands and the associated tideflats are common in eastern Port Valdez, but less common west of the Alyeska Terminal and Gold Creek. Major saltwater wetlands and tideflats extend from the southwest portion of Dayville Flats to the northwest edge of Island Flats. Additional significant wetlands and tideflats occur at Mineral Creek Flats, Gold Creek, and Sawmill Spit (Crow 1977). Jack Bay also has extensive salt marsh habitat at the head of the major coves.

The generally estuarine condition of Port Valdez is evident in the vegetation communities of the salt marshes, as they show a fresh to brackish water character rather than a marine character (Crow 1977). The diversity of these communities is quite high, with about 28 to 30 frequently occurring species.

A variety of birds are associated with the salt marshes and tideflats and use these habitats as staging, feeding, or nesting areas. Canada geese and numerous species of ducks have been observed in many of the saltmarsh-tideflat communities around Port Valdez. Because of its size, the Island Flats marsh in particular has been identified as important habitat for many species (McRoy and Stoker 1969, Hemming and

Erikson 1979, Hogan and Colgate 1980). Fifty-three species of birds were reported from Island Flats in 1979, with other marshes containing both fewer species and numbers (Hogan and Colgate 1980). Bird use of all saltmarsh-tideflat habitat in Port Valdez is highly seasonal; many species migrate through the area only in the spring and fall, while other species, such as sea ducks, principally use these marshes during winter.

Tideflats are associated with all the above salt marshes and the terminus of Shoup Glacier. This tideflat habitat represents approximately 11 to 19 percent of the Port Valdez shoreline (McRoy and Stoker 1969, Hogan and Colgate 1980). Island Flats appears to be the most productive tideflat in this area, but this conclusion is based primarily on circumstantial evidence (Lees et al. 1979). Starry flounder and diving duck predation on mussels and clams appears to be high (Lees et al. 1979). Chum salmon fry feed heavily on copepods over the tideflats in the vicinity of Mineral Creek Islands (Morsell and Perkins 1979), and a variety of fish-eating birds, feed over the flats during the salmon fry and adult migrations (Hemming and Erikson 1979, Hogan and Colgate 1980). The Island Flats communities generally increase in complexity from the high to low tide level and from east to west. The central and eastern areas, however, appear to be the most productive (Lees et al. 1979). The high level of observed predation on tideflat invertebrates and fishes by other fish, birds and mammals at Island Flats is not obvious at other tideflats, suggesting a higher density of prey at Island Flats. Comparable data on other tideflats, however, are scarce or lacking.

Freshwater wetlands are primarily found in the Robe Lake watershed (Dames and Moore 1979b). The main freshwater wetland within the Valdez boundaries covers the area formerly occupied by Robe Lake. Additional wetlands are identified in the upper reaches of Brownie Creek and Corbin Creek (Robe). These wetlands have received low study effort. The Robe Lake wetlands are probably utilized as salmonid rearing habitat by juvenile coho and sockeye salmon and Dolly Varden char, and as spawning habitat by three-spine stickleback (Williams 1979). This wetland

provides nesting and juvenile rearing habitat for dabbling ducks, shorebirds, grebes, red-winged blackbirds, and other marsh-nesting birds (Dames and Moore 1979b).

Rocky Islands and Sea Cliffs. Rocky islands and sea cliffs are defined as islands of volcanic or tectonic origin with rocky shores and steep faces; offshore rocks; capes; and steep, rocky seafronts. Rocky islands are represented by the Mineral Creek Islands, Saw Island, Entrance Island, Bunch Island, and Middle Rock, as well as by a variety of apparently unnamed islands in Anderson and Jack Bays. Seacliff habitat comprises approximately 18 percent of the Port Valdez shoreline, with much of this habitat occurring in western Port Valdez (Hogan and Colgate 1980). Sea cliff intertidal epifauna have been studied extensively in other parts of the northeastern Pacific because of the strong zonation of organisms observable at low tide. Areas specific to Port Valdez, however, have not been studied. In general, these areas support barnacles and mussels with associated predatory starfish and snails. The subtidal habitat often contains kelp beds of mixed algal species and a variety of invertebrates typically associated with rock substrate or kelp beds. The dominant invertebrates include anemones, starfish, snails, shrimp, hermit crabs, and polychaete worms. Fishes typically found in rocky subtidal habitat are found at the base of these islands or cliff habitats; for example, kelp greenling, black rockfish, wolf eel, and lingcod frequently inhabit these areas (Rosenthal 1977).

Some birds utilize these areas as both nesting and summer or winter feeding habitat. Species commonly observed include Arctic terns, which nest on Mineral Creek Islands, and goldeneyes, pigeon guillemots, and marbled murrelets, which seasonally utilize these areas primarily for feeding (Hogan and Colgate 1980). Black-legged kittiwakes and glaucous-winged gulls also are abundant during the summer and use a unique rocky island habitat for nesting: the island in the lagoon at the base of Shoup Glacier contains the fourth largest breeding colony of this species in Prince William Sound (McRoy and Stoker 1969, Hogan and Colgate 1980).

The eddies and rips formed around islands and steep points also serve to concentrate schools of small pelagic fishes (i.e., herring and sandlance), often attracting predators, such as salmon, piscivorous birds, and marine mammals. Some marine mammals, such as seals and sea lions, also use the islands and offshore rocks as hauling-out areas, while seals, sea lions, and sea otters use the surrounding subtidal areas for feeding. The rocks in Valdez Narrows have been identified as important hawling-out areas for harbor seals (McRoy and Stoker 1969).

Barrier Islands and Lagoons. Barrier islands are depositional coastal environments formed by deposits of sediment offshore or coastal remnants that form a barrier of low-lying islands and bars protecting a saltwater lagoon with a free exchange of water to the sea. Classical barrier islands and lagoons are not found in Port Valdez but there are a few coastal features with a morphology similar to that described. The morrainal deposit at the mouth of Shoup Bay has acquired some characteristics of a depositional spit. A similar feature, the spit at Gold Creek, appears to have been formed by coastal processes. Both of these areas contain significant Arctic tern breeding colonies (Hogan and Colgate 1980). The man-made structure known as Sontag Spit has acquired some of the characteristics of a spit, and three pairs of terns unsuccessfully nested there in 1979 (chicks did not survive). Canada geese are reported from the protected side of the Shoup Bay spit, and gulls use all three spits (McRoy and Stoker 1969).

Exposed High Energy Coasts. Exposed high energy coasts are defined as "open and unprotected sections of coastline with exposure to ocean-generated wave impacts and usually characterized by coarse sand, gravel, boulder beaches, and well-mixed coastal water." The enclosed nature of Port Valdez precludes this habitat, as ocean-generated waves are not present and there is insufficient fetch (distance over a water surface of unobstructed exposure to wind) within the fjord to allow the generation of high waves. Much of the coastline, however, does have a coarse substrate (i.e., gravel to boulders or bedrock) which is often associated

with Alaskan high energy coasts. Up to 60 percent of the Port Valdez shoreline contains coarse substrate, 15 percent being medium gradient sand or gravel beach and 45 percent being rocky beach (Hogan and Colgate 1980). Thus, in this case, the term "high energy coast" will be used to define these predominant Port Valdez shoreline habitats.

The flora and fauna of the rocky coastline is similar to that found on rocky islands and sea cliffs, often dominated by rockweed, mussels, and barnacles. Limpets and small snails are also abundant (McRoy and Stoker 1969). Similar species assemblages are found in the coarse gravel/cobble habitats (Nauman and Kernodle 1976, Feder et al. 1979). Pronounced zonation with tide level is evident in both habitats.

Various intertidal fishes inhabit these areas, but this group has not received much attention. The invertebrate intertidal surveys have identified three species of common intertidal fishes with some unidentified sculpins also reported (McRoy and Stoker 1969, Nauman and Kernodle 1976, Feder et al. 1979, Lees et al. 1979). The fish species present in the subtidal regions would be determined by the substrate present in the intertidal region. Some species, such as members of the cod and rockfish families, move into the rocky intertidal region to feed at night during high tides. The adult salmon migrate past these areas, often in close proximity to the shoreline, during their return migration.

The sand and gravel beaches are used by harlequin ducks and breeding Arctic terns, while goldeyes, pigeon guillemots, and marbled murrelets are found along the rocky area. Bird densities along the rocky beaches are the lowest recorded in any Port Valdez habitat (Hogan and Colgate 1980).

Marine mammals frequently feed in the vicinity of these shoreline habitats. For example, the area west of Dayville Flats to the Alyeska Terminal is identified as an important feeding area for sea otters and harbor seals (Dames and Moore 1979c, USFWS 1980).

Rivers, Streams, and Lakes. At least 50 streams are reported to enter Port Valdez (McRoy and Stoker 1969). Over half of these streams are known to support runs of salmon (Alaska Department of Fish and Game 1979). The three largest rivers, Lowe River, Valdez Glacier Stream and Mineral Creek, are fed by glaciers and have a braided configuration and highly turbid water in the summer. Most of the floodplain is unvegetated gravel, with numerous channels weaving around and through the abundant gravel bars. The small single-channel streams that flow through Old Town and Mineral Creek Flats are former glacier-stream channels that now receive ground water flow, resulting in year-round clear water. The numerous small clearwater streams that originate in the mountains around Port Valdez are primarily snow-melt streams.

Lake habitat is rare in Valdez, with only three lakes of any size: Robe, Allison, and Solomon Lakes. There are a number of small pond-sized lakes, including Deep and Crater Lakes. The Robe Lake system has undergone significant environmental change over the past 50 years. In the late 1930s, a branch of Valdez Glacier Stream diverted into Corbin Creek, causing a rapid deposition of glacial sediments in Robe Lake. The silt quickly reduced the depth of the lake and altered spawning habitat. In the late 1950s, a dike was constructed that diverted Corbin Creek into Valdez Glacier Stream. Diversion of Corbin Creek has reduced sedimentation, but the shallow depth resulting from the deposited sediment and increased water clarity, allowing for increased photosynthetic activity, have caused natural eutrophication of Robe Lake to accelerate. The portion of Corbin Creek downstream from the dike has retained some clearwater flow from groundwater seepage.

Most of the clearwater streams within the Valdez boundary have suitable gravel for salmon spawning, but the total area available for spawning is limited by the steep gradients that occur above the intertidal zone. This spatial limitation restricts spawning to the lower reaches of the streams, often only to the intertidal area, and results in the large number of streams with small runs of salmon. The turbid

glacial rivers are used as migration corridors to the spawning areas in clearwater tributaries. Pink salmon and chum salmon are particularly adapted to spawning in the lower reaches, or intertidal areas. The fry do not rear in fresh water, but migrate to sea shortly after emerging from the incubation gravel. Coho salmon, however, spend one to two years in fresh water before migrating to sea as smolts. As a result, they are found only in rivers that contain suitable rearing habitat year-round. In Valdez, only two systems presently support coho salmon -- Lowe River and Robe Lake (Table 3-3). The coho spawn in small streams, rear in clearwater areas during the summer, and move to overwintering areas in the rivers or lake during the winter. Smolt out-migration occurs in late spring after one to two years in fresh water.

Sockeye salmon populations typically require a river system containing a lake suitable for rearing, although exceptions are known. Sockeye salmon fry typically spend one to three years in a lake prior to smolt out-migration in the spring. Robe Lake provides the only suitable rearing area for sockeye. The quality of this rearing area has declined drastically in the past 50 years due to well-documented sedimentation from Corbin Creek (Glacier).

Previously, the Robe Lake system supported runs in excess of 40,000 sockeye salmon (ADF&G 1979); now the average run is approximately 5,000 sockeye (Williams 1979). Within the Robe Lake System, sockeye spawn primarily in Brownie Creek, while the majority of the coho spawn in Corbin Creek (Robe).

Other fish that utilize rivers or lakes include Dolly Varden char, eulachon, and three-spine stickleback. Anadromous Dolly Varden char, found in most of the freshwater habitats during certain times of the year, support a sport fishery. Eulachon are reported from at least Valdez Glacier Stream and Siwash Creek, probably spawning in March and April, but the size of the run is unknown (ADF&G, unpublished data). Sticklebacks can occur as marine, estuarine, and freshwater populations, and provide important forage to piscivorous birds and larger fish.

Table 3.3. Salmon escapement for selected eastern Port Valdez streams, 1971-1979.[1]

Year	City Limits Creek	City Limits Slough	Ess Creek	Siwash Creek	Loop Rd. No. 2 Creek	Loop Rd. No. 1 Creek	Sewage Lagoon Creek	Robe Lake System	Love River System	Dayville Flats Creek	Solomon Gulch Creek	Allison Creek	Abercrombie Gulch Creek	Mineral Creek System	Total
Pink Salmon															
1971	940			13,070	100	1,080		4,500	35,310	1,300		300	250		56,850
1972	30			220		475		0	0						725
1973	1,700			34,080	330	7,000		15,000	8,000			25	250	2,235	68,602
1974	860			70		262			670					217	2,079
1975	1,520			79,180	3,790	6,420		2,461	41,430	1,300	1,500	500		947	139,048
1976	5		65	5		18		0	1					8	102
1977	3,620	333		46,550	4,101	18,718	1,418	330	1,441				2,337	179	79,027
1978	10			0	0	66	0	2	0					0	78
1979	5,512			29,232	6,012	16,246	1,657	1,546	1,770					53	62,028
Chum Salmon															
1971	2,660		32	120					411				50		3,273
1972	1,200			220		45		40	2,007						3,512
1973	1,930			232				125	1,063		10		800	7,111	11,271
1974	1,000			16		0								1,454	2,470
1975				100								700			800
1976	1,080			2		6		0	270					564	1,922
1977	0			0		0	0	0	0					0	0
1978	111			0	0	0	0	0	1					68	180
1979	1,277			2	0	0	0	11	1					126	1,417
Coho Salmon															
1971				57				9,690	193				50		9,990
1972				41				875	711						1,627
1973				6				4,000	67					20	4,093
1974				0				1,662	78					0	1,740
1975				0				1,553	1,506					16	3,075
1976	2			0		0		1,049	1,310					66	2,427
1977					0		0	1,552	1,363					1	2,916
1978	0			0	0	0	0	5,091	1,643					0	6,734
1979	0			0	0	0	0	3,470	1,536					31	5,037
Sockeye Salmon															
1971						0		6,000							6,000
1972						0		5,000	27						5,027
1973						0		1,300	0						1,300
1974						0		3,000	0						3,000
1975								10	2						12
1976	1			0		C			1					2	4
1977							0	9,188							9,188
1978	0			0	0	0	0	972	29	0				4	1,005
1979	0			0	0	0	0	2,216	16	0				4	2,236

[1] From Dames and Moore (1979a) and Williams (1979 and unpublished data).

Most of the 24 recorded eagle nests within the Valdez boundaries are associated with nearby salmon-spawning streams (Map 3). The existence of inactive nests near streams not presently containing salmon has been used to indicate where salmon runs have been lost (Dames and Moore 1979a). Concentrations of eagles occur along spawning streams during the salmon runs, with up to 58 individuals counted along the Lowe River alone (Dames and Moore 1979b). Similarly, gulls congregate along and around the mouths of streams at this time, leading to the peak recorded concentrations of these species (Hogan and Colgate 1980). Carnivorous mammals, including bear, river otter, and mink, also gather to feed on the salmon, leading to increased concentrations of these species during the salmon runs.

Allison and Solomon Lakes are high-altitude, glacier-fed lakes on the south side of Port Valdez; Allison Lake lies at an elevation of 1350 ft and Solomon Lake is at 625 ft. The streams connecting the lakes with the marine system have a steep gradient with high current velocities, restricting anadromous fish to the extreme lower reaches and intertidal region. Fish are not known to occur in the lakes (USFWS 1980). Waterfowl use of the Allison Lake system is limited, but Canada geese are known to use the lake for molting and nesting. Most mammals that are typically found throughout the Valdez area, except moose, are known to occur in the Allison Lake drainage (USFWS 1980).

An additional important habitat associated with rivers and streams is the riparian woodland found along the floodplains. In Valdez, this habitat is dominated by willow, alder, and cottonwood. These areas provide important willow ptarmigan and small-bird nesting and feeding habitat, and often provide bald eagle nesting habitat. The riparian woodlands, particularly along the Lowe River, also provide moose habitat, and are preferred winter and calving areas. The Lowe River and Valdez, Glacier Stream floodplains contain most of the riparian woodland habitat in Valdez with the Mineral Creek floodplain also containing a significant amount of this habitat. The other streams contain relatively small amounts of riparian woodland habitat.

Important Upland Habitat. Much of the upland habitat within the Valdez boundaries has steep contours, contains snow for much of the year, and was recently glaciated. The combination of these factors reduces the value of this habitat for many animals and, as a result, populations in these areas are characterized by low numerical densities. The low-lying deciduous and spruce forests provide a more productive habitat, but are generally limited to small areas along the coastline. Three areas that support larger areas of productive upland habitat include the triangle between the Lowe River and Valdez Glacier Stream (continuing Robe Lake) and the Mineral Creek alluvial fan. The Corbin Creek (Robe) and Brownie Creek watersheds, in particular, contain the most diverse upland habitat and provide high-quality habitat for large mammals and furbearers (Dames and Moore 1979c). Mountain goats can be observed at higher elevations, while wolves, coyote, red fox, lynx, and moose also occupy upland habitats and can occur in the area. Black bear, brown bear, wolverine, black-tailed deer, river otter, and mink have been identified in this area (City of Valdez 1979, Dames and Moore 1979c). The upland habitat around Mineral Creek is isolated and somewhat restricted in area; thus its value as large mammal habitat is limited.

Biological Resource Utilization

Offshore Areas. The biological communities found in the offshore habitat within the Valdez boundary are currently being utilized in the following manner (not in order of importance):

- o Recreational fishing
- o Subsistence fishing
- o Scientific sampling

At present, commercial salmon fishing is not conducted within the Valdez boundaries, as Port Valdez is a closed terminal area. The known herring spawning areas within the Valdez boundaries are also closed to commercial harvest. Stocks of other species, such as crabs, shrimp, and

bottomfish, are too low to generate commercial interest. An increase in the size of the salmon runs, however, could lead to increased commercial fishing activity in the Port Valdez offshore region. The Valdez Fisheries Development Association (VFDA) is in the process of implementing plans to enhance Valdez salmon runs. If project goals are met, an additional 2 million adult salmon will return through the offshore region (VFDA 1979). VFDA has proposed a terminal harvest area, with closures in the vicinity of selected streams, to commercially harvest excess fish under emergency openings as needed (VFDA, unpublished report).

Recreational fishing in the offshore area is directed primarily toward salmon. Creel censuses have estimated 9,700, 19,400, and 7,500 angler-days of fishing effort in Port Valdez for 1974, 1977, and 1978, respectively, with 13,355, 18,320, and 10,698 total salmon harvested (Table 3.4). The effort and catch are substantially higher during the odd-year peak run of pink salmon (1977). The decrease in angler effort between 1974 and 1978 was due to a reduction in effort by nonresidents; effort by Valdez residents increased slightly (Williams 1979). As with commercial fishing, the increased salmon production proposed by VFDA should significantly increase the offshore sport fishing activity in Port Valdez.

There is some sport fishing effort directed toward halibut, bottomfish, and shellfish. In 1977, an estimated 528 halibut and 1,895 rockfish were harvested (Table 3.4).

Subsistence salmon harvest within Port Valdez is presently low but can be expected to increase if the salmon enhancement projects are successful. There is currently a minor subsistence fishery for Dungeness crab in eastern Port Valdez (Morsell and Perkins 1979).

Scientific sampling is currently being conducted in the offshore area by the NMFS Auke Bay Laboratory in relation to continuing studies of the effects of the Alyeska ballast water treatment facility. These studies are confined to areas in the vicinity of the Alyeska Marine Terminal.

Table 3.4. A comparison of Port Valdez sport fish effort and harvest estimates, 1974, 1977, and 1978.

	1974[1]	1977[2]	1978[1]
Angler days	9,708	19,423	7,462
Chinook salmon	--	247	--
Coho salmon	6,750	5,277	1,967
Sockeye salmon	--	557	--
Pink salmon	6,142	12,020	7,492
Chum salmon	463	219	1,239
Halibut	--	528	--
Dolly Varden char	--	594	--
Smelt	--	905	--
Rockfish	--	1,895	--
Other	--	1,236	--

[1] From Williams (1979).

[2] From Mills (1979).

Estuaries. There is currently little utilization of estuarine resources, mainly because streams in Valdez are closed to salmon fishing. Some fishing for Dolly Varden char probably occurs in the estuarine areas in and around streams containing anadromous runs of this species.

Wetlands and Tideflats. Migratory waterfowl tend to seek out wetlands during their fall migration; thus these areas are utilized by hunters. Waterfowl hunting would be expected around Robe Lake and Lowe River as well as some of the smaller wetlands in western Port Valdez and possibly Jack Bay. The wetlands at Island Flats, being closed to hunting, are used for nature study, photography, education activities, and research.

The tideflats of Port Valdez are used primarily for research, education activities, and nature studies. Some harvest of bay mussels may occur. NMFS maintains long term study sites at Mineral Creek Flats and Dayville Flats, and the U.S. Fish and Wildlife Service has a long-term interest in the Island Flats wetlands.

Rocky Islands and Sea Cliffs. The current patterns and kelp beds often found around rocky islands and sea cliffs tend to concentrate fish, focusing sport fishing effort in these areas. These rugged areas are quite scenic, often with seals, sea lions, sea otters, and sea birds, and attract photographers and sightseers. The subtidal cliffs and kelp beds also are preferred areas for sport diving and underwater photography.

Barrier Islands and Lagoons. The sheltered waters behind barrier islands and spits provide protected moorage and may be used as anchorages or harbors with associated recreational activities. Other uses are unknown.

Exposed High Energy Coasts. Although this is the dominant habitat in Port Valdez, there is minimal resource utilization in these areas. NMFS has a number of long-term study sites in this habitat scattered

around Port Valdez, with the studies directed at monitoring long-term effects of the Alyeska Terminal. Some harvest of mussels may occur. The principal use may be for nature study and photography.

Rivers, Streams and Lakes. All freshwater areas within the Valdez boundaries are closed to the taking of salmon, considerably reducing the sport fishing effort in these habitats. Freshwater sport fishing is directed toward Dolly Varden char, primarily during the fall anadromous runs in the Robe Lake system and at various clearwater areas in the Lowe River drainage. Small runs in other drainages receive less pressure. The riparian habitat in the Lowe River floodplain provides good ptarmigan habitat, and may be used as a hunting area.

Important Upland Habitat. Utilization of upland habitat has not been extensively documented. Big game harvest rates are low, restricted primarily to black bear and mountain goat (Table 3.5). This low harvest rate is due primarily to low densities of game animals in the area. Waterfowl and upland bird harvests are undocumented (ADF&G, personal communication).

3.1.3 Climate

Valdez typically has short, mild summers and long, cold winters. During the summer, cool air from the sea and from snow and ice fields moderates temperatures. During the winter, high mountain ridges to the north provide some barrier to the flow of cold air from the Interior, but the moderating effect of these ridges is largely offset by downslope drainage of cold air from snow fields and glacier areas. The coldest temperatures are thought to be related to the latter factor. Temperatures average $-8^{\circ}C$ ($18^{\circ}F$) during January and $+12^{\circ}C$ ($53^{\circ}F$) during July.

The surrounding mountains also have the effect of channelling local winds. From October through April, the prevailing direction is from the northeast; from May through September, the prevailing direction is

Table 3.5. Summary of game harvests in the Valdez area, 1973-1979[1].

Species	1973	1974	1975	1976	1977	1978	1979
Mountain Goat	12	4	11	6	10	20	23
Black Bear	-	5	28	22	15	19	15
Brown Bear	Estimated maximum total of 5 during this period.						
Moose	Very low harvest, not recorded.						

[1] From Alaska Department of Fish and Game harvest data.

from the southeast. During the winter, high-pressure systems in the Interior interact with low-pressure systems in the gulf to cause occasionally strong and sustained northeast winds. The annual average wind speed is 4.9 mph, and it is calm approximately 33 percent of the time.

The growing season extends from the end of May to mid-September. The ground is normally frozen from the end of October through the end of April.

Rainfall in Valdez averages about 60 inches per year; October is the wettest month, while June is usually the driest. Snowfall is heavy, averaging nearly 300 inches annually. There is considerable cloudiness the entire year. Table 3.6 summarizes of climatological characteristics for 1972-1978.

3.1.4 Air Quality

Air quality in Valdez is a function of the types and sources of pollutants present and the topographic/meteorological characteristics that affect the dispersion of pollutants. Seven types of pollutants are emitted by a variety of local sources: sulfur dioxide (SO_2), ozone (O_3), nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide,(CO) hydrocarbons (HC) and fugitive dust. The principal sources of these pollutants are the Alyeska Terminal complex and associated tanker traffic (SO_2, PM, HC); automobile traffic (NOx); and unpaved roads, gravel mining, and construction activities (PM and fugitive dust). The Environmental Protection Agency has designated Valdez a Class II air quality impact region. According to air quality monitoring conducted in anticipation of the Alpetco Project, ambient levels of CO and nitrogen dioxide NO_2 are low, with O_3 and SO_2 occasionally reaching moderate levels (EPA 1980). Air quality monitoring conducted by ALYESKA in conjunction with their facilities indicates that present ambient air pollution concentrations are not approaching values in excess of the standards. These measured values are presented in Table 3.7. The highest value recorded

Table 3.6. Climatological characteristics of the Valdez area, 1972-1978.

	Fastest Recorded Wind Speed (mph)	Monthly Average Rain (inches)	Monthly Average Snow (inches)	Monthly Average Temperature °F
January	38	4.94	54.6	19.9
February	32	4.47	51.9	23.2
March	29	2.85	44.1	28.2
April	33	4.99	29.7	36.0
May	21	2.45	0.7	44.2
June	23	2.42	0.0	51.0
July	20	2.53	0.0	55.3
August	24	3.98	0.0	54.7
September	35	8.88	0.0	47.5
October	30	8.91	14.3	38.0
November	53	6.29	32.4	27.5
December	44	4.95	66.5	22.5

Source: U.S. Department of Commerce, 1978.

Table 3.7. Summary of Valdez Air Quality Data in micrograms per cubic meter.

Pollutant		Highest Measured Value	AAAQS[1]
SO_2	3 hour	272[2]	1,300
	24	219[2]	365
TSP	24	48	150
CO	1 hour	5,725	40,000
	8 hour	2,290	10,000
O_3	1 hour	145	235
NO_2	arithmetic mean	8	100
Reduced Sulfur Compounds - 30 minutes		------	

Source: State of Alaska (1981).

[1]Alaska Ambient Air Quality Standard

[2]Values measured after ALPETCP PSD application submitted.

was the 24-hour SO_2 level, which reached a maximum level of 219 u/m^3. This level was probably due to emmissions from the tankers during tanker loading. PM and fugitive dust, measured in the winter, were low, but were expected to rise in the summer with construction activities and dry conditions. Current air quality is considered to be good, although there is a potential for future problems, depending on future types and sources of pollutants.

Port Valdez is essentially surrounded on all sides by steep mountains; several glacial and river valleys feed into the port. These topographic characteristics of air drainage into the "confined" port and the land-water interface create a complex "bowl-like" effect. Meteorological conditions also contribute to a high air pollution potential: a relatively high frequency of calm surface winds accompanied by early morning surface inversions and stable above-surface layers. Estimations of mixing heights are relatively low, and combined with the high frequency of calm conditions, lead to generally poor dispersion conditions (DOWL 1979).

3.1.5 Hydrology

Surface Water

Major freshwater inflow sources to Port Valdez include Shoup Glacier Stream, Mineral Creek, Valdez Glacier Stream, and Lowe River. Shoup Glacier Stream discharges into the northeast corner of Port Valdez in an area assumed to have low potential for development. Mineral Creek flows along the western edge of the new townsite before discharging into the port from the north. Its drainage area is 46 square miles.

Valdez Glacier Stream flows approximately four miles from the terminus of Valdez Glacier to the northeast corner of Port Valdez. It flows across a wide outwash delta composed primarily of silty sand and gravel. The old Valdez townsite was located on this outwash delta prior

to the destructive 1964 earthquake, after which the townsite was moved to its present location. Valdez Glacier Stream drains an area of 159 square miles, over half of which is covered by glacier. It is subject to floods resulting from glacier-dammed lake releases.

Lowe River originates in the mountains approximately 28 miles east of the Valdez townsite, draining an area of 346 square miles, 35 percent of which is covered by glaciers. Its floodplain character alternates between steep-walled canyons and broad, braided configurations. Several tributary streams to Lowe River contain glacier dammed lakes or empty lake basins in their drainage areas; these have historically caused floods damaging bridges across the tributaries (Post and Mayo 1971). The Lowe River discharges into the southeast corner of Port Valdez.

Many smaller streams discharge into Port Valdez or into these major watercourses. Most of these have a relatively low potential for development because of steep terrain bordering the floodplain. Small streams passing through developable areas include Robe River, Corbin Creek, Slater Creek, and an unnamed creek flowing west of the Valdez airport.

Estimates of mean annual runoff range from approximately 3 cubic feet per second per square mile ($ft^3/s/mi^2$) for small streams with headwaters of low elevation to 8-9 $ft^3/s/mi^2$ for large streams draining mountainous areas with high precipitation. Mean annual floods are likely to be approximately ten times larger than the mean annual runoff values (Balding 1976, EPA 1979). Flooding typically occurs in the early summer as the result of snowmelt and in late summer or fall as the result of rainfall combined with glacier melt. The rainfall/glacier melt floods are often larger than the snowmelt floods. Winter flow is very low in most streams in the area.

Groundwater

Because of the steep areas with shallow bedrock that predominate in the Valdez area, groundwater supplies are limited to those glacially-

formed stream valleys containing deposits of mixed alluvium, colluvium, and glacial outwash deposits. These materials are typically composed predominantly of sands and gravels with high permeability. These deposits serve as aquifers that are recharged by snowmelt, glacier melt, and rainfall from late spring through late fall. The water table elevation likely lowers during the winter, when water percolates into Port Valdez, and recharge from streams is negligible.

Specific groundwater studies near Corbin and Slater Creeks, located to the east of Valdez Glacier Stream (DOWL 1979), indicate the existence of two aquifers in that area. An upper aquifer of highly permeable materials has a water table surface that slopes downward in the direction of Port Valdez but at a lesser angle than the slope of the ground surface. The aquifer appears to be the winter water source for a few small streams that discharge into Robe Lake.

The lower aquifer identified during groundwater investigations (DOWL 1979) is confined by an extensive silt layer that completely separates the two aquifers in the area studied. The lower aquifer has a much flatter static water level than that of the upper aquifer, and has about 9 feet of artesian head at one end of the study area. Although the materials of the lower aquifer are very permeable, the aquifer appears to have little if any recharge in the vicinity of the study area.

3.1.6 Water Quality

Surface Water

The quality of the surface waters varies during the year. The suspended sediment concentrations are greatest in the summer, when glacier melt is at a maximum. Normal suspended sediment concentrations during summer are expected to be about 300-500 milligrams per liter (mg/l) in glacial systems (Balding 1976) and much less than this in streams of nonglacial origin. Other than the high turbidity associated

with glacial streams in the summer, the streams that were tested generally met the EPA and State of Alaska drinking water standards (EPA 1979). These streams are of the calcium bicarbonate type and are considered medium to hard. The dissolved solids content varies from stream to stream and during the year within a stream (EPA 1979). The dissolved solids in the surface waters in the area are generally less than 200 mg/l in the area (Balding 1976).

Groundwater

Water quality samples collected from both groundwater aquifers indicate that the water quality of the upper, unconfined aquifer slightly exceeds that of the lower, confined aquifer, but both were well within EPA and State of Alaska water quality standards (DOWL 1979). Water in both aquifers was moderately hard.

3.2 CULTURAL RESOURCES

3.2.1 Archaeological and Historical Resources

Prehistory

Prince William Sound has long proved attractive for human habitation; archaeological studies suggest that Chugach Eskimos and neighboring groups were present in the region during the early Holocene period. Separate from the Athabaskan-speaking Eyak (Cordova Region) and the Ahtna (Copper River Basin) peoples, the Chugachmuit consisted of eight subgroups with an estimated total population of under 500. The Tatitlek group was the nearest to Valdez. Villages usually occupied protected, shoreline sites with unobstructed views of all approachs; closed bays were considered traps and were avoided. It is unlikely that Port Valdez was used for anything more than sporadic foraging and hunting activities.

Nearly all activities revolved around the sea. The Chugachmuit hunted the abundant populations of marine mammals, fish, and shellfish.

Trade routes to the Eyak, Ahtna, and Port Graham Eskimos also depended upon the sea.

History

The 1700s marked the entry of European exploratory expeditions into the region. Vitus Bering led a Russian expedition into the Gulf of Alaska in 1741, and was later followed by Captain James Cook, who explored and charted Prince William Sound in 1778. The Spaniards are credited with the discovery of Port Valdez; in 1790, Don Salvador Fidolgo named the bay after a fellow naval officer. Prior to the purchase of Alaska by the United States, the Russians periodically visited Port Valdez to trade with Interior Indians.

Within five years of purchase, American prospectors started to make their appearance in Alaska. In 1884, Captain William R. Abercrombie of the U.S. Army surveyed a portage route from the Interior to Port Valdez. Valdez was established as a transportation route to the Interior, and by 1889 the makings of a port town began to take shape. In addition to miners passing through Valdez, prospectors were active in the area around Valdez and early editions of the Valdez Daily Prospector continually reported new finds. The City of Valdez was officially founded in 1897.

The U.S. Army quickly recognized the need for an alternate route and line of communication to the Interior. A series of events followed: the establishment of Fort Liscum on Port Valdez in 1900, the construction of the Valdez-Eagle Trail in 1901, the completion of the WAMCATS (Washington-Alaska Military Cable and Telegraph System) telegraph line in 1902, and the connection with Sitka by submarine cable in 1904. With the discovery of massive copper deposits, Valdez entered an unsuccessful competition with Cordova for the terminus of a railroad to the copper fields. Traffic to the Interior continued to pass through Valdez, but the construction of the government-subsidized Alaska Railroad in 1923 from

Seward to Fairbanks soon eclipsed Valdez as the region's major transportation center.

Fishing became important to the economy during the 1920s and 1930s. In the early 1930s, the Dayville Cannery was constructed at the Fort Liscum site, which had been abandoned in 1925. This cannery operated until 1950.

During World War II Valdez became a busy port again, shipping military freight via the Richardson Highway. However, the end of the war brought a slump. Winter closure of Thompson Pass, the only road link to the Interior, prevented Valdez from competing successfully with Seward and Whittier for freight hauls.

A local truck and freight operator worked throughout the winter of 1949-50, proving that the pass could be kept open. Most of the local townspeople and businessmen contributed monetarily to assist in this effort. This encouraged the Alaska Road Commission to employ a permanent crew to provide winter service and maintenance on Thompson Pass, and new freight operators again came to Valdez.

Statehood in 1959 had little effect on Valdez, until decisions were made to utilize the community as a location to house the mentally handicapped and later, the State Highway Regional Offices and Maintenance Shops. Tourism began to increase when a museum was built and local charter boat operations were formed but on March 27, 1964, at 5:37 PM, the economy of Valdez literally stopped, when the earth shook for three minutes under a major earthquake and the town was partially destroyed. Unstable soils and the town's location on sandy, loose soil of the alluvial fan of Glacier Stream brought tremendous damage and destruction. The federal and state governments responded with disaster aid and helped to relocate the City of Valdez four miles southwest to the new townsite, where more stable ground conditions existed.

A period of very slow economic activity followed until 1969, when oil development hit Alaska, initiating land speculation and rapid change. Valdez was selected as the terminus of the trans-Alaska pipeline and the site of the oil storage-transfer marine terminal. From the initial hauling of the pipe to be stored along the route of the pipeline until construction of the line and the new 800-acre terminal was completed in 1977, a boom town situation existed. Left with a stabilizing population and a healthier economy, the City of Valdez embarked on a program to encourage sound economic growth.

Resource Sites

The Valdez Coastal Management District contains 11 known Alaska Heritage Resource Survey Sites (Map 4). All 11 sites are historic (rather than prehistoric): Comfort Roadhouse, Keystone Canyon Railroad Tunnel, Fort Liscum, Wortmann's Roadhouse, McIntosh's Roadhouse, Old Goat Trail, Valdez Glacier Trail, Trans-Alaska Military Road, St. Nicholas Church, Old Town Valdez, and the Meals-Whalen Cabin.

As part of the Valdez Coastal Management Program, the Office of History and Archaeology, Division of Parks, prepared a cultural resources distribution forecast map. This forecasts the potential distribution of undiscovered cultural resources as high, low, and medium probability. The only high probability area within the District is the southern shoreline of Jack Bay. Medium probability areas include the following (progressing west to east): Potato Point, Eastern Valdez Narrows and Anderson Bay, Camp Bovie, Fort Liscum, Alyeska Terminal and southeastern Port Valdez, Mineral Creek and new townsite, and Old Valdez. The remainder of the District is considered low probability. It should be noted that this forecast is for coastal planning purposes and does not substitute for the requirements of 36 CFR Part 800 (Procedures for the Protection of Historic and Cultural Properties) or AS 4.35 (Alaska Historic Preservation Act).

In addition to those sites contained in the Alaska Heritage Resource Survey, the City of Valdez has identified four sites of local historical importance: the Chinese Cemetary, the Old Town Valdez Cemetary, the Granby Mine Tramway site, and the Cliff Mine/Gold Creek Trail site.

3.2.2 Population Characteristics

Even conservative estimates indicate the population of Valdez has tripled since 1970. By contrast, the population of Alaska as a whole has increased on 32.4 percent since 1970, according to the 1980 U.S. Census. The population growth of Valdez comes notwithstanding a precipitous decline since 1977, completion date of the Trans-Alaska Pipeline (TAPS).

As shown in Table 3.8, the population of Valdez swelled to over 8,000 during the peak of pipeline construction. It has since fallen somewhere between 3,079 and 4,107, still considerably higher than pre-pipeline days. According to the 1970 U.S. Census, the Valdez population was 1,005.

The City of Valdez currently estimates their population at 4,107. The figure is based on an extrapolation using the number of housing units multiplied by the number of occupants per unti, a standard procedure. The 4,107 represents the summer peak, and includes seasonal inhabitants. During the off-season, the population of Valdez slips to 3,500, according to Valdez officials.

The Department of Community and Regional Affairs (DC&RA) used 4,066 for revenue sharing calculations in fiscal year 1981. The figure was supplied to them by the City of Valdez. A population of 4,066 represents a downturn from an earlier estimate by the City of Valdez. In 1978, the City of Valdez estimated their population at 4,481. The estimate was derived by taking a dwelling count (1469) and multiplying that by the average number of inhabitants per dwelling unit (3.05). The DC&RA rejected Valdez's current estimate of 4,107 for revenue sharing purposes in favor of the earlier more conservative estimate of 4,066.

Table 3.8. Estimated population of Valdez, Alaska, 1920-1980.

Year	Population	Percent Change
1920[1]	466	--
1930[2]	442	- 5.1
1940[1,2]	529	19.7
1950[1,2]	554	4.7
1960[1,2]	555	0.2
1970[1]	1,005	81.1
1970[5]	1,005	
1972[2]	1,106	10.0
1973[2]	1,760	59.1
1974[2]	2,271	29.0
1975[2]	6,670	193.7
1976[2]	8,253	23.7
1977[2]	7,483	- 9.3
1978[3]	3,349	-55.2
1979[3]	3,350	0.0
1980[4]	3,500	4.5
1980[5]	3,079	
1980[6]	4,066	

Sources

1 Lin, P.C. Alaska's Population and School Enrollment. University of Alaska, ISEGR. December 1971.

2 City of Valdez. Inventory Report District Program - Phase One. June 1971.

3 University of Alaska, Anchorage. Gould, 1979.

4 Ridgeway, R. City of Valdez Planning Department. Personal Communication. May 1980.

5 U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing.

6 State of Alaska Department of Community and Regional Affairs.

The 1980 Census by the U.S. Department of Commerce shows a population of 3,079, considerably lower than other estimates. The City of Valdez is contesting the U.S. Census estimate, as are other Alaskan municipalities.

The most in-depth look at the population of Valdez was done in 1978 by the University of Alaska in Anchorage. Headed by sociologist Dr. Michael Baring Gould, the University prepared a census under contract to the City of Valdez. The 1978 University of Alaska Census reported a population of 3,349, including 106 inhabitants of the Harborview Development Center. The figure of 3,349 was also disputed by the City of Valdez, but was used by planners in preparing the Alpetco EIS.

The University of Alaska study contains other population statistics. The Valdez population is predominantly caucasian (89.9 percent), young (71.1 percent under 35 years of age) and has slightly more males (54.5 percent) than females (45.5 percent). Nearly 68.1 percent have lived in Valdez less than three years, or are new residents.

The City's population is centered in the Central Core (41.1 percent) and Airport Zook Subdivisions (24.1 percent), followed by Western Valdez/Alyeska (19.1 percent) and Richardson Highway out (Robe River, Alpine Woods, 12.7 percent).

Population projections are difficult to make given the uncertainty of future economic development in Valdez and in Alaska as a whole. Three percent per year is used by the Valdez School District for planning purposes. State population planners estimate a low growth scenario at 1.5 percent per year assuming no major economic development. With major economic development, state planners estimate population growth as high as 5 percent per year.

Discrepancies in the different population estimates presented in this section suggest possible counting errors; or, Valdez could be in the final stage of a population decline that started in 1977 with completion

of TAPS. The relative newness of their population suggests this trend. To be certain, a few more years of data would vastly improve estimates and projections.

3.2.3 Housing

There are three estimates of housing stock in Valdez. The City of Valdez used an estimate of 1,469 to calculate their 1978 Census figure. The 1980 U.S. Census data estimates the number of houses at 1,147. Northrim and Associates, CCC/HOK estimate the "good" housing stock at 1,204.

The estimate by Northrim; CCC/HOK (1,204) for the Alpetco EIS contains considerable data regarding the characteristics of the Valdez housing stock. Because of a dearth of information regarding Valdez housing at the time the Alpetco EIS was being prepared, CCC/HOK planners conducted an on-site visual survey to obtain reliable information. Some of their statistics are shown in Table 3.9.

Most dwellings are in good repair, and are occupied. Excluding hotel/motel units, the vacancy rate is a low 3.1 percent. This is surprising given the rapid exodous of construction workers upon completion of TAPS. However, during the pipeline boom there was a housing shortage in Valdez of near crisis proportions. Certainly a crisis would have developed, had not Alyeska Pipeline Service Company actively intervened. Alyeska provided most of the housing used by pipeline employees, however, these were generally temporary accommodations.

Alyeska housed a great percentage of its construction work force at Terminal Camp, a site adjacent to the marine terminal. The camp consisted of approximately 300 trailers, grouped to form barracks. At capacity, the camp housed 3,500 persons. With completion of the pipeline, use of the camp has been discontinued, although the facilities still remain in place.

Table 3.9. Total housing in Valdez, a summary of a 1979 visual survey.

Type of Housing	Good	Needs Repair	Abandoned	Total	Vacant	Rental
Single-family frame	197	1	2	200	2	3
Single-family modular	114			114		20
Single-family mobile home	481	5	35	521	23	34
Multi-family row units	10			10		10
Multi-family apartment units	161			161	6	161
Campers, camp trailers	6			6		
Hotel, motel units	219			219	209	219
Commercial-residential combined	16	—	—	16	—	—
Total Housing Units	1,204	6	37	1,247	240	447
Vacant lots	307					
Vacant trailer spaces	390					
Total No. vacant residential lots and spaces	760					

Source: Northrim Associates, Inc. (1979).

Housing for Alyeska's management staff was constructed in an area subdivided as Black Gold Number 1 and Black Gold 2 (also called Flour Housing). The area was zoned for single family units, but Alyeska received a five year conditional use permit to place temporary housing on the site at twice the density normally permitted. This housing development consisted of 200 modular units. Although the initial agreement called for removal of the modular units by Alyeska, the City agreed to let a portion of the modular units remain if they were brought up to code. As Table 3.9 shows, the Valdez housing stock count by CCC/HOK includes 114 modular units.

Most housing in Valdez is in good repair. Nearly half the housing is single family mobile homes (excluding hotel/motel units). Single family houses comprise 20 percent of the housing stock, and multi-family apartment units 16 percent. Of the 940 occupied dwellings, 738 are owner occupied and 232 are rentals. The total of 1,204 included 219 hotel/motel units, only 10 of which were occupied at the time.

Low vacancy rates and the predominance of mobile homes are important characteristics of the local housing stock. With such a low vacancy rate, the ability to absorb housing demand created by major development projects is limited. The high cost of single-family housing and perceived risk to contractors and financial institutions probably influence availability of housing. In addition, construction of new multi-family units has been minimal.

3.2.4 Land Use and Management

Valdez municipal boundaries encompass 274 square miles, including 52 square miles occupied by the Valdez Arm. Of the remaining 222 square miles, approximately 86,699 acres (61.0 percent) are state-owned; 48,081 acres (33.8 percent) are federally-owned; 4,800 acres are municipal land (3.4 percent) and 2,500 acres (1.8 percent) are privately owned. Map 5 shows land ownership. Land outside municipal boundaries is predominantly federal, state, and native-owned.

Decisions concerning regional land use and land status will affect Valdez in two important ways. First, activities and uses of land and resources outside city boundaries may affect the city's economy; secondly, state and federal agencies will manage lands within the city boundaries.

Federal

The Chugach National Forest adjoins the City of Valdez on the western third of its boundaries and occupies 25,300 acres of land within city limits. The Forest Service is preparing a Forest Land and Resource Management Plan, which consists of dividing the forest into planning units; a resource inventory and analysis; identification of issues; and preparation of management alternatives. Units 101, 102, and 104 include land within the Coastal Management District boundaries. While final recommendations on management policies for these districts have yet to be formulated, a preliminary designation is for scenic resources and public recreation use (Lyons 1980, personal communication).

The Anchorage District Office of the Bureau of Land Management (BLM) administers approximately 2,280 acres of land within the City of Valdez. BLM lands are managed under a multiple-use policy. Shoup Bay has been identified by the State Division of Parks as an area with high recreation potential.

State

Of the 86,699 acres of patented and tentatively approved state lands, approximately 51,440 acres (59 percent) were identified as public interest lands. Thirty-five percent, or 30,454 acres, will go into a land bank, and the City of Valdez will eventually get title to the remaining 4,805 acres (6 percent) under the Municipal Entitlement Act. Approximately 400 acres near Robe Lake were disposed as a subdivision in fiscal year 1980.

Public Interest Lands. The Department of Natural Resources, through the Public Interest Land Identification Project, identifies lands within municipalities that will be retained and managed by he state, and land that will be disposed of for private use. Public Interest Lands classifications are shown in Map 6, and described below:

Public Recreation - As previously mentioned, the Valdez city council approved a motion requesting the state to designate and retain specific areas for recreational purposes. These public recreation areas are primarily of local interest, and are briefly described as follows:

- o Robe Lake Recreation Area - This is the only lake within city boundaries. It is heavily used for recreation throughout the year and is also classified as a fish and wildlife habitat. Additionally, this proposed recreation area encompasses an identified watershed that contains the only red salmon run streams in the Valdez area.

- o Mile 1½ Recreation Area - This is a local picnicking site with a swimming pond. The area includes river flats suitable for fishing, as well as the historic Chinese graveyard.

- o Glacier Trail - This recreational corridor follows the original trail to the Glacier Camp, which was established in the early gold mining days and is still the site of a viable campground.

- o Airport Recreation Area - This area, contiguous to the Glacier Trail corridor, is being retained as a site for various recreational and sports activities as well as trails, picnic areas, etc., for the local population.

- o Mineral Creek Historic Trail - This recreational corridor is of historic value and also contains spectacular scenery, including views of numerous waterfalls, a turbulent river, and moun-

tains. Wildlife abounds throughout the area. Of historic value are the Stamp Mill and various gold and ore mines which dot the hillsides.

- o Canyon Slough Recreation Area - The City of Valdez envisions that this site may be more intensively developed as a ski area.

The proposed Keystone Canyon State Park was identified by both the city council and the state for retention as a state interest area. Keystone Canyon is an area of beautiful scenery readily accessible to any traveller of the Richardson Highway. The area abounds with wildlife, has historic value (including the old railroad tunnel and Goat Trail), and contains areas suitable for a variety of recreational pursuits. This proposed state park encompasses portions of the Lowe River, the Alyeska Pipeline, and the Richardson Highway.

Fish and Wildlife Habitat - Brownie Creek, Corbin Creek, Deep Creek, Deep Lake, Robe Lake, Robe River, Lowe River including its floodplain, Canyon Slough, and several spawning areas adjacent to the Richardson Highway have been identified as wildlife habitat and floodplains. These salmon spawning, rearing, and production habitats support Port Valdez's commercial, subsistence, and sport fisheries, including the Valdez Silver Salmon Derby. The protection of this fisheries resource is a high priority for both the state and the city.

Watersheds - Three watershed areas have been designated as public interest lands. One is the Mineral Creek watershed, which the City of Valdez utilizes for its groundwater reserves. The Allison Creek watershed provides water for domestic as well as industrial purposes. The water rights to this watershed are owned by the Alyeska Pipeline Service Company. The third identified watershed is Abercrombie Gulch. This surface watershed has a substantial valid water right existing on it, and has been identified as public interest.

Forests - The forest lands designated for retention are south of the Lowe River and are transected by the Alyeska Pipeline. This timber resource will benefit local loggers and mill owners, who are currently without a reliable supply of sawtimber, as well as local residents who need a supply of houselogs and firewood. Anticipated growth within the decade and upcoming state land disposals in the Valdez area will likely increase the demand for wood products.

Materials - The two identified materials sites are located along the Richardson Highway. They will be used as sources of sand and gravel for road building and maintenance.

Public Facilities - The City Council of Valdez has identified a 40-acre parcel as a future school site, sewage treatment plant, or other public facility. This site is located east of Robe Lake adjoining the Richardson Highway.

The City of Valdez has taken an active role in identifying public interest lands through the adoption of a motion requesting the state to retain specific areas. Three of Valdez's advisory commissions - the Planning and Zoning Commission, the Parks and Recreation Commission, and the Transportation Commission - reviewed areas that might be considered public interest lands. Their recommendations were brought before the city council, and a motion was passed unanimously approving and recommending that the lands be retained by the state.

Other State Lands. The Department of Natural Resources has no plans for a Valdez Land Management Study, and will continue to rely on cooperative planning with the city. However, there are other state planning activities that are important to Valdez and its Coastal Management Program. To improve recreational boating opportunities, the Alaska Division of Parks is proposing a system of marine parks in Prince William Sound and Southeast Alaska. To be located on state-selected land within the national forests, these parks could include such facilities as docks, mooring floats, beach campsites, trails, and toilets. Of the 25 sites

identified in Prince William Sound, four potential sites are located close to Valdez: Sawmill Bay, Port Fidalgo, Anderson Bay, and Jack Bay. The last two are partially or completely within the coastal management district. As of September 1979, only three of the total 64 proposed state marine parks have been approved by the Forest Service (Johannsen 1979).

Three marine park sites have been selected from Chugach National Forest under Community Grant Land Entitlements: Sawmill Bay, Anderson Bay, and Jack Bay. These lands are selected primarily for expansion of an existing community or establishment of new communities. Use for other purposes is not prohibited, and upon receiving title, Community Grant Land will undergo classification for management categories. DNR expects title to be conveyed within the next year.

Local

Land use planning and management in Valdez is implemented through three major mechanisms: a comprehensive plan, a zoning ordinance, and a recently enacted emergency floodplain ordinance. Current land use is shown in Map 7.

Comprehensive Plan. As in many Alaskan communities, the Comprehensive Plan is outdated and has never effectively served as a guide for community development. The most recent Comprehensive Plan was prepared in 1971, before the change wrought by the trans-Alaska pipeline. At that time, the Comprehensive Plan recommended that new development take place in three general areas. Single-family and multi-family residential development, supported by shopping, school, and park facilities, was slated for the area west of the new Valdez townsite (including the far side of Mineral Creek). The Old Valdez/Airport area was proposed for industrial development, with the exception of the old townsite, which was designated as not developable. The area in the general vicinity of Robe Lake was projected as a new, large single- and multi-family residential neighborhood. Shopping and convenience centers and recreation areas also were to be located in this area.

During pipeline construction, the city was hard-pressed to meet urgent demands for housing, utilities, roads, and services. The relatively late establishment of a City Planning Department (1978) and a focus on other immediate problems, such as coastal management and municipal land selection, have further postponed to 1981 the revision of the comprehensive plan. The Coastal Management Program is an important element of the Comprehensive Plan.

Zoning. The city has adopted a new zoning ordinance, which will replace an ordinance based on the 1971 Comprehensive Plan. During pipeline construction, meeting housing demands often meant approving uses in violation of the old zoning ordinance. As a result, many areas of the city were effectively in violation of the zoning ordinance. The new zoning ordinance uses zoning classifications that are more appropriate for the current land use and economic conditions in Valdez, and allows the city to more effectively direct commercial/industrial activity and increase residential density in the most suitable areas.

Emergency Floodplain Ordinance. Much of the flat, developable land in Valdez is located within the floodplains of the Lowe River, Valdez Glacier Stream, and Mineral Creek. This presents a potential for various degrees of flooding on those lands. A Federal Emergency Management Agency Flood Insurance study (FEMA, U.S. Department of Housing And Urban Development 1976) was conducted in Valdez. Maps from the FEMA study form the basis for the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The flood analysis program was established to allow property owners to buy flood insurance at rates subsidized by the federal government. In return, communities must carry out local floodplain management measures to protect lives and new construction from flooding. The community must use flood elevations shown on the map as the minimum building elevation for new construction. Private insurance agents establish premium rates on the basis of flood risk, identified on the map as letter zones corresponding to flood elevations.

This study identified four major types of flood hazards, and resulted in the designation of significant flood elevations in most developable areas of Valdez. The effective result of this study increased the cost of both flood insurance and development (design and mitigation measures) in those areas, in addition to limiting the types of development allowable. A preliminary review of the FEMA study sponsored by Valdez (Woodward-Clyde Consultants 1980) indicated a number of serious technical deficiencies with the FEMA study. Therefore, Valdez has sponsored new flooding studies to provide more reliable estimates of the flood elevations. Until these studies have been completed and FEMA flood elevations challanged, the City of Valdez has adopted an Emergency Floodplain Ordinance.

3.2.5 Recreation

The Valdez area is used extensively for recreation by local residents and visitors from both in and out of state. Primary recreation activities include sport fishing, hunting, hiking, camping, skiing (downhill and cross-country), snow machines, recreational boating, softball, swimming, tennis, bike riding, and basketball.

Several factors are responsible for the substantial recreation resources and promising outlook for further resource development in Valdez. The regional setting is an important contribution: a fjord, surrounded by rugged, glaciated mountains, that opens onto scenic Prince William Sound. Much of the federal and state lands within and adjacent to the Coastal District are being managed for public recreation, with plans for developing more facilities in the future. The transportation systems serving Valdez allow relatively good access to diverse recreational resources. Finally, the Valdez Department of Parks and Recreation has been extremely active in identifying recreation needs and establishing a program to meet those needs through capital improvements.

Federal

Map 8 shows the major federal, state, and city recreation resources in the Valdez Coastal Management District. The Chugach National Forest manages most of its lands within the municipal boundaries to maintain their scenic value and recreational use. Forest Service recreation cabins are located in Sawmill Bay and Galena Bay (Outer Valdez Arm).

State

The Alaska Department of Natural Resources, Division of Parks, is responsible for several waysides in the Valdez area. The Glacier Campground is owned by the state but leased to the City of Valdez for operation. This campground has 102 spaces and is heavily used during the summer tourist season. Two state waysides are located just outside the district boundaries. The Blueberry Lake Wayside lies just south of Thompson Pass, and the Worthington Glacier Wayside is located on the northeast side of the pass. These facilities have a combined capacity of 305 spaces.

In addition to the state wayside system, much of the 51,440 acres of state-owned Public Interest Land within Valdez has been nominated by the state and city for recreation management. These areas, described in more detail under land use and management, include the following: Robe Lake Recreation Area, Mile 1½ Recreation Area, Glacier Trail, Airport Recreation Area, Mineral Creek Historic Trail, and the Canyon Slough Recreation Area.

At the present time, there are no existing state parks within the Valdez Coastal Management District. However, two proposed parks have been identified. A Keystone Canyon State Park was first proposed in 1970. The boundaries of this potential park encompass 310,000 acres. While the majority of park land would be outside municipal limits, Keystone Canyon and some lands along and south of the Lowe River are included within proposed park boundaries. Local residents have expressed

concern about the park's impact on the Richardson Highway transportation corridor through both Keystone Canyon and Thompson Pass.

The Alaska Marine Parks System was first conceived in 1977; since that time, the state has selected lands from the Forest Service in an attempt to establish these parks. Sawmill Bay, located southwest of Valdez Narrows, is the only officially proposed and selected site. Three other local sites, Anderson, Jack, and Shoup Bays, were evaluated during the process and considered to have high recreation potential (Alaska Division of Parks, personal communication, July 1980).

Local

Over the past three years, the City Department of Parks and Recreation and its citizen advisory committee have developed an impressive parks and recreation program. Program elements are diverse, including park acquisition, facility development (picnic areas, playing fields, recreation halls, trails and bike paths, playgrounds, ski tows), and advising the Alaska Department of Natural Resources on managing public interest lands. Map 8 shows the city's existing and planned parks and recreation facilities. The planned facilities will be funded from the 1980-1985 Capital Improvements Plan, with a proposed recreation budget of $28.5 million.

The City of Valdez also operates a small boat harbor. In 1978, the number of boat slips was increased from 180 to 349, largely in response to demand for pleasure craft space. Further expansion of the small boat harbor is planned within the next five years.

The city currently has a study underway investigating the feasibility of developing a major downhill ski resort.

3.2.6 Transportation

Historically, Valdez has been an important transportation center for movement of people and commodities into Alaska's Interior. The city

was established as a supply port serving Interior gold mining communities. This role as a regional distribution center was further developed with the construction of the trans-Alaska Military Road (the precursor to the Richardson Highway) to Fairbanks in 1905, the first major highway system in Alaska. During the same period, Valdez was competing for a railroad route to the Interior; the route was eventually built from Cordova. However, with the growth of the ports of Anchorage, Seward, and Whittier and construction of the Alaska Railroad, the city's role in serving the Interior declined. Construction of the trans-Alaska pipeline and terminal facilities reestablished Valdez as a distribution point for the southern portion of the pipeline. In 1978 the residents of Valdez passed a $48 million bond package to finance construction of a container port to serve Valdez and Interior communities.

Highway Transportation System

Valdez is the southern terminus of the Richardson Highway, which provides the community's only overland transportation access. Running 365 miles north to Fairbanks, the Richardson Highway connects with the Glenn Highway at Glennallen and with the Tok Cutoff just north of Gulkana. The Richardson Highway is presently the principal route for commodity movements into and out of Valdez. It also comprises the principal element of the local highway system, connecting the new townsite with the airport, Alyeska Terminal, Robe River Subdivision, and Alpine Woods Subdivision. In addition to the street grid system that connects with the highway in the new townsite, the paved secondary roads that intersect the Richardson Highway are Mineral Creek Loop Road, Airport Road, and the Dayville Road.

The Richardson Highway is open year-round, but is occasionally closed by heavy snowfall and avalanches at Thompson Pass and north of Keystone Canyon. The Alaska Department of Transportation and Public Facilities (DOT/PF) is currently rerouting the highway within Keystone Canyon and Thompson Pass in an effort to upgrade highway capacity and reduce maintenance problems. DOT/PF has a district office in Valdez.

Except for the sharp increase and decline associated with construction of the trans-Alaska pipeline, traffic volume on the Richardson Highway has been increasing over the last two decades. This increase corresponds with the general increase in the population of Valdez and with increased tourism-related traffic travelling the Anchorage/Fairbanks-Valdez/Whittier Highway and Marine Highway loop. Table 3.10 presents 1978 local and regional traffic volumes. Average daily traffic (ADT) is heaviest between the new townsite and the Robe River Subdivision; traffic levels drop off at Dayville Road and further out of town near Keystone Canyon. The same is true of peak hour volumes. While truck traffic comprises a greater percentage of ADT outside the more populated areas of Valdez, the average number of trucks per day is higher in these areas. The carrying capacity of the Richardson Highway in the Valdez area has been estimated at 1,700 vehicles per hour, which is well in excess of the average daily peak-hour traffic volume of 300 to 370 vehicles.

Air Transportation System

The Valdez Airport is located approximately four miles east of the new townsite, 0.5 mile north of the Richardson Highway at the old townsite. Facilities include a 5,000-foot paved runway with an east-west orientation, three taxiways that connect a large apron area, and a recently constructed terminal. At the present time the airport is owned by DOT/PF, but arrangements are being made to turn the facility over to the City of Valdez. An upgrading of airport facilities was initiated in 1980 and will be completed in 1981, including extension of the runway by 1,500 feet; resurfacing and widening of the runway, taxiways, and aprons; and improvements to the lighting system.

The operation and potential capacity of the airport has been limited by local geography, weather conditions, and a lack of runway lighting. The current airport improvements and a recently installed approach instrumentation system should allow the airport to handle larger

Table 3.10. Valdez traffic volumes, local and regional, 1978.

Location	Average Daily Traffic (ADT)	Peak-Hour[1] Volume (all vehicles)	Percent Trucks	Average Trucks Per Day
Mile Point 1.0 Valdez Maintenance Station (DOT/PF)	5,225	370	12.5	655
Mile Point 3.0 West of Airport Intersection	4,540	340[2]	12.5	570
Mile Point 7.0 Valdez Scalehouse (East of Dayville Road)	4,325	325[2]	18.0	780
Dayville Road (500 feet west of Richardson Highway)	1,925	144[2]	18.0	345
Mile Point 17.0 Southwest of Keystone Canyon	1,600	120[2]	18.0	290
Mile Point 67.0 Ernestine Maintenance Camp	495	38	18.0	90
Mile Point 115.0[3] Tazlina Bridge	1,342	100	NA	200-270[4]
Mile Point 123.0[3] Gulkana Airfield Access Rd.	650	50	NA	100-130

Source: DOWL Engineers 1979.

[1] Peak hour generally occurs between 3 and 5 PM.

[2] Assumes that peak hour is 7.5 percent of ADT, based on peak-hour ratios observed at Mile Points 1.0 and 67.0.

[3] 1977 data.

[4] Estimated number of trucks assuming range of 15-20 percent trucks in general traffic stream.

NA=Not available.

aircraft and extend the weather and daylight conditions under which the airport can safely operate. Installation of a microwave landing system (MLS) is being considered.

Valdez is served by two air carriers on a regular, scheduled basis. Alaska Aeronautical Industries (AAI) services Valdez with DeHaviland Twin Otters; Valdez Airlines flies Navaho Chieftains. Nearly all of the air passenger traffic into Valdez originates in Anchorage, although some of AAI's flights also serve Cordova on a triangular route from Anchorage. Valdez Airlines offers six flights a day into Valdez. The number of aircraft takeoffs and landings peaked at 27,989 in 1977, and has declined since then, although it is still above pre-pipeline levels. Passenger movement through the Valdez airport was estimated at 28,000 for 1978. Air freight movement is estimated to be 200 to 500 tons annually, with most of it originating in Anchorage.

Marine Transportation System

Valdez is one of five Prince William Sound communities served by the southwestern region of the Alaska Marine Highway System. In addition to providing service to Cordova, Seward, Whittier, and Tatetlik, the region also includes Homer, Seldovia, and Kodiak. Two vessels, the MV Tustamena (200 passenger and 54 standard vehicles) and the MV Bartlett (170 passengers and 38 standard vehicles), serve the southwestern region.

Ferry service is provided between Whittier and Valdez and between Cordova and Valdez. The Whittier-Valdez run operates five days a week from mid-May to late September. There is no ferry service to Whittier during the rest of the year. The Cordova-Valdez run operates year-round, arriving in Valdez every other day. In 1977, the Whittier-Valdez route carried 15,853 pasengers and 3,525 vehicles. During peak tourism months (June, July, and August), the ferry runs at capacity and advance reservations are necessary. In comparison, the Cordova-Valdez run carried 7,292 passengers and 2,311 vehicles in 1977.

The Marine Highway System has two functions in serving Valdez. First, it provides an alternative means of transporting passengers and commodities into and out of Valdez. Second, it contributes to the community's tourism economy, providing a scenic cruise and convenient connections for organized tours.

Other vessel traffic is generated by several sources. The Alyeska Marine Terminal generates 11 trips a week by oil tankers in the 250,000 deadweight ton class. A small commercial fishing fleet and local pleasure craft operate out of the Valdez Small Boat Harbor. The harbor contains 349 boat slips and a boat repair grid.

Keeping an eye on all this activity is the U.S. Coast Guard, which operates a vessel traffic service (VTS) area radar station in Valdez. This station is the center for activities associated with monitoring Port Valdez and Prince William Sound traffic lanes. A Coast Guard cutter is stationed in Valdez.

3.2.7 Energy Facilities

Since the construction of the trans-Alaska pipeline, Valdez has become one of Alaska's most important centers of energy-related industries and facilities. Approximately 21 miles of the Alyeska pipeline and the storage and marine terminal facilities are located within city boundaries (Map 9). The pipeline transports 1.4 million barrels of oil daily to the marine terminal for storage, treatment, and transfer to oil tankers. Terminal facilities include: 18 oil storage tanks (14 East Tank Farm, 4 West Tank Farm), 2 API separators, 2 metering facilities, ballast treatment facility, fuel storage tanks, operations buildings, power plant, and 4 oil-loading berths capable of handling 250,000 DWT tankers.

Existing and proposed power generation facilities are the second major category of energy-related facilities in Valdez. The Copper Valley Electric Association operates a 10.1 MW diesel-fired generating plant

near the new townsite, which presently provides power to Valdez. The hydroelectric generation potential of the region is high. A 12 MW hydroelectric facility is under construction at Solomon Gulch, and is scheduled for completion in 1981. Allison Lake, located two miles east of Solomon Gulch, has been described by the Alaska District Corps of Engineers as a potential site for hydroelectric facilities.

3.2.8 Coastal Access

Access to the Valdez coastline can be evaluated in terms of physical ability to reach the coastline, land ownership as it affects access, and access requirements for type of use.

Physical access to the coastline is relatively good. Immediate access by way of the road system is available at the new townsite, Mineral Creek Loop Road (Zook Subdivision), and along Dayville Road to the Alyeska Terminal. The area least suitable for use is also the least accessible (Old Town to the mouth of the Lowe River). Access to Mineral Creek is also currently limited to foot traffic and four-wheel-drive vehicles down the floodplain. Coastline along Port Valdez is accessible by boat, with Shoup and Sawmill Bays on the north side and Saw Creek, Anderson Bay, and Jack Bay being the most popular use areas. The small boat harbor and its boat launch are the focal point for boating activities in Port Valdez.

Land ownership and use place minimal restrictions on coastal access. With the exception of the Alyeska Terminal and portions of the Port Valdez Company and Zook Subdivisions, the remainder of the coastline is in public ownership. At a minimum, continued public access is guaranteed from the small boat harbor/new town area, Dayville Road, and along Port Valdez west of the Alyeska Terminal.

Coastal access is required by a number of different types of users: industrial, transportation, commercial fishing, tourism, and

recreation. Each has different requirements, such as water depth or connection to the road system. Of all the categories, access for industrial and transportation uses are most limited, often requiring a combination of deep water nearshore, sufficient adjacent land for marshalling yards or facilities sites, and proximity to the road transportation system. Existing users include Alyeska Pipeline Service Company, the Alaska Marine Ferry System, and the U.S. Coast Guard. Water-based tourism, commercial fishing, and recreational boating are dependent on the small boat harbor; shoreline-based recreational activities, such as sport fishing and general sightseeing, usually depend on highway access and take place at the small boat harbor and along both the Richardson Highway and Dayville Road. Coastal access is shown in Map 10.

3.2.9 Community Facilities and Services

Utilities

Private utilities provide electrical and telephone services; sewer, water, and solid waste services are provided by the City of Valdez.

The Copper Valley Electric Association (CVEA), a nonprofit Rural Electrification Administration utility, provides electric service to Valdez and the Copper River Basin, but does not serve the Alyeska Terminal. Electricity in Valdez is currently generated by seven diesel generators with an installed capacity of 10.1 megawatts (MW). The 1979 peak demand was 3.9 MW, and occurred during the winter months. CVEA's Valdez service area includes the downtown business and residential district, and extends out to the airport, Robe River, and Alpine Woods subdivision areas. Construction of the 12 MW Solomon Gulch hydroelectric project is underway, with a 1981 estimated completion date. CVEA also plans eventually to install a 9 MW pressure-reducing turbine in the trans-Alaska pipeline near Valdez. The City of Valdez is presently negotiating with CVEA for the purchase of the utility.

Telephone service is provided by the Copper Valley Telephone Cooperative, which also serves the community of Glennallen. Hard hit by the pipeline boom, the utility has since updated its equipment. System capacity is 2500 telephone lines, of which 1300 are in use; the remaining 1200 lines can serve that many new households (approximately 3600 people). The 1979 estimate of telephones in service was 2136.

Sanitary Sewer

The City of Valdez operates a municipal sewage treatment plant located in the center of the old Valdez townsite. The facility, which began operation in 1976, consists of a three-cell aerated lagoon system that provides secondary treatment and has a capacity to serve the city's anticipated needs through 1983. Plans also are being considered to treat the lagoons with warm water as part of a solid waste incineration project. This could extend the life of the lagoons through 1986. Capacity of the plant also can be increased by the addition of settling lagoons when necessary.

The city provides sewer service to all of the new townsite, the airport and adjacent trailer parks, along Mineral Creek Loop Road and to the Zook Subdivision. Outlying subdivisions use septic tank and leach field sewage disposal methods.

Water System

The water system in Valdez is characterized by the availability of enormous quantities of high quality subsurface water. The city currently operates two separate water supply and distribution systems. The first system serves the immediate townsite area with three wells and a 700,000 gallon insulated steel water storage tank. The city made improvements to the system in 1980 that brought a maximum pumping capacity of 2,470 gallons per minute (gpm). Improvements planned for 1981 call for a new 1,000 gpm well and a 750,000-gallon storage tank, which are expected to provide the city with sufficient supply and storage capacity until 1990,

given a maximum townsite population of 4,058. The distribution system consists of 6-, 8-, and 10-inch diameter cast and ductile iron pipe. Pressures range from 45 to 90 psi. Fire hydrants are located from 350 to 450 feet apart throughout town.

The city collects solid waste from residences and commercial establishments, and uses city property at the old townsite for disposal. Waste hauled to the site is covered during the summer with material left over from excavation of the sewage treatment ponds. During the winter, snow is used to cover refuse until it can be handled in the summer. This landfill is also used by Valdez residents, general contractors, and occasionally by the Alyeska Pipeline Service Company. Several serious problems limit continued use of this site. A high water table that is tidally influenced by the site's close proximity to Port Valdez creates a potential for leached contamination of groundwater and surface waters. The site becomes unworkable during extremely wet conditions, and the supply of suitable cover material is limited (Director of Public Works, personal communication, 1979). In response to these problems, the city initiated a study of alternative processes and sites for solid waste disposal (Woodward-Clyde Consultants 1980), and has included funds for solid waste disposal in its 1980-81 Capital Improvement Plan.

Health Care and Medical Services

Health care and medical services are provided by the Valdez Community Hospital, the Valdez Mental Health Clinic, five resident physicians and medical practitioners, and the volunteer Emergency Medical Service Team. Private health care is supplemented by specialists who visit Valdez on fixed schedules. In addition, the Harborview Developmental Center, a state facility for the mentally and physically handicapped, is located in Valdez.

Education

The Valdez School System consists of three schools, all located at the new townsite. The Growden-Harrison Elementary School serves grades

K-6, but is scheduled to be replaced by a new 24-classroom school that is under construction. Grades 7 and 8 attend the George H. Gibson Junior High School; the Valdez Senior High School houses grades 9 through 12. School district enrollment in 1979 was 765, broken down as follows: 439 in elementary, 111 junior high, and 215 in senior high. The new Hermon Hutchens Elementary School will be operational for the commencement of the 1981-82 school year. It will have a special education wing to receive residents from the Harborview Developmental Center, a state facility for the physically and mentally handicapped; and it also will house a swimming pool and a large multi-purpose gymnasium. The combined capacity of the elementary schools, not counting the modular classroom units available to the district, will be 903. The two elementary schools will maintain an 11:1 student:teacher ratio.

Given the current student:population ratios, the school facilities listed above would be adequate to handle the addition of 3,064 persons to the city's population (a total population of 7,167). At this level, the high school would have reached design capacity, although the junior and senior high schools still would have a capacity to receive more students.

Prince William Sound Community College

Prince William Sound Community College was established in July 1978 as a member of the University of Alaska network. It currently has an enrollment of 700 students, with a full-time faculty of five and part-time faculty of 30. The college offers Associate of Arts degrees in the humanities, social sciences, office occupations and developmental disabilities.

The college staff currently is involved in developing new degree programs within fields useful in industries likely to be developed in the region. Fisheries, transportation and petroleum-related programs are among those under consideration.

In addition, a Campus Development Committee is being formed by the college to initiate construction of a major campus in Valdez.

The Valdez school system also provides special education programs for developmentally disabled children residing at the Harborview Developmental Center.

Fire Department

The Valdez Fire Department consists of four full-time positions, and two CETA positions supplemented by 56 volunteers. Four fire stations are located throughout the community, at City Hall, the airport, Robe River subdivision, and 10 Mile. Between 1972 and 1979 Department responses increased to a high of 92 in 1977, declining to 42 in 1979 (DOWL Engineers 1979c). Mobile home fires were the most frequent response during the pipeline years (1975-1977). False alarms and other responses (rubbish fires, smoke scares, search and rescue, and standby) constituted the most frequent categories of response in 1979.

Police Department

The Valdez Police Department has 13 full-time officers and five full-time dispatchers. During the pipeline boom, Valdez experienced an increase in crime that exceeded its five-fold increase in population. The incidence of crime decreased substantially after the completion of the pipeline; major crimes declined between 1976 and 1978.

3.2.10 Public Finance

The City of Valdez is in an unusual public finance position compared with most Alaskan communities. Development of North Slope oil resources resulted in the construction of the trans-Alaska pipeline oil terminal facilities in Valdez. The city expanded its city limits to take advantage of the tax revenue that the pipeline and terminal facilities represented. As a result, the City of Valdez has an assessed value per

capita that is second only to the North Slope Borough and that was estimated in 1979 at $372,589 per capita (DOWL Engineers 1979). The state average at that time was $47,342. The City of Valdez has no personal property taxes or sales taxes, and has eliminated user charges for several city services. The real property tax of 6 mills is one of the lowest in the state. General Fund expenditures between 1968 and 1980, indicative of the change in city public finance, are shown in Table 3.11.

Table 3.12 summarizes the 1978-1979 Valdez City Budget. Of revenues totaling $12.6 million, property taxes were the primary component of city revenues (69.2 percent). Other sources include last year's surplus, use revenue/interest income, and state revenue. Expenditures were needed for capital improvements and education.

The financial health of Valdez has allowed the city to pursue the goals of continued economic development and increasing the amenities of living in Valdez. A 1979 sale of $48 million in General Obligation Bonds was passed by Valdez voters for the construction of a commodity port, and the 1979/80 city budget included funds for the construction of fish hatchery facilities at Solomon Gulch. Capital improvements constituted 39 percent of the 1978/79 city budget, and the city has embarked on an ambitious five-year (1980-85) Capital Improvement Plan. This plan includes administration, planning and zoning, engineering, education, public works, port, fire department, parks and recreation, and museum projects.

3.2.11 Cultural Resources Literature Cited

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Table 3.11. City of Valdez, general fund expenditures, 1968-1980.

Year	General Fund Expenditures	
	Amount	Per Capita
1968	$ 293,418	$ 367
1969	352,814	n/a
1970	435,545	432
1971	596,723	n/a
1972 (6 months)	(416,668)[1]	n/a
1973	624,232	n/a
1974	561,912	n/a
1975	2,255,916	n/a
1976	4,570,826	n/a
1977	4,821,251	n/a
1978	11,163,381	n/a
1979 (budget)	12,623,404	2,817[2]
1980 (budget)	13,755,482	

Sources: City of Valdez, Annual Financial Report, 1972 through 1978; Valdez City Budget, 1979 and 1980.

[1] In 1972 the city fiscal year changed from the calendar year to July 1-June 30.

[2] Based on population of 4,481; $3,765 based on population esti mate of 3,350.

Table 3.12. Summary of Valdez city budget, 1978-1979.

Revenue	Amount	Percent
Surplus Carry-Forward	$1,970,000	15.6
Real Property Taxes	8,731,404	69.2
Use Revenue, Interest Income	1,313,000	10.4
State Revenue	491,000	3.9
Other	118,000	.9
	$12,623,404	100.0
Expenditures		
General Fund[1]		
Council and Administration	712,189	5.6
Engineering	198,661	1.6
Police	786,724	6.2
Fire and Emergency Medical Services	376,002	3.0
Streets	612,050	4.8
Parks, Recreation, and Campgrounds	323,462	2.6
Library and Museum	139,019	1.1
Health and Hospital	366,400	2.9
Planning and Zoning	75,177	0.6
Education	3,430,465	27.2
Other	546,864	4.3
General Fund Transfers		
Utilities	4,561	0.0
Boat Harbor	139,280	1.1
Capital Improvements	4,912,550	39.0
TOTAL	$12,623,404	100.0

Source: City of Valdez, 1978-1979 Budget and Summary of Capital Program.

Notes:

[1] Functions are summaries of 25 actual budget line items.

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3.3 ECONOMIC RESOURCES

3.3.1 Introduction

The Valdez economy is supported by oil and gas property tax revenues. Second only to the North Slope Borough, the City of Valdez has the next highest per capita assessed value of any municipality in Alaska. The per capita assessed value of property within the Valdez taxing authority is $429,964, according to the Department of Community and Regional Affairs' publication Alaska Taxable 1980, January 1981. The North Slope Borough has a per capita assessed value of $1,262,089, significantly higher than Valdez, or any other Alaska municipality.

The high per capita assessed value of property of these two local municipalities reflects the location of development and pipeline facilities for the Prudhoe Bay oil field within their respective municipal boundaries. For comparison, the per capita assessed value of property within the Anchorage Municipality is only $36,682. Statewide it is $58,896.

The per capita assessed value is the value of taxable property within the boundaries of a local taxing authority as determined by state and local tax assessors, divided by the number of residents living there. A higher ratio or higher per capita assessed value creates taxing leverage. In 1980, Valdez collected $10,650,394 in oil property tax receipts with a relatively low mill rate levy -- approximately 6.5 mills. In other words, Valdez can collect a large sum in property tax revenues with a relatively low nominal tax rate, because they tax the pipeline.

3.3.2 Employment Base

The City of Valdez has not always had such a bountiful and secure source of revenue as oil and gas property tax revenues. Prior to the

pipeline boom, Valdez was a small local port town. Its pre-eminence as an ice free port and link to the Interior was cut short with construction of a railhead at Seward in the 1920's. During the 1930's and 1940's a cannery operated in Valdez, but Cordova became the capital of the Prince William Sound fishery. Cordova also served as the railhead for the copper industry that flourished near McCarthy in the early 1900's.

Valdez's role as a transhipment point for goods destined for the Interior was briefly revived during World War II. However, the Valdez community and economy remained relatively stagnant until Valdez was chosen as the marine terminal site for the Trans-Alaska Pipeline System (TAPS).

The mainstay of the Valdez economy has historically been government employment. Harborview Hospital was built in Valdez, a facility for the mentally and physically handicapped. Valdez also became the regional district office for the State Department of Highways, now the Department of Transportation and Public Facilities (DOTPF). Prior to construction of TAPS, government employed more than 60 percent of the total work force.

Table 3.13 shows selected employment statistics for Valdez. The data for 1968 is taken from a profile of Valdez, prepared by the Alaska State, Department of Economic Development. The figures provide a glimpse of the economy and employment base before construction of TAPS.

Of the 320 people working in Valdez during 1968, 220 (68.8 percent) were employed by state and local government. Payroll records reveal 18 people were employed by the City of Valdez, the remainder by the state. The next highest employment sector was retail which employed only 23 people and accounted for a scant 7.2 percent of total employment.

The effect of the pipeline on the economy of Valdez is clearly shown by the statistics in Table 3.13. In 1976, the <u>average</u> number of

Table 3.13. Employment statistics, Alaska Department of Labor.[a]

	1979	1978	1977	1976	1975	1968[b]
Mining	0	0	0	0	0	0
Construction	49	60	1,960[c]	3,452	1,819	15
Manufacturing[d]	*	*	*	*	*	*
Transportation, Communication, Public Utilities[e]	339	346	111	165	172	15
Wholesale	*	10	14	14	22	8
Retail	109	155	141	186	263	23
Fire	34	26	40	45	36	*
Service	226	292	404	544	265	26
Miscellaneous	5	*	*	14	7	3
Federal Government	14	5	12	11	10	*
State and Local Government	273	192	190	153	142	220
TOTAL	1,049	1,086	2,872	4,584	2,729	320

[a]The statistics are yearly averages from the State of Alaska, Department of Labor, Employment Statistics. The figures are for area code 262 which includes the Valdez and Sheep Creek Census divisions. The statistics were compiled by Joe Dohner, Research Analyst, Department of Labor.

[b]These statistics are from a profile of Valdez published by the State of Alaska, Department of Economic Development (now Department of Commerce and Economic Development) in 1969. The employment data was based on 1968 data.

[c]This figure is a six month average. The months are April, May, June, July, August, September. No other monthly data was available.

[d]The data for manufacturing is not published, because it would reveal statistics of an individual business establishment.

[e]The data for Transportation, Communication, and Public Utilities includes employees of Alyeska Pipeline Service Company, Inc., involved in operation and maintenance of the pipeline terminal.

*Data not available.

construction workers was 3,452 or 75.3 percent. This was more than three times the entire 1970 population of Valdez. As shown, state and local government shrank to 153 employees or 3.3 percent of the total.

With completion of TAPS, government is once again assuming a significant role. However, the transportation, communications and public utilities sector is now the primary employer. This sector employed 339 people in 1979, or 32.3 percent of the total work force (including Alyeska Pipeline Service Company employees). Government's share (including the Federal Government) was 27.3 percent. By 1979, the construction industry's share of the work force had shrunk to only 4.6 percent of the total. Unemployment in Valdez in 1979 was between 16 percent and 18 percent, much higher than the statewide average (DOWL 1979).

3.3.3 Resource Development

Agriculture and Timber

Commercial agriculture in the Valdez area is not considered feasible (City of Valdez 1979). However, the City of Valdez is actively seeking contracts with Delta Junction area farmers to ship barley through the Valdez port facility.

Similarly, there are no timber harvesting activities occurring within the Valdez Coastal Management District at the present time, and the commercial potential of timber lands within the District is minor. Some timber harvesting is occurring on lands owned by Tatitlek Corporation in Prince William Sound, but timber in the round is being shipped directly from the logging sites.

Minerals

Regarding minerals, the Port Valdez area has no operating mines at the present time even though valuable metals once mined in the area

included gold (44 mines), silver (9 mines), copper (63 mines), lead (27 mines), and zinc (28 mines). The only mineral resource in the Valdez area likely to affect coastal management activities is the copper mining in the northeast area, i.e., from Port Valdez to Port Fidalgo (Valdez Planning Department 1979). This twenty year operation was not only quite limited as a mining activity (only about 100,000 tons were mined [Joint Federal-State Land Use Planning Commission 1974]) but it is no longer considered economically viable.

Gravel is currently being mined from several pits in the Valdez Glacier Stream floodplain for local use. Primary users of gravel are the port construction project and highway improvements.

Fisheries

Currently, salmon are the only commercial fisheries resource being utilized in the Valdez area. Port Valdez is closed to commercial fishing, but several commercial fishing boats are based out of Valdez. Salmon procesing has occurred on infrequent basis, but no processors are operating in Valdez at the present time. The City of Valdez is near completion of a fisheries resource development feasibility study, and is pursuing the establishment of a new fish processing facility at the city dock.

Recreation/Tourism

Valdez has a moderately developed tourism industry at this time. The city is on a Westour route that utilizes bussing from Anchorage, touring the Alyeska Marine Terminal, and departure by one-day cruise boat or ferry. The nearby Columbia Glacier is a prime tourist attraction on the cruise boat and ferry route between Valdez and Whittier. Two large tour boat operators are based in Valdez, and luxury cruise lines have begun making scheduled stops in Valdez over the past two years.

3.3.4 Economic Growth

In many respects, the economy of Valdez reflects the economy of the state as a whole. Both are virtually dependent on oil and gas tax revenues, and current revenues far exceed the historic norm. Government spending has exploded. In fact, Valdez even has a permanent fund. In 1977, Valdez voters set aside $13.5 million to be held perpetually in trust. Interest earnings may be used to fund either operating or capital budget expenditures, but the principal may not be impaired.

The financial well-being of Valdez has allowed the city to attempt to expand its economy. In 1979, the City of Valdez sold $48 million in bonds for construction of port facilities. However, the bond package was put together when Valdez had good reason to believe Alpetco (Alaska Oil Company) would construct an olefins petrochemical plant. Whether the port facility will pay-off without Alpetco remains to be seen. This will depend on the economic growth of Interior Alaska, and the economies of sending goods through Valdez versus Anchorage, Whittier or Seward.

The Dow-Shell group is considering Valdez as a possible site for a petrochemical facility. The abandoned Alpetco site is now available. Also, expanded port facilities should be in place and ready to use. At this time, however, it is impossible to speculate on the location of a gas liquids petrochemical industry, or if in fact there will ever be such an industry in Alaska.

The Solomon Gulch hydroelectric project is near completion. The project should provide local low-cost power, some time in the future. At 12 MW, the project is not, however, likely to supply power for any major industrial activity. Total cost for the hydro project is around $35 million.

The Copper Valley Electric Association (CVEA) is also planning to install a 9 MW pressure reducing turbine in the pipeline itself.

The turbine would provide back-up power, as the flow rate through the pipeline cannot be guaranteed at all times.

The City of Valdez is actively promoting fishing and fish processing. Also, the Valdez Fisheries Development Association is applying for a permit to construct a salmon hatchery. The hatchery would be located on Solomon Gulch Creek. The hatchery is planned to breed 50 million pink salmon eggs and 18 million chum salmon eggs. Total cost of the project is $1,771,000.

In the near term, however, the Valdez economy will be fueled primarily by oil and gas property tax receipts. These revenues should be substantial, and will last for some time.

4.0 GEOPHYSICAL HAZARDS

4.0
GEOPHYSICAL HAZARDS

The City of Valdez, like many other coastal communities in Alaska, is subject to several categories of potentially destructive geophysical hazards. Concern on the part of residents about the extent and nature of such hazards is reasonable. Sensible community development depends upon recognition of the constraints imposed by these hazards.

The objectives of this geophysical hazards study are threefold:

1. To identify (at the preliminary level) potential geophysical hazards;

2. To make preliminary maps showing the approximate geographic limits of these hazards; and

3. To recommend a logical plan for further detailed studies, where appropriate. (See Appendix B.)

These objectives were accomplished by a literature review, aerial photo interpretation, preliminary field reconnaissance, and utilizing results of a detailed flood investigation.

This section is compiled from a limited review of existing literature, aerial photo interpretation, a brief field reconnaissance, and abstractions from other Woodward-Clyde Consultants' studies conducted in the Valdez area. All of the data and information presented herein are

preliminary. The boundaries of the hazard area are based on interpretations of maps and aerial photographs, and have not been field checked. Little information is available on recurrence intervals of avalanche and mass wasting hazards. Little existing subsurface information is available to evaluate the liquefaction potential of the granular deposits that underlie most of the flatter areas in the Valdez area.

The term "geophysical hazard" is used here to describe, in general, the seismic, mass wasting, avalanche, and flood hazards in the Valdez area. Seismic hazards refer to dangers existing due either to the proximity of fault lines and the potential for failure of poor foundation soils, or to the secondary triggering of mass wasting or avalanche effects. Mass wasting hazards refer to the dangers of rock or debris slides. Avalanche hazards are related to airborne or groundborne snow slides. Flood hazards refer to storm surges, voluminous rainfall, snowmelt/glacier melt, release of water from glacier-dammed lakes, and tsunami or earthquake-generated seiche waves.

Most of the information on the accompanying preliminary maps was derived through the interpretation of three types of aerial photographs: low altitude color stereo pairs; low altitude black and white stereo pairs; and high altitude color infrared stereo pairs. A detailed flood investigation was carried out concurrently with this investigation, and the results are included here.

A preliminary field reconnaissance was made by helicopter. A limited ground reconnaissance was conducted in the area between the airport and Mineral Creek. The main intent of these reconnaissances was to examine avalanche zones before all the snow had melted in the area. Thus, other things, such as mass wasting, lineaments, and features covered by snow were not investigated during these reconnaissances.

The information and maps contained in this report are general guidelines for future coastal planning, and are not intended to take the

place of detailed geologic investigations of specific sites.

4.1 REGIONAL SETTING

The new townsite of Valdez is located on the northeast end of Port Valdez, the northeasternmost extension of Prince William Sound. Port Valdez is separated from the valleys of Interior Alaska by the steep slopes of the Chugach Mountains. These mountains are characterized by rugged, steep-walled valleys containing an extensive system of valley glaciers, and commonly rise abruptly from the shoreline. The steep mountain walls extend below water level in Port Valdez, resulting in a steep-sided, flat-bottomed trough 400 to 800 feet deep. Much of the Port Valdez shoreline is steep and rocky, except for a few areas where deltas and moraines have been placed in the port by rivers and glaciers. These depositional features provide most of the developable areas of the City of Valdez. This setting is similar to many coastal communities in the mountainous areas of Southcentral and Southeast Alaska.

The present geomorphology of Port Valdez is the result of a combination of extensive tectonic forces, including regional uplift and intrusion of igneous rocks, and massive glaciation. The tectonic forces at work in the Valdez area are associated with its location within the circum-Pacific Seismic Belt and, more specifically, within a region that has been identified as a tectonic subduction zone. The collision of two tectonic plates in this region is believed to be responsible for the high seismic and volcanic activity of the region.

The rocks of the Port Valdez region are mainly graywacke, slate, and argillite of the Valdez Group, mildly metamorphosed locally to phyllite or greenschist facies. Since the last glaciers that covered the region began to recede, these rocks have been rebounding -- rising upward. Both the depressing process and the ongoing rebounding have created a complex system of joints (regularly occurring cracks) in the rocks. The presence of these joints has played an important role in the geomorphic development of the Port Valdez Region.

Climate also plays an important role. The climate of Valdez is controlled by both cold polar air masses and warm, moist maritime air masses. These combine to produce a relatively high average annual precipitation, much of which occurs in the fall. Deep snow accumulations build at higher elevations such as Thompson Pass (to the east of Valdez), which receives a mean of 550 inches of snow annually. During winter many freeze-thaw cycles may occur. The joints in the bedrock permit ample infiltration of moisture which, upon freezing, wedges blocks and plates of rock apart. These accumulate on the mountain slopes as debris.

Soil-forming processes have not made very much progress in the area. The dominance of mechanical weathering and the steepness of the slopes have resulted in the formation of only a thin mantle of soil. Below about the 2000-foot elevation, vegetation dominated by alder shrub (Dames and Moore 1979) has been established to bind the soils. Above this elevation, soil is rapidly removed by landsliding and soil creep, thus retarding or preventing the development of soil-holding vegetation. Without benefit of supporting vegetation, the accumulated debris is drawn down by gravity and precipitation, causing active mass wasting.

4.2 POTENTIAL HAZARDS

The coastal zone in which Valdez is located is subject to several potential hazards. Some of these are so infrequent as not to be of serious concern, and some are in areas where other features such as terrain may restrict reasonable development. In the following paragraphs the potential hazards associated with seismic events, mass wasting, avalanches, and floods are discussed as they could apply to Valdez.

4.2.1 Seismic Hazard

Earthquakes are responsible for four basic types of hazards: ground rupture, ground shaking, ground failure, and tsunami. Ground rupture is the opening of the ground surface as the result of fault displacement or ground failures beneath this particular zone. Ground shaking is

the movement induced in the ground by the energy release of the earthquake. Ground failure is the loss of strength of the ground by liquefaction, sliding, and other effects of the earthquake shaking. Tsunamis are the seismic sea waves caused by the energy release of the earthquake. There are eleven major active fault systems within 150 miles of Port Valdez that are capable of producing earthquakes strong enough to affect Valdez. The dominant earthquake source is the plate boundary that underlies the region around Valdez at a depth of about 12 km.

Earthquakes result from displacement or movements of rock along zones of weakness, or faults. These displacements do not always propogate to the surface, but where they do they can cause severe damage to structures that may overlie them. Faults are often visible on aerial photographs as linear features (lineaments). However, not all lineaments seen on aerial photographs result from faulting. A careful analysis is required to distinguish those lineaments that are potentially related to faulting from these that are not. Lineaments not related to faulting include stream erosional or depositional features, and those of glacial origin. Lineaments in the Valdez area that appear to be fault-related have been mapped (Map 11). To confirm whether these lineaments are faults and to assess their level of activity requires detailed ground geologic studies. These studies will be hampered by the lack of obvious mappable geologic marker units, soil or glacial deposits and the often-extensive vegetation cover. Although it may be shown that the lineaments are not potentially hazardous faults or that the probability of sudden displacements along these features is remote, until additional confirmation studies are completed, these lineaments should be considered potentially hazardous with respect to land use planning.

As for the hazards due to ground rupture, ground shaking, and ground failure, geologic units, whether solid or unconsolidated, respond differently to the vibrations of earthquakes. In many instances, structures located on soft ground have suffered greater damage than structures on hard-rock formations. Water-filled alluvium or saturated filled ground

can magnify the amplitude of earthquake shockwaves. For the purposes of this preliminary study, the areas on the map indicating floodplains, deltas, or tidal zones are considered to have higher exposure to earthquake effects. In these areas special engineering may be necessary for the construction of safe buildings. A detailed geotechnical investigation would be needed to accurately differentiate all such areas.

Most damage during the 1964 earthquake occurred along the shoreline of Port Valdez and was caused by ground failures and seiches generated, in part, by submarine ground failures. Ground shaking led to liquefaction of the unsupported delta deposits and submarine sliding which in turn generated, or at least amplified, the seiches. Most of the disturbance occurred within 1500 m (5000 ft) of the prequake shoreline. The exception to this limit was the area southwest of Knife Ridge along the Dike (Dike Road) south of Valdez Glacier Stream. In that area ground rupture and liquefaction were noted as far as 2450 m (8000 ft) in from the prequake shoreline (DOWL 1979).

During the 1964 earthquake, submarine landslides occurred in at least two areas of Port Valdez, the most important one being at the abovementioned delta front of Old Valdez. Small submarine slumps off Shoup Spit at the western end of Port Valdez also contributed to the seiche already oscillating in Port Valdez. The seiche attained its apparent maximum runup height, as indicated by high-water marks on the snow, of 170 feet above mean sea level at Cliff Mine near Shoup Bay (Coulter and Migliaccio 1966). No traces of the 1964 tsunami or seiche damage could be discerned from the available aerial photographs, even in Shoup Bay where the runup was reported to be high. A detailed review of the 1964 earthquake and aerial photos taken shortly after the quake may reveal zones affected by these wave phenomena.

The principal cause of damage to structures away from the waterfront was ground rupture and failure liquefaction of the saturated sands and gravels underlying the structures. About 40 percent of the homes and

most of the commercial buildings in Valdez were seriously damaged by resulting fissures which disrupted their foundations (Coulter and Migliaccio 1966). The absence of evidence of damage due to waves, ground rupture, or ground shaking to the single dwelling on the Mineral Creek alluvial fan demonstrated its preferred location with regard to seismic stability (Coulter and Migliaccio 1966).

The key conditions for high liquefaction potential are loose granular sediments and high water table. All areas believed to consist of loose, saturated, fine sand and silt have been delineated on Map 11. Areas with these conditions have been subjected to disturbance during previous earthquakes. Not all the areas depicted on the map have the same potential for damage, and some areas where the liquefaction potential is high may have been missed in this cursory study. The boundaries presented are generalizations of data prepared by others. Zones that are shown as having a high potential for liquefaction should be thoroughly investigated prior to placing structures in these areas. Also, structures placed in these areas should be engineered to adequately withstand effects of liquefaction predicted during site-specific geotechnical studies. The site of Old Valdez probably has the highest potential for liquefaction, since it is located on an unretained saturated delta front subject to submarine sliding, liquefaction, and subsidence. The Mineral Creek delta to the west of New Valdez may have similar high potential. The saturated lake deposits adjacent to Robe Lake may also have high potential for ground failure. The Lowe River deposits constitute less of a hazard because they are more or less contained (except at the mouth of the river) by steep valley walls which restrict their movement; therefore, they are not included on the map.

In addition to primary seismic hazards, a common secondary effect of earthquakes is the triggering of mass wasting and avalanche events that normally occur in smaller quantities and at slower rates. The development of some of the larger scars on the map was likely influenced by seismic vibrations.

4.2.2 Mass Wasting Hazard

Mass wasting refers to the down-slope movement of rock, soil, and other debris. Snow avalanches could also be considered a form of mass wasting, but have been treated separately in this study. Rock avalanches and mud flows are typical forms of mass wasting found in Alaska. However, in the Valdez area, mass wasting is generally related to rock falls and debris slides. Rock falls, in most cases, are associated with steep slopes; accumulations of debris at the toes of slopes are limited to 20 to 30 feet from the slope. Debris slides occur where thick deposits consisting of combinations of soil, rock, vegetation, water, snow, and/or ice accumulate on bedrock slopes. These can become a major consideration during hazard assessments because large volumes of materials can begin to slide at high speed and terminate great distances from the toe of the slope.

In Valdez, there are many slopes near 90°, which are generally due to past glaciation. The predominant strike of foliation and/or bedding planes in the area appears to be in a general east-west direction. The predominant dip is steep and to the north. In several areas, such as Mineral Creek and at the Valdez Glacier Stream, these east-west striking formations have been cut by north-south trending fluvial drainage courses, which have left shallower valley wall slopes (near 40° to 50°). Most debris slides occur on these flatter slopes, the character of the bedrock and the glacial scouring produced numerous steps, which contain the limited debris moving downslope. This limits the material coming down the slopes to local rock falls. Debris slides and mass wasting on the north and south-facing slopes are minimal. Obvious debris slides have been mapped (Map 11). Occasional rock fall areas should be expected within about 100 feet of any slopes steeper than about 40°. Rock falls can be contained, in most instances, to minimize the potential hazard. Debris slides, on the other hand, may require extensive and costly engineered systems to reduce their potential impact. Some of the smaller

debris slopes may not have been detectable on the aerial photographs. For this reason caution is recommended in building any structures near steep slopes.

4.2.3 Avalanche Hazard

Preliminary data on avalanche starting zones, tracks (or chutes), and runout zones are indicated on Map 13. Because of the glaciation of Port Valdez and some of its tributary valleys, there are many steep-walled mountains and consequent potential avalanche zones. As with mass wasting, avalanches are more likely to occur where slopes are steep and where snow can accumulate. The northern shore of Port Valdez between the airport and the city has low avalanche potential. Here the steeply dipping slopes strike east-west and have large steps. The steps catch the snow sliding from higher elevations, thus protecting the lower elevations between the airport and the new town. The near-vertical lower slopes prevent the accumulation of snow at those levels. Certain areas within Mineral Creek valley and other tributary valleys where fluvial erosion predominated are more prone to avalanche because local slopes are shallow enough to permit accumulation, yet steep enough to provide chutes. Keystone Canyon and its near-vertical walls are not conducive to snow accumulation, and therefore have a lower hazard potential than a canyon with more gradual slopes. The avalanche chutes in this area are generally related to areas where erosion has lessened the grade.

Avalanches can be a high-frequency problem that will have to be handled thoughtfully. Damage from avalanches is primarily to structures lying in the path of runout zones. Construction near the ends of avalanche chutes or runout zones should be adequately engineered to mitigate the hazard. Runout zones can be reduced in size by the construction of retarding structures (mounds) and deflecting structures. There are also supporting structures for avalanche starting zones. Avalanche control with explosives and artillery can be considered in some areas. These may eventually become viable solutions since land available for development is so physically limited in Valdez.

4.2.4 Flood Hazard

Flood hazards include those due to tsunamis; storm surges; voluminous rainfall, snowmelt, and glacier melt; and release of glacier-dammed lakes. Tsunami flooding is defined in Subsection 4.2.1, Seismic Hazards; because Port Valdez is protected by its orientation, tsunamis are not a likely hazard.

The main riverine flows in the developed and developable areas of Valdez come from three sources: Valdez Glacier Stream, Mineral Creek, and Lowe River. In addition, development has occurred adjacent to Robe River, and has been planned adjacent to Corbin and Slater Creeks. The flood boundaries of these and the other waterways have been indicated on Map 14. Floodways extending beyond the limits of the Valdez Flood Study area (Keystone Canyon, Upper Mineral Creek) have not been mapped.

Storm Surge Flooding

Storm surges are relatively long-term, local increases in water level resulting from offshore storms. Maximum hazard results when such a surge coincides with a maximum tide.

The City of Valdez is exposed to the hazard of combined storm surge/high-tide flooding due to winter storms in the Gulf of Alaska. Factors affecting storm surges include coastline topography and climatological characteristics, such as atmospheric pressure, speed and direction of the storm center relative to the coastline, and the stage of frontal development (Intersea Research Corporation 1977). Storm surges at Valdez may be affected by local conditions such as the dissipative effect of flow through Valdez Narrows or the potential effects of local winds amplifying or damping the water level of the storm surge.

Estimated combined storm surge and astronomical tide elevation in Port Valdez with a 100-year recurrence interval is 10.6 feet above sea

level. Such flooding can occur along the entire Port Valdez shoreline. Because of the steep terrain, the area affected by the hazard is generally small. The relatively flat land of the river deltas allows for greater flooding.

Rainfall/Snowmelt/Glacier Melt Flooding

Floods occur in rivers as a result of a large input of water to the drainage basin in the form of rainfall, snowmelt, glacier melt, or a combination of these inputs. In the Valdez area, as well as most coastal areas of Southcentral and Southeast Alaska, the floods due to snowmelt are typically lower in magnitude than those due to rain storms in late summer or fall. Glacier melt is typically largest in late summer, increasing the potential magnitude of late summer rainfall floods in glacial streams.

The primary factors that affect the magnitude of riverine flooding include the size of the drainage basin contributing flow to the river; the amount and distribution of the precipitation that falls on the basin; the size and location of lakes, wetlands, or other water storage basins within the drainage basin; and the size and location of glaciers within the drainage basin. Frequent river flooding should be expected in the unvegetated floodplains of all the rivers in the area. Less frequent flooding occurs in overbank areas adjacent to the rivers.

Glacier-Dammed Lake Release Flooding

Glacier-dammed lakes form when a stream is blocked by a glacier. Flooding occurs when lake water develops an escape route through, under, or over the glacier dam. The escape route enlarges, allowing the lake to drain rapidly.

Little is known about factors affecting flooding from glacier-dammed lakes. Some potential factors include the mechanism by which the lake releases, the volume of water in the lake, and the route through

which the lake water travels before reaching the area subject to flooding. The frequency of glacier-dammed lake releases is likely related to the time necessary for the lake to fill and for a drainage channel to become blocked, and the position and movement of the damming glacier.

Estimates of flood discharges resulting from glacier-dammed lake releases combined with potential concurrent rainstorm floods in the basins of Valdez Glacier Stream and Lowe River are 46,000 cubic feet per second (cfs) and 59,900 cfs, respectively. Estimates of the extent of flooding, assuming that the average daily peaks of the rainfall/glacier melt flood and the glacier-dammed lake release flood coincide, are given in Map 14.

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5.0 RESOUCE ANALYSIS

5.0
RESOURCE ANALYSIS

5.1 INTRODUCTION

To implement the Coastal Management Program, the residents of Valdez will make decisions on the use of coastal resources. Residents strongly support economic growth of the community and multiple-use management of resources. Relatively limited level land, good air and water quality, and important fish and wildlife resources indicate a need for trade-offs among resource uses. By assessing the demands on coastal resources and the capability of those resources to meet demands, the resource analysis provides a reasoned approach to making resource use decisions.

The resource analysis:

- o Assesses present and anticipated demands on coastal resources;
- o Evaluates resource sensitivity and capability to meet demands;
- o Projects significant anticipated changes in inventory characteristics; and
- o Classifies coastal management areas based on local needs, resource sensitivity, and other factors, such as public safety.

The resource analysis is structured to consider the Valdez Coastal Management District as a whole and as 12 subareas or analysis zones. The regional analysis examines known and possible changes that may affect the economic and physical environment of the Valdez area, including new economic activity, population growth, changes in air and water quality, demand for housing and services, and fish and wildlife habitat.

The geographic analysis addresses specific activities, potential problems, and trends within each of the 12 subareas according to the following parameters:

- o Projected resource use and activities
- o Coastal habitats
- o Air and water quality
- o Geophysical hazards
- o Land use, management, and status
- o Transportation
- o Recreation
- o Energy facilities
- o Community facilities
- o Use classification

Areas within subzones are classified for either development or conditional development. Development areas, as the name suggests, permit development to take place according to the zoning ordinance, building code, and applicable federal and state regulations. Conditional development zones are designed where special biological resources, geophysical hazards, coastal habitats, coastal access, or other factors constrain development. Areas classified as conditional development zones may be subject to special siting, design, and construction requirements, and will be considered by the Community Development Department on a site-by-site basis.

5.2 REGIONAL ANALYSIS

5.2.1 Economic Growth

After experiencing the boom/bust cycle of Alyeska pipeline construction, the City of Valdez is determined to foster stable growth of the local economy. A number of projects are proposed and several already started to assure steady employment and income. These projects include facilities for a major port, a petrochemical complex, hydroelectric power generation, and commercial fish processing. Construction of these facilities would generate immediate employment opportunities and the operation of the facilities would provide permanent jobs. Based on the pipeline experience, one new service job would be created for every four construction and operation jobs.

The keystone of this strategy is improvement of the harbor and expansion of the port. Studies have indicated that savings could be realized if freight destined for Interior Alaska were routed through an improved Valdez port rather than through Anchorage. Vessels bringing goods for the Interior would then be loaded with outgoing minerals, forest and agricultural products such as barley, and processed fish. The upgrading of the port and harbor would create 115 construction jobs lasting two to three years. Once completed, operation of the port would require 15 permanent employees.

The Solomon Gulch hydroelectric project is already underway, and has created 100 construction jobs. Upon completion it will employ two operators. Hydroelectric power is favored as an alternative to fossil fuel generation because of the added capacity and possibility for electric rates not tied to the rising price of oil. This reasonable, stably-priced source of energy will not only lower local rates in the long run, but be a selling point for other industrial development projects.

Expansion of the fishing industry is also proposed, with the biggest potential foreseen in salmon. New boats, gear, and support and

processing facilities would be needed. A new commercial boat harbor would provide space and support facilities for fishing vessels, tenders, and possibly processing vessels. The city has actively promoted the establishment of a salmon freezer plant processing facility near the small boat harbor, and a hatchery site at Solomon Gulch. The processed fish would be shipped out through the new port and up to 50 new jobs would likely be created.

The tourist industry has untapped potential, and the port and expanded harbor would facilitate its realization. The major attraction is the coastal marine environment, and numerous coastal parks have been proposed and several developed. A bigger port could attract more cruise ship traffic.

The city is endeavoring to create new job opportunities for its citizens. Since many of the jobs require specific skills, the city is considering training residents for these specialized, higher paying jobs.

Other long-term potentials include primary processing and shipment of timber and mineral resource products. The Tatitlek Native Corporation will be logging some of its lands in Prince William Sound. Depending on the market for round and processed timber, these products could be shipped through the city's port. Similarly, mineral production in the Valdez area may become economically feasible as mineral prices rise. Processed ore could also pass through the city's port facility. The city is also working to encourage the establishment of a major marine repair facility in Valdez.

5.2.2 Population

As the City of Valdez pursues its goals of diversifying and stabilizing its economy, its population is likely to increase. Some of this growth will be large, temporary increases associated with the influx of

labor for large construction projects. A long-term increase associated with industry operational workforce and associated service industries will also occur.

The most significant constraints on the ability of the Valdez area to handle these increases are the availability of housing, and the capacity and distribution of municipal services. Availability of housing for construction personnel is relatively good, between local motels, Keystone Camp, and other service camps in the airport area. With a permanent-housing vacancy rate estimated at 3.1 percent (DOWL Engineers 1979b), however, the ability to handle a major increase is limited. Residential expansion will probably take place through a combination of private and city development projects, and possibly through further state land disposal actions. A significant increase, coupled with rising single-family housing costs, may necessitate development of higher density (multi-family) and mobile home housing. Municipal services vary in their ability to meet population growth. With current capital improvements, water supply is adequate to meet future demands with extension of the distribution system. The sewer system has both excess capacity and room for expansion if the service area is expanded. Solid waste disposal is not adequate for current demands, and will require a new location and incineration facilities.

The Valdez Coastal Management Survey indicates that 80 percent of Valdez residents would like to see the community's population increase. Approximately 34 percent of the residents preferred a population between 7,500 and 10,000, 24 percent between 5,000 and 7,500, 28 percent between 4,000 and 5,000, and 3 percent over 10,000.

5.2.3 Transportation

The transportation system of Valdez has fluctuated between a small system serving a typical coastal community to a system more characteristic of a regional industrial and distribution center. Through its

Capital Improvements Program and bond issues, the city is building the transportation infrastructure needed to become a regional distribution port and fishing fleet support base.

Problems with reliability, frequency of service, cost, and capacity characterize this transition. Weather and topographic conditions still isolate Valdez from time to time; the Richardson Highway or the Valdez airport can be closed for several days at a time due to weather and/or avalanches. Both the city and the State Department of Transportation are trying to overcome these problems with airport improvements, and with highway relocation, upgrading, and increased maintenance. The low frequency of truck and marine freight service still reflects low volumes generated by a small population, and as a result costs are high. The frequency of ferry service is excellent during the summer season, but service is discontinued to Whittier and reduced to Cordova from October to May as the high-volume tourist traffic drops off. (Nearly three-quarters of respondents to the Coastal Management Questionaire felt that increased ferry service was important to Valdez.) The frequency and capacity of air transportation is adequate for current passenger traffic, although plane size limits the size of air freight items.

The completion of the Valdez Port facility will have an immense impact on the city's transportation role. It will provide a facility capable of handling large volumes of construction equipment and supplies, both for projects in Valdez and in the Interior of Alaska. As fisheries, mining, agricultural, timber, and petrochemical industries develop at tidewater and in the Interior, the Valdez Port will be capable of handling export of products to domestic and international markets. Through local population growth and capture of distribution to the Interior, the port could break the present reliance on truck and rail transport from Anchorage. Expansion of the small boat harbor and construction of a commercial boat harbor to handle boats too large for the small boat harbor are scheduled for 1981-82 and 1983, respectively. The commercial boat harbor will be designed to accommodate vessels between 60 feet and

300 feet long. In addition to the harbor expansion, a mobile crane boat-lift capable of handling boats of up to 50 feet will be installed at the small boat harbor in 1983.

Development of transportation facilities requires consideration of other coastal resource values in two locations. The port project borders the Valdez Duck Flats, an area of high biological and special interest to state and federal agencies. A cooperative effort between the city and agencies has resulted in port development that is compatible with the Duck Flats. Similarly, the Richardson Highway traverses the area proposed as Keystone Canyon State Park. Should a park be established, cooperation is needed to ensure that the highway can be improved for transportation to the Interior, yet enhance park use and appreciation of scenic values.

5.2.4 Housing

The demand for housing is linked to population, income, and housing costs. At the current population, demand is high for low-cost single-family housing and multi-family rental units. The supply of both is low, evidenced by a high proportion of mobile home ownership and waiting lists for apartment space.

The vacancy rate was estimated at 3.1 percent in 1979 (DOWL Engineers 1979b). There are few vacant units to absorb increased long-term demand; new housing will be required for new, nonconstruction residents. The supply of temporary housing for construction workers appears adequate to meet demands. Local motels have been housing construction crews off-season, and space is available in Keystone Camp and other camps in the airport area. Some land for residential development is available from private owners (Meals Hills, Port Valdez Company properties at the new town site, and Alpine Woods), and the city has selected Mineral Creek as a residential area. State land disposals also have the potential to provide land for residential development. However, under current land disposal procedures, the state is exempt from meeting local

subdivision standards and requirements, leaving the City of Valdez with the expense of providing access and other municipal services. The District Coastal Management Program will require that future land disposals meet Valdez subdivision ordinance requirements. The coastal management questionaire indicated that 72 percent of the respondents felt that it was important to make more residential land available for development.

Custom single-family homes will be built on an individual basis, and mobile homes will continue to be an important form of new housing. When project-induced population changes occur, the housing market will probably respond.

5.2.5 Community Facilities and Services

The adequacy and cost of community services vary with who provides the service, extent of areas served, and site characteristics. For an Alaskan community of its size, Valdez is unparalleled in its education, fire protection, and police services. The financial health of Valdez keeps the cost of these services to residents low. Health care and medical services are also good.

Private utilities meet the telephone and electric service needs of the existing population. Telephone service has the capacity for an additional 1200 households (3600 residents). The Copper Valley Electric Association (CVEA) provides enough electricity to meet all local demands; however, electric costs are high compared with those in Anchorage and Fairbanks. Much of this cost is due to the rate structure for the entire CVEA service area, and construction costs of new projects such as Solomon Gulch and its distribution line. Because the City of Valdez feels that the cost of power is both a burden to its residents and a disincentive to industrial development, the city is negotiating with CVEA for the purchase of the utility.

Municipal-run utilities - sewer, water, and solid waste - suffer from service limitations and facility/site problems. Two major residential areas, Robe River subdivision and Alpine Woods, are not served by city sewer or water, and utilize on-site systems. A high groundwater table in both areas has caused problems with proper functioning of septic tanks. Problems related to pipe depth and corrosion of water lines, and sewer line infiltration will be corrected by the completion of the current Capital Improvement Program. Both the water supply and the sewage treatment plant have the capacity for additional demand, or can be easily expanded.

The city's sanitary landfill is beset by poor site conditions and inadequate expansion space. Installation of an incinerator has been considered, but a new or auxilliary site for solid waste disposal is also needed.

Expansion of specific community facilities is discussed in Section 5.3, Geographic Analysis.

5.2.6 Physical Oceanography

The present knowledge of Port Valdez physical oceanography does not provide a detailed picture of water movements throughout the fjord. As already noted, short-term current measurements (Colonell 1979) and drogue tracking observations (Muench and Nebert 1973) in the eastern half of the fjord indicate sluggish motion at best, and suggest that the water there is virtually stagnant much of the time. Also, there is the possibility that the eastern half of the fjord is essentially decoupled from the western half, an impression based on satellite photographs that show the Lowe River sediment plume tracing a counterclockwise gyre in the east end of Port Valdez. While the latter possibility does not rule out the flushing of water (and pollutants) from the east end of the fjord, it does suggest that such flushing might not readily occur. Vigorous current activity at Valdez Narrows does not necessarily ensure a

simultaneous circulation and renewal of water throughout the fjord. Because there is no information to the contrary, it cannot be said with certainty that such circulation does not occur. To reiterate, the available physical oceanographic data do not permit conclusions about the overall circulation of water in the fjord.

Given the present limited knowledge of water circulation within Port Valdez, a conservative stance in evaluating future effluent discharge activities is justified because of the possible accumulation of waterborne pollutants that would occur under stagnation conditions. Presently permitted discharges into the fjord should be monitored, and the consideration of additional discharges given increased scrutiny. Heretofore, successive applications for permits have been regarded as virtually separate and independent matters, without sufficient attention to possible cumulative effects. The lack of knowledge of circulation in the east end of the fjord, and of the ultimate fate of pollutants discharged there, underscores the need to adopt a conservative view with regard to evaluation of additional discharge permit applications. The continued addition of permitted discharges without consideration for possibly detrimental results of their combined and overall effects could lead to irreversible damage to the water quality and biota of Port Valdez. Indeed, the fjord must be viewed comprehensively instead of piecemeal by the regulatory agencies if the biologically productive character of the marine environment is to be maintained.

5.2.7 Air Quality

The ability to maintain industrial growth within the Valdez Coastal Management District is dependent upon the existing air quality, as well as the air pollution associated with future industrial projects in this area. New sources of air pollution are regulated and controlled by the EPA's recently revised Prevention of Significant Deterioration regulations (PSD) (published in the August 7, 1980 Federal Register). These regulations establish allowable increments for SO_2 and particulate

matter, above baseline concentration. As industries locate in Valdez, they "tie-up" or consume this available increment in the Valdez airshed. Thus, new projects applying for permits must work within the remaining available increment.

Although the PSD increment limits do not necessarily preclude sources from locating in the Valdez airshed, they place a constraint on the siting of new facilities. The PSD regulations essentially prevent large new sources emitting identical pollutants from locating near each other. Currently, the Alaska Petrochemical Company applied and received a PSD permit for a refinery to be located in the Valdez area. The ALPETCO project was cancelled, however, thereby freeing its allocated increment.

As mentioned above, industries wishing to locate within the Valdez area may be constrained by other industries which have received PSD permits and have effectively "reserved" portions of the allowable increment. The City of Valdez should consider what types of industries it wishes to attract with respect to the percentage of increment that will be consumed. Remaining available increment could be calculated by obtaining or preparing profiles of typical facility emission types, and performing screening dispersion models. This would provide projections of concentrations which could be compared with current increment ceilings as well as federal and state ambient air quality standards. Such a program would provide input to local decisions involving new industrial facilities. It would also provide helpful information to industries interested in Valdez as a location.

It should be noted that the PSD review required by the EPA as well as the State of Alaska requires an extensive modeling analysis, and may include preconstruction monitoring programs. The City of Valdez may wish to consider conducting their own air sampling program. Such data would be available to the public, and would satisfy PSD requirements for many potential sources, saving up to 12 months of delay in most cases. When designating industrial land and evaluating industrial develop-

ment proposals, the City of Valdez can make such designations based on monitoring data and screening modeling which takes into account plume impingement on terrain, and the location of residential and commercial use areas.

5.2.8 Water Quality

Maintenance of local water quality is a goal of the City of Valdez. High water quality is also important to healthy populations of anadromous fish, particularly given local interest in expanding commercial and recreation fisheries. As development occurs, water quality can be affected by effluent discharge, urban runoff, and increased sediment loads from man-induced erosion. Existing state and federal regulations provide adequate water quality control on a project-specific basis; awareness of potential cumulative problems will also help maintain water quality.

Saltwater

A preliminary physical oceanographic analysis indicates lack of knowledge on flushing action and circulation within the eastern half of Port Valdez. Potential sources of effluent in this area include treated waste discharges from a fish processing plant at the city dock. Population growth will increase the volume of treated sewage effluent. As additional industrial development occurs, the capability of Port Valdez to disperse effluent becomes more important to maintaining water quality. A study of Port Valdez circulation is recommended to provide information for the evaluation, siting, and design of industrial development.

Surface Water

Because many rivers and streams carry naturally high sediment loads from glacial action, they are relatively unaffected by increased levels of treated effluent and man-induced sedimentation. Others, such as

anadromous fish streams, are sensitive to water quality and sediment loads. Activities with the potential to affect site-specific water quality are discussed in Section 5.3, Geographic Analysis.

Ground Water

The quality of ground water is of concern because of localized use of on-site wells for domestic water supply. In areas of poor drainage and a high water table, contamination of ground water by on-site septic tank waste disposal systems is a potential problem. Industrial and urban water runoff that is not intercepted by storm drains and other systems can also affect ground-water quality. Development activities should consider the potential for these problems as appropriate. Activities with the potential to affect site-specific water quality are discussed in Section 5.3, Geographic Analysis.

5.2.9 Geophysical Hazards

Responsible coastal management should maximize public safety while minimizing the economic hardship resulting from development restrictions. Three factors affect the level of analysis of geophysical hazards and resulting management alternatives in Valdez: data availability, the ability of individuals to assess degree of hazard, and acceptable risk.

Availability of data on the location, frequency, and magnitude of hazards in Valdez is variable. For some hazards (seiche waves and other seismic events) historic data are available; others are obvious to the eye (avalanche) or identified as a potential hazard (mass wasting). Only in the case of the Valdez Flood Study have regional hazards been quantified. When evaluating a use or proposed activity in a specific area, site-specific investigations are usually required to determine the degree of hazard and to design appropriate safeguards for mass wasting and seismic events.

The ability of individuals to assess the degree of hazards varies, as do the financial resources required to investigate hazards. Large industrial projects assess hazards to protect their investments and to properly site, design, and construct projects. In addition to being able to afford such studies, large developers are often required by permit stipulations to investigate hazards. The individual buying a lot or building a house is less able to afford site-specific studies and more dependent on public information to understand degree of hazard.

Finally, both private individuals and the City of Valdez need to determine what is an acceptable level of risk from exposure to geophysical hazards. All of southcentral coastal Alaska faces the probability of earthquakes and their attendant hazards of tsunami, ground rupture, liquefaction, and mass wasting. Living within this large hazard zone is an acceptable risk to coastal Alaskan residents. Building near an avalanche chute or in an area that floods every three years may not be acceptable, particularly to a local government that is responsible for providing services and repairing hazard-damaged public facilities.

These factors affect local government decision-making in permitting use of potentially hazardous areas. Facing a lack of data, a "conservative approach" that unconditionally restricts development in potentially hazardous lands can inflict economic hardship on landowners and developers. At the same time a "hands off" approach can result in local government expense and municipal liability as the permitter. Some decision-making options include requiring developers in hazardous areas to show investigation of hazard, or government funding of more detailed hazard investigations.

Analysis of geophysical hazards, based on historical data and field reconnaissance, is presented under the appropriate geographic area analysis.

5.3 GEOGRAPHIC ANALYSIS (See Map 13.)

5.3.1 Keystone Canyon

Projected Resource Use and Activities

- o Richardson Highway Transportation Corridor. Potential highway improvements, sole overland transportation route to Interior market areas for the city's port and to other Alaskan communities. Substantial improvements have recently been completed.

- o Proposed Keystone Canyon State Park. This proposed state park encompasses 310,000 acres, with boundaries including Keystone Canyon and the Thompson Pass area. Proposed facilities include interpretive signs and turnouts in Keystone Canyon.

Coastal Habitats

- o Rivers, Streams, and Lakes. Further highway improvement will be needed in Keystone Canyon, but no major change in inventory conditions is foreseen.

Geophysical Hazards

- o Avalanche Hazard. Avalanche chutes and runout zones at several points on the highway side of Keystone Canyon will continue infrequently to close the Richardson Highway. The narrow canyon limits effectiveness of avalanche deflection devices and the ability to relocate the highway outside of runout zones.

- o Riverine Flooding. During high rainfall events, or other increases in flow attributable to glacier-dammed lake release or breakup, the Richardson Highway may periodically be inundated.

- o Mass Wasting. Mass wasting occurs throughout Keystone Canyon, presenting infrequent falling rock hazards to vehicular traffic on the Richardson Highway. Occasional debris slides will close the highway at the northwest end of the canyon.

Land Use, Management, and Status

- o Preferred Local Uses. Transportation - corridor to and from port facility; recreation - scenic corridor with pullouts, picnic areas, and interpretive signs.

- o Management and Status. The area is currently classified as State Public Interest Land, proposed for inclusion in Keystone Canyon State Park.

Transportation

- o Highway Improvements. Valdez citizens are concerned about the ability to maintain and upgrade the Richardson Highway under state park status. The highway is the only road link to the rest of Alaska, and vital to the operation of the municipal port facility.

Recreation

- o Proposed State Park Status. Historic significance and scenic beauty have led to inclusion of this area in the proposed Keystone Canyon State Park.

- o Activities. In addition to general sightseeing, the Canyon is used for kayaking and climbing.

- o Facilities. Local residents and state officials have indicated a need for turnouts, picnic areas, and interpretive signs.

Keystone Canyon Use Classification

- o Conditional Development. The entire region is classified conditional development, to ensure maintenance of transportation use, recreation use, and scenic values.

5.3.2 Lowe River

Projected Resource Use and Activities

- o Residential Development. Continued development within Alpine Woods Subdivision, potential residential development of state land disposal areas.

- o Pressure-Reducing Turbine. A pressure-reducing turbine (PRT) is scheduled for installation in the summer of 1981 in the trans-Alaska pipeline near Dayville Road. The PRT would produce 7.4 MW of power.

- o Transportation. Realignment, widening, and general improvements of Richardson Highway are scheduled over the next several years; potential airport relocation.

- o Community Facilities. Street upgrading and paving for Alpine Woods/Nordic subdivisions is scheduled for 1984-85.

- o Recreation. Continued hunting and fishing, designation of Canyon Slough area as alternate site for downhill skiing, natural setting along river and Richardson Highway.

- o Timber Harvesting. State Public Interest Land designation for timber management.

- o Gravel Extraction. Maintenance and possible expansion of Alaska Department of Transportation and Public Facilities gravel extraction site.

Coastal Habitats

- o Rivers, Streams, and Lakes. Lowe River and nonglacial tributaries are sensitive to obstruction of fish passage, and the tributaries are sensitive to sedimentation. Gravel extraction and residential development could obstruct fish passage. Setbacks of 25 feet for anadromous fish streams are recommended at residential areas, and no timber harvesting should occur within 50 feet of anadromous fish streams, in accordance with State Forestry Management practices.

  Lowe River riparian vegetation is high-value habitat, and both timber harvesting and state land disposal could result in habitat loss. Likely areas for loss of habitat to occur are new residential areas and the State Land Disposal area across the Lowe River from the Alpine Woods Subdivision.

- o Important Upland Habitat. Timber harvesting and development of a State Land Disposal site could result in habitat loss, particularly on the south side of the Lowe River. This is one of two important uplands in the Coastal Management District.

Air and Water Quality

- o Water Quality. Without proper precautions, timber harvesting, residential development, and other site preparation activities could increase sediment loads in tributaries to the Lowe River. Surface and ground water quality is also susceptible to improper siting and operation of on-site waste disposal systems.

Geophysical Hazards

- Riverine and Glacier-Dammed Lake Outburst Flooding. The Lowe River experiences periodic flooding from heavy rainfall, break-up, and glacier-dammed lake outburst. All activities within the floodway and floodway fringe of Lowe River are subject to the Valdez Floodplain Management Ordinance. Where feasible, structures (including bridges and flood diversion structures such as dikes) should not be located in the floodway. Bridges that cross the floodway should be designed to permit flow through the structure at flood levels and to avoid retaining and spreading flood waters behind them. More culverting is needed along the Richardson Highway to promote drainage.

- Avalanche Hazard. Over 30 avalanche chutes, primarily associated with drainages, have been identified on the steep slopes of both sides of the Lowe River valley. For the most part, these avalanche areas present no hazard to proposed or existing development. Avalanches on the north side of the valley do not reach the Richardson Highway. On the south side, avalanches occur in the vicinity of an alternate downhill ski facility site and a State Land Disposal site. Development should not be located in avalanche chutes and runout zones.

- Mass Wasting. There is an indication of mass wasting occurring on the south side of the Lowe River valley in several locations, including Canyon Slough and Washbowl Basin. Because the degree of hazard can only be determined by site-specific investigations, and mitigation measures are also site specific, development within identified mass wasting zones should exhibit appropriate site investigation and mitigation measures.

Land Use, Management, and Status

- o Preferred Local Uses. Transportation - corridor for the Richardson Highway; open space - scenic views from Richardson Highway; residential - potential expansion of the 10-Mile area, development of State Land Disposal Tracts; energy facilities - corridor for pipeline and electric transmission line rights-of-way; timber harvesting - State Public Interest Lands designated for timber management; light industrial - an area of private land off of Dayville Road has been zoned for light industrial use; gravel extraction - Lowe River floodplain; recreation - hunting, fishing, skiing (cross-country and potential downhill sites), snow machining, canoeing, and kayaking.

- o Management and Status. State - continued Public Interest Lands status for recreation, timber management, fish and wildlife habitat, gravel extraction, State land disposal; private - continued development within existing subdivisions and potential development of lands transferred by state through land disposal.

Transportation

- o Highway Improvements. Potential highway improvements have been scheduled for the summer of 1982 for Miles 5½ through 13 of the Richardson Highway, including highway realignment and widening.

- o Airport Relocation. Because of operational constraints on the current Glacier Stream site, the City of Valdez is evaluating a potential airport site in the Lowe River Valley south of Robe Lake and the Richardson Highway.

Recreation

- o Activities. Continued low-density activities (skiing, hunting and fishing, snow machining, hiking).

- o Facilities. Selected alternative feasibility study site for downhill ski facility at Canyon Slough.

Energy Facilities

- o Pressure-Reducing Turbine. A 7.4 MW pressure-reducing turbine will be installed in the summer of 1981 by the City of Valdez. Power generated will be available for residential and industrial use.

- o Pipelines. Additional or expanded right-of-way for gas liquids pipeline, looped oil pipeline.

- o Transmission Lines. Additional transmission lines or line replacement as required with development of Allison Lake hydroelectric project, installation of pressure-reducing turbine on trans-Alaska pipeline.

Community Facilities

- o Water and Sewer. Future residential growth could exceed the capability of on-site water supply and sewage disposal systems. Because of the distance from municipal systems, package water supply, and sewer systems may be installed as service demand increases.

Timber Harvesting

- o Public Interest Lands. Potential timber harvesting on Public Interest Lands classified for timber management. No state timber sales have been planned.

Gravel Extraction

- o Existing Sites. Continued extraction from Department of Transportation site at Richardson Highway milepost 15; reactivation

of Alyeska Pipeline Service Company sites for additional pipeline construction if necessary.

- o New Sites. Development of new sites for pipeline construction, access roads, as appropriate.

Lowe River Use Classification

- o Conditional Development. Floodway and floodway fringe of Lowe River; important upland habitat identified; Lowe River and any future proposed State Land Disposal areas, avalanche chutes and run-out zones; and mass wasting areas. Public Interest Lands classified timber management.

- o Development. All areas not classified Conditional Development.

5.3.3 Robe Lake Watershed and Robe River

Projected Resource Use and Activity

- o Robe Lake Rehabilitation Project. Proposed lake rehabilitation project jointly sponsored by City of Valdez and Department of Environmental Conservation to retard lake eutrophication and improve both salmon spawning/rearing habitat and recreation is commenced in 1981.

- o Commercial Float Plane Base. A local private land owner has shown interest in developing a commercial float plane facility.

Coastal Habitats

- o Rivers, Lakes, and Streams. Eutrophication of Robe Lake will continue to diminish quality of salmon spawning/rearing habitat if action is not taken. A lake rehabilitation project has received funding from the U.S. Environmental Protection Agency

(EPA) and the Alaska Department of Environmental Conservation (DEC). Robe River is an anadromous fish stream, and is sensitive to obstruction of fish passage and sedimentation. Development should not occur within 25 feet of Robe River and other anadromous fish streams.

- o Important Upland Habitat. The area includes the most important upland habitat in the Coastal Management District. Future residential expansion in Robe River subdivision and from state land disposal could eliminate small increments of habitat.

Air and Water Quality

- o Air Quality. Development of a petrochemical complex could reduce ambient air quality in the area, but will necessarily be within acceptable air quality standards set by the U.S. Environmental Protection Agency and the Alaska Department of Environmental Conservation.

- o Water Quality. Water quality in Robe Lake is deteriorating for habitat and recreation purposes due to eutrophication. Without rehabilitation, water quality will continue to deteriorate.

Geophysical Hazards

- o Seismic Hazard. Water-saturated areas or wetlands are susceptible to liquefaction during a seismic event. Wetlands north of Robe Lake would be subject to liquefaction, and structures placed within that area should be permitted only with proper site investigation and siting/design mitigation measures.

A ground feature that appears to be a lineament, oriented northwest, is located one mile east of Robe Lake. There is a potential for ground rupture along this lineament, if it is a fault. Since site-specific investigation is necessary to determine activity and potential for ground rupture, development proposed in that area should be preceded by field investigations to determine the necessity for siting/design measures.

- o Avalanche. Five areas of avalanche hazard have been identified on the south side of Robe Lake. Any residential or other development in that area should be sited to avoid chutes and runout zones.

- o Mass Wasting. Four areas of potential mass wasting have been identified in the Robe Lake area. Because the potential and magnitude of mass wasting can be identified only through site-specific investigation, development within identified mass wasting areas should include site-specific investigations and appropriate siting and design measures.

Land Use, Management, and Status

- o Preferred Local Uses. Recreation - fishing, boating on Robe Lake, hunting in upland habitat; expansion of residential - Robe River subdivision and development of State Land Disposal area; transportation - proposed float plane base on Robe Lake; commercial (recreation development).

- o Management and Status. Much of the land within this area is expected to remain as state-owned Public Interest Lands, managed for recreation, fish and wildlife habitat, and watershed. It is possible that more State Land Disposal may occur in the area east of Robe Lake, placing more land in private ownership.

The majority of the area will probably remain in open space, with some residential expansion occurring in those areas zoned for rural residential, single-family residential, and residential mobile home districts.

Transportation

- o Highway. Increased use of the Richardson Highway associated with residential and port-related economic growth will require highway widening, although this is not foreseen in the near future. Private development of State Disposal Lands could require new access from the Richardson Highway. This is most likely in the area east of Robe Lake.

- o Air. There is local interest in developing a float plane facility at Robe Lake. Development is partially linked to the rehabilitation and deepening of Robe Lake.

Recreation

- o Lake Recreation. As the only sizable freshwater lake that is accessible by road, Robe Lake has excellent potential for boating, fishing, and swimming. Rehabilitation of Robe Lake would improve water depth, water quality, and fish habitat, thereby increasing the variety and quality of recreation.

- o Public Interest Lands. Public Interest Lands in the area have been partially classified for recreation/parks management. Formal development of trails and facilities will depend on demand levels. Rehabilitation of Robe Lake could lead to development of a boat launch and swimming facilities.

Robe Lake Use Classification

- o Conditional Development. All streams and their watersheds contributing to Robe Lake (anadromous fish habitat, important upland habitat, potential liquefaction); Robe Lake and its shoreline 100 feet back from its edge; anadromous fish habitat north of the Richardson Highway at milepost 7; avalanche chutes and runout zones; mass wasting areas; and the 100-year floodplain of the Robe River (riverine flood hazard).

- o Development. All areas not classified Conditional Development.

5.3.4 Valdez Glacier Stream

Projected Resource Use and Activities

- o Alaska Oil Company Petrochemical Project Site. A 1170-acre site on the east side of Glacier Stream has been cleared and prepared, with access provided across Valdez Glacier Stream. The site will probably remain as is, pending new opportunities for industrial development.

- o Valdez Industrial Site. The City of Valdez has identified an additional 1675-acre industrial site on the west side of Glacier Stream. At the present time, the site is under consideration by both the Dow-Shell gas petrochemical consortium and Exxon as a gas liquids petrochemical site.

- o Gravel Extraction. Gravel extraction has historically taken place within the Valdez Glacier Stream floodplain, and will continue in support of port construction and other major construction.

- o Transportation. The airport and its link to the Port of Valdez will remain a vital part of the city's transportation industry. As industrial development of city and private land occurs, transportation access will be required.

- o Residential Development. Residential development will remain limited to existing trailer court areas adjacent to the airport.

Coastal Habitats

- o Rivers, Lakes, and Streams. Because of the high sediment load from the Valdez Glacier, neither Valdez Glacier Stream nor its tributaries are anadromous fish streams. Therefore no fish habitat will be affected by development. Floodplain vegetation will be removed, but is not considered important habitat.

- o Important Upland Habitat. Site preparation for the Alaska Oil Company site resulted in the loss of 800 acres of important upland habitat, in an area considered to be among the best areas of this type of habitat in the Coastal Management District. No further loss of habitat is foreseen in the near future, although other industrial activity could result in further site clearing.

Air and Water Quality

- o Air Quality. Major industrial development, such as a petrochemical complex, may require mitigation measures to avoid deterioration of air quality.

Maintenance of air quality is partly a function of terrain, and also of meteorological characteristics such as inversions and air drainage off Valdez glaciers; facility siting and emission

control equipment can be used more effectively with knowledge of these functions. Further industrial development within the Valdez Glacier area should be examined, both as to ability to meet state and federal air quality criteria on-site, and for cumulative impacts on area air quality.

- o Water Quality. Industrial development will have one major impact on water quality: increased surface runoff from facility sites. Because the high sediment load prevents surface use of Valdez Glacier Stream and it is not an anadromous fish stream, the impact on this area's water quality would be minimal. Potential cumulative impacts on Port Valdez are discussed in Section 5.2, Regional Analysis.

Geophysical Hazards

- o Riverine and Glacier-Dammed Lake Outburst Flooding. Riverine and glacier-dammed outburst flooding events have historically occurred on Valdez Glacier Stream. All activities within the floodway and floodway fringe are subject to the Valdez Floodplain Management Ordinance. Where feasible, structures (including bridges and flood diversion structures such as dikes), should not be located in the floodway. Bridges that must cross the floodway should be designed to permit flow through the structure at flood levels and to avoid retaining and spreading flood waters behind them. Structures within the floodway fringe should be designed to meet Floodplain Management Ordinance and FEMA requirements. Gravel extraction within the floodway and floodway fringe, if conducted improperly, could cause the Valdez Glacier Stream to seek a new channel. Downstream damage from such an occurrence could be substantial.

- o Seismic Hazards. During the 1964 earthquake, an area of liquefaction was observed along Corbin Creek and Valdez Glacier

Stream near its highway crossing. Because the degree of hazard can be determined only by site-specific investigations, and mitigation measures are also site specific, development within identified liquefaction zones should exhibit appropriate site investigation and mitigation measures.

- o Mass Wasting. Mass wasting along the steep slopes north of the airport and west of the glacier terminus present no hazards to existing development, and future development in those areas is unlikely. The two areas to the east of Valdez Glacier Stream, along Slater and Corbin Creeks, lie within municipal land zoned for industrial development. Because the degree of hazard can only be determined by site-specific investigations, and mitigation measures are also site specific, development within identified mass wasting zones should exhibit appropriate site investigation and mitigation measures.

- o Avalanche Hazard. Avalanche chutes and runout zones occur along the steep slopes north of the airport and Mineral Creek. They present no hazard to existing development, but it is recommended that any structural development that may take place on the northern side of the airport facility incorporate appropriate siting design, and construction mitigation measures.

Land Use, Management, and Status

- o Preferred Local Uses. Industrial - A petrochemical complex, Valdez Industrial Park; transportation - expansion of the Valdez Municipal Airport and industrial access roads; mineral extraction - gravel extraction along Valdez Glacier Stream floodplain; energy facilities - proposed gas liquids petrochemical plant site; recreation - bike path extension, neighborhood parks, trails.

- o Management and Status. Industrial- and transportation-related development has been encouraged on municipal and private lands. State-owned lands will most likely be managed for transportation uses in the vicinity of the airport, and for recreation on Public Interest Lands north and west of the airport. Use conflicts could occur between mobile home residential use and industrial development.

Transportation

- o Highway Improvements. Additional road access will be provided with increased industrial development.

- o Air Transportation. Airport improvements have recently been completed, and others are scheduled for 1981. Additional space will be required to meet requirements for runway expansion, warehouse and hanger space associated with industrial commercial aviation, and port-related development.

Recreation

- o Activities. An increase in bicycling and hiking would occur if proposed facilities are provided. Recreation management of Public Interest Lands could result in rehabilitation of the historic Valdez Glacier Trail. Without separation, some conflict will occur with industrial development in the area.

- o Facilities. Facilities proposed by the Valdez Department of Parks and Recreation include a bike path extension to the airport, a trap/skeet range, campground improvements, the Airport Neighborhood park, and rehabilitation of the Valdez Glacier Trail.

Energy Facilities

- o Petrochemical Plants and Refineries. The City of Valdez has identified a 1675-acre site on the west side of Valdez Glacier Stream as being suitable for a gas liquids petrochemical or other petroleum-related facility. The Alaska Oil Company site on the east side of Valdez Glacier Stream has reverted to city ownership and is available for other development.

- o Products Pipelines. Products pipelines could require rights-of-way in the Valdez Glacier Stream area, if petrochemical development occurs in this area.

Gravel Extraction

- o Existing Sites. Expansion of existing sites is underway to meet gravel demand from the port construction project and various highway construction and municipal Capital Improvement projects. Demand is likely to remain high, and it is possible that improper extraction could cause Valdez Glacier Stream to seek a new channel.

- o New Sites. The Valdez Community Development Department has received applications for new extraction sites. As with existing sites, improper extraction could cause Valdez Glacier Stream to seek a new channel.

Community Services

- o Solid Waste Disposal. The City of Valdez is investigating moving the municipal landfill operation from its location at the sewage treatment facilities. Seven potential sites have been identified in the Valdez Glacier Stream area, and are considered the most promising of those sites identified within city boundaries.

Use Classification

- o Conditional Development. Identified seismic hazards areas; mass wasting hazard areas; avalanche chutes and runout zones; the floodway and floodway fringe of Valdez Glacier Stream, Corbin and Slater creeks; and the area north of the airport runway classified as Public Interest Land.

- o Development. All areas not classified as Conditional Development.

5.3.5 Old Town

Projected Resource Use

- o Light and Waterfront Industrial. The City of Valdez intends to utilize the Old Town site for low-density industrial purposes. A lease has recently been granted for construction of a ship repair facility in this area. Northwest Alaskan Gas Pipeline Company has proposed using the area for pipeline storage.

Coastal Habitat

- o Wetlands and Tide Flats. It is unlikely that intensive waterfront development will occur in Old Town, due to the instability of the shoreline. Development that might be allowed would have little impact other than minor loss of habitat, particularly since the area had been intensely developed prior to the 1964 earthquake and is not considered highly productive habitat. Petro Marine Services, Inc. has leased an 88 acre tract within USS 439.

- o Rivers, Streams and Lakes. An anadromous fish stream occurs in this area. Any proposed development should be set back 25

feet from the stream banks. A salmon run has also established itself in the drainage from the sewage treatment plant.

Air and Water Quality

- o Water Quality. As discussed under areawide water quality, the water quality in this end of Port Valdez could be affected by cumulative effluent discharge. Outfalls or any industrial source of effluent in this area should meet state and federal water quality standards, and the cumulative impact on Port Valdez water quality should be considered.

Geophysical Hazards

- o Seismic Hazard. The seismic effects of the 1964 earthquake on Old Town are well documented. The area has the potential for ground liquefaction and slumping of the waterfront into Port Valdez during another seismic event. Since the state acquired ownership, the Urban Renewal Agreement has restricted use of the area within the Old Town dikes to nonstructural uses such as pipe storage. One of the problems in determining permissible use of the area is that the areal extent, magnitude, and frequency of the potential hazard are unknown. Without data, the course of action has been to restrict use of the area, particularly in light of the damage done in 1964.

  A comprehensive seismic investigation of the area could help determine the areal extent, magnitude, and frequency of hazard. Based on that knowledge and assessment of seismic risk, structures could be sited and designed to minimize the consequences of a seismic event. This would allow greater utilization of the area. However, structural utilization of the area should not be permitted unless site-specific seismic investigations and appropriate siting and design measures have been implemented.

- o Seiche/Storm Run-up. The extent of seiche/storm run-up has been estimated at 12 feet. Loss of life and property damage could result from improperly sited and designed development within this area.

Land Use, Management, and Status

- o Preferred Local Use. Light Industrial - warehouse and other lower density uses back from the waterfront; Waterfront Industrial - ship repair and other water-related uses.

- o Management and Status. Land management responsibility for the Old Town area is unclear and needs to be resolved. Because of its waterfront location, transportation access, and the limited amount of available level land in the area, the City of Valdez would like to utilize the Old Town area. At this point, the original Urban Renewal Agreement prohibits structural use of the area and allows use only on a case-by-case basis.

Transportation

- o Marine Transportation. Construction of a ship repair facility has been proposed for this area. Because of the instability of the waterfront, any activity would require siting and design measures to minimize potential hazard.

Community Facilities

- o Sewage Treatment. If a substantial population increase occurs associated with industrial development, expansion of the sewage treatment facility will be required to meet treatment demands. Adequate space for expansion from three to six sewage treatment cells is available if the solid waste disposal operation is moved to a new site. Doubling the treatment capacity would meet the needs of a population of 12,000.

- Solid Waste Disposal. The city's current solid waste disposal operation faces several problems in continuing to meet current demands and would not be able to serve a larger population. Problems include a high, tidally influenced water table, marginal operation in wet and winter conditions, and limited space and fill material for continued operation. The city is currently examining incineration as a means of reducing waste volume and is considering a new site in another location.

Use Classification

- Conditional Development. The entire area is classified Conditional Development due to potential seismic hazard.

5.3.6 Loop Road

Projected Resource Use and Activities

- Valdez Port Project. The City of Valdez is constructing a container terminal facility near Ammunition Island between the downtown area and the Industrial Park. The Valdez Container Terminal is scheduled for functional completion by December 1981 and full completion by mid-1982. The design consists of a floating dock 400 by 100 feet. Under the second option, the facility would be a 704-foot by 90-foot concrete dock on concrete piles, with -44 feet mean lower low water (MLLW) at the face, and mooring dolphins with an expanse of about 1,200 feet. A 21-acre marshalling yard is adjacent. The facility would include a track-mounted crane; container parking for 560 containers; and 380 electrical outlets for refrigeration containers or to prevent freezing. The wharf would be reached by two 100-foot by 54-foot concrete ramps, all connected to the mainland by a 1,500-foot trestle and 1,800-foot causeway. Long-range plans include development of an additional 120 acres adjacent to the

marshalling yard as a staging area. Eventually the port facility will connect to the airport, linking them as a complete freight handling unit.

Coastal Habitats

- o Wetlands and Tideflats. Port construction will result in minor habitat loss from facility and marshalling yard placement. Because of proposed zoning, other unspecified waterfront industrial or commercial activity may occur, affecting wetland and tideflat habitat. An occupied eagle's nest is located in this area, and is planned to be buffered by a proposed park.

- o Rivers, Lakes, and Streams. All three streams traversing the area are anadromous fish streams, which are sensitive to obstruction of fish passage and sedimentation from construction activities. Construction activities should not take place within 25 feet of stream banks; roads or other uses requiring stream crossing must ensure fish passage and minimize sedimentation. No facilities should be sited within 25 feet of stream banks.

Air and Water Quality

- o Air Quality. Vessel movement into the city port facility will introduce emissions into the area. The level of emission impact will depend on trip frequency, vessel type, city actions such as adoption of a low-sulfur fuel ordinance, and meteorological conditions.

Geophysical Hazards

- o Seismic Hazards. The southeastern portion of the area has a potential for ground liquefaction and slumping of the waterfront into Port Valdez. Site specific seismic investigations on a project-by-project basis would help determine the areal extent,

magnitude, and frequency of hazard. Based on that knowledge and assessment of seismic risk, structures could be sited and designed to minimize the consequences of a seismic event.

- o Seiche/Storm Run-up. The extent of seiche/storm run-up has been estimated to be 12 feet. Loss of life and property damage could result from improperly sited and designed development within the waterfront portion of this area.

Land Use, Management, and Status

- o Preferred Local Use. Waterfront industrial and light industrial - general use associated with the port facility and support services associated with petrochemical and refinery industries; transportation - marshalling yards and other transportation support activities associated with the port facility.

  Currently, there are residential, commercial, and light industrial uses of the area. The northwestern and Zook Subdivision areas will develop toward commercial and residential uses. The remainder of the area is proposed for light industrial use (port and transportation related use). Development will be linked with airport related uses in the northeast corner of the area (USS 455).

  The status of state land in this area, Public Interest Land for fish and wildlife habitat (anadromous fish streams), will probably remain unchanged in the near future.

Transportation

- o Highway Improvements. The local office of the Department of Transportation has recommended widening the Richardson Highway to four lanes between the new townsite and its intersection with Airport Road.

Port operations, associated truck traffic, and industrial development may require access and intersection improvements on the Richardson Highway.

- o Marine Transportation. With the development of the city's port facility, this area will become the center of an important regional and city commodity port complex. As facility demand grows, dock and marshalling yard expansion will take place in this area.

Recreation

- o Facilities. The City of Valdez proposes to establish open space in USS 455 southeast of the port entrance.

Coastal Access

- o Industrial Access. Highway access, proximity to town, and available space for port and water dependent industrial facilities make this one of the district's important light industrial development areas. Maintenance of coastal industrial and transportation access is necessary to ensure continued economic growth in the community.

Community Services

- o Water System. A port-Loop Road water system project has been scheduled for 1981 construction. Facilities include an insulated distribution line to the port, and water storage tank and distribution network in the Loop Road area.

Use Classification

- o Conditional Development. 25 feet within either bank of anadromous fish streams; the eastern waterfront area bordering Old Town (seismic hazard).

- o Development. All areas not classified Conditional Development.

5.3.7 Valdez Duck Flats

Projected Resource Use and Activities

- o Fish and Wildlife Habitat. Waterfowl staging and rearing areas, anadromous fish spawning and rearing areas.

- o Partial Fill. The City of Valdez wishes to reserve the right to fill a portion of USS 447 for waterfront related use.

- o Highway Improvements. Valdez subdistrict Department of Transportation and Public Facilities proposes to widen the Richardson Highway from two to four lanes to meet projected increased traffic levels. This proposal was based on construction of the Alaska Oil Petrochemical Project and may not be necessary.

- o Camper Park. Development of an in-town camper park at the southwestern edge of the area has been discussed. Facilities would include 76 RV spaces, picnic areas, dump station, and comfort/shower stations. Construction is recommended for 1983.

- o Grain Storage. The City of Valdez has selected part of additional land in the Mineral Creek Islands and is investigating a potential site for an export grain storage facility.

- o Port Expansion. Potential port expansion into Mineral Creek Islands.

Coastal Habitats

- o Offshore Areas. While no projects have been scheduled for the specific area, construction of the city port and commercial

boat harbor will occur adjacent to the District. The Port facility has been designed to maintain circulation and fish passage into the Duck Flats; construction and operation may result in temporarily higher sediment levels and accidental hydrocarbon or bilge discharge.

- o Wetlands and Tideflats. The Valdez Duck Flats are biologically important wetlands, and are sensitive to dredge and fill, sedimentation, and degradation of water quality. Proposed widening of the Richardson Highway would result in minor loss of tideflat. A fill on USS 447 at the western edge of the Duck Flats has been considered and would result in some loss of habitat. Port expansion has the potential for additional habitat loss.

- o Rivers, Streams and Lakes. Proposed road improvements should maintain fish passage to spawning areas north of the Richardson Highway.

Air and Water Quality

- o Water Quality. Port expansion and commercial boat harbor construction bordering the area should maintain water circulation patterns in and around the Duck Flats. With impaired circulation, waste discharges without proper safeguards at the port and commercial boat harbor could degrade water quality, and impact the biological productivity of the area.

Geophysical Hazards

- o Avalanche Hazard. Avalanche chutes and runout zones occur in the northwest corner of the area. While development in the area is unlikely, none should take place within the chute or runout zone.

- o Seiche/Storm Run-up. The extent of seiche/storm run-up has been estimated at 12 feet. Loss of life and property damage could result from improperly sited and designed development within the area.

Land Use, Management, and Status

- o Preferred Local Use. Recreation - natural setting, bike path; fisheries - fish hatchery; habitat - salmon and waterfowl habitat; expansion of waterfront related use in portions of USS 447, if necessary.

- o Management and Status. The area is primarily in state Public Interest Land ownership; however, both the City of Valdez and private individuals own land in the Duck Flats. Development proposals for the private holdings are likely. Special management to accommodate multiple use is recommended.

Transportation

- o Highway Improvements. Based on projected demand from the Alaska Oil Company petrochemical plant, port facility, and related projects, the Valdez Department of Transportation/Public Facilities (DOT/PF) office has recommended widening the Richardson Highway from two to four lanes.

- o Access Roads. The commercial boat harbor and any private development bordering the Duck Flats will require construction of road access from the small boat harbor and Richardson Highway, respectively.

- o Port Expansion. Based on the highest economic growth scenario (petrochemical development and export of Interior resources), additional port facilities may be required. The Mineral Creek

Islands are the most economically feasible location for port expansion. A grain storage facility is currently considered for this area.

Recreation

- o Activities. Participation in viewing spawning salmon, bird watching, and enjoying the natural setting of the Duck Flats will grow with increases in local population and tourism. Management of the area should incorporate existing and projected recreation activities.

- o Facilities. Construction of the in-town RV park would provide a needed campground for tourists arriving in Valdez by the Alaska Marine and Richardson Highways. Approximately 78 RV spaces, shower facilities, and a dump station are included in the proposal.

- o Tourism. The Duck Flats are a tourist attraction in the Valdez area, providing a scenic panorama from the Richardson Highway. The salmon viewing platform at the Crooked Creek highway pullout is also a popular attraction.

Coastal Access

- o Richardson Highway. The Richardson Highway currently provides access as a public road, for recreation and as a scenic corridor. Construction of the port facility will add a new element to the view of the Duck Flats from the highway, which may enhance the view for some and not for others.

Use Classification

- o Conditional Development. All tideflats, coastal wetlands, and anadromous fish streams flowing into the Duck Flats; the Mineral

Creek Islands with the exception of the south side of Dock Point; avalanche chutes and runout zones; seiche/storm run-up zones.

- o Development. The upland portions of USS 447 is considered a development area. (See Section 8.0, Areas Meriting Special Attention.)

5.3.8 New Townsite

Projected Resource Use and Activities

- o General Urban Development. Continued expansion of residential and commercial districts, and various capital improvement projects.

- o Commercial Boat Harbor. Construction of a commercial boat harbor has been proposed on the south side of Dock Point for 1983-85. Facilities for the 1,000-foot by 2500-foot harbor would include a breakwater and 350-foot floats to support vessels in the 60 to 300-foot range.

- o Small Boat Harbor Expansion. Expansion of the eastern end of the small boat harbor is scheduled for late 1981, to provide new slips primarily for recreational boating.

- o Fish Processing. Development of a fish processing operation at City Dock is being considered.

- o Transportation Improvements. Several potential improvements in Richardson Highway access to the downtown area are being examined: Egan Meals intersection improvement, Chitna extension, Pioneer turnoff. Construction of a new bridge across Mineral

Creek is also being considered to provide additional access to planned residential development on the west side of Mineral Creek.

- o Utilities Expansion. Extension of water and sewer service to the western portion of new townsite. Construction of water tank and well in western portion of new townsite in 1981.

- o Recreation Vehicle Park. Demand for an in-town RV park has grown over the last four years, as evidenced by the growing number of RVs parking around the small boat harbor during summer months. The City of Valdez is going to work with the University of Alaska to develop an RV park on USS 447.

Coastal Habitat

- o Rocky Islands and Seacliffs. Construction of the commercial boat harbor could have an impact on rocky island and seacliff habitat on Mineral Creek Island. Habitat removal of the island should be minimized.

Air and Water Quality

- o Water Quality. A proposed fish processing facility could have an impact on Port Valdez water quality within this area. The level of impact will depend on the processing characteristics, waste treatment, and discharge methods adopted by the operator. Expansion of the small boat harbor and a new commercial boat harbor could increase discharges and accidental events such as fuel spills from vessels, although these impacts are considered minor. Potential cumulative impacts on Port Valdez are discussed under area-wide impacts.

Geophysical Hazards

- o Avalanche Hazard. Avalanche chutes and runout zones along steep slopes north of town do not threaten existing development, and future development in those areas are unlikely. Avalanches do close road access across Mineral Creek due east of the bridge, and are one of the factors in developing new access across Mineral Creek to proposed residential lands.

- o Mass Wasting. Mass wasting occurs along the steep slopes north of town. Due to the steep terrain, it is unlikely that development will occur in these areas. Because the degree of hazard can be determined only by site specific investigations, and mitigation measures are also site specific, development within identified mass wasting zones should exhibit appropriate site investigation and mitigation measures.

- o Riverine Flooding. Mineral Creek experiences periodic flooding from heavy rainfall and breakup. One hundred year flood events do not appear to affect existing or proposed residential development on the eastern side of Mineral Creek. However, several alternate locations have been proposed for a new bridge across Mineral Creek. All activities within the floodway and floodway fringe are subject to the Valdez Floodplain Management Ordinance. Where feasible all structures, including bridges and flood diversion structures such as dikes, should not be located in the floodway. Bridges that cross the floodway should be designed to permit flow through the structure at flood levels and avoid retaining and spreading flood waters behind them. Structures within the floodway fringe should be designed to meet Floodplain Management Ordinance and FEMA requirements.

Land Use, Management, and Status

- o Preferred Local Uses. Waterfront commercial/industrial - fish processing, petroleum products supply, fishing and marine supply, motels and restaurants; transportation (water related) - ferry terminal, expanded small boat harbor, commercial boat harbor, private and public docking facilities; recreation (water related) - boat launch facilities, harbor boardwalk, trail access in Meals Hill area; non-water-related uses - residential (single family and multi-family), general commercial, transportation improvements, community services (schools, water, and sewer improvements), and recreation improvements.

- o Management and Status. The majority of land within the new townsite area is in private and municipal ownership. Major residential expansion will be taking place at the western new townsite area.

Transportation

- o Marine Transportation. As part of its Capital Improvements Program, the City of Valdez proposes to expand the small boat harbor and construct a commercial boat harbor. These actions will provide additional recreation boat slip space and new facilities more suitable for support of an expanding fishing industry.

  The residents of Valdez would like to see Alaska Marine Highway service to Valdez expanded to a year-round operation.

- o Commercial Boat Harbor. Construction of a commercial boat harbor will provide needed space and support facilities for fishing and tourism vessels that are marginally accommodated by the small boat harbor.

- Highway Transportation. Increasing traffic levels on the Richardson Highway as it enters the new town area have created a need for highway improvements regarding access and intersection safety. Several options are currently being considered.

  A new bridge across Mineral Creek will be constructed at West Egan Drive to provide access to potential residential land west of Mineral Creek.

Recreation

- Activities and Facilities. With population growth and increased use by nonresidents, demand for boat slip space has increased. Expansion of the small boat harbor in 1982 has been included in the Five Year Capital Improvement Program.

- Tourism. The general small boat harbor is an important tourism complex, including motels, restaurants, laundry facilities, and tour boat operators. A new boardwalk around the small boat harbor is aimed at tourism attraction.

  This project will improve use convenience and aesthetic appeal of the harbor area.

  The lack of a downtown camping area resulted in the proposal to work with the University of Alaska to develop an RV campground northeast of the small boat harbor on USS 447. This project has been funded for 1985 in the Capital Improvement Program.

  Residential development has been proposed for the Meals Hill area, located west of the ferry dock and east of Mineral Creek. Its scenic quality, view perspectives, and unique environmental characteristics should be enhanced with trail easements and

subdivision siting considerations as residential development occurs.

The Parks and Recreation Department has proposed establishment of greenbelts on both sides of Mineral Creek.

Coastal Access

- o Marine Access. Small boat expansion and the new commercial boat harbor will increase recreation and fishing boat access in the Valdez harbor area.

- o Recreation Access. Recreation access to the coastal portion of the downtown area will be improved by construction of the harbor boardwalk.

Fish Processing

- o Facilities. The City of Valdez is promoting a major fish processing operation at the city dock. Basically a salmon processing and freezing plant, the facility will be able to handle herring roe, bottom fish, and other species as the fishing industry develops.

Community Services

- o Sewer and Water. Residential development of western and new town site and the Meals Hill area will require connection to city sewer and water systems.

Use Classification

- o Conditional Development. The floodway and floodway fringe of Mineral Creek (including the Mineral Creek greenbelt); steep

slopes north of the new town site (avalanche and mass wasting hazard.

- o Development. All areas not classified conditional development.

5.3.9 Mineral Creek Flats

Projected Resource Use and Activities

- o Residential Development. The City of Valdez has selected land under municipal conveyance in the Mineral Creek Flats area for residential development. Proximity to the downtown area and relatively level land make this area a logical spot for residential development as the city's population expands.

- o New Mineral Creek Bridge. To ensure year-round access to the area across Mineral Creek and to expedite residential development of municipal land, a new bridge will be constructed at West Egan Drive.

- o Gold Creek Trail. The Department of Parks and Recreation has proposed construction of hiking trail through the Mineral Creek Flats area and along the coast to Gold Creek.

Coastal Habitats

- o Wetlands and Tideflats. The tideflats and coastal wetlands across the mouth of the Mineral Creek Flats area are important juvenile salmon rearing areas. These areas are sensitive to disturbance from dredge and fill activities and sedimentation from upstream development. Activities and use of municipal and private lands should avoid or mitigate these impacts.

- o Rivers, Streams, and Lakes. The small streams traversing the Mineral Creek Flat area are sensitive to obstruction of fish passage and sedimentation caused by construction. Development and accompanying access roads could cause both impacts. Access across anadromous fish streams should ensure fish passage, and 25 foot setbacks from such streams are recommended.

- o Important Uplands. The Mineral Creek Flat has been identified as an area of upland habitat, but of lesser importance than Robe Lake and Lowe River uplands. It has also been selected by the City of Valdez as one of few areas suitable for residential expansion. When expansion occurs, some upland habitat will be removed. It is recommended that clearing be minimized and greenbelts be identified prior to development, particularly in the area bordering the mouth of Mineral Creek Canyon. Setbacks will be maintained and greenbelts established to the extent possible.

Air and Water Quality

- o Water Quality. Site preparation for residential development and transportation facilities can cause increased sediment loads in streams. Because of the sensitive nature of anadromous fish streams, such activities should take precautions to minimize increasing sediment load in streams.

Geophysical Hazards

- o Mass Wasting. Potential mass wasting areas have been identified on the steep slopes northwest of Mineral Creek Flats. Due to the steep terrain, it is unlikely that development will occur in these areas. Because the degree of hazard can be determined only by site specific investigations, and mitigation measures

are also site specific, development within identified mass wasting zones should exhibit appropriate site investigation and mitigation measures.

- o Riverine Flooding. Mineral Creek experiences periodic flooding from heavy rainfall and breakup. Flooding occurs along Mineral Creek and several of the small streams in the Flats area. Because of its designation for residential development, precautions should be taken when designing and siting development.

  All activities within the floodway and floodway fringe are subject to the Valdez Floodplain Management Ordinance. Where feasible all structures, including bridges and flood diversion structures such as dikes, should not be located in the floodway. Bridges that cross the floodway should be designed to permit flow through the structure at flood levels and avoid retaining and spreading flood waters behind them. Structures within the floodway fringe should be designed to meet the Floodplain Management Ordinance.

- o Avalanche Hazard. Avalanche chutes and runout zones are present on the steep slopes northwest of Mineral Creek Flats. Development is unlikely on steep slopes, but should be sited away from runout zones.

Transportation

- o Residential Access. Residential development of municipal lands will require additional access across Mineral Creek. A new bridge will be constructed across Mineral Creek at the extension of West Egan Road. Subdivision will result in new roads in the Mineral Creek Flats.

Recreation

- o Activities. The northwestern portion of the district has been identified as Public Interest Land, recreation management. Improved access with residential development will increase recreation pressure on the area.

- o Facilities. Proposed facilities include the Gold Creek Trail and a Mineral Creek Greenbelt on the east and west sides of the stream. Bike trails will be located in the area.

Coastal Access

- o Recreation Access. Mineral Creek and its floodplain provide boating and foot recreation access. Additional recreation access would be provided by the Gold Creek Trail and its connection to the Mineral Creek Canyon Road. Development should maintain access through easements, greenbelts, or other appropriate measures.

Community Facilities

- o Water and Sewer. Residential development will create demand for water and waste disposal. Proximity to town makes connection to municipal water and sewer service likely.

- o Other Services. Residential development will create a demand for electric, telephone, and solid waste removal services. Utilities should be placed underground where feasible.

Use Classification

- o Conditional Development. The floodway and floodway fringe of Mineral Creek, a 25-foot buffer on either side of all anadromous

fish streams, the proposed Mineral Creek Greenbelt on the east and west sides of Mineral Creek, and State Public Interest Lands; avalanche chutes and runout zones; mass wasting areas; seiche/storm run-up areas.

- o Development. All areas not classified as Conditional Development.

5.3.10 Mineral Creek Canyon

Projected Resource Use and Activities

- o Hardrock Mining. Several mining claims are located on both sides of Mineral Creek Canyon. Interest has recently been shown in activating some of those claims, and may increase as economics make hard rock mining more attractive.

- o Recreation. Already a popular summer recreation area, recreation use of Mineral Creek Canyon will increase with population growth.

- o Tourism. Proximity and access to town make this a tourism and wilderness resource.

Coastal Habitats

- o Rivers, Streams, and Lakes. The lower portion of Mineral Creek is an anadromous fish stream and is sensitive to obstruction of fish passage and sedimentation of spawning areas. Mining activities in Mineral Creek Canyon should minimize increasing the sediment load of Mineral Creek and avoid damage to spawning habitat downstream.

Air and Water Quality

- o Water Quality. Hardrock mining can caused increased sediment loads in streams through improper placement of spoils and tail-

ings piles. On-site measures should be taken to avoid spoil and tailing piles in Mineral Creek and its tributaries.

Geophysical Hazards

- o Avalanche Hazard. Steep slopes on both sides of Mineral Creek Canyon are prone to avalanche in several locations. Placement of structures for mining or recreation purposes should avoid avalanche chutes and runout zones. Where runout zones cannot be avoided, placement of diversion structures is recommended.

- o Mass Wasting. Potential mass wasting areas occur along the west-facing slopes of Mineral Creek Canyon. Because the degree of hazard can be determined only by site specific investigations, and mitigation measures are also site specific, development within identified mass wasting zones should exhibit appropriate site investigation and mitigation measures.

- o Riverine Flooding. Mineral Creek experiences periodic flooding from heavy rainfall and breakup. All activities within the floodway and floodway fringe are subject to the Valdez Floodplain Management Ordinance. Where feasible, all structures, including bridges and flood diversion structures such as dikes, should not be located in the floodway. Bridges that must cross the floodway should be designed to permit flow through the structure at flood levels and avoid retaining and spreading flood waters behind them. Structures within the floodway fringe should be designed to meet the Valdez Floodplain Management Ordinance.

Land Use, Management, and Status

- o Preferred Local Use. Recreation - natural setting, skiing, snow machining, hiking, kayaking (lower section).

- o Management and Status. Most of Mineral Creek Canyon has been designated Public Interest Land for recreation management. This designation may result in future recreation facility improvements. Several valid private mining claims are located in the area; reactivation may change with mining economics. Residential use of small tract at the lower end of Mineral Creek Canyon is possible at USS 411.

Recreation

- o Activities. Mineral Creek Canyon has long been considered a summer recreation resource by Valdez residents. Public Interest Land designation should result in improved road and hiking access, if local interest and state funding are available.

Coastal Access

- o Scenic Corridor and Recreation Access. A gravel/dirt road up Mineral Creek Canyon constitutes a scenic corridor and provides recreation access to both vehicles and hikers. Use of this access will probably increase with population growth.

- o Industrial Access. Should valid mining claims be reactivated, the road up Mineral Creek Canyon could be used for movement of equipment, supplies, and ore.

Transportation

- o Highway. A summer season road runs from the new town area seven miles up Mineral Creek Canyon. The avalanche hazard poses severe problems to keeping the road open year-round; summer access is partially maintained by DOT, but road deterioration in the upper canyon restricts access. A recurrence of mining activity could require increased maintenance or road improvements.

Mineral Extraction and Processing

- o Mineral Extraction. Mineral Creek Canyon was the site of several productive gold mines around the turn of the century; many of these claims are still valid but not currently active. Rising gold prices have led to the reactivation of other dormant mines in Alaska, and it is possible that claims in Mineral Creek Canyon will be mined in the near future. Ore extraction and preliminary processing would occur on-site, with the concentrated ore shipped elsewhere for refining. Mining would require disposal of spoil and tailings in a manner that minimizes degradation of water quality.

Use Classification

- o Conditional Development. Mineral Creek Canyon Public Interest Lands; Mineral Creek floodway and floodway fringe; avalanche chutes and runout zones; mass wasting areas.

- o Development. All areas not classified Conditional Development. These areas are subject to AMSA guidelines.

5.3.11 Dayville Road

Projected Resources Use and Activities

- o Allison Point Industrial Site. The City of Valdez has selected land adjacent to the Alyeska Marine Terminal for petroleum related industrial development.

- o Hydroelectric Power Generation. The Solomon Gulch Hydroelectric Project, generating 12 MW of electricity, will be completed in 1982. Facilities include a lake tap, power tunnel, penstock, and two powerhouses.

The Corps of Engineers has proposed development of hydroelectric power generation at Allison Lake. Estimated power generation from this project is 8 MW.

- o Fish Hatchery. The Valdez Fisheries Development Association proposes to build a pink and silver salmon hatchery at the mouth of Solomon Gulch. The hatchery, when completed in 1982, will also include saltwater rearing pens off Allison Point.

- o Recreation/Tourism. The Dayville Road area has enjoyed increasing use for pink and silver salmon fishing and as an informal RV camping area.

Coastal Habitats

- o Exposed High Energy Coast. Construction of a petrochemical products dock will result in some habitat loss. However, this habitat type is common in both the area and district, and habitat loss associated with a dock would have minimal biological impact.

- o Rivers, Lakes, and Streams. Both Solomon Gulch and Allison Creek are anadromous fish streams. Salmon spawning habitat at Solomon Gulch is intertidal; use of the penstock and other design features of the Solomon Gulch Hydro Project should maintain flow over spawning areas and prevent habitat impact.

  Construction and operation of a hydroelectric facility at Allison Gulch presents a potential for impact to anadromous fish and habitat if flow is not maintained over spawning areas during construction and operation activities. Anadromous spawning and rearing areas should be located, and facilities designed and placed to minimize impacts.

Geophysical Hazards

- o Avalanche Hazard. An avalanche chute and runout zone occurs along Dayville Road between Abercrobmie and Solomon gulches. This chute presents no danger to the road and traffic. Structures, transmission lines, and above-ground pipelines should avoid avalanche chutes and runout zones, unless diversion devices or other protection are placed in the runout zone.

- o Mass Wasting. There are several small, scattered potential mass wasting areas on steep slopes at higher elevations south of Dayville Road. It is unlikely that development will take place in these areas.

- o Seiche/Storm Run-up. The extent of seiche/storm run-up has been estimated to be 12 feet above MLLW. Loss of life and property damage could result from development within the waterfront portion of this area if design and siting mitigation measures are not employed.

Land Use, Management, and Status

- o Preferred Local Use. Waterfront industrial use associated with the Alyeska Marine Terminal, and other potential petroleum related products dock; municipally owned waterfront industrial land; hydroelectric generation and transmission facilities at Solomon Gulch and Allison Lake; recreation fishing along Dayville Road; scenic corridor - view of City of Valdez, natural setting, and Alyeska Marine Terminal.

- o Management and Status. Land within the area falls under private, municipal, State Public Interest Land, and Chugach National Forest management. Private and municipal land are likely to be developed for industrial purposes. Both the Allison Lake

and Abercrombie Gulch watersheds have been designated for watershed management under State Public Interest Land classification. Hydroelectric generation is allowed under this classification. Chugach National Forest is currently preparing a Forest Land and Resource Management Plan; forest land within the Valdez Coastal Management District has been preliminarily designated for scenic resources and public recreation use (Lyons 1980 personal communication).

Transportation

- o Marine. Construction of the Alaska Oil Company project will result in an additional dock and tanker traffic in the area. Approximately 186 tanker calls a year would be made, and the increase in tanker traffic is within the capability of the existing Coast Guard Vessel Traffic System.

Recreation

- o Activities. Recreational fishing for salmon is popular among Valdez residents and tourists, since Dayville Road offers the only major onshore access to saltwater salmon fishing. Highway pullouts between Solomon Gulch and the Alyeska Marine Terminal are used as informal RV campgrounds. This area is encompassed by municipal land zoned for petroleum industry related use.

- o Facilities. Pavement of popular fishing pullouts and provision of trash dumping facilities would allow more intensive use of the area. The Solomon Gulch project includes development of a hiking trail from Dayville Road to Solomon Lake.

Coastal Access

- o Public Road Access. Dayville Road provides the only public road access along the south side of Port Valdez. Its primary

purpose is to provide road access to the Alyeska Marine Terminal, with a secondary role as recreation access and a scenic corridor.

- o Recreation Access. As the only road-accessable area for saltwater salmon fishing, Dayville Road provides important recreation access. This access will become more valuable if development of additional marine facilities restricts small boat fishing in the area. A trailhead from the road at Solomon Gulch will provide hiking access to Solomon Lake.

  Industrial development along Dayville Road should maintain recreation access for fishing by easements or other appropriate means.

- o Scenic Corridor. Dayville Road is a scenic corridor, providing the only road access on the southside of Port Valdez. It provides views of the natural setting, City of Valdez, Solomon Gulch, and Alyeska Marine Terminal (one of the major tourist attractions of Valdez). Construction of transmission lines for the Solomon Gulch project has lowered the quality of the view along the highway. Future industrial development could have a similar impact, and care should be taken to maintain access to views of Port Valdez, the city, and the Alyeska Terminal.

Energy Facilities

- o Hydroelectric Generation Facilities. The Solomon Gulch project, which will generate 12 MW of power for Valdez, Copper Center, and Glennallen, will be completed in 1982. The Corps of Engineers has identified Allison Lake as a high priority location for additional hydroelectric development. Estimated to produce

8 MW of electricity, the Allison Gulch project could replace more costly diesel fuel generation in Valdez and provide for power for industrial development. Construction is projected for the late 1980s.

- o Petroleum Related Facilities. The City of Valdez has designated a municipal land selection (Allison Point) adjacent to the Alyeska Marine Terminal for petroleum related industrial use. Energy related facilities are a high priority for this site.

Fish Processing

- o Hatcheries. The Valdez Fisheries Development Association proposes to build a humpback, chum, and silver salmon hatchery at the mouth of Solomon Gulch. The hatchery will produce an estimated 50 million humpback, 18 million chum, and 1 million silver salmon. Humpback and chum fry will be held on-site 30 to 45 days, with silver fry taken to a warm-water rearing area. The facility is aimed at increasing both commercial and recreation fishery stocks. The return rate of adult salmon is estimated to be 2 to 6 percent of released fry.

Use Classification

- o Conditional Development. All State Public Interest Lands; land and tidelands north of Dayville Road; Chugach National Forest Land.

- o Development. All areas not classified as Conditional Development.

5.3.12 Western Port Valdez

Projected Resource Use and Activities

- o Land Transfers. The State of Alaska has selected two parcels of land within Chugach National Forest under Community Grant Lands. Use possibilities include availability for municipal selection, and development of marine oriented recreation facilities.

- o Recreation. Both Shoup Bay and Anderson Bay have been identified as areas of high recreation quality. Facility development is a long-term possibility. The City of Valdez Department of Parks and Recreation has proposed construction of a hiking trail along the north side of Port Valdez to Gold Creek.

- o Industrial Development. The City of Valdez has identified a parcel of land within the Jack Bay Community Grant Land selection as a potential energy facility site.

Coastal Habitat

- o Barrier Islands and Lagoons. The Shoup Bay spit is the only land form that can be classified as a "barrier island." Because it is unique in the district, material borrow or other activities that could damage habitat should be prohibited.

- o Rivers, Streams, and Lakes. While timber harvesting and other comsumptive resource use is unlikely in this area, the identified anadromous fish streams are sensitive to obstruction of fish passage and stream sedimentation. Buffer strips of 25 feet on either side of anadromous fish streams should be established. No timber harvesting within 50 feet of streams should occur, in accordance with State Forestry Management practices.

Geophysical Hazards

- o Avalanche Hazard. Several avalanche chutes and runout zones have been identified north of Valdez Narrows. While development in this area is unlikely, none should occur within identified avalanche chutes and runout zones.

- o Mass Wasting. Several potential mass wasting areas have been identified on both sides of Port Valdez. Because the degree of hazard can be determined only by site specific investigations, and mitigation measures are also site specific, development within identified mass wasting zones should exhibit appropriate site investigation and mitigation measures.

- o Sieche/Storm Run-up. The extent of seiche/storm run-up has been estimated at 12 feet. Loss of life and property damage could result from improperly sited and designed development within this area.

Land Use, Management, and Status

- o Preferred Local Use. Recreation - saltwater fishing and recreational boating, hiking; energy facilities - potential energy facility site in Jack Bay.

- o Land Management and Status. The majority of land in this area is likely to remain in state and federal ownership. The U.S. Forest Service is currently preparing a Forest Land and Resource Management Plan for Chugach National Forest; land within the coastal management district has a preliminary designation for scenic resources and public recreation.

  The area within the vicinity of Shoup Bay is managed by BLM under multiple use guidelines. Some federal and state interest has been shown in recreation use of Shoup Bay.

State lands include those managed for watershed and recreation under Public Interest Land classification, and lands selected for Community Grant Lands. Community Grant Lands are selected primarily for expansion of existing communities or establishment of new communities. As in the case of Jack Bay, they may be used for municipal land selection or classified as Public Interest Lands. Both Anderson and Jack Bays have been mentioned as possible recreation areas.

Transportation

- o Marine. Construction and operation of the City Port and the Alaska Oil Company petrochemical project will increase tanker and container ship traffic in Port Valdez.

  Increased recreational boating and identification of onshore recreation areas may require construction of small boat mooring and landing facilities.

Recreation

- o Activities. Western Port Valdez is a major recreation resource of Valdez. Small boat recreation and fishing is popular during summer months. Lack of facilities limits onshore use to occasional landings and camping.

- o Facilities. Construction of the Gold Creek trail will allow hiking along Western Port Valdez. Shoup Bay, Anderson Bay, and Jack Bay have been identified by state and federal agencies as potential recreation areas. Official designation as recreation areas could result in construction of limited facilities to improve boat access and onshore use.

Coastal Access

- o Boat Access. Access to western Port Valdez is currently limited to small boats, primarily for recreation purposes.

- o Other Access. Construction of the Gold Creek Trail will open up hiking access along the area's shoreline.

Energy Facilities

- o Energy Facility Sites. The City of Valdez has identified a potential energy facility site within the Jack Bay Community Grant Land Selection. No specific facilities have been proposed, but the area has been studied as a feasible LNG liquefaction and marine terminal.

Use Classification

- o Conditional Development. Fifty feet on either side of identified anadromous fish streams. Identified avalanche chutes and runout zones; potential mass wasting areas; identified Public Interest Lands; Shoup Bay and spit for recreation use and coastal habitat.

- o Development. All areas not classified as Conditional Development.

6.0 POLICIES, SUBJECT USES, AND PROPER AND IMPROPER USES

6.0
POLICIES, SUBJECT USES, AND PROPER AND IMPROPER USES

6.1 GENERAL POLICY STATEMENT

In recognition that the Valdez Coastal Management District contains the majority of all developable lands as well as providing habitat for many species of flora and fauna, the Coastal Management Citizens Committee recommends that viable economic uses be considered that are both geared to a coastal setting and designed for the enhancement of the physical environment. The Committee is especially cognizant of the Valdez life-style and clean environment, keeping in mind the desire to sustain a stable economy, but not to the detriment of the natural beauty of and quality of life in Valdez.

To accomplish the goals and objectives of the Valdez Coastal Management Program, a set of principles or policies are set forth here to guide decisions concerning activities and uses in the coastal zone. The policies are grouped in three categories: 1) general policies on land and water activities, and consistency and coordination, 2) policies for specific coastal activities and resources, and 3) policies regarding development areas.

Where applicable, the policies incorporate the standards and guidelines of the Alaska Coastal Management Act. These policies actively promote: sensible and efficient use of coastal lands; consolidation of activities; concurrent or multiple use of lands; use of sound engineer-

ing practices; protection of environmental quality; enhancement of fish and wildlife resources; regional cooperation; and, coordination between state and federal agencies and the City of Valdez.

Achieving balance is also important, particularly where there are potentially competing goals, such as industrial development and resource enhancement; where local preferences differ from state and federal interests, where planning for activities in the coastal area can lead to unnecessary restrictions, or where short-run gains result in the forfeiture of long-run benefits.

Finally, the policies are action-oriented. With its planning and regulatory powers, the City of Valdez intends to implement this program through its municipal authority, the allocation of fiscal and human resources and cooperation with private developers and other levels of government.

6.2 GENERAL POLICIES

6.2.1 Land and Water Activites

1. Waterfront-Dependent and Waterfront-Related Uses

Only waterfront-dependent or related activities or uses as defined in this plan will receive priority for waterfront areas. Uses which are neither waterfront-dependent or waterfront-related will be considered in shoreline areas only when inland sites are not available.

2. Facilities

Cooperative use of piers; cargo handling, storage, parking or other facilities is strongly encouraged.

3. Navigable Waters

The navigable waters in Port Valdez shall be available for multiple use.

4. Activities

Activities on and uses of adjacent coastal lands shall be compatible.

6.2.2 Consistency and Coordination

1. Consistency

Uses and activities in the coastal zone, including public activities by all levels of government, shall be consistent with the district plan. The Community Development Department will be responsible for enforcing compliance with all applicable provisions of the Coastal Management Plan.

2. Coordination

The City of Valdez shall minimize regulations by using zoning, subdivision, flood plain ordinances and building codes to implement the district plan. Regulations shall allow flexibility in the techniques used to achieve desired goals of local government.

6.3 SPECIFIC USE POLICIES

6.3.1 Coastal Development

Industrial

1. Optimum Location

The City of Valdez shall assist with the identification of suitable sites for industrial development which satisfy industrial require-

ments, meet safety standards, protect fish and wildlife resources, and maintain environmental quality.

2. Natural Features

Excavation, shoreline alteration, and disturbance of anadromous streams, tideflats, and wetlands shall be minimized when constructing and operating port, harbor, dock, and industrial facilities.

3. Dredge and Excavation Material

Dredge and site excavation material shall be disposed of in sites approved by the Community Development Department. Dredge spoil may be utilized in shoreside landfills if permitted under applicable regulations for the purpose of creating usable waterfront land.

4. Facility Design

Developments in or over the water, such as piers, docks, and protective structures shall be located, designed, and maintained in a manner which minimizes adverse impacts upon water quality, fish, wildlife, vegetation, and physical processes.

5. Buffer Zones

Buffer zones are desirable between industrial areas and major public transportation routes, and between industrial development and adjacent, non-industrial properties.

6. Accessory Development

Support facilities of a waterfront development which do not require waterfrontage should be sited inland.

7. Alteration of Bodies of Water

Filling or drainage of water bodies, floodways, backshores or natural wetlands for expansion of upland areas for commercial development is subject to review by the Community Development Department.

Commercial

The following industrial policies shall also apply to commercial development:

- o Natural features
- o Dredge and excavation material
- o Facility design
- o Accessory development
- o Alteration of bodies of water

Residential

1. Location

In areas with poorly draining soils, development shall not be allowed unless connected to a sewer line. Where not feasible, on-site facilities shall be designed so as not to cause conditions that will pollute rivers, lakes, and other water bodies including the ground water supply.

2. Open Space

Maximum retention of green areas and open space shall be encouraged.

3. Hazardous Lands

Development shall not occur in areas designated as hazardous such as avalanche runout zones, active floodways and high water channels, and unstable slopes and shorelines. Siting, design, and construction measures to minimize exposure to these hazards may be required in Conditional Development areas.

6.3.2 Energy Facilities

The siting and approval of major energy facilities shall be based on the standards and guidelines set forth in the Alaska Coastal Management Act. Sites suitable for the development of major onshore, nearshore, offshore, and outer continental shelf energy facilities must be identified by the state in cooperation with the district.

1. Site Selection

Major energy facilities will be located in areas set aside by the City of Valdez for industrial use.

2. Facility Expansion

Sites must have enough space for reasonable expansion of facilities without pre-empting lands suitable for other development.

3. Consolidation

Companies must strive to consolidate their activities and, wherever feasible, share their facilities with other companies or the community.

4. Habitat Protection

Sites will be approved which call for a minimum of dredging, clearing, and construction in productive habitats.

5. Accidental Spills

Sites must be selected where water discharges and oil spills can be contained most effectively.

6. Air Quality

Energy facilities with airborne emissions must be located where winds and air currents can disperse emissions and where the cumulative impact does not violate state and federal air quality standards.

7. Water Quality

Effluent discharge of energy facilities must be located where currents can disperse effluents and where the cumulative impact does not violate state and federal water quality standards.

8. Impact Avoidance

Energy facilities will be sited to minimize impact on environmental and cultural values in the immediate vicinity.

6.3.3 Recreation, Tourism, and Natural Setting

1. The City of Valdez shall encourage recreational and tourism development, improvement of the aesthetics of the city, and provide public access to shoreline areas.

2. Recreational developments shall provide the local population a wide range of recreation opportunities in appropriate locations.

3. Since shorelines with a high value for recreation are limited and the long-term demand is unlimited, facilities for water-dependent or water-oriented recreation shall be located near the shoreline, while non-water-related recreation facilities should be located inland.

4. Recreational and access developments shall, wherever appropriate, blend into the surroundings, and preserve or enhance scenic views and vistas.

5. New development shall incorporate recreation access where applicable.

6. The City of Valdez shall offer incentives to city development that incorporate landscaping and historical displays.

7. The City of Valdez shall support local, state, and federal efforts to develop marine parks, roadside pullouts, and other recreation facilities on public lands within and adjacent to coastal management district boundaries.

6.3.4 Transportation and Utility Routes

1. State Highway Construction and Maintenance

The City of Valdez shall support state highway construction and maintenance efforts to improve the transportation link to interior Alaska.

2. Location

Wherever there is a cost effective inland alternative, transportation and utility routes shall be located away from the shorelines. If

shoreline routes are constructed, they shall provide reasonable means of public access to the water.

3. Facility Design, Construction, and Maintenance

Design, construction, and maintenance of highways, airport, port, and utilities shall minimize alteration of water courses, wetlands, and intertidal marshes.

4. Stream Crossings

Roads shall cross anadromous streams only when necessary to provide access deemed necessary by the City of Valdez. Bridge or culvert construction and design must minimize habitat disturbance and allow fish passage. Construction scheduling shall be done in accordance with good fisheries conservation practices.

5. Underground Utilities

To the extent feasible, underground installation of utilities is preferred to overhead installation.

6. Sanitary Landfills

To avoid leachate pollution, landfills shall be located above the groundwater table.

6.3.5 Geophysical Hazards

1. Utilization

The City of Valdez shall require safe and sensible utilization of potentially hazardous lands.

2. Coordination

The City of Valdez shall encourage the state and federal government and private interests to gather geophysical information, analyze the extent of hazards, and recommend proper siting, design, and construction measures to maximize safe utilization of hazardous lands.

3. Geophysical Hazard Areas: Landslides and Mass Wasting

The District Plan shall identify potential geophysical hazard areas where further investigation is necessary. Development of these areas may not be approved by the appropriate state or local authority until siting, design, and construction measures for minimize property damage and protecting against loss of life have been provided. All development shall be prohibited in areas identified as subject to landslide and mass wasting hazards unless the Community Development Department approves siting, design, and construction measures to safeguard against property damage and loss of life.

4. Riverine Flooding

All development is subject to the City of Valdez Floodplain Management Ordinance.

5. Coastal, Seiche, and Tsunami Flooding

New development within 10.5 feet elevation above mean sea level (100-year recurrence or 1 percent probability event) shall be limited to water-related uses. Water-related development within 10.5 feet above sea level shall be subject to siting, design and construction measures to safeguard against potential hazards.

6. Seismic Events

Proposals for development within known and potential seismic areas shall be required to prepare a geotechnical investigation prior to

development to determine an area's physical capability to accommodate various uses. The investigation shall also recommend siting, design, and construction measures to minimize the hazard.

7. Glacier Stream Flood Plain Plan

The City of Valdez shall prepare a Glacier Stream Flood Plain Plan to guide gravel mining and other activities within the Glacier Stream flood plain.

6.3.6 Coastal Access

1. Public Access

New development shall be encouraged to provide access to shorelines when such access does not interfere with operations or create a hazard to life and property.

2. Recreation Facilities

The City of Valdez shall continue to provide access to the shoreline through trails, bikepaths, and development of State Public Interest Lands under its management.

3. Access to State and Federal Lands

The City of Valdez shall continue to encourage state and federal governments to provide marine access to their lands on Port Valdez and Valdez Arm through the Marine Parks, Forest Service Cabins, and other similar programs.

6.3.7 Fisheries and Seafood Processing

1. Fisheries Enhancement

The City of Valdez shall continue to actively promote the development of hatcheries and aquaculture programs. Fisheries programs will strive to maintain, restore, or enhance the natural biological productivity of Port Valdez, anadromous streams, and lakes in the coastal zone.

3. Optimum Resource Use

Maintenance and enhancement of fisheries should be given high consideration in reviewing shoreline use proposals which might adversely impact important fisheries habitat, migratory routes, and the harvest of fish.

3. Industrial Development

Development which has an adverse impact on fisheries and wildlife shall design and implement measures to mitigate these impacts.

6.3.8 Gravel Extraction

1. Material Sources

The City of Valdez shall identify preferred locations for extracting gravel and other material resources within the Coastal Management District.

2. Gravel Mining

Mining shall be subject to any Flood Plain Management Plan adopted by the City of Valdez, and subject to Title 16 Fish and Game regulations, when applicable.

6.3.9 Archaeological and Historical Resources

1. Resource Identification

Because prehistoric and archaeological sites are important assets local and state governments should institute programs designed to identify and protect all significant sites not already protected by federal and state programs.

6.3.10 Air and Water Quality

1. Cumulative Impact

New industrial development shall comply with state and federal regulations for air and water quality.

2. Wastewater Discharge

The discharge of wastewater and toxic wastes into Port Valdez shall be limited to areas with adequate flushing action and be discharged in accordance with State of Alaska regulations.

3. Harbors

Harbor, small boat harbor, and marina designs shall incorporate facilities for proper handling of sewage and refuse.

6.3.11 Resource Enhancement and Protection

1. Habitat Protection

Management of sensitive areas such as estuaries; wetlands and tideflats; beaches; rivers, streams, and lake systems; and high energy coasts shall be done in accordance with the standards of the Alaska Coastal Management Program.

2. Natural Processes

Estuaries, tideflats, and wetlands shall be managed to assure continued water flow and natural circulation patterns, and appropriate levels of nutrients and oxygen. Dredging shall not be permitted in these areas, unless approved by the Community Development Department, U.S. Army Corps of Engineers, and other appropriate state and federal agencies.

3. Upland Habitats

Upland habitats shall be managed to prevent excessive runoff and erosion and to retain natural drainage patterns, surface water quality and natural groundwater recharge areas.

6.4 DEVELOPMENT CLASSIFICATION POLICIES

The following policies are meant to guide activities and development in areas classified by the resource analysis.

6.4.1 Areas Meriting Special Attention (AMSA)

Activities and development within AMSA areas shall be limited to those identified as proper uses for these areas.

6.4.2 Conditional Development Areas

1. Conditional development areas where coastal development may be subject to constraints created by biological resource needs, geophysical hazards, coastal habitat, land ownership, adjacent land use, coastal access, and air and water quality, shall be identified and periodically reviewed by the Community Development Department.

2. Activities and development within conditional development areas shall be subject to coordination with the Community Development Department.

3. Potential constraints on activities and development within conditional development areas shall be identified in the Valdez District Coastal Management Program.

6.4.3 Development Areas

1. Development areas shall be established within the Valdez Coastal Management District where economic and coastal development objectives are not subject to constraints created by geophysical hazards, biological resources, coastal habitat, recreation, land ownership, coastal access, and air and water quality concerns.

2. Economic and coastal development are preferential uses for these areas.

6.5 SUBJECT USES

The following activities and uses of coastal land and water resources are subject to the Valdez District Coastal Management Program:

- o Coastal Development - industrial, commercial, and residential development
- o Recreation - designation of areas and facilities
- o Energy Facilities - petroleum and petrochemical product refining, storage, transportation, and transfer; electric and hydroelectric generation facilities and transmission lines
- o Transportation - highway, air and marine facilities
- o Utilities - water and sewer lines and facilities, solid waste disposal, utility lines

- o Fisheries - seafood processing, fishery enhancement and rehabilitation

- o Timber Harvesting and Processing - timber sales and harvesting, log storage and transfer

- o Mining and Mineral Processing - hard rock minerals, gravel, sand, and other construction materials

- o Subsistence - subsistence areas and activities.

6.5.1 Uses of State Concern

The policies of the Valdez District Coastal Management Program reflect the five categories of Uses of State Concern, which are defined as those land and water uses which would significantly affect the long-term public interest. The five categories are listed below:

(A) uses of national interest, including the resources for the siting of ports and major facilities which contribute to meeting national energy needs, construction and maintenance of navigational facilities and systems, resource development of Federal land, and national defense and related security facilities that are dependent upon coastal locations;

(B) uses of more than local concern, including those land and water uses which confer significant environmental, social, cultural or economic benefits or burdens beyond a single coastal resource district;

(C) the siting of major energy facilities or large-scale industrial or commercial development activities which are dependent on a coastal location and which, because of their magnitude or the magnitude of their effect on the economy of the State

of the surrounding areas, are reasonably likely to present issues of more than local significance;

(D) facilities serving statewide or interregional transportation and communication needs; and

(E) uses in areas established as State parks or recreational areas under AS 41.20 or as State game refuges, game sanctuaries or critical habitat areas under AS 16.20.

6.6 PROPER AND IMPROPER USES

In accordance with the policy of multiple use of resources, the determination of proper and improper uses of coastal land and water resources within the Valdez Coastal Management District is not an exclusionary process. Proposed uses are measured by performance with regard to policies, resource concerns identified under conditional development areas identified in the Resource Analysis and AMSA management guidelines.

Specific proposals for land and water uses or activities shall be submitted to the Community Development Department for review and determination of both proper/improper use and consistency with the District Coastal Management Program. Decisions made by the Community Development Department can be appealed to the Planning and Zoning Commission and City Council. This process in no way precludes the need for compliance with the City Zoning Ordinance, Floodplain Management Ordinance, Subdivision Regulations, Building Codes, and other pertinent city land and water use controls.

In addition to the specific policies, conditional development resource concerns, and AMSA guidelines, the following points should be emphasized in the evaluation of resourse use/activities proposals:

1. Zoning Ordinance. Acceptable uses under the City Zoning Ordinance must address applicable conditional development concerns.

2. Water Dependency. Water-dependent or water-related uses have priority use of the shoreline. Non-water dependent or related uses should be located inland when feasible and prudent inland locations are available. Feasibility reflects zoning constraints, population distribution, and economic hardship to private individuals.

7.0 IMPLEMENTATION

7.0
IMPLEMENTATION

Implementation of the Valdez Coastal Management Program relies on the utilization of existing federal, state, and local government regulations and land use controls (Figure 7.1). This approach eliminates duplication of authority and minimizes the need for additional regulations and permits. The only additional controls needed for program implementation are amendments to the Valdez Zoning Ordinance to 1) enforce policies not covered by existing ordinance provisions, and 2) establish a proceedure for Valdez Community Development Department review of activities taking place within district boundaries for determination of consistency with the Valdez Coastal Management Program.

On the local level, the Community Development Department will review private and local government activity proposals for determination of consistency with the Valdez Coastal Management Program. The determination of consistency can be appealed through the Valdez Planning and Zoning Commission and City Council, following the standard zoning appeal procedure.

The City of Valdez also wishes to undertake the continuing review of state and federal agency actions affecting the coastal zone for determination of consistency with the Valdez District Coastal Management Program. A proposed approach to developing a Memorandum of Understanding with the Division of Policy Development and Planning to implement A-95 review consistency determination procedure is included in this section.

POLICIES	River & Harbor Act-Section 10	Federal Water Pollution Control Act - Sec. 401	Sec. 402	Sec. 404	Clean Air Act	Hazardous Waste Permit Program	Executive Order 11988	11990	Title 16	Alaska Water Quality Standards	Waste Water Disposal Regulations	Solid Waste Diposal	Alaska Historic Preservation Act	Zoning Ordinance	Subdivision Regulations	Building Code/ Permit	Floodplain Management Ordinance	Administrative Guidelines
General Policies																		
Land and Water 1	X																	X
2																		X
3																		X
Consistency/ Coordination 4	X	X	X	X			X											X
1		X		X														X
2		X		X														X
Specific Use Policies																		
Industrial Dev. 1	X								X					X				X
2	X	X	X	X										X				X
3														X				X
4	X	X	X	X					X					X				X
5	X													X				X
6														X				X
7														X				X
Commercial Dev.														X		X		X
Residential Dev. 1										X				X	X		X	X
2														X	X			X
3														X	X			X

FEDERAL

STATE

BOROUGH

Figure 7.1. Policy Implementation.

2.

Transportation and Utilities							Recreation & Tourism						Energy Facilities									
1	2	3	4	5	6	7	1	2	3	4	5	6	1	2	3	4	5	6	7	8		
		X																X			FEDERAL	River & Harbor Act-Section 10
																		X				Federal Water Pollution Control Act - Sec. 401
																						Sec. 402
																						Sec. 404
																						Clean Air Act
																						Hazardous Waste Permit Program
																						Executive Order 11988
																						11990
		X	X																		STATE	Title 16
					X																	Alaska Water Quality Standards
																						Waste Water Disposal Regulations
					X																	Solid Waste Diposal
																						Alaska Historic Preservation Act
		X						X						X		X	X	X			BOROUGH	Zoning Ordinance
		X	X	X				X			X											Subdivision Regulations
																						Building Code/ Permit
																						Floodplain Management Ordinance
		X	X	X				X		X	X	X		X	X		X					Administrative Guidelines

3.

		River & Harbor Act-Section 10	Federal Water Pollution Control Act - Sec. 401 Sec. 402 Sec. 404	Clean Air Act	Hazardous Waste Permit Program	Executive Order 11988	11990	Title 16	Alaska Water Quality Standards	Waste Water Disposal Regulations	Solid Waste Diposal	Alaska Historic Preservation Act	Zoning Ordinance	Subdivision Regulations	Building Code/ Permit	Floodplain Management Ordinance	Administrative Guidelines
Geophysical Hazards	1												X			X	X
	2												X	X			X
	3												X	X			X
	4												X	X	X		X
	5												X				X
	6																X
	7																X
Coastal Access	1												X	X			X
	2												X	X			X
	3												X				X
Fisheries/Seafood Processing	1																X
	2																X
	3																X
Mineral Processing	1												X				X
	2																X
Archaeological/ Historical	1											X					X
	2																X
Air & Water Quality	1				X												X
	2																X
	3		X							X	X						X
	4		X							X	X						X

FEDERAL STATE BOROUGH

4.

DEVELOPMENT CLASSIFICATION POLICIES										
Resource Enhancement/ Protection			Conditional Development			Development				
1	2	3	1	2	3	1	2			
	X				X				River & Harbor Act-Section 10	FEDERAL
					X				Federal Water Pollution Control Act - Sec. 401	
					X				Sec. 402	
									Sec. 404	
									Clean Air Act	
									Hazardous Waste Permit Program	
	X								Executive Order 11988	
									11990	
	X								Title 16	STATE
									Alaska Water Quality Standards	
									Waste Water Disposal Regulations	
									Solid Waste Diposal	
									Alaska Historic Preservation Act	
				X	X	X			Zoning Ordinance	BOROUGH
	X								Subdivision Regulations	
	X								Building Code/ Permit	
									Floodplain Management Ordinance	
X	X	X	X	X	X	X	X	X	Administrative Guidelines	

7.1 FEDERAL AND STATE IMPLEMENTATION MEASURES

Several Federal and State regulations have been used to implement coastal management policies. The specific regulations are listed below. A summary of each of these measures is presented in Appendix B.

Federal Controls

The River and Harbor Act of 1899, Section 10
The Clean Water Act, Section 404, 402, 311
The National Environmental Policy Act of 1969
Executive Order 11988 Floodplain Management
Executive Order 11990 Protection of Wetlands
The Coastal Zone Management Act of 1972
The Fish and Wildlife Coordination Act
The National Historic Preservation Act of 1966
The Endangered Species Act of 1973
The Marine Mammal Protection Act of 1973

State Controls

Alaska Statute 16
Alaska Water Quality Standards
Waste Water Disposal Regulations
Water Appreciation Permit
Alaska Historic Preservation Act of 1971

7.2 IMPLEMENTATION MEASURES

The City of Valdez enforces 5 local controls which implement 27 of the policies identified as Coastal Management Plan Policies. They are the Zoning Ordinance, Subdivision Regulations, Building Code and Floodplain Ordinance. Twenty-three of the Coastal Management Plan Policies do not lend themselves to implementation through specific regulation, but rather are to be used as general administrative guidelines for all city actions.

7.2.1 Private and Local Government Actions

In accordance with Chapter 30.80.010 of the Valdez Zoning Ordinance, the Valdez Community Development Department will review proposals for activities taking place within the Valdez Coastal Management District and determine consistency of the proposal with the Valdez Coastal Mangement. Proposals must include a brief description of the activity and a mpa showing the location of development at a scale of 1:63,360. The Community Development Department will respond to the applicant within 10 working days as to whether the information submitted is adequate to determine consistency, or whether more information is needed. Major problems associated with Conditional Development Area constraints or consistency will be identified to the applicant at this time. The Community Development Department will reach a determination of consistency within 30 days of receipt of activity proposals, or of additional information when required. Consistency determination decisions will include development conditions and/or reasons for finding proposals not consistent with the District Program.

The deterimination of consistency can be appealed to the Valdez Planning and Zoning Commission, which must consider the appeal at its next scheduled meeting, and rule on the appeal by the following scheduled meeting. Further appeal can be made to the Valdez City Council.

The Community Development Department will review proposed actions for consistency by considering the following factors:

1. Type of Action
   - A. Municipal
     - o capital improvement projects
     - o permits
   - B. Private land developments

2. Location of the action within the coastal zone

3. Significant affects on the coastal zone, including:

- o significant changes in the manner in which land, water or coastal zone natural resources are used:
- o significant limitations on the range of uses of coastal zone natural resources;
- o significant changes in the quality of coastal zone natural resources

4. Resource use that will be significantly affected

- o Offshore areas
- o Estuaries
- o Westlands and Tideflats
- o Rocky Islands and Sea Cliffs
- o Barrier Islands and Lagoons
- o Exposed High Energy Coasts
- o Rivers, Streams, and Lakes
- o Important Upland Habitat
- o Historical, Prehistoric, and Archaeological Areas
- o Air Quality
- o Surface Water
- o Groundwater
- o Scenic Areas
- o Coastal Flood Zone and River Floodplains
- o Parks and Recreation Areas
- o Open Space
- o Developed Waterfront
- o Urban Residential

5. Consistency with local land and water use controls. If not consistent, name the specific control(s) with which the action is not consistent and describe why the action is not consistent.

6. Consistency with all policies spelled out in the district plan.

7. Control of development areas in which the action may be located, and appropriate mitigation measures proposed.

8. Location of the action within Areas Meriting Special Attention

9. Consistency with the management plan for an Area Meriting Special Attention, if the action is located in the AMSA.

Enforcement

It will be the responsibility of the Community Development and Engineering Departments to monitor activities within the Coastal Management District to ensure that the policies and conditions of the district Program are being implemented. A summary of District Enforcement actions will be submitted to the office of Coastal Management on an annual basis.

Memoranda of Understanding

The City of Valdez wishes to formalize, by means of memoranda of understanding, consistency review of all state and federal actions and to establish procedures for coordinating plans and programs at federal, state, areawide and local levels.

Memoranda of Understanding will be drafted between the City of Valdez and at least the following three/state agencies -- Division of Policy Development and Planning, Department of Fish and Game anbd the Department of Environmental Conservation.

The memoranda will cover:

- o procedures and timetables for A-95 review;
- o assumption by the City of Valdez of primary responsibility for consistency determinations;

- procedures for coordination of consistency determination with the Alaska Coastal Management Office:
- procedures for settling disagreements and providing for remedies.

8.0 AREAS MERITING SPECIAL ATTENTION

8.0
AREAS MERITING SPECIAL ATTENTION

Areas meriting special attention (AMSAs) are areas singled out during coastal management program development for detailed planning. As defined in the Alaska Coastal Management Act [AS46.210(1)], AMSAs are:

> A detailed geographic area within the coastal area which is sensitive to change or alteration and which, because of plans or commitments or because a claim on the resources within the area delineated would preclude subsequent use of the resources to a conflicting or incompatible use, warrants special management attention, or which, because of its value to the general public, should be identified for current or future planning, protection, or acquisition.

Acceptable rationales for designating AMSAs are identified in the Alaska Coastal Management Act (CMA) and the Alaska Coastal Management Program standards. All proposals for AMSAs must be related to one or more of the following:

1. Areas of unique, scarce, fragile, or vulnerable natural habitat, cultural value, historical significance, or scenic importance;
2. Areas of high natural productivity or essential habitat for living resources;
3. Areas of substantial recreational value or opportunity;
4. Areas where development of facilities is dependent upon the utilization of, or access to, coastal waters;

5. Areas of unique geological or topographic significance that are susceptible to industrial or commercial development;
6. Areas of significant hazard due to storms, slides, floods, erosion, or settlement;
7. Areas needed to protect, maintain, or replenish coastal land or resources, including coastal floodplains, aquifer recharge areas, beaches, and offshore sand deposits;
8. Areas important for subsistence hunting, fishing, food gathering, and foraging;
9. Areas with special scientific values or opportunities, including those where ongoing research projects could be jeopardized by development or conflicting uses and activities; and
10. Potential estuarine or marine sanctuaries. [AS 46.40.210 (1) and ACMP Standards 6AAC 80.160 (b)]

The City of Valdez feels that areas important to economic development, transportation, and energy facilities are also valid rationales for designating an AMSA.

The management scheme which "must preserve, protect, enhance, or restore the value or values for which the area was designated, "as specified in 6AAC 80.160(c). The management scheme must include:

(a) A description of the uses and activities that will be considered proper and the use and activities that will be considered improper with respect to land and water within the area;

(b) A summary or statement of the policies that will be applied in managing the area; and

(c) An identification of the authority that will be used to implement the proposed management scheme.

Any person, federal or state agency, or local government may recommend AMSAs. Coastal Management Districts must consider recommended AMSAs, but are not bound to accept an AMSA as nominated. Final decisions on AMSA designations are made during program review by the Coastal Policy Council, which considers state and federal agency comments at that time. This minimizes speculation and diverse interpretations about how the area is to be maintained.

The use of AMSAs to manage resource use and activities can be easily abused; ideally AMSAs should be used to resolve conflicts between uses or to protect single-purpose values of public importance only when other coastal management tools are not adequate. In the case of many potential AMSAs, policies, development conditions, and implementation (including incorporation of state and federal regulations) are adequate to resolve use conflicts or protect uses. A large number of individual AMSAs can result in piecemeal planning and additional layers of requirements for potential resource users.

Approval of an AMSA as part of a Coastal Management Program includes both the approval of the AMSA boundaries and of the specific management plan adopted for it.

- All proposed AMSAs are protected to some degree by other program elements; specifically management classification districts and policies.

- AMSAs have been employed when areas have multiple land managers with often conflicting management objectives in areas of important single or multiple resource value.

- The City of Valdez philosophy is that these land managers should work together to develop the scope of an AMSA management plan that protects both their interests and general public interest. Such a development has time and fiscal requirements beyond the scope of this program.

- Interim management will consist of classifying recommended AMSAs, conditional development for those values which make an area worthy of recommendation as an AMSA. Activities within the AMSA must show how those resource values/conflicts are addressed.

The Valdez Coastal Management Program has designated four AMSAs: the Duck Flats/Mineral Creek Islands, Mineral Creek Canyon, Robe Lake and Keystone Canyon. Maps 14a and 14b show the AMSAs and values associated with them.

VALDEZ DUCK FLATS

1. Name - Duck Flats and Mineral Creek Islands.

2. Location - This area is located on the north side of Port Valdez, east of the new townsite, and south of the Richardson Highway (Map 14a).

3. Description and Significance

a) Duck Flats. The flats are a 1000 acre intertidal area consisting of 540 acres of mud flats and 460 acres of saltwater marsh. Six clearwater streams, fed by groundwater and snowmelt, flow year-round into the Duck Flats.

The marshland is one of the larger tracts of marsh along Port Valdez. The marshland is made up of two separate marsh areas. The larger east marsh is located along the eastern and northern margin of the flat. The smaller marsh, west marsh, is located at the extreme southwestern margin of the flat. The marshy interchannel topography is quite flat and consists of poorly drained fine silts and clays. Below the marsh the tideland grades into mudflats which are totally exposed during low tide.

The Duck Flats is a highly productive biological area due to high levels of nutrient availability. The East Marsh is dominated by a grass/milkwort community. The West Marsh is on slightly higher ground and is dominated by a sedge/rush community.

All six streams flowing into the Flats are used for spawning by salmon, primarily pinks and chums. Spawning also occurs in the intertidal areas. The outmigrating fry of pink and

chum salmon feed in the subtidal waters. The Duck Flats streams contribute about 12 percent of the pink salmon taken in the commercial fishery in odd years. The Duck Flats also contribute about one percent of chum salmon to this fishery. All six of these streams are categorized as "critical spawning habitat" (Dames and Moore 1979). The Alaska Department of Fish and Game classifies these streams as sensitive and/or critical habitat.

The Duck Flats area has substantial ecological value in that it provides habitat for a variety of waterfowl. The saltmarsh and tidal mudflats are most important as a feeding area for waterbirds during the spring and fall migrations.

Mallards, green winged teal, pintail and wigeon are the most abundant nesters on the Flats. Much of the saltmarsh surrounding the Flats is a migration staging area for Canada Geese. Several other species of waterfowl and shorebirds utilize the area during various seasons and stages of the tide.

An active bald eagle nesting site is located on the east side of the marsh near Mineral Creek Road.

Larger land mammals tend to avoid areas such as the Flats due to lack of protective cover and the proximity of human activity. The smaller mammals (rodents and hares) may use the better drained sites adjacent to the mudflats. Predatory mammals such as coyote, weasel, mink and river otter may frequent these areas inhabited by smaller land animals.

Marine mammals, primarily harbor seal and sea otter use the Duck Flats for feeding. Harbor seals move into the mudflats to feed on starry flounder and spawning/rearing salmonids. Sea otters forage in the lower intertidal area for clams and mussels.

b) Mineral Creek Islands. The Mineral Creek Islands consist of a series of bedrock outcrops within the entrance area to the Duck Flats. These hogback islands have served as a crib wall in holding back the glacial outwash plain silts and gravels and stabilizing the Duck Flats area behind them. The outer islands (Spruce, Cranberry, Raspberry, and Iris) are less than one acre in surface area with steep rock sides and flat tops. The dominant vegetation is grass interspersed with various shrubs and herbaceous plants. Some of these outer islands are considered ecologically unique in regard to their vegetative composition.

The inner islands (Ammunition, Bluff, Round, and West) are slightly larger (1-3 acres). The vegetation is dominated by shrubs.

The outer islands and Sontag Spit serve as a nesting area for about 30-50 pairs of Arctic terns. The outer islands have been classified as a seabird colony by the U.S. Fish and Wildlife Service. Harbor seals have been observed to have "hauled out" on Seal Rock on Spruce Island. The inner islands are also used for roosting by a variety of birds. A few small mammals also inhabit the islands.

The Duck Flats are equally important to Valdez residents for economic, transportation, and lifestyle reasons. These uses on lands and waters within the AMSA area include transportation, residential, recreation, fisheries, utility, and communication.

One of the major developments in the area is the Richardson Highway/Mineral Creek Loop Road which encircles the entire mainland section of the AMSA. The Richardson Highway is the only land transportation route linking Valdez to the Alaskan interior. Daily traffic along that portion of the highway adjacent to the AMSA averaged 4540 vehicles in 1979 (Alpetco DEIS 1979). Considerable improvements are planned for the Richardson Highway over the next five years including a widening of the road bed.

The Sontag Spit, located off Mineral Creek Loop Road, immediately south of Siwash Creek, consists of a 1500 foot long fill barrier extending out towards Ammunition Island.

The city is near completing a port facility south of Ammunition Island. This will include a 21-acre marshalling yard consisting of dredged material and fill. A floating dock will be connected to the marshalling yard by four walkways and two ramps. A 1500 foot long trestle will connect the marshalling yard to the mainland. Fill material will be required to create a 1000 foot long paved roadway from the trestle to the existing Sontag Spit Road. The city has also selected land in this area as a potential site of an export grain terminal.

An area east of the small boat harbor (Harbor Cove) has been suggested for the site of a new commercial harbor. This would require dredging the area immediately south of Dock Point and West Island, between Harbor Point and the outer islands. The portion of this area above mean lower low water is under city ownership.

Expansion of the commercial fishing industry in Valdez may also require additional areas for warehouses, equipment storage and cold storage facilities. One area that has been proposed is between North Harbor Drive and Inner Point (west of Southwest Cove). The western half of the fill area would be on state land and the eastern half on city lands.

Several recreational uses are made of the AMSA area. A highway pullout next to City Limit (Crooked) Creek is heavily used during the tourist season for viewing salmon spawning. The viewing platform at the pullout is also used for nature study and scenic and wildlife viewing.

The city proposed a $100,000 camper park as part of the 1978-1979 recreation budget. This park would be situated north of the small

boat harbor on state lands (same general area as the proposed commercial boat harbor land fill). No action has yet been taken.

The Valdez Fisheries Development Association hatchery facility on City Limits Creek (northwest of the Richardson Highway and adjacent to the AMSA boundary), built in 1979, consists of a small incubation unit from which a chum and pink salmon brood stock will be developed. The chum salmon stock will be planted in incubation/spawning channels in Old Valdez, taking advantage of the abundance of groundwater in that vicinity. Hatchery reared pink salmon will be used to establish runs for Solomon Gulch. The capacity of the hatchery is 1.5 million eggs.

4. Basis for Recommendation

The many existing and proposed uses has created intense competition for use of this very productive and unique area. This area's use as a transportation corridor and port site, fishery, aquaculture site, scenic and nature viewing site will create conflicts which will require particular attention to ensure proper management.

5. Ownership and Management

Lands within the proposed AMSA are under City of Valdez, State of Alaska, and private ownership. There are no federal land holdings within the Duck Flats/Mineral Creek Islands area. Of the 1,000 acres included within the AMSA's boundary, approximately 800 acres are owned by the City of Valdez, 150 acres by the State of Alaska (including University of Alaska held lands), and 50 acres by private individuals. Through Title 16 and Federal Water Pollution Control Act, the Alaska Department of Fish and Game the U.S. Army Corps of Engineers have jurisdiction over some activities occurring within the AMSA.

6. Ownership and Management of Adjacent Area

Land to the north of the AMSA is owned by the State of Alaska as unclassified land. Private lands border the AMSA to the west and east, and consist of residential and commercial uses.

7. Potential Conflicts

Potential conflicts include port, utilities and other coastal development activities with fish and wildlife habitat. Maintaining water quality and circulation is a key concern. Restriction of activities important to the economy of Valdez is also a concern, as is the potential for condemnation of private lands without compensation.

8. Management/Development Plan

Conditional development criteria should be enforced until specific management and development plans can be formulated. Members of an AMSA management task force should include representatives of the Valdez Community Development Department; Alaska Departments of Environmental Conservation, Fish and Game, and Commerce and Economic Development; the Alaska District Corps of Engineers; U.S. Fish and Wildlife Service; and the University of Alaska and other private land holders.

MINERAL CREEK CANYON

1. Name - Mineral Creek Canyon.

2. Location - Mineral Creek Canyon is located two miles north of the new townsite.

3. Description and Significance

Mineral Creek drains a glacier fed watershed, 46 square miles in area. This watershed recharges the aquifer utilized by the city. The steep-walled canyon is very scenic, with several waterfalls tumbling from the surrounding rugged mountains. The mountain stream is fast flowing and alternates between narrow stretches and braided areas.

The biological habitat consists of riparian woodland, deciduous forest and alder shrub at higher elevations. Birds and mammals typical of these habitat types are present.

Due to the scenic beauty and natural resources, the canyon is considered a high quality recreation area. Several trails, both hiking and winter ski trails, and a park have been proposed for the area.

The canyon also has historical significance as a gold mining area with several claims still active. McIntosh's Roadhouse and the Old Stampmill are historic sites as identified by the Alaska Historical Resource Site Survey. The Survey also concluded that there is a medium probability of archaeological sites being present. One of the proposed trails in the canyon would be a historic trail.

In recent years, interest in the canyon's mineral resources, primarily gold, has grown. The west side of the lower canyon is used as an access route to the currently active mining claims.

The City of Valdez has proposed improving access to the canyon by building a bridge across the creek, and upgrading the road.

4. Basis for Recommendation

Mineral Creek Canyon is nominated as an AMSA because of the scenic importance, historical significance and the substantial recreational value, existing and potential. The area is also an aquifer recharge area. Potential conflicts exist between mineral development and the recreational and historic resources of the canyon.

5. Ownership and Management of the Area

The Mineral Creek watershed has been classified as State Public Interest Land for watershed and recreation purposes. Several active and inactive mining claims are located in the canyon.

6. Ownership and Management of Adjacent Area

The majority of adjacent lands are classified as State Public Interest Land (watershed), although the University of Alaska owns a small portion of land below the AMSA.

7. Potential Conflicts

Potential conflicts include mining activities with recreation activities, scenic values and aquifer recharge.

8. Management/Development Plan

Conditional development criteria should be enforced until specific management and development plans can be formulated. Members of an AMSA management task force should include representatives of the Valdez Community Development Department; Alaska Departments of Natural Resources

(Division of Parks and Division of Land and Water), Environmental Conservation, and Fish and Game; University of Alaska; and owners of mining claims.

ROBE LAKE

1. Name - Robe Lake.

2. Location - Robe Lake is located north of the Richardson Highway, 3 miles east of Port Valdez. (Map 14b).

3. Description and Significance

The 600 acre Robe Lake, the only sizeable lake that is accessible by road in Valdez, is fed by several creeks and drained by the shallow Robe River into Port Valdez. The lake's average depth is 8 feet with a maximum depth of 15 feet. Robe Lake accounts for 12% of the surrounding 7 square mile watershed. Wetlands account for another 17% of the watershed's area.

Three clearwater creeks flow into Robe Lake. Deep Creek, which drains 10 acre Deep Lake, enters Robe Lake on the northeast corner. Brownie Creek, also entering the northeast corner, drains the wetlands north of Rove Lake. Corbin (Robe) Creek, 1½ miles long, enters Robe Lake from the northwest.

Corbin (Robe) Creek, fed by groundwater and dike leakage, flows in the former channel of the glacial Crobin Creek. A dike diverting Corbin Creek into Valdez Glacier Stream was constructed during the 1950's to eliminate the deposition of glacial sediment into the lake. The diverted creek is now referred to as Corbin (Glacier) Creek.

While the dike has ended sedimentation in the lake, it has also eliminated the major source of water inflow. The resulting lower temperature and water level of the lake have led to an increasing rate of eutrophication. The heavy growth of vegetation has reduced the area of open water by one third.

The Robe Lake system is used by a variety of salmon species, char and Dolly Varden. At present of the salmon species, silvers are most common. The lake system supports the only red salmon run in the Valdez area. It also contains pinks and a small number of chums.

Corbin (Robe) Creek has consistently been the major silver salmon spawning stream in the Valdez area. The number of spawners in recent years (1972-1978) have ranged from 708 to 4839. These numbers generally account for about half of the total spawners in the Port Valdez drainage and more than 80% of the spawners in the Robe River system (Dames and Moore 1979). Juvenile salmon spend 1-2 years in the lake before moving out to sea.

Small numbers of spawning red salmon have been observed in Corbin (Robe) Creek as well as a number of Dolly Vardens.

Brownie Creek is a productive stream and includes valuable red salmon spawning and rearing habitat (DOWL 1979). The red salmon run used to be large enough to support commercial operations but in the past decade the largest run was only 9188 fish (DOWL 1979). The decline has been attributed to a combination of overfishing and changes in the lake. The unusually warm waters of the creek appear to enhance its spawning potential. Brownie Creek also supports a large Dolly Varden population and a much smaller number of silver salmon.

Silvers, reds, pinks and chums are all found in the Robe River.

The lake and marshes are utilized by numerous waterfowl and marsh nesting birds. Higher ground is heavily vegetated with deciduous-spruce forest or alder shrubs. In addition to the regular upland game birds and mammals there are several brown/grizzly bears who fish for salmon in the small streams flowing into the lake.

Year round recreation is provided by the lake and its environs. Robe Lake and River are fished for Dolly Varden. The salmon fishery was closed in the 1950's. Waterfowl are hunted in the fall. Boating and swimming are other popular activities. A boat ramp is located on the lake south of the Robe River.

To the west of the AMSA is the 150 home Robe River subdivision. There are also float plane bases on the west and southeast sides of the lake. Several homes are scattered around the lake.

A 1900 acre site was prepared for the now defunct Alaska Oil Company project. This has eliminated 800 acres of important upland habitat, part of which is located in the Robe River watershed.

The City of Valdez, Valdez Fisheries Development Association, the Alaskan Department of Environmental Conservation and Alaska Department of Fish and Game (Division of Sport Fish) have proposed a rehabilitation and enhancement project of the lake. The goal would be the reversal of the eutrophication process and thereby improve the lake's spawning/rearing and recreational characteristics.

Several residential projects have been proposed around the lake. A state-land disposal area for residential use is located on the east side. Local interest has been indicated in developing a float plane facility at Robe lake. Development is partially linked to the rehabilitation and deepening of Robe Lake.

Seismic hazard potential exists in this area that complicates land use decisions. Water saturated areas and wetlands are subject to liquefaction. A possible linement, 1 mile east of the lake, has potential for ground rupture if it is a fault. Five areas on the south side of the lake have been identified as avalanche areas and four areas identified for mass wasting.

4. Basis for Recommendation

The Robe Lake area is a highly valuable resource area for a number of different and possibly incompatible uses. The variety of existing and proposed uses will require careful consideration and planning to achieve optimum use.

5. Ownership and Management of the Area

Much of the land within this area is expected to remain state-owned Public Interest lands, managed for recreation/parks, fish and wildlife habitat and watershed. It is possible that more State Land Disposal may occur in the area east of Robe Lake, placing more land in private ownership.

6. Ownership and Management of Adjacent Areas

Privately owned rural residential land (southeast corner) city owned industrial lands (northwest) and unclassified state lands comprise adjacent areas.

7. Conflicts

More upland habitat may be lost with residential expansion. Future industrial development on city land has the potential to reduce ambient air quality and could possibly affect the water quality of the ground-water flowing into Robe Lake.

8. Management/Development Plan

Conditional Development criteria should be enforced until specific management and development plans can be formulated. Members of an AMSA management task force should include representatives of the Valdez Community Development Department; Valdez Fisheries Development Association; Alaska Departments of Environmental Conservation, Natural Resources

(Division of Parks and Division of Land and Water) and Fish and Game; and private land holders.

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KEYSTONE CANYON

1. Name - Keystone Canyon.

2. Location - Keystone Canyon is along the Lowe River between Miles 13 and 17 of the Richardson Highway. (Map 14b).

3. Description and Significance

The extremely narrow and steep-sided canyon has been cut by the Lowe River which drains an area of 346 square miles, 35 percent of which is glaciated. The nearly vertical walls attain heights of 800 feet on the east side and 450 feet on the west. The 500 foot Bridal Veil Falls and 100 foot Horsetail Falls are two of the waterfalls in the canyon.

In the Narrow river bottom the predominant vegetation is alder, with some cottonwoods in favored localities. Sitka spruce are present on the steep slopes to an elevation of 1500 feet. Dense thickets of alder and willow cover many of the slopes between 500 and 2500 feet. Mountain goats and brown/grizzly and black bears may be seen on occasion. No salmon spawn in the glacial river waters but Dolly Varden may be present seasonally when the waters are relatively clear.

The Richardson Highway, which runs through the canyon, is the sole overland transportation route connecting Valdez with the rest of the state. Past transportation use of the canyon has led to the identification of two historic sites, the Goat Trail and the "Railway Tunnel", by the Alaska Historical Resources Survey.

The trans-Alaska Military Road section on the side of Keystone Canyon was begun in 1898. In 1920 the Alaska Road Commission widened the old military trail and made it into a useable road. This section through Keystone Canyon is called the Goat Trail. The Goat Trail was abandoned in 1947 in favor of a new route along the bottom of the canyon.

In the early 1900's there were several attempts to build a railroad to the interior through Keystone Canyon. A shootout between rival companies occurred in 1907. A railroad was never completed and all that remains is the "Rail War Tunnel", constructed in 1906-1907, at Mile 15.

The canyon is also utilized heavily for recreation. Motorists view the spectacular scenery from the pullouts. White-water boaters enjoy the run through the canyon. Hiking along the Goat Trail is a popular activity as it affords good views of the canyon, waterfalls and the peaks and glaciers above. In winter a few enthusiasts enjoy ice-climbing. The scenic and recreational uses of the canyon have led to its inclusion in the proposed 310,00 acre Keystone Canyon State Park.

The canyon is also utilized as a utility corridor. The trans-Alaska pipeline runs along a bench above and on the east side of the canyon. The powerlines from the Solomon Gulch Hydropower project also run through the canyon.

4. Basis for Recommendation

Keystone Canyon's historical and scenic value and its importance for recreation, transportation and as a utility corridor recommend its nomination as a AMSA. With so many activities occurring in a limited area, special care will be needed to balance the various uses.

Particular concern has been raised over the potential conflict between the canyon's inclusion in the proposed state park and its use as a transportation corridor. The maintenance and upgrading of the highway in the canyon is essential to the economic livelihood of Valdez. At present no major work is needed on the highway. Minor needs include resurfacing, additional turnouts, and to enhance the recreational value of the canyon at turnouts, interpretive signs and some benches.

An additional transportation concern is that all traffic is stopped at Mile 15 when Thompson Pass is closed due to snow. This prevents access to Sheep Creek and many area residents would like the road block moved closer to Thompson Pass.

There are several hazards present in the canyon which will have to be considered in planning its future uses. The steep sides of the canyon present an avalanche hazard. Avalanche chutes and runout zones at several points in the canyon will continue to infrequently close the highway. The narrow canyon limits the effectiveness of deflection devices or the option of relocating the highway.

Mass wasting consisting of rock falls and debris slides occur infrequently. There is also a remote but potential flooding hazard from the release of glacier dammed lakes.

5. Ownership and Management of the Area

The Keystone Canyon area is classified State Public Interest Land for park and recreational use. The State's DOT/PF and the City of Valdez, Alyeska Pipeline Service Company and the Copper Valley Electric Association all have rights-of-way within the canyon.

6. Ownership and Management of the Adjacent Area

The area surrounding the canyon is also State Public Interest Land for parks and recreation.

7. Conflicts

Potential conflicts include the use of the canyon as a park and as a transportation corridor. The use of the canyon as a utility corridor may also conflict with its scenic values.

8. Management/Development Plan

Conditional development criteria should be enforced until specific management and development plans can be formulated. Members of an AMSA management task force should include representatives of the Community Development Department; the Alaska Departments of Natural Resources (Division of Parks and Division of Land and Water) Transportation/Public Facilities, and Commerce and Economic Development; and the State Pipeline Coordinators Office.

APPENDIX A
PUBLIC INVOLVEMENT

APPENDIX A

PUBLIC INVOLVEMENT

INTRODUCTION

The purpose of public involvement in the Valdez Coastal Management Program has been three-fold:

1. to provide information and to educate the public about the purpose and impact of the program; and

2. to provide opportunities for public input throughout the planning and decision-making process.

3. to utilize local knowledge in the program.

During the coastal management program, public involvement activities have been integrated into the overall planning process. It was recognized early in the process that a variety of "publics" exists. For that reason, a variety of techniques were used to obtain public involvement. In an effort to involve as many people as possible, for as long as possible in the program, four interrelated techniques were used:

1. advisory committees (Coastal Management Citizens Committee, and Planning and Zoning);

2. public meetings and workshops;

3. surveys; and

4. media contacts.

With all of the techniques a "reiterative" approach was used. That is, the Community Development Department staff took the responsibility of proposing "something" as a basis of discussion and debate, as well as for review and comment. Based on public input, draft documents were refined several times. Two important sections of the report were developed in this manner: issues, goals and objectives, and policies.

The rest of this section will highlight each of the four techniques used to obtain public input in Phase II of the City of Valdez Coastal Management Program.

ADVISORY COMMITTEES

Two advisory committees were utilized during preparation of the Phase I and II Coastal Management Programs to ensure consistent citizen input on the direction of the program.

The advantages of the advisory committee approach are the continuity of the committee throughout the planning process, the potential diversity available in one "working" group, and greater intensity of interaction with the process and its products. One of the disadvantages of this method of public involvement is that it tends to limit public input to those on the committee. This can be a problem if the committee members are not representative of broader community attitudes. In order to overcome the possible disadvantage of the select committee method of public involvement, the City of Valdez complemented its use of two advisory committees with three other public involvement techniques. These techniques are described later in this section.

During the Phase I Coastal Management Program, the City of Valdez established a Citizens Committee. The purpose of the Committee was to

"advise the Community Development Department on matters pertaining to the coastal zone management program. Specifically, the Committee would:

1. Provide input for the development of the detailed coastal zone management work program, within the framework of the general work program; and

2. Review and comment on the documents prepared for the coastal zone management program, prior to consideration by the City Council. The committee played a key role in the formulation of issues, goals, objectives, and policies.

The City of Valdez CZM Citizens Committee is composed primarily of individuals who represent major cross sections of the community. The individuals and the organization included a lawyer, engineer, real estate agent, oil terminal worker, law enforcement officer, marine biologist and insurance salesperson. The committee held six meetings that were open to the public during 1980. Eight meetings were conducted during the Phase I Program.

In addition to the CZM Citizens Committee, the City of Valdez used one other advisory committee, the Planning and Zoning Commission. The Planning and Zoning Commission was involved in the Valdez Coastal Management Program in a review capacity, and participated in one of the workshops.

PUBLIC MEETINGS AND WORKSHOPS

One of the techniques used to supplement the advisory committee method of obtaining public input was public meetings and workshops.

Two workshops/meetings were held during the second phase of the coastal management program. The first set of workshops occurred in July 1980. The main purpose of the first workshop was educational; to provide City residents with basic information about coastal management. In addi-

tion, the following topics were discussed at the workshop; The draft coastal management survey and draft issues, goals and objectives. The first workshop in Valdez was attended by 16 residents in addition to advisory committee members.

A second workshop occurred in September, 1980 but attendance was poor and the workshop was adjourned. Between October 1980 and January 1981, six citizens advisory committee meetings were held and usually attended by interested residents. Two public meetings were held during the Phase I program to review the resource inventory and coordinate with government agencies and regional interest groups.

With the exception of the first workshop, the workshops/meetings were more successful in obtaining input from committee members than from local residents. Further information on the workshops/meetings held by the City of Valdez as part of the coastal management program can be obtained from the Community Development Department.

SURVEYS

The City of Valdez used a public opinion survey to supplement the other public involvement techniques used in the coastal management program. The survey was prepared jointly by the Community Development Department, Woodward-Clyde Consultants, and Kramer and Associates. It was distributed to all boxholders at the U.S. Post Office in the City of Valdez.

This section will primarily summarize data obtained from the Valdez Caostal Management survey. Fourteen questions were prepared, addressing issues, industrial development hazards, resource protection, lifestyle, recreation activities, waterfront development, population growth, and residence. In September 1980, 1600 questionaries were distributed to post office box holders; pick-up boxes were placed in the post office, library, and other downtown locations. Over two weeks, 160 respon-

ses (a 10 percent sample) were received. Two-thirds of the responses came from new town residents, with three-fourths of the respondents living in Valdez six years or less.

Survey results are summarized by question below:

1. Coastal Management Issues

People identified resource protection (54 percent) as the most important issue. Economic productivity was the second most important issue (42 percent). Although people found all the issues important, they felt the impact of activities in Prince William Sound was considered the least important.

2. Industrial Preference

People preferred growth of the Port and fishing industries more than any other industry. The number of people supporting the two ran about 80 percent in both cases. People also supported tourism, recreation, shipyards and marine repair.

Support for petroleum related growth was split with 42 percent for, 38 percent against, and 20 percent ambivalent.

People felt growth in the timber industry and the mineral extraction industry was unimportant. The timber industry had only 14 percent support and the mineral extraction industry had 22 percent.

3. Geophysical Hazards

The only hazards people felt were important were earthquakes (56 percent) and tidal waves (53 percent). They felt riverine flooding and snow avalanche were generally unimportant, though not by overwhelming majority. Mass wasting and coastal storm flooding were considered relatively unimportant.

4. Resource Protection Concerns

Air quality was the number one resource protection concern with water quality second. About 90 percent of the people supported each of these as important concerns.

Fish and wildlife habitat and natural setting protection received 85 percent and 70 percent support, respectively, as important resource protection concerns.

5. Land Availability and Development Priorities

Seventy-two percent of the people felt it was important to make more residential land available for development.

Making recreational, commercial and open space available was important, but not the number one priority.

The support for making more industrial land available was split with 43 percent supporting it as important, 37 percent considering it unimportant, and 19 percent ambivalent.

6. Lifestyle Values

The most important lifestyle values were Valdez' natural setting (73 percent) and small town character. Other important aspects included its coastal location (64 percent), recreation opportunities (61 percent), employment opportunities (56 percent) and hunting and fishing (53 percent).

7. Land and Water Use Preferences Within Specific Geographic Areas

Keystone Canyon was the most popular choice as an historical resource, open space area, or natural area. Seventy-four percent of

the people felt that leaving it as a natural setting was an appropriate use. Thirty-six percent felt recreation was an appropriate use and 32 percent thought that it was an historical resource.

The Lowe River was the second most popular choice as a hunting and fishing area. People chose hunting and fishing, natural setting, and recreation as the most appropriate uses (in that order).

The uses selected as appropriate for the Robe Lake watershed were, in order; hunting and fishing, natural setting, wildlife habitat and residential. It was the third most frequently chosen residential area.

The Valdez Glacier Stream/Airport area was the most popular for gravel extraction and second most popular for industrial development. The uses chosen as most appropriate were, in order; industrial, gravel extraction, commercial, recreational and residential.

Zook subdivision was the most chosen residential and commercial area. Those uses and industrial use were the only ones felt appropriate by a majority of respondents.

Old Town was the most frequently chosen industrial area and second most chosen historical and commercial area. The uses most frequently chosen as appropriate were, in order; industrial, commercial, historical, and open space/hazards.

The Duck Flats was the most frequently chosen habitat area and least chosen residential area. The uses most frequently chosen as appropriate were, in order; wildlife habitat, natural setting, open space, hunting and fishing, and recreational.

Mineral Creek Canyon was the most popular recreational area. The uses most frequently chosen as appropriate were, in order; natural setting, recreational, historical, hunting and fishing, and wildlife habitat.

Uses for the Dayville Road area most frequently chosen as appropriate were, in order; industrial, natural setting, commercial, and hunting and fishing. These uses are generally incompatible and the number of people favoring these as appropriate is close; 27 percent, 24 percent, 21 percent, and 20 percent, respectively. This area was the third most frequently selected industrial area and eighth most chosen natural setting area. It was the fourth most popular residential area.

Port Valdez west of Alyeska Terminal was the area most frequently chosen as appropriate for hunting and fishing. The uses most chosen as appropriate were, in order; hunting and fishing, natural setting, recreational, and wildlife habitat.

8. Recreation Activity Preferences

Over half the people had high interest in fishing, salt water boating, and hiking.

Those recreational interests that over half the people had some interest or no interest in were camping, bike riding, hunting, cross country skiing, tennis, softball and canoeing/kayaking.

Those recreational interests over half the people had no interest in at all were downhill skiing (51 percent, no interest) and golf (70 percent, no interest).

Those write-in responses most frequently received were bowling and ice skating. Other responses received more than twice were, in order; snowmobiling, swimming, racquetball/handball, rollerskating, bird and wildlife watching, movie theater, photography, basketball, shooting and jogging.

9. Waterfront Priority

Those uses that over 50 percent of the people felt required a waterfront location were, in order; boat harbors and ferry docks, fish processing plants, open natural areas, fish hatcheries and parks.

Those uses that over 50 percent of the people felt a waterfront location was slightly to very important were, in order of importance; campgrounds and picnic areas, hotels and restaurants, cold storage, warehouses, roads and highways, private homes, parking lots, and timber processing.

Those uses that over 50 percent of the people felt a waterfront location was not at all important were; retail shops - 53 percent not at all important, and mobile home courts - 80 percent, not at all.

10. Future Problems

Air pollution was seen as the most important future problem (68 percent). Water pollution was the only other future problem that concerned more than 50 percent of the people (51 percent).

Other future problems seen as very to slightly important were, damage to natural areas, loss of scenic beauty, loss of hunting and fishing, loss of access to waterfront and inadequate recreation facilities.

11. Important Coastal Development Needs

All items listed were felt to be very important to Valdez by over 50 percent of the people. They were, in order of importance, increased ferry service, commercial boat harbor, more fish hatcheries, small boat harbor expansion, state land disposal, more recreational facilities and areas, and increased tourism (49 percent).

12. Population Growth Preferences

Eighty percent of the respondents favored population growth (over 4000 people). Thirty-four percent favored a population between 7,500-10,000, 24 percent between 5,000 and 7,500, 19 percent between 4,000 and 5,000 and 3 percent over 10,000.

13. Area of Residence

Sixty-seven percent of the respondents were living in the New Town area with the rest scattered fairly evenly throughout the other areas of town.

14. Length of Residence in Valdez

less than one year	11%
1-3 years	23%
4-6 years	31%
7-10 years	11%
10 or more years	24%

MEDIA CONTACTS

The fourth technique used to obtain public involvement in the City of Valdez Coastal Management Program was contact with local media. Notices of all the workshops and public meetings were published in the Valdez Vanguard. In addition, a story and editorial about the Valdez Coastal Management Program was published in the Vanguard during the Phase II program.

APPENDIX B
FEDERAL AND STATE REGULATIONS

APPENDIX B

FEDERAL AND STATE REGULATIONS

INTRODUCTION

Some policies of the Valdez Coastal Management Plan can be achieved through existing federal and state regulatory programs which are designed to protect water quality, wetlands, and anadromous fish streams. The primary controls applicable to the Valdez plan would be achieved through permit requirements of the River and Harbor Act of 1899, the Clean Water Act of 1977 as Amended, and through Alaska Statute 16, Alaska Department of Fish and Game. Numerous other Presidential Executive Orders, and federal and state policies, regulations, and agreements provide further controls and criteria for evaluating applications for these permits. The major state and federal controls which could affect location, construction or facility operation in the Valdez coastal zone are described briefly below.

FEDERAL CONTROLS

The River and Harbor Act of 1899 in Section 10 provides for the U.S. Army Corps of Engineers (COE) to regulate:

- o construction of structures or work in or affecting navigable waters of the U.S.;
- o excavation of materials or accomplishment of other work in or affecting such waters.

Activities requiring Section 10 permits also require:

- o a statement of consistency with the Alaska Coastal Zone Management Program;

- o certain activities also require Water Quality Certification by the ADEC under Section 401 of the Clean Water Act.

The COE conducts public interest reviews which consider the following factors before issuing a Section 10 permit: navigability, fish and wildlife, conservation, pollution, aesthetics, ecology, the general public interest, energy needs, economics, safety, historic values, food production, flood damage prevention, land use classification, water supply, and water quality.

Section 404 of the Clean Water Act requires:

- o the U.S. Army Corps of Engineers to regulate the discharge of dredge or fill material into the waters of the United States;

- o the administrator of EPA to have further authority, subject to certain procedures, to restrict or prohibit the discharge of dredge or fill material that may cause an unacceptable adverse effect on municipal water supplies, shellfish beds, fishery areas, wildlife areas or recreation areas;

- o certification of consistency with the state Coastal Zone Management Program;

- o a Certificate of Reasonable Assurance from the ADEC stating that the proposed activity complies with Section 401 of the Clean Water Act, which includes compliance with the Alaska Water Quality Standards (18 AAC 70).

This jurisdiction extends over wetlands. Permit applications are reviewed using the same guidelines described for a Section 10 permit above.

Section 402 of the Clean Water Act requires:

- a National Pollutant Discharge Elimination System permit from the EPA by the operator of any activity or wastewater system which discharges into a waterway;

- certification of consistency with the state Coastal Zone Management Program;

- a Certificate of Reasonable Assurance from the ADEC stating that the proposed activity complies with Section 401 of the Clean Water Act, which includes compliance with the Alaska Water Quality Standards (18 AAC 70).

For the purpose of the NPDES program, pollutants include dredge spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, celler dirt, and industrial, municipal and agricultural waste discharged into water.

The National Environmental Policy Act (NEPA) of 1969 as Amended:

- declares it is the national policy to encourage a productive and enjoyable harmony between man and his environment;

- establishes six goals toward that end;

- establishes in Section 102 (c) the requirement for an Environmental Impact Statement to be included in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the environment.

Briefly, the six goals of NEPA which should guide all federal actions or decisions are:

- o to fulfill the responsibilities of each generation as trustee of the environment;
- o assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- o attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable or unintended consequences;
- o preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports a diversity and variety of individual choice;
- o achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities;
- o enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Executive Order 11988 Floodplain Management establishes overall objectives:

- o to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains;
- o to avoid direct and indirect support of floodplain development wherever there is a practicable alternative;

- o creates general requirements for all federal agencies to follow in conducting activities in floodplains, regardless of land ownership;

- o requires federal agencies which guarantee, approve, regulate or insure any financial transaction related to a floodplain area to notify private parties involved that the property is located in a floodplain; the notice must explain chances of being flooded, requirements for flood insurance, and include a statement that the transaction may be subject to floodplain regulations.

Actions by federal agencies which are subject to the provisions of the Order include the management, acquisition, or disposal of federal lands and facilities; financing or assisting in construction and improvement; and conducting activities and programs including planning, regulating and licensing. Floodplain Management Guidelines appear in 43 CFR 6030. Agencies are required to use the best available information to determine whether an activity is located in a floodplain. In the case of Valdez, the Valdez Coastal Management Program coastal flood zone and river floodplain maps should be utilized for determinations. If an activity is determined to be located in a floodplain, the agency involved is required to make the earliest possible public notice and provide for "continuing communication" during the planning, impact assessment and alternative selection stages of the activity. When a decision to proceed with floodplain development is made, a notice of findings and explanation must be made public. State agencies receiving federal funds for a project may also be required to satisfy these notice requirements.

Executive Order 11990 Protection of Wetlands mandates all federal agencies to take certain actions:

- o to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands;

- to avoid direct or indirect support of new construction in wetlands whenever there is a practicable alternative.

When leasing or granting easements or rights-of-way or otherwise disposing of federally owned wetlands, a federal agency is required:

- to reference in the conveyance any uses that are restricted under federal, state and local wetland regulations;

- to attach appropriate restrictions to use of the land.

This Order applies only to federally owned or controlled wetlands. State agencies using federal funds may be responsible for meeting requirements of EO 11990.

Section 311 of the Clean Water Act addresses oil spills, and creates the requirement for Spill Prevention, Containment and Countermeasure Plans to be developed by owners and operators of major onshore non-transportation related oil storage facilities.

The Coastal Zone Management Act of 1972 as Amended in Section 307(c) requires federal agencies conducting activities which could directly affect the coastal zone to comply, to the maximum extent practicable, with an approved state coastal zone management program. Non-federal applicants for federal licenses or permits are required to submit certification that the proposed activity will comply with the state's program.

The Fish and Wildlife Coordination Act requires any federal agency which proposes to control or modify a body of water to first consult with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, as appropriate, and the head of the state agency exercising control over the wildlife resources.

The National Historic Preservation Act of 1966 authorizes an Advisory Council on Historic Preservation to review and comment upon

any activities licensed by the federal government which would have an effect upon properties listed in or eligible for listing in the National Register of Historic Places.

The Endangered Species Act of 1973 requires federal agencies to use their authorities to carry out programs for the conservation of endangered or threatened species, and to insure that any authorized action does not jeopardize the continued existence of such endangered or threatened species or result in destruction or modification of its habitat.

The Marine Mammal Protection Act of 1972 expresses the intent of Congress that marine mammals be protected and encouraged to develop in order to maintain the health and stability of the marine ecosystem.

Other federal controls which could affect the operation of an industrial facility in the Valdez coastal zone include the Safe Drinking Water Act, the Marine Protection, Research & Sanctuaries Act of 1972 as Amended, the Resource Conservation and Recovery Act, and Toxic Substances Control Act.

STATE CONTROLS

The primary state controls over development in the Valdez coastal zone would be exercised by the Alaska Department of Fish and Game (ADF&G), the Alaska Department of Environmental Conservation (ADEC) and the Alaska Department of Natural Resources (ADNR).

Alaska Statute 16 provides for the ADF&G to authorize plans and specifications for any construction that may affect anadromous fish streams of the state, and also requires that fish passage be provided.

Alaska Water Quality Standards, identified in 18 AAC 70, are used by the ADEC in certifying NPDES permits to the EPA, according to

provisions of Section 401 of the Federal Water Pollution Control Act Amendments of 1972 as modified by the Clean Water Act of 1977.

Wastewater disposal regulations (18 AAC 72) provide means for implementing Alaska Water Quality Standards, by establishing a requirement for a waste disposal permit from the ADEC in order to conduct an operation which results in the disposal of wastewater into or upon the waters of the state or surface land. "Wastewater" means sewage, waterborne industrial waste, laundry liquid effluent, shower or sink water, or other wastes which are waterborne and in a liquid state.

Water Appropriation Permit (11 AAC 72) establishes the requirement for a permit to appropriate water, which is issued by the ADNR, prior to the diversion, impoundment, or withdrawal of unappropriated waters on state, federal or private lands. Use of the water must be for the benefit of the appropriator, other persons or the public, and must be reasonable and consistent with public interest [AS 46.15.260(3)]. Eight factors are considered in determining whether an appropriation is in the public interest: benefit to the applicant resulting from the appropriation; the effect of economic activity resulting from the appropriation; the effect on fish and game resources and public recreational opportunities; the effect on public health; the effect of loss of alternate uses of the water; the harm to other persons; the intent and ability of the applicant to complete the appropriation; and the effect upon access to navigable or public waters.

Public notice of water permit applications must be given in a general circulation newspaper, and by service upon other appropriators who may be affected. The ADNR also may conduct hearings.

Alaska Historic Preservation Act of 1971 establishes the state policy to protect and preserve historic and prehistoric sites and objects, and provides for public access to the results of any archaeologic findings or investigations. The ADNR also can exercise controls over

some development through stipulations attached to rights-of-way or easements across state land; Miscellaneous or Special Land Use Permits for activities on state land; and Land or Tideland leases.

APPENDIX C
PROPOSED AMENDMENTS TO THE VALDEZ ZONING ORDINANCE

APPENDIX C

PROPOSED AMENDMENTS TO THE VALDEZ ZONING ORDINANCE

The following changes are recommended in the Valdez Zoning Ordinance to implement the following policies of the Valdez Coastal Management Program:

GENERAL POLICIES

Land and Water Activities

Policy: 1. WATERFRONT DEPENDENT/WATER RELATED USES

Only waterfront dependent activites or uses as defined in this plan will receive priority for waterfront areas. Uses that are neither waterfront dependent nor waterfront related will be considered in shoreline areas only when inland sites are not available.

This policy can be implemented through a combination of means utilizing the Zoning Ordinance and the zoning map. First, to a large extent this policy can be implemented by the existence of the W-C and W-I zones in the Zoning Ordinance (Sections 30.04.110 and 30.04.120). These zoning districts emphasize uses that require a location along the waterfront. The following amendments to the Zoning Ordinance are recommended:

30.02.934 Use, Waterfront Related

A use of land and/or buildings that benefits from a location on or adjacent to the waterfront. Such uses need not be totally dependent upon the waterfront, but their operations and efficiency are enhanced by proximity to the waterfront.

30.02.936 Use, Waterfront Dependent

A use of land and/or buildings that has a primary function of provision of goods and/or services to the waterfront and its users. Location on or near the waterfront is essential for the efficient operation of these uses.

30.40.120A

Change Water Related to Waterfront Related.

30.04.110A

Change Water Related to Waterfront Related. Change Water Dependent to Waterfront Dependent.

These changes will make the Zoning Ordinances cognizant of the definition of waterfront related and dependent uses. It is important that the same definitions and terminology be used in the Coastal Management Program.

Consistency and Coordination

Policy: 1. The City of Valdez shall minimize regulations by using zoning, subdivision, and floodplain ordinances and building codes, and by drafting Memoranda of Understanding between the city and other governmental agencies.

A definition of the Coastal Zone should be included in the Zoning Ordinance. This will assure that the Ordinance as applied to the Coastal Zone is specific and consistent with the Coastal Management Plan. The most effective way to accomplish this would be to reference the Coastal Zone as defined in the Valdez Coastal Management Program:

30.02.205 Coastal Zone

The area governed by and/or described in the Valdez Coastal Management Program

as adopted by the Alaska Coastal Policy Council.

This simple amendment will allow the use of the term "Coastal Zone" within the Zoning Ordinance and by the Planning Commission and City Council in their decisions on zoning matters without creating confusion or uncertainty.

SPECIFIC USE POLICIES

Industrial Development

Policy: 1. OPTIMUM LOCATION

> The City of Valdez shall assist with the identification of suitable sites for industrial development which satisfy industrial requirements, meet safety standards, protect fish and wildlife resources, and maintain environmental quality.

Under Policy No. 1 concerning optimum location of industrial development, language should be included within the intent section of the appropriate zoning district to ensure that the area set aside for the use of those districts "meet safety standards, protect fish and wildlife resources and maintain environmental quality." This can be done with the following amendment:

> 30.04120 A Intent
>
> The WI district is intended to be applied to lands with direct access or close proximity to navigable tidal waters that can be developed with the listed industrial uses while still meeting safety, environmental, and fish and wildlife protection standards set forth by applicable state, federal, and local governing agencies.

The same type of wording should be added to the Intent section of the HI and LI zoning districts. This wording simply allows the Planning Commission to make decisions based upon the satisfaction of the indicated standards. It also strengthens the position of the Planning Commission and City Council in applying such standards to conditional use applications.

Policy: 6. BUFFER ZONES

Buffer zones are desirable between industrial areas and major public transportation routes, and between industrial development and adjacent non-industrial properties.

This can be accomplished with an amendment to the Conditional Use Section of the Zoning Ordinance relating to submission requirements. The following section should be added to the Zoning Ordinance:

30.06.020

When proposed industrial or commercial use abbutts a non-residential zone the treatment of the common boundary of those areas should be described in the application materials along with measures designed to mitigate any adverse impacts that could be caused by the proposed conditional use. Such measures may include, but are not limited to, upper zones, landscaping, setbacks, fences, earthen berms, and project orientation.

This amendment would put applicants on notice that there is concern for the interface of industrial and non-industrial uses, and that specific attention should be paid where those areas will affect each other.

Recreation, Tourism, and Natural Setting

Policy: 3. Since shorelines with a high recreation value are limited and the long-term demand is unlimited, facilities for water-dependent or water-oriented recreation shall be located near the shoreline, while non-water-related recreation facilities should be located inland.

The Waterfront Commercial zone already allows for waterfront parks, access paths and boardwalks. By including the same allowance in the Waterfront Industrial zone the opportunities for waterfront recreation facilities in areas that are uniquely suited for such facilities would be expanded. Consequently, the following amendment should be made to the Zoning Ordinance:

30.04.120D Conditional Uses

Waterfront parks, access paths and boardwalks.

Fisheries and Seafood Processing

Policy: 4. OPTIMUM RESOURCE USE

Maintenance and enhancement of fisheries should be given high consideration in reviewing shoreline use proposals which might adversely impact important fisheries habitat, migratory routes, and harvest of significant fish.

Policy: 5. INDUSTRIAL DEVELOPMENT

Development which has an adverse impact on fisheries and wildlife shall mitigate these impacts.

Policies No. 4 and 5 under Fisheries and Seafood Processing, indicate

a need to maintain and protect fisheries and fishing related shoreline resources. The appropriate way to do that would be through the Conditional Use Section of the Zoning Ordinance. Specific wording should be added to the Ordinance as follows:

30.06.020G

Impact on fisheries and wildlife habitat within the Coastal Zone, where applicable including the mitigation measures proposed to reduce the impact if necessary.

This wording puts the burden of proof on the applicant to determine if such impact is occurring and, if so, that appropriate mitigating measures are to be taken.

DEVELOPMENT CLASSIFICATION POLICIES

Conditional Development Areas

Policy: 1. Conditional development areas where coastal development may be subject to constraints created by biological resource needs, geophysical hazards, coastal habitat, land ownership, adjacent land use, coastal access, and air/water quality, shall be identified and periodically reviewed by the Community Development Department.

Policy: 2. Activities and development within conditional development areas shall be subject to approval by the Community Development Department and with appropriate state and federal agencies.

Development Areas

Policy: 1. Development areas shall be established with the Valdez Coastal Management District where economic and coastal

development objectives are not subject to constraints created by geophysical hazards, biological resources, coastal habitat, recreation, land ownership, coastal access, and air/water quality concerns.

In some areas, because of their sensitivity, all uses would be subject to the requirements of a Conditional Use Permit. Those areas would be shown on the zoning map with an overlay pattern. The following amendments would have to be made to the Zoning Ordinance:

30.02.255 Conditional Development Area

An area within any zone that, because of the sensitivity of the land and its relationship to surrounding areas, is deemed to require special planning attention. Within Conditional Development Areas all permitted uses will be reviewed in accordance with the Conditional Use Permit procedures set forth in Chapter 30.06 of this title. Conditional Development Areas will be depicted on the zoning map by a cross hatch pattern overlaying the underlying zoning.

Add the following section:

30.03.010 Conditional Development Areas

The two amendments above would provide a definition of Conditional Development Areas and would include them in the chapter creating the districts within the Zoning Ordinance. Implementation of the Conditional Development Areas would be accomplished by including the following sentence within the following sections of the Ordinance:

Conditional Development Areas subject to the provisions of Chapter 30.06 of this title would be included within the following sections of the Zoning Ordi-

nance:

30.04.010D22
30.04.020D5
30.04.030D5
30.04.040D10
30.04.050D5
30.04.060D7
30.04.070D3
30.04.080D6
30.04.090D3
30.04.100D2
30.04.110D2
30.04.120D2
30.04.130D9
30.04.140D13

By adding the above phrase to these sections, any potential land user is put on notice that if his land is under the cross hatch pattern indicating Conditional Development Areas, he will have to go through the Conditional Use Permit process. As further clarification the following sentence should be added in the Conditional Use Regulations:

Under Section 30.06.010 Purpose, add a new sentence between the second and third sentence in the paragraph: "In areas identified as conditional development areas on the zoning map, any land uses within the areas designated conditional development areas would be subject to the provisions of the Conditional Use Permits."

With this sentence the conditional development areas are added to the purpose of the Conditional Use Permits and are given added importance.

APPENDIX D
PROJECT TEAM

APPENDIX D

PROJECT TEAM

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