Federal-State
Land Use Planning Commission
For Alaska

Dear Reader:

Preservation of Alaska's primitive land is important to society for a variety of reasons: Wildlands are used for recreation; they are needed by living cultures and contain the archeologic record of past peoples. Alaska's undeveloped areas are our nations last extensive wilderness. And they support ecosystems including their wildlife, which have been fragmented or lost in other states. The Commission has delineated these values in a number of studies so that an adequate and representative system of the states natural lands can be set aside for present and future generations.

Landscape values are an equally important aspect of the natural setting. But until now the visual and aesthetic qualitites of the Alaska environment have not received the same attention as such other factors as Recreation, Culture and History, Wilderness, and Ecosystems. Landscape has been neglected as a primary value of natural lands because it has not been sufficiently described, quantified, and categorized. It has been the province of the artist, not the scientist, and perhaps rightly so.

But Alaska is changing, and if the state's diverse natural landscapes are to survive, efforts for their protection must be undertaken now. Visual and aesthetic values should be given full weight in the establishment of Federal and State parks and other preserves. Furthermore, the vulnerability of various landscapes to disruption can be a consideration in the creation of land use plans and development guidelines throughout the state.

We believe therefore, that "Alaska Natural Landscapes" fills a major gap in the studies that have been completed by the commission and by others in recent years.

Sincerely,

Esther C. Wunnicke
Federal Co-Chairman

Sincerely,

Walter B. Parker
State Co-Chairman

733 W. FOURTH AVENUE, SUITE 400
ANCHORAGE, ALASKA 99501

ALASKA NATURAL LANDSCAPES

By
Richard J. Gordon
and
Benjamin A. Shaine

Illustrations by
Ayse Gilbert

Joint Federal-State Land Use Planning Commission
for Alaska

May, 1978

CONTENTS

INTRODUCTION

Because it is not usually quantified and categorized, landscape is seldom given weight in resource development and land use decisions. Yet the visual aspects of the natural environment are important to people, particularly in the diverse and spectacular setting of Alaska. The purpose of this study is to describe the landscapes of Alaska so that their value can be more clearly understood. We identify characteristic Alaska landscapes and describe outstanding or representative areas that illustrate each landscape type. In addition, we map those areas where we have found a combination of superlative landscape qualities of statewide significance.

This work is preliminary because it covers a subject on which little has been published in Alaska and which deserves considerably more attention than we were able to give in a brief time. Consensus on issues of landscape aesthetics requires much discussion among not only professionals, but people from many backgrounds. We hope that this study can be used as a starting point for such discussions, which will refine, criticize, and alter our findings.

A landscape inventory can be the basis for further work listing the vulnerabilities and strengths of the various landscape types for development. It can be used in the creation of landscape protection policies and regulations. Policy makers may wish to attach special value to the undisturbed character of Alaska landscapes by creating a statewide system protecting outstanding representatives of the various landscape types. This study can be used as one tool in developing such a system.

Landscape is defined here as including the aesthetic and visual aspects of land as experienced by people. The analysis involves two tasks:

- First, identification of areas with describable visual character: areas of clearly interrelated, uniform visual characteristics. These areas can be said to have a specified "visual character type," using Bureau of Land Management and U.S. Forest Service terminology. These two agencies are now beginning to map landscape units in limited parts of the state. Our analysis lists the kinds of landscape units found in Alaska and maps them over the entire state.

- Second, description of the superlative landscapes of Alaska. These superlative landscapes are of two kinds: Visual units of a single character type which stand out from a statewide perspective on specified criteria; and scenic complexes, where a diversity of outstanding visual units are in proximity.

DEFINITIONS OF SOME TERMS USED IN THIS STUDY

Visual Character Type: The overall appearance of the land. An area of a single visual character type is a area of clearly interrelated, uniform or consistently similar visual characteristics. This term is used by the Bureau of Land Management and U.S. Forest Service.

Viewshed: The area that can be seen from a given location.

Visual Unit: An area of land encompassing a viewshed or set of closely related viewsheds, or which is visually very homogeneous and relatively small in extent, or which has a strong visual focus on one central feature, or which is a usually unified and internally related unit although diverse in character.

Sequence: The tendency of the land to channel and encourage human travel along given routes. Landform tends to dictate peoples' patterns of movement and thus the location from which they see the landscape, and the sequence of their perceptions. Navigable rivers, interconnected lake systems, saltwater passages, coasts, and valleys-and-passes are examples of natural features that tend to pattern the sequence of human movement. Roads, railroads, and often light aircraft usually follow these same features. In this study, we consider only the sequences encouraged by the geography of natural features, rather than roads that happen to be in existence today.

Scenic Complex: A landscape of diverse, striking, or distinctively representational visual characteristics in contiguous areas. Usually a scenic complex consists of several visual units representing more than one visual character type, which may be experienced together. Viewsheds from key observation points can cover diverse landscape character types and unify a scenic complex. Sequence is also a factor unifying areas into a scenic complex.

Special Place: An area of unique or striking visual characteristics. Special places are often formed by enclosures, such as canyons and valleys. They may derive their special character from the presence of a particular peak, wall or gorge, waterform or other individual feature, or from especially interesting viewpoints. Generally, special places are smaller in extent than visual units. They can make a landscape distinctive and thus are important in identifying outstanding landscapes and scenic complexes. They tend also to be areas for which at least some people have developed a special feeling. They may also represent significant cultural or historical values, as do several special places we have mapped. To an extent, the concept goes beyond a strictly visual analysis of the landscape. Nonetheless, it is worth introducing and illustrating. (1)

4. The Commission's ecosystems (vegetative type) map of Alaska, as an indicator of ecosystems and ecotones, (6) boundaries of which were used whenever possible in defining physiographic divisions and smaller units.

5. A list and map of Alaska's natural features developed by an interagency workshop conducted by the Commission and the Department of the Interior, locating features which are the focus of many landscape units. (7)

6. Stenmark's mapping and evaluation of scenic quality in the Commission's Resources Inventory of Alaska (8) as well as other scenic resource identification maps (9, 10) prepared by Stenmark and others.

7. Existing BLM landscape mapping for the National Petroleum Reserve-Alaska and Forty-Mile areas, and the Forest Service mapping of the Chugach and Tongass National Forests.

We borrowed freely from all of these sources and modified as seemed appropriate. Wahrhaftig's physiographic map was our most important tool for dividing the state into landscape regions and into units of specific visual character.

All three maps included in this study show a regionalization of Alaska based primarily on large-scale relationships of landforms and relief and secondarily on similarities of texture and color. Two primary determinants of texture and color are geologic structure and vegetation, the latter primarily a function of climate.

We consider the three major vegetative types in Alaska--tundra, boreal ("northwoods") forest, and coastal (rain) forest to present strikingly distinctive visual appearances, as also does high brush where it dominates. Accordingly, we have modified traditional regional physiographic boundaries to reflect locations of regional interfaces of these vegetative types in all cases. In many cases, physiographic boundaries are formed by distinctive features such as ridgelines or mountain fronts, which also can be used to separate the major vegetative types. In other cases, either physiographic or vegetative aspects or both are transitional over broad expanses, making it feasible to use approximate vegetation boundaries without doing violence to physiographic breaks. (In such cases, the transitional landscape itself may be delineated as a distinct visual character type, extending on both sides of the physiographic division boundary.) The result is a single set of regional divisions and selected subdivisions which effectively delineate the regional visual similarities and differences within Alaska.

1. To include outstanding landscapes throughout the state based upon each of the listed criteria.

2. To identify the widest possible range of landscape types. Each unit was selected on its individual merits, however--not merely as a representative example of a type.

3. To include as visual units the most visually striking places in Alaska. In regions where striking scenery abounds, however, only a limited number of visual units are delineated, which may represent only outstanding examples of such landscape types, rather than a complete cataloging of them.

4. To encompass as scenic complexes some larger areas, which may be comprised either of a grouping of outstanding visual units, or of a region of sufficient overall diversity or quality to be outstanding as a whole. Scenic complexes are not generally intended to include all visual or physiographic aspects of a particular geographic area. Included are only those portions which are required to exemplify the qualities for which the area has been selected.

7. Visual appearance of terrain apparently affected only by natural forces--i.e., not visibly altered by human activities.

8. Large scale or striking evidence of wildlife. Migration routes of wildlife, coastal bird and mammal colonies, gathering areas for caribou, natural salt licks, and similar places are of special interest, often periodically or seasonally.*

---

* This study concerns itself strictly with discernable visual characteristics. We wish to point out, however, that visual experiences may also have a social, intellectual, emotional, or spiritual impact upon the viewer in at least the following ways:

1. Landscapes focused on distinctive particular features often assume social or symbolic significance. For example, because Denali is the highest peak on the continent, it is the center of a landscape of considerable social importance as a symbol of Alaska.
2. The experience of viewing landscapes known to be unaltered by people may provide a spiritual satisfaction. The rememberance or even thought of such views may do the same.
3. The visual evidence of, or merely the knowledge of, human presence in the past may give an additional depth to the visual experience.
4. The contemplation and understanding of the processes by which landscapes have been produced, and are still being altered, may increase satisfaction from directly perceived vistas.

3. Pavlof Volcano from surrounding valleys and hills on the lower Alaska Peninsula, or from the seas far to the north or south. (From a much smaller perspective, Aniakchak Caldera is seen to be a miniature enclosed world from the point of view of the observer within.)

4. Denali looming far above its Alaska Range neighbors across Wonder Lake, from the Kantishna Hills, or from many other close and distant viewing points.

5. Chitistone-Nizina Canyons with their stratified light-colored enclosing walls, dominating all views except for slot-like vistas of the mountains beyond.

6. The lone Pinnacle of Mount Saint Elias rising far above the glaciers which extend upward from Icy Bay.

7. Series of round, smooth, evenly-trending ridges, with their narrow intervening valleys, seeming to roll like waves to the horizon, such as the Nulato Hills in the Andreafsky watershed.

8. The unity and austere grandeur of the winding Tracy Arm fiord, with smooth near-vertical rock walls and a narrow swath of saltwater flooring the immense defile.

Significant features and special places

Many of the visual units, especially in mountain and coastal regions, possess striking features. See discussion of Special Places, which illustrates how such features can create a powerful visual image.

Outstanding sequences

1. The float down the Kisaralik River from a cirque in the Tikchik Mountains, across rolling tundra uplands, through raptor-inhabited canyons cutting through the Kilbuck Mountains, then along narrow channels beside innumerable ponds where ducks and swans nest, into the Kuskokwim Delta.

2. The traverse, via large lakes, short connecting streams, and portages through the Tikchik and Wood River lakes system, with wooded plains on one side and glacier-carved mountains on the other.

3. The Chitistone Pass traverse from the semi-arid White River basin, beside large glaciers and through deep Chitistone Canyon, into the expansive, mountain-flanked, alder-covered Chitina Valley.

4. Float travel down the enormous Copper River canyon, from interior birch woods, down a wide steep-walled defile cutting through the high coastal mountains, past calving glaciers, and into flats rich in waterbirds and rimmed by coastal rain forest.

3. Lower Koyukuk River constantly cutting snake-like curves in one place, yet slicing across such curves in another, leaving visible traces in an expansive pattern of oxbows and meander lakes.

4. Upper Chitina Valley, where slides and other mass-wasting constantly occur along the rimming mountains, and where the river deposits silt and gravel over its mile-wide bed, yet with its main current in places cutting into forested valley sides beyond its bed's previous edge.

5. On the Copper River Delta, the large amount of annual outbuilding, as well as the continuing rearrangement of the ocean-bordering spits by longshore currents.

6. Hubbard Glacier calving steadily into Disenchantment Bay, yet seeming to advance inexorably toward a blockage of tributary Russell Fiord.

7. Muir Inlet in Glacier Bay, where the bay-head glacier is receding hundreds of yards annually as it has been for centuries, with the various successional stages of returning vegetation visible in sequence down the bay.

Terrain appearing unaltered

Virtually all of the units visually appear to have been affected almost solely by natural forces, although the rate of human-caused change in this situation is accelerating.

Striking evidence of wildlife

1. The annual post-calving concentrations of the Porcupine Caribou Herd in favored Arctic lowland valleys in the northern Arctic Wildlife Range from the Canning to the Kongakut Rivers.

2. Migrating concentrations of caribou through key passes in the Brooks Range such as Howard Pass connecting the Arctic foothills with the Noatak, accompanied by their predators such as the wolf.

3. Large numbers of ducks, geese, swans, and cranes in fall flight, concentrated in favored lakes and wet meadows on the Yukon Flats.

4. Moose concentrations in winter within sheltered willow-rich river bottoms such as along the Koyukuk.

5. High sea cliffs such as the Fox Castles on St. George Island of the Pribilofs, where apparently over a million seabirds swarm and nest annually, as well as large harems of fur seals on the adjacent bouldery coastlines.

ALASKA LANDSCAPE CHARACTER TYPES

An area of a particular visual character type, as shown on Map 1, is a contiguous unit of clearly interrelated, uniform, or consistently similar visual characteristics. Areas are of the same character type if (1) they are located in the same physiographic division of Alaska, (2) they have the same degree of relief, and (3) they have the same landform. The variables of location, relief, and landform are described as follows:

Location

These physiographic divisions are delineated strictly on the basis of visual characteristics. They are adapted from the work of Wahrhaftig, Stenmark, and the Land Use Planning Commission ecosystems map. The small inset map of Physiographic Divisions on Map 1 shows only the more prominent divisions listed below.

I. Tundra Lowlands (predominant vegetation: tundra)
    - Arctic
        - Foothills
        - Lowlands
    - Western
        - Uplands
        - Lowlands
        - Islands

II. Brooks Range
    - North Slope (predominant vegetation: tundra)
    - South Slope (predominant vegetation: boreal forest)

III. Interior (predominant vegetation: boreal forest)
    - Highlands
        - Eastern
        - Western
        - Southwestern
    - Lowlands
        - Interior
        - Coastal influence

IV. Aleutian Range (predominant vegetation: high brush, tundra)
    - Alaska Peninsula (including Unimak Island)
    - Aleutian Islands

V. Pacific Mountain System (predominant vegetation: boreal forest)
    - Alaska Range (includes Talkeetna Mountains)
    - Wrangell Mountains
    - Coastal Ranges - north slopes
    - Cook Inlet (upper portion)

VI. Gulf of Alaska Coast (predominant vegetation: coastal forest)
    - Northern Gulf
        - Mainland
        - Islands
    - Southeast Alaska
        - Mainland
        - Islands

Sedimentary (depositional) mountains.

- S Mountains of sedimentary rocks, in some cases lightly metamorphosed.
- Sv Valleys and troughs exceptionally wide, in above type.
- Sr Ruggedly glacier-carved sedimentary mountains.
- Se Ruggedly eroded sedimentary mountains, predominantly limestone.

Volcanic mountains or lava flows, of single type or with other types of mountains.

- V Volcanoes and lava flows.
- Vo Irregular volcanic islands or uplands with outcrops.
- Vi Volcanoes with igneous intrusive mountains.
- Vs Volcanoes with sedimentary and layered metamorphic mountains.

Glacial

- G Glacier and icefield dominated environments.

River-shaped topography and riparian zones.

- R River dominated environments.

Coastal landscapes. Note that only selected types of coastlines and coastal landscapes which are particularly distinctive have been delineated. Others are considered to be merely the edges of the types of landscapes adjacent to them, for the purposes of this study.

- Cm Coastal marshes, spits, and low islands.
- Cb Beach and forest coast.
- Ci Bay and inlet coast.
- Cs Bay and inlet to fiord coast set into banded sedimentary rocks, in many cases mixed with volcanic rocks.
- Cf Fiord coast.
- Cg Fiord coast set into sheer granite (Ig) mountains.

3. Lower mountains and hills.
   - Eo Relatively flat to mountainous land with rugged erosional exposures, either predominately along rivers and bluffs, or as strikingly eroded features in otherwise gentle mountains.
   - Eb Badlands - major dissection of poorly consolidated deposits.
   - M Rounded ranges of hills, often extensive regular formations reaching to the horizon, in some cases surmounted by localized clusters of the character described in (S).
   - S Ranges in sedimentary rocks, some partially metamorphosed, layering or bedding visible in many cases, frequently contorted.
   - Mw Bedrock significantly dissected by flowing water.
   - Mt Ridges with sloping trend in elevation.
   - Ms Ranges of mountains widely spaced on gentle uplands.
   - I Bedrock predominantly shaped by glaciation.
   - V Volcanoes or stratified bedrock within which volcanic evidence predominates.
   - R Major river bottoms cutting through low mountains or hills.
   - Ci Bay and inlet coast set into low mountains, in many cases on islands.
   - Cf Fiord coast set into low mountains, in many cases on islands.
   - Cb Coast with beaches and forest, spits, barrier islands, estuaries and deltas, with interspersed glacier-carved crystalline mountains.
   - Cs Bay and inlet coast set into low mountains, showing banding and layering of cliffs and slopes, in many cases mixed with volcanic rocks or mountains.

4. Higher mountains.
   - Em Mesa and canyon areas, featuring relatively flat summits, plateaus, and dissected canyons.
   - M Generally rounded mountains, often with narrow steep-sided valleys, primarily affected by forces of erosion by moving water, permafrost, and freezing and thawing; erosional outcrops may be present. Local effects of glaciation may be conspicuous, particularly on north facing slopes.
   - I Ranges in softer crystalline or volcanic rocks, usually heavily glacier-carved, with glaciers remaining locally, in many cases penetrated by traversible valleys and passes.
   - Ir Very rugged ranges, heavily glaciated, with sharp ridges and peaks, snowfields, and valley glaciers.
   - Ig Ranges in massive resistant cliff-forming rock, heavily glacier-carved, with glaciers remaining locally or more extensively, with faces and walls common,; generally granitic. Massifs of smooth exfoliated walls and glacial-rounded domes an important subtype.
   - S Ranges in sedimentary rocks, usually heavily glacier-carved, with some glaciers remaining locally, in many cases penetrated by traversible valleys and passes. Layering or bedding visible in many cases, frequently contorted.
   - Sv Similar to (S) except very wide flat-bottomed, generally steep-walled valleys, gaps, and troughs separating the mountains, some at relatively high elevations.

DISTRIBUTION OF ALASKA LANDSCAPE CHARACTER TYPES

This table combines all three variables used to define landscape character type: location, relief, and landform. Categories of relief are: (1) plains and lowlands; (2) gentle uplands; (3) lower mountains and hills; (4) higher mountains; (5) very high mountains. Landform categories are described beginning on page 16.

	Location by Region					
Landform Type	Tundra Lowlands	Brooks Range	Interior	Aleutian Range	Pacific Mountains	Gulf Coast
F	1		1			
Fp	1,2	2	1,2		2	
Fo	1					
Fg			1		1	
Eo	2		3			
El	2					
Er	2		2			
Eg	2					
Eb					3	
Em					4	
M	2,3	2,3	2,3,4			
Mw			3			
Mt	2	2	2		2,3	
Ms	3		3		3	
Mb					2	
I	2,3,4			2,3,4	3,4	4
Ir	4	4		4	4,5	4,5
Ig		4		4		
S	3	3,4				4
Sv		4				
Sr		4				
Se			4			
V	2			3,4,5	5	3
Vo	2					
Vi				5	5	
Vs						5
G					4	4
R	1,2		2,3		4	4
Cm	1					1
Cb						1,2,3
Ci				2,3,4		3
Cs				3,4		
Cf				3		2,3,4,5
Cg						4

5. KILLIK: Fairly small, flowing through very wide, steep-walled mountain valley, then across higher foothills into Colville. Moderately clear, slightly glacial-influenced. Flow extremely variable, turbid at high water. Much of upper portion very slow with pond-like segments, through primarily consolidated sand dunes. Foothill portions rather fast flowing with bouldery rapids where successive moraines are crossed. Very high bluffs at intervals in foothill section. Tundra, except high brush on gentler bluffs, within which parts of lower valley are constricted.
6. NOATAK: Fairly large, flowing west between lower ridges of Brooks Range to sea; in places in narrow valley, more generally in very broad basin. Two short canyons. Moderately clear, slightly glacial-influenced; flow rather variable, turbid at higher water. Crosses tundra with scattered spruce stands along lower portion beneath tundra uplands. Moderately slow, except for moraine-related somewhat rapid sections in upper portion. Small delta with whistling swans seasonally visible.
7. KOYUKUK NORTH FORK: Fairly small, flowing between steep rugged mountains of southern Brooks Range in rather narrow valley, then in broader valley rimmed by more rounded mountains, to junction of main Koyukuk. One very rugged deep canyon in upper part. Tundra on hills and along upper-most part, grading into boreal forest to south. Moderately clear except at high water, slightly glacial-influenced. Portions quite rapid, becoming moderately rapid to more gentle in lower segment.
8. ALATNA: Fairly small, flowing south through Brooks Range, foothills, the flat plains to Koyukuk. Generally clear except at high water, slightly glacial-influenced. Uppermost portion tundra, with brush along river, entering boreal forest in middle portions, and forest to open muskeg along lower segment. Fairly narrow mountain valley, becoming enclosed by high rugged rock-rimmed mountains in middle portion. Most of river very slow and meandering, even through much of mountain portion.
9. KOBUK, UPPER: This portion fairly small, flowing from large Walker Lake through very broad valley bordered by low mountains. Generally clear. Sparse to densely wooded spruce forests. Flow rather gentle except heavy rapids in two short sinuous canyons, one through lava flow.
10. SALMON: Small, flowing south through Brooks Range, into Kobuk across marshy lowland. Very clear, except at higher water. Upper portion tundra and willow brush, with patches of spruce forest and scattered tundra along lower portion. Pond-filled wetlands near mouth. Rather narrow valley through fairly steep but lower mountains for most of its course. Steady current but usually gentle, occasional rapids and pools. Jade flakes give vivid color to river environment in places.
11. KUZITRIN: Small, flowing from low rounded mountains, across marshy flats, into network of sloughs, then into saltwater lake. Water-birds much in evidence. Rugged low mountains to southwest.

turbid. Many bars and slough. High willow and cottonwood along river, boreal forests adjacent. Gentle, though steady strong current, quite dramatic at breakup. Strikingly scenic bluffs and palisades at intervals along each bank, some with contorted finely-layered rock strata, others with jagged low pinnacles.

20. CHARLEY: Relatively small, going from fairly high rounded hills, across strongly rolling uplands, through a succession of narrow canyon-like segments into gentle plain leading into the Yukon. Succession of high rocky bluffs on alternating sides of river. Exceptionally clear. Generally tundra in upper portion, boreal forest with moist tundra benches and rocky shorelines. Succession of moderate rapids for most of length.
21. CHILIKADROTNA: Fairly small, heading in large lake at edge of Chigmit Mountains, flowing across foothills region of flat bottom-land. River is rimmed by scattered, low, rounded hills. Subalpine woodland at upper end, boreal forest and muskegs in valley, birch woods on slopes, tundra on hilltops. Quite rapid, with nearly constant though moderate rapids for entire length to junction with Mulchatna. Very clear, with hint of blue-green from the glacial flour-tinted Twin Lakes at head.
22. CHISANA: Rather large turbid glacial river, forming one of two upper branches of the Tanana, above junction with Nabesna. Flows north from Chisana glacier at edge of Wrangell Mountains, across wooded plain, then knives through Nutzotin (Alaska) Range through rather narrow rock-palisaded canyon, then crosses foothills and extensive Tetlin Flats with many ponds. Boreal forest. Fast-moving but few rapids, though some areas of turbulence. Wide river bottom with gravel and mud bars.
23. BEAVER CREEK OF WRANGELLS: Fairly small, flows across fairly narrow valley between mesa-like mountains of northern Wrangells and rather rugged edge of Nutzotin Mountains. Generally clear, with moderate glacial influence, muddying water at times of peak glacial melt. Tundra on upper portions, across subalpine parkland in middle portions, then into Canada through boreal forest before joining White River. An east-flowing river contained within the mountains, quite rapid with one canyon. Bluffs frequent along lower portion.
24. DELTA: Fairly small and clear in upper portion, where it joins a series of lakes in rolling subalpine hills, becoming larger and turbid from glacial tributaries where it crosses northward in a deep narrow valley through the eastern Alaska Range, passing close to Black Rapids Glacier, then crossing a sloping interior plain to the Tanana. Boreal forest except willow and tundra near head. Moderate rate of flow with quite rapid sections. High mountains close to middle portion.
25. SUSITNA: Very large glacial river, very turbid, emerging from glaciers at the south edge of the Alaska Range high peaks. Cuts deeply into a high rolling plateau, with rock-walled canyons. Lower down, becomes braided with clay bluffs and mud banks, until

and falls, with intervening pools. Rock outcrops common, areas of rock bluffs along stream. Open boreal forest.

33. AMERICAN CREEK: Fairly short, small river starting in lakes at edge of Aleutian Range, flowing across very wide valley into Lake Coville. Mainly hilly uplands, with higher mountains nearby, and vegetation transitional between maritime tundra and boreal forest. Very clear, with constant sharp rapids. In places inset into narrow bench between higher terraces, occasional areas of gravel to rock bluffs.
34. KING SALMON: Fairly clear, some glacial influence flowing through broad open valley. Fairly gentle flow across dry tundra, from edge of Aleutian Range across gentle upland, then over wet tundra lowland into Bristol Bay to north. On upper Alaska Peninsula.
35. ANIAKCHAK: Short moderately clear, rather small stream, beginning in Aniakchak Caldera, emerging through deep cliff-rimmed slot, The Gates, across willow-alder and tundra covered uplands, down to beach along Pacific coast. Tall grasses predominant beyond influence of ash and lava. Very rapid though steady rate of flow. Flows south on central Alaska Peninsula.
36. BREMNER: Very turbid glacial river, flowing from glaciers, west through a deep fairly wide mountain valley rimmed by high ice-hung peaks of the Chugach Mountains. Transitional vegetation, brushy boreal forest near head, grading into coastal rain forest. Valley of hummocky terrain and benchlands with many ponds. River exceedingly rapid, in many places contained between narrow low rock walls, with sharp turns where water piles onto banks. Lower portion somewhat gentler with silt and gravel bars. Sand dunes where enters Copper River. Near junction, a lake lies beneath a high mound where trumpeter swan concentrations are often seen.
37. SITUK: Quite small very clear coastal river, flowing across lowlands from headwaters lake to Pacific Ocean beach and marshes. Coastal forest. Gentle, though with steady current. Fish, including steelhead, visible and abundant. Very short; single channel throughout. Near Yakutat, with high coastal mountains looming behind. Low banks.
38. HASSELBORG: Very short clear stream, flowing from Hasselborg Lake on Admiralty Island to saltwater on Mitchell Bay. Fairly gentle sections alternating with rapids and falls. Partially in gentle valley with heavy coastal forest right up to water's edge; several rocky canyon segments. Open grassy spruce forest near mouth, beyond which flow miles of virtual saltwater river channels, with reversing flow, before Chatham Strait is reached. Low but bold mountains in background.
39. UNUK: Enters from Canada at southern end of Southeast Alaska. Medium-sized turbid glacial stream, with very fast but not too turbulent steady flow. Braided areas. Tall cottonwood groves along bottoms, dense coastal conifer forest beyond. Wide flat-floored, U-shaped valley, with high round-topped mountains on both sides. Much of valley enclosed by near-vertical smooth granite walls of considerable height.

Q. BAINBRIDGE PASSAGE: Narrow long saltwater channel with fast currents between Prince William Sound islands, with sea otters and patchwork of rain forest, muskeg, and rock exposure.

R. CHILKOOT PASS: Steep passageway between steep-walled glacially-rounded mountains and glaciers, between coast and piney interior, with very evident remains of historic human passage.

S. JOHNS HOPKINS INLET: Abundant seals on iceflows bring life to the ultimate in austere glacial landscapes, with steep walls down which glaciers slide, and triad of pinnacled high ice peaks above glacier at head.

T. WEST CHICHAGOF INNER PASSAGE: Lengthy reach of bays and channels between meadows and forested mountains on one side, and a string of small islands separating passage from the ocean on the other, with bold rock outcrops.

U. KOOTZNAHOO INLET: Intricate maze of shallow rocky saltwater channels and pools, with fast currents, luxuriant subtidal life, meadows, and large trees.

V. TWIN GLACIER LAKE: Lake tributary to Taku River, with one bay warmed to swimming temperature by hot springs, pair of large glaciers calving into other end, backed by symmetrical peaks.

W. FORDS TERROR: Intimate though rugged small fiord, with high sheer granite walls laced with waterfalls, roaring tidal torrent at entrance; beach at head.

IMPORTANT VIEWPOINTS

A. CAMDEN BAY BEACHES: Spits and lagoons bordering Arctic Ocean, from which the closest part of the snowy Brooks Range rises steeply behind inclined plains and rolling foothills. Example of unified vista.

B. PETERS-SCHRADER LAKES: Pair of lakes in Carnivore Valley, looking out past foothills, looking in at highest most glacier-clad mountains of Brooks Range.

C. CASTLE MOUNTAIN: Mesa rising above rolling tundra foothills, expansive vistas similar to western plains, backed by abrupt north front of Brooks Range.

D. PINGALULIGIT MOUNTAIN: Sharp high hill overlooking foothills portion of Killik Valley, with cliff-sided bluffs and long straight mountain valley far to south.

E. LOOKOUT RIDGE: In lower Arctic foothills, sighting down very long smooth ridge, with gently undulating uplands and entrenched rivers, distant horizon.

F. IGLOO MOUNTAIN: Area of round-shaped scalloped uplands, sharp mesas, and narrow deep gorges in rolling open tundra uplands.

G. SUKAKPAK MOUNTAIN: Striking cliff-rimmed landmark, from which sheer bedded sidewalls of both sides of Dietrich Canyon lead far to the north.

H. GATES OF THE ARCTIC: Boreal Mountain and Frigid Crags face each other across North Fork Koyukuk valley; opening broad and hill-rimmed to south, narrow and bounded by cliffs to north.

slopes of Blackburn looming above it all, seemingly quite close behind.

V. NIKOLAI RIDGE: Flat gravelly ridge, the platform from which to peer down the Mile High Cliffs of Nizina Canyon, and far up the deep trench of Chitistone Canyon, with high snow mountains surrounding them. Perhaps the classic canyon-rim viewpoint of Alaska.

W. RIDGE ABOVE CANYON CREEK: Low mountain ridge separating the wet meadows and Big Bend Lakes of the open basin to west, a large grassy basin to north, snow peaks to east, looking south down into the slot of the very deep narrow twisting gorge of Canyon Creek in the Wrangells.

X. ROCK MOUND OVERLOOKING MATANUSKA GLACIER: Bold rounded bedrock outcrop above Glenn Highway, from which one can peer far up the Matanuska Glacier to the blocking high mountain wall behind, and up and down the road-traversed narrow valley of the Matanuska River and colorful ridges beyond.

Y. PANORAMIC PEAK OF GRANITE MOUNTAIN: To north across rough low foothills and wet plains, to west toward Mount Hayes, and nearer-to-south, Alaska Range at Mount Sivertip, across high gentle plateau.

Z. RIDGE OVERLOOKING BLACK RAPIDS GLACIER: Delta River valley and Richardson Highway to east, narrow view far up straight gorge of Black Rapids Glacier to west and into snow peaks of Alaska Range.

AA. MOLYBDENUM RIDGE: North to lower ridges and canyon of Little Delta River, south across high valley to strikingly-sculpted high peaks of Mt. Deborah and Hayes.

BB. PARKS HIGHWAY TOWARD DENALI: From south, first broad open vista of Denali and great rock gorges in front of it.

CC. SOUTHWEST RIDGE OF KANTISHNA HILLS: Direct view across Wonder Lake at white ramparts of Denali, and across intermontane valley to south at face of Alaska Range, in contrast to receding hills and lower lands to west.

DD. ROOSEVELT HILLS ABOVE CHILCHUKABENA LAKE: From low platform, across lake set into hills, far out over flat pond-flecked plain, at wall of high Alaska Range and Denali to south.

EE. CASTLE ROCKS: From low granite hills, southeast across flat plain at Denali and Alaska Range. This point, and the two above, are anchors for the extensive vista unifying interior lowlands with the high wall of snow peaks. This is the type of view which perhaps characterizes Alaska in the minds of visitors, more so than any other. It encompasses vast distances, clarity of atmosphere and simplicity of structure.

FF. UP ELDRIDGE GLACIER TO DENALI: Parks Highway view, with rocky pinnacles in middle distance, back toward the distant looming dome of Denali.

GG. BUNCO-SWAN LAKES AND EASTERN PETERS HILLS: Series of viewpoints with foreground setting of lakes or high valleys, over jagged Tokosha Mountains, up granite-bounded Ruth Glacier Gorge toward Denali and Hunter.

RR. RUSSELL ISLAND IN UPPER GLACIER BAY: From this rocky island in the middle of the upper widening of Glacier Bay's west arm, appears a scene apparently just emerging from the ice age, with a succession of inlets from which glaciers flow or are closely seen, with much bare bedrock and talus, and only the scantiest vegetation, with scattered icebergs enlivening the waters.

SS. MOUNT RIPINSKI: This low mountain at the head of Lynn Canal provides a sweeping vista far down the mountain and forest lined rims of this very long straight waterbody at the upper end of Southeastern Alaska. To the west across the Chilkat valley stand the jagged icy Takinska Mountains beyond Haines.

TT. DENALI FAULT TRENCH: This viewpoint is indicated at Anderson Pass in McKinley Park, a strategic location for looking far along the fault in either direction. This fault, which actually slices diagonally through the Alaska Range, can be experienced at many other points as well, being a very narrow trench into which glaciers pour, and a narrow vista right through the heart of Alaska's highest mountains.

Largest aufeis field in Arctic Alaska at Ivishak junction with Saviukviyak River. Abrupt mountain front in Echooka-Ivishak area, among most striking in Brooks Range.

4. KADLEROSHILIK PINGOS: Kadleroshilik Mound is largest pingo in Arctic Alaska, ice-cored mound 190 feet above plain. Near adjacent Kadleroshilik River, excellent array of pingos in all stages of development, strikingly rising from flat Arctic plain, patterned ground, and thaw lakes.
5. FRANKLIN BLUFFS-WHITE HILLS: White hills, very pale, form isolated plateau 600 feet above Arctic plain, deeply dissected into badlands. To north, Toolik River pingo fields. To east, equally high bluffs along Sagavanirktok River, also eroded into badlands, but here brightly colored. Wildlife often seen, including peregrine falcon. To south along river, excellent examples of braiding in shallow non-glacial stream.
6. COLVILLE DELTA: Interlaced system of distributary channels, deltaic deposits, largest area of sand dunes in Arctic lowlands with whistling swans in numbers visible in summer. Simpson Lagoon and islands to east.
7. PIC DUNES: Sand dune fields, lying in odd playa lake, set 50 feet below surrounding Arctic plain. Sagebrush. The major Arctic dune system.
8. COLVILLE RIVER BLUFFS: Scattered very high stratified bluffs along lengthy section of Colville River. Contrast of river basin cutting through long even narrow ridges of foothill zone. Dense high willow along slopes, contrasting with tundra elsewhere. Peregrine falcon and other raptors often seen in summer. Ishukpak Bluff the northernmost.
9. ROOFTOP RIDGE: In foothills east of Anaktuvuk River, hogback, very steep on north side. Varied rock types in Racetrack Basin and hills just to north.
10. CHANDLER RIVER MESAS AND HOGBACKS:
    a. Hatbox Mesa: Irregular flat-topped mesa rising above upper foothills west of Chandler Lake.

    One of the most striking arrays of mesas and buttes in Alaska, such as Castle and Fortress Mountains, river bluffs such as Paunagaktuk, Niakogon and Tuktu along the Chandler. Also curious notches in hills such as "The" (Kiruktagiak) Notch north of Chandler Lake. Features formed from various sedimentary types; fossils.
11. TOPAGORUK ORIENTED LAKES: Just east of Topagoruk River, series of lakes, in all stages of development, oriented in roughly north-south axis.
12. IKPIKPUK-OUMALIK POLYGONS: Extensive polygon formations, both high and low, centered west of Oumalik River, oxbow lakes and small dunes along river. To the north, sluggish meandering Ikpikpuk River with meander scrolls, oxbow lakes, low dunes.
13. TAKRAK ORIENTED LAKES: Outstanding series of mature oriented lakes between Ketik and Meade Rivers, lying on flat plain.

From Elusive Lake, set well into the mountains, south to the main divide, the South Fork Ribdon, Accomplishment Creek, uppermost Wind River country has narrow valleys and austere rocky mountains with little vegetation.

21. SMOKE CREEK: An area with rather separate mountain blocks on the South Slope, local wooded area, and side valleys with ponds.
22. ATIGUN GORGE: A narrow canyon at the north edge of the mountains, in places a chasm as much as 2000 feet deep, revealing multi-layered very contorted rock strata, eight miles in length.
23. NORTH FORK CHANDALAR AND LAKES:
    a. North Fork Chandalar Valley: The main valley and a parallel prong just north form deep U-shaped canyons with high steep walls contrasting with the numerous ponds along the valley floors.
    b. Geroe Creek Cirques: Exceptionally precipitous headwaters of this North Fork tributary, with a great cirque, cliffs, and a few tarns.

    Squaw, Twin, and Chandalar Lakes set in steep-walled canyons near the south mountain front. Ponds and tarns in the Poss Mountain area southwest of Big Lake.
24. SHAININ LAKE: Fairly large lake in broad U-shaped valley at north front, with rugged gray limestone mountain slope rising abruptly above it, and Mount Wachsmuth distinct from adjacent mountains, protruding onto the foothill lands.
25. GATES OF THE ARCTIC MOUNTAINS:
    a. Ulo Valley: Valley of the north-flowing Itkillik River, with Itkillik Lake at mouth. Exceptionally striking steep-walled mountains with stata varying from light to nearly black. Isolated cirque-headed side valley to west beneath Cocked Hat Mountain, with pinnacles.
    b. Mount Doonerak Area: East-west side valley along north side of Doonerak with Kinnorutin Pass set off on both sides by narrow canyons. Gorges and tarn lakes in valleys bounding Doonerak; a horn-shaped peak carved out of dark sedimentary rock, rising above level of adjacent mountains.
    c. Gates of the Arctic-Ernie Creek: Upper North Fork Koyukuk bounded by two opposite cliff-rimmed peaks, Boreal and Frigid (The Gates), colorful Redstar Mountain to south, Doonerak to east, and Valley of Precipices along Ernie Creek, the continuation of same valley to north.

    An area of exceptionally sharply glacier-carved slaty rocks, many distinctive peaks, small glaciers. Many tarns at tributary heads along the parallel east-west upper Tinayguk and Anaktuvuk Creek (Anaktiktok Valley) to the east.
26. CHANDLER LAKES AND HIGH VALLEYS:
    a. Chandler-Agiak Valley: Large Chandler Lake set in cliff-rimmed U-shapped valley near the north front, with a series of lakes to north and south in Chandler and similarly aligned Agiak valleys. At south end, valley system ends at Lonely

b. Walker Lake: A large, long narrow lake entering from the south front of the mountains. Beaches. Low bold hummocky outcrops above northwest shore, contrasting with rather luxuriant spruce forest. Very open lichen-floored terrain with few trees at south end.

c. Arrigetch Peaks: Another area of granite not far east of Igikpak, sculpted by ice into massive slick-smooth dark gray walls with both spires and narrow reef-like summits. Abundant tarns. Seasonally green valley floors and lack of talus contrast sharply with the adjacent walls. Small clean white glaciers.

d. Alatna valley: Section from Arrigetch Creek nearly to Malamute Fork is a wide U-shaped extremely steep-walled valley, bounded by pale pastel-colored sedimentary rocks with many exposed smooth rock faces. The blue Alatna meanders gently from side to side in curious contrast to the rugged walls. Near south front, thinly layered strata have contrasting dark and light lenses and are severely contorted.

Foothills in this area, as presumably elsewhere on south edge of the Brooks Range, offer unique color display in fall: alpine bearberry, whose leaves turn a very vivid orange-red in fall, are subalpine plants elsewhere in Alaska to the south, and disappear to the north. In this region, they live on the floor of more open sections of the forest, where their brilliant hue contrasts with the orange of the birches and the deep green of the spruces, in the foothills zone. Near the Alatna well within the mountains lies Takahula Lake, set beneath massive pale rock slopes. Numerous narrow side valleys between Arrigetch and Igikpak have rock faces and numerous tarns. The relatively small smooth granite intrusions are surrounded by the various sedimentary types described.

32. INYORURAK-HOWARD PASSES: Series of fairly low passes and intervening block-like mountains at east end of DeLong Mountains, separating the upper Noatak drainage from the North Slope. Traditional use by large numbers of migrating caribou, as well as significant historical evidence of early man. Lakes near passes at heads of Nigu and Etivluk Rivers.

33. SCHWATKA MOUNTAINS:

a. Upper Ambler Canyon: U-shaped canyon with rugged lower mountains and bold cliffs rimming parts of the valley. Various rock types, including finely banded cliffs in contrasting shades.

Includes tributary Ulaneak River with pale massive limestone and much smooth bedrock. Complex also includes the three westernmost mountain valleys on north side draining into Noatak, with interconnecting passes, narrow valley bottoms, and striking glacial-scoured rocks. Small granite area, upper Igning.

34. ANGAYUCHAM HILLS AND LAKES:

a. Selby Lake: Selby-Narvak is single lake separated into two parts, with beaches and bordering meadows, set beneath very craggy peaks with many pinnacles.

Scattered spruce fingers in marsh and tundra. Many waterbirds seasonally contribute a striking visual feature.

41. SHISHMAREF INLETS AND BARS: From Cape Espenberg, west to Cape Prince of Wales, series of lagoons, spits, and barrier islands across the entire northern rim of Seward Peninsula; patterned like Krusenstern. Some lagoons of large size. Beaches to west of blackish volcanic sands. Loons, cranes, and swans very conspicuous to west on open tundra.
42. DEVIL MOUNTAIN EXPLOSION LAKES: White Fish, Devil Mountain, and Killeak groups or pairs of perfectly round lakes, set deeply under high banks in gently rolling upland tundra landscape. Maar lakes caused by underground explosions where hot volcanic materials interacted with permafrost.
43. SERPENTINE HOT SPRINGS AND TORS: Luxuriant high willow vegetation and green summer turf in valley below hot springs. Surrounded by gentle hills, capped with castle-like series of block-shaped rock protrusions and pinnacles of granite, called tors, along ridge tops.
44. IMURUK LAVA BEDS:
    a. Lava Lake: Rather small lake at edge of extensive lava beds, with beach, open tundra, and low but very rough uneven lava flows adjacent to one another.

    Various shades of rather recent lava from different flows, with lichen and moss growing on them, with little patches of other vegetation. Border a number of lakes, with Bendeleben Mountains appearing as a ridge far behind. At base of mountains, Kuzitrin Lake with pale sand beach. Frost polygons and extensive soil creep.
45. KIGLUAIK MOUNTAINS-IMURUK BASIN: Mountains low but very ruggedly glacier-carved, thoroughly dissected and separated by streams. Very striking mountain lakes and tarns. Tundra and willow vegetation. Mountains break off to south into Imuruk Basin, large estuary entering sea through narrow rock-rimmed channel with petroglyphs. Craggy peaks reflect in basin. Tundra marsh at head of basin, where waterbirds congregate, through which Kuzitrin River flows in single channel.
46. CAPE DARBY-MOUNT SWINIUK CLIFFS: Very high pale cliffs at Cape Darby on east side of Golovnin Bay, Norton Sound. To northeast, Marble Cliffs on Mount Kwiniuk just inland from coast, nearly white.
47. KOOKOOLIGIT VOLCANIC FIELD: Old shield volcano on St. Lawrence Island. Diversity of small-scale volcanic features, including large number of small cones, fresh and steep-sided; ragged lava flows and many small tarns.
48. KOOZATA LAGOON AND SPITS: Remarkable repetition along south coast of St. Lawrence Island with series of pairs of spits and bars, forming striking pattern from above. A number of cuspate formations, enclosing lagoons.

volcanic bedrock, forming a series of narrow colorful gorges, through which the dark waters of the river flow smoothly. Howling Dog Canyon, Lower Ramparts also notable.

58. CENTRAL YUKON FLATS RIVER NETWORK: In vicinity of the junction, and proximity of the Yukon, Porcupine, Black, Grass, and Sheenjek Rivers lies an expanse of river-created landscape, with extensive sloughs, meander lakes, oxbows, islands, and similar features. Nesting waterbirds are very noticeable in season.

59. UPPER YUKON RIVER HIGHLANDS:
    a. Yukon River Bluffs: Between Kathul Mountain and the Charley River, the Yukon has its greatest density of rocky bluffs.
    b. Ogilvie Mountains-Tatonduk River: Spectacular relief where the narrow partly incised Tatonduk Valley knifes through the Ogilvies, with whitish cliffs lining the valley and gorge segments of the rapid clear river.

Between Eagle and Toakoma Bluff, the upper Yukon River has cut a series of rock bluffs of diverse rock types. Some are thinly laminated into layers of contrasting shades and colors, others are carved into pinnacles, about which peregrine falcons may be seen. The Ogilvie Mountains, though not high, show one of the most striking samples of ruggedly-carved limestone topography in Alaska. They reveal sharp crestlines, precipitous slopes, and deep narrow valleys, interrupted by gorges, with areas of red rock, 4000-foot local relief, and massive cliff-forming sedimentary rocks (after Wahrhaftig).

60. TANANA HIGHLANDS:
    a. Charley River Bluffs: The middle Charley River exposes a series of high rock bluffs on alternating sides of the river, with views of the dome-shaped mountains beyond.

The culmination of the Interior highlands occurs in this region, with wave after wave of fairly high but rounded mountains, surmounted locally by sharp cones. An occasional north-facing cirque with tarn, but over most of the range no glaciers have intruded, leaving a topography of smooth-crested summits, even by steep-sided slopes, with streams in narrow V-shaped terraced canyons. Spruce forest and tundra interdigitate with subalpine brush in many locations. Ridges surmounted in places by granite tors and rock fingers above the general level. Subalpine fall color particularly fine.

61. BEAVER CREEK MOUNTAINS AND BENCH:
    a. White Mountains: Inside the bend of upper Beaver Creek, these mountains form a single ridge of limestones and volcanics, weathering white, and though not high, sculpted by solution and freezing-and-thawing into a remarkable assemblage of bizarre pinnacles, reefs, glens, and gorges; the ultimate landscape of its type in Alaska. Western edge rises as a smooth uplift of bare bedrock from the edge of Beaver Creek.

Beaver Creek is fairly small, very clear, with many bluffs and rock outcrops along its upper portion, meandering near its mouth into the Yukon Flats. Series of ridges with isolated higher summits

70. KOBUK SAND DUNES-LICHEN WOODLANDS: Extensive area of unconsolidated wind-shaped high sand dunes, bordered and cut by small streams and springs. Scattered groves of small cottonwoods in swales on dunes, spruce bordering streams, tundra-covered low Waring Mountains on south side, large slow Kobuk River on north. On adjacent vegetated old dunes, lovely spruce woodland of open-grown trees and pale gray-green forest floor deeply covered with lichens. This area extends far west from the present dunes and is a good example of this woodland type.
71. PURCELL MOUNTAINS: Isolated low range of mountains, with rounded summits. Contains an odd tarn in a north-facing cirque, especially noteworthy for the V-shaped gorges in its mountain valleys.
72. NOGAHABARA SAND DUNES: A small area of active sand dunes at the end of a low mountain ridge, and bordered on the east by the Koyukuk Flats.
73. KAIYUH SLOUGH PONDS: Partially forested wetlands, forming a series of interconnected lakes within the wetlands, where waterfowl can readily be observed.
74. BEAVER MOUNTAINS: An isolated long north-south ridge with spurs, generally rounded but with many tiny tarns and a few glacial lakes.
75. ANDREAFSKY ROLLING HILLS: Portion of the Nulato Hills near Andreafsky River, characterized by very extensive ranges of even parallel-trending compressed high hills, forming a tightly-patterned landscape. Summits even-topped, rounded, giving impression from above of closely-spaced waves. Separated by steep-sided very narrow valleys, with trellis pattern of parallel main streams, and perpendicular to them, other sets of parallel tributary streams. Tundra except for woodlands along lower slopes near streams.
76. MIDDLE KUSKOKWIM CANYON: Gorge 100-400 feet deep incised into much wider older 1000 foot deep valley crossing Kuskokwim Mountains. Major river, partially constricted, though in other places with some side channels.
77. CHUILNUK-KIOKLUK MOUNTAINS: One of the most scenic small ranges in the interior, between the Aniak and Holitna Rivers. Each range deeply dissected by tributaries of the Holokuk and other streams into a finger-like pattern of ridges, with tarns and a series of larger glacial lakes inset in the north-facing steep-sided basins.
78. SHOTGUN HILLS: East of the Tikchiks and more heavily glaciated than most small interior ranges, intricately dissected in a radial series of ridges and hub-like drainages, with many tarns.
79. AHKLUN MOUNTAINS-WOOD TIKCHIK LAKES: Groups of rugged steep-walled mountains, having sharp summits, sometimes with needle-like slate-gray pinnacles, separated by broad valleys and lowlands. Most rivers incised into low bedrock gorges in lower parts of their valleys, several in northwest cutting through canyons directly across ridges (after Wahrhaftig). Most notable for an extensive series of large lakes on the east side, in deep glacial troughs between serrate ridges, actually extending completely through the mountains into the edging lower lands to the west; long beaches at

domes and pinnacles. Similar small-scale features in narrow tributary gorges. South side valleys of Chitistone frame vistas of high precipitous crystalline peaks. Forming the third side of a triangular series of passages is Skolai Basin, with strikingly layered volcanic rocks, some brightly colored, with the sidewalls cut by large deep glacier-floored cirques. The above two areas are unified by the natural channel for travel over Chitistone Pass. Beaver Creek drainage lies north of and parallel to the White River, with clear water, mesa-like mountains in between, Nutzotins bordering closely on north side. Tall open spruce forest patches with lush mossy floor along lower Beaver Creek, cathedral-like.

83. JACKSINA MESAS-TANADA LAKE: Horizontally layered landform of rather flat-topped benches and high mesas at various levels, cut by deep rock-ribbed Jacksina Canyon, and interconnected with an intricate series of deep narrow flat-floored canyons with castellated sidewalls and alpine lakes. Two large lakes set at base of mountains, almost at the timberline. Wrangells volcanoes on skyline, with closer jagged-topped layered black volcanic Tanada Peaks forming eastern skyline. Open tundra except fringe of trees along lakes and in lower stream bottoms.

84. WESTERN WRANGELL MOUNTAINS AND FORELANDS: Very large-scale exceptionally smooth-appearing vista of aproned slopes rising evenly from fringing Copper River, inset in steep gravel-rimmed sidewalls, to large high snowy volcanoes, some rounded, some jagged, one quite flat on top. Closer to mountain heights, Wrangells deeply incised by series of rock-walled canyons, with much deep red volcanic coloring, and major waterfall up Chesnina Canyon. Bubbling warmed mud ponds surmounting bare rises on slopes.
    a. Lower Chetaslina Canyon: Pair of canyons, which join, on main and East Fork of Chetaslina. Deep and very narrow, incised in colorful compacted mudflows, with a variety of boulders of various colors included, bright yellow rhyolite, and hoodoos eroded in softer materials.

85. MOUNT BLACKBURN AREA: Series of deep canyons, mostly wide, leading toward massive volcano, with Castle Mountain and similar square-topped to jagged layered black volcanic mountains in front. Subalpine basin separating ridges above Chitina Valley from main mountain ridges, connecting adjacent canyons by low passes parallel to mountain front.
    a. Upper Kotsina Canyon: Most diverse canyon in Wrangells since it separates Wrangell lavas which form northwest wall, with red lavas from layered deposits (some in delicate light colors) along southeast wall. Long Glacier entering lower part of main valley. Orange colored peak on inside of junction of two forks sets off entrance to upper valley.
    b. Kuskulana Canyon: Single climactic view from upper valley: foreground river rushing from deepset glacial valley, middle high black ridge, background great white ridge of Mount Blackburn looming over all else.

surrounding Amphitheater Mountains. Large area of rounded bedrock domes and ridges, wet to dry tundra uplands; the upper Delta River flowing through the Tangle Lakes, and Maclaren River pointing straight toward Mount Hayes, separating Clearwater (west) from the Amphitheater (east) Mountains.

a. Black Rapids Glacier Trough: Narrow glacier-filled trough holding periodically rapidly-moving glacier, leading the eye straight into high peaks.
b. Eureka Basin: Large alpine valley between Amphitheater Mountains and crest of Alaska Range, with low summits, streams, and ponds, and overlooks from the south toward the high peaks.

93. TALKEETNA HIGH BENCHLANDS AND LAKES: On northeast edge of Talkeetna Mountains, where steep-sided rather flat-topped ridges, deeply dissected by intricate stream network, grade into high rolling plateau. Several larger mountain lakes and tarns including stair-step series of lakes down through narrow basins. Oshetna River to Kosina Creek.
94. UPPER MATANUSKA VALLEY AND GLACIERS: Fairly narrow glaciated trough draining southward down Matanuska River, containing exposed bedrock domes to 1000 feet high, many ice-carved bedrock basin ponds, steep high bounding walls contrasting on opposite sides. On the northwest (Talkeetna) side, layered mountains and colorful outcrops with dall sheep often visible.

a. Matanuska Glacier: On southeast side of trough, massive crystalline Chugach Mountains are split by huge glacier, leading from dark hummocky snout far up white-floored valley into heart of high ranges.

95. SOUTHWEST TALKEETNA MOUNTAINS: At south end, lush subalpine Hatcher Pass valleys with gentle slopes and angular gray peaks behind. Extensive alpine benches and ridges rising gently east toward jagged rocky peaks, very deeply cut by Kashwitna and Sheep Creeks, with long gentle main valleys and hanging side canyons with many tarns.
96. SUSITNA RIVER GORGE: Cutting west across northern Talkeetna plateaus, powerful glacial Susitna River has cut deep gorges, the deepest being very steep-walled, extremely narrow, and as much as 1000 feet deep, with the river pounding through it with enormous turbulence, from east to west.
97. NANCY MORAINE LAKES: In Little Susitna Valley just east of the Talkeetnas, Cook Inlet lowlands exhibit extensive stagnant ice topography, with drumlin fields, eskers, and various sorts of morainal debris. Covered by birch-spruce forest with luxuriant undergrowth, the hummocky topography provides the setting for innumerable ponds and lakes, which are connected in the Nancy Lakes area by only short overland gaps.
98. SWANSON-SWAN MORAINE LAKES: Similar topography to 97, though nearly-connecting system of lakes covers larger expanse. Drained by clear small Swanson River, more bog areas present, and much of the terrain exhibits new growth following extensive fires. Waterfowl

c. Denali Fault Slit: The active Denali Fault maintains a narrow trench between the mountain front and the summits, creating passes such as Anderson, from which a vast extent of the fault is visible east and west (the visual unit mapped runs east to the Broad Pass Trough). It is partly occupied by glacial ice.

d. Wickersham Wall: One of Alaska's most massive cliffs is the high wall facing northwest from Denali, separated from the ridge to the north by the defile of Peters Basin.

The northern side of the Denali massif is wholly encompassed by the above visual units, plus the immense vista from the Chilchukabena Lake unit.

102. BROAD PASS BASIN-DENALI VIEWS: Long narrow basin between Alaska and Talkeetna Ranges. Long narrow lakes and low hills on floor. Main streams incised in deep rock-walled gorges. Series of fine views from basin, which Parks Highway follows, across Chulitna River and open spruce woods, up Eldridge Glacier and over high pinnacles in middle distance toward Denali. Tall vertical face of Mount Hunter a striking feature, as well as portions of other crags and glaciers. On east side of basin, bare round hills above Byers Lake provide sweeping views of a similar nature from a higher perspective, with ponds and rock domes in foreground.

103. DENALI GLACIER GORGES: This complex unified Denali, the long glaciers and granite gorges leading from it, the pinnacled Tokosha Mountains at the foot of this segment of the Alaska Range, the fringing foothills, and lowland lakes at the base of the mountains. Three types of vistas are most often experienced. From such lakes in the wooded lowlands as Swan and Bunco, Denali's white ramparts appear over the darker Tokosha Mountains foreground, with a gentle woodland and tundra apron dipping down from them. Just to the west, the northeast edges of the Peters Hills provide a more extended perspective, up the Tokositna and Ruth Glacier Gorges, a relatively close mountain view, but of diverse alpine elements, in contrast to the apparently simpler alpine structure as seen from the Kantishna Hills to the north, where the snow peaks appear to rise almost sheer from the plains.

a. Ruth Glacier Gorge: The third view is that from alpine ridges, such as at the head of Alder Creek, where the view is of mile-high dark granite walls enclosing the white Ruth Glacier, with an amphitheater at the head of The Great Gorge, and the West Fork passing along the high face of Mount Huntington, with Mount Hunter looming above.

104. AMOS LAKES-CATHEDRAL BASIN: The Upper Tonzona River unifies foothills and mountains on the northwest side of the Alaska Range. Colorful bare ground of deep reds and other hues is eroded into modest badland topography along Red Paint Creek and the Amos Lakes area. Up the Tonzona is the west facing Cathedral Basin with granite cliffs beneath Heart Mountain. The narrow Tonzona valley upstream to the south dissects rough alpine topography toward the gentle Mystic Pass.

Tlikakila River canyon. The lakes are all variations on a theme: Turquoise lies amidst tundra, with an abrupt mountain wall looming above the flats at its head. Lachbuna is in gentler country, with long beaches. Portage is a deep rich purplish blue color, and lies just above the rim of Tlikakila canyon. The canyon has a navigable glacial river flowing through it, with the lower canyon composed of two parallel canyon segments, with a high rugged but very narrow island-like mountain ridge separating them. At its head is Lake Clark Pass, which has a small mountain lake, and glaciers from each side coming together to form a jumbled glacial topography.

a. North Fork Canyon: A row of massive cliff-sided mountains, with inset glacial cirques, rises sharply above the narrow, partly glacier filled canyon. The narrow floor and immense side walls create a powerful enclosure, leading upward to dark jagged peaks above the main glacier.

b. Twin Lakes Valley: A classic set of twin mountain lakes, with rugged peaks on both sides and at the head, and narrow side valleys leading into them. Water, as with many of the lakes in the area, reflects a vivid hue from glacial flour. Gravel beaches are bordered by subalpine woodland, a fringe replaced at higher elevations by tundra. Adjacent to the lower lake is an odd mountain of granular finely laminated rock of great diversity of shades, and colors varying from buff to black, giving somewhat the impression of an enormous multi-hued sand dune.

c. Tlikakila Canyon: The straight lower portion of this canyon is rather narrow, though flat-floored, and very steeply bounded by pale walls of sheer cliffs and narrowly enclosing mountain rims.

110. LAKE CLARK:

a. Lake Clark-Little Lake Clark: Lake Clark is a large, very long straight lake, with its head in very rugged mountains, with mountains rimming much of its length, and foothills and flats near its foot. Since most of its shoreline is visible from most anywhere along its length, the lake unifies a very large visual unit, a single enclosed but lengthy vista. At its head, separated from the main lake by glacial outwash with a short connecting stream, is Little Lake Clark, rimmed by steep mountains with high escarpments, and a large waterfall in one side valley.

b. Kijik Lake and Canyon: Separated from the midpoint of Lake Clark only by a low mountain is Kijik Lake, rather small, rimmed by narrowly enclosing low but very steep mountain walls. Large numbers of red salmon can be readily seen spawning in the shallows. Kijik Canyon, above the lake, is a very windy, extremely narrow slot with a variety of eroded rockforms along its walls.

These two visual units comprise the Lake Clark scenic complex.

b. Tuxedni Bay: Long bay with side inlets, penetrating Chigmits. Partially silted in. Large Chisik Island, with bird cliffs and other promontories and islets, of thinly layered rock structure, the combination providing rugged diverse coastal landscape.

c. Tilted Hills Coastal Cliffs: Between Chinitna and Iniskin Bays, coast rimmed by a succession of cuestas and hogbacks dipping gently inland but very steeply seaward. Finely bedded sedimentary rocks, of pale orange to brown, finely textured.

Cliffs like the Tilted Hills scattered all along this coast, some with waterfalls cascading down them into the sea. Hickerson Lake with high gray-brown finely layered cliffs, scrubby Sitka spruce (coastal) forest at lower end, waterfalls in side valleys, and slightly steaming Iliamna Volcano looming above lake head. To the north, close views of Redoubt up Drift River valley. Area characterized by heavily silted bays, rocky islets, fine-textured coastal cliffs, scrubby tree stands with high brush, Chigmit Mountains of relatively low heights but craggy tops and many rock exposures, with the two volcanoes looming symmetrically overall. Classic examples of patterned morainal deposits, as at stagnating Red Mountain Glacier from Mount Iliamna, with unvegetated debris crossed by narrow arc-shaped bands of raised, heavily vegetated end moraine.

115. EASTERN LAKE ILIAMNA: From Pile Bay area inland and east toward the coast: Intermixture of vegetation elements from boreal forest, maritime tundra, and coastal forest. Two extensive groups of small islands and intricately dissected low larger islands, one at east end of Lake Iliamna in Pile-Pedro Bays, the other in the southeastern part of the lake around Kakhonak and Intricate Bays. Low but humpy with much exposed bedrock, open woodland and brushy tundra. Just west of the Chigmit Mountains south of the east end of Lake Iliamna, chain of long narrow lakes in rolling uplands, but set in bold rock-rimmed basins. From one group, the short clear Copper River flows through low gorges, over cascades, and among pools, west into Lake Iliamna.

116. AUGUSTINE ISLAND VOLCANO: A fairly low symmetrical volcano forming an island in lower Cook Inlet. Quite active and steaming. Orange bluffs in places along coast, and colorful gorges, contrasting with pale gray ash forming much of remaining surface.

117. KATMAI LAKES-VALLEY OF TEN THOUSAND SMOKES:

a. Kulik Lake Valley: Long narrow lake set into moderate elevation part of Aleutian Range, with high steep bluffs rimming lakeshore. Mountains grayish-purple, coarsely laminated with contrasting shades of light and dark, snow-capped volcanoes beyond head. Many tarns.

b. Bay of Islands Area: At head of North Arm of Naknek Lake, cluster of islands and narrow inlets, along with narrow irregular ponds just inland, primarily brush-covered with scattered trees and much exposed low rounded bedrock.

b. Amber Bay Beaches: Pair of long crescent beaches backed by extensive grassy flats, along heads of twin bays of Amber and Aniakchak. Rocky capes on intervening headlands. Aniakchak River flows navigably though rapids from caldera to beach across ash flows, then lush meadows and brushlands.

122. SEMIDI ISLANDS AND HAYSTACKS. Cluster of small islands well offshore, characterized by vertical, often smooth granite cliffs, haystacks, and spires, in places deeply inset by ocean in gorge-like defiles. Large seabird and sea lion colonies in summer. Uplands rolling and grassy.

123. CASTLE CAPE FIORDS: Intricately scalloped topography south of Chignik, with Castle, Kuiukta, and Devils Bays and very intricately dissected and extremely rugged intervening fiord network. Bedded sedimentary rocks give fine-textured appearance. Pale rock colors and deciduous vegetation make fiords less somber than elsewhere in coastal Alaska. Castle Cape with layered rocks of many hues, and high pinnacles; landmark to sailors.
   a. Devils Bay: A small inlet, it is virtually enclosed by steep mountain walls which are finely layered and eroded into diverse formations.

124. SHUMAGIN DISSECTED ISLANDS: Similar shoreline pattern to the above, but crystalline rocks predominate. Succession of deep bays and narrow inlets. Vegetation grassland with exceptionally deep luxuriant moss. Sea otters readily seen in numbers.

125. HOODOO LAKE-CANOE BAY: Intricate erosional topography in poorly consolidated rocks surrounding Hoodoo Mountain, with lake in flat basin just beneath. Deeply-gouged cirque lake enclosed by rim of adjacent Mount Dana, beneath which lies nearly enclosed Canoe Bay, with narrow marshes rimmed by steep low mountains.

126. PAVLOF VOLCANO-IZEMBEK LAGOON:
   a. Cathedral Valley: Long valley, wide below, narrowing near head, rimmed by starkly-eroded cliffs and fluting formed from buttresses of surrounding volcanoes. Northward draining, tundra.
   b. Izembek Lagoon: Extensive series of Bering Sea coastal lagoons, sheltered by spits and sandy islands, with marshes extending inland. Outstanding viewing area for geese concentrations during migration. Jagged volcanic mountains rise to south and east.

   Pavlof is a very high symmetrical volcano, with the addition of a lower cone that stands beside it. Just west across Cathedral Valley stands the lower but needle-topped Aghileen Pinnacles. In its vicinity stands the much-eroded remnant of a caldera, with narrow cliff-sided Emmons Lake filling a segment of it. Pavlof has been recently active.

127. SHISHALDIN VOLCANO-FISHER CALDERA: On large Unimak Island, 9300 foot Shishaldin Volcanoe rises steeply in perfect snow-covered symmetry. Just east and almost totally separated by a low pass stand the contrasting Isanotski Peaks, a volcano whose top has been

as Karluk where salmon and the brown bears which feed on them are readily observed. Tangled high brush of alder, devil's club, and salmonberry cover mountains to 2000 feet, but interspered with large meadows and birch parklands on lower slopes in places, and attractive cottonwood groves near stream mouths.

a. Three Saints Bay: A curving rather small narrow fiord on the south side, with a seabird islet near its mouth, and inlet with gravel beach and large intertidal reef. Warmer tone to this fiord than to those further east in the Gulf of Alaska, due to the yellow-green hues of the deciduous vegetation and grasses.

GULF OF ALASKA COAST Division (Vegetation: coastal rain forest)

137. NORTHERN AFOGNAK BAYS AND ECOTONE: Along the northwest coast of Afognak Island, the Sitka spruce of the coastal forest opens into lush grassy meadows, and fades into lush grass and brushlands. Topography is a series of long, narrow inlets with bold but often green headlands and irregular shorelines with many islets. Innumerable ponds, some shaped like the inlets and barely separated by intervening lowland. Low mountains near coast, becoming more gentle in the interior of the island. Red Peak low but colorful. Extends from Devil Inlet and Hidden Lake to Malina Bay and Afognak Lake, across the vegetation transition.
138. KACHEMAK BAY: Unique combination of contrasting, though separately common landscapes. Rather wide long inlet, partially enclosed near outer end by long low Homer Spit of gravel. South coast characteristic coastal forest, with coves and low-descending glaciers from Kenai Mountains, of moderate height but extremely rugged crest. On the north side, gravel beaches, gently sloping benchlands, with alternation of boreal spruce woods, birch groves, and an extensive complex at various levels of small to large meadows. Available vista may look through birches, across large flower-filled meadow out over the bay, across at the white glaciers and dark forests fringing the crags bounding the view.
139. KENAI FIORDS: A very compact series of narrow inlets, islands and sea stacks backed by the Kenai Mountains to the north. From the Harding Icefield atop these mountains, glaciers descend steeply into the fiords, some calving into tidewater. Rising seawater with respect to the land has drowned the valleys, inundated the bottoms of cirques, and created an extremely intricate scalloped topography which is the best representation of its type on the west coast of North America. In many cases, adjacent fiords are separated by curving, ruggedly glacier-carved mountain ridges only a few hundred yards thick. Sparse coastal forest. Seabirds and marine mammals perhaps visible in greater abundance than in any other major Alaska fiord area except nearby southwestern Prince William Sound. Puffins are particularly common.

near outlet of fiord. The most notable characteristic distinguishing the fiords in this area from Alaskan fiords elsewhere is the contrasting juxtaposition of tidewater glaciers and fringing high mountains with dark green forests, in some places right up to the glaciers. Kittiwake colony.

b. Esther Passage: Narrow passage between Esther Island and mainland, forested near tidewater, but with high granite walls in places, down which fine lacy waterfalls plunge.

c. Unakwik Inlet: Long fiord with glacier at head and various small offshoot bays and lakes. Patterned vegetation between patches and stringers of forest and open muskegs covered with sphagnum moss, and coated with tiny but colorful flowers in season.

d. Columbia Glacier: Very broad glacier with high seaward face. Great length and breath visible retreating into the higher mountains. Areas of forest approach in places nearly to ice. Heather Island separates inlet into two bays. Glacier Island, very dissected and with hummocky rock outcrops, borders the foot of the bay.

Granite Bay on Esther Island also has high cliffs and falls. Muskegs and meadows alternate more frequently with dense forest than in most areas in the coastal forest region. Coghill Lake is a partially wooded lake adjacent to College Fiord, its luxuriance contrasting with the cliffs and glaciers just up the fiord. Cascade Bay in Eaglek Bay has several rather large waterfalls, coming from lakes above the bay. Lowland lakes and tarns are abundant in the area.

143. KEYSTONE CANYON GORGES: Just above Valdez, the Lowe River has carved a deep exceedingly narrow slit through the lower edge of the mountains. Several similar tributary gorges are carved on the north side of the river, just upstream from the main canyon.

144. PORT FIDALGO COVES: Three coves cut into the south shore of Port Fidalgo, Two Moon Bay being especially noteworthy. This is an area of isolated abrupt low mountains, separated by expansive gentle topography mostly clothed in muskeg bog, with scattered trees providing variously shaped silhouettes.

145. LOWER COPPER RIVER CANYON: A very wide flat-bottomed steep-walled canyon winding entirely through the high coastal mountains, the Chugach Range. Wood Canyon, a narrow low gorge where the entire river is narrowly constricted. Very steep alder-covered slopes alternating with rock buttresses and glaciers rise directly 6000-7000 feet above the river. Low sand dune deposits. Two large glaciers, Childs and Miles, calve directly into the river, one in a lake-like widening, the other in a rapid narrow section. Transition from birch-spruce woods just below Chitina, through long section with heavy brush and the odd cottonwood, to coastal forest at the very lower end. Bears and goats often seen along the river.

floored basin, bordered by large white-fronted glaciers, and rimmed by a solid semicircular wall of high distinctive mountains. Hubbard Glacier, with a very high wide face breaking into the bay, is slowly advancing. Behind its right edge are the Russell-Nunatak Fiords, which are presently saltwater, but have before been fresh and may soon be once again.

149. LOWER ALSEK CANYON: Portion of lower Alsek River segment in Alaska. Very large fast glacial river in wide bed. Basin-like section closely hemmed in by high peaks, near border. Then flows by five-mile wide Alsek Glacier which calves steadily into the river, and into Dry Bay estuarine flats below. High summits of Fairweather Range to south visible over glaciers from river. Deception Hills adjacent to lower portion of gentle alpine hills with many small lakes set in basins.
150. CHILKOOT PASS-DYEA VALLEY: Wide forested valley narrowing upstream between steep glacial-smoothed rock walls and hummocky outcrops on valley floor. Steep boulder field leading to pass, below which subalpine fir and white birch enter from Canadian side. From Pass, vista of fiord beneath rock-bound valley to south; series of large lakes on upland basin in Canada to north.
151. FAIRWEATHER COAST-LITUYA BAY: Extensive sand beach, wide due to recent uplift, between LaPerouse and Fairweather Glaciers. Forested benchlands behind beach, leading to low rocky mountains. Between them and high Fairweather Range peaks of Crillon and LaPerouse is Desolation Valley, following a fault line and mostly filled with chaotic glacier jumbles. Central portion entered by Lituya Bay, which penetrates through a turbulent bouldery defile between spits. One ridge scoured of vegetation to 1700 feet high by recent massive tidal wave. Cliff-edged Cenotaph Island in bay is host to seabird colony. Long low ridges in upper forest formed by ice front.
152. BOUSSOLE-DIXON BLUFFS AND BEACHES: Separating the extensive beaches to north and rocky inlets to south is a transitional section with bold headlands and deep halfmoon bays with sandy beaches. Dixon River flows from one valley. Small lakes in heads of flat-floored valleys near glaciers. Foot travel feasible between these bays, uniting them in sequential visual experience.
153. DUNDAS BAY: Long bay with a number of inlets. Low mountains with much exposed bedrock and steep bluffs rim the bay, except for large flat at head of west arm. High humpy ridge protrudes into bay, rather symmetrically separating twin valleys, one filled partly by upper portion of bay.
154. GLACIER BAY WEST ARM: Rather wide bay narrowing into tributary fiords, each with its own distinct character, including islands largely of exposed bedrock and rimmed by mountains of quite diverse rock types, all heavily scoured, bared and rounded at lower elevations by intense glacial action. Vegetation successively less developed up bay.
    a. Upper West Arm: An austere terrain smoothed by glaciers, but much bedrock, glaciers entering from gaps in shoreline, and

and thus are a very conspicuous visual element creating diversity as seen from the water.

Along much of this coast is a gently rolling low sea-cut bedrock bench, thinly covered with muskeg-like vegetation with rounded rock outcrops. Most distinctive along shorelines and islands is massive smooth rounded low bedrock rising from the water much in the manner of the Quetico-Superior canoe country or San Juan Islands in Puget Sound. Goulding Lakes chain inland.

157. EDGECUMBE VOLCANO: A rather low rounded symmetrical volcano rising on Kruzof Island just north of Sitka. Set apart from other mountains, its smooth volcanic form contrasting with mountains within view in the area.

158. EAST BARANOF BAYS AND WATERFALLS: Mountains of southern Baranof Island are higher and more rugged than elsewhere on Alexander Archipelago. They rise more steeply from the east shore. In the Nelson Bay-Warm Springs Bay area are steep rock slopes, stair-step lake groups in the descending glacial basins, and striking waterfalls that fall between levels or directly into saltwater. Warm springs may be found in bay of that name. Small glaciers common.

159. RED BLUFF BAY: Particularly narrow deeply penetrating fiord on east side of southern Baranof. High rock bluffs above the bay, but long fairly gentle valley meandering far into the mountain spine. Red rock exposure on bluff near entrance.

160. SOUTHWEST BARANOF FIORD COAST AND LAKES. Series of ocean-exposed but long narrow inlets and lakes in similar basins on west coast of Baranof. Redoubt Lake barely separated from saltwater. Other bays with shallow turbulent entrances. Long inlets such as Great Arm of Whale Bay. A cluster of rock basin lakes just south of these inlets, in very rugged settings beneath steep glacier-hung peaks, among them Rezanof and Plotnikof.

161. HASSELBORG LAKE CHAIN-PACK CREEK BROWN BEARS: On Admiralty Island, wide area of gently rolling uplands between the mountains of the north and south portions, with rounded wooded ridges and scattered ponds. A traversable chain of lakes and streams, with beaches and forested shores, including many very large Sitka spruce giants. Short forest-rimmed Hasselborg River has falls as well as gentle portions. Along Seymour Canal on east shore, series of productive salmon streams such as Pack Creek, where the very dark brown bears characteristic of this island can be observed fishing during the salmon runs. Humpback whales frequent Seymour Canal.

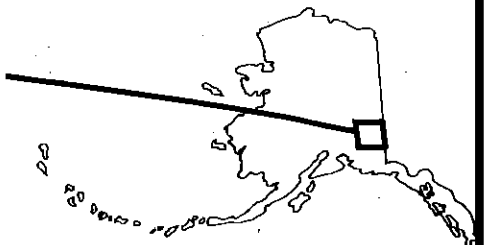
    a. Hasselborg Lake: Long narrow lake whose lower end is rimmed by lowlands with tall forest, while the head is rimmed by a cluster of steep-sided mountains.

    b. Kootznahoo Inlet: Draining west from Hasselborg River, a series of salt lakes, meadow-rimmed salt pools, and a maze of rocky intervening channels with rapid tidal currents; exceptionally luxuriant readily visible subtidal marine plant and animal life.

169. YES BAY-ANAN CREEK LAKES: On Cleveland Peninsula, long narrow inlets such as Bailey Bay and similarly shaped coastal lakes such as McDonald Lake adjacent to Yes Bay. Waterfalls descending from lake valleys such as Shelokum into saltwater. Clusters of smaller interior lakes and tarns both north (Anan side) and south of main ridge. Large run of pink and chum salmon on Anan Creek attract concentration of readily-observed black bears.
170. UNUK RIVER VALLEY: Medium-sized navigable glacial river entering from Canada passes through wide U-shaped valley, with areas of high smooth vertical granite headwalls. Unusually eroded recent lava formations, and Blue River cutting through them on tributary near Canadian border.
171. DALL ISLAND INLET COAST: Karst topography, forming oddly shaped rock formations, gullies, and pitted topography due to solution weathering in marble. Series of inlets nearly cutting through central portion of island, with rocky marble walls, small islands, and interior ponds.
172. MOIRA SOUND-KLAKAS INLET: A number of long narrow inlets above Cholmondeley Sound, Moira Sound, and Klakas Inlet, on Prince of Wales Island. Rounded hummocky summits of 2000-3500 feet locally surmounted by spire-like summits which escaped glaciation, though only slightly higher. Strings and chains of small lakes in the Niblack and Hetta Lake areas.
173. FISH CREEK-GOKACHIN LAKES: On southeastern Revilla Island, glacier scoured generally rounded upland topography with a mixture of forest, muskeg, subalpine vegetation, and scoured bedrock. Innumerable tarns, ponds, and rather large mountain lakes occupy the many basins scoured by ice in these uplands, extending from Lake Grace and Mirror and Gokachin Lakes down Fish Creek to a cluster of small lakes near the head of Thorne Arm. One of the outstanding lake-dominated landscapes in Southeastern Alaska.
174. RUDYERD BAY-BOCA DE QUADRA-PEARSE CANAL FIORDS: A network of fiords extends along the east (mainland) side of East Behm Canal and Revilla Channel south to Portland Canal along the Canadian border. The northern ones are relatively short with high precipitous bounding walls of smooth granite. Walter Cove, the northern fiord, is winding and narrow, with steep, in some places slightly furrowed walls. Equally dramatic is the setting of Big Goat Lake above the head of this fiord. Boca de Quadra is a rather straight, extremely long fiord with smaller tributary inlets.
    a. Rudyerd Bay: A steep-walled fiord heading in a vertical-walled round basin called The Punchbowl. Just above it is Punchbowl Lake with a large island in the middle. The valleys above these fiords interconnect in a maze of Yosemite-like canyons (similar dimensions and rock type), with rounded mountains above, becoming more craggy farther inland along the horizon.
    b. Willard Inlet: At the southern end of this huge peninsula bordered by East Behm and Portland Canals, lies the best

An Example of a Scenic Complex:

The White River Area



forest. The peaks provide dominating landmarks from almost every viewpoint, while the lakes are special places providing a focus for human journeys and activities.

Surrounding scenery is also important. The sequence of travel through the area, then over Chitistone Pass and down the Chitistone Canyon to the Chitina Valley, then on to the coast at Cordova involves moving through the varied environments of this part of the continent, always in the most spectacular and interesting examples of each landscape type.

Color contributes to the scene in summer and particularly during autumn. The dominant colors of the area are light pastels--greens, oranges, and blues. Color is an important element differentiating this area from landscapes coastward from the Alaska and Wrangell Ranges, where greater rainfall produces much deeper and less subtle coloration.

Natural processes, both ecological and geological, are striking. The landscape is new and in tumult, primarily under the influence of moving ice. The Russell Glacier has surged and changed in the past few years. On bluffs along the floodplain of the upper White River, recent erosion reveals melting permafrost lenses. These same bluffs contain many feet of peat, interlayered with river sediments and volcanic dust. Stumps from a dozen generations of spruce forest lie exposed in the peat, with the present generation growing from the top layer.

The area is one of the best in the Wrangell Mountains Region for viewing dall sheep, caribou, and other species, including schools of grayling and trout, which congregate near the shores of the larger lakes. All of the area is nearly pristine wilderness, except for four small guiding camps.

SUMMARY

VISUAL CHARACTERISTICS DEFINING LANDSCAPE CHARACTER (BLM SYSTEM)

* Landform--physiography, rockform, texture
* Vegetation--type and extent of cover, interfaces
* Water--coasts, lakes, streams, marshes
* Color--rock, soil, vegetation, sky color
* Adjacent Scenery--influence of nearby and distant views

FACTORS DEFINING VISUAL CHARACTER TYPE (THIS STUDY)

* Location--by region within the state
* Relief--large-scale shape of the land surface
* Landform--features and textures of that surface

CRITERIA FOR EVALUATING LANDSCAPES

* Diversity of visual characteristics
* Well developed, clearly expressed single characteristic
* Significant features, landmarks and places
* Outstanding sequences
* Significant visual spaces--vistas, enclosures
* Evident natural process--ecological and geological
* Terrain appearing unaltered by man
* Large scale or striking evidence of wildlife

CRITERIA FOR DEFINING SCENIC COMPLEXES

* Sequence--the unifying factor of human travel patterns
* Viewshed--the area seen from key viewpoints
* Contiguity of outstanding landscapes of varied types

CITATIONS

1. Vineyard Open Land Foundation, "Looking at the Vineyard: A Visual Study for a Changing Island," published by the Vineyard Open Land Foundation, West Tisbury, Massachusetts, 1973. Kevin Lynch, Consultant.

2. We discussed these systems with Duane Lyon and Jim Tallerico, landscape architects for the U.S. Forest Service, Chugach National Forest, Anchorage, and Stan Specht, landscape architect for the BLM State Office, Anchorage. The BLM system is newer and more refined than the USFS system. It is under development by landscape architects, many of whom transferred to BLM after working on the Forest Service system. The Forest Service landscape analysis system is defined in "National Forest Landscape Management Volume 2: Chapter 1: The Visual Management System," USDA Forest Service, Agriculture Handbook Number 462. The BLM system, now being revised, is at Section 6300 (Visual Resource Management) and following sections of the BLM Manual.

3. L. Burton Litton, "Forest Landscape Description and Inventories: A Basis for Land Planning and Design," USDA Forest Service Research Paper PSW-49, 1968. Developed further in Litton, "Aesthetic Dimensions of the Landscape," in John Krutilla (ed.), Natural Environments, Resources for the Future, 1972. pp. 262-291.

4. Clyde Wahrhaftig, "Physiographic Divisions of Alaska," U.S. Geological Survey Professional Paper 482, 1965.

5. Edwin H. Hammond, "Classes of Land - Surface Form," map of Alaska, National Atlas Sheet Number 61, U.S. Geological Survey, 1969. Howell Williams, "Landscapes of Alaska - Their Geological Evolution," U.S. Geological Survey, 1958, and Robert L. Detterman, "The Arctic Lowland Region - Potential Landform and Lifeform Natural Landmarks, U.S. Geological Survey, 1974.

6. Joint Federal-State Land Use Planning Commission for Alaska, "Major Ecosystems of Alaska," 1973.

7. Summarized in memorandum and map, "Intergovernmental Meeting on Data and Evaluation Criteria for Natural and Cultural Features," Duncan L. Read to Co-Chairmen, Federal-State Land Use Planning Commission for Alaska, August 22, 1977.

8. Scenic evaluation, maps, and discussions by Richard J. Stenmark in "Recreational and Preservation Opportunities in Alaska" and "Resources of Alaska - A Regional Summary," completed by Resources Planning Team, Joint Federal-State Land Use Planning Commission for Alaska, July, 1974.

ACKNOWLEDGMENTS

This study is a cooperative endeavor of the authors and the illustrator, Ayse Gilbert, who also coordinated the publication process. Special credit is due to Susan LeFever, cartographer, to Karen Christensen, Grace Hill, Nadine Stredwick, and Dorcus Wasson, for their elegant typing, and to Richard Stenmark and Sally Gibert for their critical review of the manuscript.

9. Scenic and landform maps by Richard J. Stenmark in "The D-2 Book, Lands of National Interest in Alaska," Joint Federal-State Land Use Planning Commission for Alaska, May, 1977.

10. Richard J. Stenmark, Federal-State Land Use Planning Commission, map overlays on 1:250,000 scale giving scenic quality rating.

AN EXAMPLE OF A SCENIC COMPLEX: THE WHITE RIVER AREA

The northeast corner of the Wrangell Mountains region in Alaska and extending into Canada is superlatively scenic. The scenic complex includes the upper White River drainage and the adjacent area drained by Ptarmigan Creek. It is an unusually fine example of a type of landscape complex found generally along the northern margin of the Pacific Mountain System at places where the high peaks are adjacent to hills and lower mountains. The area is exceptional by the criteria used to define outstanding visual units and scenic complexes.

The area is unified by a number of visual characteristics. It can be defined as the area from which the high white Natazhat ridge of the St. Elias Mountains is seen as the dominant natural landmark. This ridge dominates views from the White River valley floor, is framed by views across Rock and Ptarmigan Lakes, and is still dominant from the ridges to the north, as far as Wiki Peak several miles beyond Ptarmigan Lake.

The landform of the area is defined by three major elements: the St. Elias and Wrangell high ranges to the north and west, the broad, lowlying White River Valley, and the complex of hills and mountains rising above Ptarmigan Creek and the White River tributaries to the north. The view as seen from a number of critical viewpoints tends to lie within the area, adding to the perception that the area is a single visual space. Some of these key viewpoints are North Fork Island in the White River, the shores of and ridges above Rock and Ptarmigan Lakes, and the ridges near Ping Pong Mountain.

The sequence of human travel patterns further confirms this unity. Once in the area, people tend to stay either within the large basin of the White River or the smaller basins of Rock and Ptarmigan Lakes. In either case, their visual world is circumscribed by the boundaries of the area. People passing through the area on foot, horseback, or light aircraft almost all come along a route between Chisana and Chitistone Pass, the only break in the Wrangell-St. Elias mountain barrier. For these travelers, the area is clearly defined as the complex of lakes, hills and valleys dominated by the Natazhat ridge.

The upper White River, running parallel to the Natazhat ridge, separates the hills from the high mountains, creating sweeping vistas and a perception of vast space. This pattern repeats at only a few places along the edge of the Southcentral Alaska arc of high mountains, notably also in the vicinity of Wonder Lake, where the McKinley River separates the Alaska Range and the Kantishna Hills.

The area has tremendous visual diversity in form, texture, and color. In close proximity are large lakes and small lakes, lakes set in forest and lakes set in tundra. There is the vast open White River valley and the intimate setting of Ptarmigan Creek, winding through white spruce

network in Alaska of exceedingly narrow extremely long fiords. Many have intense tidal turbulence at their mouths except at slack tide. Willard Inlet, off Pearse Canal, is typical, although more crooked than most, with rather steep but fairly low and forested mountains rising closely above it, creating a vista of powerful enclosure, yet of proliferating life. The latter is enhanced, since this most southerly area of the Alaskan mainland exhibits the greatest variety of tree species, including silver fir locally, as well as the differing textures of cedar, hemlock, and spruce.

c. Hidden Inlet: Fiord off Pearse Canal of small dimensions, with very turbulent entrance, narrowly separated walls, and steep primarily bedrock slopes rising from each side, creating an almost austere sense of deep enclosure.

175. TAKINSHA MOUNTAINS-CHILKAT EAGLES: West of the Chilkat River, the Takinsha Mountains tower above Haines, a classic compact spire-topped, ice-hung fluted range of alpine peaks. The Tsirku and Takhin Rivers cut interconnecting valleys far back into them, with colorful rock outcrops. Along the Chilkat River in winter, near Chilkat Lake, is a major concentration of bald eagles, readily visible, which roost in tall cottonwoods along the river and feed on late-spawning and dead salmon.

162. TAKU INLET: Taku River from Canada flows into long tidal inlet near Juneau. Cottonwood and spruce swamp forest on river bottoms. Small steep Hole in the Wall Glacier and wide Taku Glacier calve into river. Twin Glacier calves into lake of that name adjacent to river, partly heated by hot springs. Meadows and smooth vertical granite faces along portions of lower inlet.
163. TRACY ARM-ENDICOTT ARM: Within Holkham Bay, framed by nearly enclosing outer ridges and the massive hump of Sumdum Mountain above it, two long rather narrow winding fiords bifurcate, each heading in glaciers. Topography of these fiords is of steepening walls toward the head of the fiord, becoming smooth almost sheer often exfoliating granite, long furrows in walls where mountains appear to be pulling apart, occasional often-precipitous edged side canyons, and fairly high but glacially rounded dome like summits.
    a. Tracy Arm: Very long winding fiord with near-vertical walls with cascades, rounded high rims, and two glaciers entering near head, bordered by mountains much rounded off by flowing ice.
    b. Fords Terror: Much smaller fiord off Endicott Arm, with roaring tidal maelstrom near mouth, and narrow canyon-like interior between smooth walls, with narrow crannies leading up between the sheer walls, individual trees accentuating the contrast of the gray rock and blue water. Waterfalls along cliffs. Beach at head.
164. SCENERY COVE AND LAKES: Near the Baird Glacier at the head of Thomas Bay, small narrow steep-walled cove, with waterfalls. Above it, pair of narrow alpine lakes in rugged setting.
165. TEBENKOF-BAY OF PILLARS: Two adjacent bays in forested rolling uplands with scattered steep-sided low mountains on the west side of Kuiu Island. Irregular shorelines and numerous side inlets. Large tidal flats with grass and sedge favored by deer. Land mainly forested, with often-wooded muskegs interspersed. Extensive series of islands, many rocky or steep-sided and flat topped, within bays of generally rock-rimmed character.
166. ROCKY PASS: Rather narrow winding island-dominated waterway, with irregular often-rocky shoreline and extensive grass flats and bars. Large waterfowl flocks readily seen here during migration.
167. LOWER STIKINE RIVER VALLEY: Stikine River enters from Canada, flowing through wide U-shaped steep-sided valley, with tributary valleys leading to lakes, glaciers, and peaks. Steep-sided horn of 10,000 foot Kates Needle visible north from the river. In places glacier approaches near river, or high rock-walled ridges rise from the valley floor.
168. ETOLIN ISLAND INLETS AND LAKES. Across central part of Etolin Island lie Burnett, Mossman, and Menefee Inlets which are very long, narrow cuts with intimate forest and upland landscapes in enclosed settings. Between them are low mountain uplands with strings of alpine lakes, the near view of which contrasting with the view down the inlets beyond.

several small flats and gravel beaches. Only low brush in sheltered locations where a little soil has formed. Large gently-rising glacier above head of Tarr Inlet.

b. Johns Hopkins Inlet: A different world, as this inlet bends and narrows, with 6000 foot rock walls flaring only slightly, and small glaciers forming frozen cascades down them. Glacier at head with zigzag morainal pattern on ice, and three 10,000 foot pyramidal peaks rising side by side from head of glacier. Penetrates more deeply into very high mountains than any other Alaska fiord.

155. GLACIER BAY EAST ARM-PLANT SUCCESSION: Smaller arm, partially bordered by both erosional and depositional ice-formed topography of moderate relief. Low distinct rusty-colored pyramid, the Nunatak, rises along the shore. Further up, White Thunder Ridge of pale granitic rocks rises low but almost sheer from the water. All stages of vegetational succession down from head of bay: from lichens on rock, to moss, to mountain avens, to willow patches, to alder brush, to scrubby spruce in heavy brush, to cathedral-like just-matured forest with straight columns and open mossy forest floor, to island with fully mature uneven-aged snaggly-topped spruce-hemlock forest with brushy openings and low brush on forest floor.

a. Upper Muir Inlet: Muir Glacier steadily retreating, leaving for the moment the Alaska Fiord most sterile of terrestrial life, but favored by a large seal herd which raises pups on iceflows. High-faced active glacier at head, and smoothed recent ice remnants, no longer moving, up side valleys.

b. Adams Inlet: Extensive basin with rim of higher mountains and large glaciers, partly saltwater, partly extensive flats from bare mud to early successional vegetation, partly low hills. Evidence of earlier forest in trunks and stumps still visible near shore.

156. WEST CHICHAGOF-YAKOBI ISLAND COAST:

a. Ogden Passage-Slocum Arm Waterway: An unusual sheltered continuous waterway along the west edge of the main island, with intervening salt lakes and meadow-fringed bays, but separated from the ocean by a nearly solid string of small narrow islets. Scrubby forest, with many trees shaped by the elements into contorted shapes, and intermingled partly wooded to open muskegs. Whereas interior muskegs are stands of spire-shaped black spruce and feathery tamarack, the coastal type is quite different, with an extremely picturesque form of low often contorted lodgepole pine, often with individual trees or small groups of separate, discrete small ponds on brush-free sphagnum floor, dark often flag-shaped mountain hemlocks, and rusty barked paler-needled cedars, the latter often in rows rimming the muskeg. Due to high precipitation and often poor drainage, these coastal muskegs often grow on gentle slopes, rimmed with trees at the break of the slopes,

146. WEST COPPER-BERING RIVER DELTA:
   a. Controller Bay Spits-Kayak Island: Controller Bay, shallow with silt flats, bordered by a series of islands and spits. Okalee Spit is low, long and narrow. Wingham Island is higher, with seabird colony. The flats at the head of the bay are distinctive, with a large glacial outwash and delta plain with a mosaic of small lakes, ponds, marshes, sloughs, and indefinite streams. Kayak Island is fairly low except near the south tip, where a 1600 foot vertical yellowish-white cliff drops off virtually into the sea.
   b. Berg Lake-Bering Waterfalls: The upper Berg Lakes, one of which is partially separated by the edge of Bering Glacier, is filled with floating ice, and backed by the precipitous glacier-hung face of the horizontally-layered Carbon Mountain. Below the lake, the large glacial Bering River plunges over two large waterfalls, impressive not for their height but for the volume of water plunging over them.

   The area presents a mixture of landscape types unique in Alaska, with extensive marshes surrounding ragged isolated mountain blocks, some such as the Suckling Hills, low but covered mainly with lush grass. Trumpeter swans easily seen in the marshes during summer, and huge numbers of shorebirds and waterfowl use the bays and mudflats in migration.

147. ROBINSON MOUNTAINS: A short distance behind ocean beaches and fringing forest, these mountains separate the coastal lowlands from Guyot and Bering piedmont glaciers. Their south face is a bare fluted nearly vertical wall carved into contrastingly colored and shaded layers, the overall impression a dark purple.

148. SAINT ELIAS RANGE-MALASPINA GLACIER: Extending many miles from the high peaks virtually to the ocean lies the vast piedmont Malaspina Glacier. It is dark and pitted, with vegetation growing on it near its terminus; white and nearly flat behind, with strikingly contrasting black lines of medial moraine rock, in places very contorted into a ragged but repetitive pattern of compression. The mountains are individually distinctive, from the ice-sheathed battlements of Cook, the great dark rock faces of Augusta, to the enormous south-facing cliffs and white summit pyramid of Saint Elias. Viewed from Ocean Cape at the tip of the Yakutat Forelands, the latter appears as an enormous pyramid. A unified vista is gained from the beaches, across the glacier to the summits. Malaspina coastline is predominantly a series of wide sand beaches, fringed by ponds, marshes, young forest, or meadows. Flower displays in the meadows are not exceeded in the state.
   a. Icy Bay: This inlet is choked with calving ice from various glacial lobes, and separated by high rugged groups of hills. The vista over saltwater from the hills on the southwest rim of the bay up the Tyndall Glacier to Saint Elias, is outstanding.
   b. Disenchantment Bay-Hubbard Glacier: Disenchantment Bay, the head of Yakutat Bay, gives the feeling of being a vast water-

a. Beauty Bay: An inlet in the West Arm of Nuka Bay, under the sharp spire of Iceworm Peak.
b. Harris Bay: Sea arches; bay nearly divided into upper and lower segments by islets nearly across its center. Northwestern Lagoon with numerous entering glaciers.
c. Aialik Bay: Low but ragged icy peaks on all three sides, small Quicksand Cove Beach. Chiswell Islands at mouth with large seabird and sea lion colonies.

140. MONTAGUE EARTHQUAKE COAST: The Hanning Bay area of southwest coast of Montague Island illustrates the 30-foot uplift during 1964 earthquake. Bog, forest, and alpine tundra in close proximity in adjacent McLeod Harbor, a characteristic pattern in Prince William Sound.

141. SOUTHWEST PRINCE WILLIAM SOUND ISLANDS AND FIORDS:
a. Knight Inlet Coastline: Of all the islands in Prince William Sound, this one is particularly striking due to its submarine volcanic origin. Lumpy pillow lavas on a large scale make much of the island appear dominated by round smooth bare bedrock, of many shapes, though high cliffs and low rugged peaks have been carved by glaciers. An extremely incised west coast provides diverse landscapes, which are set off by narrow channels bordered by islands and a string of rocky islets. Between Deer Cove and Drier Bay, precipitous faces some with waterfalls, plunge to the saltwater, and rise to three bold low mountains, The Three Giants.
b. Icy Bay-Jackpot Bay: Jackpot Bay is small, rimmed by glacier-hung peaks, and a series of small lakes up the valley. Icy Bay and associated Nassau Fiord reveal many icebergs that have calved from the entering glaciers and are favored by the many harbor seals. Several small seabird colonies. Sharp-topped Pinnacle Mountain visible above the head of Icy Bay.
c. Bainbridge Narrows: A very long narrow marine passageway shows a diversity of textures and rockforms at close range, with patches of dark coastal forest, little meadows, and ribs of rock. Sea otters often seen. West end frames Bainbridge Glacier across Port Bainbridge. Winding channel, scattered islets.

Whales of diverse species can perhaps better be seen in these waters than any other accessible place in Alaska, although an equal abundance of one species, the humpback whale, can be seen along the east side of Admiralty Island in Southeastern Alaska. A maze of mountainous but small inlets, bays, and islands drop off into the Pacific in bold headlands from Elrington and adjacent islands.

142. NORTHWEST PRINCE WILLIAM SOUND:
a. Harriman Fiord: A nearly enclosed narrow long arm of Port Wells, bordered by long mostly bare slopes leading to very high craggy peaks, incised by glaciers which calve into the fiord. Yet somewhat gentle topography immediately adjacent to parts of shoreline. Scrubby coastal forests on lower slopes

deeply eroded into huge pinnacles. Well to west across lush tundra and low brush is the remnant of Fisher Caldera, containing two large lakes, and opening east toward the high volcanoes. Completing a triangle between them is Tugamak Ridge on the north edge of the island, offering an overlook to the volcanoes.

128. OKMOK CALDERA: On Umnak Island, much like Aniakchak, but with higher Tulik Cone looming from just outside steep enclosing walls, and steaming from many fumaroles much as the Valley of Ten Thousand Smokes must have once appeared. Colorful cones and broken lava flows.
129. ISLANDS OF THE FOUR MOUNTAINS: A cluster of rather small islands, each representing the above-water portion of a distinct volcano. Two of them, Carlisle and Cleveland, are perfect high cones, the latter steaming furiously in recent years. Two other high volcanoes visible on nearby Umnak Island.
130. WEST ATKA FIORD COAST: A long, narrow, indented grassy island, with many long narrow fiords nearly cutting the island into pieces, steep-sided low mountains, and many ponds and lakes.
131. ADAK LAKES AND BAYS: Southern part of Adak, characterized by grassland and bold rounded rock hummocks and promontories on low mountains. Coastal cliffs, fiords, and interior formed by glaciers into rugged topography and innumerable ponds and lakes. High coastal cliffs. Many waterfalls, including Bay of Waterfalls, where many cascade into the sea.
132. KANAGA CALDERA AND VOLCANO: Volcano on northern peninsula of Kanaga Island, with Kanaga Volcano, and small Kanaga Caldera, whose main ridge, Kanaton Ridge is separated from the volcano by a lake-filled depression, and which provides an excellent viewing platform.
133. SEMISOPOCHNOI CALDERA: Five-mile wide caldera, like Okmok and Aniakchak, but with several lakes. Located on small island with Anvil Peak in center.
134. DAVIDOF-KHVOSTOF DROWNED CALDERA: Remnants of caldera formed between the two listed islets and Pyramid Island. Blocks, pinnacles, and remnants protrude from the sea, with openings that a ship can pass between. Various shapes and textures of rocks, including layering, make the vista from within one of the strangest and most dramatic in Alaska.
135. ATTU MOUNTAIN GRASSLAND: Low but steep-sided and closely-spaced mountain topography, with bold headlands and stream valleys around the bays. Exceptionally luxuriant though non-woody lowland vegetation, consisting of tall grasses, herbaceous plants, and in season a flower display not excelled in Alaska. Fog characteristically shrouds the rock forms and hides the emerald hues seasonally so vivid on Aleutian Islands such as Attu.
136. WEST KODIAK FIORDS AND LAKES: A nearly interconnecting network of long fiords and similarly-shaped lakes dissect west-central Kodiak Island. Wide grassy valleys separate the rather low but boldly carved bedrock-exposed crystalline mountains. Inlets varying from long straight Uyak Bay to narrow winding Moser Bay, and lakes such

c. Valley of Ten Thousand Smokes: Extensive intermontane flat-bottomed basin covered with buff-colored compacted ash, deeply cut by streams into narrow gorges, surrounded by rounded mountains, and rimmed at head by Knife Peak and other medium-height volcanoes. Erosional and depositional processes rapidly altering character of landscape.

Inland slope of Aleutian Range, with low layered mountains backed by unified cluster of 5000-7000 foot volcanoes of irregular shape. Brushy open birch or spruce woodland, grading into tundra. Chain of large mountain lakes, extending from Brooks to Battle, along mountain front. In northeast, extensive series of bedrock benches at successive levels, deeply entrenched by stream, where differential resistance of sedimentary rocks and ash or lava flows have allowed erosion to expose the harder nearly horizontal surfaces, and form cliffs through the softer materials.

118. KATMAI VOLCANO AND INLET COAST: Series of deep inlets and low capes, vegetated by luxuriant high brush with interspersed meadows. Kukak Bay, rimmed by group of volcanic peaks, some rounded, some very sharp, with broad mud flats at head. On these mud flats, sedge meadows, and near stream mouths, brown bears can often be readily observed feeding and resting. Coarsely laminated mountains, behind which loom the network of volcanoes.
    a. Geographic Harbor: Picturesque fiord with very narrow passageway entering it, bordered by low bedrock and sand beaches. Rimmed by steep-sided rather flat-topped mountains of tans to purples, with laminations of all shades, the pattern repeated in miniature on beach rock outcrops. From just outside Amalik Bay (of which Geographic Harbor is inner part), one can see Mount Katmai volcano, which has a round level rim with a silhouette like shark's teeth, showing the remnant after the top collapsed inward in this century.
119. BECHAROF SOUTHEAST ARM AND PEULIK ACTIVE VOLCANO: Newly active low volcanic cone near the Gas Rocks under Mount Peulik on the south shore of Becharof Lake. Rim of low but ruggedly eroded mountains in valleys that rim the long narrow Southeast Arm of Becharof Lake. Adjacent smaller lakes and Portage Bay, with steep cliffs along coastal inlet. Many low islands in Southeast Arm with tall grass, favored by brown bears.
120. CHIGINAGAK VOLCANO COAST: Bay and inlet coastline, with small rocky islets, between Wide Bay and Nakalilok Bay, with layered rock strata in mountains near coast, extensive bay-head tide flats, and string of round to peaked volcanoes inland.
121. ANIAKCHAK CALDERA AND BEACHES:
    a. Aniakchak Caldera: Large crater within volcano, rimmed by cliffs, containing cones and Surprise Lake, and sparse vegetation just becoming reestablished following volcanic activity about 1930. Aniakchak River flows from lake through narrow colorful gash in wall, The Gates.

111. KONTRASHIBUNA-TAZIMINA LAKES: Large waterfalls cascade from rivers below each of these lake groups. The two Tazimina Lakes lie to the south. The upper lake has extensive gravel beaches and rugged mountain borders. The lower lake has lower more rounded mountains looming above it. The vegetation around the lower lake is a gradation between boreal forest and maritime tundra, with patches of birch and spruce, tundra, and areas of dry lichen-floored open spruce woodland.
    a. Kontrashibuna Lake: This is a particularly impressive lake. Sand beaches fringe the lower portion. Above a bend is a long straight stretch leading into mountains of only moderate height but extremely rugged and with small glaciers. Low vertical cliffs line the upper end of the lake, with one rock promontory, channeling the view deep into the narrowing defile between the peaks.

112. MULCHATNA-CHILIKADROTNA FOOTHILLS BASIN: An extensive basin with woodland along much of its floor, with scattered hills such as the Bonanza Hills rising from its floor, and rimmed by a series of foothills, wooded along their slopes but with tundra on top. These provide easily attainable viewpoints since they fringe the Mulchatna River and their woodlands are open. One gains a sense of a vast enclosed basin, visible from many places within or along it, and backed by the Chigmit Mountains. The rivers flowing through it are rather small, rapid, and clear, since the glacial flour settles in the lakes from which they spring. The bulk of this complex lies within the Interior Division, but it ties more closely in visual terms to the mountains.
    a. Mulchatna Foothills Valley: At the lower end of its foothills portion, the Mulchatna is rather closely rimmed by low but interesting foothills, with their diverse vegetation and easily attained summit views. This section ends at Red Bluff, where the foothills end, and the spruce forest away from the river shoreline changes abruptly to tundra.

113. KOKSETNA VALLEY AND BLUFFS: Set in rather low hills, this river nonetheless is striking due to the abundant rock outcrops which are exposed in this country. The river itself has bold bluffs, and sections carved into low but narrow rock-rimmed gorges, with cascades and pools. It is surrounded by open woodlands with extensive open areas.

<u>ALEUTIAN RANGE Division</u> (Vegetation: tundra and high brush)

114. REDOUBT-ILIAMNA VOLCANOES-COOK INLET COAST:
    a. Crescent Lake: Medium-sized lake set into west edge of Chigmit Mountains. White spruce forest but with heavy brush from coastal influence. Extensive sand beaches near lower end. Line of craggy summits surrounding upper lake. Redoubt Volcano seen from lower end, a contrasting form.

105. CHELATNA LAKE: Long narrow mountain-front lake on the south slope. From gentle woodlands at its foot, it leads into the lower reaches of the Alaska Range, with a small cluster of smooth sheer granite spires above Cripple and Snowslide Creeks beyond the head of the lake.
106. CATHEDRAL SPIRES: Forming the headwaters of the Kichatna River, a number of narrow finger-like smooth glaciers deeply dissect a compact cluster of smooth-walled granite spires. These vertical crags can be closely seen from the intervening glaciers, which separate them into individual ridges and peaks of modest actual rise from base to top, but very impressive due to their sheerness and the small spaces from within which they are closely seen.
107. REVELATION MOUNTAINS:
    a. Hesperus-South Buttress Glacier Gorge: Spires of similar form and character to the Cathedral Spires, but less completely separated from one another, though rising taller due to the lower elevation of the glacial approach. A single very narrow extremely deep glacial trough with mountain walls scarcely separated by side canyons, abruptly terminated against the scarps of Golgotha and Angel Peaks at the south end.

    The surrounding Revelation Mountains are an exceptionally remote area of tall cliffs at the head of the Big River, rimmed by gentle alpine flanks on the west. The vista of Hesperus rising a sheer 8000 feet above the lowlands near the head of the Big River shows one of the most abrupt mountain faces in Alaska.
108. MERRILL PASS AREA SPIRES AND LAKES:
    a. Two Lakes-Necons Chilligan Pass: A narrowing alpine valley penetrates the Chigmit Mountains to a low-elevation pass characteristic of this particular mountain range. A small lake lies at its head, from which is visible the contrasting landforms of crystalline spires on the west side (Two Lakes-Necons), and the gentler, colorful, much more talus-covered mountains on the Chilligan River side.
    b. Chakachamna Lake-Merrill Pass: Sharp granite spires near Merrill Pass, most notably The Tusk and Skwentna Spires. Down river to the east are two contrasting lakes: Kenibuna, nearly filled in from glacial outwash and nearly blocked by Shamrock Glacier, yet with wide beaches and gentle wooded slopes; and large straight Chakachamna, a classic mountain lake, with high glacier-covered pinnacles rising directly from the south shore, except for a sandy beach near the stream outlet. Just northeast of the lake rises the high bulky mass of Mount Spurr, a recently active volcano.

    These two visual units encompass the Revelation Mountains scenic complex, with Necons-Chilligan Pass lying directly north of Merrill Pass.
109. LAKE CLARK PASS AREA CANYONS AND LAKES: This complex encompasses the west side of the Chigmit Mountains, including Turquoise, Twin, Lachbuna, and Portage Lakes at the mountain front, and the deep

and moose often seen, and Kenai Mountain rises from east edge of lakeland.

99. KENAI MOUNTAINS AND LAKES: Forest and extremely attractive mixture of dark mossy spruce transition from boreal to coastal forest, with subalpine mountain hemlock band, yet mixed with light-textured birch and aspen woodlands, and interspersed with grassy meadows. Discrete massive mountain blocks separated by network of through valleys and low open passes. Tilted benchlands on west rising east to glaciated mountains. Abundant valley-floor lakes of all sizes as well as alpine tarns. Long gentle subalpine valleys.

100. HEALY BADLANDS: Small portion of unglaciated high rugged foothills on north flank of Alaska Range. Soft rapidly eroding poorly consolidated rock strata forming small amphitheaters, delicately fluted badland cliffs, and badlands in oranges and reds, as at Suntrans. Along Lignite Creek thinly laminated bluffs expose all shades from black coal to white lenses, in addition to pale buff.

101. DENALI HIGH PEAKS AND LOWLANDS:

a. Chilchukabena Lake-Roosevelt Hills: Isolated hills with granite outcrops rising out of vast plain, cradling lake in basin facing toward mountains. Views from hills unite into single unified vista a range of visual types from foreground lake and vast sparsely wooded moist lowland below, across tundra foothills to the white wall of the Alaska Range beyond, topped by Denali. Castle Rocks further west provide a similar vista. Closer is the view from the southwest edge of the Kantishna Hills across tundra and woodlands and Wonder Lake toward Denali, often with caribou in the foreground. Primary focus is on high section between Denali, Foraker, and Russell. At closer range one sees the very high cliffs of the northwest-facing Wickersham Wall, and further west, the large and colorful Chedotlathna Glacier curves up toward the pinnacle of Mount Russell.

b. Polychrome-Sable Trough: Separating the Wyoming and Kantishna Hills from the Alaska Range is a subalpine to alpine trough, formed by a line of plains and passes, rather similar to the trough between the northeast Wrangells and the Alaska Range. There, however, a stream flows through part of the trough, in addition to those that cross it. This trough has no stream flowing along it; seven streams flow directly across it, each cutting a narrow V-shaped canyon across the rugged unglaciated high hills to the north. Yet, this trough allows a visual sweep, unifying the extensive and diverse types of terrain bordering it. The McKinley Park Highway follows it, from which may readily be seen many of Alaska's large mammal species. Various crystalline and volcanic rock types are visible, including brightly colored eroded lava flows in the Toklat River area near Polychrome Pass. Large glacial rivers have deposited extensive wide gravel and boulder beds. The central focus to the west from most points is Denali.

86. WALL OF MOUNT BONA: Above deeply inset narrow valleys filled by Hawkins and Barnard Glaciers, stupendous scarps along faces and cirques of south face of Mount Bona, and adjacent peaks of University Range. Main south wall of igneous materials, but to the northeast cliffs are of sediments and volcanics as well, though blocky crystalline rocks remain dominant.
87. CANYON CREEK GORGE: Northward valley from upper Chitina Valley, with very deep narrow winding gorge of strikingly patterned deformed rock strata.
88. GRANITE CREEK BASIN: Isolated large basin, surrounded almost entirely by rugged mountains, the entrance walled off by a glacier. Subalpine meadows and brushy areas along hummocky floor of basin, with one large colorful lake. Kiagna Canyon entering from north with high smooth vertical walls. Dark peaks on south rim carved into very fine sharp needles.
89. TANA WEST FORK MARSHLANDS: Large basin formed by fork of upper Tana River, with glacier at head, rock bluffs and outcrops alternating with steep vegetated slopes, forming abrupt valley walls. Valley floor entirely a waterfowl marsh, with wet meadows, sloughs, small streams and ponds.
90. TEBAY LAKES BASIN: Rather narrow basin enclosing cluster of three fair-sized lakes, each with its own vivid color, vistas framed by steep scarps and ice-sculpted peaks of craggy character. Land surface unusually hummocky, with numerous exposed round smooth bedrock bosses, some inset with brightly colored tarns. Luxuriant though boreal vegetation.
91. JARVIS-GERSTLE MOUNTAINS: Granite Mountain forms a northern extension of the eastern Alaska Range, and a viewing platform: from Panoramic Peak north over the Tanana Flats; and from its ridge, south across Jagged Boulder Plateau up narrow partly glacier-filled Jarvis and Gerstle valleys to the high Alaska Range peaks such as Mount Silvertip and White Princess.
92. MOUNT DEBORAH-HAYES PEAKS AND LAKES: A diverse area of high mountain and high plateau. At the east, north-flowing Delta River cutting through Alaska Range in tundra-sided narrow valley, with lavas on Rainbow Mountain on southeast edge eroded into bright colors. To the north, views from Molybdenum Ridge over extensive rolling alpine plateaus toward lowlands. To the southwest, up East Fork Little Delta to magnificent Mount Deborah, and south over alpine uplands to the very dominant Mount Hayes, and up and down Delta Creek just to the east. On the south side, views over upper Susitna to Deborah and Hess, including high peaks north from the alpine plateau traversed by the Denali Highway. Just north are the Clearwater Mountains, separated into blocks by streams, with scattered rolling alpine highlands, and rock basin lakes widespread in cirques and passes. Stagnant icemelt topography along south edge of area, with large esker systems around Crazy Notch, and many long narrow lakes in rock-cut basins in notches through ridges, with additional ponds just south in hummocky moraines in and in the

eastern ends, in contrast to vertical cliffs and rocky promontories interspersed with small gravelly beaches to west. Overlaps interior, wooded country on east, with heavy brush on mountains, extending into tundra country west of the main ridge with scattered brush and cottonwood groves. West of the main ridge is a large number of large to medium sized mountain lakes widespread through the Ahklun and Kilbuck Mountains, many in striking settings of canyons, basins, and cirques, and bordered by drier tundra, cottonwoods, or brush.

a. Kisaralik Canyon: After flowing out from the Ahklun Mountains, this river carves a steep vegetated canyon, as well as a series of low rocky gorges with cascades or falls, directly through the round-topped Kilbuck Mountains, going from tundra to cottonwood groves to river-edge spruce woods with tundra benches.

b. Lake Beverley Horns: This large lake on the east side of the Ahkluns has two arms called Golden Horn and Silver Horn, which cut between distinctively glacier-carved rock-ribbed round-topped pinnacles.

PACIFIC MOUNTAIN Division (Vegetation: boreal forest)

80. CARDEN LAKE AND PALISADES: A marshy lake set in a trough between the north front of the Alaska (Nutzotin) Range and the Carden Hills. Columnar volcanic palisades rise along the south rim of the Carden hills above the lake.

81. CROSS CREEK-CHISANA CANYONS: Two very different canyons, separated by a basin around Chisana settlement, perfectly aligned so that very long narrowly-enclosed vistas go in both directions. Symmetrical pinnacle of Cross Peak, with its face ice-covered, rises at head of Cross Creek. Cross Creek Canyon rather narrow, rimmed in part by thinly-bedded rocks in a variety of light colors. Chisana Canyon is a steep rocky defile through the Alaska Range carved by the large glacial Chisana River, with fluted gray cliffs in portions of it, and sharp-peaked mountains above.

82. CHITISTONE CANYON-WHITE RIVER:

a. White River-Ptarmigan Group of Lakes: A broad subalpine glacial valley, set off by high snow peaks forming south wall, and flat-topped alpine ridges of bedded volcanics to north. Series of lakes north of valley, a setting for views of the high peaks, but with diverse foregrounds: a mixture of meadows, aspen groves, spruce forests, and tundra, with columnar lava cliffs cradling one lake. Several small canyons on south with brightly colored layered walls, and unique blotchy ground patchwork of exposed white ash deposits.

b. Chitistone-Nizina Canyons: North-south Nizina Canyon heading at large glacier and Wrangells volcanoes, joining separate northeast-trending narrower Chitistone Canyon with gorge and high waterfall near head. Both set in multi-layered rather pale-colored sedimentary and volcanic strata, eroded into

from Lime Peak at west end of White Mountains, Mount Schwatka to north overlooking both White Mountains and Yukon Flats, with Mt. Glacier and Wolf also to north, and isolated lower mountains at edge of flats. Yukon Flats in this area bordered by rolling marginal terraces having steep 150-600 foot escarpments above flats, with abundant thaw lakes. Thus, a remarkable diversity of landscape types within small area.

62. CHENA GRANITE TORS: Above Chena River on south side, extensive rather flat tundra ridgetop is surmounted by striking series of granite pinnacles in castle-like formations.
63. KANUTI FLATS-SITHYLEMENKAT LAKE: Series of interconnecting ponds, with streams and sloughs on Kanuti Flats. Drains along Kanuti River, north via narrow rock-walled canyon. To south, two adjacent large round lakes, possibly (though questionable) of meteor origin, Sithylemenkat and Tokusatatquaten, in unique setting for the interior, in wooded basins under mountain ridges.
    a. Sithylemenkat Lake: Large round lake cradled within rounded ridges.
64. RAY MOUNTAINS: Although in region which escaped continental glaciation, local glaciation did produce landscape of partially glaciated upper valleys and north-facing cirques, a few containing tarns as well as oddly-shaped rocky crags and tors. Springs.
65. YUKON RIVER, RAMPARTS: Very large river hemmed into narrow rocky winding gorge between Ray River and the Tanana. Very high bold partially vegetated bluffs enclose this length of river, with Smoothface Mountain rising behind. In many places, river confined to single channel, flowing fast but without rapids.
66. BONEY CREEK DISSECTED BENCHLANDS: From a tableland, covered by mostly-vegetated dunes, a very intricate network of small streams east of the Nowitna River that have carved a remarkable series of 200-300 foot steep-walled gullied canyons. Closely parallel tributaries are also similarly incised, creating on a miniature scale a canyonlands topography.
67. NOWITNA RIVER CANYON: Above the big bend of the Nowitna, this rather small, clear, gentle river has carved a deep bedrock canyon through ranges of compressed, rounded low mountains.
68. LOCKWOOD HILLS-PAH FLATS: A combination of well-defined examples of a variety of interior landscape types within a relatively small area. Steep-sided lone Angutikada Peak immediately overlooking the small wetland Pah Flats with ponds and small streams, draining north via the Pah River through a narrow canyon. Ridge of rounded lower mountains along southwest edge of flats, steeply bounding them.
69. KOYUKUK FLATS MEANDER SLOUGHS: Extensive well-developed area of river-built wetland landscape in general vicinity of Three Day Slough. Oxbows, meander scrolls and related river features along with thaw lakes, with pond-dominated wetlands atop extensive low benches bordering each side of river bottoms.

49. KINIPAGHULGHAT MOUNTAIN AND MARINE PLATFORM: Raised rather flat marine platform at eastern edge of St. Lawrence Island. Rising sharply from it, rather flat topped block-shaped mountain of lava, generally steep-sided, except where streams have eroded into it. Sides carved by formerly higher sea into high wave-cut cliffs.
50. KOKECHIK BAY SPITS-ASKINUK MOUNTAIN-YUKON DELTA SEGMENT: Combination in small area of remarkable diversity of landscapes. Portion of the vast Yukon Delta, with its network of distributaries and tundra ponds, where North America's most diverse assemblage of subarctic waterbirds may be seen. Between Hooper Bay and Scammon Bay, series of four spits (Panowat the longest), and adjacent island beaches. Isolated mountains to 2300 feet, breaking off into Bering Sea in the high cliff at Cape Romanzof.
51. ST. MATTHEW ISLAND GROUP: St. Matthew, Hall, and Pinnacle Islands in middle of Bering Sea. Cape Upright and Glory of Russia Cape with series of cliffs and intervening ledges where large numbers of seabirds nest. Dark volcanic bedded rocks, with remarkable green growth of mosses and other small plants, contrasting with bare rock. Pinnacle Island with small segment of gravel beach, backed by very high jagged dark pinnacles of lava.
52. CAPE MOHICAN BIRD CLIFFS: Peninsula jutting from northwest corner of Nunivak Island, with low volcanic peak at base, and high cliffs, Cape Mohican at tip, hosting hugh numbers of nesting seabirds annually.
53. ROBERTS MOUNTAIN CRATERS-CAPE MENDENHALL DUNES: Roberts Mountain, volcanic formation with explosion craters, carved by Duchikmiut River with a number of lakes at its head. To south, at the south tip of Nunivak Island, extensive low dunes and beaches of peninsula. Favored grazing area of Pleistocene relic, the muskox.
54. CAPE NEWENHAM: Capes Newenham and Peirce, dropping from rolling uplands into Bering Sea with very high cliffs, favored seasonally by large numbers of nesting seabirds. Face of cliffs thinly layered, contorted rock formations of various shades.
55. HAGEMEISTER ISLAND SPITS: Very long, narrow Asigyukpak Spit on mainland to west, Tongue Point to north, and extremely long narrow spit off Hagemeister Strait. Very colorful pebbles along beaches.
56. FOX CASTLE BIRD CLIFFS: Strikingly eroded very high rim of cliffs all along northwest coast of St. George Island of Pribilofs, plunging into Bering Sea. Seasonally hosts one of the greatest concentrations of seabirds on earth, which swirl far out to sea. Large concentrations of fur seal harems in rookeries along bouldery coasts on each end of cliffs.

INTERIOR Division (Vegetation: boreal forest)

57. PORCUPINE RIVER GORGE:
    a. Upper Ramparts: Brick-orange rock cliffs hem in uppermost Alaskan section of large Porcupine River in deep gorge.

Flowing through benchlands and low rolling hills, the main river and the lower ends of its tributaries have incised themselves into

Narrow southern limb of Brooks Range, separated by trough from main portion. Mountains low but ruggedly glacial-carved. Series of large rock-basin lakes in narrow canyons carved by melt rivers from former glaciers to north. Cliffs and pinnacles common. Many alpine tarns.

35. AKILLIK RIVER AND PASS: Baird Mountains with streams primarily eroding upstream from south side, forming a hydrographic divide nearly at north edge of Brooks Range, well north of physiographic divide, i.e., main set of ridges. Thus, rivers such as Akillik cut around behind these high ridges, forming narrow gorges with dramatic canyon scenery, and leading to open low passes intensively used by migrating caribou. Many tarns.
36. DELONG MOUNTAINS AND TARNS: Headwaters of stream cutting into south flank of DeLongs, Bordering north rim of Noatak valley, identical in formation to stream-cut topography (above) in Bairds on south rim. Series of such rivers, most notably upper drainages of Kaluktavik and Kugururok, where curved headward portions form remarkable series of east-west passes at very edge of Arctic foothills to north, forming outstanding travel ways for caribou and man. Utukok headwaters at north. Scattered tarns in relatively low but ruggedly glacier-carved bedded mountains.
37. NOATAK CANYON-NARVAKRAK LAKE: Long narrow mountain valley, areas of high bluffs along single-channeled Noatak River, adjacent large basin lake. Evident glacial features at west edge of late-Pleistocene glaciation. Expansive vistas of low mountains enclosed in vast Noatak valley.
38. SALMON RIVER: Small clear gentle stream bordered by patchwork of spruce forest, deciduous low brush, and tundra. Low rock bluffs along river. Riffles and deep pools, with blue river color intensified by jade particles widely distributed in river sands and gravels.

WESTERN TUNDRA Subdivision

39. CAPE KRUSENSTERN-IGICHUK HILLS:
    a. Cape Krusenstern: Very extensive series of narrow successively deposited beach ridges between curve of Cape Krusenstern and lagoon inside. Striking visual small-scale pattern as seen from adjacent ridge or plane. Easily seen evidences of early man's camps and house pits.

    Beyond the cape, smooth open tundra, inset with small clusters of whitish-gray chalky bare hills sharply contrasting with tundra. Sheshalik Spit at east end of beach patterned like Cape Krusenstern. Series of fringing lagoons behind beaches. Rocky bluffs behind lagoons in places.
40. KOBUK DELTA: Park of vast complex of deltas, estuaries, and ponds where Kobuk, Noatak, and Selawik rivers are filling embayment at mouths. Kobuk Delta a pattern of distributaries reaching out in spreading pattern beyond oxbows and sloughs of river upstream.

Lake, atop peculiar wide flat east-west basin lying nearly astride the divide.

b. Loon Lake: A bouldery-edged small lake just above tree line set amidst steep rock walls at the head of a south-flowing drainage. Snow Bunting Lakes, tarns at the head of its valley.

An area of wide steeply-rimmed valleys, with tarns in side valleys. Wide and gentle to the south, though deep within the mountains.

27. WILD LAKE: A rather long lake with beaches set in a narrow valley in open woods just south of the tree limit, with fairly gentle slopes leading to pinnacles on Surr Mountain to the northwest and a series of high ponds to the northeast. Deep within the South Slope of the mountains.

28. JOHN RIVER CANYON: A narrow canyon set between Gunsight Mountain and The Sentinels, carved into rather pale smooth massive limestone. A section to the north incised narrowly into recent deposits. Gentle river gradient, with deep blue river set off by rock walls.

29. UPPER KILLIK-KURUPA LAKES AREA: Overlapping the upper foothills, the complex includes rolling tundra interspersed with sharp low mountains. At the north front of the Range intensively eroded stark pale hills are backed by a steep mountain wall. Sharp horns occur near the east end, and tarns and hanging valley are numerous.

    a. Kurupa Lakes: A pair of narrow deep blue moraine-dammed lakes at the foot of massive rugged mountains. A setting which Detterman (USGS) considers "the most spectacular scenery in the Arctic lowlands." Gray limestone cliffs along the south wall contrast with vari-colored chert on the north side, and highly folded layers in the valley walls. A broad U-shaped valley to the south terminates in a group of cirque lakes.

    b. Upper Killik River: Montane portion flows slowly through pond-like section. Set in an exceptionally wide valley, the river is bordered by high rock-ribbed mountains cut by deep side canyons. The river bottom is incised into finely laminated lake bottom sediments, in places capped by partially stabilized sand dunes of considerable height. Outstanding examples are found of depositional glacial topography with a remarkable series of many types of moraines. Long winding bouldery rapids have developed where the river crosses sets of end moraines.

30. ALATNA-NIGU HEADWATERS HIGH BASIN: A high gentle-floored basin, with radiating valleys of great width, yet lying near the height of land. At the headwaters of the Nigu, Killik, and Alatna Rivers, with numerous ponds and tarns, and exposed bedrock along the valley floor to the northwest.

31. ARRIGETCH-ALATNA AREA:

    a. Mt. Igikpak: A snaggle-toothed peak, far higher than surrounding mountains, at the center of an area of granitic rocks forming walls and spires, yet bordered on the west by the gentle Tupik Creek-Reed River valley connected via Angiaak Pass.

14. AWUNA ENTRENCHED RIVER: Canyon several hundred feet deep, with side canyons, entrenched into gentle upland.
15. KASEGALUK LAGOON-ICY CAPE: Outstanding offshore bar with compound spits enclosing a lagoon and estuary system. Stabilized and active dunes. Marine and lagoon deposits at Icy Cape, where marine mammals are often seen. Very long offshore bar.
16. UPPER UTUKOK HOGBACKS AND ENTRENCHMENT:
    a. Archimedes Ridge: Long linear cuesta (steep on one side, gentle on the other) 1000 feet above base. Adjacent drainages cutting into cuesta.

    Lookout Ridge in this area carved into nearly diamond-shaped formation. Disappointment Ridge, deeply cut by encroaching drainage heads, forming cliffs. This area of upper Utukok River and tributaries, most notably Canyon Creek, have cut very deep canyons into gentle uplands, with trellis-shaped drainage patterns developing. Little known but very striking canyonlands country. Caribou concentrations visible during calving season.
17. KUKPOWRUK HOGBACKS AND ENTRENCHMENTS:
    a. Kukpowruk Entrenched River: "A magnificant section of canyon and ridge topography" (Detterman, USGS) similar to southwest canyon country in character though not scale. Relief 1000 feet. Mesas and ridges further dissected by tributary streams.
    b. Igloo Mesa: Kidney-shaped 1500-foot high mesa above gentle upland just west of Kukpowruk River, excellent viewpoint.

    This is the most scenic area of Arctic lowlands, of a character not elsewhere represented significantly in Alaska. Poko Mountain, 1700-foot high very dissected mesa. To north, Amatusuk Hills, northernmost cuesta, thinly bedded, with contrasting vistas of plain to north and canyon country to south.
18. CAPE LISBURNE-LISBURNE HILLS: The Brooks Range is here truncated by the sea. Gray fossilized limestone cliffs, unlike the many coastal cliffs elsewhere in Alaska. Strata in cliff face highly folded, contrasting shades. Very large bird colony in summer. Very compact range of rugged low mountains directly adjacent to coast, topographic feature nowhere else found in northern Alaska, deeply dissected in V-shaped gorges.

BROOKS RANGE Division (North Slope vegetation is tundra, South Slope is boreal forest at lower elevations)

19. UPPER SHEENJEK RIVER: Abundant ponds and lakes throughout section of U-shaped mountain valley, a striking contrast. Vegetation transitional at ecotone between forest and tundra, with patches of open and closed woodland. Area roughly between Ambresvajun (Last) and Lobo Lakes.
20. NORTHWEST PHILIP SMITH MOUNTAINS:
    a. Ribdon-Accomplishment Low Pass: Open east-west pass and tarn connecting head of Ribdon South Fork and Accomplishment Creek, directly beneath exceptionally rugged glaciated portion of Philip Smith Mountains.

OUTSTANDING OR REPRESENTATIVE VISUAL UNITS AND SCENIC COMPLEXES

Listed below are those units considered, based on the criteria presented, to be of particular significance. Numbering in this section follows that labeled on Map 3. Each separate tract, whether a visual unit or a scenic complex, is given a number. Each visual unit contained within a larger scenic complex is given a letter. In some cases, two separately designated tracts, usually scenic complexes, are contiguous. In those cases, it is judged that the relationships within each of the tracts, and the differences between them are sufficient to warrant separate designation. It is also recognized, though it cannot conveniently be indicated on a map, that some tracts can be delineated with very precise boundaries, whereas, others grade less definably into less significant or less closely related terrain.

ARCTIC LOWLANDS Subdivision (Tundra)

1. BEAUFORT LAGOONS-ICY REEF: Offshore sand bar, Beaufort and Nuvagapak Lagoons, Aichilik River delta, wet tundra on shore.
2. SADLEROCHIT-ROMANZOF FOOTHILLS AND MOUNTAINS TO COAST:
   a. Ignek Valley: East-west valley within northern extension of Brooks Range, striking vari-colored strata. Diverse fossils. Ignek Mesa viewpoint for valley.
   b. Peters-Schrader (Neruokuk) Lakes: These connected lakes are one of few in northeast Brooks Range; Carnivore Creek valley penetrates high peaks. Mt. Chamberlin, highest in Brooks Range, adjacent to lakes.
   c. Okpilak Valley: Exceptionally rugged glaciated mountains closely fringing river. Moraine pairs and sand dunes in foothills.

   Unusual series of east-west interconnecting valleys, leading to Canning River. Canning River strikingly scenic along west edge of this northern extension of Brooks Range, with lateral vistas up the east-west valleys, separating three parallel ranges. Broad Hulahula Valley, also fringed with the highest most glaciated Brooks Range mountains. Shublik Springs along Canning, largest on Arctic Slope, cottonwood grove in sea of tundra. Katakturuk Plateau on north flank of northernmost Sadlerochit Range, rolling hills and badlands of brightly colored rocks, deep canyon carved by Katakturuk River into plateau. Limestone outcrop in Katakturuk Fold to north. Western edge is Jago Valley, whose upper foothill region, along with tributary McCall valley, exhibit outstanding glacial deposits. The complex extends northward to the Arctic Ocean beach from which stretches an extensive vista, backed by the high ridges of the Brooks Range.
3. ECHOOKA-IVISHAK MOUNTAIN FRONT:
   a. Echooka Springs and Aufeis: Large year-round springs, fine cottonwood grove. Extensive permanent field of stream overflow ice. Smooth massive bare slopes facing the lowlands.

HH. MOUNT YENLO: High tundra dome surrounded by upper Yentna valley, looking north across lower hills and basins at Denali, Alaska Range and glaciers pouring out from the mountains.

II. ANCHOR POINT: Looking west from Sterling Highway across Cook Inlet at the sharp-peaked Chigmit Mountains, far overtopped by the graceful volcanic cones of Iliamna and Redoubt, with wisps of steam often visible.

JJ. KACHEMAK BAY OVERLOOK: Not far south of II, rise on Sterling Highway from which Kachemak Bay is first visible, with interspersed spruce woods and meadows in foreground, Homer Spit in middle distance, and beyond the blue waters of the bay, and the glaciers and ragged crest of the Kenai Mountains.

KK. HALFWAY MOUNTAIN ABOVE MULCHATNA RIVER: Low birch-flanked tundra-topped round hills, from which one looks across flat basin of Chilikadrotna and Mulchatna Rivers with widely scattered low hills; the Chigmit Mountains seemingly form a wall from which lakes protrude, far to the east.

LL. BONANZA HILLS: Low yet glacier-scoured hills, through which the upper Mulchatna Canyon is seen, with a rim of low hills to north, west, and more distantly to south, and the Chigmit Mountain wall at equal distance to east. This and the previous viewpoint help define an extensive vista of a very large visually enclosed basin, rimmed on three sides by low rounded series of hills, small clear streams at the bottom and set off by a mountain wall at the east.

MM. DUMPLING MOUNTAIN: Viewpoint above Brooks Camp, looking out over gentle wooded uplands, with higher hills grading into multi-layered mountains and snowy volcanoes far to south. Naknek Lake unifies this extensive vista, tying into one visual experience a variety of landscapes from wooded plains to snowy volcanoes.

NN. TUGAMAK RIDGE ON UNIMAK ISLAND: From rim of caldera across lake and extensive uplands toward the contrasting needle-topped eroded volcano of Isanotski and the classic Fuji-like high cone of Shishaldin Volcano, and out over grassy plains to the seas to north and south.

OO. ANANGULA ISLAND: View over saltwater at rounded Vsevidof and jagged Rechesnoi on nearby Umnak Island, and in the opposite direction, the more distant symmetrical volcano of the Islands of the Four Mountains. This vista encompasses more individually striking volcanoes than any other in Alaska which gives a partial sense of enclosure.

PP. EAST RIDGE OF ROBINSON MOUNTAINS OVER ICY BAY: Rocky layered terraces and cliffs of foreground lead the eye across Icy Bay with its calving glaciers, over hills and vast icefields to the pinnacle-topped bulk of Mount Saint Elias, highest coastal mountain on earth, and its rock-ribbed neighbors. To the right lies the broad Pacific.

QQ. OCEAN CAPE AT YAKUTAT BAY: Very wide fine sand beaches, rimmed by spruce forests whose limbs are coated by deep moss, northwest across wide Yakutat Bay to the white piedmont Malaspina Glacier, behind which towers Saint Elias, appearing from this point as a perfect matterhorn peak.

I. THREE TIME MOUNTAIN IN JOHN RIVER VALLEY: Overlook of smooth-walled narrow canyon of lower John River through limestone, with wooded base.

J. ANGAYUCHAM MOUNTAINS: Close view of lakes such as Selby enclosed in rocky gorges, across gentle upland toward south front of main Brooks Range.

K. KOBUK SAND DUNES: Pale rolling sand dunes, cut by little streams, rimmed by lichen-floored open woodland. Example of unified vista similar to that in Lake Clark western foothills, with wooded flat tree-rimmed basin, tundra topped hills and backed on one side by rugged Brooks Range. Sense of enclosure in vast basin, all parts of which seem tied together by view from dunes within or hilltops along edges.

L. ASKINUK MOUNTAINS: Rocky volcanic hills on Yukon Delta, overlooking most productive nesting area with sloughs and ponds, with spits and open Bering Sea visible to west.

M. KILBUCK MOUNTAINS ALONG KISARALIK RIVER: Vista up small river across tundra and cottonwood-covered rolling uplands leading to a deep canyon to the east, and gentle hills merging with endless pond-filled tundra plain to the west.

N. RIDGE ABOVE LAKE BEVERLEY: Above Hard Luck Bay of the lake, ridge offers contrasting vista of open woodland below, various lakes extending out from mountains, and rugged peaks rimming upper portion of lake.

O. ALEKNAGIK LAKE ROAD: Rise looking northwest from road gives sudden sweep of Wood River Mountains and Lakes, one after another.

P. MOUNT SCHWATKA: Overlook of pitted lake-strewn uplands and Yukon Flats to north, and pale craggy limestone peaks and gorges of White Mountains to south.

Q. RIDGE ABOVE PTARMIGAN AND ROCK LAKES: Spruce-patch and meadow rimmed Ptarmigan Lake basin below, narrow slot along edge, connecting the lakes; Rock Lake and vast White River valley beyond, with Mount Natazhat and row of snowy peaks behind.

R. MOUND IN FRONT OF NABESNA GLACIER: From tundra-topped rough hill, sweeping views down valley and into canyon of Nabesna glacial river, and up to and far across smooth Nabesna Glacier, rimmed by high snow peaks of Wrangells, with valley lakes just below.

S. WRANGELLS OVERLOOK NEAR SLANA: From hills next to Glenn Highway, down across incised Copper River and wet lowlands, up very long even slope to high dome of Mount Sanford and other high Wrangells volcanoes.

T. WRANGELLS OVERLOOK NEAR CHITINA: Rather similar view, toward jagged Mount Drum and long smooth snow ridge of Mount Wrangell. These two vistas anchor the extensive view which tie the volcanoes and fringing apron of the western Wrangells to the populated Copper Basin.

U. UPPER KUSKULANA RIVER TOWARD MOUNT BLACKBURN: Classic mountain view, with open river bench in foreground, roaring gray glacial river, black rock face of volcanic mountain behind, with white

SPECIAL PLACES

a. ULO VALLEY: Wide tundra valley bordered by exceptionally rugged bedded mountains and narrow craggy side valleys.
b. ALATNA CANYON: Wide wooded canyon through which Alatna River slowly meanders, with many ponds, bordered by massive bare-rock mountains of various shapes and textures; Arrigetch Peaks up side valley.
c. SELBY-NARVAK LAKE: Hourglass shaped lake with beaches and sloping meadows set in rocky gorge of Brooks Range spur; sharp pinnacles above.
d. CAPE KRUSENSTERN: Rounded gravel cape with innumerable narrow ridged and swales paralleling ocean, each with distinct evidence of past human use.
e. IMURUK BASIN: Large salt lake, bordered by petroglyphs, with abundant nesting waterbirds, and sharp glacier-carved Kigluaik Mountains behind.
f. LAVA LAKE: Small lake bordered partly by beach and tundra, partly by low but very rough jumble of partly vegetated lava flow.
g. CHARLEY RIVER: Between Copper Creek and base of mountains, with succession of high rocky bluffs, rapid clear river, wooded banks, and tundra meadows.
h. NECONS-CHILLIGAN PASS: In Lake Clark country, contrast of sharply-etched crags down one side, smooth orange-flecked ridges down the other with pond set in pass.
i. KONTRASHIBUNA LAKE: Long narrow glacial lake, with beaches near one end, leading into high jagged mountains, bordered by bluffs and cliffs near head.
j. SOUTHWEST KANTISHNA HILLS: Viewing platform in Camp Denali area, across tarns and Wonder Lake toward Denali and white wall of Alaska Range.
k. CHITISTONE CANYON-TRUMPETER LAKE: Small lake with waterbirds at entrance to the high steep multi-layered walls and deep flat floored canyon.
l. ROCK-PTARMIGAN LAKES TRENCH: Narrow slot, floored by six successive ponds, abruptly bordered by round tundra mountains; diverse vegetation.
m. LOWER COPPER RIVER CANYON: Immense canyon, wide floor occupied by large braided glacial river, bordered by a gorge, calving glacier, alder-covered walls, and ice-hung peaks.
n. SEMIDI ISLANDS: Sharply-etched sea cliffs, haystacks, and pinnacles of granitic sea islets, covered with grassy meadows and large swarms of seabirds and sea lions.
o. OKMOK CALDERA: Steaming volcano floor miles across, with steep walls and small volcano cone; diverse volcanic features.
p. ANANGULA ISLAND: Small lush grassy island, home to eerily-calling nocturnal seabirds; former hunting outpost of early man in Alaska, whose evidences remain. Groups of high snow-covered volcanoes on two sides.

it enters the rapidly silting head of Cook Inlet. Upper portion fast; middle canyon portion among the continent's classic powerful white water rivers with high volume, severe constriction, and intense turbulence. Lower end steady movement but not turbulent. Boreal forest.

26. NELCHINA-TAZLINA: Fairly small, though turbid due to glacial flour, with some glacial color in water as well. Branches begin from mountain lake in Chugach, and glacier. They cross gently rolling Copper (Nelchina) Basin uplands, moving quite rapidly. Entrenched in deep slot, with boulder to silt cutbanks into glacial and lake-deposited materials. Boreal forest.
27. COPPER: Very large glacial river, heading in glacier, swinging from edge of high Wrangell mountains around large arc separating long apron of ascending Wrangell lavas from Copper Basin. Entrenched in rather wide valley bottom with braids, gravel banks, and gravel to boulder high bluffs along edges. Rather rapid flow throughout, more turbulent in upper portions. Lower part enters a gorge, Wood Canyon, then flows with fast steady current and wide braids through the Coast Range (Chugach Mountains) with a wide flat-bottomed valley with exposed silt and low sand dunes, rimmed by very high rugged steep-walled mountains. Two glaciers calve into river. Extensive delta, much favored by waterbirds, before river enters Gulf of Alaska.
28. KROTO (DESHKA): Rather small Susitna Valley stream, generally clear except at high water. Flows across rolling uplands, hummocky morainal hills, into Susitna. Luxuriant boreal forest. Fairly gentle, across valley with areas of steep bluffs.
29. SWANSON: Source in area of morainal hills on Kenai Peninsula with many lakes, across gently rolling boreal forest plain, into Cook Inlet. Quite narrow, very clear except for amber bog-color to water. Very gentle, one of smallest rivers in Alaska which is readily navigable across upland terrain.
30. TLIKAKILA: Very turbid glacial river flowing from low pass in Chigmit Mountains, through rather narrow U-shaped alpine valley with cliffs and high mountain walls on both sides. Moderately rapid though even flow, beginning from small lake at head. Boreal forest, with heavy alder-willow brush. Rugged peaks visible along entire length. Flows into Lake Clark.
31. KOKSETNA: Rather small stream with very clear water. Flows in arc from headwater lakes across rolling uplands close to base of Chigmit Mountains. Open boreal forest with meadow areas. River quite rapid, with ledges and small cascades. Gorge sections where incised into rock-rimmed small canyons. Noteworthy due to abundance of sharp rugged rock outcrops, both along river itself and in adjacent otherwise-gentle uplands. Flows into Lake Clark.
32. COPPER (ILIAMNA): Very short stream, fairly small, very clear. Source in lakes in low mountains near Cook Inlet's southwest side; flows into Lake Iliamna. Very rapid, with series of heavy rapids

Generally fairly clear. Tundra with some willow patches. Mostly slow, with sections of steady current. Broad valley.

12. KISARALIK: Flows through western tundra region into lower Kuskokwim on Yukon-Kuskokwim Delta. Generally clear except turbid at high water, very slight glacial influence. Flows from cirque in Ahklun Mountains, across rolling tundra upland, through Kilbuck Mountains in canyon with scattered cottonwood groves, across foothills with rim of boreal forest just along river, then across pond-filled lowlands with alternating tundra, high willow brush, and spruce groves. Mostly fairly gentle with fast steady current, with several canyons having sharp rapids or falls. Generally in broad valley, except canyon sections.
13. PORCUPINE: Enters from Canada; fairly large, flows across rolling gentle upland benches, then through extensive Yukon Flats wetlands. Boreal forest, mostly of small stature. Gentle flow, though steady and fairly fast through entrenched upper sections, which form colorful cliff-rimmed narrow gorges. Moderately clear to moderately turbid. Lower portion braided with sloughs to junction with Yukon.
14. UNALAKLEET: Fairly small, flowing through narrow valley between low rounded mountains with steep sides, into Norton Sound. Generally very clear. Moderately steady current. Rather short river. Wooded lower slopes, brush to woods on valley bottoms, tundra on hills.
15. SELAWIK: Fairly small, across broad wooded valley rimmed by rounded hills in upper portion, then crossing extensive pond-filled wet plain, ending in extensive delta and estuary system. Waterfowl very evident in season. Clear, except wine-colored bog water influence in lower portion. Gentle, though steady flow in upper portion. Boreal forest, grading to open marsh and tundra near mouth.
16. KOYUKUK: Main stem is rather large, fairly turbid river, with broad silt to gravel banks and clay to boulder bluffs. Crosses extensive wetlands, where river forms many miles-wide system of oxbows, sloughs, and similar evidences of meandering channel. Boreal forest, with large cottonwoods and willows along river. Quite gentle.
17. NOWITNA: Fairly small, crosses from high rounded hills through rolling uplands, then across wet plain and into Yukon. Fairly narrow valley, with canyon segment in upper portion. Deeply incised tributaries, with silt and clay bluffs primarily. Gentle but steady current. Meanders in lower portion. Boreal forest. Generally quite clear, with bog water stain in lower portion.
18. YUKON, RAMPARTS SECTION: Very large, through narrow rocky gorge with bold steep, but generally wooded high bluffs rising directly above narrow river bottom. Winds through gorge, with gentle though strong steady current. Boreal forest. Quite deep and turbid. Low mountains beyond.
19. YUKON, TANANA HIGHLANDS SECTION: Very large, through moderately narrow valley in high rounded hills with mountains beyond. Quite

RIVER ENVIRONMENTS, VIEWPOINTS, AND SPECIAL PLACES

Map 2 includes a representative system of river and river-related landscapes. They are chosen to illustrate variety in terms of size, water clarity, and rapidity of the river itself, as well as degree of incision, and regional landform and vegetative diversity. The examples shown are intended to illustrate the range of Alaskan visual character types of landscapes that are primarily riparian in nature. Such landscapes usually lie in long narrow corridors, difficult to array in combination with the more uniformly shaped units shown on Map 1. The system is intended to be representative, not comprehensive. It is not intended to suggest a system of wild and scenic rivers. The map also locates selected key viewpoints, which are useful in determining viewsheds, examples of which are drawn in. Also shown are examples of special places, small areas of unique or striking visual characteristics which may impart a powerful visual impact on the viewer, in a highly personal way.

A SYSTEM OF RIVER-RELATED LANDSCAPES

1. COLVILLE: Fairly large, flowing through Arctic foothills and lowlands. Not glacier-influenced, moderately clear; flow quite variable since neither soil nor vegetation can absorb much rainfall or snowmelt, and somewhat turbid at high water. Rather gentle gradient. Tundra, except high willow brush along bluffs and side gullies in upper portion. Rolling to flat terrain, with high bluffs or cliffs along one side or the other for much of length. Extensive delta, with sand dunes.
2. UTUKOK: Fairly small, flowing through Arctic foothills and lowlands. Not glacier-influenced; clear; rather gentle. Tundra ranging from moist (tussock) with dry tundra on hills, to wet tundra with innumerable ponds. Upper part across rolling terrain overtopped by steep-sided mesas, with sections of the Utukok deeply incised where they cross such landforms. Large caribou concentrations cross river in mid-summer.
3. IKPIKPUK: Fairly small, flowing from lower Arctic foothills, across extensive Arctic lowlands. Very braided, generally quite shallow, and rather clear. Moist to wet tundra primarily. Extensive willow brush along upper portions. Sand dune area. Abutted by innumerable ponds and large lakes across plains. Riparian corridor is major wildlife habitat in terrain otherwise much less diverse, thus, wildlife is often a visible aspect of landscape.
4. KONGAKUT: Fairly small, flowing for considerable distance north through Brooks Range, then across foreshortened stretch of foothills and plains to coast. Moderately clear, slightly glacial-influenced; flow quite variable. Very braided beyond mountain front as is typical of North Slope rivers. Flows through tundra, some low brush in mountains. Lies in narrow to broad valley. Upper portion quite rapid, with ledges. Large early summer caribou concentrations in upper foothills.

Sr Similar to (S) except ruggedly glacier-carved with sharp ridges and peaks.
Se Ruggedly eroded limestone mountains, essentially unglaciated, forming spires, reefs, cliffs, and other sharply defined bedrock features.
V Volcanic mountains.
G Broad icefields, total snow and ice environments from which nunataks, peaks, and ridges may rise, but do not dominate.
R Major river bottoms cutting through higher mountains, forming very deep wide canyons.
Ci Bay and inlet coast set into higher mountains.
Cf Fiord coast set into higher mountains, except as below.
Cg Fiord coast set into higher mountain type described in (Ig).
Cs Fiord to bay and inlet coast as in 3(Cs).

5. Very high mountains.
Ir High peaks areas, containing distinctive individual intrusive or uplifted summits rising above mountain ranges, from the slopes of which glaciers flow into the foothills.
V High volcanoes rising along gradual slopes from open plains.
Vi High peaks dominated by symmetric volcanoes, rising in certain cases, above extensive ranges.
Vs Limestone and volcanic, rock cliff and canyon landscapes, featuring very high layered walls and stream-cut gorges, and backed by very high mountains.
Cf Fiord coast set into very high mountains.

Topographic Divisions of Alaska

The two factors of relief and of landform can be combined to describe the diverse topography of Alaska. This list shows all of the topographic divisions we have identified. Each type of topography is represented on Map 1:

1. Plains and lowlands.
   - F Essentially flat, like (Fp), but little standing water.
   - Fp Flat or essentially flat, much standing water. May be glacial (outwash generally, flatter moraine, till plain); or nonglacial (thaw lakes, stream meanders, stream drainage networks along stream courses or on deltas).
   - Fo Flat, like (Fp), oriented lakes predominant.
   - Fg Small scale relief due to glacial deposition and melting (moraine, stagnant ice, severely pitted outwash).
   - R Major river bottoms (alluvial flats, terraces, meanders).
   - Cm Coastal marshes, estuaries, deltas, spits, barrier beaches.
   - Cb Beach and forest coast.

2. Gentle uplands.
   - F Flat lying to gently rolling, many streams but little standing water.
   - Fp Flat lying to gently rolling, many ponds or streams.
   - Eo Irregular surface, with occasional rugged lower hills, sharp ridges, mesas, or buttes.
   - El Long ridges, some steep-sided and narrow, others broad, locally overtopped by mesa-like hills on gently undulating plain.
   - Er Flat lying to gently rolling, moderately to intensely dissected; or major river deeply incised.
   - Eg Hogbacks, cuestas, mesas, buttes, and dome-like formations, with bold cliffs locally exposed, and streams very deeply incised in narrow gorges.
   - M Rolling, even trending ridges.
   - Mt Ridges with sloping trend in elevation (transitional to hills or mountains).
   - Mb Long narrow flat-bottomed basin, set in higher mountains, with rock outliers and glacial deposits.
   - I Rugged intrusive islands and sea stacks
   - V Gentle uplands dominated by lava flows.
   - Vo Gently undulating to rough volcanic topography on islands or isolated volcanic uplands, in places having wave-cut cliffs and local groups of vents, cones, and other outcrops.
   - R Major river bottoms through gentle uplands.
   - Cb Beach and forest coast set in gentle uplands.
   - Ci Bay and inlet coast set in gentle uplands, in some cases including isolated low mountains.
   - Cf Fiord coast set in gentle uplands.

Relief

These numbers, combined with the landform abbreviations below, identify the various visual character types that are shown on Map 1.

1. Plains and Lowlands

2. Gentle Uplands

3. Lower Mountains and Hills

4. Higher Mountains

5. Very High Mountains

Landform

Upper case letter indicates the primary characteristic; the following lower case letter indicates the most significant secondary characteristic.

Flat to gently rolling lowlands.
- F Flat, few ponds.
- Fp Flat, many ponds.
- Fo Flat, oriented ponds.
- Fg Glacial deposition, gently rolling, many ponds.

Erosional environments, generally of low to moderate relief.
- Eo Outcrops and rough irregular hilly surface.
- El Long ridges on undulating plain.
- Er River incised or dissected.
- Eg Gorges, hogbacks, domes, i.e. gentle canyonlands topography.
- Eb Badlands.
- Em Mountains of mesa and canyon character, relatively greater relief.

Mountains:

Mountains generally of rounded form or wide spacing.
- M Generally rounded mountains with little or no glacial carving.
- Mw Bedrock shaped and dissected by flowing water.
- Mt Ridges with sloping trend.
- Ms Mountains or ranges widely spaced on uplands.
- Mb Narrow basin within mountains.

Igneous intrusive mountains, generally glacial-carved and rugged.
- I Crystalline mountains, moderately rugged, some glaciers.
- Ir Rugged crystalline mountains, glaciers generally widespread.
- Ig Sheer granite peaks and cliffs, often exfoliating.

6. Seasonal abundance and visibility of a variety of large mammals including sheep, grizzly, caribou, and moose along the subalpine trough in Mt. McKinley National Park between the Kantishna Hills and the Alaska Range.

7. Brown bear concentrations on Admiralty Island during salmon spawning along and above the stream mouths of Seymour Canal, such as at Pack Creek.

5. The Chilkoot Pass crossing, rich in evidence of prior human passage, and connecting the coastal wet forests with the drier, redolent fir and pine forests of the interior (in Canada).

6. Boat travel along Pearse Canal at the southeast edge of Southeast Alaska, with side trips up the succession of extremely long, extremely narrow tributary fiords.

Significant visual spaces - vistas, enclosures

1. The vast space bounded by the Arctic Ocean rim on one edge and the northernmost wall of the Brooks Range on the other, in northwestern Arctic National Wildlife Range.

2. The vast semi-enclosed basin of the Mulchatna-Chilikadrotna Rivers in the Lake Clark country, rimmed by low tundra-capped foothills and backed by the Alaska Range. (A similar basin, shown on Map 2, surrounds the Kobuk Sand Dunes, rimmed by the Baird Mountains crest and two spur ridges reaching the Kobuk River, and the Waring Mountains.)

3. The long yet confined space looking up or down Lake Clark, unified by the single water body, walled by foothills and mountains, and leading the eye far into the high mountains.

4. The expansive vista from low overlooks such as the Roosevelt Hills above Chilchukabena Lake, across the flat muskeg-filled interior plain, toward the distant but immense white wall of the Alaska Range with its centerpiece Denali. This type of long view, dramatically unifying diverse landscapes, is among the classic Alaska vistas.

5. The extensive evenly sloping apron from the Copper River up to the giant, seemingly suspended volcanic snow domes of the Wrangell Mountains.

6. The ice-age vista from the Pacific Ocean beach across the huge Malaspina piedmont glacier to the ice-sheathed precipices and high peaks of the Saint Elias Range.

Evident natural processes

1. Constant reshaping of unconsolidated sand within the Kobuk Sand Dunes, as well as continuing incremental deposition of fine windblown materials from nearby unvegetated river bars.

2. Upper Yukon River, cutting back into its bluffs, the sloughing off of the bluffs augmented by melting of exposed permafrost and occasionally exposing remains of mammoths while depositing islands in other portions of its ever-changing channels.

AREAS ILLUSTRATING CRITERIA FOR EVALUATING LANDSCAPES

The visual units and scenic complexes identified on Map 3 demonstrate each of the criteria for evaluating landscapes. While many units reflect combinations of criteria, the examples listed below are illustrative.

Diversity of visual characteristics

1. The regional compression in the Arctic Wildlife Range of coastal spits, lagoons, pond-filled plains, foothills, and high glaciated mountains including both layered and granitic types, into a relatively compact area between Camden Bay and the Brooks Range crest.

2. The middle portion of the Alatna River valley in the Brooks Range, with tundra-covered uplands to the north, the granite spires of the Arrigetch Peaks to the west, the tree-floored valley itself rimmed by colorful mountains of massive exposed sediments, leading on the south to rolling forested New England-like foothills.

3. The Wood-Tikchik lakes area, extending into wooded lowlands on the east, set in relatively low but strikingly glacier-carved crags, yet extending west right through them into a rolling upland of tundra and cottonwood groves in the Togiak watershed on the west.

4. The northeast edge of Lake Iliamna and adjacent valleys and Cook Inlet coast; within this small area exists a unique intergradation of maritime tundra, boreal forest, and coastal rain forest.

5. The regional compression in the Lake Clark country of Pacific coastal rain forest, fiords, high glaciated mountains including both craggy peaks and overtopping volcanoes, across into large mountain-edge lakes, and foothills of tundra and boreal forest, between the west shore of Cook Inlet and the Mulchatna River.

6. The Stikine River valley, which grades perceptibly from the meadows, pine woods, and round rocky domes of the interior (in Canada) to the glacier-hung crags and cliffs, clam beaches and rain forest near its mouth.

Well developed single characteristic

1. Nearly featureless yet endlessly rolling tundra plains and low hills forming a single unbroken unfenced horizon like the Great Plains once was, extending outward from the river bluffs along the middle Colville.

2. The unity of stream, pond, muskeg, woodland, and sky inter-tying the expanse of the Yukon Flats, readily seen from overlooking bluffs along the edges, but easily perceived from any point within.

CRITERIA FOR EVALUATING OUTSTANDING LANDSCAPES

Eight criteria are used to evaluate superlative visual units and scenic complexes shown on Map 3. These criteria are an outgrowth of the factors used to distinguish between landscape types.

1. The presence of a diversity of visual characteristics. Diversity is indicated by factors such as vegetative types, physiographic provinces, water, and land surface form. It is heightened by complex interrelationships between these features, such as found in areas of interfingered ecological zones, twisting coastline, and the like.

2. The presence and clearly visible expression of a single visual characteristic exceptionally well developed. The arctic coastal plain where it most clearly exhibits endless horizons and a surface free of major features is an exceptional landscape, for example.

3. The presence of significant natural features, landmarks, striking forms, and special places, such as specific peaks and canyons. Distinctive natural features can be the dominating and unifying elements of a landscape.

4. The opportunity for special sequential experiences within the landscapes, as on a chain of canoe lakes, a fjord, or interconnecting valleys. For example, the trip by water on the Wood River-Tikchik Lakes complex is a powerful aesthetic experience and, as a result, the lake/stream complex and its environs forms one landscape complex of high quality.

5. The inclusion of significant visual spaces, such as vast expansive vistas or deep enclosures. An important expansive landscape with broad vistas might be bounded on one side by a range of high peaks and, fifty miles away across plains, by low hills from which the scene is best viewed. Or, in an area of relatively low relief, a river winding through a forest may create many small enclosed spaces, as perceived from water level.

6. The presence of natural processes. Highly visible natural processes are both interesting and unifying elements in the landscape. They include evidence of ecological change and succession, geological processes (including erosion, glaciation, volcanism, and deposition), seasonal changes, and evidence of movement--and sand, snow, ice, and so forth. Alaska landscapes often dramatically feature these processes.

Map 1: "Visual Character Type Map"

Map 1 divides Alaska into units of uniform landscape character type. These units, which subdivide the regional divisions, are defined by three variables: location by region within the state; relief, indicating large-scale shape of the land surface; and landform, the features and texture of that surface. We found that landscapes can be fully described using these three factors, since they determine such other attributes as climate, vegetation, and color patterns.

Map 2: "River Environments, Viewpoints, and Special Places"

While mapping landscape character, we identified a number of locations that are important to any scenic analysis, but which are not mappable areas of uniform landscape character type in a statewide context. Map 2 shows these natural features. It shows a representative system of rivers and river-related landscapes chosen to illustrate comprehensively the range of diversity of this aspect of landscape character using the same concepts as in preparing Map 1. Map 2 also locates selected key viewpoints which are useful in determining the viewsheds which define visual units. It shows a variety of special places, including water features (lake basins, lake systems, river stretches which create distinctive riparian visual environments, coasts), canyons, gorges, cliffs, distinctive valleys, and summits of unique and striking character. The key viewpoints and special places shown on Map 2 are intended only to illustrate a range of examples and are limited also by the extent of our personal knowledge and certainly could be expanded.

Map 3: "Visual Units and Scenic Complexes"

Maps 1 and 2 were our starting point for identifying outstanding and representative visual units and superlative scenic complexes. These are shown on Map 3. We used two additional concepts to help us define scenic complexes: viewshed and sequence. The area seen from a key viewpoint is a viewshed. Sequence refers to the pattern of human movement on the land. A river or coastline or a series of connected passes and valleys are natural features which can channel travel and join landscapes into an area usually perceived as a unity. For example, the Wood-Tikchik lake and river system is the unifying element of a scenic complex comprised of mountains, lakes, streams, foothills, and lowlands.

Alaska's many kinds of visual units and scenic complexes are shown on Map 3. We include the state's best landscapes to the extent we know them. The map shows only outstanding representative areas -- it is not intended to be a definitive listing of all the superlative landscapes. The objectives of Map 3 are:

METHOD

The initial task was to devise criteria for distinguishing between areas of different visual character. This process began with a review of the BLM and Forest Service landscape analysis systems. (2) The BLM approach, the more refined of the two, uses five key factors to describe landscape character type:

1. Landform: Includes physiography, relief, texture, depositional and erosional forms, and rockform such as cliffs, beaches, and bluffs.

2. Vegetation: Described by type of vegetative cover, extent of cover, and ecotones--the interfacing and intermingling of vegetative types.

3. Water: Presence of still water (lakes), moving water (streams), the intermingling of land and water (marshes), and the primary interface of land and water (coasts).

4. Color: Presence of color and color contrasts in soil, rock, vegetation, water, and snow and ice.

5. Influence of Adjacent Scenery: Often views outside the visual units are critical to perceptions of landscapes within the unit--for example, in the situation where distant mountain ranges encircle a lowlying plain.

The BLM system is used as a foundation in the development of a chart, "Factors Distinguishing Alaska Landscape Character Types," which shows how we arrive at criteria for classifying landscapes into categories. Litton's landscape classification system, prepared earlier for the U.S. Forest Service, is also useful in defining landscape units from the perspective of human experience. (3)

Using this criteria, the state was systematically surveyed for areas of uniform visual characteristics using the following resource information:

1. U.S. Geological Survey topographic maps, useful in delineating relationships and contrasts in land and water forms.

2. Wahrhaftig's physiographic divisions of Alaska, which comes close to mapping visual character type and thus is the most important basis for this work. (4)

3. Hammond's landform map of Alaska, useful in delineating units of comparable relief and texture. We are also indebted to the work of Williams and of Detterman in classifying Alaska landscapes. (5)

COMPONENTS OF THIS STUDY

The results of the study include:

* This text, which describes the method of work, outlines the criteria used in categorizing landscapes, and lists the types of landscapes identified in Alaska.

* A chart, "Factors Distinguishing Alaska Landscape Character Types," which shows the physical aspects of the land which enable us to discriminate between landscapes.

* Three maps of Alaska showing:

  (1) areas of uniform landscape character type;

  (2) the location of certain natural features important in defining visual units and scenic complexes; and

  (3) outstanding visual units and scenic complexes representing significant aspects of the diverse Alaska landscape.

* Illustrations showing many of the types of landscapes we have identified.