

Alaska – Glaciers, Gold, and Grizzlies

June 28- July 12, 2023

6 hours graduate credit Colorado School of Mines

Cost: \$6000. With credit. \$5650. Without credit.

Day 1: Fly to Bellingham, Washington. On plane, view map in the packet of the volcanoes of the Pacific Northwest. This is a great opportunity to view Mt. Rainier, Mt. Adams, and Mt. St. Helens from a different perspective. Landforms, such as mudflows are much easier to see from the air. Between flights from Seattle to Bellingham, we will study the topography of Puget Sound, a huge fjord left by Pleistocene glaciation and look for the resident Orca Whales, which can sometimes be spotted from the air. At Bellingham, transfer to the Alaska Marine Ferry Terminal, where our ship will depart by 5:00 p.m. Choices for lodging on the ship will be tents that are duct tapped to the deck or a stateroom. (Cost is not included but can be arranged for an additional cost and dependent upon availability.) Class will begin with introductions, maps, and overviews on deck after we depart

Days 2,3,4 As we travel the Inland Passage, we will very likely see migrating humpback whales, orcas, seals, sea lions, otters, puffins and hundreds of other wildlife species. Class time will consist of keeping running lists of the biodiversity of mammal and bird species. We will often be treated to lectures by wildlife professionals that are hired by the Alaska Marine Highway, to point out interesting life forms and geology. Hopefully, we will see groups of Humpback Whales as they bubble net feed, as a group cooperatively surrounding fish with bubbles of air and then exploding up through the fish with their massive baleen covered jaws agape. We will learn about these whale's life cycles and migrations of over 3000 miles per year. We will study whale behavior and listen to recordings of the beautiful and intriguing humpback whale songs, which can be heard over hundreds of ocean miles.

Glaciers, tinted blue by extreme density of the ice, have carved through the sheer mountain slopes on our port and starboard sides. Glacial "flour," which consists of tiny particles of clay debris from the grinding glaciers, will tint the river run off a cloudy blue. We will study the geomorphology of glacial landforms, including cirque lakes, tarns, kettle lakes, arêtes, glacial horns, and U shaped valleys. Our route along the Inland Passage will follow the fjords of water, which are long narrow inlets surrounded by sheer walls that were originally carved out by glaciers. We will see many beautiful examples of hanging lakes with waterfalls cascading down the cliffs, caused by the intersection of smaller mountain glaciers with larger valley glaciers. Lectures will center on geologic time, the Pleistocene Ice Ages, global warming and the disappearance of the ice sheets and glaciers, the causes and impacts of global warming. Islands have migrated through plate tectonics over millions of years from the equatorial region and

crashed into the Alaskan terrain. Huge geologic subduction zones are responsible for the Ring of Fire, volcanoes that rim the Pacific Ocean. We will study in detail, these plates, the directions of their movements and the impacts on local terrain and people. Earthquakes and tsunamis have played a huge impact on the historical people around the Ring of Fire. We will study the Japanese earthquake and tsunami, as well as the 2004 Indian Ocean earthquake and tsunami.

At Ketchikan, we will depart the ferry for a quick hike and exploration of Ketchikan Totem Heritage Center and learn about the indigenous Tlingit and Haida natives who carved these totem poles in the 19th century. We will learn about native people of Alaska, the Russian settlers and otter hunters, the land purchase of Alaska by the U.S., and the impact of the Klondike Gold Rush. Explore the routes that the gold seekers took through Canada and Alaska to reach the Klondike and hear the tales of heroism and scandal. Learn how Colorado's Soapy Smith met his demise in Skagway. Explore the torturous overland gold route from Skagway to the Klondike, as people fought their way over mountain passes, through swamps and down swollen rivers driven by the thirst for gold.

Learn how native species have been exploited and driven almost to extinction by early whalers and otter hunters. The near extinction of the otter population then drove fascinating changes in the kelp forests of Washington, Oregon and California. Learn about keystone species and how the disruption of one species impacts whole ecosystems.

After arriving in Juneau, the Alaskan capital city that is only accessible by air or boat, we will continue on to with the ferry to Skagway, the departure site for the Gold Rush. This evening you have a choice of attending a delightful musical play about the mining history of Skagway.

Day 5: Explore the famous White Pass, which led to the Klondike Gold Fields. Then take a flight seeing tour back to Juneau, seeing glaciers, cirques, and the Lynn Canal from the air. The Lynn Canal is misnamed, because it is really a beautiful fjord.

Day 6: Ferry to Gustavus, shuttle to the hotel and explore the Bay near Glacier Bay Lodge. While I sat on the deck of the Glacier Bay Lodge for 3 hours watching whales, the longest time span I went without seeing one was 17 seconds. The Humpbacks are voraciously stocking up on protein and building body fat to see them through their winter migrations to Hawaii and tropical waters, where they will give birth and mate. The tropical waters are practically devoid of krill and food for these giants, so it is typical for a mother Humpback to lose 33% of her body mass in this migration. Hiking around the bay will enable us to study the flora and fauna of the Tiaga Ecosystem. Tiaga has some of the most pristine and clean forests in the world. Due to recent glacial evacuation and patchy permafrost, these forests are perfect places to study how plants recolonize an ecosystem and to learn the principles of succession.

Day 7: At Glacier Bay National Park, we will embark on a guided day long tour to learn the fascinating history of the tide level glaciers and their recession for miles upstream into the bay. The guides on this trip are exceptional naturalists and geologists, so we will be treated to extensive knowledge about this fascinating ecosystem. Along the way, we will see sea lion colonies, seal colonies, several nesting rookeries of gulls, tern, and albatross, as well as frenzy feeding Humpback Whales. Fly from Gustavus in southeastern Alaska to Anchorage in the heartland of Alaska. What an incredible flight, as we study the massive Hubbard Ice Field from the air. This is our chance to see lateral and terminal moraines, the birth of fjords, cirques, hanging valleys and hundreds of more glacial topographical features. This flight is the most intensive study of glaciology that we will encounter. We will conduct a treasure hunt of glacial features from the air.

Day 8: In Anchorage, we will rent a vehicle and head toward Homer, passing beautifully glaciated valleys and waterfalls on our way. We will take a walking tour of the Homer Spit, which is really a terminal moraine from a glacier receding at the end of the Pleistocene. We will also learn how the locals have reinforced the shorelines to cut down on the erosion of the fierce winter storms. Watching the fishing and tourist boats come back to the dock, we will see how the local economy thrives and depends upon halibut fishing and tourism. Is the halibut fishing sustainable? Learn the life of this unique flat fish and learn how fishing is impacting its population. We will also learn the history of the Aleutian Islands and the volcanoes that have formed them.

Day 9: To me this day is the highlight of the entire trip. We will board a bush plane, soar over the tops of some of Alaska's most active volcanoes, and land on a sand shore of Lake Clark National Park. Grazing on the lush grasses and feeding on the abundant salmon in the rivers, we will see one of Alaska's most magnificent animals, the Grizzly or Brown Bear (as the locals call it.) This subspecies of Grizzly is much less aggressive than the inland bear, partially because it is so well fed. Chances are excellent that we will see mothers with cubs, bears fishing, bears clamming, bears grazing, and bears playing tussle in mock fights. Our tour guides are local rangers with extensive knowledge in bear behavior, the ecology of Lake Clark, salmon fisheries, and Alaska economy. Returning to Homer, we will take time to book our own adventures for tomorrow. Adventures can include halibut fishing, kayaking across Katchimak Bay or hiking.

Day 10: This is a choose your own adventure day, which I am not counting for any credit. It is absolutely necessary to spend an extra day in Homer in case of inclement weather on Day 9. If the bear tour has to be delayed, we will have a chance to make it up here. The bush planes will not fly unless weather is good. People can book their own Homer adventure during the evening of Day 9. Halibut fishing is world renowned in Homer. Lucky fishermen can send their catch home frozen in time to synchronize with their own arrivals. Katchimak Bay is a beautiful

and pristine ocean inlet. People can take a small boat across the Bay and kayak on the opposite side, which is wilderness. Locals only refer to this beautiful and pristine area as “Across Katchimak Day.” In the afternoon, we will depart from the beautiful Homer area, drive inland and then onto the Kenai Peninsula, passing many beautiful waterfalls and Taiga forest along the way. Arriving in Seward, we will learn more about the history of this quaint little town, which was named after William Henry Seward, Abraham Lincoln’s Secretary of State, who was instrumental in purchasing Alaska from Russia in 1867 for a purchase price of \$7.2 million dollars, or about 2 cents per acre. Learn the history of this amazing transaction and why the Russian Czar was so desperate for income.

We will then tour Exit Glacier, which is located just outside of the Seward City limits and is a drive and hike to glacier. We will take the hike along the glacial erratics and debris field, investigate striated rocks, carved as the glacier ground past the bedrock loaded with boulders and sediments. We will again see images of the glacier’s retreat during the last 50 years.

A walking tour of Seward and short hike around Resurrection Bay will acquaint us more with this former indigenous campground, Russian fishing village, and lately a tourist jump off point to Kenai Fjords National Park. Seward is also seeped in gold history of the trail to Cook Inlet. The dogsled trail did indeed lead many prospectors to riches, but also began the world famous Iditarod Sled Dog Race, which leads 975 miles from Anchorage to Nome.

Day 11: Today will find us on another wonderful boat tour of the Kenai Fjords National Park, our last chance to see tidewater glaciers calving into the sea, the bark of seal pups, the long dorsal fins of Orcas, or the shearwater rookeries. See otters grooming and eating clams. Hear the thundering blow of the Humpback Whales and learn more of the history of this pristine park. This day long tour will take us on the longest pathway in Kenai Fjords. The very knowledgeable guides will inform us of geological, glacial, and wildlife phenomenon all along the way. After the Kenai Fjords tour, we will drive back to Anchorage and return the rental vehicle.

Day 12: All aboard for the train ride to the tallest mountain in North America. At 20,320 feet, Denali towers over the landscape. The train moves across rivers, taiga habitat, farmland, and over Broad Pass at 2363 feet and across the longest bridge at 914 feet. This is a photography opportunity and again has local naturalists as guides along the route. We will study the topography, geology, flora and fauna, hopefully seeing migrating caribou, moose, and bear. The afternoon will also include a short hike to explore the area.

Day 13: We will then take a bus tour into the park to learn the ecology and see wildlife. Private vehicles are only allowed on the first 15 miles of Denali National Park, so we will embark on Bus Denali Park Tundra Wilderness Tour, a fully narrated tour of wildlife, ecology and geology inside of

the park. At Denali National Park and Preserve we will study the geology and glacial features of this beautiful mountain, as well as hopefully view some of the most spectacular wildlife of our journey – caribou, moose, grizzly bear, Arctic Foxes, and possibly wolves.

Day 14: Train trip to Anchorage and fly out late in the night or during Day 15. Class session on the train trip home will include more information on other Alaska National Parks, more information on the routes of the Alaska Marine Highway, and jigsaws by teachers for their A projects.

Day 15: Most people fly home on this day. A few stay on to explore on their own.