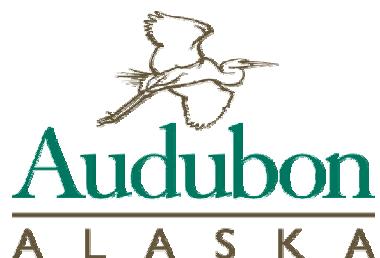


The Coastal Forests and Mountains Ecoregion of Southeastern Alaska and the Tongass National Forest

A CONSERVATION ASSESSMENT AND RESOURCE SYNTHESIS
MARCH 2007

Editors

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Preface

On behalf of Audubon Alaska and The Nature Conservancy of Alaska, we are proud to introduce you to “The Coastal Forests and Mountains Ecoregion of Southeastern Alaska and the Tongass National Forest: A Conservation Assessment and Resource Synthesis.” More than two years ago our organizations joined forces in a collaborative project to compile scientific information and evaluate ecological priorities for conservation in southeastern Alaska, including in the Tongass National Forest. Not only is the Tongass the nation’s largest national forest, but it also is home to some of the most important and extensive temperate old-growth rainforest in the world, plus all of the fabulous fish and wildlife associated with that increasingly rare ecotype.

We believe this product is unique in that it provides a common habitat inventory that encompasses all land classifications and ownerships throughout southeastern Alaska. By focusing on ecological values at a watershed scale within the region’s 22 biological provinces, we are providing a tool that we hope will be used by scientists, conservationists, resource managers, communities, Native tribes and organizations, and others to set priorities and avoid conflicts among uses and users across the Tongass and Southeast more broadly.

One of the hallmarks of this project was its strong scientific underpinnings. In this effort, we sought out many scientists and resource managers with on-the-ground expertise in Southeast to help guide and counsel us throughout this project. For example, we convened a scientific steering committee and also invited numerous experts to assist us in preparing, writing, and reviewing this detailed and comprehensive report. Indeed, some of the authors have worked in Southeast for decades and represent the very best and most experienced people possible to have assisted with this effort.

The data compiled here and which are the basis for the many maps and tables in this report were largely derived from the state and federal resource agencies that manage the lands and fish and wildlife of this region. We also were committed to making these data available through a Geographic Information System (GIS) database that is accessible to anyone with a personal computer.

In southeastern Alaska today, there is an unprecedented opportunity for protecting the ecological integrity—the fish, wildlife and plants, and the lands and waters that sustain them—and unique natural qualities of this coastal rainforest while also maintaining economic prosperity and people’s quality of life. We believe these resource syntheses, conservation assessment, and GIS tools will enhance and support wise decision-making. To this end, we encourage you to delve into the details and, we hope, come away with a new appreciation and perspectives about southeastern Alaska’s rainforest.

Finally, we thank our funders, including the Brainerd Foundation, William and Flora Hewlett Foundation, Gordon and Betty Moore Foundation, Wilburforce Foundation, ConocoPhillips Alaska, and the Alaska Department of Fish and Game for their invaluable support.

September 2006

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Executive Summary:

Southeast Alaska and Tongass National Forest Conservation Assessment and Resource Synthesis

Southeastern Alaska (Southeast)—located along Alaska’s panhandle between the Canadian Border and Yakutat Bay—encompasses more than 1,000 islands and more than 18,000 mi (30,000 km) of marine shoreline. This region also contains one of the most significant areas of old-growth temperate rainforest in the world. Approximately 80% of Southeast is managed within the 16.8 million acre (6.8 million hectare) Tongass National Forest, the largest national forest in the United States. Much of this region also comprises a unique assemblage of intact coastal watersheds that support abundant populations of fish and wildlife, including many species that have declined or become threatened in the southern portion of their historical ranges (for example, Pacific salmon [*Oncorhynchus* spp.], brown bear [*Ursus arctos*], and marbled murrelet [*Brachyramphus marmoratus*]).

In this collaborative project, Audubon Alaska (Audubon) and The Nature Conservancy (TNC) reviewed and synthesized existing information on selected resources, completed a conservation assessment of focal species and ecological systems, and presented a conceptual conservation strategy for Southeast and the Tongass. Specific goals of this project were to:

- Identify priority areas for conservation within each of the 22 biogeographic provinces throughout Southeast; and
- Evaluate and refine the conservation strategy for Southeast and the Tongass.

The following objectives were completed for Southeast and the Tongass in the Audubon-TNC Project:

- Reviewed existing resource information;
- Developed a geographic information system (GIS) database for selected resource values;
- Completed a conservation assessment and resource synthesis of selected resources;

- Developed a process for ranking ecological values of watersheds within biogeographic provinces;
- Developed a geographically-based spreadsheet (watershed matrix) of selected resources in all watersheds throughout the region;
- Developed a GIS database (for viewing in an Arc Reader program) for use as a decision support tool in conservation planning and management; and
- Assessed the current Tongass conservation strategy and developed a conceptual strategy focused on protecting representative watersheds of high ecological values within each biogeographic province of Southeast.

The report is presented in 3 parts: Chapters 2 through 4 provide a conservation assessment of Southeast, summarizing original and current conditions of selected resources regionwide as well as within individual provinces; Chapters 5 through 9 represent a resource synthesis describing the state of knowledge of habitats and species as well as perspectives on human use of the region; and Chapter 10 provides conceptual recommendations for refining the Tongass Forest conservation strategy and addressing long-term conservation needs throughout Southeast.

In the watershed strategy described in this report, we selected a suite of focal species and ecological systems to estimate ecological values at the watershed level. We used habitat capability models from the Tongass Land Management Plan (as modified by an interagency review group of wildlife experts) to assess habitat values for focal species (bears, deer, marbled murrelets, salmon). Salmon spawning and rearing habitat was assessed by combining the ADF&G anadromous salmon catalog with the USFS Stream Inventory. An inventory of upland and riparian large-tree forests was assembled from USFS forest and soils inventory data and other sources on state and private lands. Estuary occurrence data was derived from the intertidal emergent vegetation class (E2EM) from the

USF&WS National Wetlands Inventory (NWI) data and interpreted from Landsat ETM imagery for areas where NWI was not available.

To assess the relative ecological value of watersheds, watershed comparisons were made within biogeographic provinces (22 distributed throughout Southeast). Watershed value comparisons were conducted using a Marxan Model. The Marxan Model is a spatially-explicit tool for developing and evaluating reserve networks based on explicit conservation goals.

Additional products appended to this report include a watershed matrix and GIS database for Southeast. The spreadsheet presenting the matrix displays data for selected focal species and resources (such as spawning salmon, deer habitat, bear habitat, big-tree distribution, and estuary distribution) within each of the 1,030 watersheds distributed across Southeast. The individual watersheds as well as individual focal resources are ranked based on their ecological values within each province. The total area, amount of timber harvest, and linear distance of roads are also tabulated for each watershed.

The GIS database has been packaged on a DVD with project files for viewing in ArcReader and is available upon request. This program can be used on personal computers and is a powerful tool that enables users to scroll through a map of Southeast and view the various resource overlays used in this analysis at various scales. This comprehensive set of GIS data layers permits selective viewing of topographic and landform features, streams and lakes, province and watershed boundaries, Tongass management layers, habitat distribution of focal species, estuaries, forest types, and ecological rankings of watersheds.

The ecological integrity of the Southeast's rainforest will depend, in large part, on balancing industrial development with conservation measures, including an expanded watershed-scale reserve system for this region. An expanded system of intact watershed reserves would minimize risks to ecosystem integrity including sensitive populations of fish and wildlife and rare habitat types (e.g., big-tree old-growth forests). The establishment of additional watershed reserves also would provide a scientific benchmark for monitoring future habitat and population changes and determining the cause of such change. Audubon Alaska and The Nature Conservancy have identified core areas of biological importance as well as priority watersheds of high ecological values.

Recommendations were developed to maintain ecosystem integrity and conserve fish and wildlife populations and the natural range of variability of habitat types throughout Southeast and the Tongass. Key recommendations developed in this report included the following:

1. Maintain and expand the existing conservation reserve network to include additional intact watersheds (VCUs) throughout Southeast and the Tongass;
2. Each of Southeast's 22 biogeographic provinces should include a representative set of intact watershed reserves of high ecological value;
3. The watershed matrix ranks watersheds on their ecological values based on focal species and ecological systems. The highest ranked watersheds should be given conservation priority. Tier 1 and 2 watersheds have been mapped and represent the top 50% of ecological values within each province. Tier 1 and 2 watersheds may provide a useful template for expanding the watershed reserves in provinces with under-represented reserves;
4. Establish ecological restoration priorities for selected watersheds throughout Southeast and the Tongass;
5. Some provinces (e.g., North Prince of Wales) have undergone substantial resource development activities and may be at risk of losing their ecological integrity. Developed watersheds which still maintain relatively high ecological values have been mapped and should be given first priority for restoration activities;
6. Establish scientific benchmarks for long-term ecological research and monitoring in selected watershed reserves within representative provinces distributed across Southeast;
7. Use the Arc Reader GIS database to review and refine the TLMP old-growth reserve structure;
8. Standards and guidelines should be reviewed and revised, where appropriate, in consultation with species experts from state and federal resource agencies and universities;
9. Review the ecological values of watersheds and their current industrial infrastructure and consider aggregating impacts in some watersheds while providing additional conservation (including watershed-scale reserves) in other higher-value watersheds;
10. Apply best management practices (e.g., TLMP habitat buffers and standards and guidelines and State Forest Practices Act guidelines) to resource

development projects conducted in matrix lands throughout Southeast. Particular emphasis should be placed on maintaining riparian buffers and productive salmon spawning and rearing habitat throughout Southeast and the Tongass;

11. With respect to state lands, consider establishing additional critical habitat areas surrounding state lands and waters that include high-value and/or sensitive fish and wildlife habitats; and

12. Where multiple land or water jurisdictions overlap, consider developing co-management agreements to safeguard fish and wildlife habitat values.

In Southeast today, resource managers, scientists, and conservationists have an unprecedented opportunity for protecting the ecological integrity and unique natural qualities of this coastal rainforest—important to all Americans—while also sustaining local economies and maintaining the quality of life valued by the people who live and work in the region. The opportunities for conserving intact landscapes (including all their functional parts) have largely disappeared throughout much of the world. To maintain conservation options in Southeast, scientists and resource managers must evaluate and refine the regional conservation strategy through a collaborative process that uses the best available science. This conservation assessment, resource synthesis, conservation strategy, and GIS tools are provided to enhance the conservation efforts of resource managers, scientists, and conservationists working in southeastern Alaska and the Tongass National Forest.

Coastal Forests and Mountains Ecoregions of Southeastern Alaska and the Tongass National Forest: A Conservation Assessment and Resource Synthesis

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Introduction

John Schoen and David Albert

Southeastern Alaska (Southeast)—a dynamic land in transition—is situated along a narrow band of broken coastline dissected by myriad rivers and streams compressed between glaciated coastal mountains and the powerful North Pacific Ocean. This coastal ecosystem overlaps the northern portion of the world’s largest temperate rainforest—the Pacific Coast Rainforest, which extends from northern California to the Kenai Peninsula of Alaska.

Encompassing over 5,000 islands within the Alexander Archipelago and more than 18,000 mi (30,000 km) of marine shoreline, Southeast supports abundant populations of wildlife and fish species, many of which are rare or threatened in the lower 48 states. Approximately 80% of Southeast is contained within the 16.8 million acre (6.8 million ha) Tongass National Forest. Established as a reserve by presidential proclamation in 1902, President Theodore Roosevelt expanded the reserve and named it the Tongass National Forest—the nation’s largest—in 1907. Roughly the size of West Virginia, the Tongass contains nearly a third of the rare old-growth, temperate rainforest on earth and retains the greatest



FIG 1. Mud Bay on North Chichagof Island, looking north to Glacier Bay and Mt. Fairweather. (John Schoen photo).

expanse of intact old-growth forest remaining in the United States.

Unlike most forests in the lower 48 states, the Tongass still possesses significant areas of intact landscapes with a high degree of ecological integrity. All 5 species of Pacific salmon (*Oncorhynchus* spp.) still spawn in abundance in free-flowing streams and rivers throughout the region and contribute significantly to the biological richness of this coastal ecosystem. During the last half-century, however, substantial portions of the most productive forest lands in Southeast have undergone significant ecological change as old-growth forests were harvested to support

the region's forest products industry. As in other areas in the world, timber harvest in Southeast focused first on the most accessible and highest-quality timber lands of the region and created an expansive network of more than 5,000 mi (8,000 km) of logging roads. These same productive, low-elevation lands also overlap the most valuable fish and wildlife habitats in Southeast.

In Southeast today, resource managers, scientists, and conservationists have an unprecedented opportunity for protecting the ecological integrity and unique natural qualities of this coastal rainforest—important to all Americans—while also sustaining local economies and maintaining the quality of life valued by the people who live and work in the region. The opportunities for conserving intact landscapes (including all their functional parts) have largely disappeared throughout much of the world. To maintain conservation options in Southeast, scientists and resource managers must quickly evaluate and refine the regional conservation strategy through a collaborative process that uses the best available science. The conservation assessment and analytical tools described in this report were designed to support that process.

GOALS AND OBJECTIVES

The overarching goal of this conservation project is to conserve the biological diversity and ecosystem integrity of the temperate rainforest ecosystem of southeastern Alaska.

Specific goals of this report were to:

- Identify priority areas for conservation within each of 22 biogeographic provinces throughout Southeast
- Evaluate and refine the conservation strategy for Southeast and the Tongass

The following objectives supported these goals:

1. Review existing resource information for Southeast and the Tongass
2. Develop a geographic information system (GIS) database for selected resource values throughout Southeast and the Tongass
3. Complete a conservation assessment and resource synthesis of selected resources from Southeast and the Tongass
4. Develop a process for ranking ecological values of watersheds within biogeographic provinces distributed across Southeast and the Tongass

5. Develop a geographically-based spreadsheet (watershed matrix) of selected resources for watersheds throughout Southeast and the Tongass

6. Develop a GIS database (for viewing in an Arc Reader program) for use as a decision support tool in conservation planning and management throughout Southeast and the Tongass

7. Assess the current Tongass conservation strategy and develop a conceptual strategy focused on protecting representative watersheds of high ecological values within each biogeographic province of Southeast

PROJECT SCOPE

In this collaborative project, Audubon Alaska (Audubon) and The Nature Conservancy (TNC) reviewed and synthesized existing information on selected ecological, economic, subsistence, and wilderness resources throughout Southeast and the Tongass. This synthesis report is intended as a working document providing an overview of the region and its resources. The GIS tools were used to combine the synthesized data and information in a watershed database. The resulting product provided the initial step toward assessing the current Tongass conservation strategy and recommending refinements to that strategy for application across Southeast and particularly the Tongass National Forest.

A scientific advisory committee (Appendix A) of agency and university scientists was established to guide the development of this project. Public documents reviewed included scientific literature, resource inventories, agency reports, and planning documents (such as the U.S. Forest Service 1997 Tongass Forest Land and Resource Management Plan and environmental impact statement). In addition, knowledgeable field experts were identified and interviewed. The mapping component of this project was spearheaded by TNC in cooperation with Audubon by using data layers from state and federal resource agencies. After initial draft summaries of resources and conservation topics were compiled, reviews were sought from scientists and resource managers in academic institutions, federal and state resource agencies, and conservation organizations. These reviews were intended to “ground-truth” or peer review the text and maps. It is intended that review and updates of this synthesis be an ongoing process.

The watershed database (watershed matrix, in Appendix B) consists of a quantitative ecological

ranking (within each biogeographic province) of selected data layers (both individually and combined) for each watershed in Southeast and the Tongass. The watershed was the primary management unit (also termed Value Comparison Unit [VCU]) in the Tongass. The matrix includes summary statistics of resource values by watershed (VCU) and incorporates a ranking system to map and compare watersheds within the 22 biogeographic provinces across Southeast.

The GIS database for this conservation assessment of Southeast has also been made available to users of this report with project files for viewing in Arc Reader, a share-ware utility for read-only access to GIS functionality (available upon request as a separate DVD).

ORGANIZATIONAL OVERVIEW OF THIS REPORT

This report is presented in 3 parts: Chapters 2 through 4 provide a conservation assessment of Southeast, summarizing original and current conditions of selected focal resources region-wide as well as within individual provinces; Chapters 5 through 9 represent a resource synthesis describing the state of knowledge of habitats and species as well as perspectives on human use of the region; and Chapter 10 provides conceptual recommendations for refining the Tongass Forest conservation strategy and addressing long-term conservation needs throughout Southeast. In addition, the GIS database upon which this report is constructed is provided in Appendix B and C. The content of these parts is further described below.

Chapter 2 identifies the study area and methodology of the Southeast conservation assessment. It lays the foundation for assessing the historical and current status of selected resources across the region and for evaluating and refining the conservation strategy for Southeast. Chapter 3 provides a regional overview of biological values and conservation risks, and Chapter 4 briefly summarizes the current status of each of the 22 biogeographic provinces throughout Southeast.

Chapter 5 provides a detailed description of the major habitats of Southeast, focusing in particular on forest habitats and the pattern of forest succession following disturbance. This chapter provides an important overview of the variety and differences among forest types and is fundamental for

understanding the conservation implications of forest management in the region.

Chapters 6, 7, and 8 provide a synthesis of scientific knowledge of selected focal species of mammals, birds, and fish, respectively. Species were selected based on availability of current scientific data, their significance to the region, and relationships to forestry activities in Southeast. Each species-specific component of the 3 synthesis chapters summarizes what is known about the distribution and abundance of the species in the region, their habitat relationships, the influence of forestry practices, and implications for conservation. The summaries were written and compiled by species experts and peer reviewed by knowledgeable scientists.

Chapter 9 provides perspectives on human use, including a summary of historical and current information about subsistence uses of natural resources and the history, status, and value of wilderness in Southeast. The chapter also summarizes the history and current status of economic activities in Southeast, including the salmon, timber, mining, and tourism industries. It explains how these industries have changed and adapted to the unique geographical setting of the region.

Chapter 10 discusses the current conservation strategy for the Tongass and offers recommendations for refinements to that strategy for maintaining habitat diversity and ecological integrity of the temperate rainforest ecosystem. A spatial optimization of biodiversity and timber values was used to develop an integrated conservation area design for the Tongass National Forest and southeastern Alaska.

Additional products from this analysis include the watershed matrix and GIS database for Southeast. The spreadsheet presenting the matrix displays data for selected focal species and resources (such as spawning salmon, deer habitat, bear habitat, large-tree distribution, and estuary distribution) within each of 1,006 watersheds distributed across Southeast. The individual watersheds as well as individual focal resources are ranked based on their ecological values within the 22 biogeographic provinces. The total land area, amount of timber harvest, linear distance of roads, and percentage of lands in conservation or development status are also tabulated for each watershed.

The GIS database has been packaged on a DVD-Rom with project files for viewing in Arc Reader and

is available upon request. This program is a powerful tool that enables users to scroll through a map of Southeast and view (at any scale) the various resource overlays used in this analysis. This set of GIS data layers permits viewing of topographic, landform, and vegetation features, province and watershed boundaries, Tongass management layers, habitat distribution, estuaries, and rankings of watersheds.

This conservation assessment, resource synthesis, conservation strategy, and GIS tools are provided to enhance the conservation efforts of resource managers, scientists, and conservationists in Southeast and the Tongass. Application of the most recent principles of conservation biology, supported by new GIS technology, should assist forest and wildlife managers in refining conservation strategies to safeguard the biological diversity and ecological integrity of Southeast in balance with sustaining local economies and the unique quality of life enjoyed by the people of the region.

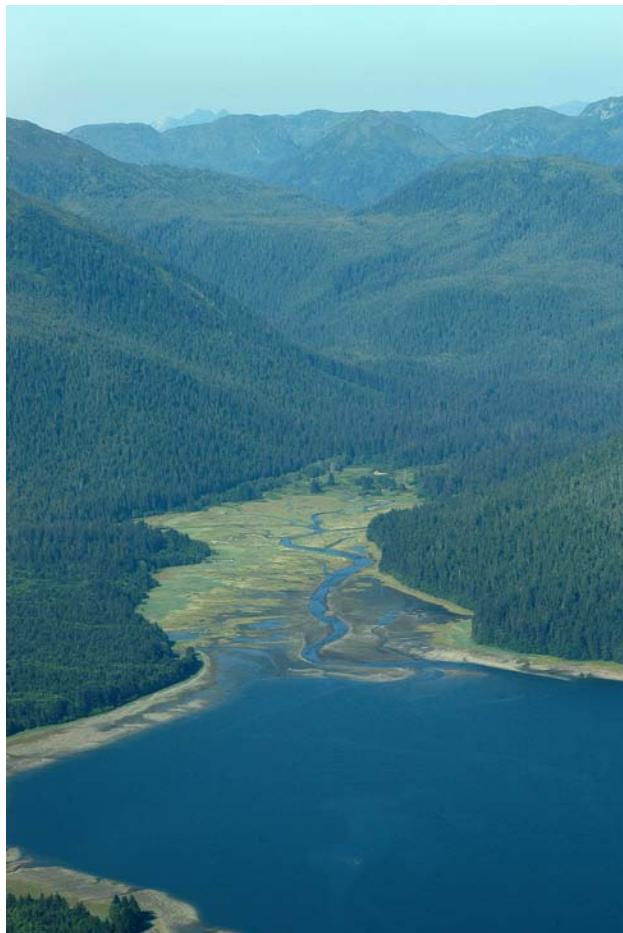


Fig 2. Crab Bay, Tenakee Inlet, East Chichagof Province. (John Schoen photo)

KEY TERMS AND DEFINITIONS

Key terms used throughout this report are defined below. Many of these definitions have been excerpted or adapted from Forest Service documents including the 1997 Tongass National Forest Land and Resource Management Plan (TLMP) while others have been adapted from various ecology text books.

Alexander Archipelago: The offshore islands of southeastern Alaska from Glacier Bay to the Canadian Border.

Algorithm: A finite set of well-defined instructions.

Alluvial soils: Sediments from river beds, flood plains, lakes and at the foot of mountain slopes and estuaries. Alluvial soils are generally well-drained and support the growth of large trees.

Anadromous fish: Fish, including salmon and steelhead, which mature and spend much of their adult life in the ocean, returning to freshwater streams to spawn.

Biogeographic provinces: Twenty-two ecological subdivisions of southeastern Alaska that are identified by generally distinct ecological, physiographic, and biogeographic features.

Biological diversity: The variety of life, including diversity of gene pools, species, communities, landscapes, and ecological processes like predation, decomposition, parasitism, and nutrient cycling.

Canopy: The overstory of a forest stand including tree tops and limbs which intercept sunlight and snow resulting in shade and snow free patches on the forest floor.

Canopy gap: Natural openings in the forest overstory naturally created from the loss of single trees or small groups of trees caused by windthrow, insects, or disease.

Carrying capacity: The concept that there is a maximum population size an ecosystem can sustain without causing long-term habitat damage and a reduction in the population size.

Clearcut: Forest harvesting method in which all trees are cleared in one cut. Clearcuts produce an even-aged stand of second-growth timber.

Coarse filter: An approach used for wildlife conservation and analysis which focuses on the characteristics of entire ecosystems and landscapes instead of individual species.

Commercial forest land: Forest land that is producing or is capable of producing crops of

industrial wood and has not been administratively or legislatively withdrawn from development.

Connectivity: The state of being functionally connected by movement of organisms, materials, and energy.

Conservation: Planned management of wildlife resources to prevent exploitation, destruction of neglect. The management of human uses of fish, wildlife, or other natural resources to yield the greatest sustainable benefit to current generations while maintaining options for future generations. This definition of conservation encompasses preservation, maintenance, sustainable use, restoration, and enhancement.

Corridor: An area of habitat that allows movement of individuals from one region or place to another; keeping populations connected.

Cumulative effects: The combined effects of all human activities on a defined area of land or water. In isolation, each individual action may not have a measurable effect on a given wildlife population. Over time, however, each incremental activity may have a combined (or even magnified) effect on the population.

Ecological integrity: The maintenance of an ecosystem's biological diversity (e.g., genes, species, populations, communities, landscapes) and natural ecological processes (e.g., predator-prey relationships, herbivory, decomposition, nutrient cycling) within their natural range of variability over time.

Ecosystem: An interacting ecological community together with its physical environment, considered as a unit. Ecosystems can be defined at various scales from a small pond to a large region like southeastern Alaska.

Endemic: Restricted to a specific locality (for example an island subspecies).

Estuary: An ecological system at the mouth of a stream where fresh water and salt water mix and where salt marshes and intertidal mudflats are present.

Fine filter: An approach used for wildlife conservation management and analysis which focuses on individual species and their habitats.

Geographic Information System (GIS) data: Data about the location and types of lands, resources, and uses within a specific area that is used to make computer-generated maps.

Habitat: The physical and biological resources required by an organism for its survival and reproduction; these requirements are species specific. Food and cover are major components of habitat and must extend beyond the requirements of the individual

to include a sufficient area capable of supporting a viable population.

Habitat fragmentation: Process by which habitats are increasingly subdivided into smaller units, resulting in their increased isolation as well as losses of total habitat area. Fragmentation can result in separating previously continuous populations causing the separate populations to be more vulnerable to extirpation or local extinction.

Karst: A type of topography that develops in areas underlain by soluble rocks, primarily porous limestone, which results in good surface drainage, the growth of large trees, caves, and.

Land use designation (LUD): Land management direction applied to the Tongass Forest at the level of watershed or Value Comparison Unit (VCU).

- LUD 1. Recommended Wilderness area.
- LUD 2. Lands managed in a roadless state to retain their wild character.
- LUD 3. Lands managed for a variety of uses including both amenity and commodity uses.
- LUD 4. Lands managed primarily for intensive resource development.

Old-growth forest: Ecosystems distinguished by the later stages of forest development. Old growth is characterized by a patchy, multi-layered canopy; trees of uneven age; large trees, snags, and woody debris on the forest floor; dominant trees over 300 years old; and a diverse and productive understory of herbs, shrubs, and ferns on the forest floor.

Old-growth reserve: A contiguous unit of old-growth forest habitat managed to maintain the integrity of the old-growth forest. Beach-fringe forest, riparian buffers, and habitat conservation areas all contain old growth reserves.

Population: Any group of animals belonging to the same species at the same time and place.

Productive old growth: Old-growth forest capable of producing at least 20 cubic ft of wood fiber per acre per year, or having greater than 8,000 board ft per acre.

Riparian Area: The streamside area including a stream channel, lake or estuary bed, and the plants that grow in the water and the land next to the water.

Roadless area: An area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles.

Second-growth forest: Young forest growth that has regenerated naturally, or has been planted, after some drastic removal of the original forest (for

example, clearcut harvest, serious fire, or insect attack).

Southeastern Alaska: The narrow mainland coast and nearshore islands from the Canadian Border south of Ketchikan to Yakutat Bay, also termed Southeast.

Stewardship: Management of natural resources that conserves them for future generations.

Stream class: A Forest Service category of stream channels based on their fish production value.

- Class I streams and lakes which have anadromous fish habitat and resident fish.
- Class II streams and lakes with resident fish populations where no anadromous fish occur.
- Class III perennial and intermittent streams with no fish populations but have influence on downstream fish habitat.
- Class IV streams with no influence on downstream fish habitat.

Subsistence: Section 803 of the Alaska National Interest Lands Conservation Act defines subsistence use as, “the customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.”

Sustained use: Management that ensures that human uses of resources can be maintained indefinitely without harm to the resource.

Tongass Land Management Plan: The Forest Service land and resource management plan developed in 1997 to guide the management of the Tongass National Forest.

Value Comparison Unit (VCU): Distinct geographic areas that generally encompass a drainage basin, or watershed, containing one or more large stream systems. Boundaries usually follow easily recognizable watershed boundaries. The 1997 Tongass Land Management Plan established 926 VCUs on the Tongass Forest.

Viable population: A population that contains an adequate number of individuals appropriately distributed to ensure a high probability of long-term survival without significant human intervention (For example: A 95% probability of persistence for 100 years).

Watershed: Watersheds generally form a distinct area bounded by ridges where all surface waters drains to a common point. Watersheds can range from less than 100 acres (40 ha) to more than 100,000 acres (40,470 ha). In the Tongass Land Management Plan, VCUs are often analogous to watersheds or make up segments of watersheds.

Watershed matrix: A spreadsheet database ranking ecological values of focal resources (e.g., summer bear habitat, salmon spawning and rearing habitat, large-trees, estuaries, etc.) and all resources combined for every watershed in Southeast by biogeographic province. Total land area, amount of timber harvest, and road distances are also presented for each watershed.

Windthrow: The act of trees being uprooted by the wind. Windthrow is a common natural forest disturbance in Southeast.