

# Conservation Prioritization of the Chilkat-Skagway Rivers Region



## *Identifying Opportunities for Conservation*

**Prepared by the Southeast Alaska Land Trust**

With support from the U.S. Fish and Wildlife Service

Southeast Alaska Coastal Conservation Program

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## Identifying Opportunities for Conservation

### Introduction

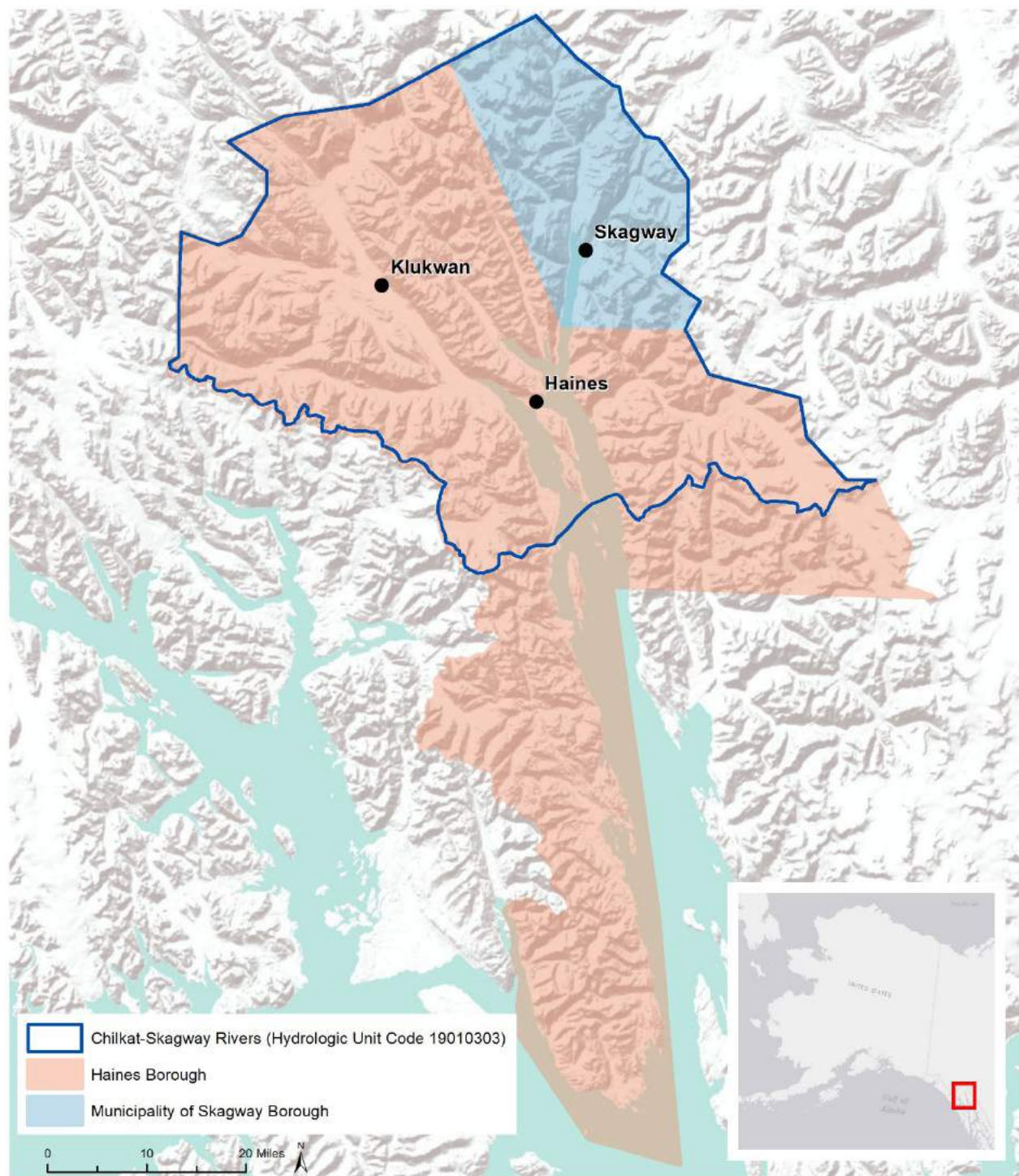
This conservation priority analysis is the third in a series of reports produced by the Southeast Alaska Land Trust (SEAL Trust) with the intent of identifying lands that are compatible with SEAL Trust's conservation mission and goals. This report and the associated Geographic Information Systems (GIS) maps were completed with the help of a U.S. Fish and Wildlife Service (USFWS) Coastal Grant awarded to fund a conservation priority analysis of parcels within the Chilkat-Skagway Rivers region of SEAL Trust's service area.

The Southeast Alaska Land Trust cooperates with communities, landowners, and others to permanently conserve habitat, recreation, open space, and historic and cultural areas. This prioritization analysis will be used as a strategic conservation planning tool to identify and prioritize lands with high conservation values within the Chilkat-Skagway Rivers region that are compatible with SEAL Trust's conservation mission and goals and that are held by private individuals and organizations, native corporations or tribal interests, municipalities, and the State of Alaska.

This prioritization analysis focuses on the communities of Haines, Skagway, and Klukwan (Figure 1). The study area was based on the boundaries of the Chilkat-Skagway Rivers Hydrologic Unit (Hydrologic Unit Code 19010303). Though this hydrologic unit extends north into Canada, the study area for this prioritization includes only the portion within Alaska. This area is rich in biodiversity, with valuable upland and aquatic habitats that provide important functions and support watershed health and sustainability.

SEAL Trust seeks a strategic approach to exploring additional conservation possibilities in the Chilkat-Skagway Rivers region. This prioritization analysis is intended to help evaluate current opportunities and to help plan long-term conservation strategies in the region. Using GIS technology, this prioritization analysis offers an analytical, data-driven planning tool that could be used to supplement SEAL Trust's existing processes for conservation assessments and evaluations.

Figure 1



## Study Area

*Chilkat-Skagway Rivers Hydrologic Unit*

## Project Goals

SEAL Trust seeks the ability to quickly and objectively assess the conservation value of potential projects within the Chilkat-Skagway Rivers region. The goals of this conservation prioritization project are as follows:

1. Identify mapped ecological resources that contribute to a parcel's conservation value;
2. Create a tool using GIS to rank the conservation values of private, tribal, municipal, and state lands within the Chilkat-Skagway Rivers Hydrologic Unit;
3. Provide enough data within the tool that a user can easily query data of interest.

## Background

### Geography

This prioritization analysis focuses on the communities of Haines, Skagway, and Klukwan within the Chilkat-Skagway Rivers Hydrologic Unit, situated at the northern extent of Lynn Canal within Alaska's Inside Passage. There are ten glacially-fed rivers in the region: the Taklin, Tsirku, Klehini, Kelsall, Chilkat, Taiya, Skagway, Chikoot, Ferebee, and Katzehin Rivers. Many of these rivers provide excellent salmon habitat; the Chilkat River, for example, provides spawning habitat for all five species of salmon, as well as steelhead trout (Schoen & Dovichin, 2007). The Chilkat-Skagway Rivers Hydrologic Unit contains approximately 55,000 acres of wetlands, which is approximately six percent of the total land area (Smith, 2016).

The Chilkat-Skagway Rivers region has the lowest precipitation in Southeast Alaska, resulting in habitats that are distinct from the rest of Southeast Alaska. The overlap of coastal rainforest and drier inland conditions results in the greatest richness of vascular plants in Alaska (Schoen & Dovichin, 2007). Plant community types in the region include fire-influenced white birch and pine communities, subalpine fir communities, and coastal rainforest communities at sea level. The riparian forest surrounding the Chilkat River and associated rivers includes cottonwood, spruce, willow, red-osier dogwood, and high brush cranberry, providing excellent wildlife habitat for moose and other species (Schoen & Dovichin, 2007). Additionally, glacial rebound rates of nearly one inch per year have resulted in uplift meadows and associated communities, providing unique habitat for wildlife in an area dominated by steep mountain slopes (Schoen & Dovichin, 2007). Due to the habitat diversity, the Chilkat-Skagway Rivers region has the highest mammal diversity in Southeast Alaska, with 38 species of mammals (Schoen & Dovichin, 2007).

### Communities and Landowners

Land in the region is owned by a mix of state, federal, and private landowners (Figure 2). The region is comprised of three municipalities: Haines Borough (2,726 square miles), Municipality of Skagway Borough (463 square miles), and the Alaska Native village of Klukwan (1.9 square miles). Approximately 3,570 people live in these three communities.

In 2010, the population of Haines was 2,508 (Research and Analysis: Alaska Census Data, 2018). The Haines Comprehensive Plan projects that the population will increase up to 2,971 by 2030 and will require between 92 and 210 more dwelling units (Haines Borough, 2012), continuing to put pressure on developable lands in the borough.

The Native Alaskan village of Klukwan is technically part of the Hoonah-Angoon Census Area, but is an enclave in the Haines Borough. It is located 22 miles northwest of Haines on the Chilkat River and has a population of 95 (American Fact Finder, 2018). The Chilkat River remains an important subsistence resource for Klukwan residents who rely on healthy rivers and wetland habitat for hunting and fishing (Chilkat Indian Village, 2018).

The Municipality of Skagway Borough is located at the head of Taiya Inlet and is the smallest borough in Alaska at 463 square miles. In Skagway, privately owned lands account for only 0.6 percent of total land (Municipality of Skagway Borough, 2009). During the 2010 census, the Municipality of Skagway Borough had a population 968 (Research and Analysis: Alaska Census Data, 2018) and the town estimates the population forecast for 2030 somewhere in the range between 670 and as high as 1,110 (Municipality of Skagway Borough, 2009).

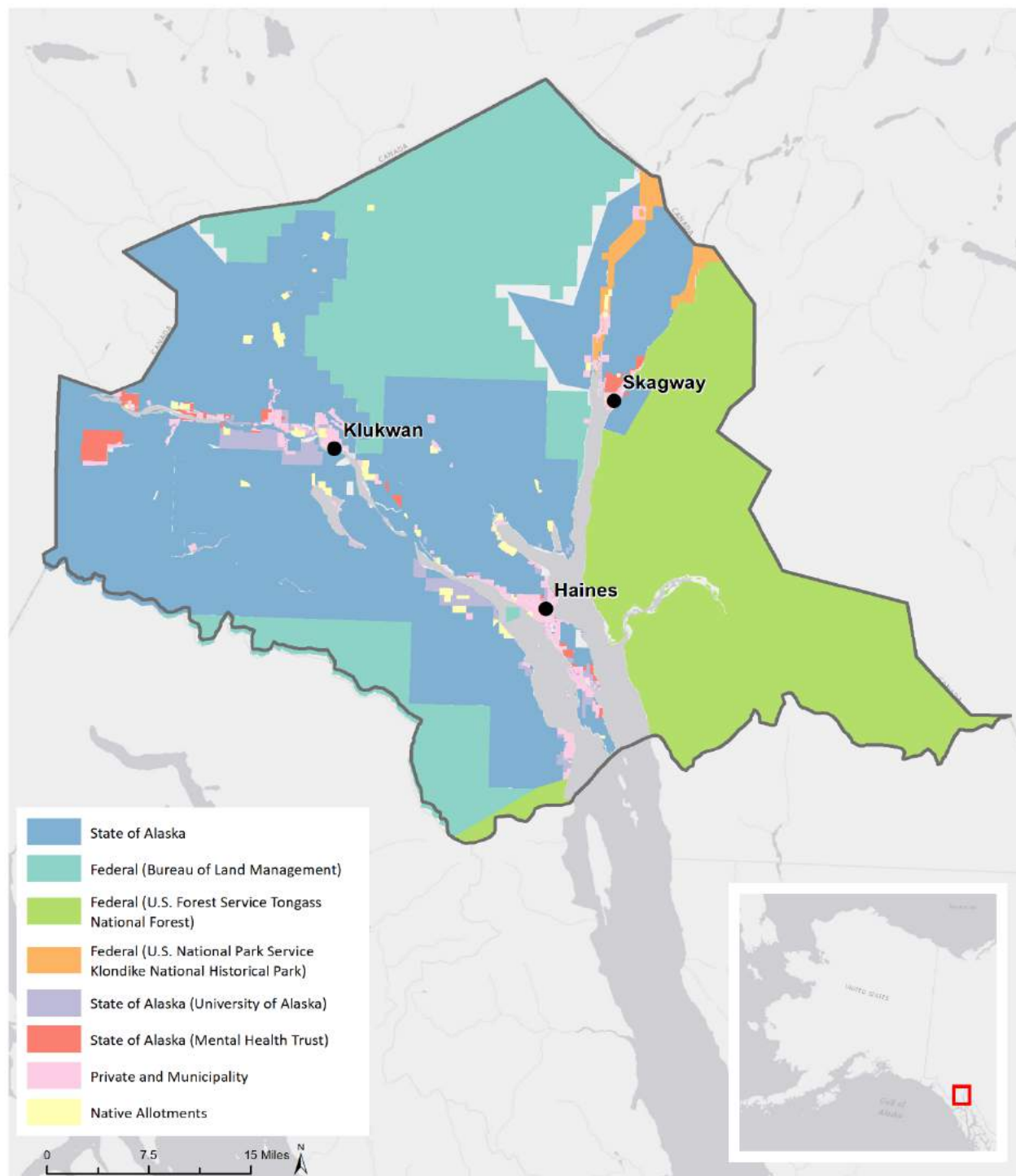
State and federal government owns the majority of the land within the Chilkat-Skagway Rivers Hydrologic Unit. Table 1 shows the approximate percentage of land owned by different landowners in the region. The largest landowner is the State of Alaska, which owns 45 percent of the total land area in the region. Only five percent of lands in the Chilkat-Skagway Rivers Hydrologic Unit are considered to have potential for conservation status. These lands are owned by private individuals or organizations, tribal entities, the University of Alaska, and the Alaska Mental Health Trust Authority (Mental Health Trust).

It should be noted that this prioritization analysis considered land managed by the University of Alaska and the Mental Health Trust as separate from other state-owned lands. Though these two organizations are state government entities, their land management strategies are more flexible and therefore these lands are more likely to be available for conservation.

*Table 1 The largest landowners in the Chilkat-Skagway Rivers region and approximate percentage that each entity owns.*

Landowner	Percentage of land owned in the study area
State of Alaska	45
Federal (Bureau of Land Management)	26
Federal (U.S. Forest Service, Tongass National Forest)	23
Federal (U.S. National Park Service, Klondike National Historical Park)	1
Other (private, tribal, municipal, University of Alaska, Mental Health Trust)	5

Figure 2



## Land Ownership

*Land Ownership and Land Management within the Study Area*



## Land Conservation Status

The majority of land in the region is managed by either the federal or state government, with varying levels of conservation status (Figure 3). Federal land in the Chilkat-Skagway Rivers region is primarily managed by either the Bureau of Land Management (BLM) or the U.S. Forest Service (USFS). Both BLM and USFS lands are managed for multiple uses. Land use designations within the Tongass National Forest include remote recreation, modified landscapes, wild rivers, old growth forest, and other designations (U.S. Forest Service, 2008).

Other federal lands in the Chilkat-Skagway Rivers region include the Klondike Gold Rush National Historical Park within the Municipality of Skagway Borough. The Klondike Gold Rush National Historical Park is managed by the U.S. National Park Service and protects 13,200 acres along the historic Chilkoot Trail in the Taiya and Skagway Valleys near Skagway. The Park preserves and commemorates the Klondike Gold Rush of the late 1890s.

State lands in the Chilkat-Skagway Rivers region are managed by various state departments with different levels of conservation status. These lands include the Haines State Forest, which is comprised of 286,000 acres around the Chilkoot, Chilkat, and Ferebee Rivers near the communities of Haines and Klukwan (Division of Forestry, 2018). It is managed by the Alaska Department of Natural Resources (ADNR) for multiple uses, including subsistence uses, recreation, hunting, mining, and commercial timber harvest. Approximately 42,000 acres of the Haines State Forest are dedicated to timber harvest.

A portion of the Haines State Forest is designated as the Alaska Chilkat Bald Eagle Preserve and is managed by ADNR's Division of Parks and Outdoor Recreation. The Preserve was established in 1982 to protect the world's largest concentration of bald eagles and their habitat (Division of Parks and Outdoor Recreation, 2018) and is identified as a Critical Habitat Area. The area is 18 miles north of Haines and consists of river bottom land along the Chilkat, Kleheni, and Tsirku Rivers.

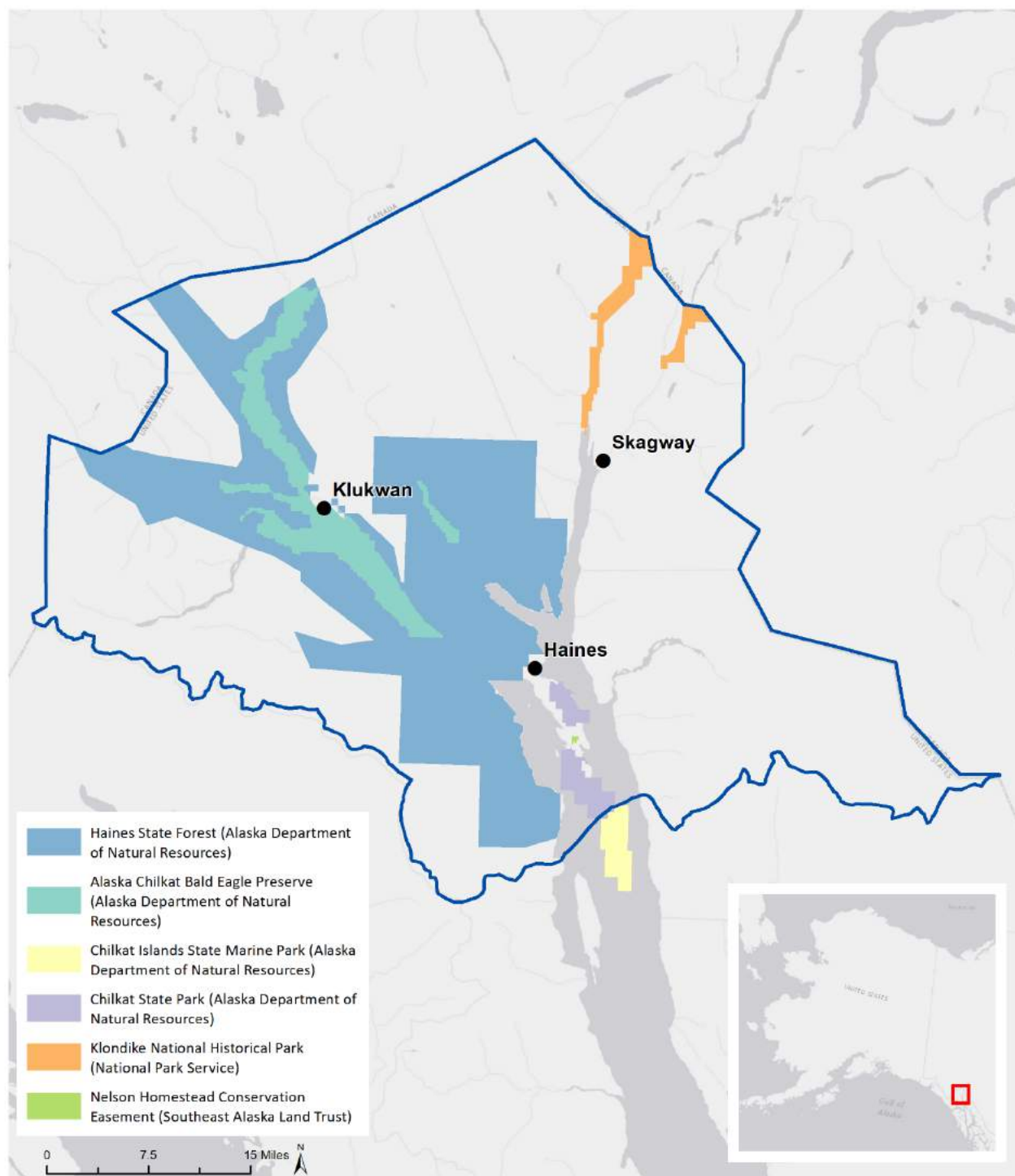
There are four state recreation areas within the Haines Borough: Chilkat State Park (9,837 acres), Chilkoot Lake State Recreation Site (80 acres), Portage Cove State Recreation Site (97 acres), and Mosquito Lake State Recreation Site (Alaska Department of Natural Resources, 2018). Additionally, the Chilkat Islands State Marine Park is located immediately adjacent to the study area in Lynn Canal. This marine park is 6,560 acres. These recreation areas are managed by the Alaska Department of Natural Resources Division of Parks and Outdoor Recreation.

SEAL Trust currently holds one conservation easement within the study area, located in the Mud Bay area of Haines Borough. The Nelson Homestead Conservation Easement was executed in December 2013, and protects 128.51 acres of mud flats, estuary, and forested upland. The conservation easement was put in place primarily to protect the property's mud flats and estuary habitat, as well as the property's recreational and educational values.

Threats to critical habitat in the region come from road and airport development and expansion; pollution from sewage, landfills, or roads; and, displacement of wildlife from critical foraging habitat by recreational activities (Schoen & Dovichin, 2007). Other potential threats include residential development, timber harvesting, transportation infrastructure (i.e., roads, bridges, ferry terminals, airports, and harbors), hydroelectric power/alternative energy facilities, mining, tourism infrastructure, and the development of the aquaculture industry in the region.

As shown in Figure 2, only five percent of the land in the Chilkat-Skagway Rivers region is owned by landowners other than the federal or state governments. The population in the communities of Haines and Skagway is projected to grow over the next decade, which will put significant pressure on these lands for residential development. This prioritization analysis will help to identify parcels' suitability for development or conservation.

Figure 3



## Protected Lands

*Protected federal, state, and private lands within the Study Area.*



## Methodology

This prioritization analysis uses GIS to identify appropriate parcels in the Chilkat-Skagway Rivers Hydrologic Unit and rank them based on the conservation criteria listed in Table 2. This analysis prioritized lands owned by private entities, municipalities, the Mental Health Trust, and the University of Alaska.

Though Federal and State lands may have high conservation values, these lands are difficult to acquire for conservation, and are therefore excluded from this analysis. It should be noted, however, that land managed by the University of Alaska and the Mental Health Trust are included in the parcel dataset. Though these two organizations are state government entities, their land management strategies are more flexible and therefore these lands are more likely to be available for conservation.

Parcels owned by private entities, municipalities, the Mental Health Trust, and the University of Alaska were extracted from the Haines Borough tax parcels GIS layer and the Municipality of Skagway Borough tax parcels GIS layer. In total, 5,430 parcels in the region were considered for prioritization.

After extracting the parcels for analysis, the parcel layer was intersected with layers containing data about the following conservation values: 1) wetlands, 2) anadromous waters, 3) estuaries, 4) stream and lakes, and 5) watersheds identified by The Nature Conservancy (TNC) as Conservation Priority Watersheds. Parcels scored one (1) if the conservation criteria was present and zero (0) if the conservation attribute was absent. In addition, this analysis considered the normalized area of wetlands to rank parcels based on the area of wetlands present within the parcel. Further explanation about the criteria and datasets used in this analysis is provided in Table 2.

In order to prioritize the parcels, the six conservation value categories were summed to produce a maximum score of six. The parcels with the highest score are considered to have the highest conservation value and are a high priority for conservation efforts.

It is important to note that this prioritization is based on criteria that emphasize wetlands, waterways, and anadromous fish habitat. Because of the focus on water resources, it is possible that this prioritization analysis underrepresents other landscape features with high conservation value, such as unique forest habitat. Water features on the landscape, however, are often important attributes that coincide with many other habitat values. For example, wetlands can provide critical habitat for a diversity of species. Furthermore, TNC's Conservation Priority Watersheds (a criterion for this prioritization) were ranked based on a wide range of ecological conditions and are therefore representative of many conservation values that are not individually analyzed in this prioritization analysis. This prioritization analysis is SEAL Trust's best approximation of the conservation value of land parcels in the Chilkat-Skagway Rivers region given the best available data.

Table 2: Conservation values and associated datasets used to prioritize parcels within the study area.

Conservation Value	Reason for Inclusion	Data Source	Notes
<b>Presence of wetlands</b>	Wetlands provide a wide variety of important ecosystem services, including: flood control, groundwater recharge, water filtration, habitat for fish, wildlife, and plants, and cultural and recreational activities (U.S. Fish & Wildlife Service, 2018).	U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI)	NWI is a widely-used national dataset; there are, however, many places where wetlands have not been mapped or data is unreliable in the State of Alaska.
<b>Normalized area of wetlands</b>	It is useful to evaluate parcels based on the area of wetlands present. The wetland acreage was normalized by dividing each wetland area by the largest value, so the parcel with the largest wetland area gets a score of "1" and every other parcel is scored between 0 and 1.	U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI)	The wetland acreage of each parcel was calculated using the NWI dataset and the parcels layer.
<b>Presence of anadromous streams</b>	Anadromous streams provide critical habitat for commercial species of fish important to the Southeast Alaska economy. Culturally, salmon and other anadromous fish play an important role in lifestyles and traditions. In addition, the fish resources support a wide variety of other wildlife, such as bears and raptors, and provide nutrients to freshwater systems (Armstrong & Willson, 2014).	Alaska Department of Fish and Game Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes-Southeastern Region, Effective June 1, 2010	
<b>Presence of estuaries</b>	Estuaries provide critical habitat for many species, including for commercial fish species. Additionally, estuaries act as stopovers for migratory bird species. Estuaries also filter water and buffer coastlines from erosion (National Oceanic and Atmospheric Administration, 2017).	U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI)	The NWI dataset was used to identify estuaries in the region; only polygons classified as "estuarine" were selected.
<b>Presence of streams and lakes</b>	Lakes and their lacustrine zones are important freshwater ecosystems (Kalff, 2002). They provide water supply and can provide recreational opportunities. They also provide scenic views. Streams and their corridors are critical fish and wildlife habitat. They also provide water supply and can provide recreational opportunities.	U.S. Forest Service	
<b>Conservation Priority Watersheds</b>	Watersheds identified by The Nature Conservancy and Audubon Alaska as being "largely intact" and encompassing the highest current ecological values within each province" (Schoen & Dovichin, 2007).	The Nature Conservancy & Audubon Alaska (2007)	

## Results

The most important product of this prioritization analysis is the GIS map with the final prioritized parcel layer. This GIS tool will allow for regional analysis of conservation priorities, as well as provide information at the parcel level about potential conservation projects. This section shows a selection of the resulting maps and tables from the prioritization analysis, but the GIS tool can be used for querying and exploring the prioritization analysis further.

The maximum possible score is six (6), and parcels with a score of four (4) and higher were identified as top priority parcels for SEAL Trust land protection in the area. This process analyzed 5,430 parcels, ranging in size from less than 1 acre to 2,250 acres. The highest priority parcel has a score of 5.150. It is a 183-acre parcel owned by the University of Alaska in the Haines area.

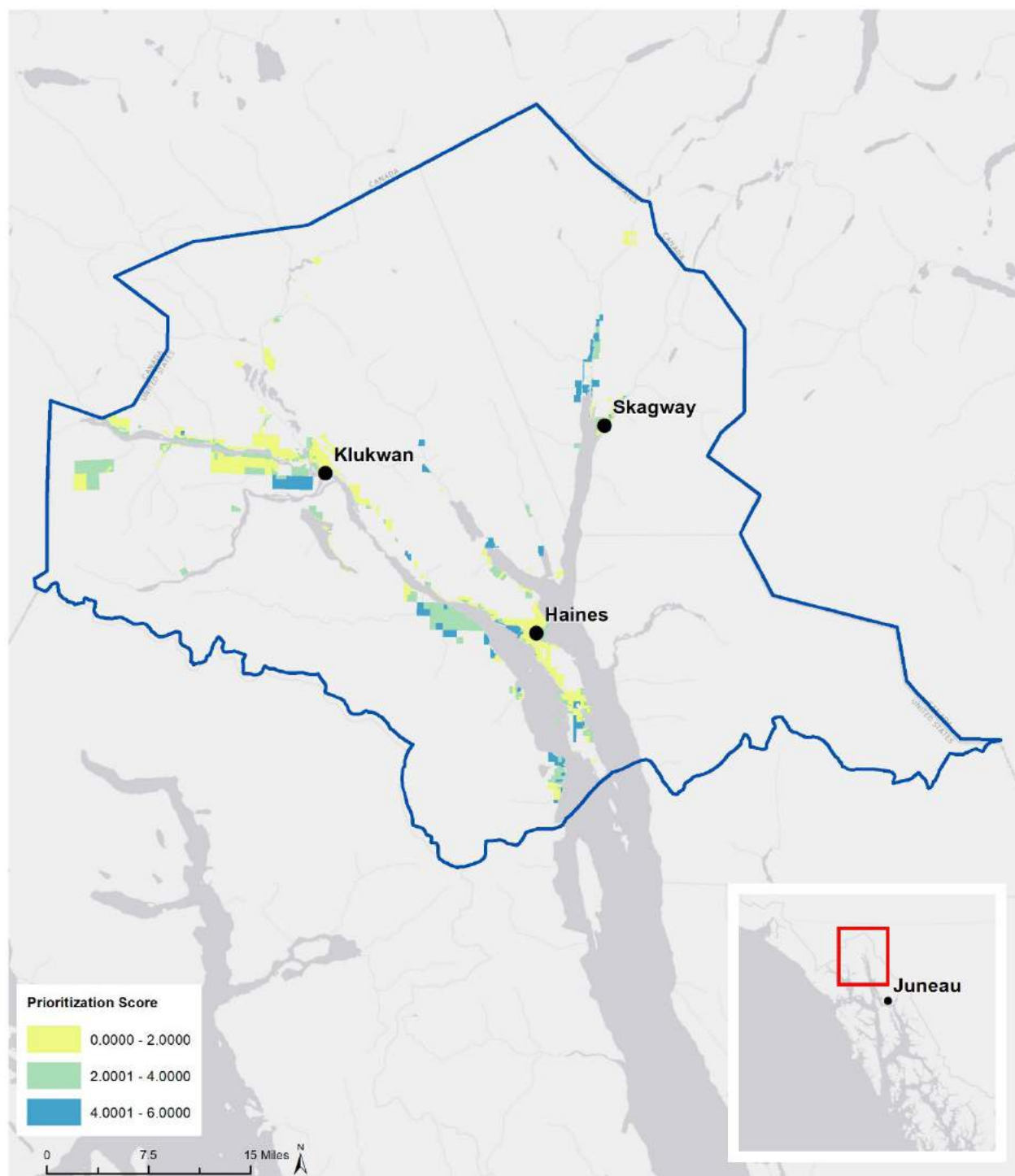
Figure 4 illustrates all of the prioritized parcel in the Chilkat-Skagway Rivers Hydrologic Unit. Table 3 lists the ten parcels within the Chilkat-Skagway Rivers Hydrologic Unit with the highest prioritization scores. Figure 5 to Figure 7 depict the prioritized parcels at three localized areas within the study area for more detail.

The prioritization is a useful initial tool for identifying sites of interest, however, SEAL Trust performs additional research and due diligence on a site of interest before entering into any agreements. The map and its layers is used only as a first step in identifying a project.

*Table 3: Top ten prioritized parcels within the Chilkat-Skagway Rivers region.*

Landowner	Score (0-6)	Total Acreage
University of Alaska	5.150	183
Municipality of Skagway Borough	5.095	159
Private Landowner	5.038	47
Private Landowner	5.038	45
Private Landowner	5.031	43
Private Landowner	5.027	48
Municipality of Skagway Borough	5.025	428
Private Landowner	5.020	31
Municipality of Skagway Borough	5.004	5
Municipality of Skagway Borough	5.002	4

Figure 4



## Chilkat-Skagway Rivers Hydrologic Unit

*Prioritization of parcels within the Chilkat-Skagway  
Rivers Hydrologic Unit*



## Haines Area

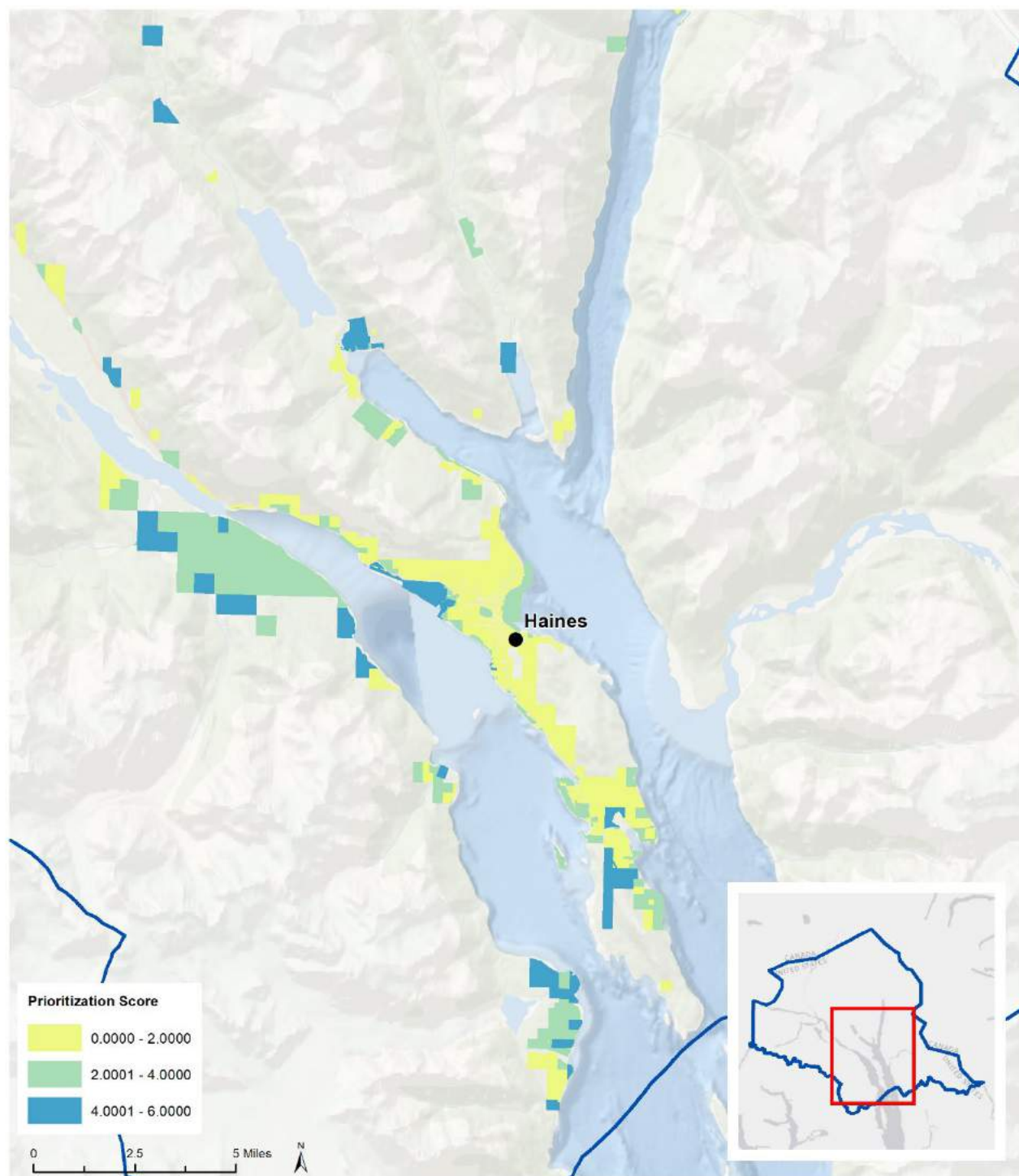
Figure 5 shows the prioritized parcels near Haines and Table 4 lists the five parcels near Haines with the highest prioritization scores. The top parcel, owned by the University of Alaska, scored 5.150, is 183 acres, and is located adjacent to the Chilkat River. This parcel received a high score due to the presence of wetlands, the presence of estuarine wetlands, the presence of anadromous waters, the presence of a stream, and the parcel's location within a Conservation Priority Watershed.

*Table 4: Top five prioritized parcels near Haines.*

Landowner	Score (0-6)	Total Acreage
University of Alaska	5.150	183
Private Landowner*	5.039	183
Private Landowner	5.020	31
Private Landowner	5.002	141
Private Landowner	4.119	141

\*This landowner owns four parcels, all adjacent to each other, which scored as the second through fifth priority parcels. These four parcels are represented as one property in this table by summing the individual acreages, and is given the score of the highest scoring parcel.

Figure 5



## Haines Area

*Prioritization of parcels near Haines*

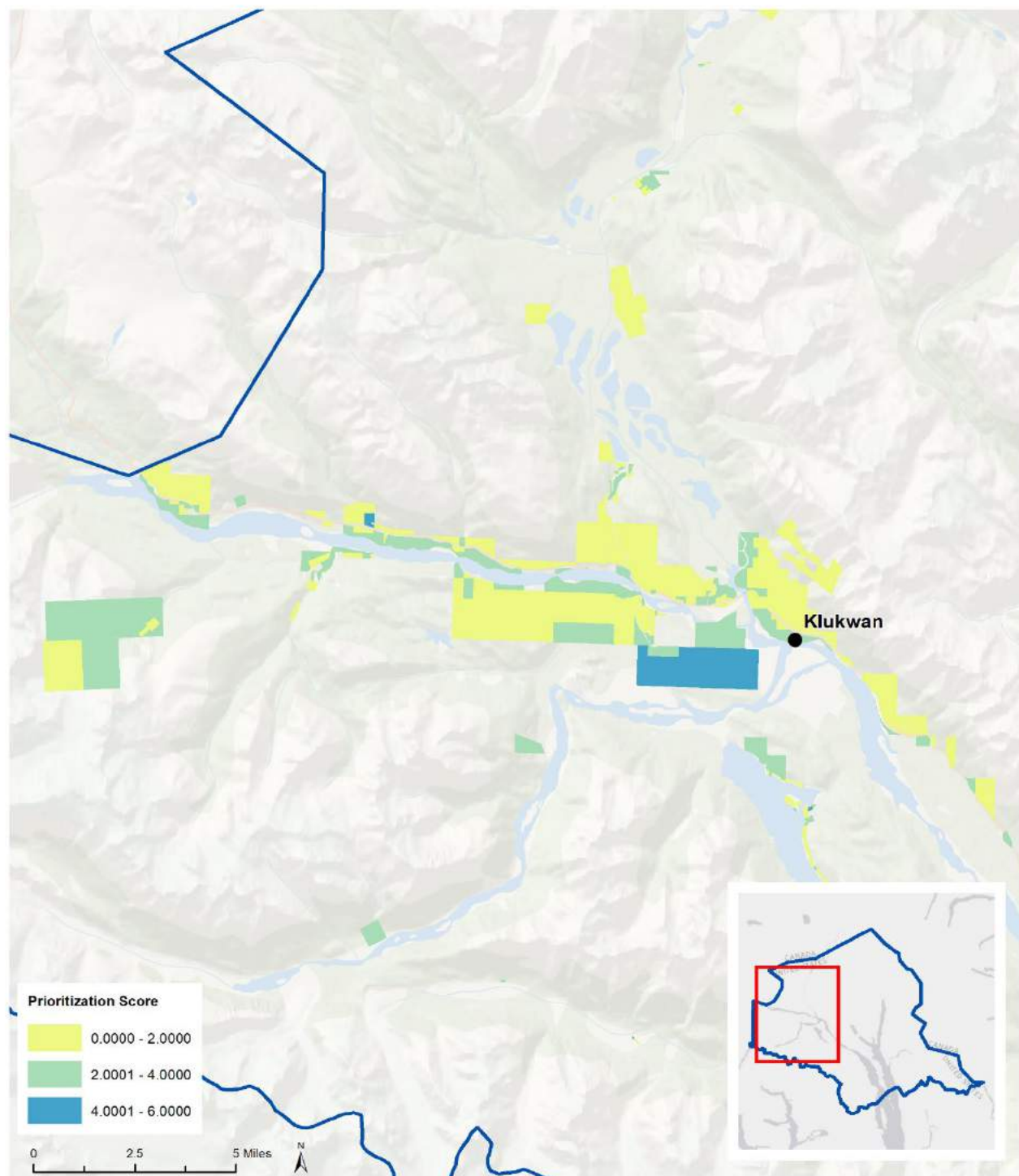
## Klukwan Area

Figure 6 shows the prioritized parcels near the community of Klukwan and the Chilkat, Klehini, and Tsirku Rivers. Table 5 lists the five parcels located northwest of Haines, near the community of Klukwan, with the highest prioritization scores. The top parcel, owned by the University of Alaska, scored 4.336, is 1,788 acres, and is located near the confluence of the Chilkat and Tsirku Rivers. This parcel received a high score due to the presence of wetlands, an anadromous fish stream, a stream, and being located within a Conservation Priority Watershed.

*Table 5: Top five prioritized parcels in the area near the Chilkat, Klehini, and Tsirku Rivers.*

Landowner	Score (0-6)	Total Acreage
University of Alaska	4.336	1,788
Mental Health Trust	4.003	51
Private Landowner	4.001	4.5
Private Landowner	4.000	1.5
University of Alaska	3.132	162

Figure 6



## Klukwan Area

*Prioritization of parcels near Klukwan*

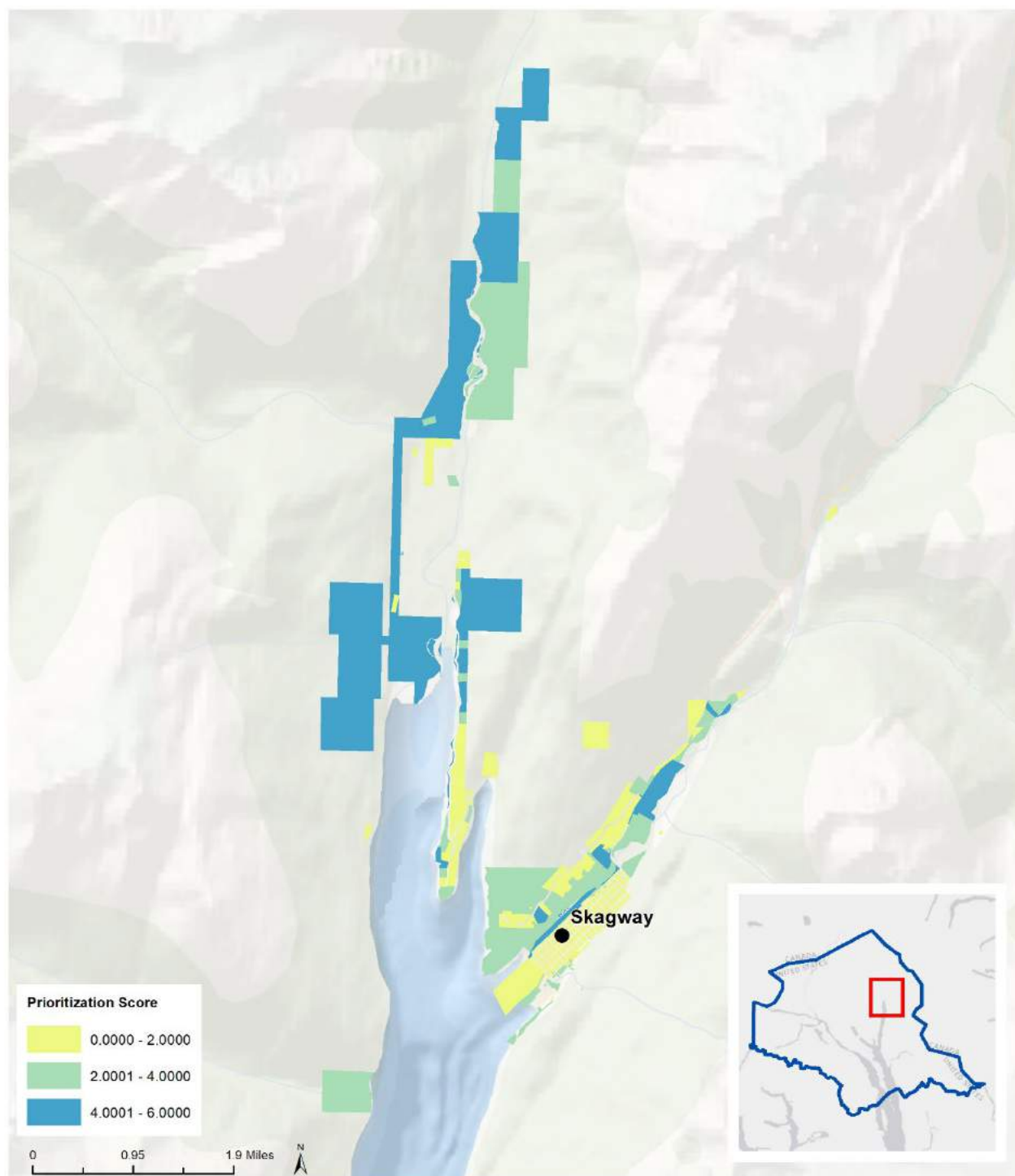
## Skagway Area

Figure 7 shows the prioritized parcels near Skagway. Table 6 lists the five parcels near Skagway with the highest prioritization scores; all five are owned by the Municipality of Skagway Borough. The top parcel scored 5.095, is 159 acres, and is located along the Taiya River. This parcel received a high score due to the presence of wetlands, the presence of estuarine wetlands, an anadromous fish stream, a stream, and being located within a Conservation Priority Watershed.

*Table 6: Top five prioritized parcels near Skagway.*

Landowner	Score (0-6)	Total Acreage
<b>Municipality of Skagway Borough</b>	5.095	159
<b>Municipality of Skagway Borough</b>	5.025	428
<b>Municipality of Skagway Borough</b>	5.004	4.7
<b>Municipality of Skagway Borough</b>	5.000	3.8
<b>Municipality of Skagway Borough</b>	5.000	3.5

Figure 7



## Skagway Area

*Prioritization of parcels near Skagway*

## Discussion

This analysis of parcels within the Chilkat-Skagway Rivers Hydrologic Unit provides SEAL Trust with a useful tool for identifying and prioritizing properties with high conservation value. This prioritization analysis will help SEAL Trust achieve its mission of collaborating with communities, individuals, and organizations to permanently conserve highly valued habitat, recreation, open space, and cultural and historic areas.

This analysis identified a parcel owned by the University of Alaska as the highest priority parcel for conservation. Other parcels owned by the University of Alaska were identified in localized areas as having high conservation value. Partnering with the University of Alaska may provide significant opportunities for land conservation within the Chilkat-Skagway Rivers region.

Furthermore, the University of Alaska owns two parcels adjacent to the Nelson Homestead Conservation Easement on the Chilkat Peninsula. These parcels are 283 acres and 40 acres. Though these parcels scored relatively low in the prioritization analysis (2 and 1, respectively), conservation of these parcels would significantly increase the protected habitat and open space acreage on the peninsula and in the Mud Bay area of Haines Borough. Whenever possible, SEAL Trust seeks to conserve lands contiguous with other protected areas. Partnering with the University of Alaska to protect these two parcels aligns with SEAL Trust's conservation goals.

Given that only 0.6% of the land within the Municipality of Skagway Borough is privately held, it is not surprising that the municipality owns the five highest-ranked parcels in the Skagway area. SEAL Trust has a history of partnering with municipalities on conservation projects, and holds conservation easements on municipal lands in both Juneau and Sitka. This model may work well for conservation projects in the Skagway area.

SEAL Trust has an In-lieu Fee Program for wetland mitigation, per the 2011 *Instrument between Southeast Alaska Land Trust and the U.S. Army Corps of Engineers, Alaska District for the Southeast Alaska Land Trust In-lieu Fee Program*. As a part of the In-lieu Fee Program, SEAL Trust often seeks projects focusing on wetlands and estuaries. This prioritization analysis will be useful in managing the In-lieu Fee Program, as the tool can be used to identify parcels ranked highly for the presence of wetlands and estuaries.

As SEAL Trust continues working to conserve land throughout Southeast Alaska, tools such as this prioritization analysis will be useful for informing conservation priorities and identifying potential partners. Through these efforts, highly valued conservation lands will be preserved for generations to come.

## References

- Alaska Department of Natural Resources. (2018). *Alaska State Parks Units*. Retrieved from Alaska Department of Natural Resources Division of Parks and Outdoor Recreation: <http://dnr.alaska.gov/parks/parkunits.htm>
- American Fact Finder*. (2018). Retrieved from United States Census Bureau: [https://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml?src=bkmk](https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmk)
- Armstrong, R. H., & Willson, M. F. (2014). *Natural Connections in Alaska*. Guangzhou, China: Everbest Printing Co., Ltd.
- Chilkat Indian Village. (2018). *Chilkat Indian Village*. Retrieved from <http://chilkatindianvillage.org>
- Division of Forestry. (2018, October). *Alaska's State Forests*. Retrieved from Alaska Department of Natural Resources Division of Forestry: <http://forestry.alaska.gov/stateforests.htm>
- Division of Parks and Outdoor Recreation. (2018, October). *Alaska Chilkat Bald Eagle Preserve*. Retrieved from Alaska Department of Natural Resources Division of Parks and Outdoor Recreation: <http://dnr.alaska.gov/parks/units/eagleprv.htm>
- Haines Borough. (2012). *Haines Borough 2025 Comprehensive Plan*. Haines.
- Kalff, J. (2002). *Limnology*. Upper Saddle, NJ: Prentice Hall.
- Municipality of Skagway Borough. (2009). *Municipality of Skagway 2020 Comprehensive Plan*.
- National Oceanic and Atmospheric Administration. (2017, July). *Estuaries*. Retrieved from NOAA Ocean Service Education: [https://oceanservice.noaa.gov/education/kits/estuaries/estuaries03\\_ecosystem.html](https://oceanservice.noaa.gov/education/kits/estuaries/estuaries03_ecosystem.html)
- Research and Analysis: Alaska Census Data*. (2018, October). Retrieved from Department of Labor and Workforce Development: <http://live.laborstats.alaska.gov/cen/dparea.cfm>
- Schoen, J. W., & Dovichin, E. (2007). *The Coastal Forests and Mountains Ecoregion of Southeastern Alaska and the Tongass National Forest: A Conservation Assessment and Resource Synthesis*. Audubon Alaska and The Nature Conservancy.
- Smith, M. A. (2016). *Ecological Atlas of Southeast Alaska*. Audubon Alaska.
- U.S. Fish & Wildlife Service. (2018, June). *National Wetlands Inventory*. Retrieved from U.S. Fish and Wildlife Service: <https://www.fws.gov/wetlands/>
- U.S. Forest Service. (2008). *Tongass National Forest Land Use Designations*. U.S. Department of Agriculture.

## GIS Data Sources

Base Maps	Light Gray Canvas Map: Sources: Esri, DeLorme, HERE, MapmyIndia. World Terrain Base: Sources: Esri, USGS, NOAA.
Land/Parcel Ownership	2013 Haines Borough tax parcels layer. 2015 Municipality of Skagway Borough tax parcels layer.
Hydrologic Unit Boundary	U.S. Geological Survey, National Hydrography Dataset. U.S. Department of the Interior.
Borough Boundaries	"Alaska Boroughs." Alaska Department of Natural Resources – Information Resource Management.
Tongass National Forest Boundary	Alaska, Southeast, Tongass National Forest, Forest Plan, LUD, Land Use Designation, Forest Plan 2008, Management Prescriptions, Land and Resource Management Plan.
Klondike National Historical Park Boundary	"Conservation System Units." Alaska Department of Natural Resources - Information Resource Management.
Mental Health Trust Lands	"Alaska DNR Mental Health Trust Land." Alaska Department of Natural Resources - Information Resource Management.
Native Allotments	"Alaska DNR Native Allotment." Alaska Department of Natural Resources - Information Resource Management.
State of Alaska Boundaries	Alaska Department of Natural Resources.
Bureau of Land Management Boundaries	"USA_Federal_Lands." Esri.
State Parks	"Alaska State Park Units through ILMA." Alaska Department of Natural Resources - Information Resource Management.

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